Paper Summary

<!--META_START-->

Title: A framework for analyzing the relationships between cancer patient satisfaction, nurse care, patient

Authors: Ng Kim-Soon, Alyaa Idrees Abdulmaged, Salama A. Mostafa, Mazin Abed Mohammed, Fadia A.

DOI: https://doi.org/10.1007/s12652-020-02888-x

Year: 2022

Publication Type: Journal

Discipline/Domain: Healthcare Management / Patient Experience

Subdomain/Topic: Cancer patient satisfaction, nurse care, attitudes, hospital service quality

Eligibility: Eligible

Overall Relevance Score: 78

Operationalization Score: 65

Contains Definition of Actionability: Yes (implicit — as actionable insights for improving patient satisfactio

Contains Systematic Features/Dimensions: Yes

Contains Explainability: No

Contains Interpretability: Partial (through statistical relationships)

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Quantitative

Study Context: National Cancer Institute, Misurata, Libya — cancer patient treatment satisfaction

Geographic/Institutional Context: Libya, National Institute of Oncology (Misurata)

Target Users/Stakeholders: Hospital managers, nurses, healthcare policy makers

Primary Contribution Type: Empirical framework and statistical analysis

CL: Yes

CR: Yes

FE: No

TI: No

EX: No

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Title:

A framework for analyzing the relationships between cancer patient satisfaction, nurse care, patient attitu

Authors:

Ng Kim-Soon, Alyaa Idrees Abdulmaged, Salama A. Mostafa, Mazin Abed Mohammed, Fadia Abdalla Mu

DOI:

https://doi.org/10.1007/s12652-020-02888-x

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Healthcare Management / Patient Experience

Subdomain/Topic:

Cancer patient satisfaction, nurse care, attitudes, hospital service quality

Contextual Background:

The study examines how nurse care, nurse attitude, and patient attitude affect cancer patient satisfaction

Geographic/Institutional Context:

Libya, National Institute of Oncology (Misurata)

Target Users/Stakeholders:

Hospital managers, nurses, healthcare policy makers

Primary Methodology:

Quantitative

Primary Contribution Type:

Empirical framework and statistical analysis

General Summary of the Paper

This paper develops and tests a framework linking cancer patient satisfaction with nurse care, nurse attitu

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is understood as producing "actionable insights to improve the healthcare services" by identi

> "Measuring the level of satisfaction provides actionable insights to improve the healthcare system" (p. 8

> "It pointed to several important areas to enhance the satisfaction of cancer patients by analyzing the lev

What Makes Something Actionable

- Identifiable, measurable service quality attributes (tangibility, empathy, responsiveness, reliability, assur
- Modifiable interpersonal and efficiency aspects of nurse care
- Positive patient attitudes (trust, willingness to engage in treatment discussions, confidence in nurses)
- Hospital service empathy and responsiveness
- Alignment of nurse care with patient needs

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Cancer patient satisfaction–nurse care–attitude model
- **Methods/Levers:** Quantitative survey, Likert-scale items on service quality and attitudes
- **Operational Steps / Workflow:** Identify satisfaction determinants → Measure through patient surveys
- **Data & Measures:** 5-point Likert scale for nurse care, nurse attitude, patient attitude, service quality;
- **Implementation Context:** National Cancer Institute, Misurata, Libya

> "A comprehensive approach… conceptualized to assess the service quality" (p. 87)

> "Descriptive statistics, correlation, and multiple regression were applied in the analyses" (p. 87)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clarity in communication and service processes improves satisfaction (linked to
- **CR (Contextual Relevance):** Yes — Service quality assessment tailored to Libyan cancer care conte
- **FE (Feasibility):** No — No explicit mention of implementation feasibility.
- **TI (Timeliness):** No — Not explicitly linked to being actionable.
- **EX (Explainability):** No — Statistical results are reported but not tied to explainability of interventions
- **GA (Goal Alignment):** Partial — Aligns nurse care improvements with patient satisfaction goals.
- **Other Dimensions Named by Authors:** Empathy, responsiveness, interpersonal skills.

Theoretical or Conceptual Foundations

- Expectation Confirmation Theory (Oliver, 1980)
- Theory of Reasoned Action (Fishbein & Ajzen, 1980)

Indicators or Metrics for Actionability

- Likert scale scores on nurse care, attitudes, and service quality attributes
- Beta coefficients from regression analysis indicating strongest predictors of satisfaction

Barriers and Enablers to Actionability

- **Barriers:** Limited prior research in Libya; patient illness severity limiting survey participation; lower le
- **Enablers:** Structured measurement instruments; high reliability (Cronbach's alpha ≥ 0.70); strong sta

Relation to Existing Literature

The paper extends existing satisfaction research by jointly considering nurse and patient attitudes alongs

Summary

This study presents a framework linking nurse care, nurse attitude, and patient attitude to cancer patient s

Scores

- **Overall Relevance Score:** 78 — Strong conceptual link to actionability with systematic features ident

- **Operationalization Score:** 65 — Clear operational steps and statistical testing, but limited discussion

Supporting Quotes from the Paper

- "Measuring the level of satisfaction provides actionable insights to improve the healthcare system" (p. 88

- "It pointed to several important areas to enhance the satisfaction of cancer patients by analyzing the lev

- "A comprehensive approach… conceptualized to assess the service quality" (p. 87)

- "Patient attitude significantly affected cancer patient satisfaction" (p. 98)

Actionability References to Other Papers

- Oliver, R.L. (1980) Expectation Confirmation Theory

- Fishbein, M., & Ajzen, I. (1980) Theory of Reasoned Action

- Al-Borie & Damanhouri (2013) SERVQUAL analysis in hospitals

- Kang & Oh (2015) Hospital service quality attributes and satisfaction

Paper Summary

<!--META_START-->

Title: YarnSense: Automated Data Storytelling for Multimodal Learning Analytics

Authors: Gloria Milena Fernández-Nieto, Vanessa Echeverria, Roberto Martinez-Maldonado, Simon Buck

DOI: N/A

Year: 2024

Publication Type: Conference (Workshop Proceedings)

Discipline/Domain: Learning Analytics / Educational Technology

Subdomain/Topic: Automated Data Storytelling, Multimodal Learning Analytics, Nursing Simulation Traini

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual + Reference Implementation

Study Context: Clinical nursing simulation with 254 students, 6 teachers

Geographic/Institutional Context: Monash University (Australia), University of Technology Sydney, Escue

Target Users/Stakeholders: Students, Teachers, Researchers in education/training

Primary Contribution Type: Architecture & System Implementation

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

YarnSense: Automated Data Storytelling for Multimodal Learning Analytics

Authors:

Gloria Milena Fernández-Nieto, Vanessa Echeverria, Roberto Martinez-Maldonado, Simon Buckingham S

DOI:

N/A

Year:

2024

Publication Type:

Conference (Workshop Proceedings)

Discipline/Domain:

Learning Analytics / Educational Technology

Subdomain/Topic:

Automated Data Storytelling, Multimodal Learning Analytics, Nursing Simulation Training

Contextual Background:

The paper addresses the challenge of making complex multimodal learning analytics data interpretable a

Geographic/Institutional Context:

Monash University (Australia), University of Technology Sydney (Australia), Escuela Superior Politecnica

Target Users/Stakeholders:

Students, Teachers, Educational Researchers

Primary Methodology:

Conceptual architecture development with in-the-wild reference implementation

Primary Contribution Type:

System architecture + case study

General Summary of the Paper

The authors present *YarnSense*, a multi-tier architecture for automatically generating educational data s

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed implicitly as the ability of multimodal data outputs to **support reflection, identify pe

> "Based on the notion of data storytelling as a means of extracting actionable insights from data…" (Abs

> "…weaving complex data into coherent narratives that align with the teacher's pedagogical intentions" (

What Makes Something Actionable

- Alignment with teacher's pedagogical intentions and learning design

- Translation of raw sensor data into meaningful constructs

- Integration of contextual knowledge (roles, resources, assessment criteria)

- Clear visual and narrative presentation to non-experts

- Timely delivery to support post-activity reflection

- Inclusion of error detection and performance feedback linked to guidelines

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** YarnSense Architecture

- **Methods/Levers:** Pedagogical rule definition, sensor-based multimodal data capture, QE modelling,

- **Operational Steps / Workflow:**

  1. Teachers define learning context & pedagogical intentions (Context Modeller)

  2. Collect multimodal data from machine and human sensing

3. Transform into learner models via multimodal matrices and QE modelling

  4. Generate DS outputs combining data, visuals, and teacher feedback

- **Data & Measures:** Positioning data, physiological data, audio/video, logged actions

- **Implementation Context:** Nursing simulations with defined critical actions and teamwork assessment

> "Data from the Learner Model are visualised and combined with narratives to convey a story for an indiv

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — DS principles include removing unnecessary elements, highlighting important fe

- **CR (Contextual Relevance):** Yes — tied to pedagogical intentions and activity specifics

- **FE (Feasibility):** Yes — aligned with realistic instructional and technological constraints

- **TI (Timeliness):** Yes — aimed at post-activity debriefs in near-real time

- **EX (Explainability):** Yes — multimodal constructs and DS enhance interpretability

- **GA (Goal Alignment):** Yes — narratives tied directly to teacher's learning goals

- **Other Dimensions Named by Authors:** User agency in modifying rules; integration with teacher feedb

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Theoretical or Conceptual Foundations

- Data Storytelling principles (purposeful communication, meaningful visuals, narrative structures)

- Quantitative Ethnography (QE)

- Multimodal Matrix methodology

- Theory of Proxemics for spatial interaction analysis

Indicators or Metrics for Actionability

- Error detection types (Sequence, Timeliness, Frequency)

- Time spent in proximity to patients or team members

- Adherence to clinical guideline-timed actions

Barriers and Enablers to Actionability

- **Barriers:** Complexity of multimodal data; automation challenges for certain modalities; need for conte

- **Enablers:** Teacher-defined rules; automated DS generation; integration of multiple sensing modalitie

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Relation to Existing Literature

Builds on prior work in multimodal learning analytics and DS, extending from high-fidelity prototypes to fu

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Summary

YarnSense operationalises actionability in educational analytics as the transformation of raw multimoda

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Scores

- **Overall Relevance Score:** 88 — Strong conceptualisation of actionability through DS and pedagogica

- **Operationalization Score:** 90 — Comprehensive architecture, clearly defined workflow, demonstrated

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Supporting Quotes from the Paper

- "[...] based on the notion of data storytelling as a means of extracting actionable insights from data…" (A

- "... weaving complex data into coherent narratives that align with the teacher's pedagogical intentions" (

- "Data from the Learner Model are visualised and combined with narratives to convey a story for an indiv

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Actionability References to Other Papers

- Martinez-Maldonado et al. (2020) — Layered storytelling approach for multimodal learning analytics

- Echeverria et al. (2018) — Educational data storytelling for teacher attention

- Fernández-Nieto et al. (2022) — Combining visualisation, narrative, and storytelling for student data ins

Paper Summary

<!--META_START-->

Title: Why-Not Explainable Graph Recommender

Authors: Herve-Madelein Attolou, Katerina Tzompanaki, Kostas Stefanidis, Dimitris Kotzinos

DOI: 10.1109/ICDE60146.2024.00178

Year: 2024

Publication Type: Conference

Discipline/Domain: Computer Science / Artificial Intelligence

Subdomain/Topic: Explainable Recommender Systems, Counterfactual Explanations, Graph-based Reco

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit and explicit through actionable explanation design)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (EMiGRe)

Operationalization Present: Yes

Primary Methodology: Conceptual + Experimental Evaluation

Study Context: Graph-based recommendation systems with user–item interaction data

Geographic/Institutional Context: CY Cergy Paris University, Tampere University

Target Users/Stakeholders: End-users of RS, system developers/debuggers

Primary Contribution Type: Algorithm/Framework Proposal with Evaluation

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Why-Not Explainable Graph Recommender

Authors:

Herve-Madelein Attolou, Katerina Tzompanaki, Kostas Stefanidis, Dimitris Kotzinos

DOI:

10.1109/ICDE60146.2024.00178

Year:

2024

Publication Type:

Conference

Discipline/Domain:

Computer Science / Artificial Intelligence

Subdomain/Topic:

Explainable Recommender Systems, Counterfactual Explanations, Graph-based Recommendations

Contextual Background:

The work is situated in the area of explainable AI for recommendation systems, particularly in addressing

Geographic/Institutional Context:

CY Cergy Paris University (France), Tampere University (Finland)

Target Users/Stakeholders:

End-users seeking transparency; system developers for debugging and improving recommender perform

Primary Methodology:

Conceptual framework development + algorithm design + experimental evaluation on Amazon product re

Primary Contribution Type:

Algorithm/Framework (EMiGRe) and empirical validation

General Summary of the Paper

This paper introduces **EMiGRe**, a framework for generating *Why-Not explanations* in graph-based re

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as providing explanations that *suggest concrete, feasible actions a user can take

> "We opt for a form of Counterfactual Explanations… proposing a possible world that could have led to t

> "…provides… actionable insights on the source data and their interrelations" (p. 1)

What Makes Something Actionable

- Directly modifiable by the user (edges rooted at the user node)

- Feasibility within privacy constraints (only user's own actions)

- Causally linked to producing the desired recommendation (must result in WNI being top-1)

- Specificity (identifies exact edges to add or remove)

- Adaptability to system constraints and user preferences

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** EMiGRe (Explainable Missing Graph Recommendation)

- **Methods/Levers:** Counterfactual graph modifications via edge addition (Add Mode) or removal (Rem

- **Operational Steps / Workflow:**

  1. Define Why-Not item (WNI)

2. Identify candidate edges (user-rooted) influencing WNI ranking using Personalized PageRank contrib

3. Search for minimal modification set (Incremental, Powerset, Exhaustive Comparison)

4. Validate candidate explanations against top-1 constraint

- **Data & Measures:** Personalized PageRank scores, contribution metrics, runtime, success rate, expla

- **Implementation Context:** Post-hoc explanation for graph-based RS, tested on Amazon product revie

> "…set of edges rooted at the user u node… to replace rec by WNI as the recommendation" (p. 5)

> "…propose… missing pertinent edges to be added… or existing edges to be removed" (p. 5)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — explicitly identifies specific, understandable actions (edges)

- **CR (Contextual Relevance):** Yes — actions are user-specific and relevant to target item

- **FE (Feasibility):** Yes — constrained to actions the user can perform

- **TI (Timeliness):** No — no explicit discussion of time sensitivity

- **EX (Explainability):** Yes — method provides causal reasoning via counterfactuals

- **GA (Goal Alignment):** Yes — directly tied to achieving WNI recommendation

- **Other Dimensions Named by Authors:** Privacy-preserving scope

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Theoretical or Conceptual Foundations

- Counterfactual explanations (AI interpretability literature)

- Graph-based recommendation and Personalized PageRank

- Why-Not questions in databases and ranking functions

Indicators or Metrics for Actionability

- Success rate (ability to achieve WNI in top-1)

- Size of explanation (fewer edges preferred)

- Runtime efficiency (practicality of producing the explanation)

Barriers and Enablers to Actionability

- **Barriers:**

  - Cold start/low activity users (few modifiable edges)

  - Highly popular competing items (structurally difficult to displace)

  - Out-of-scope cases where only edge additions or removals are insufficient

- **Enablers:**
  - Availability of rich user–item interaction data
  - Graph-based structure allowing edge-level manipulation
  - Efficient PPR computation methods

Relation to Existing Literature

Extends explainable RS literature from *Why* to *Why-Not* scenarios, differing from PRINCE by:

1. Focusing on missing recommendations

2. Providing both past-action and future-action explanations

Builds on prior Why-Not work in databases and adapts it to graph RS with privacy-preserving constraints.

Summary

The paper introduces EMiGRe, a novel framework for producing actionable Why-Not explanations in grap

---

Scores

- **Overall Relevance Score:** 90 — Strong conceptualization of actionability with explicit operational fea

- **Operationalization Score:** 95 — Detailed algorithms, heuristics, and evaluation directly tied to produ

---

Supporting Quotes from the Paper

- "We opt for a form of Counterfactual Explanations… proposing a possible world that could have led to th

- "…set of edges rooted at the user u node… to replace rec by WNI as the recommendation" (p. 5)

- "We provide more actionable explanations, by proposing not only existing actions… but also new action

- "This form of explanation provides user-comprehensible and actionable evidence of the trustworthiness

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Actionability References to Other Papers

- Ghazimatin et al. (2020) — PRINCE: Provider-side Interpretability with Counterfactual Explanations in R

- Miller (2017, 2021) — Contrastive explanation theory

- Database and IR Why-Not literature (e.g., Bidoit et al. 2014, Chapman & Jagadish 2009)

Paper Summary

<!--META_START-->

Title: When Rigor Meets Relevance: the Development of Hybrid Actionable Knowledge Production Syste

Authors: Thomaz Wood Jr, Edvalter Becker Holz, Renato Souza

Title:

When Rigor Meets Relevance: the Development of Hybrid Actionable Knowledge Production Systems

Authors:

Thomaz Wood Jr, Edvalter Becker Holz, Renato Souza

DOI:

Year:

2023

Publication Type:

Journal

Discipline/Domain:

Management / Organizational Studies

Subdomain/Topic:

Actionable Knowledge, Hybrid Research Systems, Rigor–Relevance Gap

Contextual Background:

The paper examines how business schools can develop research systems that produce knowledge that i

Geographic/Institutional Context:

Canadian Business School (CBS) and Brazilian Business School (BBS), both top-tier, AACSB/EFMD/AM

Target Users/Stakeholders:

Researchers, practitioners, institutional leaders (e.g., deans, directors), policymakers in higher education.

Primary Methodology:

Qualitative — inductive, interpretive case studies using grounded theory and "knowing-from-within" episte

Primary Contribution Type:

Conceptual + empirical — development of a three-stage hybridization model for AK generation.

General Summary of the Paper

The paper challenges the dominant "bridging theories" of actionable knowledge, which assume rigor and

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

AK is defined as knowledge that is both **rigorous** (advances theoretical understanding) and **relevant**

> "AK refers to knowledge that both advances the theoretical understanding of phenomena and allows fo

> "…embodying the features of both systems in a way that one could not distinguish them in the final mat

---

What Makes Something Actionable

- Integrates **scientific rigor** and **practical relevance** in the same output.

- Involves **multi-stakeholder participation** and recognition.

- Supported by **institutional structures** that embed this integration.

- Produces outputs (e.g., reports, journal articles, cases) **valued by both academic and practitioner audi

- Sustains **legitimacy** across both academic and practice communities.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Research Hybridization (three stages: coexistence, juxtaposition, mi

- **Methods/Levers:** Institutional entrepreneurial/supportive actions; structural mechanisms for regulatio

- **Operational Steps / Workflow:**

  1. **Coexistence** — bring together rigor- and relevance-oriented components via projects, partnerships

  2. **Juxtaposition** — formalize and couple processes, regulations, revenue models.

  3. **Mingling** — produce outputs embodying both rigor and relevance seamlessly.

- **Data & Measures:** Project portfolios, partnerships, publication and dissemination outputs, stakeholde

- **Implementation Context:** Business schools with research offices and hybrid research units.

> "We developed a conceptual model to describe the process by which… knowledge systems are hybridi

> "Institutional entrepreneurial and supportive actions aimed at creating multivoiced knowledge-based pr

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clarity in communicating research values to both academics and practitioners (p

- **CR (Contextual Relevance):** Yes — strong emphasis on solving real, context-specific problems (p. 1

- **FE (Feasibility):** Yes — structurally embedded processes ensure actionable outputs are deliverable (

- **TI (Timeliness):** Partial — urgency of emerging topics noted as a challenge (p. 13).

- **EX (Explainability):** No explicit linkage to actionability.

- **GA (Goal Alignment):** Yes — alignment between institutional mission, academic outputs, and societa

- **Other Dimensions Named by Authors:** Institutional legitimacy, stakeholder participation, economic su

---

Theoretical or Conceptual Foundations

- Hybridism (Battilana & Dorado 2010; Battilana & Lee 2014)

- Actionable knowledge literature (Tenkasi & Hay 2004; Sharma & Bansal 2020)

- Grounded theory methodology

- Knowing-from-within epistemology (Shotter 2008)

Indicators or Metrics for Actionability

- Publication in both **top-tier academic journals** and **practice-oriented outlets**.

- Stakeholder recognition and engagement levels.

- Revenue generation from practice-linked projects.

- Diversity of dissemination formats (books, cases, reports, events).

Barriers and Enablers to Actionability

- **Barriers:**

  - Loss of academic talent to private sector (p. 13)

  - Pressure to diversify revenue (p. 13)

  - Bureaucratic overload (p. 16)

  - Skepticism from traditional academics (p. 18)

- **Enablers:**

  - Institutional entrepreneurial actions (p. 21)

  - Structural governance mechanisms (p. 23)

  - Multi-stakeholder networks (p. 24)

Relation to Existing Literature

Contrasts with bridging theories, which rely on temporary, discretionary collaboration between researchers

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Summary

This paper reconceptualizes actionable knowledge (AK) generation by replacing the "bridging" paradigm

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Scores

- **Overall Relevance Score:** 92 — Strong conceptual clarity on actionability, explicit features, and nove

- **Operationalization Score:** 88 — Detailed three-stage process with mechanisms and institutional prac

---

Supporting Quotes from the Paper

- "AK refers to knowledge that both advances the theoretical understanding of phenomena and allows for

- "…views, norms, forms and practices… are materialized in the form of outputs that embody characterist

- "Institutional entrepreneurial and supportive actions aimed at creating multivoiced knowledge-based pro

- "Support from contract experts is also important because some projects involve researchers from other

---

Actionability References to Other Papers

- Babüroglu & Ravn (1992) — Normative action research

- Tenkasi & Hay (2004) — Theory–practice linkages

- Sharma & Bansal (2020) — Co-creating rigorous and relevant knowledge

- Battilana & Dorado (2010); Battilana & Lee (2014) — Hybrid organizations

- Beer (2020) — Developing actionable knowledge for practice and theory

Paper Summary

<!--META_START-->

Title: What Is "Actionable" Science for Climate and Environment?

Authors: Ziheng Sun

DOI: 10.1007/978-3-031-41758-0_1

Year: 2023

Publication Type: Book Chapter

Discipline/Domain: Environmental Science / Climate Science

Subdomain/Topic: Actionable science; climate change adaptation and mitigation; environmental decision

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with quantitative framework proposal

Study Context: Climate and environmental science research, with focus on science-to-action translation

Geographic/Institutional Context: Global, with examples from the USA (California), coastal resilience, and

Target Users/Stakeholders: Policymakers, engineers, scientists, local communities, funding agencies, inc

Primary Contribution Type: Conceptual framework and evaluation model

CL: Yes

Title:

What Is "Actionable" Science for Climate and Environment?

Authors:

Ziheng Sun

DOI:

10.1007/978-3-031-41758-0_1

Year:

2023

Publication Type:

Book Chapter

Discipline/Domain:

Environmental Science / Climate Science

Subdomain/Topic:

Actionable science; climate change adaptation and mitigation; environmental decision support

Contextual Background:

This chapter addresses the concept, necessity, and evaluation of "actionable" science within climate and

Geographic/Institutional Context:

Global scope, with examples including California climate adaptation, NOAA coastal resilience programs,

Target Users/Stakeholders:

Decision-makers, scientists, engineers, industry stakeholders, local communities, and funding agencies.

Primary Methodology:

Conceptual framework development, supported by illustrative case studies and proposed quantitative for

Primary Contribution Type:

Conceptual definition and operationalization model for actionability.

General Summary of the Paper

The chapter defines "actionable science" as research explicitly designed to produce knowledge, recomme

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable science is "oriented towards answering inquiries such as 'What actions should we take in this

> "Actionable science requires a meticulous examination of ideas within the confines of practical constrai

> "An actionable science endeavor should not run counter to the overarching consensus goals shared by

---

What Makes Something Actionable

- Alignment with real-world challenges and operational application goals.

- Practical application potential for significant societal challenges.

- Consideration of "what-if" engineering questions and operational uncertainties.

- Feasibility within resource, scalability, political, and economic constraints.

- Public understanding through clarity and transparency.

- Measurable societal, environmental, economic, and cultural impacts.

- Practicality from the operators' perspective.

- High engagement with stakeholders and end users.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Quantitative actionability assessment model.

- **Methods/Levers:** Six-factor model: Relevance, Feasibility, Public Understanding, Societal Impact, Pr

- **Operational Steps / Workflow:**

  1. Define project objectives and societal alignment.

  2. Assess each factor using quantitative/qualitative indicators.

  3. Identify barriers (e.g., policy, economics) and design mitigation strategies.

  4. Engage stakeholders early and iteratively.

  5. Use feedback to refine applicability and implementation readiness.

- **Data & Measures:** Accessibility scores, scalability indices, impact metrics (economic, environmental,

- **Implementation Context:** Climate and environmental projects at local, regional, and global scales.

> "If the answer is 'yes' to all three questions, the research falls within the high basket of actionable scien

> "The overarching goal is to provide decision-makers with the tools and information they need to make w

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Explicitly tied to public understanding and communication effectiveness.

> "Effective communication is essential for promoting public understanding and support." (p. 14)

- **CR (Contextual Relevance):** Yes – Research must align with specific societal and operational needs

> "Aligned with real-world challenges and part of a broader community effort." (p. 7)

- **FE (Feasibility):** Yes – Multi-factor feasibility assessment provided.

> "Another important factor for actionable research is the feasibility of implementing the results into real-w

- **TI (Timeliness):** Partial – Timeliness is implied via real-time science discussion but not formalized as

- **EX (Explainability):** Yes – Linked to transparency, clarity, and addressing "what-if" questions.

- **GA (Goal Alignment):** Yes – Must not run counter to shared societal/scientific goals.

- **Other Dimensions Named by Authors:** Stakeholder engagement, practicality by operators, societal in

---

Theoretical or Conceptual Foundations

- Knowledge transfer frameworks (Chai et al., 2003; Agrawal, 2001).

- Co-production of knowledge (Beier et al., 2017).

- Climate information usability literature (Kirchhoff et al., 2013).

- Life cycle and environmental impact assessment methods.

Indicators or Metrics for Actionability

- Quantitative scores for relevance, feasibility, public understanding, societal impact, practicality, and eng

- Sub-metrics: accessibility, scalability, reproducibility, political/economic feasibility, clarity, transparency,

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Barriers and Enablers to Actionability

- **Barriers:** Funding constraints, policy misalignment, technological immaturity, public misunderstandin

- **Enablers:** Early stakeholder engagement, clear communication, alignment with policy goals, interdisc

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Relation to Existing Literature

Positions itself as integrating and extending prior definitions of actionable knowledge by proposing a com

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Summary

This chapter provides one of the most comprehensive conceptualizations and operational frameworks for

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Scores

- **Overall Relevance Score:** 95 – Highly explicit definition, detailed attributes, and strong conceptual cl

- **Operationalization Score:** 95 – Provides structured, measurable framework with concrete metrics, ex

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Supporting Quotes from the Paper

- "Actionable science requires a meticulous examination of ideas within the confines of practical constrain

- "An actionable science endeavor should not run counter to the overarching consensus goals shared by

- "If the answer is 'yes' to all three questions, the research falls within the high basket of actionable scien

- "Effective communication is essential for promoting public understanding and support." (p. 14)

Actionability References to Other Papers

- Beier et al. (2017) – Co-production of actionable science.

- Kirchhoff et al. (2013) – Actionable knowledge usability.

- Meinke et al. (2006) – Actionable climate knowledge.

- Chai et al. (2003); Agrawal (2001) – Knowledge sharing/transfer.

- Lemos et al. (2012) – Climate information usability gap.

Paper Summary

<!--META_START-->

Title: What About Her? Increasing the Actionability of HUMINT in Paternalistic Cultures by Considering Fe

Authors: Stephan Lau & Farina T. S. Bauer

DOI: 10.1080/08850607.2022.2068890

Year: 2022

Publication Type: Journal

Discipline/Domain: Intelligence Studies / Security Studies

Subdomain/Topic: Human Intelligence (HUMINT), Gender Integration, Paternalistic Cultures

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 80

Contains Definition of Actionability: Yes (explicitly in context of HUMINT diversity and flexibility)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (conceptual framework linking female integration to actionability)

Operationalization Present: Yes (survey, interview data, training, recruitment, targeting recommendations)

Primary Methodology: Mixed Methods (Survey + Interviews + Literature Review)

Study Context: Military HUMINT operations in paternalistic cultures (primarily Afghanistan, also Iraq, Koso

Geographic/Institutional Context: Bundeswehr (German military) & NATO operations

Target Users/Stakeholders: Military intelligence planners, HUMINT operatives, defense policymakers

Primary Contribution Type: Conceptual framework + empirical practitioner insights

CL: Yes — "effective and actionable human intelligence collection" linked to gender-sensitive planning (p.

CR: Yes — strong emphasis on cultural context (paternalistic norms) affecting access and utility of opera

FE: Yes — operational feasibility discussed via recruitment, training, interpreters (p. 15–16)

TI: Partial — timeliness not a major theme, though linked implicitly to live collection flexibility ("actionabilit

EX: Partial — explainability emerges in clarifying myths and assumptions but not as formal feature

GA: Yes — alignment with mission goals stressed via "targeting" and "actionability" as central concepts (p

Reason if Not Eligible: n/a

<!--META_END-->

Title:

What About Her? Increasing the Actionability of HUMINT in Paternalistic Cultures by Considering Female

Authors:

Stephan Lau & Farina T. S. Bauer

DOI:

10.1080/08850607.2022.2068890

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Intelligence Studies / Security Studies

Subdomain/Topic:

Human Intelligence (HUMINT), Gender Integration, Paternalistic Cultures

Contextual Background:

The study addresses the integration of women as both operators and targets in military human intelligenc

Geographic/Institutional Context:

German Bundeswehr HUMINT units in NATO missions (Afghanistan, Iraq, Kosovo).

Target Users/Stakeholders:

Military HUMINT planners, operators, NATO leadership, defense policymakers.

Primary Methodology:

Mixed Methods (Survey of 40 operatives + 2 interviews + literature review).

Primary Contribution Type:

Conceptual framework and operational recommendations.

General Summary of the Paper

The article examines the role of "female intelligence" — the gender-sensitive integration of women as bot

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the increased operational flexibility and diversity in options available to HUMINT

> "We advocate the integration of female and male operators in the same units by creating and supportin

> "Actionability… [is] the general flexibility and the elbow room to play with the circumstances" (p. 17)

What Makes Something Actionable

- Inclusion of both male and female operators to broaden operational scenarios.

- Ability to engage otherwise inaccessible targets (especially across gender lines in paternalistic cultures)

- Flexibility in adapting team composition and role-playing to exploit cultural dynamics.

- Adequate logistical, linguistic, and training support (e.g., interpreters, cultural competence).

- Targeting strategy that includes both male and female sources.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Female Intelligence Integration for Actionability (conceptual).

- **Methods/Levers:** Targeting female sources, mixed-gender team integration, debunking myths, syste

- **Operational Steps / Workflow:** Assessment of current beliefs, recruitment and training, inclusion in m

- **Data & Measures:** Survey (Likert-scale) and interviews with Bundeswehr HUMINT operators; descrip

- **Implementation Context:** Military HUMINT in Afghanistan, Iraq, Kosovo.

> "Two concepts are essential: targeting female sources and increasing actionability" (p. 14)

> "Including female targets and… combining male and female capabilities… would increase the actionabi

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — linked to clear operational understanding of female capabilities and myth correct

- **CR (Contextual Relevance):** Yes — integration strategies rooted in cultural norms of paternalistic so

- **FE (Feasibility):** Yes — feasibility tied to recruitment, interpreters, training (p. 15–16).

- **TI (Timeliness):** Partial — implied through live flexibility in engagements.

- **EX (Explainability):** Partial — addresses misconceptions but no formal explainability model.

- **GA (Goal Alignment):** Yes — female integration linked to mission success and HUMINT collection ef

- **Other Dimensions Named by Authors:** Diversity, mixed-team synergy, cultural competence.

Theoretical or Conceptual Foundations

- Gender-sensitive HUMINT theory in counterinsurgency.

- Cultural access theory (third gender perception).

- Intelligence actionability as operational flexibility.

Indicators or Metrics for Actionability

- Operator access levels to male/female targets.

- Availability of female interpreters.

- Proportion of female targets included in mission planning.

- Role of female operators in achieving mission objectives.

Barriers and Enablers to Actionability

- **Barriers:** Myths/stereotypes, lack of interpreters, unclear targeting strategy, insufficient training, sma

- **Enablers:** Mixed-gender teams, cultural role exploitation, persistent engagement, rigorous training (t

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Relation to Existing Literature

Builds on critiques of FET and CST programs, integrates prior cultural engagement research, and adds B

Summary

This paper presents a comprehensive conceptual and empirical examination of integrating women as bot

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Scores

- **Overall Relevance Score:** 88 — Strong explicit conceptualization of actionability in HUMINT, clear lir

- **Operationalization Score:** 80 — Offers concrete operational strategies (targeting, training, recruitmer

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Supporting Quotes from the Paper

- "Female intelligence… recognizes females as targets of collection but also considers females as operat

- "Mixed teams would increase the actionability of intelligence collection entities" (p. 17)

- "Two concepts are essential: targeting female sources and increasing actionability" (p. 14)

- "Access to local women was significantly less denied to female operators" (p. 12)

- "Lack of female interpreters… constitutes an implementation problem with a high priority" (p. 15)

Actionability References to Other Papers

- Pottinger, Jilani, & Russo (2010) on Afghan women's influence.

- Azarbaijani-Moghaddam (2014) on FET evaluations.

- Rohwerder (2015) on lessons from FETs.

- Brandon et al. (2018) on science-based interviewing and elicitation.

Paper Summary

<!--META_START-->

Title: User Perceptions of Actionability in Data Dashboards

Authors: Madeleine Sorapure

DOI: 10.1177/10506519231161611

Year: 2023

Publication Type: Journal Article

Discipline/Domain: Technical and Professional Communication / Data Visualization

Subdomain/Topic: COVID-19 Dashboards, Actionability, User Perceptions

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 88

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (Ivankovi■ et al.'s 7 criteria + added dimensions)

Operationalization Present: Yes

Primary Methodology: Qualitative (usability study with thematic analysis)

Study Context: Evaluation of two COVID-19 county-level dashboards (Santa Barbara County, CAN)

Geographic/Institutional Context: Santa Barbara County, California, USA; University of California, Santa E

Target Users/Stakeholders: Nonexpert public users of public health dashboards

Primary Contribution Type: Empirical study expanding conceptual framework of dashboard actionability

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Partial

GA: No

Reason if Not Eligible: N/A

<!--META_END-->

Title:

User Perceptions of Actionability in Data Dashboards

Authors:

Madeleine Sorapure

DOI:

10.1177/10506519231161611

Year:

2023

Publication Type:

Journal Article

Discipline/Domain:

Technical and Professional Communication / Data Visualization

Subdomain/Topic:

COVID-19 Dashboards, Actionability, User Perceptions

Contextual Background:

The study examines how nonexpert users interact with COVID-19 dashboards, particularly regarding acti

Geographic/Institutional Context:

Santa Barbara County, California; University of California, Santa Barbara

Target Users/Stakeholders:

Nonexpert, general public users of public health dashboards

Primary Methodology:

Qualitative usability study with think-aloud protocols, thematic analysis, and post-interview survey

Primary Contribution Type:

Empirical evaluation and conceptual extension of dashboard actionability framework

General Summary of the Paper

The article reports on a multiphase usability study of ten nonexpert participants interacting with two COVI

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is explicitly defined as the ability of data dashboards to inform and support user decision mak

> "Actionable data—that is, data that can inform decisions that users need to make" (p. 257)

> "There needs to be a 'fit' between the information, the user, and the purposes for which the information

What Makes Something Actionable

- Alignment with audience needs and contexts

- Appropriate type, amount, and organization of information

- Clear data sources and methodology

- Time trends linked to relevant decisions

- Locally granular data

- Demographic subgroup breakdowns

- Storytelling and intuitive visual cues

- Emotional engagement that does not overwhelm decision making

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Ivankovi■ et al.'s seven criteria for actionable dashboards (adapted

- **Methods/Levers:** Usability design principles (navigation structure, composite indicators, visual simpli

- **Operational Steps / Workflow:** Audience analysis → Data selection → Display design (tabs, color co

- **Data & Measures:** Infection rates, vaccination rates, hospitalizations, mortality, demographic breakd

- **Implementation Context:** COVID-19 public health dashboards at county level

> "Participants frequently discussed wanting to find data that met their information needs, was relatively e

> "Accounting for the emotional impact of data dashboards… would be a helpful addition to an analysis o

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clarity of visual presentation and navigation linked to actionability (p. 267)

- **CR (Contextual Relevance):** Yes — local and personally relevant data emphasized (p. 265)

- **FE (Feasibility):** Partial — some acknowledgment of limits on user actions in pandemic context (p. 2

- **TI (Timeliness):** No — timeliness not explicitly tied to actionability beyond data recency

- **EX (Explainability):** Partial — accessible explanations provided but often underutilized by users (p. 2

- **GA (Goal Alignment):** No explicit mention

- **Other Dimensions Named by Authors:** Emotional impact of data viewing; need for prioritization of cri

Theoretical or Conceptual Foundations

- Ivankovi■ et al.'s seven actionability criteria

- Concepts of "fitness for purpose" and "fitness for use" in dashboard design

- User-centered design principles from TPC and data visualization literature

Indicators or Metrics for Actionability

- Composite risk scores with visual color scales

- Survey agreement ratings on actionability criteria (Likert scale)

- User-reported clarity, relevance, and decision-making support

Barriers and Enablers to Actionability

- **Barriers:** Information overload; low granularity; inaccessible explanations; emotional stress; scrolling

- **Enablers:** Local data; concise summaries; familiar visual metaphors; intuitive navigation; demograph

Relation to Existing Literature

Positions findings within ongoing debates on COVID-19 dashboards' effectiveness, contributing empirical

Summary

Sorapure's study offers an in-depth empirical look at how nonexpert users perceive and use public health

Scores

- **Overall Relevance Score:** 92 — Strong explicit and implicit conceptualization of actionability, detaile

- **Operationalization Score:** 88 — Clear application of an existing framework to dashboard design and

Supporting Quotes from the Paper

- "Actionable data—that is, data that can inform decisions that users need to make" (p. 257)

- "There needs to be a 'fit' between the information, the user, and the purposes for which the information

- "Participants frequently discussed wanting to find data that met their information needs, was relatively e

- "Accounting for the emotional impact of data dashboards… would be a helpful addition to an analysis of

Actionability References to Other Papers

- Ivankovi■ et al. (2021) — Features constituting actionable COVID-19 dashboards

- Barbazza et al. (2021) — Assessment of dashboard actionability over time

- Yigitbasioglu & Velcu (2012) — Fitness for purpose/use in dashboards

- Pappas & Whitman (2011) — User-centered design for dashboard development

Paper Summary

<!--META_START-->

Title: TriCTI: an actionable cyber threat intelligence discovery system via trigger-enhanced neural networ

Authors: Jian Liu, Junjie Yan, Jun Jiang, Yitong He, Xuren Wang, Zhengwei Jiang, Peian Yang, Ning Li

DOI: https://doi.org/10.1186/s42400-022-00110-3

Year: 2022

Publication Type: Journal

Discipline/Domain: Cybersecurity

Subdomain/Topic: Cyber threat intelligence, NLP, threat detection

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 92

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (conceptual + experimental model implementation)

Study Context: Automated extraction of actionable CTI from unstructured cybersecurity reports using NLP

Geographic/Institutional Context: Chinese Academy of Sciences; Capital Normal University

Target Users/Stakeholders: Security operations centers (SOC), cybersecurity analysts, threat intelligence

Primary Contribution Type: Methodological framework and system development (TriCTI)

CL: Yes – clarity of campaign stage and IOC association explicitly tied to actionability (p.2)

CR: Yes – contextual relevance via mapping IOCs to campaign stages (p.2)

FE: Yes – feasibility demonstrated by operational system tested on 29k reports (p.1, p.12)

TI: Partial – system processes historical and near-real-time data, but not explicitly constrained by latency

EX: Yes – interpretability through "campaign triggers" enhancing classification explainability (p.2, p.6)

GA: Yes – goal alignment through prioritizing defense actions based on campaign stage severity (p.8–9)

Reason if Not Eligible: N/A

<!--META_END-->

Title:

TriCTI: an actionable cyber threat intelligence discovery system via trigger-enhanced neural network

Authors:

Jian Liu, Junjie Yan, Jun Jiang, Yitong He, Xuren Wang, Zhengwei Jiang, Peian Yang, Ning Li

DOI:

https://doi.org/10.1186/s42400-022-00110-3

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Cybersecurity

Subdomain/Topic:

Cyber threat intelligence, NLP, threat detection

Contextual Background:

The paper addresses the challenge of extracting actionable cyber threat intelligence (CTI) from the vast a

Geographic/Institutional Context:

Institute of Information Engineering, Chinese Academy of Sciences; University of Chinese Academy of S

Target Users/Stakeholders:

Security operations centers (SOC), incident response teams, cybersecurity researchers.

Primary Methodology:

Mixed methods: conceptual framework design, NLP-based system architecture, experimental validation

Primary Contribution Type:

Novel system (TriCTI) and methodology for discovering actionable CTI with enhanced interpretability.

General Summary of the Paper

The authors propose TriCTI, a trigger-enhanced neural network system for discovering actionable cyber t

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable CTI is defined as CTI that "conveys a richer context of IOCs by revealing their campaign stage

> "Actionable CTI can provide incident response teams with actionable insights and recommendations to

> "If actionable CTI is integrated into intrusion detection systems, SOC teams can take appropriate mitiga

---

What Makes Something Actionable

- Coupling IOCs with campaign stages for context.

- Providing interpretability for prioritization of threats.

- Supporting direct mitigation decisions aligned with attack phase.

- Being complete across all stages of the attack lifecycle.

- Accurate extraction to avoid false positives.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** TriCTI (Trigger-enhanced Cyber Threat Intelligence discovery syste

- **Methods/Levers:** Campaign trigger annotation, IOC detection and filtering, BERT-based trigger vecto

- **Operational Steps / Workflow:** Data crawling → preprocessing (purification, segmentation, IOC fangi

- **Data & Measures:** 29,686 cybersecurity reports; annotated datasets DS-1 and DS-2; evaluation met

- **Implementation Context:** Applied to unstructured vendor reports spanning 2000–2021; verified using

> "The sooner the detection is done, the less loss the organization under attack will suffer" (p.8)

> "Applying actionable CTI to intrusion detection systems can guide security operators to make faster, be

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – clear association of IOCs to campaign stages is essential (p.2).

- **CR (Contextual Relevance):** Yes – mapping to campaign stages ensures relevance to defense conte

- **FE (Feasibility):** Yes – operationalized on large dataset with automation (p.1, p.12).

- **TI (Timeliness):** Partial – while timely response is stressed, the system is not explicitly real-time.

- **EX (Explainability):** Yes – campaign triggers improve interpretability (p.2, p.6).

- **GA (Goal Alignment):** Yes – enables prioritization according to severity of campaign stage (p.8–9).

- **Other Dimensions Named by Authors:** Completeness across all campaign stages; interpretability; re

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Theoretical or Conceptual Foundations

- Cyber Kill Chain model (Hutchins et al., 2011) for campaign stage definitions.

- NLP concepts: BERT, CBERT augmentation, trigger-based attention mechanisms.

Indicators or Metrics for Actionability

- Campaign stage correctly assigned to IOC.

- Classification performance (Accuracy, F1 score).

- Coverage across all campaign stages.

- Verified maliciousness via VirusTotal relationships.

Barriers and Enablers to Actionability

- **Barriers:** Scarcity of annotated cybersecurity corpora; complexity of sentences with multiple stages;

- **Enablers:** Trigger-based explainability; data augmentation; automated large-scale processing; valida

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Relation to Existing Literature

The paper critiques prior IOC extraction and threat action identification work for lacking campaign stage c

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Summary

This paper presents TriCTI, an NLP-based, trigger-enhanced neural network framework for discovering a

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Scores

- **Overall Relevance Score:** 95 – Strong, explicit conceptualization of actionability with comprehensive

- **Operationalization Score:** 92 – Detailed, step-by-step operationalization with system architecture, wo

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Supporting Quotes from the Paper

- "[Actionable CTI] conveys a richer context of IOCs by revealing their campaign stages" (p.2)

- "SOC teams can take appropriate mitigation actions based on contextual information of the alerts" (p.2)

- "We introduce the 'campaign trigger'… to improve the performance of the classification model" (p.1)

- "Applying actionable CTI to intrusion detection systems can guide security operators to make faster, bet

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Actionability References to Other Papers

- Hutchins et al. (2011) – Cyber Kill Chain model.

- Yadav and Rao (2015) – Technical aspects of the cyber kill chain.

- Liao et al. (2016), Zhou et al. (2018), Long et al. (2019) – IOC extraction methods.

- Zhu and Dumitras (2018) – Campaign stage identification with rule-based approach.

Paper Summary

<!--META_START-->

Title: Towards User Guided Actionable Recourse

Authors: Jayanth Yetukuri, Ian Hardy, Yang Liu

DOI: https://doi.org/10.1145/3600211.3604708

Year: 2023

Publication Type: Conference

Discipline/Domain: Artificial Intelligence / Human-Centered Computing

Subdomain/Topic: Actionable Recourse, User Preferences in ML Explanations

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit, user-preference-centered)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (UP-AR optimization & workflow)

Operationalization Present: Yes

Primary Methodology: Conceptual with empirical evaluation

Study Context: Actionable recourse in ML decision-making across domains such as credit, hiring, insuran

Geographic/Institutional Context: University of California, Santa Cruz; U.S.

Target Users/Stakeholders: End-users affected by ML decisions (e.g., loan applicants), ML system desig

Primary Contribution Type: Method/Framework Proposal with Empirical Validation

CL: Yes — "communicating in terms of preference scores… improves the explainability of a recourse ger

CR: Yes — "actionability… centered explicitly around individual preferences… may not necessarily be eq

FE: Yes — "feasible action set… actionable by Alice" (p.1)

TI: Partial — timeliness not a primary dimension, but operational efficiency is addressed

EX: Yes — "preference scores… improves the explainability of a recourse generation mechanism" (p.1)

GA: Yes — goal alignment with user's own constraints and desires (p.1–2)

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Towards User Guided Actionable Recourse

Authors:

Jayanth Yetukuri, Ian Hardy, Yang Liu

DOI:

https://doi.org/10.1145/3600211.3604708

Year:

2023

Publication Type:

Conference

Discipline/Domain:

Artificial Intelligence / Human-Centered Computing

Subdomain/Topic:

Actionable Recourse, User Preferences in ML Explanations

Contextual Background:

The paper addresses the challenge of making ML-generated recourse actionable for individuals adversel

Geographic/Institutional Context:

University of California, Santa Cruz; U.S.

Target Users/Stakeholders:

End-users denied desired outcomes by ML systems; system designers and policymakers interested in tru

Primary Methodology:

Conceptual framework and algorithm development with empirical evaluation across multiple datasets.

Primary Contribution Type:

Method/Framework Proposal with Empirical Validation

General Summary of the Paper

The authors introduce **User Preferred Actionable Recourse (UP-AR)**, a novel method for generating a

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined implicitly as the **viability of taking a suggested action** within the constraints and

> "Actionability… is centered explicitly around individual preferences, and similar recourses… may not ne

> "AR aims to provide… a feasible action set which is both actionable by Alice and… as low-cost [as poss

---

What Makes Something Actionable

- Alignment with individual user constraints and desires (hard and soft rules)

- Ability to operationalize within user's own cost and effort parameters

- Feasibility in practice (e.g., avoiding impossible or undesirable feature changes)

- Explainability of why the action is suggested and how it fits user preferences

- Personalization beyond general feasibility rules

How Actionability is Achieved / Operationalized

- **Framework/Approach Name:** User Preferred Actionable Recourse (UP-AR)

- **Methods/Levers:** Gradient-based iterative optimization weighted by user preference scores; tempera

- **Operational Steps / Workflow:**

  1. Elicit three types of preferences (scoring, bounding, ranking) from the user.

  2. Embed these as constraints in optimization.

  3. Generate candidate recourse via stochastic gradient-based updates informed by user preference-wei

  4. Apply redundancy and cost correction to finalize recourse.

- **Data & Measures:** Percentile shift cost function; pRMSE to evaluate preference adherence; tradition

- **Implementation Context:** Credit lending, income prediction, recidivism risk prediction.

> "We start by enabling Alice to provide three types of user preferences… We embed them into an optimi

> "The proposed method minimizes the cost of a recourse weighted by $\Gamma\blacksquare$ for all actionable features" (p.3

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — user preference scores increase explainability (p.1)

- **CR (Contextual Relevance):** Yes — recourse tailored to individual user profile (p.1–2)

- **FE (Feasibility):** Yes — constraints ensure recommendations are viable for that user (p.1–3)

- **TI (Timeliness):** Partial — efficiency in generation is discussed, but timeliness as a decision-making

- **EX (Explainability):** Yes — preference-based reasoning improves explainability (p.1)

- **GA (Goal Alignment):** Yes — recourse aligned with user's stated objectives (p.1–2)

- **Other Dimensions:** Diversity only as secondary contrast to preference tailoring

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Theoretical or Conceptual Foundations

- Builds on **Actionable Recourse (AR)** as per Ustun et al. (2019)

- Local feasibility concept from Mahajan et al. (2019)

- Preference elicitation parallels human-in-the-loop approaches (De Toni et al., 2022)

- Optimization inspired by gradient-based adversarial example generation

---

Indicators or Metrics for Actionability

- pRMSE between desired and achieved feature cost proportions

- Constraint violations (lower is better)

- Redundancy (steps that don't affect outcome)

- Sparsity (number of features changed)

- Proximity (l2 distance from original point)

Barriers and Enablers to Actionability

- **Barriers:** Ignoring user-specific constraints; reliance on universal cost functions; high redundancy; ex

- **Enablers:** Explicit preference capture; flexible optimization accommodating hard/soft constraints; cos

---

Relation to Existing Literature

The authors note most AR literature focuses on universal feasibility and cost minimization, sometimes ad

---

Summary

This paper reframes **actionability** in ML recourse as inherently **user-specific** and **preference-drive

---

Scores

- **Overall Relevance Score:** 92 — Strong, explicit integration of user-centered definition of actionability

- **Operationalization Score:** 95 — Detailed algorithm and empirical workflow directly aimed at achievin

---

Supporting Quotes from the Paper

- "Actionability… is centered explicitly around individual preferences…" (p.1)

- "We start by enabling Alice to provide three types of user preferences… embed them into an optimizatic

- "Communicating in terms of preference scores… improves the explainability of a recourse generation m

- "The proposed method minimizes the cost of a recourse weighted by $\Gamma\blacksquare$ for all actionable features" (p.3

Actionability References to Other Papers

- Ustun et al. (2019) — Actionable Recourse in Linear Classification

- Mahajan et al. (2019) — Local Feasibility

- De Toni et al. (2022) — Human-in-the-loop preference elicitation

- Wachter et al. (2017) — Counterfactual Explanations

- Poyiadzi et al. (2020) — FACE method

Paper Summary

<!--META_START-->

Title: Towards an Extensible Web Usage Mining Framework for Actionable Knowledge

Authors: N. Pushpalatha, S. Sai Satyanarayana Reddy

DOI: n/a

Year: 2017

Publication Type: Conference Paper

Discipline/Domain: Computer Science / Data Mining

Subdomain/Topic: Web Usage Mining, Actionable Knowledge, Fuzzy Clustering

Eligibility: Eligible

Overall Relevance Score: 78

Operationalization Score: 82

Contains Definition of Actionability: Implicit

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (XWUMF)

Operationalization Present: Yes

Primary Methodology: Conceptual + Experimental (Prototype implementation)

Study Context: Web log analysis for user behaviour and business intelligence

Geographic/Institutional Context: India (JNTU Hyderabad, Vardhaman College of Engineering)

Target Users/Stakeholders: Businesses, Web Analysts, Decision-Makers

Primary Contribution Type: Framework and Algorithm Proposal (XWUMF, SWUM)

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Towards an Extensible Web Usage Mining Framework for Actionable Knowledge

Authors:

N. Pushpalatha, S. Sai Satyanarayana Reddy

DOI:

n/a

Year:

2017

Publication Type:

Conference Paper

Discipline/Domain:

Computer Science / Data Mining

Subdomain/Topic:

Web Usage Mining, Actionable Knowledge, Fuzzy Clustering

Contextual Background:

The study focuses on developing a flexible, extensible web usage mining framework (XWUMF) to transfo

Geographic/Institutional Context:

India (JNTU Hyderabad, Vardhaman College of Engineering)

Target Users/Stakeholders:

Businesses, Web Analysts, Decision-Makers

Primary Methodology:

Conceptual + Experimental (Prototype implementation with empirical evaluation)

Primary Contribution Type:

Framework and Algorithm Proposal (XWUMF, SWUM)

General Summary of the Paper

The paper introduces the eXtensible Web Usage Mining Framework (XWUMF) designed to process web

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors implicitly define actionability as the transformation of web usage patterns into "business intel

> "The patterns when interpreted by domain experts can result in business intelligence." (p. 1)

> "Our empirical results revealed that the framework helps in discovering actionable knowledge." (p. 1)

What Makes Something Actionable

- Derives from **meaningful usage patterns** that reflect actual user behaviour.

- Must be interpretable by **domain experts** to support decision-making.

- Should enable **customer-centric strategies** in competitive environments.

- Requires **quality thresholds** (MinTime, MinConfidence) to ensure reliability of patterns.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** XWUMF (eXtensible Web Usage Mining Framework)

- **Methods/Levers:** Hybrid fuzzy clustering + user behaviour analysis; sequential mining with quality th

- **Operational Steps / Workflow:** Pre-processing → Fuzzy clustering → Usage mining → Pattern disco

- **Data & Measures:** Execution time, memory usage; MinTime and MinConfidence thresholds.

- **Implementation Context:** Tested on WDC dataset + 3 synthetic datasets.

> "The framework supports a hybrid approach which can have fuzzy clustering techniques and web minin

> "Sequential Web Usage Miner… generates patterns that reflect user behaviour." (p. 3)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Patterns must be interpretable by domain experts.

- **CR (Contextual Relevance):** Yes – Patterns tied to customer behaviour for strategic business use.

- **FE (Feasibility):** Yes – Extensible design allows integration of algorithms suitable for different domai

- **TI (Timeliness):** Partial – Execution time evaluated, but real-time capability not central.

- **EX (Explainability):** Partial – Domain expert interpretation required; not fully automated explainability

- **GA (Goal Alignment):** Yes – Focused on customer-centric business intelligence.

- **Other Dimensions Named by Authors:** Extensibility, personalization, performance efficiency.

Theoretical or Conceptual Foundations

- Business intelligence theory (data-to-decision processes)

- Web usage mining and fuzzy logic principles

Indicators or Metrics for Actionability

- Execution time

- Memory usage

- Minimum time threshold (MinTime)

- Minimum confidence threshold (MinConfidence)

Barriers and Enablers to Actionability

- **Barriers:** Domain dependence for interpretation; quality of raw web logs; computational constraints.

- **Enablers:** Extensible framework; hybrid methodology; performance tuning via parameters.

Relation to Existing Literature

The authors situate their work in the context of prior research in fuzzy logic, neural networks, case-based

Summary

Pushpalatha and Reddy (2017) propose XWUMF, an extensible, hybrid framework for mining actionable

Scores

- **Overall Relevance Score:** 78 – Strong implicit definition and explicit feature linkages, but lacking forr

- **Operationalization Score:** 82 – Clear operational workflow and algorithm with performance metrics; h

Supporting Quotes from the Paper

- "The patterns when interpreted by domain experts can result in business intelligence." (p. 1)

- "The framework supports a hybrid approach which can have fuzzy clustering techniques and web minin

- "Sequential Web Usage Miner… generates patterns that reflect user behaviour." (p. 3)

- "Our empirical results revealed that the framework helps in discovering actionable knowledge." (p. 1)

Actionability References to Other Papers

- Lin & Hong (2013) – Fuzzy web mining survey

- He (2013) – Case-based reasoning + text mining for UX improvement

- Abello et al. (2015) – Semantic web for OLAP exploration

Paper Summary

<!--META_START-->

Title: Actionable Recommendations in the Bright Futures Child Health Supervision Guidelines

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 80

Contains Definition of Actionability: Yes (explicit via GLIA criteria)

Contains Systematic Features/Dimensions: Yes (decidability, executability)

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (Service Interval Diagram, GLIA)

Operationalization Present: Yes

Primary Methodology: Qualitative (guideline content analysis)

Study Context: Evaluation of Bright Futures pediatric preventive care guideline for computer implementat

Geographic/Institutional Context: United States; Indiana University School of Medicine / Regenstrief Instit

Target Users/Stakeholders: Pediatricians, clinical decision support developers, public health agencies

Primary Contribution Type: Conceptual and methodological assessment

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Partial

GA: Partial

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Actionable Recommendations in the Bright Futures Child Health Supervision Guidelines

Authors:

S.M.E. Finnell, J.L. Stanton, S.M. Downs

Publication Type:

Journal Article

Discipline/Domain:

Clinical Informatics / Pediatrics

Subdomain/Topic:

Pediatric preventive care guidelines, clinical decision support, guideline implementability

Contextual Background:

Bright Futures is the most widely accepted pediatric preventive health care guideline in the U.S., organize

Geographic/Institutional Context:

United States; Indiana University School of Medicine / Regenstrief Institute

Target Users/Stakeholders:

Pediatricians, clinical decision support developers, public health agencies

Primary Methodology:

Qualitative (guideline content analysis)

Primary Contribution Type:

Conceptual and methodological assessment

General Summary of the Paper

This study evaluates the Bright Futures pediatric preventive care guidelines to determine their suitability f

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is explicitly defined through GLIA as requiring:

- **Decidability**: Clear specification of the conditions under which to apply a recommendation.

- **Executability**: Specific, unambiguous, detailed description of what action to take.

> "Actionable recommendation statements are both decidable (…clinical circumstances… clearly enough

> "It is impossible to create computer implementable decision rules if the guideline statements are vague

What Makes Something Actionable

- Precise conditions for applicability (decidability)

- Specific, detailed, unambiguous action steps (executability)

- Consistency in recommendation wording

- Potential adaptation to continuous age-based intervals for missed or delayed visits

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** GuideLine Implementability Appraisal (GLIA) v2.0; Service Interval D

- **Methods/Levers:** Consolidation of action statements, GLIA-based assessment, representation of rec

- **Operational Steps / Workflow:**

  1. Consolidate duplicate and fragmented actions into discrete recommendations

  2. Apply decidability criterion first; if met, apply executability

  3. Develop SID to map recommendations across ages

- **Data & Measures:** 2,161 Bright Futures actions; reduced to 245 recommendations; 52 actionable

- **Implementation Context:** Pediatric preventive care; EHR-based clinical decision support

> "The SID spans… from birth to 21 years… represents the appropriate time for delivering services as a c

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clarity in conditions and actions is essential.

- **CR (Contextual Relevance):** Yes — recommendations should be relevant to specific ages and conte

- **FE (Feasibility):** Partial — feasibility implied but not systematically assessed.

- **TI (Timeliness):** No explicit link to actionability.

- **EX (Explainability):** Partial — some detail provided, but not uniformly.

- **GA (Goal Alignment):** Partial — linked indirectly via alignment with preventive care objectives.

- **Other Dimensions Named by Authors:** None beyond GLIA's standard eight dimensions.

Theoretical or Conceptual Foundations

- GLIA v2.0 (Shiffman et al., 2005) for implementability assessment

- CDC immunization schedule concept for SID format analogy

Indicators or Metrics for Actionability

- Meets GLIA decidability and executability criteria

- Count and proportion of recommendations deemed actionable

Barriers and Enablers to Actionability

- **Barriers:**

  - Vague recommendations lacking specificity

  - Organization by visit rather than age interval

  - Inconsistent wording across visits

    - Lack of detail for sensitive topics (e.g., mental health)

- **Enablers:**

    - Clear, specific age-based criteria

    - Standardized, detailed action descriptions

    - Consolidation of redundant actions

Relation to Existing Literature

Authors build on prior GLIA applications in multiple clinical domains and extend the method to pediatric p

Summary

The paper provides a rigorous, criteria-based evaluation of Bright Futures guidelines' actionability, focusin

Scores

- **Overall Relevance Score:** 88 — Explicit definition of actionability via GLIA; comprehensive applicatio

- **Operationalization Score:** 80 — Clear process for assessing and representing actionability; SID offer

Supporting Quotes from the Paper

- "Actionable recommendation statements are both decidable… and executable…" (p. 652)

- "It is impossible to create computer implementable decision rules if the guideline statements are vague

- "The SID spans… from birth to 21 years… represents the appropriate time for delivering services as a c

- "Only 52 (21%) meet criteria for actionability…" (p. 657)

Actionability References to Other Papers

- Shiffman RN et al. (2005) on GLIA

- CDC immunization schedules as a model for SID

- Multiple GLIA applications in other specialties (Hill et al., Peleg & Garber, Nagler et al., van Dijk et al.)

Paper Summary

<!--META_START-->

Title: The Heuristic Uses of Four 'Knows' for Managing Knowledge in Education

Authors: Chung Hong Tam

DOI: n/a

Year: n/a

Publication Type: Journal

Discipline/Domain: Education / Knowledge Management

Subdomain/Topic: Heuristic frameworks for knowledge management in educational contexts

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit and explicit via "relevant or actionable knowledge" in Kn

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with applied case discussion

Study Context: Knowledge Management in schools and "Knowledge Community" projects (Hong Kong ar

Geographic/Institutional Context: Hong Kong (primary/secondary education), cross-national projects

Target Users/Stakeholders: Teachers, school leaders, educational policymakers, students

Primary Contribution Type: Conceptual framework revision and application to education

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

The Heuristic Uses of Four 'Knows' for Managing Knowledge in Education

Authors:

Chung Hong Tam

DOI:

n/a

Year:

n/a

Publication Type:

Journal

Discipline/Domain:

Education / Knowledge Management

Subdomain/Topic:

Heuristic frameworks for knowledge management in educational contexts

Contextual Background:

The paper addresses the persistent confusion between knowledge management (KM) and information m

Geographic/Institutional Context:

Hong Kong schools, with examples from global collaborative projects.

Target Users/Stakeholders:

Teachers, school leaders, education policymakers, students.

Primary Methodology:

Conceptual with applied case discussion.

Primary Contribution Type:

Conceptual framework revision and operationalization for education.

General Summary of the Paper

This paper revises the "Four Knows" (Know-Why, Know-Who, Know-What, Know-How) framework to add

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as transforming knowledge into "relevant or actionable knowledge" for the benefici

> "Know-How…transforms the knowledge creator's knowledge into the relevant or actionable knowledge

> "Knowledge must be placed in context so that it is actionable" (p. 5)

What Makes Something Actionable

- Clear purpose and value for decision-making (Know-Why)

- Defined stakeholders and governance of roles/responsibilities (Know-Who)

- Adequate, relevant, and pedagogically aligned content (Know-What)

- Structured processes for transforming and delivering knowledge so it can be used (Know-How)

- Codification into accessible, usable formats

- Timely updating and quality assurance

- Contextualization to user needs

- Alignment with institutional goals

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Revised Four Knows; Knowledge Community (KC)

- **Methods/Levers:** Six-step KM cycle: create, capture, codify, store, manage, disseminate

- **Operational Steps / Workflow:** Identify drivers, assign roles, define content needs, follow KM cycle w

- **Data & Measures:** Repository content quality, user engagement, avoidance of duplication, alignment

- **Implementation Context:** Applied in Hong Kong primary/secondary schools and cross-national collab

> "Six steps… create, capture, codify, store, manage, disseminate" (p. 5)

> "Codification strategies to ensure all subject knowledge… can be transferred to the right person" (p. 3)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — "Define KM clearly at the early stage to understand its contours and challenges"

- **CR (Contextual Relevance):** Yes — "Knowledge must be placed in context so that it is actionable" (p

- **FE (Feasibility):** Yes — "Education strategies should manage resource allocation so that variation in

- **TI (Timeliness):** Partial — Implied in need for timely updating and dissemination

- **EX (Explainability):** Partial — Codification into understandable formats is emphasized, but not explic

- **GA (Goal Alignment):** Yes — KM tied to school/learning community objectives

- **Other Dimensions Named by Authors:** Sustainability, governance, stakeholder engagement

Theoretical or Conceptual Foundations

- Lundvall & Johnson's (1994) Four Knows

- Wenger's (1998) Communities of Practice

- Tacit/explicit knowledge distinction (Polanyi, 1958)

Indicators or Metrics for Actionability

- Repository usability and access

- Quality and relevance of stored materials

- Evidence of knowledge reuse and sharing

- Reduction in duplication of materials

Barriers and Enablers to Actionability

- **Barriers:** Role ambiguity; lack of codification strategies; resource constraints; poor quality content; re

- **Enablers:** Clear definition of KM; role clarity; codification; knowledge-sharing culture; adequate infras

Relation to Existing Literature

Positions the revised Four Knows as a bridge between KM theory and educational practice, enhancing Lu

Summary

The paper reframes the Four Knows—Know-Why, Know-Who, Know-What, and Know-How—for educatio

Scores

- **Overall Relevance Score:** 92 — Strong conceptual framing of actionability via "relevant or actionable

- **Operationalization Score:** 95 — Detailed, step-by-step KM process explicitly aimed at achieving actio

Supporting Quotes from the Paper

- "Know-How…transforms the knowledge creator's knowledge into the relevant or actionable knowledge o

- "Knowledge must be placed in context so that it is actionable" (p. 5)

- "Six steps… create, capture, codify, store, manage, disseminate" (p. 5)

- "Codification strategies to ensure all subject knowledge… can be transferred to the right person" (p. 3)

Actionability References to Other Papers

- Lundvall & Johnson (1994) — original Four Knows

- Wenger (1998) — Communities of Practice

- Polanyi (1958) — tacit knowledge concept

- Turban et al. (2002) — KM processes

Paper Summary

<!--META_START-->

Title: The Emerging Role of Global Situational Awareness 2.0 Resources in Disaster Response

Authors: Carl Taylor

DOI: 10.1117/12.853113

Year: 2010

Publication Type: Conference Proceedings

Discipline/Domain: Public Health / Disaster Response

Subdomain/Topic: Situational Awareness, Health Informatics, Emergency Management

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit – situational awareness as acquiring relevant event data

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (Situational Awareness 2.0 concept)

Operationalization Present: Yes

Primary Methodology: Conceptual / Use-Case Review

Study Context: Disaster response with public health and medical integration

Geographic/Institutional Context: Global; examples from Haiti, Chile, UK; U.S.-based institutional perspec

Target Users/Stakeholders: Public health officials, disaster responders, healthcare providers, NGOs, gov

Primary Contribution Type: Conceptual framework with practical technology examples

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

The Emerging Role of Global Situational Awareness 2.0 Resources in Disaster Response

Authors:

Carl Taylor

DOI:

10.1117/12.853113

Year:

2010

Publication Type:

Conference Proceedings

Discipline/Domain:

Public Health / Disaster Response

Subdomain/Topic:

Situational Awareness, Health Informatics, Emergency Management

Contextual Background:

The paper addresses the integration of emerging web-based, open-source, and social networking tools in

Geographic/Institutional Context:

Global application with examples from Haiti, Chile, the UK; institutional perspective from the U.S. (Univers

Target Users/Stakeholders:

Public health officials, emergency managers, healthcare providers, NGOs, governmental and military age

Primary Methodology:

Conceptual / Use-case review

Primary Contribution Type:

Conceptual framework and operational examples

General Summary of the Paper

This paper presents "Situational Awareness 2.0" as a next-generation approach to disaster response, inte

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Situational awareness is described as "acquiring all relevant information about the event and translating t

> "True situational awareness means acquiring all relevant information about the event and translating th

> "Awareness without transactional capability may allow you to view the event but only as a mostly passiv

What Makes Something Actionable

- Inclusion of both community and patient-centric data

- Ability to foresee developments ("see around corners")

- Integration of multi-source data (structured/unstructured, validated/unvalidated)

- Real-time adaptability to update strategies

- Linkage to response mechanisms (transactional capacity)

- Contextual relevance to affected populations

- Engagement with social networks and emergent coherence

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Situational Awareness 2.0

- **Methods/Levers:** Integration of open-source mapping (Ushahidi, Google Evolve), SMS reporting, pat

- **Operational Steps / Workflow:** Pre-event modeling; multi-channel data collection; community/patient

- **Data & Measures:** Structured hospital data, structured mobile survey data, unstructured social media

- **Implementation Context:** Disaster response scenarios (H1N1, Haiti earthquake)

> "With appropriate integration of situational awareness 2.0 tools, public health can both manage the com

> "Situational awareness (2.0) is a fundamental component of preparedness." (p. 5)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Clarity in data patterns is necessary for effective response (p. 7)

- **CR (Contextual Relevance):** Yes – Data must be relevant to community and patient context (p. 3–4)

- **FE (Feasibility):** Yes – Tools must be usable under disaster constraints (low bandwidth, mobile acce

- **TI (Timeliness):** Yes – Real-time or near-real-time data critical (p. 4)

- **EX (Explainability):** Partial – Emphasis on understanding patterns but less on model transparency

- **GA (Goal Alignment):** Yes – Aligns awareness and response with public health mission (p. 2–3)

- **Other Dimensions Named by Authors:** Emergent coherence, transactional capability

Theoretical or Conceptual Foundations

- Ashby's Law of Requisite Variety

- Science 2.0 (Ben Shneiderman)

- Concepts of emergent coherence in social networks

Indicators or Metrics for Actionability

- Ability to prioritize patients based on comorbidities and risk

- Surge capacity avoidance through patient diversion

- Accuracy and timeliness of data flows

Barriers and Enablers to Actionability

- **Barriers:** Overly hospital-centric approaches; fragmented data sources; unreliable/unvalidated data;

- **Enablers:** Open-source/free tools; multi-modal data collection; social network engagement; pre-even

Relation to Existing Literature

Positions itself as extending Science 2.0 concepts to disaster management, combining predictive modelin

Summary

Taylor's paper reframes situational awareness as inherently linked to actionability, arguing that data mus

Scores

- **Overall Relevance Score:** 85 – Strong implicit definition of actionability, clear list of features linked to

- **Operationalization Score:** 90 – Detailed processes, tools, and workflows directly tied to achieving ac

Supporting Quotes from the Paper

- "True situational awareness means acquiring all relevant information about the event and translating tha

- "Awareness without transactional capability may allow you to view the event but only as a mostly passiv

- "With appropriate integration of situational awareness 2.0 tools, public health can both manage the com

- "Situational awareness (2.0) is a fundamental component of preparedness." (p. 5)

Actionability References to Other Papers

- Toner, E. (2009) Creating Situational Awareness: A Systems Approach

- Taylor & Stephens (2009) Situational Awareness 2.0

- Patrick Meier & Jen Ziemke (2010) Crisis Mapping

- Ben Shneiderman (Science 2.0 concepts)

Paper Summary

<!--META_START-->

Title: The assessment of urban eco-efficiency of Brazilian municipalities based on directional distance fur

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit and explicit in "actionable insights" framing)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (Expanded Urban Eco-efficiency DEA-DDF model)

Operationalization Present: Yes

Primary Methodology: Quantitative (DEA with Directional Distance Function)

Study Context: Urban eco-efficiency in large Brazilian municipalities (>300k inhabitants)

Geographic/Institutional Context: Brazil, Sustainable Cities Program (ICS-SDSN)

Target Users/Stakeholders: Municipal policymakers, urban planners, environmental agencies

Primary Contribution Type: Empirical assessment model and benchmarking tool for urban eco-efficiency

CL: Yes – clarity in KPI definitions linked to actionability

CR: Yes – contextual relevance tied to Brazilian urban and regional disparities

FE: Yes – feasibility considered through realistic improvement scenarios and GDP constraint

TI: Partial – scenarios consider current data but not explicit urgency thresholds

EX: Yes – model explainability via indicator weights and peer benchmarking

GA: Yes – alignment with SDGs and municipal sustainability goals

Reason if Not Eligible: N/A

<!--META_END-->

Title:

The assessment of urban eco-efficiency of Brazilian municipalities based on directional distance function

Authors:

Andreia Zanella, Renata Oliveira

Publication Type:

Journal

Discipline/Domain:

Urban Sustainability / Environmental Management

Subdomain/Topic:

Eco-efficiency assessment, DEA, Sustainable Development Goals

Contextual Background:

Evaluates eco-efficiency of Brazilian cities using SDG-linked KPIs, combining desirable and undesirable o

Geographic/Institutional Context:

Brazil; Instituto Cidades Sustentáveis (ICS) and Sustainable Development Solutions Network (SDSN) da

Target Users/Stakeholders:

Municipal decision-makers, environmental managers, policy analysts.

Primary Methodology:

Quantitative (DEA with Directional Distance Functions).

Primary Contribution Type:

Methodological innovation in urban eco-efficiency measurement and operational policy guidance tool.

General Summary of the Paper

This study develops and applies an optimization model based on Data Envelopment Analysis (DEA) and

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the ability to provide "actionable insights" to policymakers through eco-efficiency

> "The model specified can identify best practices and areas for targeted improvement, offering actionabl

> "…highlights their specific strengths and weaknesses, providing decision-makers with alternative scena

---

What Makes Something Actionable

- Clear linkage to specific, measurable KPIs.

- Ability to benchmark against high-performing peers.

- Scenario-specific improvement pathways.

- Alignment with SDG targets.

- Interpretability via weight assignment to indicators.

- Feasibility maintained by keeping GDP (wealth proxy) constant.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Expanded Urban Eco-efficiency Framework (DEA-DDF with SDG-li

- **Methods/Levers:** DEA with directional distance functions; weight restrictions to ensure KPI relevance

- **Operational Steps / Workflow:**

  1. Select 8 KPIs (inputs, desirable outputs, undesirable outputs) aligned with SDGs.

  2. Collect municipal data (2019–2022) from ICS-SDSN.

  3. Apply DEA-DDF model under weight constraints.

  4. Run three improvement scenarios with fixed GDP per capita.

  5. Identify peer cities for benchmarking.

  6. Analyze indicator weights to detect strengths/weaknesses.

- **Data & Measures:** GDP per capita, % water/sewage/waste collection, % conservation area, waste g

- **Implementation Context:** Brazilian municipalities with >300,000 inhabitants.

> "…enables the reflection of alternative decision scenarios…providing actionable insights to support the

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – KPIs precisely defined and linked to SDGs.

  > "…enables local governments to prioritize their efforts effectively…" (p. 8)

- **CR (Contextual Relevance):** Yes – tailored to Brazilian regional disparities.

- **FE (Feasibility):** Yes – keeps GDP constant to reflect realistic constraints.

- **TI (Timeliness):** Partial – scenarios reflect current data but no explicit urgency metric.

- **EX (Explainability):** Yes – indicator weights and peer benchmarking enhance interpretability.

- **GA (Goal Alignment):** Yes – fully aligned with SDG targets.

- **Other Dimensions Named by Authors:** Equity in service provision; environmental burden mitigation.

Theoretical or Conceptual Foundations

- WBCSD eco-efficiency principles.

- Expanded eco-efficiency definition from Oliveira et al. (2017).

- DEA literature on environmental performance with undesirable outputs (Chung et al., 1997; Seiford & Zh

---

Indicators or Metrics for Actionability

- 8 SDG-linked KPIs (input, desirable outputs, undesirable outputs).

- Eco-efficiency scores from DEA-DDF model.

- Peer similarity coefficients (λ values).

- Scenario-specific performance differentials.

Barriers and Enablers to Actionability

- **Barriers:**

  - Data variability and quality.

  - Regional inequalities in infrastructure and governance.

  - Environmental pressures in Amazonian cities.

- **Enablers:**

  - SDG-aligned indicator framework.

  - Benchmarking culture.

  - Scenario-specific targeting of improvements.

Relation to Existing Literature

Builds on DEA-based eco-efficiency studies but is the first to apply multiple directional vectors to urban e

---

Summary

This paper operationalizes actionability in urban sustainability assessment through a DEA-DDF model tha

---

Scores

- **Overall Relevance Score:** 90 — Strong conceptual clarity on actionability (via actionable insights fra

- **Operationalization Score:** 95 — Fully specified DEA-DDF operational workflow with real-world data,

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Supporting Quotes from the Paper

- "The model specified can identify best practices and areas for targeted improvement, offering actionable

- "…highlighting specific strengths and weaknesses, providing decision-makers with alternative scenarios

- "…enables the reflection of alternative decision scenarios…providing actionable insights to support the

---

Actionability References to Other Papers

- Oliveira et al. (2017, 2019, 2020) – Expanded eco-efficiency assessment methods.

- Chung et al. (1997) – Incorporating undesirable outputs in DEA.

- Seiford & Zhu (2002) – Desirable input modeling.

- WBCSD (2000) – Eco-efficiency definition.

Paper Summary

<!--META_START-->

Title: Telling stories: Exploring the relationship between myths and ecological wisdom

Authors: Esther Eidinow

DOI: 10.1016/j.landurbplan.2016.04.014

Year: 2016

Publication Type: Journal

Discipline/Domain: Environmental Studies / Classics

Subdomain/Topic: Myths, ecological wisdom, scenario planning

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicitly through ecological wisdom and its actionable transmiss

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (scenario planning as mechanism)

Operationalization Present: Yes

Primary Methodology: Conceptual / Theoretical synthesis with illustrative case studies

Study Context: Interdisciplinary exploration linking classical mythology, indigenous knowledge, and enviro

Geographic/Institutional Context: Global, with case studies from Greece, Indonesia, and Borneo; Univers

Target Users/Stakeholders: Environmental planners, policymakers, indigenous communities, scholars

Primary Contribution Type: Conceptual framework and methodological suggestion

CL: Yes

CR: Yes

FE: Partial

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Telling stories: Exploring the relationship between myths and ecological wisdom

Authors:

Esther Eidinow

DOI:

10.1016/j.landurbplan.2016.04.014

Year:

2016

Publication Type:

Journal

Discipline/Domain:

Environmental Studies / Classics

Subdomain/Topic:

Myths, ecological wisdom, scenario planning

Contextual Background:

The paper bridges classical studies, indigenous ecological knowledge, and environmental planning to arg

Geographic/Institutional Context:

Global scope; cases from ancient Greece, Komodo Island (Indonesia), and Borneo. Author based at Univ

Target Users/Stakeholders:

Environmental planners, policymakers, indigenous communities, academics across humanities and envir

Primary Methodology:

Conceptual synthesis with illustrative historical and ethnographic case studies.

Primary Contribution Type:

Conceptual framework linking myth-making with ecological wisdom and operational suggestion for scena

General Summary of the Paper

This paper proposes that myths function as repositories and transmitters of ecological wisdom, integrating

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed through the lens of ecological wisdom as both theoretical ideas (sophia) and practi

> "Myths… can provide a framework for… capturing ecological wisdom… [and] transmitting it as actionab

> "They are practical, they provoke action, and they shape our perception of the world" (p. 49)

What Makes Something Actionable

- Integration of theoretical and practical wisdom.

- Embedding knowledge in culturally resonant narratives.

- Ability to provoke context-relevant action.

- Retention of multiple perspectives and plurality of narratives.

- Connection to lived, practical experience and socio-political realities.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Myth-making; Scenario Planning.

- **Methods/Levers:** Use of culturally embedded narratives; stakeholder engagement across knowledge

- **Operational Steps / Workflow:** Identify existing myths; preserve plurality; integrate via scenario plann

- **Data & Measures:** Narrative content, stakeholder perspectives, scenario quality metrics (information

- **Implementation Context:** Multi-stakeholder environmental planning, integrating indigenous and scien

> "Scenario-planning… offers a mechanism for creating new myths… facilitating the integration of multipl

> "Scenarios… encapsulate and transmit new information… developing shared mental models… and stre

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — scenarios must have "ergonomic design" and coherent sequence (p. 51).

- **CR (Contextual Relevance):** Yes — myths emerge from and reflect local ecological and socio-politic

- **FE (Feasibility):** Partial — implied in practical wisdom but not systematically defined.

- **TI (Timeliness):** Partial — responsiveness of myths to contemporary events noted (p. 48).

- **EX (Explainability):** Yes — myths' cultural logic and resonance explained via cognitive and aesthetic

- **GA (Goal Alignment):** Yes — aligning myths with ecological wisdom goals and integrated planning o

- **Other Dimensions Named by Authors:** Multiplicity; flexibility; integration without dilution.

Theoretical or Conceptual Foundations

- Aristotelian sophia and phronesis.

- Cognitive metaphor theory (Fauconnier & Turner).

- Indigenous knowledge integration literature (Bohensky & Maru, 2011).

- Scenario planning theory (Schwartz, Wack).

Indicators or Metrics for Actionability

- Narrative's ability to provoke action.

- Participant engagement and shared mental model formation in scenarios.

- Scenario attributes: vividness, coherence, plausible unexpectedness.

Barriers and Enablers to Actionability

- **Barriers:** Difficulty integrating diverse knowledge systems; risk of erasing local perspectives; domina

- **Enablers:** Plurality of myths; culturally embedded narratives; scenario planning methodology.

Relation to Existing Literature

Builds on Xiang's (2014) ecological wisdom framework, expands by integrating classical and indigenous

Summary

Eidinow positions myths as dual carriers of theoretical and practical ecological wisdom, capable of making

Scores

- **Overall Relevance Score:** 90 — Strong conceptual clarity linking actionability to integrated theoretica

- **Operationalization Score:** 85 — Concrete mechanism (scenario planning) tied to actionability, with d

Supporting Quotes from the Paper

- "Myths… can provide a framework for… capturing ecological wisdom… [and] transmitting it as actionabl

- "They are practical, they provoke action, and they shape our perception of the world" (p. 49)

- "Scenario-planning… offers a mechanism for creating new myths… facilitating the integration of multiple

- "Scenarios… encapsulate and transmit new information… developing shared mental models… and stre

Actionability References to Other Papers

- Xiang (2014) on ecological wisdom.

- Bohensky & Maru (2011) on integrating indigenous and scientific knowledge.

- Schwartz (1996), Wack (1985a,b) on scenario planning.

- Schwartz & Sharpe (2010) on practical wisdom.

Paper Summary

Year: 2018

Publication Type: Journal Article

Discipline/Domain: Educational Technology / School Leadership

Subdomain/Topic: School Analytics, Educational Data Analytics, ICT in Education, fsQCA

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 88

Contains Definition of Actionability: Yes (implicit and explicit in "actionable insights" context)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (School Analytics model)

Operationalization Present: Yes (fsQCA methodology and configurations)

Primary Methodology: Quantitative (fsQCA with validation protocols)

Study Context: European K-12 schools; focus on fostering students' digital skills through ICT

Geographic/Institutional Context: Cross-European dataset (~3000 schools)

Target Users/Stakeholders: School leaders, policymakers, educational researchers

Primary Contribution Type: Conceptual model and applied methodological demonstration

CL: Yes

CR: Yes

FE: Yes

TI: No explicit link

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Supporting school leadership decision making with holistic school analytics: Bridging the qualitative-quan

Authors:

Stylianos Sergis, Demetrios G. Sampson, Michail N. Giannakos

DOI:

https://doi.org/10.1016/j.chb.2018.06.016

Year:

2018

Publication Type:

Journal Article

Discipline/Domain:

Educational Technology / School Leadership

Subdomain/Topic:

School Analytics, Educational Data Analytics, ICT in Education, fsQCA

Contextual Background:

The paper addresses the challenge of enabling school leaders to make informed strategic decisions by le

Geographic/Institutional Context:

European schools (~3000 schools across multiple countries)

Target Users/Stakeholders:

School leaders, educational policymakers, educational researchers

Primary Methodology:

Quantitative (fsQCA applied to large-scale survey data, with contrarian analysis, predictive validity testing

Primary Contribution Type:

Conceptual model and methodological application

General Summary of the Paper

This study develops and applies a *School Analytics* model for K-12 educational leadership decision-ma

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper defines actionable insights as **informative suggestions on what decisions need to be made**

> "...do not offer support for translating these needs into actionable insights (i.e., informative suggestions

> "…could provide school leaders with actionable insights, in the form of school-wide informative suggest

---

What Makes Something Actionable

- Based on comprehensive, holistic data across multiple school layers.

- Identifies specific *configurations* of conditions, not just isolated factors.

- Links directly to strategic goals (e.g., improving digital skills).

- Supports targeted, context-aware interventions.

- Validated through robust statistical and comparative analysis.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** School Analytics Model + fsQCA methodology

- **Methods/Levers:** Complexity theory, configuration theory, fuzzy-set QCA, contrarian analysis, predic

- **Operational Steps / Workflow:**

  1. Define strategic goal (e.g., enhancing digital skills).

  2. Identify and measure relevant school ecosystem factors.

  3. Apply fsQCA to identify multiple sufficient configurations for desired outcomes.

  4. Validate results through predictive testing and statistical comparisons.

  5. Translate configurations into school-specific improvement pathways.

- **Data & Measures:** Multi-actor surveys (leaders, teachers, students), Likert-scale measures of attitud

- **Implementation Context:** European K-12 school leadership, ICT integration.

> "…eight distinct configurations of school factors…describe how school leaders can potentially generate

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — insights presented as clear configurations.

- **CR (Contextual Relevance):** Yes — tailored to specific school contexts.

- **FE (Feasibility):** Yes — configurations consider real-world constraints.

- **TI (Timeliness):** No explicit link.

- **EX (Explainability):** Yes — grounded in theory, configurations explained.

- **GA (Goal Alignment):** Yes — all configurations tied to strategic improvement goals.

- **Other Dimensions Named by Authors:** Equifinality, causal asymmetry (from complexity theory).

Theoretical or Conceptual Foundations

- Complexity Theory

- Configuration Theory

- School Analytics framework (Sergis & Sampson, 2014, 2016)

- ICT Competence Profiling models (various cited works)

Indicators or Metrics for Actionability

- fsQCA consistency and coverage scores.

- Predictive validity results.

- T-test comparisons between experimental and control groups.

Barriers and Enablers to Actionability

Barriers:

- Limited translation of analytics to actionable steps in existing tools.

- Complexity of multi-layered school ecosystems.

- Variability in infrastructure, culture, and leadership attitudes.

Enablers:

- Holistic data collection across micro, meso, macro layers.

- Theoretical grounding in complexity/configuration.

- fsQCA's capacity to reveal multiple valid improvement paths.

Relation to Existing Literature

Positions itself as extending prior ICT-in-schools studies by moving from factor identification to *configura

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Summary

This paper operationalizes the concept of *actionability* in educational decision-making by defining it as t

---

Scores

- **Overall Relevance Score:** 90 — Strong conceptualization of actionability with explicit link to decision

- **Operationalization Score:** 88 — Detailed multi-step methodology (fsQCA) with validation, directly tie

---

Supporting Quotes from the Paper

- "...do not offer support for translating these needs into actionable insights (i.e., informative suggestions

- "…could provide school leaders with actionable insights, in the form of school-wide informative suggesti

- "...eight distinct configurations of school factors…describe how school leaders can potentially generate

---

Actionability References to Other Papers

- Sergis & Sampson (2014, 2016) — School Analytics framework

- Tondeur et al. (2008), Solar et al. (2013), Aesaert et al. (2015) — ICT integration models

- Fiss (2007, 2011), Ragin (2000, 2008) — fsQCA and configuration theory

- Woodside (2014) — Complexity theory and contrarian analysis

Paper Summary

<!--META_START-->

Title: Stream Reasoning for the Internet of Things: Challenges and Gap Analysis

Authors: Xiang Su, Ekaterina Gilman, Peter Wetz, Jukka Riekki, Yifei Zuo, Teemu Leppänen

DOI: Not provided (conference proceedings WIMS '16, Nîmes, France)

Year: 2016

Publication Type: Conference

Discipline/Domain: Computer Science / Internet of Things

Subdomain/Topic: Stream reasoning, semantic web, IoT data processing

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 70

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: No

Contains Interpretability: No

Contains Framework/Model: Yes (general architecture + experimental IoT system)

Operationalization Present: Yes (C-SPARQL example implementation)

Primary Methodology: Conceptual + Experimental

Study Context: IoT systems in domains such as smart city, intelligent transportation, healthcare, home au

Geographic/Institutional Context: University of Oulu (Finland), TU Wien (Austria)

Target Users/Stakeholders: IoT system designers, semantic reasoning researchers, real-time data proces

Primary Contribution Type: Gap analysis and recommendations for stream reasoning in IoT

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: No

Title:

Stream Reasoning for the Internet of Things: Challenges and Gap Analysis

Authors:

Xiang Su, Ekaterina Gilman, Peter Wetz, Jukka Riekki, Yifei Zuo, Teemu Leppänen

DOI:

Not provided (conference paper WIMS '16)

Year:

2016

Publication Type:

Conference

Discipline/Domain:

Computer Science / Internet of Things

Subdomain/Topic:

Stream reasoning, semantic web, IoT data processing

Contextual Background:

The paper addresses the challenge of producing actionable knowledge from heterogeneous, dynamic IoT

Geographic/Institutional Context:

University of Oulu (Finland), TU Wien (Austria)

Target Users/Stakeholders:

IoT researchers, semantic reasoning system developers, IoT application architects

Primary Methodology:

Conceptual review, comparative analysis, small-scale experimental demonstration

Primary Contribution Type:

Gap analysis with recommendations for stream reasoning in IoT

General Summary of the Paper

The paper examines how stream reasoning can address the need for actionable, real-time insights in IoT

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly framed as the ability to deduce **timely, sufficiently accurate, and reliable knowle

> "It is critical to deduce timely, sufficiently accurate, and reliable knowledge from IoT systems to take act

> "Stream reasoning… enables handling of dynamic and heterogeneous data… implementing real-time s

---

What Makes Something Actionable

- Timeliness: knowledge generated before it becomes outdated

- Contextual integration: combining sensor data with domain ontologies and user rules

- Semantic enrichment: deriving higher-level insights from low-level sensor readings

- Scalability: ability to handle large, heterogeneous, fast data

- Robustness: coping with incomplete, out-of-order, or incorrect data

- Efficiency: low-latency reasoning even in resource-constrained environments

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** General IoT-stream reasoning architecture; experimental smart offic

- **Methods/Levers:** Semantic data modeling (RDF), continuous queries (C-SPARQL), background kno

- **Operational Steps / Workflow:** IoT devices → JSON sensor data → RDF transformation → continuou

- **Data & Measures:** Sensor data (light, motion, door position, Wi-Fi signal); processing latency, reaso

- **Implementation Context:** Smart office proof-of-concept; generalizable to other IoT domains

> "Data streams are processed on-the-fly and do not require a considerable amount of resources to make

> "Combining on-the-fly several data streams… would enable much more interesting scenarios." (p.6)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — reasoning results must be unambiguous and interpretable in context.

- **CR (Contextual Relevance):** Yes — data combined with background knowledge/domain ontologies.

- **FE (Feasibility):** Yes — solutions must run on resource-constrained IoT nodes.

- **TI (Timeliness):** Yes — low-latency reasoning emphasized.

- **EX (Explainability):** No explicit discussion.

- **GA (Goal Alignment):** Partial — reasoning often tied to application-specific user-defined rules.

- **Other Dimensions Named by Authors:** Robustness, scalability, uncertainty management.

Theoretical or Conceptual Foundations

- Semantic Web standards (RDF, OWL, SPARQL)

- Stream reasoning definition by Unel & Roman (2009)

- Time-aware semantic models (TA-RDF, Temporal RDF, stRDF)

Indicators or Metrics for Actionability

- Reasoning latency relative to data arrival

- Throughput (data processing rate)

- Accuracy/completeness of inferred knowledge under time constraints

---

Barriers and Enablers to Actionability

- **Barriers:**

  - Limited scalability of current stream reasoners

  - Lack of uncertainty handling

  - Inflexible time models

  - Resource constraints of IoT devices

- **Enablers:**

  - Semantic data integration

  - Continuous query models

  - Lightweight/incremental reasoning

Relation to Existing Literature

Positions stream reasoning as an extension to Semantic Web reasoning, addressing IoT's dynamic, high

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Summary

This paper presents a comprehensive analysis of how stream reasoning can be used to produce actionab

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Scores

- **Overall Relevance Score:** 88 — Strong implicit definition of actionability and detailed mapping of nec

- **Operationalization Score:** 70 — Provides a working prototype and specific implementation steps, tho

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Supporting Quotes from the Paper

- "It is critical to deduce timely, sufficiently accurate, and reliable knowledge from IoT systems to take acti

- "Stream reasoning… enables handling of dynamic and heterogeneous data… implementing real-time se

- "Combining on-the-fly several data streams… would enable much more interesting scenarios." (p.6)

Actionability References to Other Papers

- Unel & Roman (2009) — definition of stream reasoning

- Barbieri et al. — C-SPARQL

- Koubarakis & Kyzirakos — stRDF

- Rodríguez et al. — TA-RDF

- Gutierrez et al. — Temporal RDF

Paper Summary

<!--META_START-->

Title: SmartReviews: Towards Human- and Machine-Actionable Representation of Review Articles

Authors: Allard Oelen, Markus Stocker, Sören Auer

DOI: https://doi.org/10.1007/978-3-030-91669-5_9

Year: 2021

Publication Type: Conference

Discipline/Domain: Information Science / Digital Libraries

Subdomain/Topic: Semantic Publishing, Scholarly Knowledge Graphs, Review Article Authoring

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit via functional characteristics)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with Implementation and Use Case Demonstration

Study Context: Scholarly review article authoring and publishing

Geographic/Institutional Context: L3S Research Center & TIB Leibniz Information Centre, Germany

Target Users/Stakeholders: Academic authors, publishers, research communities, digital library develope

Primary Contribution Type: Conceptual framework and software tool implementation

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

SmartReviews: Towards Human- and Machine-Actionable Representation of Review Articles

Authors:

Allard Oelen, Markus Stocker, Sören Auer

DOI:

https://doi.org/10.1007/978-3-030-91669-5_9

Year:

2021

Publication Type:

Conference

Discipline/Domain:

Information Science / Digital Libraries

Subdomain/Topic:

Semantic Publishing, Scholarly Knowledge Graphs, Review Article Authoring

Contextual Background:

The paper addresses limitations in traditional scholarly review articles—lack of updates, low collaboration

Geographic/Institutional Context:

L3S Research Center & TIB Leibniz Information Centre for Science and Technology, Hannover, German

Target Users/Stakeholders:

Academic authors, publishers, research communities, and developers of digital library infrastructure

Primary Methodology:

Conceptual framework, technical implementation, and demonstration via a use case

Primary Contribution Type:

Conceptual model, operational framework, and software tool

General Summary of the Paper

This paper presents *SmartReviews*, a new authoring and publishing framework for scholarly review arti

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability here is framed in terms of both *human* and *machine* use: a review is actionable if it can b

> "The key limitation is the inability of machines to access and process knowledge presented within revie

> "The use of these technologies improves the machine-actionability of data and provides a means to ma

---

What Makes Something Actionable

- **Updatable** (living document concept with version control)

- **Collaboratively authored** (community-based contributions with provenance tracking)

- **Structured & semantic representation** (linked data, ontologies, RDF)

- **Accessible** (HTML format, WCAG compliance)

- **Interoperable** (machine-readable formats, FAIR data principles)

- **Contextually linked** (properties tied to ontologies to enhance interpretability)

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** SmartReviews within ORKG

- **Methods/Levers:** Use of RDF, ontologies (DOCO, Fabio, DEO), semantic comparison tables, living o

- **Operational Steps / Workflow:**

  1. Create sections (text, comparisons, visualizations, ontology tables, resource/property tables)

  2. Populate with structured, linked data from ORKG

  3. Maintain head version with version history for updates

  4. Enable collaborative editing and attribution via acknowledgements

- **Data & Measures:** RDF triples, SPARQL queries for retrieval, ontology-linked properties

- **Implementation Context:** Digital library / semantic publishing infrastructure

> "Comparison sections form the core of each review article." (p. 108)

> "The data itself can be accessed via… SPARQL endpoint, RDF dump, and REST interface." (p. 110)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – clear structured representation via tables/visuals

- **CR (Contextual Relevance):** Yes – ontology linking ensures contextual meaning

- **FE (Feasibility):** Yes – enabled by ORKG platform and existing ontologies

- **TI (Timeliness):** Partial – supports updates but depends on community activity

- **EX (Explainability):** Partial – ontology tables explain properties but not all content

- **GA (Goal Alignment):** Yes – aligns with FAIR principles and open science goals

- **Other Dimensions Named by Authors:** Accessibility, Collaboration, Coverage

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Theoretical or Conceptual Foundations

- Living documents concept (Shanahan 2015)

- Semantic Web and Linked Data principles (Berners-Lee et al., RDF, SPARQL)

- FAIR data principles (Wilkinson et al., 2016)

Indicators or Metrics for Actionability

- Ability to execute SPARQL queries over review content

- Presence of ontology-linked properties

- Version history and update frequency

- Accessibility compliance (HTML, WCAG)

Barriers and Enablers to Actionability

- **Barriers:** Researcher habits, resistance to change, lack of incentives for ongoing updates

- **Enablers:** Collaborative platform, attribution system, FAIR data standards, semantic web technologie

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Relation to Existing Literature

The authors situate their approach within semantic publishing research, citing prior calls for machine-rea

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Summary

The paper conceptualizes actionability in scholarly reviews as a combination of dynamic updatability, sen

---

Scores

- **Overall Relevance Score:** 90 — Strong, detailed implicit definition of actionability with explicit dimens

- **Operationalization Score:** 95 — Full technical and procedural workflow for achieving actionability is p

---

Supporting Quotes from the Paper

- "The key limitation is the inability of machines to access and process knowledge presented within review

- "Comparison sections form the core of each review article." (p. 108)

- "The data itself can be accessed via… SPARQL endpoint, RDF dump, and REST interface." (p. 110)

- "The use of these technologies improves the machine-actionability of data and provides a means to mal

---

Actionability References to Other Papers

- Shanahan (2015) — Living documents concept

- Berners-Lee et al. (2001) — Semantic Web and Linked Data

- Wilkinson et al. (2016) — FAIR data principles

- Garcia-Castro et al. (2010) — Semantic living documents in life sciences

Paper Summary

<!--META_START-->

Title: Smart computing based student performance evaluation framework for engineering education

Authors: Prabal Verma, Sandeep K. Sood, Sheetal Kalra

DOI: https://doi.org/10.1002/cae.21849

Year: 2017

Publication Type: Journal Article

Discipline/Domain: Computer Science / Engineering Education

Subdomain/Topic: IoT-based performance evaluation, educational data mining, game-theory decision ma

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit – "turn data into actionable insight" and detailed properties

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (five-layer IoT-based framework)

Operationalization Present: Yes (detailed algorithms, workflows, decision-making logic)

Primary Methodology: Conceptual + Experimental

Study Context: Engineering education, student performance monitoring and evaluation

Geographic/Institutional Context: Guru Nanak Dev University, Punjab, India

Target Users/Stakeholders: Engineering college management, faculty, students

Primary Contribution Type: Conceptual framework + implementation and evaluation

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Smart computing based student performance evaluation framework for engineering education

Authors:

Prabal Verma, Sandeep K. Sood, Sheetal Kalra

DOI:

https://doi.org/10.1002/cae.21849

Year:

2017

Publication Type:

Journal Article

Discipline/Domain:

Computer Science / Engineering Education

Subdomain/Topic:

IoT-based performance evaluation, educational data mining, game-theory decision making

Contextual Background:

The paper addresses how IoT technologies, combined with cloud computing, RFID sensing, and data min

Geographic/Institutional Context:

Guru Nanak Dev University, Punjab, India

Target Users/Stakeholders:

Engineering college management, faculty, students

Primary Methodology:

Conceptual + Experimental

Primary Contribution Type:

Conceptual framework + implementation and evaluation

General Summary of the Paper

The study proposes and tests a five-layer IoT-based "smart computing" framework to evaluate engineerin

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the transformation of IoT-derived student interaction and activity data into insigh

> "IoT technology… allow[s] educators and administrators to turn data into actionable insight" (p. 977)

> "Based on student sessional performance score, decisions are taken by management authority to incre

---

What Makes Something Actionable

- Continuous, automated collection of relevant performance data (academic + activity)

- Integration of diverse datasets into a unified performance score

- Timely analysis to inform session-based interventions

- Decision models (game theory) to translate performance metrics into concrete management actions

- Context-aware activity classification to ensure relevance

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Five-layer IoT-based student performance evaluation framework

- **Methods/Levers:** RFID/GPS/wearable sensing, cloud data preprocessing, Bayesian Belief Network c

- **Operational Steps / Workflow:**

  1. Data acquisition & synchronization (sensors, RFID, gateway devices)

  2. Cloud storage & preprocessing (noise removal, classification into daily/occasional activities)

3. Activity recognition & temporal visualization

  4. Data mining & performance score calculation (weighted daily/occasional activity integration)

  5. Game-theoretic decision making for institutional actions

- **Data & Measures:** Sensor data, attendance logs, activity metadata, academic marks, interaction sco

- **Implementation Context:** Engineering college with RFID-enabled monitoring and cloud analytics

> "Layer 4 computes the student performance score… integrating IoT-based data mining… with academi

> "Game-based decision component takes automated decisions based on student performance score" (p

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – performance score formula and activity classification are explicitly defined

- **CR (Contextual Relevance):** Yes – activity types and weights tailored to engineering education conte

- **FE (Feasibility):** Yes – demonstrated with actual deployment and tested scalability

- **TI (Timeliness):** Yes – real-time data acquisition and session-based decision-making

- **EX (Explainability):** Yes – decision rules, algorithms, and weighting schemes are transparent

- **GA (Goal Alignment):** Yes – aligns with improving student performance and institutional reputation

- **Other Dimensions Named by Authors:** Integration of behavioral, locational, academic, and interactive

---

Theoretical or Conceptual Foundations

- Ubiquitous learning

- Educational data mining

- Game theory (non-cooperative model)

Indicators or Metrics for Actionability

- Student Performance Score (PS) – weighted integration of activity and academic scores

- Reputation Score (RS) – aggregated institutional performance metric

- Activity-specific participation indices (PageRank, co-location metrics)

Barriers and Enablers to Actionability

- **Barriers:** Sensor data noise/incompleteness, integration complexity, privacy/security concerns

- **Enablers:** IoT infrastructure, cloud analytics, established decision-theory models, automated data pi

---

Relation to Existing Literature

Positions itself at the intersection of IoT-based smart learning environments, educational data mining, an

---

Summary

This paper operationalizes actionability by systematically linking sensor-derived behavioral and interactio

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Scores

- **Overall Relevance Score:** 92 – Strong implicit and explicit conceptualization of actionability with clea

- **Operationalization Score:** 95 – Detailed, stepwise methodology, algorithms, and decision logic direct

---

Supporting Quotes from the Paper

- "IoT technology… allow[s] educators and administrators to turn data into actionable insight" (p. 977)

- "Based on student sessional performance score, decisions are taken by management authority…" (p. 9

- "Layer 4 computes the student performance score… integrating IoT-based data mining… with academic

- "Game-based decision component takes automated decisions based on student performance score" (p.

Actionability References to Other Papers

- Kaur & Sood (2015) – Game-theoretic IoT performance evaluation in industry

- Zhu et al. (2016) – Smart education conceptual framework

- Wu et al. (2014) – Cognitive IoT paradigm

- Lauria & Duchessi (2006) – Bayesian belief networks for decision support

Paper Summary

<!--META_START-->

Title: Situation Recognition Using EventShop

Authors: Vivek K. Singh, Ramesh Jain

DOI: 10.1007/978-3-319-30537-0

Year: 2016

Publication Type: Book

Discipline/Domain: Computer Science / Information Systems

Subdomain/Topic: Situation Recognition, Spatiotemporal Data Integration, Actionable Insights

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 95

Contains Definition of Actionability: Yes (explicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual + System Implementation + Case Studies

Study Context: Real-time, heterogeneous spatiotemporal multimedia data processing for situation-aware

Geographic/Institutional Context: Applications in USA, Thailand, California; Institutions: Rutgers Universit

Target Users/Stakeholders: Application designers, data scientists, policy makers, public safety officials, h

Primary Contribution Type: Conceptual framework + operational toolkit (EventShop) + case studies

CL: Yes – "explicit, computable blueprints" for situation modeling must be clear to enable action-taking (p

CR: Yes – Situations must be contextually relevant to user needs and local conditions (macro, meso, per

FE: Yes – Must be feasible through available data sources, computational operators, and real-time proce

TI: Yes – Emphasis on real-time evaluation and data half-life (p. 40)

EX: Yes – Framework supports explicit mapping from spatiotemporal descriptors to actionable classificati

GA: Yes – Goal-driven modeling is central; situations are defined for a purpose (p. 29)

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Situation Recognition Using EventShop

Authors:

Vivek K. Singh, Ramesh Jain

DOI:

10.1007/978-3-319-30537-0

Year:

2016

Publication Type:

Book

Discipline/Domain:

Computer Science / Information Systems

Subdomain/Topic:

Situation Recognition, Spatiotemporal Data Integration, Actionable Insights

Contextual Background:

The book addresses the challenge of deriving actionable insights from heterogeneous, real-time, spatiote

Geographic/Institutional Context:

Case studies in USA (asthma/allergy alerts, seasonal pattern detection), California (wildfire detection), Th

Target Users/Stakeholders:

Application designers, researchers, public safety and health agencies, policy makers, and developers of s

Primary Methodology:

Conceptual framework development, computational modeling, operational system implementation (Event

Primary Contribution Type:

Conceptual + Operational framework for actionable situation recognition.

General Summary of the Paper

The book defines "situation" as *"an actionable abstraction of observed spatiotemporal descriptors"* and

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Situations are *"actionable abstractions of observed spatiotemporal descriptors"* — meaning they are hig

- Observability (must be based on measurable data)

- Abstraction (aggregating raw data into meaningful states)

- Application-specific decision support (classification into states that trigger actions)

> "An actionable abstraction of observed spatiotemporal descriptors." (p. 13)

> "Top-level descriptors and abstractions need to be chosen based on the application domain and the as

---

What Makes Something Actionable

- **Goal-based definition:** Purpose-driven modeling for a specific application

- **Spatiotemporal grounding:** Anchored in measurable coordinates and time

- **Observability:** Derived only from observable, sensor-measurable data

- **Abstraction:** Higher-level constructs derived from raw data

- **Relevance:** Must support concrete decision-making

- **Personalization:** Ability to tailor situations to individual contexts

- **Timeliness:** Real-time processing to match data half-life and decision needs

- **Feasibility:** Use of available data sources and computational methods

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** EventShop Situation Recognition Framework

- **Methods/Levers:** Situation-to-Source (S2S) modeling; spatiotemporal data unification; operator-base

- **Operational Steps / Workflow:**

  1. Model situation via S2S diagrams (goal-driven feature decomposition)

  2. Select and ingest relevant data streams

  3. Unify into STT (space-time-theme) tuples

  4. Aggregate into E-mages (spatiotemporal grids)

  5. Apply analysis operators to derive situation classifications

  6. Personalize using individual-level data streams

  7. Trigger alerts/actions via E-C-A style rules

- **Data & Measures:** Spatiotemporal descriptors, statistical features, thresholds, similarity metrics, ope

- **Implementation Context:** Real-time heterogeneous data streams, web-based GUI for rapid prototypi

> "Provides a situation modeling kit… translate mental models into explicit, actionable, and computable m

> "Unified representation (E-mage) and situation recognition algebra for diverse spatiotemporal data." (p.

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Explicit blueprints for situations (p. 47–49)

- **CR (Contextual Relevance):** Yes – Macro, meso, personal scale relevance (p. 24–25)

- **FE (Feasibility):** Yes – Based on available data, unified representation, reusable operators (p. 23–25

- **TI (Timeliness):** Yes – Real-time evaluation, data half-life concept (p. 40)

- **EX (Explainability):** Yes – Clear mapping from descriptors to actionable classifications (p. 13)

- **GA (Goal Alignment):** Yes – Goal-driven modeling emphasized (p. 29)

- **Other Dimensions Named by Authors:** Personalization, scalability, interoperability

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Theoretical or Conceptual Foundations

- Situation awareness literature (Endsley 1988; Barwise & Perry 1980)

- GIS, complex event processing, multimedia concept recognition

- Situation calculus and event calculus from AI

- E-C-A (event-condition-action) rules

- Image algebra analogies for spatiotemporal data

Indicators or Metrics for Actionability

- Precision/recall vs. ground truth in case studies (e.g., >90% wildfire detection)

- Real-time responsiveness (matching data update cycles)

- Discriminative power of features

- User adoption/engagement (e.g., retweets in flood alerts)

Barriers and Enablers to Actionability

- **Barriers:**

  - Lack of standard definition of "situation"

  - Data heterogeneity and missing values

  - Real-time scalability challenges

  - Privacy concerns for personal data

- **Enablers:**

  - Unified STT/E-mage representation

  - Modular operator-based framework

  - GUI-based modeling and prototyping tools

  - Support for personalization and multiple decision scales

Relation to Existing Literature

Positions itself as the first systematic, end-to-end approach for combining heterogeneous, real-time multi

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Summary

This work offers a comprehensive, computationally grounded framework for transforming heterogeneous,

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Scores

- **Overall Relevance Score:** 95 — Explicit, well-grounded definition of actionability, comprehensive list

- **Operationalization Score:** 95 — Detailed, stepwise framework, implemented system, tested across n

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Supporting Quotes from the Paper

- "We define a situation as 'An actionable abstraction of observed spatiotemporal descriptors.'" (p. 13)

- "Top-level descriptors and abstractions need to be chosen based on the application domain and the ass

- "Provides a situation modeling kit… translate mental models into explicit, actionable, and computable m

- "Unified representation (E-mage) and situation recognition algebra for diverse spatiotemporal data." (p.

- "Lower the floor… Raise the ceiling." (p. 20)

- "Generate personalized actionable situations." (p. 40)

Actionability References to Other Papers

- Endsley, M. (1988). *Situation awareness global assessment technique*.

- Barwise, J., & Perry, J. (1980). *Situations and attitudes*.

- Yau, S., & Liu, J. (2006). *Hierarchical situation modeling and reasoning for pervasive computing*.

- Event-condition-action frameworks in active databases.

- GIS and spatial data analysis literature.

Paper Summary

<!--META_START-->

Title: Sharing science through shared values, goals, and stories: an evidence-based approach to making

Authors: Bethann Garramon Merkle, Evelyn Valdez-Ward, Priya Shukla, Skylar R. Bayer

DOI: 10.2307/27316303

Year: 2021

Publication Type: Journal Article

Discipline/Domain: Science Communication / Human–Wildlife Interactions

Subdomain/Topic: Values-based science communication, stakeholder engagement, storytelling in scienc

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit and explicit through a values-goals-stories model)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (values–goals–stories framework, backward design approach)

Operationalization Present: Yes (stepwise guidance, tools, worksheets, examples)

Primary Methodology: Conceptual / Practice-based synthesis

Study Context: Science communication across academic and non-academic contexts, with emphasis on

Geographic/Institutional Context: Primarily U.S.-based examples, cross-disciplinary applicability

Target Users/Stakeholders: Scientists, science communicators, policymakers, community stakeholders

Primary Contribution Type: Conceptual framework and applied guidance

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Sharing science through shared values, goals, and stories: an evidence-based approach to making scien

Authors:

Bethann Garramon Merkle, Evelyn Valdez-Ward, Priya Shukla, Skylar R. Bayer

DOI:

10.2307/27316303

Year:

2021

Publication Type:

Journal Article

Discipline/Domain:

Science Communication / Human–Wildlife Interactions

Subdomain/Topic:

Values-based science communication, stakeholder engagement, storytelling

Contextual Background:

This article addresses the persistent challenge of making scientific research relevant and useful to decisi

Geographic/Institutional Context:

Primarily U.S.-based examples; applicable across global contexts.

Target Users/Stakeholders:

Scientists, science communicators, policy makers, educators, local communities, conservation managers

Primary Methodology:

Conceptual framework supported by practical tools and examples.

Primary Contribution Type:

Conceptual framework and applied recommendations.

General Summary of the Paper

The paper presents a conceptual and practical approach for making science communication more effecti

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper conceptualizes actionability as the extent to which science communication is designed to conr

> "We emphasize the essential interplay between values, goals, and stories… which scientists can active

> "Actionable recommendations and tools scientists can immediately use to articulate their values, identif

What Makes Something Actionable

- Centering communication on **shared values** between scientists and stakeholders.

- Setting **explicit, stakeholder-informed goals** for science communication.

- Using **storytelling** to make science relatable and emotionally resonant.

- Employing **backward design** to ensure activities serve communication goals.

- Actively **listening to and understanding stakeholder perspectives**.

- Building **trust and long-term relationships**.

- Considering **cultural, political, and historical contexts**.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Values–Goals–Stories framework; Backward Design for Scicomm

- **Methods/Levers:** Values articulation exercises; stakeholder mapping and listening; goal setting tools

- **Operational Steps / Workflow:**

  1. Identify and articulate personal and scientific values.

  2. Learn and integrate stakeholder values.

  3. Co-develop goals aligned with shared values.

  4. Use backward design to plan activities.

  5. Develop and deliver stories that embody values and goals.

- **Data & Measures:** Qualitative stakeholder input, values worksheets, narrative feedback.

- **Implementation Context:** Applicable across environmental, policy, education, and outreach settings.

> "We recommend a stepwise process to identify your values, those of your stakeholders, and how to rela

> "Backward design… prioritizes key concepts that lead to long-term understanding… keeping our focus

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Emphasis on plain language, avoiding jargon to reach stakeholders.

- **CR (Contextual Relevance):** Yes – Stakeholder contexts and sociopolitical realities must inform com

- **FE (Feasibility):** Yes – Offers stepwise, resource-backed processes adaptable to scientist constraint

- **TI (Timeliness):** Partial – Encourages goal setting early in projects, but timeliness is not a primary fo

- **EX (Explainability):** Yes – Stresses explaining science in relatable, narrative forms.

- **GA (Goal Alignment):** Yes – Goals are co-developed or informed by shared values.

- **Other Dimensions Named by Authors:** Trust-building, inclusivity, cultural awareness.

Theoretical or Conceptual Foundations

- Backward Design (Wiggins & McTighe, 2004)

- Science–advocacy continuum (Donner, 2014)

- Impact identity framework (Risien & Storksdieck, 2018)

- Narrative persuasion and storytelling literature (Dahlstrom, 2014)

Indicators or Metrics for Actionability

- Presence of stakeholder-informed goals.

- Evidence of trust and relationship building.

- Stakeholder use or application of communicated science.

- Narrative resonance and engagement levels.

Barriers and Enablers to Actionability

- **Barriers:** Systemic disincentives in academia; lack of scicomm training; political polarization; inequiti

- **Enablers:** Co-production approaches; values alignment; trust-based relationships; accessible tools a

Relation to Existing Literature

The approach integrates science communication theory, stakeholder engagement principles, and applied

Summary

This paper provides a robust conceptual and practical guide to making science actionable through intenti

Scores

- **Overall Relevance Score:** 88 – Strong conceptual clarity on actionability via the values–goals–stories

- **Operationalization Score:** 90 – Provides explicit, stepwise instructions, tools, and applied examples f

Supporting Quotes from the Paper

- "We emphasize the essential interplay between values, goals, and stories… which scientists can activel

- "Backward design… prioritizes key concepts that lead to long-term understanding… keeping our focus

- "We recommend a stepwise process to identify your values, those of your stakeholders, and how to rela

- "Actionable recommendations and tools scientists can immediately use to articulate their values, identify

Actionability References to Other Papers

- Donner (2014) – Science–advocacy continuum

- Risien & Storksdieck (2018) – Impact identities framework

- Wiggins & McTighe (2004) – Backward design

- Dahlstrom (2014), Dahlstrom & Ho (2012) – Storytelling in science

- Elliott & Resnik (2014) – Transparency of values in science

Paper Summary

<!--META_START-->

Title: Secondary findings from next-generation sequencing: what does actionable in childhood really mea

Authors: Julie Richer, Anne-Marie Laberge

DOI: https://doi.org/10.1038/s41436-018-0034-4

Year: 2019

Publication Type: Journal

Discipline/Domain: Medical Genetics

Subdomain/Topic: Genomic screening, secondary findings, pediatric actionability

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 88

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: No

Contains Interpretability: No

Contains Framework/Model: Yes
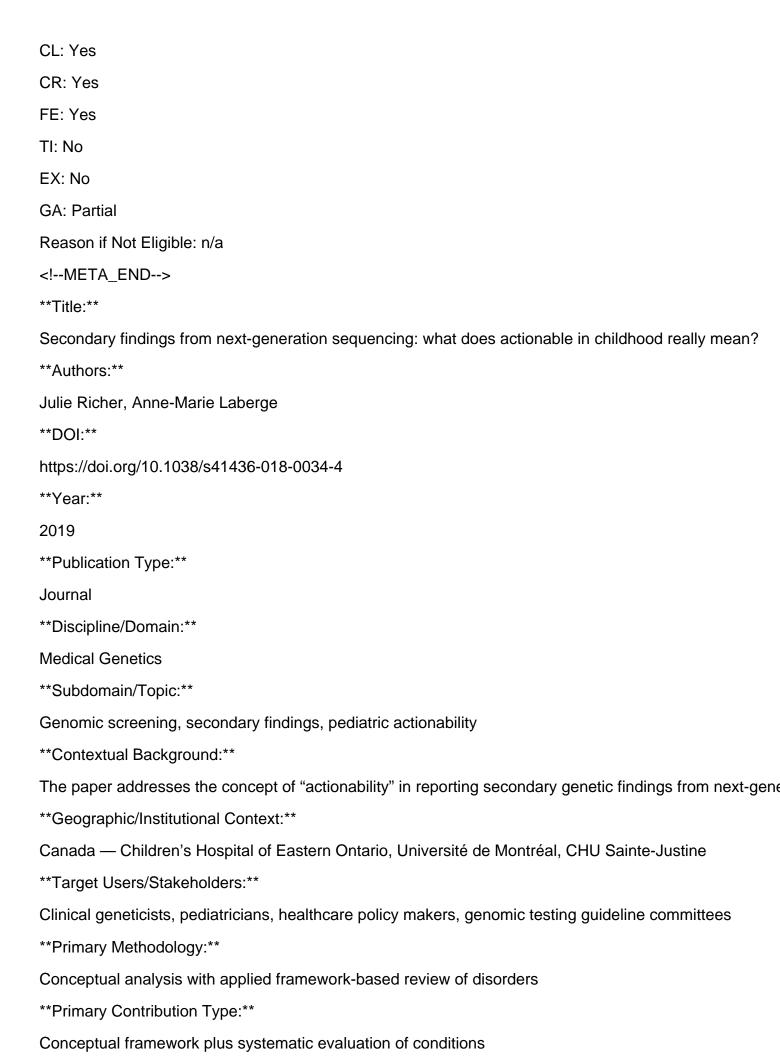
Operationalization Present: Yes

Primary Methodology: Conceptual with applied framework review

Study Context: Evaluation of disorders on ACMG SF v2.0 list for pediatric actionability

Geographic/Institutional Context: Canada (Children's Hospital of Eastern Ontario; Université de Montréal

Target Users/Stakeholders: Clinical geneticists, pediatricians, policy makers, genomic screening committ

Primary Contribution Type: Conceptual framework and applied disorder evaluation

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: No

GA: Partial

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Secondary findings from next-generation sequencing: what does actionable in childhood really mean?

Authors:

Julie Richer, Anne-Marie Laberge

DOI:

https://doi.org/10.1038/s41436-018-0034-4

Year:

2019

Publication Type:

Journal

Discipline/Domain:

Medical Genetics

Subdomain/Topic:

Genomic screening, secondary findings, pediatric actionability

Contextual Background:

The paper addresses the concept of "actionability" in reporting secondary genetic findings from next-gene

Geographic/Institutional Context:

Canada — Children's Hospital of Eastern Ontario, Université de Montréal, CHU Sainte-Justine

Target Users/Stakeholders:

Clinical geneticists, pediatricians, healthcare policy makers, genomic testing guideline committees

Primary Methodology:

Conceptual analysis with applied framework-based review of disorders

Primary Contribution Type:

Conceptual framework plus systematic evaluation of conditions

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General Summary of the Paper

This paper critically examines what "actionable in childhood" means in the context of secondary genomic

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as a disorder for which surveillance and/or preventive/treatment measures are ava

(i) Childhood onset with measures initiated in childhood, or

(ii) Adult onset but proven-effective measures when started in childhood.

> "An actionable finding can be defined as a disease-causing pathogenic variant for a disorder for which s

> "…we consider a disorder 'actionable in childhood' if… the disorder has either (i) childhood onset… or (

What Makes Something Actionable

- Proportion of cases presenting in childhood

- Availability of preventive/treatment measures in childhood

- Demonstrated effectiveness in childhood

- Quality of supporting evidence

- Acceptability and risk-benefit balance of interventions

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** WHO screening criteria applied to genomic secondary findings

- **Methods/Levers:** Disorder categorization by onset proportion; evidence grading for interventions; ass

- **Operational Steps / Workflow:**

  1. Apply WHO criteria related to actionability

  2. Gather natural history and management data

  3. Categorize disorders by childhood onset proportion

  4. Assess evidence quality for interventions

- **Data & Measures:** Published guidelines, GeneReviews, natural history studies

- **Implementation Context:** Pediatric genomic testing in Canadian/Western healthcare systems

> "…we categorized disorders based on the proportion of cases that presented in childhood…" (p. 124)

> "We propose… disclosure in childhood would be limited to disorders for which a majority of cases prese

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Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clear definition of pediatric actionability and decision framework (p. 129)

- **CR (Contextual Relevance):** Yes — applies specifically to pediatric genomic disclosure context (p. 1

- **FE (Feasibility):** Yes — requires availability and acceptability of interventions (p. 126)

- **TI (Timeliness):** No — no explicit link of timeliness as necessary criterion

- **EX (Explainability):** No — explainability not discussed

- **GA (Goal Alignment):** Partial — alignment with child's best medical interests emphasized (p. 126)

- **Other Dimensions Named by Authors:** Evidence quality threshold, proportion of cases affected, bala

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Theoretical or Conceptual Foundations

- WHO Wilson & Jungner screening criteria

- Berg et al.'s semiquantitative metric for actionability

- Distinction between medical vs. patient-initiated actionability

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Indicators or Metrics for Actionability

- Proportion of cases with childhood onset

- Quality of evidence grading (very low, low, moderate, high)

- Existence and professional consensus of guidelines

Barriers and Enablers to Actionability

- **Barriers:**

  - Low or very low quality of evidence for many conditions

  - Variable disease penetrance and expressivity

  - Potential psychological and social harms

  - Resource limitations for opportunistic screening

- **Enablers:**

  - Professional guidelines supporting early intervention

  - Evidence of effective prevention/treatment in childhood

Relation to Existing Literature

The paper builds on ACMG recommendations, critiques the lack of pediatric-specific thresholds, and inco

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Summary

Richer and Laberge (2019) present a structured approach to defining and operationalizing "actionable in

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Scores

- **Overall Relevance Score:** 92 — Provides explicit definition, clear pediatric criteria, and detailed dime

- **Operationalization Score:** 88 — Offers an applied framework and systematic evaluation; slightly limit

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Supporting Quotes from the Paper

- "[An] actionable finding can be defined as a disease-causing pathogenic variant… to significantly impro

- "…the disorder has either (i) childhood onset… or (ii) adult onset, but such measures have been demon

- "…disclosure in childhood would be limited to disorders for which a majority of cases present in childho

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Actionability References to Other Papers

- Berg JS et al. (2016) — Semiquantitative metric for evaluating clinical actionability

- Moret C et al. (2017) — Categorization of medical vs. patient-initiated actionability

- Wilson JMG, Jungner G (1968) — WHO screening principles

Paper Summary

<!--META_START-->

Title: Return of non-ACMG recommended incidental genetic findings to pediatric patients: considerations

Authors: Kevin M. Bowling, Michelle L. Thompson, Melissa A. Kelly, Sarah Scollon, Anne M. Slavotinek, I

DOI: https://doi.org/10.1186/s13073-022-01139-2

Year: 2022

Publication Type: Journal

Discipline/Domain: Genomics / Medical Genetics

Subdomain/Topic: Incidental findings in pediatric genomic sequencing

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 75

Contains Definition of Actionability: Yes (implicit, framed in return-of-results context)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: No formal named model, but structured criteria for return

Operationalization Present: Yes

Primary Methodology: Mixed Methods (case series across multiple genomic studies + conceptual analysi

Study Context: Four pediatric genomic sequencing studies (SouthSeq, KidsCanSeq, P3EGS, COAGS) re

Geographic/Institutional Context: USA (multiple academic medical centers, diverse patient populations)

Target Users/Stakeholders: Clinical geneticists, laboratory directors, policy-makers, pediatric healthcare p

Primary Contribution Type: Empirical cases + conceptual considerations for return of incidental genetic fir

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Return of non-ACMG recommended incidental genetic findings to pediatric patients: considerations and c

Authors:

Kevin M. Bowling, Michelle L. Thompson, et al.

DOI:

https://doi.org/10.1186/s13073-022-01139-2

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Genomics / Medical Genetics

Subdomain/Topic:

Incidental findings in pediatric genomic sequencing

Contextual Background:

The paper addresses the emerging challenge of incidental genetic findings (IFs) outside ACMG-recomme

Geographic/Institutional Context:

USA — University of Alabama at Birmingham, Baylor College of Medicine, UCSF, HudsonAlpha Institute

Target Users/Stakeholders:

Clinical geneticists, genetic counselors, policy-makers, laboratory directors, pediatricians.

Primary Methodology:

Mixed Methods — descriptive case series of 23 IFs in 21 pediatric patients across four genomic studies,

Primary Contribution Type:

Empirical case data + conceptual framework for decision-making in returning non-ACMG IFs in pediatric

General Summary of the Paper

This study examines the identification and return of incidental genetic findings (IFs) in pediatric patients f

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper implicitly defines actionability in the context of IF return as the potential for a genetic finding to

> "If the finding will alter patient care… then return of the result will be useful to the provider, patient, and

> "Actionability… exists on a continuum… Actionability may also encompass… awareness… to avoid a fu

What Makes Something Actionable

- Alters patient care (management, treatment, surveillance) in a beneficial way.

- Potential to prevent adverse outcomes or misdiagnosis.

- Enables timely screening or monitoring.

- Associated with conditions where preventive or mitigating actions exist.

- Can provide important awareness for at-risk family members.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** No formal named model; uses structured considerations (Table 3).

- **Methods/Levers:** Case-by-case assessment using penetrance, severity, age of onset, family history,

- **Operational Steps / Workflow:** Phenotype-independent variant analysis → classification (ACMG-AMI

- **Data & Measures:** Variant pathogenicity, disease penetrance estimates, onset age, family history, tr

- **Implementation Context:** Pediatric genomic sequencing across diverse clinical sites.

> "Laboratories… [should] proactively plan for how they intend to characterize what constitutes an IF and

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — need to differentiate IFs from primary findings, especially in young patients.

> "…differentiating incidental and primary findings can be difficult… especially when age of onset is high

- **CR (Contextual Relevance):** Yes — family history and patient context inform decision to return.

- **FE (Feasibility):** Yes — considers whether findings are clinically manageable or preventable.

- **TI (Timeliness):** Partial — early-onset conditions prioritized; timing influences utility.

- **EX (Explainability):** Partial — cases show explanation of variant-disease links, but not a formal emph

- **GA (Goal Alignment):** Partial — return aligned with patient/family health planning and prevention goa

- **Other Dimensions Named by Authors:** Severity of disease, penetrance, personal utility.

Theoretical or Conceptual Foundations

- ACMG guidelines for SFs.

- Ethical discourse on predictive testing in children.

- Concepts of clinical and personal utility from prior literature (e.g., Bunnik et al. 2015).

Indicators or Metrics for Actionability

- Age of onset distribution for the condition.

- Disease penetrance estimates.

- Availability of screening or preventive interventions.

- Severity of condition.

Barriers and Enablers to Actionability

- **Barriers:** Variable penetrance, uncertain onset, incomplete phenotype data, potential anxiety, lack of

- **Enablers:** Clear preventive/treatment pathways, strong family history, high penetrance, severe disea

Relation to Existing Literature

Builds on debates around returning genomic findings in children, extending from ACMG SF frameworks t

Summary

This paper provides one of the most detailed empirical and conceptual analyses of returning non-ACMG i

Scores

- **Overall Relevance Score:** 88 — Strong implicit definition of actionability, rich feature set, empirical g

- **Operationalization Score:** 75 — Detailed process descriptions and decision criteria; operationalized t

Supporting Quotes from the Paper

- "[Actionability]… if the finding will alter patient care… then return of the result will be useful…" (p. 11, Ta

- "Actionability… exists on a continuum… may also encompass… awareness… to avoid… misdiagnosis."

- "Diferentiating incidental and primary findings can be difficult… especially when… age of onset… is high

Actionability References to Other Papers

- ACMG SF v2.0 and v3.0 recommendations (Kalia et al., 2017; Miller et al., 2021)

- Bunnik EM et al., 2015 (personal utility in genomic testing)

- NCCN guidelines for cancer screening

- ClinGen Actionability Working Group protocols

Paper Summary

<!--META_START-->

Title: Reconciling evidence-based medicine and precision medicine in the era of big data: challenges and

Authors: Jacques S. Beckmann, Daniel Lew

DOI: 10.1186/s13073-016-0388-7

Year: 2016

Publication Type: Journal Article

Discipline/Domain: Medicine / Clinical Bioinformatics

Subdomain/Topic: Precision Medicine, Evidence-Based Medicine, Big Data Integration

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 70

Contains Definition of Actionability: Yes (implicit, in terms of "clinically actionable knowledge")

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Partial (conceptual integration model)

Operationalization Present: Yes (data integration, bioinformatics workflow)

Primary Methodology: Conceptual / Review

Study Context: Integration of precision medicine and evidence-based medicine in big data healthcare

Geographic/Institutional Context: Switzerland (SIB Swiss Institute of Bioinformatics), global implications

Target Users/Stakeholders: Clinicians, bioinformaticians, healthcare policymakers, patients/citizens

Primary Contribution Type: Conceptual framework and challenges/opportunities analysis

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

<!--META_END-->

Title: Reconciling evidence-based medicine and precision medicine in the era of big data: challenges

Authors: Jacques S. Beckmann, Daniel Lew

DOI: 10.1186/s13073-016-0388-7

Year: 2016

Publication Type: Journal Article

Discipline/Domain: Medicine / Clinical Bioinformatics

Subdomain/Topic: Precision Medicine, Evidence-Based Medicine, Big Data Integration

Contextual Background: The paper addresses the tension and complementarity between precision me

Geographic/Institutional Context: Switzerland; global healthcare systems

Target Users/Stakeholders: Clinicians, bioinformaticians, policymakers, healthcare IT developers, pat

Primary Methodology: Conceptual / Review

Primary Contribution Type: Conceptual framework and challenge–opportunity mapping for integration

General Summary of the Paper

This paper outlines how high-resolution, high-throughput biomedical technologies and big data can drive

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors frame actionability as the **translation of big, heterogeneous biomedical datasets into "clinica

> "Proper data mining and translation of the vast datasets into clinically actionable knowledge will require

> "The real challenge… will be to curate, store, federate, integrate, share, mine, interpret, and transform t

What Makes Something Actionable

- Standardization and interoperability of clinical and laboratory datasets

- Integration of multi-layered data (genomics, microbiome, lifestyle, environmental)

- Statistical robustness from large cohorts combined with individual-level granularity

- Ethical, legal, and privacy safeguards for trust in data sharing

- Explainable outputs that can guide clinical decisions at the point of care

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Evidence-Based Precision Medicine

- **Methods/Levers:** Big data integration, bioinformatics analysis, interoperability standards, meta-analy

- **Operational Steps / Workflow:** Data collection (EHR, wearables, genomics, etc.) → Standardization

- **Data & Measures:** Omics, imaging, clinical measures, behavioral and lifestyle data, environmental e[...]

- **Implementation Context:** Multi-institutional, transnational data-sharing systems

> "…collation and meta-analyses of big data from cross-institutional and transnational large-scale registe[...]

> "…create sustainable federated, safe data commons or warehouses…" (p. 6)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — data must be interpretable for clinicians and patients.

- **CR (Contextual Relevance):** Yes — personalized care requires context-specific relevance.

- **FE (Feasibility):** Yes — operational constraints considered in prevention focus.

- **TI (Timeliness):** Partial — early detection emphasized, but not deeply operationalized.

- **EX (Explainability):** Yes — clinical bioinformatics bridges data complexity and clinical understanding[...]

- **GA (Goal Alignment):** Yes — alignment to prevention, wellness, and patient-centered care.

- **Other Dimensions Named by Authors:** Interoperability, standardization, patient empowerment.

Theoretical or Conceptual Foundations

- Systems medicine (P4: predictive, preventive, personalized, participatory)

- Holistic integration of biological and environmental determinants of health

- N-of-one to N-of-many cohort aggregation

Indicators or Metrics for Actionability

- Early detection of symptoms

- Identification of pre-symptomatic individuals

- Delay or prevention of disease onset

- Integration and usability of diverse data streams in decision-making

Barriers and Enablers to Actionability

- **Barriers:** Heterogeneous EHR systems, lack of interoperability, semantic complexity, data silos, priva[...]

- **Enablers:** Federated safe data commons, standardized vocabularies/ontologies, citizen participation[...]

Relation to Existing Literature

Positions precision and evidence-based medicine as complementary paradigms; builds on P4 medicine, [...]

Summary

Beckmann and Lew (2016) argue for integrating the population-level rigor of evidence-based medicine wi[...]

Scores

- **Overall Relevance Score:** 85 — Strong conceptual framing of actionability in a healthcare big data c[...]

- **Operationalization Score:** 70 — Provides a clear conceptual workflow and enabling infrastructure, bu[...]

Supporting Quotes from the Paper

- "Proper data mining and translation of the vast datasets into clinically actionable knowledge…" (p. 1)

- "The real challenge… will be to… transform these extensive heterogeneous data into scalable, medicall

- "…collation and meta-analyses of big data from cross-institutional and transnational large-scale register

- "Shifting emphasis of medicine more from therapy to prevention, and from disease to wellness" (Table 1

Actionability References to Other Papers

- Auffray et al. (2009, 2015) on systems medicine

- Hood & Price (2014) on prevention-focused precision medicine

- Schwaederle & Kurzrock (2015) on actionability in oncology

- Collins (2015) on NIH precision medicine perspective

Paper Summary

<!--META_START-->

Title: Prospective Longitudinal ctDNA Workflow Reveals Clinically Actionable Alterations in Ovarian Canc

Authors: Jaana Oikkonen, Kaiyang Zhang, Liina Salminen, Ingrid Schulman, Kari Lavikka, Noora Anderss

DOI: https://doi.org/10.1200/PO.18.00343

Year: 2019

Publication Type: Journal

Discipline/Domain: Oncology / Precision Medicine

Subdomain/Topic: Circulating Tumor DNA (ctDNA) in High-Grade Serous Ovarian Cancer (HGSOC)

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit, clinically oriented)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (workflow pipeline)

Operationalization Present: Yes

Primary Methodology: Mixed Methods (prospective clinical cohort, bioinformatics pipeline)

Study Context: Clinical workflow for longitudinal ctDNA analysis to guide treatment in HGSOC

Geographic/Institutional Context: Turku University Hospital & University of Helsinki, Finland

Target Users/Stakeholders: Oncologists, molecular tumor boards, translational cancer researchers

Primary Contribution Type: Clinical proof-of-concept & open-source workflow

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Prospective Longitudinal ctDNA Workflow Reveals Clinically Actionable Alterations in Ovarian Cancer

Authors:

Jaana Oikkonen, Kaiyang Zhang, Liina Salminen, Ingrid Schulman, Kari Lavikka, Noora Andersson, Erika

DOI:

https://doi.org/10.1200/PO.18.00343

Year:

2019

Publication Type:

Journal

Discipline/Domain:

Oncology / Precision Medicine

Subdomain/Topic:

ctDNA analysis in high-grade serous ovarian cancer (HGSOC)

Contextual Background:

The study addresses the challenge of guiding treatment in metastatic solid cancers, particularly HGSOC,

Geographic/Institutional Context:

University of Helsinki & Turku University Hospital, Finland

Target Users/Stakeholders:

Oncologists, molecular tumor boards, translational researchers, precision medicine programs

Primary Methodology:

Mixed methods — prospective clinical cohort of 12 HGSOC patients (78 plasma samples, 21 tissue samp

Primary Contribution Type:

Clinical proof-of-concept and open-source workflow for actionable ctDNA detection

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General Summary of the Paper

This study presents a clinical and bioinformatics workflow for detecting clinically actionable alterations in

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Implicitly defined as the presence of genomic alterations in ctDNA that can be linked to existing therapies

> "Potentially clinically actionable alterations were validated… classified as most prominent (ESCAT… S

> "The provided approach allows the selection of treatment options that target subclones that persist duri

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What Makes Something Actionable

- Direct association with existing or investigational therapies

- Sufficient evidence of clinical relevance (ESCAT ranking)

- Persistence in tumor subclones during treatment

- Validation in tumor tissue (IHC/ISH)

- Concordance with patient's mutational profile and disease context

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Clinical ctDNA workflow integrating sequencing, bioinformatics pipel

- **Methods/Levers:** >500-gene targeted panel sequencing, variant/CNA calling, filtering, prioritization v

- **Operational Steps / Workflow:** Longitudinal plasma sampling → sequencing → bioinformatics filtering

- **Data & Measures:** VAF dynamics, mutation counts, CNA ratios, CA-125 levels

- **Implementation Context:** Prospective monitoring before, during, after chemotherapy in HGSOC

> "Longitudinal ctDNA sampling can be used to detect response… and identify clinically applicable mutat

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Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clear link between detected alteration and therapeutic relevance (ESCAT criteria

- **CR (Contextual Relevance):** Yes — therapy matching based on patient-specific ctDNA profile.

- **FE (Feasibility):** Yes — minimally invasive sampling, open-source tools.

- **TI (Timeliness):** Yes — early detection of poor responders after 1–2 chemo cycles.

- **EX (Explainability):** Yes — biological pathway context and evidence level for each alteration.

- **GA (Goal Alignment):** Yes — aligns with goal of improving survival in HGSOC by targeting resistant

- **Other Dimensions Named by Authors:** Concordance with tumor tissue; evidence-based prioritization

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Theoretical or Conceptual Foundations

- ESCAT (ESMO Scale for Clinical Actionability of Molecular Targets)

- Concepts from precision oncology: mTOR, HR deficiency, EGFR pathway targeting

- Longitudinal biomarker monitoring

Indicators or Metrics for Actionability

- Variant Allele Frequency (VAF) trends

- CNA ratios

- CA-125 tumor marker correlation

- ESCAT evidence tier assignment

Barriers and Enablers to Actionability

- **Barriers:** Low VAF subclonal mutations, ctDNA heterogeneity, validation requirements, therapy avail

- **Enablers:** Open-source pipeline, integration with knowledgebase, high plasma-tumor concordance, r

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Relation to Existing Literature

Builds on prior ctDNA monitoring studies (e.g., TP53 tracking in HGSOC) but extends to broad-panel acti

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Summary

This paper delivers a robust, clinically relevant framework for using longitudinal ctDNA profiling to guide t

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Scores

- **Overall Relevance Score:** 90 — Clear conceptualization of clinical actionability and explicit criteria fo

- **Operationalization Score:** 95 — Comprehensive, step-by-step clinical workflow integrating sampling,

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Supporting Quotes from the Paper

- "We identified high-confidence, potentially clinically actionable mutations or CNAs in seven patients (58°

- "The provided approach allows the selection of treatment options that target subclones that persist durir

- "Treatment… was changed on the basis of detection of ERBB2 amplification… followed by significant tu

- "Longitudinal ctDNA sampling can be used… to identify poor-responding patients after first cycles of che

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Actionability References to Other Papers

- ESCAT framework: Mateo et al., 2018

- TP53 monitoring in HGSOC: Parkinson et al., 2016

- Pathway-specific targeting references for mTOR, HR deficiency, EGFR, CDK alterations

Paper Summary

<!--META_START-->

Title: Policy Helix and Antecedents of Cybersecurity Policymaking Agility

Authors: Masoud Afshari-Mofrad, Babak Abedin, Alireza Amrollahi

DOI: Not provided

Year: 2023

Publication Type: Conference Paper

Discipline/Domain: Information Systems / Cybersecurity Policy

Subdomain/Topic: Cybersecurity policymaking agility; dynamic policy cycles; organisational resilience

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicitly—actionability as agility in policymaking)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (Cybersecurity Policy Helix)

Operationalization Present: Yes

Primary Methodology: Qualitative (semi-structured expert interviews)

Study Context: Cybersecurity policymaking in dynamic threat environments

Geographic/Institutional Context: Australia; Macquarie University; multi-sector expert sample

Target Users/Stakeholders: Policymakers, CISOs, cybersecurity managers, organisational boards

Primary Contribution Type: Conceptual framework + empirical antecedents

CL: Yes

CR: Yes

Title:

Policy Helix and Antecedents of Cybersecurity Policymaking Agility

Authors:

Masoud Afshari-Mofrad, Babak Abedin, Alireza Amrollahi

DOI:

Not provided

Year:

2023

Publication Type:

Conference Paper

Discipline/Domain:

Information Systems / Cybersecurity Policy

Subdomain/Topic:

Agility in cybersecurity policymaking; policy-cycle adaptation; cyber resilience

Contextual Background:

Addresses the need for agile cybersecurity policymaking (CSPM) in dynamic cyber threat environments,

Geographic/Institutional Context:

Macquarie University, Australia; expert interview participants from multiple sectors (ICT, finance, telecom

Target Users/Stakeholders:

Policymakers, CISOs, CIOs, CTOs, cybersecurity managers, boards, risk committees.

Primary Methodology:

Qualitative—inductive thematic analysis of semi-structured expert interviews (n=10).

Primary Contribution Type:

Conceptual model and empirically derived antecedents of CSPM agility.

General Summary of the Paper

This paper investigates agility in cybersecurity policymaking as a strategic capability for organisations fac

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly framed as *policymaking agility*—the capacity to promptly adapt cybersecurity po

> "Policies are not an ideology that cannot be changed… they should instead be perceived as a means to

> "CSPM agility… means tailoring policies to both changes in the threat landscape and the organisation's

What Makes Something Actionable

- Continuous sensing of threat landscape (internal/external)

- Policy adaptation to organisational risk appetite and maturity

- Integration of intelligence into agenda-setting and decision-making

- Feedback-informed reformulation and implementation

- Stakeholder awareness and engagement

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Cybersecurity Policy Helix

- **Methods/Levers:** Continuous intelligence gathering, iterative agenda-setting, flexible decision-making

- **Operational Steps / Workflow:** Sense → Synthesise → Agenda-setting → Policy formulation/decision

- **Data & Measures:** Threat intelligence (internal/external), vulnerability scans, risk assessments, incid

- **Implementation Context:** Cross-sectoral, adaptable to organisational size/maturity

> "Intelligence for policy formulation/reformulation can come from both internal and external sources… Th

> "Evaluation can occur locally at each stage… results might return to agenda-setting" (p. 8)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — training, awareness, common policy language stressed (p. 9)

- **CR (Contextual Relevance):** Yes — policy must align with organisational maturity and risk appetite (p

- **FE (Feasibility):** Yes — workarounds for legacy systems and phased maturity building (p. 6)

- **TI (Timeliness):** Yes — adapt policies before scheduled review cycles (p. 6)

- **EX (Explainability):** Partial — rationale for changes linked to risk mitigation, though not explicitly fram

- **GA (Goal Alignment):** Yes — align policy with business risk mitigation and enabling operations (p. 6)

- **Other Dimensions Named by Authors:** Awareness, adaptability, stakeholder collaboration

Theoretical or Conceptual Foundations

- Digital agility and organisational agility literature (Pinsonneault & Choi, 2022; Grover, 2022)

- Policy cycle framework (Lasswell, Brewer, Howlett et al.)

- Dynamic policy cycle (Valle-Cruz et al., 2020)

Indicators or Metrics for Actionability

- Frequency and responsiveness of policy updates

- Reduction in unmitigated vulnerabilities

- Employee policy compliance rates

- Outcomes of "top table" simulations

Barriers and Enablers to Actionability

- **Barriers:** Board inexperience, lack of asset visibility, resistance to change, poor communication, lega

- **Enablers:** Informed leadership, structured asset/vulnerability management, dedicated risk committee

Relation to Existing Literature

Builds on organisational agility and dynamic policy cycle research, addressing a gap in operationalising a

Summary

The paper reframes "actionability" as agility in cybersecurity policymaking, grounded in the ability to integ

Scores

- **Overall Relevance Score:** 88 — Strong implicit conceptualisation of actionability as policymaking agi

- **Operationalization Score:** 90 — Concrete framework, workflow, and organisational practices directly

Supporting Quotes from the Paper

- "[CSPM agility] means tailoring policies to both changes in the threat landscape and the organisation's i

- "Many companies… don't have an asset management system… If you're trying to formulate a cybersec

- "Evaluation can occur locally at each stage… results might return to agenda-setting" (p. 8)

- "Change management is necessary… comprehending the risks" (p. 9)

Actionability References to Other Papers

- Valle-Cruz et al. (2020) — dynamic policy cycle

- Pinsonneault & Choi (2022) — digital agility

- Grover (2022) — digital culture/ambidexterity

- Siregar & Chang (2019) — cybersecurity agility

- Malatji et al. (2022) — asset management in cybersecurity

Paper Summary

<!--META_START-->

Title: PIK3R1 W624R Is an Actionable Mutation in High Grade Serous Ovarian Carcinoma

Authors: Concetta D'Ambrosio, Jessica Erriquez, Maddalena Arigoni, Sonia Capellero, Gloria Mittica, Ele

DOI: 10.3390/cells9020442

Year: 2020

Publication Type: Journal Article

Discipline/Domain: Oncology / Cancer Genomics

Subdomain/Topic: Precision oncology; actionable mutations; ovarian cancer; PI3K pathway

Eligibility: Eligible

Overall Relevance Score: 82

Operationalization Score: 90

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Yes

Contains Framework/Model: Yes (patient-derived xenograft validation approach)

Operationalization Present: Yes

Primary Methodology: Experimental (patient-derived xenografts, ex vivo/in vivo drug testing)

Study Context: High grade serous epithelial ovarian carcinoma (HGS-EOC)

Geographic/Institutional Context: Italy (Candiolo Cancer Institute, University of Torino) & UK (University o

Target Users/Stakeholders: Cancer researchers, molecular oncologists, clinical trial designers, translatio

Primary Contribution Type: Empirical validation of rare actionable mutation in ovarian cancer

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Contextual Background:

The study focuses on identifying and validating rare but actionable genetic mutations in HGS-EOC, partic

General Summary of the Paper

This paper reports the discovery and validation of a rare PIK3R1 W624R mutation in high-grade serous o

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the functional property of a mutation that (1) renders tumour cells dependent ("a

> "Mutations have also been defined as 'actionable', not only because their functional outcome makes ca

> The study uses PDX models "to validate low frequency mutations as biomarkers for targeted therapy" (

What Makes Something Actionable

- Functional impact on a key signalling pathway relevant to oncogenesis.

- Presence of a targeted drug that inhibits the altered pathway.

- Evidence from functional assays in relevant tumour models (PDX/PDTC).

- Truncal nature of the mutation (present in all tumour cells).

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** PDX–PDTC functional validation pipeline for rare mutations.

- **Methods/Levers:** Whole exome sequencing, pyrosequencing for allele frequency, pathway activatior

- **Operational Steps / Workflow:**

  1. Identify candidate mutation via WES and CNA analysis.

  2. Confirm truncal status via allele frequency in tumour and PDX.

  3. Predict functional consequences via in silico analysis and structural modelling.

  4. Test pathway activation via immunohistochemistry (P-S6).

  5. Test drug sensitivity in PDTCs to multiple inhibitors.

  6. Validate in vivo efficacy in PDX tumour growth and biomarker changes.

- **Data & Measures:** Allele frequency, GR metrics in viability assays, IHC quantification of Ki67 and P-

- **Implementation Context:** HGS-EOC PDX biobank.

> "PDX model… invaluable for functional validation, as it allowed overcoming questionable assays in test

> "PIK3R1 W624R carrying cells [were] addicted… to inhibitors of the PI3K/AKT/mTOR pathway." (Abstra

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — functional consequences demonstrated through targeted assays and clear drug-

- **CR (Contextual Relevance):** Yes — relevance to ovarian cancer context stressed; rare mutation vali

- **FE (Feasibility):** Yes — presence of clinically available inhibitors; mutation is targetable.

- **TI (Timeliness):** No explicit link.

- **EX (Explainability):** Partial — mechanistic explanation offered but structural modelling inconclusive.

- **GA (Goal Alignment):** Yes — aligns with precision oncology aim of matching mutations to therapies.

- **Other Dimensions Named by Authors:** Truncality, pathway addiction.

Theoretical or Conceptual Foundations

- Precision oncology model of "driver" vs. "passenger" mutations.

- Concept of mutation "addiction" to specific signalling pathways.

- Basket/umbrella trial rationale for cross-cancer therapeutic targeting.

Indicators or Metrics for Actionability

- Mutation truncal status.

- Drug-response curves (GR metrics).

- Biomarker modulation (P-AKT, P-S6) upon inhibitor treatment.

- In vivo tumour growth delay and reduced proliferation index.

Barriers and Enablers to Actionability

- **Barriers:** Low frequency of mutation; inconclusive structural modelling; lack of prior functional charac

- **Enablers:** Availability of relevant inhibitors; PDX/PDTC models mimicking patient tumour biology; hig

Relation to Existing Literature

The authors note that while PIK3R1 mutations are common in other cancers, they are rare in HGS-EOC.

Summary

This study identifies and functionally validates a rare PIK3R1 W624R mutation as actionable in high-grad

Scores

- **Overall Relevance Score:** 82 — Clear conceptualisation of actionability with explicit definition, trunca

- **Operationalization Score:** 90 — Detailed, reproducible pipeline from mutation identification to functio

Supporting Quotes from the Paper

- "Mutations… defined as 'actionable', not only because their functional outcome makes carrier cells resp

- "PIK3R1 W624R carrying cells [were] addicted… to inhibitors of the PI3K/AKT/mTOR pathway." (Abstra

- "PDX model… invaluable for functional validation, as it allowed overcoming questionable assays in test

- "The PIK3R1 W624R #475 PDTCs… were sensitive to… buparlisib… alpelisib… dactolisib… but not…

Actionability References to Other Papers

- COSMIC (CGCv84) database [28]

- DGidb drug–gene interaction database [31]

- References on PI3K/AKT/mTOR inhibitors in clinical development [20, 48–51]

- Prior functional studies on PIK3R1 mutations [32, 38–40]

Paper Summary

<!--META_START-->

Title: Opportunity Map: A Visualization Framework for Fast Identification of Actionable Knowledge

Authors: Kaidi Zhao, Bing Liu, Thomas M. Tirpak, Weimin Xiao

DOI: 10.1145/1099554.1099684

Year: 2005

Publication Type: Conference

Discipline/Domain: Computer Science / Information Systems

Subdomain/Topic: Data Mining, Visualization, Actionable Knowledge Discovery

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit and explicit elements)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Yes

Contains Framework/Model: Yes (Opportunity Map)

Operationalization Present: Yes

Primary Methodology: Conceptual with applied case study

Study Context: Post-mining analysis of large rule sets from data mining to identify actionable patterns

Geographic/Institutional Context: University of Illinois at Chicago; Motorola Labs (USA)

Target Users/Stakeholders: Data analysts, product designers, decision-makers in industrial contexts

Primary Contribution Type: Visualization framework and interactive analysis method

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title: Opportunity Map: A Visualization Framework for Fast Identification of Actionable Knowledge

Authors: Kaidi Zhao, Bing Liu, Thomas M. Tirpak, Weimin Xiao

DOI: 10.1145/1099554.1099684

Year: 2005

Publication Type: Conference

Discipline/Domain: Computer Science / Information Systems

Subdomain/Topic: Data Mining, Visualization, Actionable Knowledge Discovery

Contextual Background: This work addresses the challenge of sifting through large volumes of mined

Geographic/Institutional Context: University of Illinois at Chicago; Motorola Labs, USA

Target Users/Stakeholders: Data analysts, product engineers, product managers, decision-makers in

Primary Methodology: Conceptual development with real-world industrial case study

Primary Contribution Type: Framework/methodology (Opportunity Map) with interactive visualization f

General Summary of the Paper

The paper proposes the **Opportunity Map**, a visual data mining framework designed to quickly identify

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the ability of a rule or pattern to guide concrete interventions within the user's d

> "An attribute is actionable if the user is able to do something with that attribute to achieve some desired

> "Actionability is the key… It depends on the task that the user wants to perform." (p. 1)

What Makes Something Actionable

- The attribute must be controllable within the user's context.

- The class or problem addressed must be important to the user's goals.

- The relationship between attribute and class should be clear, strong (support/confidence), and interpreta

- Patterns must be applicable to real-world decision-making, not just surprising.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Opportunity Map

- **Methods/Levers:** Visual prioritization matrix; user-driven sorting by importance and actionability; drill-

- **Operational Steps / Workflow:**

  1. Mine rules (e.g., with class association rule miner CBA).

  2. Visualize as attribute–class matrix.

  3. Arrange classes (by importance) and attributes (by actionability).

  4. Focus on top-left priority sector (important + actionable).

  5. Drill down into attribute–class pairs to find finer-grained actionable rules.

  6. Compare rule sets across subsets (e.g., product versions).

- **Data & Measures:** Support and confidence of rules; number of rules per cell; coverage of data points

- **Implementation Context:** Post-mining analysis in industrial product design/failure diagnosis.

> "This isolates a small area in the matrix… that may contain actionable rules." (p. 2)

> "The insights from these rules are immediately actionable, as engineers can… identify/propose possible

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — visualization aids interpretation and explicit linking of attributes to classes.

- **CR (Contextual Relevance):** Yes — prioritization is based on user/application importance.

- **FE (Feasibility):** Yes — actionable attributes are defined as those under user control.

- **TI (Timeliness):** Partial — focuses on efficiency in identification, but not time-to-implementation.

- **EX (Explainability):** Partial — interpretability via visualization; not formal model explainability.

- **GA (Goal Alignment):** Yes — prioritization matrix directly aligns with application objectives.

- **Other Dimensions Named by Authors:** Unexpectedness (as contrast with actionability).

Theoretical or Conceptual Foundations

- Quality Function Deployment (House of Quality)

- Rule interestingness measures (objective vs. subjective) from data mining literature

Indicators or Metrics for Actionability

- Support and confidence of rules in priority sectors

- Number of rules covering key attribute–class intersections

- Coverage percentage of rules over relevant data points

Barriers and Enablers to Actionability

- **Barriers:** Imbalanced datasets, non-actionable attributes, overwhelming number of rules

- **Enablers:** Visualization of priorities, interactive drill-down, comparative analysis

Relation to Existing Literature

The framework integrates subjective interestingness with visual analytics, diverging from existing visualiz

Summary

The **Opportunity Map** framework offers a systematic and interactive way to identify actionable knowled

Scores

- **Overall Relevance Score:** 88 — Strong conceptualization of actionability linked to operational needs

- **Operationalization Score:** 90 — Detailed, step-by-step framework with tooling, workflow, and industr

Supporting Quotes from the Paper

- "Actionability is the key… It depends on the task that the user wants to perform." (p. 1)

- "An attribute is actionable if the user is able to do something with that attribute to achieve some desired

- "This isolates a small area in the matrix… that may contain actionable rules." (p. 2)

- "The insights from these rules are immediately actionable…" (p. 8)

Actionability References to Other Papers

- [1] Adomavicius & Tuzhilin (1997) — Action hierarchy approach.

- [17] Liu et al. (2001) — Identifying non-actionable association rules.

- [22] Piatesky-Shapiro & Matheus (1994) — Interestingness of deviations.

- [26] Silberschatz & Tuzhilin (1996) — Patterns interestingness framework.

Paper Summary

<!--META_START-->

Title: Ontological Approach in the Smart Data Paradigm as a Basis for Open Data Semantic Markup

Authors: Julia Rogushina

DOI: n/a

Year: 2023

Publication Type: Conference Paper

Discipline/Domain: Computer Science / Information Systems

Subdomain/Topic: Smart Data, Semantic Markup, Ontologies, Open Data

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicit, linked to "Smart Data" as actionable knowledge)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with Applied Case Study

Study Context: Semantic markup and ontological structuring in Smart Data processing for open data reso

Geographic/Institutional Context: Institute of Software Systems, National Academy of Sciences of Ukrain

Target Users/Stakeholders: Researchers, ontology engineers, open data curators, semantic web develop

Primary Contribution Type: Conceptual framework with practical application

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

<!--META_END-->

Title:

Ontological Approach in the Smart Data Paradigm as a Basis for Open Data Semantic Markup

Authors:

Julia Rogushina

DOI:

n/a

Year:

2023

Publication Type:

Conference Paper

Discipline/Domain:

Computer Science / Information Systems

Subdomain/Topic:

Smart Data, Semantic Markup, Ontologies, Open Data

Contextual Background:

The paper is situated within the Smart Data paradigm, focusing on transforming raw, often unstructured d

Geographic/Institutional Context:

Institute of Software Systems, National Academy of Sciences of Ukraine; case study on the Great Ukrain

Target Users/Stakeholders:

Researchers, semantic data engineers, open data platform managers, cultural heritage digitization projec

Primary Methodology:

Conceptual framework with applied implementation case study.

Primary Contribution Type:

Conceptual modeling + applied system implementation.

General Summary of the Paper

The paper explores how unstructured or semi-structured data can be transformed into Smart Data—data

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Smart Data is defined as data that has been processed into "actionable insights or knowledge" to suppor

- Trusted, contextualized, relevant, cognitive, predictive, and consumable data.

- Structured or semi-structured representation enabling machine-actionable use.

> "Smart data mines semantics from Big data and provide information that can be used to make decision

> "…transform input 'raw' data into machine-understandable, machine-processable, and machine-actiona

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What Makes Something Actionable

- **Semantic enrichment** via ontologies and metadata.

- **Contextual relevance** to specific tasks or domains.

- **Feasibility of processing** (appropriate ontology expressiveness and size).

- **Trust and quality** of data (FAIR principles).

- **Goal alignment** with user needs and analysis objectives.

- **Explainability and interpretability** via formalized semantics.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Semantic markup using ontology-based Smart Data transformation;

- **Methods/Levers:** Ontology selection/reduction; task thesauri; semantic templates; linking markup tag

- **Operational Steps / Workflow:**

  1. Retrieve relevant external ontology.

  2. Transform/reduce ontology to task needs.

  3. Map ontology elements to markup tags.

  4. Implement markup in SMW (categories, templates, semantic properties).

- **Data & Measures:** Metadata completeness, ontology expressiveness, query support.

- **Implementation Context:** Great Ukrainian Encyclopedia portal (e-VUE).

> "…formalize models for such special cases of ontologies as Wiki ontology and task thesaurus." (p. 14)

> "…retrieval of external domain ontology… transformation according to semantic markup requirements…

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear semantic markup rules and ontology alignment.

> "Understandability of the markup language… standardized notations…" (p. 6)

- **CR (Contextual Relevance):** Yes — Ontology must be relevant to task domain.

- **FE (Feasibility):** Yes — Ontology size/complexity must allow efficient processing.

- **TI (Timeliness):** Partial — Discusses ongoing enrichment but not explicit temporal constraints.

- **EX (Explainability):** Yes — Formal semantics enable reasoning.

- **GA (Goal Alignment):** Yes — Ontology and markup designed per specific information needs.

- **Other Dimensions:** Interoperability (FAIR principles), standard compliance.

Theoretical or Conceptual Foundations

- DIKW pyramid adapted for Big Data.

- FAIR data principles.

- Ontology theory (Gruber 1993).

- Semantic Web standards (RDF, OWL).

Indicators or Metrics for Actionability

- Degree of semantic enrichment.

- Ontology-task alignment (coverage and absence of redundancy).

- Query expressiveness in SMW.

Barriers and Enablers to Actionability

- **Barriers:**

  - Overly large or irrelevant ontologies.

  - Lack of domain standards in ontology form.

  - Computational overhead in complex reasoning.

- **Enablers:**

  - Ontology reduction methods.

  - Use of open knowledge sources.

  - SMW semantic templates.

Relation to Existing Literature

Builds on semantic markup and ontology integration in Smart Data, extending concepts with a formal mod

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Summary

This paper positions "actionability" within the Smart Data paradigm, framing it as the transformation of raw

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Scores

- **Overall Relevance Score:** 88 — Strong conceptualization of actionable data via Smart Data, with sys

- **Operationalization Score:** 85 — Clear, task-oriented methods for achieving actionability through onto

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Supporting Quotes from the Paper

- "Smart data mines semantics from Big data and provide information that can be used to make decisions

- "…transform input 'raw' data into machine-understandable, machine-processable, and machine-actiona

- "…retrieval of external domain ontology… transformation according to semantic markup requirements…

- "Understandability of the markup language… standardized notations…" (p. 6)

Actionability References to Other Papers

- DIKW hierarchy (Hey, 2004)

- FAIR data principles (FAIR_data, 2021)

- Gruber (1993) on ontology specifications

- Semantic Web foundational works (RDF, OWL)

- Zeng (2017) on Smart Data for digital humanities

Paper Summary

<!--META_START-->

Title: Next-generation sequencing, should I use anti-HER2 therapy for HER2-amplified tumors off-label? I

Authors: Doah Cho, Sarah J. Lord, John Simes, Wendy Cooper, Michael Friedlander, Susie Bae, Chee K

DOI: 10.1177/17588359221112822

Year: 2022

Publication Type: Journal

Discipline/Domain: Oncology / Precision Medicine

Subdomain/Topic: HER2-targeted therapy; Off-label treatment decision frameworks

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit and explicit in biomarker–treatment context)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes (biological rationale, biomarker testing validity)

Contains Framework/Model: Yes (seven-question extrapolation framework)

Operationalization Present: Yes (detailed framework and application example)

Primary Methodology: Conceptual / Framework development with illustrative application

Study Context: Clinical decision-making for off-label HER2-targeted therapy in HER2-amplified cancers w

Geographic/Institutional Context: Australia; University of Sydney and collaborating institutions

Target Users/Stakeholders: Oncologists, molecular tumor boards, clinical researchers, policymakers

Primary Contribution Type: Conceptual framework + practical guidance for extrapolation in precision onco

CL: Yes — clarity in biomarker definition and testing necessary for actionability

CR: Yes — explicitly ties contextual relevance to extrapolation appropriateness

FE: Yes — feasibility linked to cost/access and biomarker testing capability

TI: Partial — timeliness implied in using current testing and treatment options before disease progression

EX: Yes — explainability through step-wise rationale and biological plausibility

GA: Yes — alignment with clinical goals of improved patient outcomes and informed consent

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Next-generation sequencing, should I use anti-HER2 therapy for HER2-amplified tumors off-label? Illustra

Authors:

Doah Cho, Sarah J. Lord, John Simes, Wendy Cooper, Michael Friedlander, Susie Bae, Chee Khoon Lee

DOI:

10.1177/17588359221112822

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Oncology / Precision Medicine

Subdomain/Topic:

HER2-targeted therapy; Off-label treatment decision frameworks

Contextual Background:

This paper addresses the growing clinical challenge of whether targeted cancer therapies—proven in spe

Geographic/Institutional Context:

Australia; National Health and Medical Research Council Clinical Trials Centre, University of Sydney; coll

Target Users/Stakeholders:

Oncologists, molecular tumor boards, precision oncology decision-makers, clinical researchers, and polic

Primary Methodology:

Conceptual framework development with illustrative clinical application.

Primary Contribution Type:

Decision-making framework for extrapolating biomarker–treatment evidence to off-label contexts.

General Summary of the Paper

The paper presents a structured framework for deciding whether to use targeted therapies off-label when

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the co-dependency between a biomarker and a targeted treatment—where sel

> "A biomarker is 'actionable' if treatment selection based on biomarker status improves clinical outcomes

> "Actionability may differ between cancers due to differences in intratumoral heterogeneity, tumor microe

---

What Makes Something Actionable

- Reliable and validated biomarker testing (analytical validity)

- Clearly defined biomarker positivity criteria for the cancer type

- Strong evidence from clinical trials or high-quality non-randomized studies linking biomarker presence to

- Biological plausibility and consistency across tumor types

- Distinction between prognostic and predictive value

- Consideration of surrogate endpoint validity

- Comparable safety profile in new cancer context

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Seven-question extrapolation framework

- **Methods/Levers:** Analytical validity check, biomarker criteria validation, evidence tiering (ESCAT), na

- **Operational Steps / Workflow:** Sequential question-based evaluation; uncertainty scoring for each dc

- **Data & Measures:** Concordance metrics (NGS vs. evidentiary standard tests), prevalence data, prec

- **Implementation Context:** Applied by clinicians and molecular tumor boards when trial data are lackin

> "Questions 1 to 6 should be considered individually, and judgment for the level of uncertainty for extrap

> "Recommendations should be individualized and consider the estimated benefit versus risks of off-labe

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — need for transparent, validated biomarker definition.

- **CR (Contextual Relevance):** Yes — extrapolation must consider tumor-specific biology.

- **FE (Feasibility):** Yes — feasibility tied to cost, access, and testing capabilities.

- **TI (Timeliness):** Partial — urgency implied to decide before disease progression.

- **EX (Explainability):** Yes — framework explicitly explains rationale for decisions.

- **GA (Goal Alignment):** Yes — focused on aligning treatment with patient outcome goals.

- **Other Dimensions Named by Authors:** Safety similarity, surrogate endpoint validity, cost and equity i

---

Theoretical or Conceptual Foundations

- ESMO Scale for Clinical Actionability of molecular Targets (ESCAT)

- GRADE Evidence-to-Decision (EtD) frameworks

- PICO model for framing clinical questions

Indicators or Metrics for Actionability

- Concordance rates between NGS and standard HER2 testing

- Sensitivity, specificity, PPV, and NPV of biomarker assays

- Survival and response outcomes from RCTs or high-quality observational studies

- Surrogate endpoint validation status in the cancer type of interest

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Barriers and Enablers to Actionability

- **Barriers:** Biological heterogeneity; lack of validated criteria in new tumor type; unvalidated surrogates

- **Enablers:** Strong biomarker–treatment evidence in analogous cancers; validated testing; patient willi

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Relation to Existing Literature

Positions the framework within ongoing discussions about precision oncology actionability, building on ES

Summary

This paper develops and illustrates a structured seven-question framework to guide off-label targeted the

---

Scores

- **Overall Relevance Score:** 95 — Strong explicit/implicit definition of actionability, comprehensive feat

- **Operationalization Score:** 90 — Detailed and actionable framework with clear application steps, thou

---

Supporting Quotes from the Paper

- "A biomarker is 'actionable' if treatment selection based on biomarker status improves clinical outcomes

- "Have the criteria used to define HER2 positivity been assessed in the cancer type for off-label trastuzu

- "Questions 1 to 6 should be considered individually, and judgment for the level of uncertainty for extrapo

- "Off-label therapy may be justified if sufficient evidence exists to support a positive benefit-risk assessm

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Actionability References to Other Papers

- ESCAT (Mateo et al., 2018)

- Wolff et al., 2018 HER2 testing guidelines

- Multiple RCTs: Slamon et al., 2001; Bang et al., 2010; Fader et al., 2020

- Haslam et al., 2019 surrogate endpoint correlation study

Paper Summary

<!--META_START-->

Title: Navigating Uncertainty: Challenges in Visualizing Ensemble Data and Surrogate Models for Decisio

Authors: Kristi Potter, Sam Molnar, J.D. Laurence-Chasen, Yuhan Duan, Julie Bessac, Han-Wei Shen

DOI: 10.1109/MCG.2025.3549665

Year: 2025

Publication Type: Journal

Discipline/Domain: Computer Graphics / Visualization

Subdomain/Topic: Uncertainty visualization, ensemble simulation, surrogate modeling, decision support s

Eligibility: Eligible

Overall Relevance Score: 88

Operationalization Score: 80

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (conceptual)

Operationalization Present: Yes

Primary Methodology: Conceptual + Case Study (Flood Modeling)

Study Context: Visualization design for integrating ensemble data and AI-based surrogate models to sup...

Geographic/Institutional Context: National Renewable Energy Laboratory (USA), The Ohio State Universi...

Target Users/Stakeholders: Decision-makers, scientists, engineers, emergency planners

Primary Contribution Type: Conceptual framework + applied case study

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title: Navigating Uncertainty: Challenges in Visualizing Ensemble Data and Surrogate Models for Dec...

Authors: Kristi Potter, Sam Molnar, J.D. Laurence-Chasen, Yuhan Duan, Julie Bessac, Han-Wei Shen...

DOI: 10.1109/MCG.2025.3549665

Year: 2025

Publication Type: Journal

Discipline/Domain: Computer Graphics / Visualization

Subdomain/Topic: Uncertainty visualization, ensemble simulation, surrogate modeling, decision supp...

Contextual Background: The paper addresses how uncertainty visualization can transform ensemble ...

Geographic/Institutional Context: USA – National Renewable Energy Laboratory, The Ohio State Univ...

Target Users/Stakeholders: Decision-makers in domains such as disaster response, infrastructure pla...

Primary Methodology: Conceptual + applied case study (flood modeling scenario)

Primary Contribution Type: Conceptual framing with practical illustration

General Summary of the Paper

The paper examines how uncertainty visualization can support decision-making when combining ensemb

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors implicitly define actionability as enabling decision-makers to confidently interpret, navigate, a

> "Uncertainty visualization plays a critical role in transforming ensemble simulation data into actionable i

> "…ensuring users can access relevant information, evaluate it accurately, and have confidence in their

What Makes Something Actionable

- Clear communication of uncertainty types (ensemble vs. surrogate)

- Support for both global exploration (ensembles) and localized queries (surrogates)

- Ability to interact flexibly with input and output spaces

- Representation of joint and conditional parameter relationships

- Support for tradeoff analysis when objectives conflict

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Not named formally, but uses a conceptual integration framework (F

- **Methods/Levers:** Visual parameter space exploration, forward and inverse surrogate modeling, widg

- **Operational Steps / Workflow:** Explore ensemble data → Use forward surrogate for prediction → Use

- **Data & Measures:** Ensemble simulation outputs, surrogate predictions, quantified uncertainty metrics

- **Implementation Context:** Flood modeling (dam breach scenario)

> "…present the intricate connections between input parameters and output predictions in an intuitive ma

> "…highlight sets of inputs that satisfy each output individually as well as input configurations that achiev

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear representation of uncertainty is essential for decision-making.

- **CR (Contextual Relevance):** Yes — Tailoring visualizations to specific decision-makers (engineers v

- **FE (Feasibility):** Yes — Identifying when scenarios are feasible and when constraints are unrealistic.

- **TI (Timeliness):** Partial — Surrogates enable faster exploration but timeliness is not emphasized as a

- **EX (Explainability):** Yes — Differentiating uncertainty sources and mapping input–output dependenc

- **GA (Goal Alignment):** Yes — Linking visualization design to stakeholder objectives.

- **Other Dimensions Named by Authors:** Tradeoff analysis, interpretability, interactivity.

Theoretical or Conceptual Foundations

- Ensemble simulation theory

- Uncertainty visualization literature

- Surrogate modeling (Gaussian Processes, deep learning)

- Visual parameter space analysis frameworks

Indicators or Metrics for Actionability

- Degree to which uncertainty is distinguishable (ensemble vs. surrogate)

- Accuracy and stability of surrogate predictions

- Ability to generate feasible and goal-consistent input–output configurations

Barriers and Enablers to Actionability

- **Barriers:** Surrogate accuracy variability; difficulty reconciling uncertainty types; usability challenges i

- **Enablers:** Integration of ensemble + surrogate strengths; interactive constraint setting; visualization o

Relation to Existing Literature

The paper extends prior work on uncertainty visualization by focusing on the integration of ensemble and

Summary

This paper provides a detailed conceptual and applied exploration of how uncertainty visualization can m

Scores

- **Overall Relevance Score:** 88 — Strong implicit conceptualization of actionability with multiple explicit

- **Operationalization Score:** 80 — Provides a clear applied example (flood modeling) and concrete inte

Supporting Quotes from the Paper

- "Uncertainty visualization plays a critical role in transforming ensemble simulation data into actionable in

- "Communicate diverse uncertainties: Clearly distinguish and convey the different uncertainties associate

- "Clarify input–output relationships: Present the intricate connections between input parameters and outp

- "Highlight sets of inputs that satisfy each output individually as well as input configurations that achieve

Actionability References to Other Papers

- Bonneau et al. (2014) – State-of-the-art in uncertainty visualization

- Sedlmair et al. (2014) – Visual parameter space analysis framework

- Obermaier & Joy (2014) – Challenges in ensemble visualization

- Shen et al. (2025) – Flow-based surrogate models for uncertainty quantification

Paper Summary

<!--META_START-->

Year: 2025

Publication Type: Journal

Discipline/Domain: Precision Oncology / Molecular Diagnostics

Subdomain/Topic: ESCAT framework, biomarker-drug ranking, interrater agreement

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 65

Contains Definition of Actionability: Yes (explicit via ESCAT definition)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (ESCAT)

Operationalization Present: Yes

Primary Methodology: Quantitative (statistical analysis of expert rankings)

Study Context: Multi-institutional assessment of agreement in ranking biomarker-drug pairs by ESCAT Le

Geographic/Institutional Context: Multi-national, including institutions in Russia, France, Italy, USA

Target Users/Stakeholders: Precision oncology experts, molecular tumor boards, guideline developers

Primary Contribution Type: Empirical evaluation of framework reproducibility

CL: Yes — clarity is implied as necessary for agreement on LOE rankings

CR: Yes — contextual relevance to tumor type and biomarker-drug association explicitly tied to actionabil

FE: Yes — feasibility indirectly addressed via standard of care vs. experimental therapy distinction

TI: Partial — timeliness not central but implied in need for up-to-date literature

EX: Yes — explainability tied to evidence-based LOE assignment

GA: Yes — goal alignment with improving clinical decision-making for targeted therapy

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Multi-Institutional Evaluation of Interrater Agreement of Biomarker-Drug Pair Rankings Based on the ESM

Authors:

Alexandra Lebedeva, Ekaterina Belova, Alexandra Kavun, Anastasiia Taraskina, Michele Bartoletti, Ivan

DOI:

https://doi.org/10.1007/s40291-024-00748-4

Year: 2025

Publication Type:

Journal

Discipline/Domain:

Precision Oncology / Molecular Diagnostics

Subdomain/Topic:

ESCAT framework, biomarker-drug ranking, interrater agreement

Contextual Background:

The study examines whether the ESMO Scale for Clinical Actionability of Molecular Targets (ESCAT) pro

Geographic/Institutional Context:

Multi-national collaboration (Russia, France, Italy, USA).

Target Users/Stakeholders:

Precision oncology experts, molecular tumor boards, guideline developers.

Primary Methodology:

Quantitative statistical agreement analysis (Cohen's kappa, Kolmogorov–Smirnov test, regression analys

Primary Contribution Type:

Empirical evaluation of framework reproducibility.

General Summary of the Paper

This study evaluates how consistently precision oncology experts assign ESCAT Levels of Evidence to b

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper adopts ESCAT's definition: actionability reflects the **clinical significance of a biomarker-drug

> "The ESMO Scale of Clinical Actionability of molecular Targets (ESCAT) classification system… classif

> "Framework… designed to provide guidance on how the genomic findings should be used in clinical pra

---

What Makes Something Actionable

- Strong published clinical evidence supporting efficacy of the biomarker-drug pairing.

- Contextual relevance to tumor type.

- Evidence from well-designed clinical trials.

- Alignment with existing guidelines and standard-of-care definitions.

- Consideration of genomic context (multiple biomarkers, resistance mechanisms).

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ESCAT

- **Methods/Levers:** Literature review, expert evaluation, LOE classification (IA–X).

- **Operational Steps / Workflow:**

  1. Select biomarker-drug pairs (both common and rare).

  2. Provide tumor type, mutation origin, detection method to experts.

  3. Experts assign LOE following ESCAT criteria.

  4. Aggregate responses, determine consensus LOE, calculate agreement statistics.

- **Data & Measures:** Consensus LOE, Cohen's kappa, standard deviation from consensus, regression

- **Implementation Context:** Multi-institutional expert setting.

> "The median of LOE rankings… was considered the consensus LOE" (p. 93).

> "General agreement rate… estimated using two methods: Cohen's kappa and the Kolmogorov–Smirno

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — essential for agreement on LOE.

- **CR (Contextual Relevance):** Yes — tumor-specific and biomarker-specific context required.

- **FE (Feasibility):** Yes — addressed through distinction between standard-of-care and experimental th

- **TI (Timeliness):** Partial — literature currency implied but not central.

- **EX (Explainability):** Yes — LOE assignments tied to strength of evidence.

- **GA (Goal Alignment):** Yes — aimed at improving targeted therapy selection.

- **Other Dimensions:** Reproducibility, evidence strength, framework consistency.

Theoretical or Conceptual Foundations

- ESCAT framework (Mateo et al., 2018).

- Comparative mention of OncoKB and variant interpretation guidelines.

Indicators or Metrics for Actionability

- ESCAT Level of Evidence (IA–X).

- Consensus vs. individual LOE deviation.

- Agreement statistics (Cohen's kappa).

Barriers and Enablers to Actionability

- **Barriers:** Subjectivity in LOE assignment; lack of negative trial data consideration; uncertainty in clas

- **Enablers:** Standard-of-care status; clear guideline backing; multidisciplinary tumor board discussions

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Relation to Existing Literature

Positions ESCAT as the most comprehensive existing framework but notes parallels with variant interpret

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Summary

This multi-institutional study critically examines the reproducibility of ESCAT-based biomarker-drug rankir

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Scores

- **Overall Relevance Score:** 90 — Explicit definition of actionability, systematic dimensions, and critica

- **Operationalization Score:** 65 — Clear methodology for LOE assignment and consensus-building, bu

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Supporting Quotes from the Paper

- "[ESCAT] classify molecular aberrations based on the available evidence… and matching the clinical be

- "The most important drawback… is the potential subjectivity of the assigned LOE depending on the pers

- "The median of LOE rankings… was considered the consensus LOE" (p. 93).

- "Our results outline the concerning rate of discordances when using the ESCAT framework" (p. 99).

Actionability References to Other Papers

- Mateo et al., 2018 — ESCAT framework origin.

- OncoKB (Chakravarty et al., 2017).

- AMP/ASCO/CAP guidelines (Sirohi et al., 2020).

- ACMG-AMP guidelines (Amendola et al., 2020; Lyon et al., 2022).

Paper Summary

<!--META_START-->

Title: Metrics for What, Metrics for Whom: Assessing Actionability of Bias Evaluation Metrics in NLP

Authors: Pieter Delobelle, Giuseppe Attanasio, Debora Nozza, Su Lin Blodgett, Zeerak Talat

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Yes

Contains Framework/Model: Yes (desiderata-based framework)

Operationalization Present: Yes

Primary Methodology: Review and Conceptual Framework + Qualitative Analysis

Study Context: NLP bias measures

Geographic/Institutional Context: International (Authors from KU Leuven, Instituto de Telecomunicações I

Target Users/Stakeholders: NLP researchers, metric developers, practitioners, policymakers, regulators

Primary Contribution Type: Conceptual framework + systematic literature review

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title: Metrics for What, Metrics for Whom: Assessing Actionability of Bias Evaluation Metrics in NLP

Authors: Pieter Delobelle, Giuseppe Attanasio, Debora Nozza, Su Lin Blodgett, Zeerak Talat

DOI: 10.18653/v1/2024.emnlp-main.1315

Year: 2024

Publication Type: Conference Proceedings (EMNLP 2024)

Discipline/Domain: Natural Language Processing, Responsible AI

Subdomain/Topic: Bias evaluation metrics, actionability, metric design

Contextual Background: The paper situates itself in the context of growing use of bias measures in NI

Geographic/Institutional Context: Belgium, Portugal, Italy, Canada, UAE

Target Users/Stakeholders: NLP researchers, fairness auditors, AI developers, policymakers, regulato

Primary Methodology: Conceptual framework + systematic literature review (146 papers)

Primary Contribution Type: Definition and framework for "actionability" of bias measures + review-bas

General Summary of the Paper

The authors define *actionability* in bias measures as the degree to which a measure's results enable inf

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is "the degree to which a measure's results enable decision-making or intervention" — result

> "Actionability refers to the degree to which a measure's results enable decision-making or intervention..

> "…results from actionable bias measures should facilitate informed actions with respect to th

Paper Summary

<!--META_START-->

Title: Managing social media recovery: The important role of service recovery transparency in retaining cu

Authors: Andreawan Honora, Wen-Hai Chih, Kai-Yu Wang

DOI: https://doi.org/10.1016/j.jretconser.2021.102814

Year: 2022

Publication Type: Journal

Discipline/Domain: Marketing / Consumer Services

Subdomain/Topic: Service recovery, social media transparency, customer forgiveness

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicit — service recovery transparency is treated as actionable

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial (implicit through transparency and clarity concepts)

Contains Framework/Model: Yes (conceptual model with mediation and moderation)

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Survey + Experimental)

Study Context: Social media service recovery after service failures

Geographic/Institutional Context: Indonesia; National Dong Hwa University; Brock University

Target Users/Stakeholders: Service providers, customer service managers, social media teams

Primary Contribution Type: Empirical validation of conceptual model

CL: Yes

CR: Yes

FE: No

TI: No

EX: Yes

GA: Partial

Reason if Not Eligible: n/a

<!--META_END-->

Title: Managing social media recovery: The important role of service recovery transparency in retainin

Authors: Andreawan Honora, Wen-Hai Chih, Kai-Yu Wang

DOI: https://doi.org/10.1016/j.jretconser.2021.102814

Year: 2022

Publication Type: Journal

Discipline/Domain: Marketing / Consumer Services

Subdomain/Topic: Service recovery, social media transparency, customer forgiveness

Contextual Background: The paper investigates how transparency in handling customer complaints o

Geographic/Institutional Context: Indonesia; National Dong Hwa University; Brock University

Target Users/Stakeholders: Service providers, customer service managers, social media managers

Primary Methodology: Mixed methods (Survey + Experiment)

Primary Contribution Type: Empirical testing of conceptual model integrating transparency, forgivenes

General Summary of the Paper

The paper explores how *service recovery transparency* — making complaint-handling visible to all on so

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is conceptualized implicitly as the capacity of *service recovery transparency* to trigger cust

> "Service recovery transparency refers to the extent to which the responses of a service provider to its c

> "Providing transparent service recovery by handling complaints in the presence of others helps generat

What Makes Something Actionable

- Public visibility of complaint handling

- Honesty, clarity, accuracy, and openness in communication

- Creating positive emotional reactions (forgiveness) in customers

- Leveraging social influence via audience effects

- Incorporating emotional recovery elements (apology, explanation) when transparency is low

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Conceptual mediation-moderation model linking transparency, forgiv

- **Methods/Levers:** Public replies on social media, offering sincere apologies, providing detailed explar

- **Operational Steps / Workflow:**

  1. Identify and respond to complaints publicly where possible

  2. Include emotional recovery strategies if transparency is low or absent

  3. Monitor forgiveness and switching intentions as key outcomes

- **Data & Measures:** 7-point Likert scales for transparency, forgiveness, switchover intention, apology,

- **Implementation Context:** Social media complaint handling

> "Public response… enables other consumers access to complaints and allows them to view on social m

> "When an apology/explanation is absent, higher levels of service recovery transparency will be importa

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — "honesty, clarity, accuracy, and openness" as part of transparency (p. 2)

- **CR (Contextual Relevance):** Yes — recovery process visibility to other customers directly relevant t

- **FE (Feasibility):** No explicit link to feasibility as part of actionability

- **TI (Timeliness):** Not explicitly linked to actionability in findings (though timeliness noted in prior literat

- **EX (Explainability):** Yes — explanation moderates the effect of transparency on forgiveness (p. 4)

- **GA (Goal Alignment):** Partial — goal of retaining customers via forgiveness aligns with firm objective

- **Other Dimensions Named by Authors:** Social presence effects; emotional recovery strategies

Theoretical or Conceptual Foundations

- Social influence theory (Latane, 1981)

- Emotional recovery vs. economic recovery distinction

Indicators or Metrics for Actionability

- Customer forgiveness score (Likert scale)

- Switchover intention score (Likert scale)

- Measured interaction effects of apology and explanation

Barriers and Enablers to Actionability

- **Barriers:** Absence of apology/explanation reduces forgiveness in low-transparency settings; chatbot

- **Enablers:** Public responses; sincerity; open explanations; alignment with customer expectations for t

Relation to Existing Literature

Extends prior social media recovery studies by focusing on emotional constructs (forgiveness) rather than

Summary

This paper positions service recovery transparency as a critical, actionable element in social media comp

Scores

- **Overall Relevance Score:** 90 — Clear conceptualization of transparency as actionable, explicit medi

- **Operationalization Score:** 85 — Well-specified model, measured constructs, and actionable steps fo

Supporting Quotes from the Paper

- "Service recovery transparency refers to the extent to which the responses of a service provider to its cu

- "The higher the level of service recovery transparency is, the higher the level of customer forgiveness a

- "When an apology/explanation is absent, higher levels of service recovery transparency will be importan

- "Providing transparent service recovery… helps generate customer forgiveness, which… reduces switch

Actionability References to Other Papers

- Hogreve et al., 2019; Schaefers & Schamari, 2016 — transparency in online recovery

- Wei et al., 2020 — emotional vs. economic recovery

- Latane, 1981 — social influence theory

- Wang et al., 2020 — public vs. private apologies

Paper Summary

<!--META_START-->

Overall Relevance Score: 82

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Data Mining, Machine Learning, Topic Modeling)

Study Context: African Development Bank (AfDB) project portfolio analysis for investment guidance

Geographic/Institutional Context: Africa / AfDB (headquartered in Côte d'Ivoire)

Target Users/Stakeholders: Investors, policy makers, AfDB analysts

Primary Contribution Type: Machine Learning workflow for actionable investment guidance

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Machine Learning-Based Framework for the Analysis of Project Viability

Authors:

Jean Marie Tshimula, Atsushi Togashi

DOI:

10.1109/CCOMS.2018.8463273

Year:

2018

Publication Type:

Conference

Discipline/Domain:

Data Science / Development Economics

Subdomain/Topic:

Machine Learning for Investment Decision Support in African Development Projects

Contextual Background:

The study focuses on transforming African Development Bank (AfDB) project data into actionable insights

Geographic/Institutional Context:

Africa / African Development Bank

Target Users/Stakeholders:

Potential investors, AfDB officials, development economists, policy makers

Primary Methodology:

Mixed Methods (Machine Learning classification + NLP topic modeling)

Primary Contribution Type:

Design and implementation of a machine learning-based workflow for actionable investment recommenda

General Summary of the Paper

The paper presents a machine learning framework designed to process and analyze AfDB project data, c

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly understood as the ability of the analytical framework to transform raw project data

> "…transforming the project data…into actionable insights and…giving investment directions to follow ba

> "…generate the knowledge required for orienting people…willing to know more details…with insightful g

What Makes Something Actionable

- Connection to AfDB's strategic "High Five" priorities

- Clear identification of sectors and countries with investment potential

- Data-driven classification of promising projects using RF accuracy and LDA topic extraction

- Reduction of uncertainty and investment risk through predictive modeling

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Machine Learning-Based Workflow (AfDB investment analysis)

- **Methods/Levers:** Web scraping (afdbr R package), MongoDB storage, Random Forests, LDA topic r

- **Operational Steps / Workflow:** Data extraction → Structured storage → Data cleaning & translation →

- **Data & Measures:** Project descriptions, status, sector, elapsed time, reappraisal status

- **Implementation Context:** AfDB project portfolio

> "…workflow…consists of two phases: data collection and storage, and analysis module." (p. 2)

> "…built a model with 100 trees…then built an LDA model to outline the data with 20 topics." (p. 4)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear sector classification and thematic topic identification aid understanding.

- **CR (Contextual Relevance):** Yes — Links directly to AfDB's High Five priorities and African market t

- **FE (Feasibility):** Yes — Uses existing AfDB data and scalable ML methods.

- **TI (Timeliness):** No explicit reference.

- **EX (Explainability):** Partial — RF feature importance is used, but model interpretability is not deeply

- **GA (Goal Alignment):** Yes — Explicitly tied to AfDB's strategic priorities.

- **Other Dimensions Named by Authors:** Risk reduction, investment prioritization.

Theoretical or Conceptual Foundations

- AfDB High Five priorities

- Random Forest classification theory (Breiman, 2001)

- LDA topic modeling (Blei et al., 2003)

Indicators or Metrics for Actionability

- RF classification accuracy (99.8%)

- Identification of top 7 sectors for investment

- Topic frequency and relevance to strategic priorities

Barriers and Enablers to Actionability

- **Barriers:** Missing project descriptions (7.1%), language inconsistencies requiring translation

- **Enablers:** Comprehensive AfDB dataset, automated continuous data scraping, alignment with strate

Relation to Existing Literature

Positions itself as extending previous AfDB project evaluation models (e.g., Mubila et al. 2002) by focusir

Summary

This paper develops and demonstrates a machine learning-based workflow to make AfDB project data ad

Scores

- **Overall Relevance Score:** 82 — Strong implicit definition of actionability and clear link to features (se

- **Operationalization Score:** 90 — Detailed workflow, concrete ML methods, data sources, and sector

Supporting Quotes from the Paper

- "Transforming the project data…into actionable insights and…giving investment directions to follow bas

- "…generate the knowledge required for orienting people…with insightful guidance." (p. 2)

- "…built a model with 100 trees…then built an LDA model to outline the data with 20 topics." (p. 4)

Actionability References to Other Papers

- Mubila & Lufumpa (2002) — Statistical model for project success factors

- Blei et al. (2003) — LDA model

- Breiman (2001) — Random Forests

Paper Summary

<!--META_START-->

Title: Learning analytics dashboard: a tool for providing actionable insights to learners

Authors: Teo Susnjak, Gomathy Suganya Ramaswami, Anuradha Mathrani

DOI: https://doi.org/10.1186/s41239-021-00313-7

Year: 2022

Publication Type: Journal

Discipline/Domain: Educational Technology / Learning Analytics

Subdomain/Topic: Learning Analytics Dashboards (LADs), Actionable Insights, Predictive and Prescriptiv

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (proposed LAD integrating descriptive, predictive, prescriptive, interpret

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Systematic Literature Review + System Design)

Study Context: Higher Education, learner-facing dashboards

Geographic/Institutional Context: Massey University, New Zealand

Target Users/Stakeholders: Students (primary), instructors, higher education institutions

Primary Contribution Type: Conceptual framework + prototype implementation

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

Title:

Learning analytics dashboard: a tool for providing actionable insights to learners

Authors:

Teo Susnjak, Gomathy Suganya Ramaswami, Anuradha Mathrani

DOI:

https://doi.org/10.1186/s41239-021-00313-7

Year:

2022

Publication Type:

Journal

Discipline/Domain:

Educational Technology / Learning Analytics

Subdomain/Topic:

Learning Analytics Dashboards, Actionable Insights, Predictive and Prescriptive Analytics

Contextual Background:

The paper addresses the design, capabilities, and challenges of learner-facing Learning Analytics Dashb

Geographic/Institutional Context:

Massey University, New Zealand

Target Users/Stakeholders:

Students (primary), instructors, institutional decision-makers

Primary Methodology:

Mixed Methods (Systematic Literature Review + Prototype Dashboard Design & Implementation)

Primary Contribution Type:

Conceptual framework, synthesis of literature, and novel LAD prototype integrating multiple analytics laye

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General Summary of the Paper

The study systematically reviews 17 recently published LADs (2018–2021) to assess their capabilities, fo

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the LAD's ability to provide learners with insights that can trigger informed, spe

> "…understand why a model produced given predictions… what insights can be derived… in order to tri

> "Prescriptive outputs… tailored to each learner… issue advice on behavioral adjustments and learning

---

What Makes Something Actionable

- Interpretability and explainability of predictive models.

- Presentation of counterfactuals showing how specific changes could improve outcomes.

- Contextually relevant, personalized recommendations.

- Evidence-based and data-driven suggestions.

- Clarity and avoidance of cognitive overload.

- Integration of predictive accuracy and confidence communication.

- Goal alignment with learner objectives.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Proposed Multi-Panel LAD with descriptive, predictive, prescriptive,

- **Methods/Levers:** Machine learning models (CatBoost, scikit-learn), model interpretability tools (Anch

- **Operational Steps / Workflow:** Data collection from LMS (Moodle) → preprocessing → predictive mo

- **Data & Measures:** Engagement metrics, assignment/test scores, demographic info, predictive risk sc

- **Implementation Context:** Higher education institution pilot, 20 classes, ~4000 student dataset.

> "…counterfactuals indicate… minimal changes… would produce… more positive outcomes…" (p. 17)

> "…conversion of a black-box predictive model into a glass-box, human interpretable model…" (p. 16)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Minimal use of colors, clear data-to-ink ratio (p. 17).

- **CR (Contextual Relevance):** Yes — Learner-specific metrics and comparisons (p. 16).

- **FE (Feasibility):** Yes — Recommendations based on minimal changes in controllable factors (p. 17).

- **TI (Timeliness):** Partial — Emphasis on early predictions for timely intervention, but no explicit real-ti

- **EX (Explainability):** Yes — Feature importance, anchors, counterfactuals (p. 17–18).

- **GA (Goal Alignment):** Yes — Advice aimed at maximizing course completion and learning outcomes

- **Other Dimensions:** Ethical transparency, cognitive load minimization.

Theoretical or Conceptual Foundations

- Explainable AI (XAI)

- Counterfactual explanations (Wachter et al., 2017)

- Learning analytics layers (descriptive, predictive, prescriptive)

- Cognitive load theory in dashboard design (Tufte, 2001; Bera, 2016)

Indicators or Metrics for Actionability

- Predictive model accuracy (%)

- Feature importance rankings

- Risk classification (high/low)

- Minimal change thresholds for outcome improvement

Barriers and Enablers to Actionability

- **Barriers:** Lack of interpretability in most LADs, technical complexity, concept drift, small datasets, eth

- **Enablers:** Emerging XAI tools, counterfactual generation methods, integrated data sources, agile ins

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Relation to Existing Literature

Positions itself as first LAD to fully integrate descriptive, predictive, and data-driven prescriptive analytics

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Summary

This paper identifies significant gaps in the ability of existing LADs to deliver actionable insights, emphasi

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Scores

- **Overall Relevance Score:** 92 — Strong conceptual framing of actionability with explicit features and

- **Operationalization Score:** 95 — Fully articulated operational model with specific tools, data sources,

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Supporting Quotes from the Paper

- "Models need to possess explanatory characteristics… in order to trigger actionable behavioral adjustm

- "Prescriptive outputs… tailored to each learner… advice on behavioral adjustments…" (p. 4)

- "Counterfactuals indicate… minimal changes… would produce… more positive predictive outcomes." (p

- "Conversion of a black-box predictive model into a glass-box… so that they can understand how their pr

---

Actionability References to Other Papers

- Wachter et al. (2017) – Counterfactual explanations

- Ribeiro et al. (2018) – Anchors for interpretability

- Adadi & Berrada (2018) – Explainable AI

- Baneres et al. (2019, 2021) – Early warning systems and predictive analytics in LA

- Rets et al. (2021), Valle et al. (2021) – Need for prescriptive recommendations in LADs

Paper Summary

<!--META_START-->

Title: Latent classes from complex assessments: What do they tell us?

Authors: Jake McMullen, Ryan W. Lewis, Drew H. Bailey

DOI: https://doi.org/10.1016/j.lindif.2020.101944

Year: 2020

Publication Type: Journal

Discipline/Domain: Educational Psychology

Subdomain/Topic: Latent Class Analysis in Mathematics Achievement Assessment

Eligibility: Eligible

Overall Relevance Score: 70

Operationalization Score: 55

Contains Definition of Actionability: Implicit

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Partial (applied LCA process)

Operationalization Present: Yes

Primary Methodology: Quantitative

Study Context: Application of LCA to 5th-grade math benchmark assessments to explore predictive value

Geographic/Institutional Context: Mid-sized, socioeconomically and racially diverse U.S. school district (W

Target Users/Stakeholders: Educators, school districts, educational policymakers

Primary Contribution Type: Empirical study with methodological evaluation

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Yes

GA: Partial

Reason if Not Eligible: n/a

<!--META_END-->

Title: Latent classes from complex assessments: What do they tell us?

Authors: Jake McMullen, Ryan W. Lewis, Drew H. Bailey

DOI: https://doi.org/10.1016/j.lindif.2020.101944

Year: 2020

Publication Type: Journal

Discipline/Domain: Educational Psychology

Subdomain/Topic: Latent Class Analysis in Mathematics Achievement Assessment

Contextual Background: The study tests whether LCA applied to district-wide math benchmark assess

Geographic/Institutional Context: Mid-sized, socioeconomically and racially diverse school district in th

Target Users/Stakeholders: Educators, curriculum planners, district administrators, policymakers.

Primary Methodology: Quantitative

Primary Contribution Type: Empirical study evaluating methodological and practical utility of LCA.

General Summary of the Paper

This study investigates the practical and predictive value of applying Latent Class Analysis (LCA) to large

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly defined as the ability of latent classes to yield *meaningful and useful patterns of

> "...such latent classes actually reflects actionable information for educators" (p. 3)

> "…identifying students whose patterns of knowledge suggest they are at greater risk…than their curren

What Makes Something Actionable

- Produces knowledge patterns that explain performance differences *beyond* overall scores.

- Identifies groups where targeted instruction in specific skills would be more effective than alternatives.

- Reflects knowledge states with different causal effects on future learning.

- Is interpretable in relation to domain theory (e.g., fractions as a pivotal skill).

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Latent Class Analysis (LCA)

- **Methods/Levers:** Application of LCA to pass/fail benchmark standards to group students by knowled

- **Operational Steps / Workflow:**

  1. Fit multiple-class LCA models to benchmark pass/fail data.

  2. Select model based on BIC and interpret profiles.

  3. Compare profiles with similar overall performance but different knowledge patterns.

  4. Assess predictive validity for end-of-year standardized tests, controlling for covariates.

- **Data & Measures:** Pass/fail by curriculum standard, prior year standardized test scores, demographi

- **Implementation Context:** District-level assessments; could be implemented by school systems with e

> "...gleaning such actionable patterns…would be highly beneficial for educators" (p. 3)

> "...estimate an approximate range of effects…by statistically controlling…" (p. 3)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Profiles must be interpretable and coherent.

- **CR (Contextual Relevance):** Yes – Linked to specific curriculum standards and grade-level benchma

- **FE (Feasibility):** Partial – Method is implementable with existing district data, but practical gains are s

- **TI (Timeliness):** No – Study uses assessments months before the end-of-year exam, but timeliness i

- **EX (Explainability):** Yes – Classes must be interpretable in terms of cognitive development and curri

- **GA (Goal Alignment):** Partial – Supports targeted instruction toward high-leverage skills like fractions

- **Other Dimensions Named by Authors:** None explicitly labeled beyond above.

Theoretical or Conceptual Foundations

- Integrated theory of numerical development (Siegler et al., 2011)

- Prior LCA applications in cognitive development tasks (e.g., Piagetian tasks, conceptual change studies

- Theories on fractions as critical to mathematical development (Siegler et al., 2012)

Indicators or Metrics for Actionability

- Differences in predictive power of latent classes after controlling for overall performance and covariates.

- Magnitude of residual effects (SD units) indicating potential causal importance of specific skill deficits.

Barriers and Enablers to Actionability

- **Barriers:**

  - Broad, complex tests mask specific cognitive states.

  - Pass/fail aggregation loses fine-grained information.

  - Small added predictive value after controls.

- **Enablers:**

  - Coherent, interpretable class structures.

  - Potential for identifying skill-specific deficits relevant to intervention.

Relation to Existing Literature

Positions LCA as promising in theory-driven contexts with narrow, well-defined constructs but cautions ag

Summary

This study evaluates whether latent class analysis applied to broad, curriculum-based math benchmark a

Scores

- **Overall Relevance Score:** 70 – Provides implicit, substantive criteria for actionability and ties feature

- **Operationalization Score:** 55 – Presents a replicable method for deriving and testing actionability fro

Supporting Quotes from the Paper

- "...such latent classes actually reflects actionable information for educators" (p. 3)

- "…identifying students whose patterns of knowledge suggest they are at greater risk…than their current

- "…gleaning such actionable patterns…would be highly beneficial for educators" (p. 3)

- "...estimate an approximate range of effects…by statistically controlling…" (p. 3)

Actionability References to Other Papers

- Siegler, Thompson, & Schneider (2011) – Integrated theory of numerical development.

- Siegler et al. (2012) – Fractions as central to math learning.

- Embretson & Yang (2012) – Theoretically grouped test items.

- Jansen & van der Maas (1997, 2002) – LCA in Piagetian balance scale tasks.

Paper Summary

Contains Definition of Actionability: Yes (explicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (WAx Framework)

Operationalization Present: Yes

Primary Methodology: Conceptual with illustrative case study

Study Context: Crisis management with distributed actors in cyber-socio-technical systems

Geographic/Institutional Context: Italy (ENEA, Sapienza University of Rome)

Target Users/Stakeholders: Crisis managers, rescue operators, analysts, decision-makers

Primary Contribution Type: Conceptual framework application and modelling method

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Knowledge Fusion for Distributed Situational Awareness driven by the WAx Conceptual Framework

Authors:

Antonio De Nicola, Maria Luisa Villani, Francesco Costantino, Andrea Falegnami, Riccardo Patriarca

DOI:

n/a

Year:

2021

Publication Type:

Conference

Discipline/Domain:

Crisis Management / Information Systems

Subdomain/Topic:

Distributed Situational Awareness, Knowledge Fusion, WAx Framework

Contextual Background:

The paper addresses the challenge of achieving distributed situational awareness in large crisis scenario

Geographic/Institutional Context:

Italy (ENEA, Sapienza University of Rome)

Target Users/Stakeholders:

Crisis managers, rescue operators, analysts, decision-makers

Primary Methodology:

Conceptual with illustrative case study (mountain rescue after avalanche)

Primary Contribution Type:

Conceptual framework application and modelling method

General Summary of the Paper

The authors propose a conceptual modelling approach for integrating distributed knowledge in crisis man

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable knowledge is defined as the output of knowledge fusion that is "consistent, accurate, and usef

> "We define knowledge fusion as the process of integrating multiple knowledge entities to produce action

> "[...] make it actionable requires to achieve a shared understanding among the different involved actors

What Makes Something Actionable

- Consistency across multiple knowledge sources.

- Accuracy of information relative to the operational reality.

- Usefulness for the specific decision-making purpose.

- Integration of heterogeneous knowledge entities (human, cyber, tacit, explicit).

- Alignment with operational goals and constraints.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** WAx Framework with Knowledge Conversion Maps

- **Methods/Levers:** Identification of agents, classification of WAx entities, mapping of knowledge conve

- **Operational Steps / Workflow:**

  1. Identify key agents (blunt-end, sharp-end, analysts).

  2. Identify WAx knowledge entities for each agent.

  3. Build knowledge conversion map (matrix linking source and target entities with conversion type).

- **Data & Measures:** WAx entity types, knowledge conversion activities (introspection, internalisation, e

- **Implementation Context:** Crisis management lifecycle phases (preparedness, response, recovery, m

> "The final aim is to build a knowledge conversion map for each phase of the crisis management lifecycl

> "The imagined reconstructed situation...is originated by a knowledge fusion activity that takes into acco

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Actionable knowledge must be interpretable by diverse actors.

- **CR (Contextual Relevance):** Yes — Knowledge must fit specific crisis context.

- **FE (Feasibility):** Partial — Implied via operational constraints but not explicitly detailed.

- **TI (Timeliness):** No — Timeliness not explicitly linked to actionability.

- **EX (Explainability):** Partial — WAx structure promotes traceability but not fully elaborated.

- **GA (Goal Alignment):** Yes — Explicitly aligned to crisis management decision goals.

- **Other Dimensions Named by Authors:** Consistency, accuracy, usefulness.

Theoretical or Conceptual Foundations

- WAx framework (Work-As-x representations from resilience engineering).

- Nonaka & Konno's knowledge conversion model (tacit/explicit).

- Ontology integration for knowledge fusion.

Indicators or Metrics for Actionability

No formal quantitative metrics; qualitative criteria include coherence, integration completeness, and align

Barriers and Enablers to Actionability

- **Barriers:** Conflicting perspectives, incomplete information, communication losses, differing objectives

- **Enablers:** Ontology-based shared understanding, structured knowledge conversion mapping, multi-a

Relation to Existing Literature

Positions itself against prior ontology-based situational awareness approaches by focusing on modelling

Summary

This paper applies the WAx conceptual framework to the challenge of distributed situational awareness in

Scores

- **Overall Relevance Score:** 88 — Strong explicit definition and conceptual clarity on actionability, with

- **Operationalization Score:** 82 — Clear multi-step method (agent/entity identification, conversion map

Supporting Quotes from the Paper

- "We define knowledge fusion as the process of integrating multiple knowledge entities to produce action

- "Make it actionable requires to achieve a shared understanding among the different involved actors." (p.

- "The final aim is to build a knowledge conversion map for each phase of the crisis management lifecycle

- "The imagined reconstructed situation...is originated by a knowledge fusion activity that takes into accou

Actionability References to Other Papers

- Nonaka, I., & Konno, N. (1998). *The concept of "Ba"* — knowledge conversion.

- Patriarca et al. (2021) — WAx framework.

- Osman et al. (2021) — ontology integration for knowledge fusion.

- Benaben et al. (2020) — crisis knowledge meta-model.

Paper Summary

<!--META_START-->

Title: Investigating the electric vehicle adoption initiatives for achieving sustainable development goals

Authors: Shashi Kant Tripathi, Ravi Kant, Ravi Shankar

DOI: https://doi.org/10.1016/j.sftr.2025.100469

Year: 2025

Publication Type: Journal

Discipline/Domain: Sustainable Transportation / Industrial Engineering

Subdomain/Topic: Electric Vehicle Adoption; Sustainable Development Goals; Multi-Criteria Decision-Ma

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit, through prioritization framework and link to SDGs)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Systematic Literature Review, Expert Elicitation, MCDM, Machine

Study Context: EV sector in India as a case study

Geographic/Institutional Context: India; Sardar Vallabhbhai National Institute of Technology; Indian Institu

Target Users/Stakeholders: Policymakers, EV manufacturers, charging infrastructure developers, sustain

Primary Contribution Type: Prioritization framework for EV adoption initiatives linked to SDGs

CL: Yes

CR: Yes

FE: Yes

Title:

Investigating the electric vehicle adoption initiatives for achieving sustainable development goals

Authors:

Shashi Kant Tripathi, Ravi Kant, Ravi Shankar

DOI:

https://doi.org/10.1016/j.sftr.2025.100469

Year:

2025

Publication Type:

Journal

Discipline/Domain:

Sustainable Transportation / Industrial Engineering

Subdomain/Topic:

Electric Vehicle Adoption; Sustainable Development Goals; Multi-Criteria Decision-Making

Contextual Background:

The study focuses on identifying and prioritizing Electric Vehicle Adoption Initiatives (EVAIs) to advance s

Geographic/Institutional Context:

India; conducted by SVNIT Surat and IIT Delhi

Target Users/Stakeholders:

National and state policymakers, EV manufacturers, charging infrastructure developers, environmental re

Primary Methodology:

Mixed Methods — Systematic Literature Review (PRISMA), Expert Elicitation, Multi-Criteria Decision-Mak

Primary Contribution Type:

Decision-support framework for aligning EV adoption with prioritized SDG targets

---

General Summary of the Paper

The paper develops a hybrid decision-making and machine learning framework to identify, prioritize, and

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is conceptualized as the ability of initiatives to directly and measurably advance specific SDG

> "The priority of these EV adoption initiatives (EVAIs) will aid policymakers and stakeholders in streamlin

> "These assessments offer valuable insights for EV stakeholders, assisting them in stratifying critical init

---

What Makes Something Actionable

- Direct contribution to measurable SDG targets

- Contextual relevance to national sustainability and transport policies

- Feasibility in terms of infrastructure, technology, and socio-economic conditions

- Policy alignment and potential for government or stakeholder support

- Scalability and replicability across regions

- Integration of environmental, social, and economic considerations

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Hybrid Spherical Fuzzy MCDM + Machine Learning Framework

- **Methods/Levers:** Systematic literature review, expert elicitation, SF-BBWM, SF-CM, SF-EDAS

- **Operational Steps / Workflow:**

  1. Identify EVAIs and associated SDG targets via PRISMA-guided SLR and PyPDF2 sentence extractio

  2. Expert validation and categorization of EVAIs and SDGs

  3. Prioritization of initiatives using SF-BBWM

  4. SDG clustering with SF-CM to find most critical ones

  5. SDG ranking with SF-EDAS

  6. Sensitivity analysis and method comparison with SF-TOPSIS and SF-CODAS

- **Data & Measures:** Expert weight assignments, linguistic scale to fuzzy number conversion, appraisa

- **Implementation Context:** Indian EV market, national and state policy framework

> "The findings… highlight the top two key initiatives, namely, subsidizing solar-powered EV charging, an

> "SF-BBWM… to prioritize these EVAIs… SF-EDAS ranks the shortlisted SDGs." (p. 3)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clearly defined initiative categories and sub-initiatives linked to SDGs (p. 5)

- **CR (Contextual Relevance):** Yes — tailored to Indian EV sector and policy framework (p. 2)

- **FE (Feasibility):** Yes — initiatives assessed on policy, infrastructure, and economic viability (p. 10–12)

- **TI (Timeliness):** Yes — urgent alignment with 2030 SDG targets (p. 2)

- **EX (Explainability):** Yes — transparent methodology and ranking process (p. 7–9)

- **GA (Goal Alignment):** Yes — explicit linkage to specific SDG targets (p. 6–12)

- **Other Dimensions Named by Authors:** Policy coherence, scalability, environmental impact reduction

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Theoretical or Conceptual Foundations

- Fuzzy set theory (Zadeh, 1965)

- Spherical fuzzy sets (Kutlu Gündo■du & Kahraman, 2019)

- Best-Worst Method (Rezaei, 2015) and Bayesian BWM

- Multi-Criteria Decision-Making and clustering methods

Indicators or Metrics for Actionability

- Criteria weights from SF-BBWM

- SDG appraisal scores from SF-EDAS

- Spearman's rank correlation in sensitivity testing

Barriers and Enablers to Actionability

- **Barriers:** Limited charging infrastructure, high upfront costs, coal-dependent charging, low public awa

- **Enablers:** Government incentives (FAME I & II), renewable integration in charging, battery swapping

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Relation to Existing Literature

Positions itself as filling a gap in linking specific EV initiatives to prioritized SDG targets using a formalize

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Summary

This study presents a novel hybrid methodology combining Spherical Fuzzy Bayesian Best-Worst Method

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Scores

- **Overall Relevance Score:** 90 — Strong conceptual framing of actionability through explicit linkages t

- **Operationalization Score:** 95 — Highly detailed, step-by-step operationalization with tested robustne

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Supporting Quotes from the Paper

- "The priority of these EV adoption initiatives (EVAIs) will aid policymakers and stakeholders in streamlin

- "Identification of the main and sub-categories of EVAIs and the achievable SDGs… Prioritization… Sho

- "Affordable and sustainable transportation (SDG11.2) is found to be the most significant SDG… followe

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Actionability References to Other Papers

- Lipu et al. (2022) — EV benefits and SDG alignment

- Asgarian et al. (2023) — Policy support and sustainable transportation

- Peng & Bai (2023) — Holistic policy approaches

- Hannan et al. (2021) — Battery energy storage and SDGs

- Omahne et al. (2021) — Social aspects and SDG connections

Paper Summary

<!--META_START-->

Title: Individual and Group-level considerations of Actionable Recourse

Authors: Jayanth Yetukuri, Yang Liu

DOI: https://doi.org/10.1145/3600211.3604758

Year: 2023

Publication Type: Conference

Discipline/Domain: Artificial Intelligence / Human-Centered Computing

Subdomain/Topic: Actionable Recourse, Fairness in Machine Learning, User Preferences, Plausibility

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 78

Contains Definition of Actionability: Yes (explicitly in context of recourse viability)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial (linked to transparency and trust)

Contains Interpretability: Partial (discussed via counterfactual explanation methods)

Contains Framework/Model: Yes (proposed optimization approach incorporating preferences and plausib

Operationalization Present: Yes

Primary Methodology: Conceptual + Quantitative Experiments

Study Context: Machine learning decision systems in lending, insurance, hiring

Geographic/Institutional Context: University of California, Santa Cruz; USA

Target Users/Stakeholders: Negatively impacted individuals seeking recourse; developers of ML decision

Primary Contribution Type: Conceptual framework + algorithmic method proposal with empirical demonst

CL: Yes — "Such a transparent mechanism also builds trust in decision-making by enabling adversely aff

CR: Yes — "Plausibility draws strong signals from group-level population information, which must be cons

FE: Yes — "Considering that she belongs to the sub-population of denied single parent, the recourse may

TI: Partial — Timeliness is not explicitly discussed as a feature of actionability.

EX: Partial — Linked to transparency and trust but not fully unpacked.

GA: Yes — "Identify specific, actionable steps in agreement with the approved single parent sub-populati

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Individual and Group-level considerations of Actionable Recourse

Authors:

Jayanth Yetukuri, Yang Liu

DOI:

https://doi.org/10.1145/3600211.3604758

Year:

2023

Publication Type:

Conference

Discipline/Domain:

Artificial Intelligence / Human-Centered Computing

Subdomain/Topic:

Actionable Recourse, Fairness in Machine Learning, User Preferences, Plausibility

Contextual Background:

The paper addresses how actionable recourse—recommendations enabling individuals to achieve desire

Geographic/Institutional Context:

University of California, Santa Cruz (USA)

Target Users/Stakeholders:

Negatively impacted individuals seeking to reverse unfavorable algorithmic decisions; developers and po

Primary Methodology:

Conceptual framework combined with empirical experiments on real-world datasets.

Primary Contribution Type:

A conceptual and computational approach integrating user preferences and group-level plausibility into re

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General Summary of the Paper

The paper explores how actionable recourse in ML decision systems can better account for individual use

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the *viability of taking a suggested action* within the context of recourse for ML

> "Ensure the actionability (the viability of taking a suggested action) of recourse." (p. n/a)

> "Plausibility draws strong signals from group-level population information… to achieve low-cost recours

---

What Makes Something Actionable

- **Alignment with user preferences** (continuous feature scores, categorical rankings, feature bounds)
- **Feasibility** given personal constraints
- **Plausibility** based on similarity to approved cases in the individual's subgroup
- **Transparency** to build trust
- **Fairness** across groups with different distributional characteristics

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Not formally named, but described as constrained optimization incor
- **Methods/Levers:** Optimization function embedding individual preferences; plausibility score constrain
- **Operational Steps / Workflow:**
  1. Collect individual user preferences (three types).
  2. Integrate these as constraints in recourse optimization.
  3. Calculate group-level plausibility score.
  4. Generate recourse maximizing plausibility while respecting user constraints.
- **Data & Measures:** Real-world datasets; plausibility score; recourse cost metrics.

- **Implementation Context:** Lending, insurance, hiring decisions.

> "We propose to capture… three types of user preferences… and embed them into an optimization func

> "We quantify plausibility of recourse with respect to the approved sub-population of the individual's grou

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — linked to transparency and understandability in recourse generation.

- **CR (Contextual Relevance):** Yes — plausibility relies on subgroup context.

- **FE (Feasibility):** Yes — explicitly tied to personal constraints and preferences.

- **TI (Timeliness):** Partial — not directly addressed as a criterion.

- **EX (Explainability):** Partial — present via transparency but not deeply analyzed.

- **GA (Goal Alignment):** Yes — recourse must align with the individual's goal of entering the approved

- **Other Dimensions Named by Authors:** Plausibility; User Preference Diversity.

Theoretical or Conceptual Foundations

- Actionable Recourse in Linear Classification (Ustun et al., 2019)

- Counterfactual explanation generation methods (FACE, GS, CCHVAE)

- Local feasibility constraints (Mahajan et al., 2019)

Indicators or Metrics for Actionability

- Plausibility score based on proximity to approved subgroup manifold

- Recourse cost (individual and group-level)

- Adherence to stated user preferences

Barriers and Enablers to Actionability

- **Barriers:**

  - Universal cost metrics ignoring personal constraints

  - Distributional idiosyncrasies across groups

  - Lack of integration of user preferences in current methods

- **Enablers:**

  - Explicit collection of user preferences

  - Group-level plausibility constraint

  - Transparent recourse generation

Relation to Existing Literature

The paper builds upon existing counterfactual explanation and actionable recourse literature but extends

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Summary

This paper advances the concept of actionable recourse by explicitly integrating **individual-level prefere

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Scores

- **Overall Relevance Score:** 85 — Strong conceptual framing of actionability with explicit dimensions (p

- **Operationalization Score:** 78 — Provides a clear methodology for integrating individual and group-le

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Supporting Quotes from the Paper

- "[Actionability is] the viability of taking a suggested action…" (p. n/a)

- "We propose to capture Alice's three types of user preferences… and embed them into an optimization

- "We quantify plausibility of recourse with respect to the approved sub-population of the individual's grou

- "Considering that she belongs to the sub-population of denied single parent, the recourse may not be ac

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Actionability References to Other Papers

- Ustun et al. (2019) — Actionable Recourse in Linear Classification

- Mahajan et al. (2019) — Local feasibility in counterfactual explanations

- Mothilal et al. (2020) — Diverse counterfactual explanations

- Poyiadzi et al. (2020) — FACE method

- Laugel et al. (2017) — Inverse classification interpretability

- Pawelczyk et al. (2020) — CCHVAE counterfactual generation

Paper Summary

<!--META_START-->

Title: In Search of an Alternative Framework for the Creation of Actionable Knowledge: Table-Tennis Res

Authors: Niclas Adler, Rami Shani

DOI: n/a

Year: 2001

Publication Type: Book Chapter

Discipline/Domain: Organizational Studies / Management Science

Subdomain/Topic: Participatory Inquiry, Actionable Knowledge, Knowledge-Based Firms

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial (through intermediate theories)

Contains Framework/Model: Yes (Table-Tennis Research process model)

Operationalization Present: Yes

Primary Methodology: Qualitative, Conceptual with Longitudinal Case Study

Study Context: Knowledge-based firm (Ericsson), participatory research projects (10 projects over 6 year

Geographic/Institutional Context: Sweden (Ericsson HQ), Chalmers University of Technology, Stockholm

Target Users/Stakeholders: Academic researchers, practitioner researchers, organizational leaders in kno

Primary Contribution Type: Conceptual framework and methodological innovation

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Yes

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title: In Search of an Alternative Framework for the Creation of Actionable Knowledge: Table-Tennis I

Authors: Niclas Adler, Rami Shani

DOI: n/a

Year: 2001

Publication Type: Book Chapter

Discipline/Domain: Organizational Studies / Management Science

Subdomain/Topic: Participatory Inquiry, Actionable Knowledge, Knowledge-Based Firms

Contextual Background: The chapter addresses how actionable knowledge can be generated throug

Geographic/Institutional Context: Sweden; Chalmers University of Technology, Stockholm School of E

Target Users/Stakeholders: Organizational researchers, knowledge managers, R&D leaders, academ

Primary Methodology: Qualitative, conceptual with longitudinal case study

Primary Contribution Type: Methodological framework and process model

General Summary of the Paper

The paper develops and illustrates the "Table-Tennis Research" approach — a participatory inquiry frame

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable knowledge is defined as knowledge that both advances scientific understanding and directly i

> "Actionable knowledge was defined as new knowledge that advances our scientific body of knowledge

> "In the context of generating knowledge for action, it is vital that many perspectives are used… and tha

What Makes Something Actionable

- Relevance to "red and hot" issues (strategic importance, timeliness, perceived as critical by both academ

- Iterative testing and refinement of intermediate theories through actual experiments

- Boundary-spanning integration of perspectives, domains (action/reflection), and phases (design, data, v

- Close alignment with organizational decision-making and strategic discourse

- Mutual ownership of research questions, process, and interpretation

How Actionability is Achieved / Operationalized

- **Framework/Approach Name:** Table-Tennis Research

- **Methods/Levers:** Iterative jam sessions, intermediate theories, real-time experimentation, boundary-

- **Operational Steps / Workflow:** Identify red/hot issues → form mixed teams → conduct jam sessions

- **Data & Measures:** Qualitative data from organizational settings, observations, experimental outcome

- **Implementation Context:** Multi-project, multi-year collaboration at Ericsson involving engineers, mana

> "Research in real-time and on red and hot issues… provides opportunities for validating actionability in

> "The jam sessions… act as the enabling context within which actionable knowledge creation occurs." (p

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clarity in research focus, intermediate theories, and communication of findings is

- **CR (Contextual Relevance):** Yes — must be tied to organizationally strategic "red and hot" issues.

- **FE (Feasibility):** Yes — actionable theories must be testable within organizational constraints.

- **TI (Timeliness):** Yes — focus on issues that are immediately relevant and urgent.

- **EX (Explainability):** Yes — intermediate theories serve as shared explanatory frameworks between o

- **GA (Goal Alignment):** Yes — mutual goals of scientific contribution and practical improvement.

- **Other Dimensions Named by Authors:** Boundary-spanning integration, iterative adaptability, mutual t

Theoretical or Conceptual Foundations

- Knowledge-based view of the firm (Grant, 1998; Nonaka & Takeuchi, 1995)

- Action research and participatory inquiry traditions (Lewin, 1946; Argyris & Schön, 1974; Reason, 1995)

- Habermas' three cognitive interests (technical, practical, emancipatory)

Indicators or Metrics for Actionability

- Degree to which research produces both scientific publications and local theories for action

- Uptake of intermediate theories in organizational practices

- Sustained learning systems post-project

Barriers and Enablers to Actionability

- **Barriers:** Loss of red/hot focus, turnover of key decision-makers, role ambiguity, imbalance between

- **Enablers:** Mutual trust, joint ownership, iterative validation, strategic relevance, boundary-spanning p

Relation to Existing Literature

Builds on and integrates multiple participatory research streams (action science, clinical field research, ap

Summary

Adler and Shani's chapter advances "Table-Tennis Research" as a participatory methodology optimized f

Scores

- **Overall Relevance Score:** 95 — Explicit definition of actionable knowledge, comprehensive set of en

- **Operationalization Score:** 90 — Detailed process model with concrete steps, but context-specific to l

Supporting Quotes from the Paper

- "Actionable knowledge was defined as new knowledge that advances our scientific body of knowledge a

- "Research in real-time and on red and hot issues… provides opportunities for validating actionability in k

- "The jam sessions… act as the enabling context within which actionable knowledge creation occurs." (p

- "By integrating practitioners and different academic disciplines to address an organizational issue, the m

Actionability References to Other Papers

- Argyris & Schön (1974) — Action science

- Nonaka & Takeuchi (1995) — Knowledge creation theory

- Reason (1995) — Participative inquiry paradigm

- Habermas (1981) — Cognitive interests framework

- Gibbons et al. (1994) — Transdisciplinarity

Paper Summary

<!--META_START-->

Eligibility: Eligible

Overall Relevance Score: 98

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with pragmatic evaluation

Study Context: Development and implementation of an assertion rubric for clinical actionability in seconda

Geographic/Institutional Context: Primarily U.S.-based with contributions from Canada

Target Users/Stakeholders: Clinical laboratories, geneticists, policy makers, genomic medicine implemen

Primary Contribution Type: Framework/methodology for actionability assessment and assertion

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title: Implementing evidence-based assertions of clinical actionability in the context of secondary findi

Authors: Christine M. Pak et al.

DOI: https://doi.org/10.1016/j.gim.2024.101164

Year: 2024

Publication Type: Journal

Discipline/Domain: Genomic Medicine / Clinical Genetics

Subdomain/Topic: Clinical actionability, secondary genomic findings, evidence-based frameworks

Contextual Background: The paper addresses the gap in standardized, evidence-based assessment

Geographic/Institutional Context: Primarily U.S.-based research institutions and clinical genetics orga

Target Users/Stakeholders: Clinical laboratories, geneticists, health policy makers, genomic medicine

Primary Methodology: Conceptual framework development with iterative refinement and pragmatic ev

Primary Contribution Type: Framework/methodology for actionability assessment and assertion.

General Summary of the Paper

This article presents the ClinGen AWG's development of an evidence-based "assertion rubric" to generat

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors define clinical actionability as the potential for an intervention, informed by genetic findings, t

> "Clinical actionability in this context includes interventions that could be implemented to mitigate or prev

> "The assertion process allows the AWG to capture… effectiveness of medical interventions… penetran

---

What Makes Something Actionable

- Severity of health outcome

- Likelihood (penetrance) of outcome

- Effectiveness of intervention in preventing/mitigating outcome

- Nature/burden of intervention

- Strength and quality of supporting evidence

- Contextual adoption in clinical practice

- Ethical or feasibility constraints on gathering more evidence

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ClinGen Actionability Assertion Rubric

- **Methods/Levers:** 4-domain SQM scoring → preliminary assertion → expert discussion → consensus

- **Operational Steps / Workflow:**

  1. Score outcome–intervention pairs in four domains (0–3 each).

  2. Identify highest-scoring O/I pair for each gene–condition pair.

  3. Generate preliminary assertion using score thresholds.

  4. Discuss in AWG meetings; consider additional predefined factors.

  5. Document rationale for final assertion.

- **Data & Measures:** Evidence from systematic reviews, meta-analyses, clinical guidelines; penetrance

- **Implementation Context:** Applied to both adult and pediatric gene–condition pairs across 350+ cases

> "The total score is the sum of the four domain scores… used to generate the preliminary assertion of ac

> "The assertion level can be changed based on… poor-quality evidence… interventions widely used… c

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear, structured scoring and definition of levels.

- **CR (Contextual Relevance):** Yes — Context-specific scoring (adult/pediatric frameworks).

- **FE (Feasibility):** Yes — Consideration of real-world clinical adoption and feasibility of interventions.

- **TI (Timeliness):** Partial — Timeliness implied via secondary finding reporting priorities.

- **EX (Explainability):** Yes — Rationale documented for each assertion.

- **GA (Goal Alignment):** Yes — Focus on preventing/mitigating health outcomes aligned with patient he

- **Other Dimensions Named by Authors:** Burden of intervention, ethical considerations for evidence co

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Theoretical or Conceptual Foundations

- Builds on ACMG recommendations for secondary finding reporting.

- Extends the existing ClinGen semi-quantitative metric framework.

- Incorporates evidence hierarchies (systematic review, meta-analysis, guidelines).

Indicators or Metrics for Actionability

- Total domain score (0–12) for highest-scoring O/I pair

- Effectiveness score thresholds

- Tier 1 evidence for "definitive" designation

Barriers and Enablers to Actionability

- **Barriers:** Limited/poor-quality evidence; rare/pediatric conditions with limited trial feasibility.

- **Enablers:** Established clinical use; strong guidelines; high-penetrance variants.

Relation to Existing Literature

Positions the rubric as a standardization advance over prior ad hoc practices in secondary finding reporti

---

Summary

The paper describes the creation and implementation of the ClinGen Actionability Assertion Rubric, a sta

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Scores

- **Overall Relevance Score:** 98 — Offers explicit definition, detailed dimensions, and a fully developed

- **Operationalization Score:** 95 — Provides clear step-by-step process, criteria, and integration into pra

---

Supporting Quotes from the Paper

- "Clinical actionability in this context includes interventions that could be implemented to mitigate or prev

- "The total score is the sum of the four domain scores… used to generate the preliminary assertion of ac

- "The assertion level can be changed based on… interventions widely used… high-quality evidence not l

- "The assertion process allows the AWG to capture… effectiveness of medical interventions… penetranc

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Actionability References to Other Papers

- ACMG SF v2.0, v3.0, v3.1 policy statements

- Hunter et al. (2016, 2018, 2022) on clinical actionability assessment protocols

- Saelaert et al. (2019) on professional perspectives in reporting secondary findings

Paper Summary

<!--META_START-->

Title: Identifying actionable strategies: using Consolidated Framework for Implementation Research (CFI

Authors: Helen Lam, Michael Quinn, Toni Cipriano-Steffens, Manasi Jayaprakash, Emily Koebnick, Forne

DOI: https://doi.org/10.1186/s43058-021-00150-9

Year: 2021

Publication Type: Journal

Discipline/Domain: Implementation Science / Public Health

Subdomain/Topic: Colorectal cancer screening, evidence-based intervention implementation

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit, operational focus)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (CFIR)

Operationalization Present: Yes

Primary Methodology: Qualitative

Study Context: Federally Qualified Health Centers (FQHCs) implementing 3 EBIs for CRC screening

Geographic/Institutional Context: Large urban FQHC in Chicago, Illinois, USA

Target Users/Stakeholders: Primary care providers, integrated care specialists (CRC stewards), administ

Primary Contribution Type: Empirical study with implementation strategy recommendations

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Identifying actionable strategies: using CFIR-informed interviews to evaluate the implementation of a mul

Authors:

Helen Lam, Michael Quinn, Toni Cipriano-Steffens, Manasi Jayaprakash, Emily Koebnick, Fornessa Ran

DOI:

https://doi.org/10.1186/s43058-021-00150-9

Year:

2021

Publication Type:

Journal

Discipline/Domain:

Implementation Science / Public Health

Subdomain/Topic:

Colorectal cancer screening, evidence-based intervention (EBI) implementation

Contextual Background:

The study examines how three EBIs—EHR provider reminders, quarterly provider assessment/feedback,

Geographic/Institutional Context:

Large urban FQHC in Chicago, Illinois, USA

Target Users/Stakeholders:

Primary care providers, CRC stewards (integrated care specialists), administrators, implementation team

Primary Methodology:

Qualitative (semi-structured CFIR-guided interviews, template analysis)

Primary Contribution Type:

Empirical study + operational recommendations

General Summary of the Paper

The paper uses the Consolidated Framework for Implementation Research (CFIR) to analyze the implem

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is understood implicitly as the ability to **translate findings about barriers/facilitators into con

> "By identifying the contextual determinants, we can then determine implementation strategies to facilita

> "The ultimate goal… was to identify possible implementation strategies… to promote CRC screening…

What Makes Something Actionable

- Based on clearly identified barriers/facilitators from stakeholders

- Integrates with existing workflows to minimize disruption

- Distributes responsibility (team-based rather than provider-centric)

- Supported by clear goals and performance feedback

- Supported by culturally and linguistically appropriate resources

- Tied to measurable indicators (e.g., screening rates, completion rates)

- Supported by leadership engagement and organizational incentives

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** CFIR-guided post-implementation formative evaluation

- **Methods/Levers:** Qualitative interviews; barrier/facilitator mapping; context-specific strategy design

- **Operational Steps / Workflow:**

  - Conduct CFIR-based stakeholder interviews

  - Code responses into CFIR constructs

  - Identify contextual barriers/facilitators

  - Develop targeted strategies (e.g., morning huddles, standing orders, dashboards)

- **Data & Measures:** EHR-based screening rates, provider order rates, completion rates, qualitative fe

- **Implementation Context:** Large urban FQHC with diverse patient populations and resource constrair

> "We will tackle the two barriers related to the EHR provider reminder… using a teamwork-based approa

> "Goals direct attention and action… Specific and challenging goals can lead to better task performance

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Strategies emphasize clarity in communication, goals, and feedback reports.

  > "Include the target CRC screening rates in the quarterly… report." (p. 12)

- **CR (Contextual Relevance):** Yes — Strategies tailored to FQHC realities (diverse patients, resource

- **FE (Feasibility):** Yes — Solutions integrate into workflow (e.g., huddles, MA screening updates).

- **TI (Timeliness):** No explicit link to timeliness as a requirement.

- **EX (Explainability):** Partial — Strategies are explained, but not framed in terms of "explainability."

- **GA (Goal Alignment):** Yes — Emphasis on setting clear organizational and clinic-level goals.

- **Other Dimensions Named by Authors:** Team-based care; cultural/linguistic appropriateness.

Theoretical or Conceptual Foundations

- Consolidated Framework for Implementation Research (CFIR)

- Goal-setting theory (Locke, Latham)

Indicators or Metrics for Actionability

- CRC screening order and completion rates

- Provider- and clinic-level performance comparisons

- Achievement of target goals in quarterly feedback

Barriers and Enablers to Actionability

- **Barriers:** EHR reminder fatigue; unreliable data; cultural/linguistic challenges; lack of goals; poor con

- **Enablers:** HRSA reporting incentives; peer pressure; quarterly feedback reports; leadership engager

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Relation to Existing Literature

Positions CFIR as a pragmatic framework for evaluating and improving EBI implementation in resource-c

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Summary

This study operationalizes "actionability" as turning contextual analysis of implementation barriers and fac

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Scores

- **Overall Relevance Score:** 85 — Strong implicit conceptualization of actionability with concrete featur

- **Operationalization Score:** 90 — Detailed, context-specific strategies directly linked to identified barrie

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Supporting Quotes from the Paper

- "By identifying the contextual determinants, we can then determine implementation strategies to facilitat

- "Use teamwork approach and share the burden… Conduct morning huddles… Implement standing orde

- "Include the target CRC screening rates in the quarterly… report… Disseminate… to all members of the

- "Identify and collect culturally and linguistically specific CRC education material." (p. 12)

Actionability References to Other Papers

- CFIR framework: Damschroder et al. (2009)

- Goal-setting theory: Locke et al. (1981), Lunenburg (2011)

- Implementation strategies literature: Proctor et al. (2013), Keith et al. (2017)

Paper Summary

<!--META_START-->

Title: Human Resources-Based Organizational Data Mining (HRODM): Themes, Trends, Focus, Future

Authors: Hila Chalutz-Ben Gal

DOI: 10.1007/978-3-031-24628-9_36

Year: 2023

Publication Type: Book Chapter

Discipline/Domain: Human Resource Management, Data Science

Subdomain/Topic: Human Resources Analytics, Organizational Data Mining, ROI-based Analysis

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit via "actionable knowledge" definition in ODM/HRODM co

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes (e.g., interpretable actionable insights in recruitment model)

Contains Framework/Model: Yes (ROI-based approach, LAMP framework)

Operationalization Present: Yes (ROI-based HRODM process, tool-based implementation examples)

Primary Methodology: Systematic Literature Review and Synthesis (with conceptual and empirical analys

Study Context: Organizational decision-making in HR using data mining and analytics, ROI lens

Geographic/Institutional Context: Global, with shift of research focus from Europe to North America

Target Users/Stakeholders: HR managers, organizational decision-makers, data scientists, researchers

Primary Contribution Type: Theoretical framework, synthesis, practical implementation guidance

CL: Yes – clarity/understandability explicitly linked to actionable insight via "meaningful managerial insigh

CR: Yes – contextual relevance linked to ROI-based adoption decisions

FE: Yes – feasibility linked to adoption justification and ROI-driven prioritization

TI: Yes – timeliness implicit in proactive vs. reactive HRODM application

EX: Yes – explainability emphasized in interpretable recruitment decision model

GA: Yes – goal alignment via strategic management tool framing

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Human Resources-Based Organizational Data Mining (HRODM): Themes, Trends, Focus, Future

Authors:

Hila Chalutz-Ben Gal

DOI:

10.1007/978-3-031-24628-9_36

Year:

2023

Publication Type:

Book Chapter

Discipline/Domain:

Human Resource Management, Data Science

Subdomain/Topic:

Human Resources Analytics, Organizational Data Mining, ROI-based Analysis

Contextual Background:

The chapter explores the use of data mining and analytics in human resources (HRODM), situating it with

Geographic/Institutional Context:

Global; review shows an increasing North American research dominance post-2011.

Target Users/Stakeholders:

HR professionals, executives, data scientists, management scholars, organizational strategists.

Primary Methodology:

Systematic literature review, conceptual synthesis, and ROI-based framework application.

Primary Contribution Type:

Theoretical framework and applied guidance for HRODM adoption and implementation.

General Summary of the Paper

This chapter reviews and synthesizes the literature on Human Resources-Based Organizational Data Mir

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the transformation of HR data into "valuable and actionable knowledge" to impro

> "ODM is defined as leveraging… tools… to transform data into valuable and actionable knowledge to ga

> HRODM aims "to provide an organization with insights for effectively managing employees… to achieve

---

What Makes Something Actionable

- Insights must be relevant to organizational strategy (goal alignment).

- They must be derived from structured analytics (LAMP components).

- ROI must be demonstrable to justify adoption.

- Outputs must be interpretable and implementable by practitioners.

- Contextual fit between analytics tools and organizational challenges.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ROI-based approach, LAMP framework (Logic, Analytics, Measurem

- **Methods/Levers:** Systematic literature review; classification of studies; mapping ROI levels to resear

- **Operational Steps / Workflow:** Identify HR challenge → select analytics tools → conduct analysis →

- **Data & Measures:** HR metrics, organizational KPIs, turnover data, satisfaction scores, recruitment su

- **Implementation Context:** Strategic HRM, talent management, workforce planning, recruitment, reten

> "The ROI-based approach… provides a robust tool to compare and contrast different dilemmas and ass

> "Extraction of interpretable and actionable insights" in recruitment decisions (p. 859).

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL:** Yes — "meaningful managerial insights" and "clear connection between analytics investment an

- **CR:** Yes — contextual fit between analytics approach and organizational challenge (p. 848).

- **FE:** Yes — ROI as a feasibility test for adoption (p. 834, 847).

- **TI:** Yes — proactive vs. reactive application influences timeliness (p. 847).

- **EX:** Yes — interpretable recruitment models explicitly mentioned (p. 859).

- **GA:** Yes — strategic management tool framing and KPI alignment (p. 842).

- **Other Dimensions Named by Authors:** Evidence-based approach, process efficiency.

Theoretical or Conceptual Foundations

- LAMP framework (Boudreau & Ramstad, 2006).

- Contextual approach in organizational research (Johns, 2006, 2018).

- Strategic HRM and ROI literature.

Indicators or Metrics for Actionability

- ROI percentage/ratio.

- Turnover rates and causes.

- Recruitment success probability.

- Training ROI.

- KPI performance changes post-implementation.

Barriers and Enablers to Actionability

- **Barriers:** Limited empirical evidence; lack of structured adoption methods; reactive data use; low RO

- **Enablers:** ROI-based decision framework; integration of LAMP; predictive analytics tools; alignment

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Relation to Existing Literature

Builds on HR analytics, organizational data mining, and ROI literature; integrates managerial and technic

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Summary

The chapter positions HRODM as a high-impact approach for transforming HR data into actionable organ

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Scores

- **Overall Relevance Score:** 92 — Clear implicit definition of actionability, strong linkage to dimensions

- **Operationalization Score:** 95 — Detailed step-by-step operationalization with ROI metrics, applied to

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Supporting Quotes from the Paper

- "ODM is defined as… transforming data into valuable and actionable knowledge to gain a strategic com

- "To provide an organization with insights for effectively managing employees… to achieve business goa

- "The ROI-based approach… provides a robust tool to compare and contrast different dilemmas and ass

- "Extraction of interpretable and actionable insights" (p. 859).

Actionability References to Other Papers

- Boudreau & Ramstad (2006) – LAMP framework.

- Rasmussen & Ulrich (2015) – Adoption challenges and ROI focus.

- Levenson (2005, 2015) – Strategic HR analytics for goal alignment.

- Pessach et al. (2020) – Interpretable recruitment decision-making tool.

Paper Summary

<!--META_START-->

Title: How Clinicians Conceptualize "Actionability" in Genomic Screening

Authors: Kellie Owens, Pamela Sankar, Dina M. Asfaha

<!--META_END-->

Title:

How Clinicians Conceptualize "Actionability" in Genomic Screening

Authors:

Kellie Owens, Pamela Sankar, Dina M. Asfaha

DOI:

Year:

2023

Publication Type:

Journal Article

Discipline/Domain:

Genomic Medicine / Medical Ethics

Subdomain/Topic:

Actionability in population genomic screening

Contextual Background:

The paper explores how clinicians define, assess, and operationalize "actionability" in the context of gen

Geographic/Institutional Context:

United States; multiple health systems with varying resources and genomic screening programs.

Target Users/Stakeholders:

Primary care providers, clinical geneticists, genetic counselors, public health genomics program manage

Primary Methodology:

Qualitative interviews (n=35) with purposive and snowball sampling.

Primary Contribution Type:

Empirical qualitative analysis.

General Summary of the Paper

This qualitative study investigates how clinicians—primary care providers, clinical geneticists, and genetic

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Definitions range from narrow ("pathogenic change with known treatment or surveillance saving lives") to

> "Actionable would have to be a truly pathogenic change, for which there is a known treatment or surveil

> "I think of [actionability] really broadly: anything that has the potential, either now or in the future, to mo

---

What Makes Something Actionable

- Strong evidence of pathogenicity and penetrance

- Efficacy, burden, and availability of interventions

- Severity of potential disease

- Potential for life modification, clinical trial enrollment, or psychosocial benefit

- Alignment with patient's values and personal utility

- Institutional capacity to act on the result

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** No formal named framework; draws on ACMG, CDC Tier One, and

- **Methods/Levers:** Variant classification (ClinVar, ClinGen), professional guidelines, institutional policie

- **Operational Steps / Workflow:** Evidence assessment (now vs. later), determination of available interv

- **Data & Measures:** Variant pathogenicity, penetrance, disease severity, trial data, population-level sc

- **Implementation Context:** Varies by health system—resource-rich systems expand scope; resource-li

> "Because we're a safety net hospital… we would return results on the CDC Tier 1 conditions… probabl

> "We don't want to leave patients hanging, because… reality happens before the ideal does." — Geneti

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clarity of variant classification and intervention pathways emphasized.

- **CR (Contextual Relevance):** Yes — tailored to institutional resources and patient population.

- **FE (Feasibility):** Yes — dependent on institutional capacity and follow-up infrastructure.

- **TI (Timeliness):** Partial — tension between acting now vs. waiting for more evidence.

- **EX (Explainability):** Partial — some emphasis on transparency of evidence and interpretation.

- **GA (Goal Alignment):** Yes — decisions reflect health system priorities and patient benefit.

- **Other Dimensions:** Personal utility, psychosocial impact, marketability (for some institutions).

Theoretical or Conceptual Foundations

- ACMG actionability guidelines and secondary findings lists

- CDC Tier One genomic conditions

- Concepts of clinical validity, clinical utility, and personal utility

- Precision medicine vs. evidence-based medicine paradigms

Indicators or Metrics for Actionability

- Evidence level for pathogenicity/penetrance

- Strength of intervention evidence (RCTs for PCPs; mechanistic plausibility for geneticists)

- Severity of disease outcome

- Institutional capacity metrics (follow-up care rates)

Barriers and Enablers to Actionability

- **Barriers:** Lack of consensus on evidence standards; insufficient infrastructure; provider genetics trair

- **Enablers:** Established guidelines (ACMG, CDC Tier One); institutional investment; belief in patient b

---

Relation to Existing Literature

Builds on prior patient-centered studies of actionability by focusing on clinician perspectives; confirms tha

---

Summary

Owens et al. (2023) provide a qualitative investigation into how clinicians conceptualize "actionability" in g

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Scores

- **Overall Relevance Score:** 90 — Strong explicit and implicit definitions, systematic features, and clini

- **Operationalization Score:** 75 — Clear description of decision-making processes and contextual facto

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Supporting Quotes from the Paper

- "[My definition of] actionable would have to be a truly pathogenic change… that impacts a lifetime of me

- "Anything that has the potential, either now or in the future, to modify either life choices or medical treatr

- "We don't want to leave patients hanging… reality happens before the ideal does." (p. 6)

- "Because we're a safety net hospital… we would return results on the CDC Tier 1 conditions." (p. 10)

Actionability References to Other Papers

- Berg et al. (2016) — semiquantitative metric for evaluating clinical actionability

- ACMG SF v3.1 (Miller et al., 2022)

- CDC Tier One Genomics Applications

- Lázaro-Muñoz et al. (2017) — subjective judgments in selecting medically actionable genes

- Kohler et al. (2017) — personal utility in genomic testing

Paper Summary

Title:

Genomically matched therapy in refractory colorectal cancer according to ESMO Scale for Clinical Action

Authors:

Núria Mulet Margalef et al.

DOI:

10.1002/1878-0261.13444

Year:

2023

Publication Type:

Journal Article

Discipline/Domain:

Oncology

Subdomain/Topic:

Precision oncology; colorectal cancer; genomic profiling; clinical actionability

Contextual Background:

The study assesses the feasibility and clinical utility of expanded genomic profiling (EGP) in refractory me

Geographic/Institutional Context:

Catalan Institute of Oncology and Vall d'Hebron Institute of Oncology, Spain.

Target Users/Stakeholders:

Oncologists, molecular tumor boards, clinical trial coordinators, policymakers in precision oncology.

Primary Methodology:

Quantitative – retrospective cohort analysis.

Primary Contribution Type:

Empirical evidence applying ESCAT to real-world mCRC genomic profiling.

General Summary of the Paper

This paper reports on a cohort of 187 heavily pretreated mCRC patients enrolled in an expanded genomi

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is conceptualized through the ESCAT framework, which ranks genomic alterations based on

> "The clinical value according to ESMO Scale for Clinical Actionability of Molecular Targets (ESCAT) cla

> "ESCAT I… validated in clinical trials… ESCAT IV… preclinical data" (Table 1, p. 2)

What Makes Something Actionable

- Validation in prospective clinical trials (ESCAT I)

- Evidence of response in phase I/II or retrospective studies (ESCAT II)

- Validated in other malignancies (ESCAT III)

- Supported only by preclinical data (ESCAT IV)

- Molecular relevance to drug targeting

- Potential inclusion in biomarker-guided clinical trials

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ESCAT (ESMO Scale for Clinical Actionability of Molecular Targets)

- **Methods/Levers:** Classification of genomic alterations; NGS profiling; molecular tumor boards; clinica

- **Operational Steps / Workflow:** Patient selection → FFPE tumor sample → NGS mutation, CNA, fusio

- **Data & Measures:** Prevalence of ESCAT I–IV alterations; trial inclusion rates

- **Implementation Context:** Precision oncology in a comprehensive cancer center

> "EGP programmes in patients with advanced CRC are feasible and identify a subset of patients with po

> "Final inclusion rate in biomarker-guided clinical trials was 2.7%" (p. 2)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — classification provides a clear, evidence-ranked hierarchy of targets.

- **CR (Contextual Relevance):** Yes — alterations are linked to mCRC therapeutic decisions.

- **FE (Feasibility):** Yes — NGS profiling is feasible in reference centers with adequate tumor tissue.

- **TI (Timeliness):** No explicit link.

- **EX (Explainability):** No explicit link.

- **GA (Goal Alignment):** Partial — aim to align profiling with targeted therapy inclusion.

- **Other Dimensions Named by Authors:** Evidence tier, molecular target druggability.

Theoretical or Conceptual Foundations

- ESCAT framework (Mateo et al., 2018) for ranking targets.

- ESMO guidelines on mCRC management and molecular profiling.

Indicators or Metrics for Actionability

- ESCAT category prevalence per patient cohort.

- Percentage inclusion in biomarker-guided trials.

- Mutation prevalence by sidedness and RAS status.

Barriers and Enablers to Actionability

- **Barriers:** Low prevalence of high-tier alterations; trial slot unavailability; sample insufficiency; absenc

- **Enablers:** Centralized high-quality NGS analysis; multidisciplinary molecular boards; established clin

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Relation to Existing Literature

Aligns with prior reports on low prevalence of high-evidence druggable alterations in mCRC and low trial

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Summary

The study applies the ESCAT framework to a real-world cohort of refractory mCRC patients undergoing e

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Scores

- **Overall Relevance Score:** 78 — Strong explicit definition via ESCAT and systematic features, though

- **Operationalization Score:** 72 — Clear application of ESCAT in workflow and measurable outputs, bu

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Supporting Quotes from the Paper

- "The clinical value according to ESMO Scale for Clinical Actionability of molecular Targets (ESCAT) clas

- "EGP programmes in patients with advanced CRC are feasible and identify a subset of patients with pot

- "Final inclusion rate in biomarker-guided clinical trials was 2.7%" (p. 2)

- "Reducing tissue and economical costs… reshaping NGS panels periodically… implementing liquid biop

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Actionability References to Other Papers

- Mateo J. et al., 2018 — Original ESCAT framework definition.

- Mosele F. et al., 2020 — ESMO NGS recommendations.

- ESMO Clinical Practice Guidelines for mCRC (Cervantes et al., 2023).

Paper Summary

<!--META_START-->

Title: Generic Project Definitions for Improvement of Health Care Delivery: A Case-Based Approach

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit and explicit through "actionable knowledge" framing)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (CTQ flowdown + operational definitions; 9 generic templates)

Operationalization Present: Yes

Primary Methodology: Retrospective case-based analysis (Qualitative with quantitative metrics)

Study Context: 271 Lean Six Sigma projects in hospitals (general, teaching, academic) in the Netherlands

Geographic/Institutional Context: Netherlands, Belgium; University Medical Center Groningen, Erasmus M

Target Users/Stakeholders: Hospital managers, project leaders, health care professionals (including nurs

Primary Contribution Type: Case-based templates for defining improvement projects in healthcare deliver

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Generic Project Definitions for Improvement of Health Care Delivery: A Case-Based Approach

Authors:

Gerard C. Niemeijer, Ronald J. M. M. Does, Jeroen de Mast, Albert Trip, Jaap van den Heuvel

Discipline/Domain:

Health Care Management / Quality Improvement

Subdomain/Topic:

Lean Six Sigma; Process Improvement; Case-Based Reasoning; Health Care Delivery Optimization

Contextual Background:

The paper addresses improvement of health care delivery via process optimization, using a large-scale re

Geographic/Institutional Context:

Hospitals in the Netherlands and Belgium (general, teaching, academic hospitals).

Target Users/Stakeholders:

Hospital managers, project leaders, quality improvement teams, nurses, doctors, administrators.

Primary Methodology:

Retrospective qualitative analysis with quantitative operational metrics.

Primary Contribution Type:

Nine generic project definition templates for process improvement.

General Summary of the Paper

This study analyzes 271 Lean Six Sigma process improvement projects from hospitals in the Netherlands

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Eligibility

Eligible for inclusion: **Yes**

The paper explicitly frames its goal as producing "actionable knowledge" for defining and operationalizing

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How Actionability is Understood

Actionability is framed as the ability to define improvement projects in a way that enables efficient selectio

> "The purpose of this article is to create actionable knowledge, making the definition of process improve

> "These templates function as exemplars for future process improvement projects, making the selection,

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What Makes Something Actionable

- Clear linkage between project objectives and organizational strategy

- Explicit operational definitions through CTQ flowdown

- Use of measurable indicators

- Mid-level generality (removing excessive context-specificity)

- Reusability of template structures

- Direct connection to performance dimensions (cost, safety, satisfaction, throughput)

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Lean Six Sigma methodology; Case-Based Reasoning (CBR)

- **Methods/Levers:** CTQ flowdown; standard measurement plans; operational definitions; nine generic

- **Operational Steps / Workflow:** Define → Measure → Analyze → Improve → Control (DMAIC); extrac

- **Data & Measures:** Critical-to-Quality (CTQ) indicators linked to metrics such as LOS, resource utiliza

- **Implementation Context:** Hospitals in NL and BE, across multiple departments.

> "The CTQ flowdown results in a measurement plan, which operationalizes a project's objectives." (p. 15

> "We identified 9 generic project definition templates… proposed to serve as exemplars." (p. 155)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Templates and CTQ flowdown explicitly define objectives and metrics.

- **CR (Contextual Relevance):** Yes — Tied to hospital strategy and operational context.

- **FE (Feasibility):** Yes — Focus on measurable and achievable improvements.

- **TI (Timeliness):** Partial — Addresses throughput and waiting time in some templates.

- **EX (Explainability):** Partial — CTQ flowdowns show logical rationale but limited emphasis on interpre

- **GA (Goal Alignment):** Yes — Projects aligned with strategic focal points.

- **Other Dimensions Named by Authors:** Reusability; mid-level generality; evidence-based problem sel

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Theoretical or Conceptual Foundations

- Lean Six Sigma DMAIC methodology

- Case-Based Reasoning (CBR) from AI

- CTQ flowdown as conceptual linking model

Indicators or Metrics for Actionability

- LOS (Length of Stay)

- Bed occupation rates

- Number of unnecessary units used

- Percentage of missing/unavailable equipment

- Error rates in registration/invoicing

- Resource utilization rates

- Complication/infection rates

Barriers and Enablers to Actionability

- **Barriers:** Context differences across hospitals; risk of uncritical application of templates; local knowle

- **Enablers:** Structured CTQ flowdown; clear linkage to strategy; reusable templates; measurable indic

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Relation to Existing Literature

Positions contribution as a complement to rule-based Lean Six Sigma methods, adding case-based, mid-

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Summary

Niemeijer et al. (2011) present a case-based reasoning approach to defining healthcare improvement pro

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Scores

- **Overall Relevance Score:** 90 — Strong conceptual and practical integration of actionability through e

- **Operationalization Score:** 95 — Highly detailed operational process (DMAIC, CTQ flowdown, metrics

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Supporting Quotes from the Paper

- "The purpose of this article is to create actionable knowledge, making the definition of process improver

- "These templates function as exemplars for future process improvement projects, making the selection,

- "The CTQ flowdown results in a measurement plan, which operationalizes a project's objectives." (p. 15

- "We identified 9 generic project definition templates… proposed to serve as exemplars." (p. 155)

Actionability References to Other Papers

- De Mast J, Does RJMM, De Koning H. *Lean Six Sigma for Service and Healthcare* (2006)

- Slade S. *Case-based reasoning: a research paradigm* (1991)

- Aamodt A, Plaza E. *Case-based reasoning: foundational issues* (1994)

- De Koning H, De Mast J. *The CTQ flowdown as a conceptual model of project objectives* (2007)

Paper Summary

<!--META_START-->

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 Innov

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,

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 D

Operationalization Present: Yes (discussion of methods, practices, and integration possibilities for achiev

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, globa

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

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

<!--META_END-->

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 (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 resea

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 mo

- **Methods/Levers:** Multi-, inter-, and transdisciplinary research; participatory foresight; scenario exerci

- **Operational Steps / Workflow:** Problem scoping, multidisciplinary synthesis, participatory engageme

- **Data & Measures:** Combination of qualitative deliberation outputs, stakeholder inputs, and computat

- **Implementation Context:** Governance of emerging technologies, particularly Big Data, under RRI pri

> "Participatory engagement can be considered a vital element for a more 'anticipatory' and 'reflexive' go

> "Big Data technologies estimate probable future trajectories… rendering the future knowable and its ou

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 b

- **FE (Feasibility):** Partial – implied in TA's role of offering viable options, but less explicitly tied to feasi

- **TI (Timeliness):** Yes – timely advice is critical in high-stakes contexts; Big Data's real-time capabilitie

- **EX (Explainability):** Yes – TA's transparency vs Big Data's opacity (algorithmic black boxes) discuss

- **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, contextua

Barriers and Enablers to Actionability

- **Barriers:** Big Data opacity; overreliance on algorithmic objectivity; displacement of deliberative proce

- **Enablers:** Integration of computational analytics into TA; multidisciplinary collaboration; genuine part

Relation to Existing Literature

Positions Big Data as a socio-technical phenomenon with both epistemic and political implications, extend

Summary

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

Scores

- **Overall Relevance Score:** 87 – Strong conceptualization of actionability (explicitly named, linked to T

- **Operationalization Score:** 75 – Detailed discussion of methods and integration pathways, though no

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.

Paper Summary

<!--META_START-->

Title: Facilitation of Entrepreneurial Discovery Processes by Policymakers: An Actionable Definition of Ro

Authors: Miren Estensoro, Miren Larrea

DOI: https://doi.org/10.1007/s13132-022-00906-1

Year: 2023

Publication Type: Journal

Discipline/Domain: Regional Development / Innovation Policy

Subdomain/Topic: Smart Specialisation Strategies (S3/S4), Entrepreneurial Discovery Processes (EDP),

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (Six Roles of Facilitative Policymakers)

Operationalization Present: Yes

Primary Methodology: Action Research

Study Context: Bilbao Next Lab, urban S3 strategy with EDP facilitation in Bilbao, Spain

Geographic/Institutional Context: Bilbao City Council, Bilbao Ekintza (city development agency), Basque

Target Users/Stakeholders: Policymakers, entrepreneurs, researchers, quadruple helix actors

Primary Contribution Type: Conceptual framework with operationalization

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title: Facilitation of Entrepreneurial Discovery Processes by Policymakers: An Actionable Definition of

Authors: Miren Estensoro, Miren Larrea

DOI: https://doi.org/10.1007/s13132-022-00906-1

Year: 2023

Publication Type: Journal

Discipline/Domain: Regional Development / Innovation Policy

Subdomain/Topic: Smart Specialisation Strategies (S3/S4), Entrepreneurial Discovery Processes (ED

Contextual Background: Focuses on how policymakers can operationally facilitate EDPs within S3/S4

Geographic/Institutional Context: Bilbao City Council and Bilbao Ekintza, Basque Country, Spain.

Target Users/Stakeholders: Policymakers, entrepreneurs, quadruple helix actors, researchers.

Primary Methodology: Action Research

Primary Contribution Type: Actionable conceptual framework.

General Summary of the Paper

The paper develops and tests an actionable framework for the roles of policymakers in facilitating Entrepr

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the ability for policymakers' roles in EDPs to be **directly implementable** in pra

> "Our contribution is oriented… not exclusively in the theoretical… but also in how they can address its d

> "We connect… the roles with the dilemmas, efforts, tensions, needs, power issues, challenges, risks…

What Makes Something Actionable

- Roles are **linked to concrete actions**, decisions, and facilitation techniques.

- Grounded in **real-world dilemmas** and capacity gaps policymakers face.

- Context-specific learning integrated into process design.

- Inclusion of **both substance knowledge** (technical field) and **process knowledge** (trust, shared vis

- Built-in **monitoring and systematisation** for ongoing improvement.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Six Roles of Facilitative Policymakers in EDPs.

- **Methods/Levers:** Action research co-generation; facilitation techniques; collaborative governance; st

- **Operational Steps / Workflow:**

  1. Choose field to explore

  2. Learn about the field

  3. Engage stakeholders

  4. Attract outside knowledge

  5. Develop shared vision

  6. Monitor, evaluate, systematise

- **Data & Measures:** Process indicators, documentation of lessons learned, stakeholder engagement r

- **Implementation Context:** Bilbao's Futurable pilot EDP on wearable technologies.

> "Participants considered that the first step… was to have a clear definition of their roles…" (p. 1332)

> "Monitoring systems should include process indicators… and systematisation of experiences…" (p. 133

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clear role definitions and functions.

- **CR (Contextual Relevance):** Yes — tailored to Bilbao's specific EDP context.

- **FE (Feasibility):** Yes — tested in practice with policymakers.

- **TI (Timeliness):** Partial — emphasis on continuous adaptation but less on strict time-bound delivery.

- **EX (Explainability):** Partial — roles explained, but mechanisms sometimes implicit.

- **GA (Goal Alignment):** Yes — aligned with S3/S4 innovation and collaborative governance goals.

- **Other Dimensions Named by Authors:** Trust-building, conflict management, integration of external kr

Theoretical or Conceptual Foundations

- Smart Specialisation and EDP literature (Foray et al., 2012; Lepore & Spigarelli, 2018)

- Facilitation theory (Costamagna & Larrea, 2018)

- Collaborative governance (Ansell & Gash, 2008)

- Action research methodology.

Indicators or Metrics for Actionability

- Process indicators (number of workshops, participant diversity)

- Evidence of stakeholder collaboration

- Recorded lessons learned and systematisation outputs.

Barriers and Enablers to Actionability

- **Barriers:** Lack of policymaker facilitation skills; limited knowledge of technical domains; power-sharin

- **Enablers:** Embedded capability-building; action research support; proactive stakeholder engagemen

Relation to Existing Literature

Positions itself as filling the gap between conceptual EDP role descriptions and practical operationalisatic

Summary

This paper operationalises the facilitation role of policymakers in Entrepreneurial Discovery Processes wi

Scores

- **Overall Relevance Score:** 92 — Strong conceptual clarity on actionability, fully integrated with opera

- **Operationalization Score:** 95 — Detailed, field-tested workflow with concrete, replicable steps and cl

Supporting Quotes from the Paper

- "We connect… the roles with the dilemmas, efforts, tensions, needs… which increase their actionability.

- "Participants considered that the first step… was to have a clear definition of their roles…" (p. 1332)

- "Monitoring systems should include process indicators… and systematisation of experiences…" (p. 133

- "The knowledge… has a more actionable nature than the theoretical concepts…" (p. 1338)

Actionability References to Other Papers

- Foray et al. (2012); Lepore & Spigarelli (2018); Costamagna & Larrea (2018); Ansell & Gash (2008); Pe

Paper Summary

<!--META_START-->

Title: Explaining Aggregate Behaviour in Cognitive Agent Simulations Using Explanation

Authors: Tobias Ahlbrecht, Michael Winikoff

DOI: https://doi.org/10.1007/978-3-030-30391-4_8

Year: 2019

Publication Type: Conference

Discipline/Domain: Artificial Intelligence, Multi-Agent Systems

Subdomain/Topic: Cognitive agents, Explainable AI, Agent-based simulation

Eligibility: Eligible

Overall Relevance Score: 87

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicit, tied to usefulness of explanations for simulation refinem

Contains Systematic Features/Dimensions: Yes (implicit through explanation properties such as specificit

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (aggregation mechanism for explanations)

Operationalization Present: Yes

Primary Methodology: Conceptual + Simulation-based demonstration

Study Context: Traffic simulation with cognitive BDI agents

Geographic/Institutional Context: TU Clausthal, Germany; Victoria University of Wellington, New Zealand

Target Users/Stakeholders: Simulation developers, researchers, possibly decision-makers using simulati

Primary Contribution Type: Methodological framework and proof-of-concept

CL: Yes

CR: Yes

FE: Partial

TI: Partial

EX: Yes

GA: Partial

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Explaining Aggregate Behaviour in Cognitive Agent Simulations Using Explanation

Authors:

Tobias Ahlbrecht, Michael Winikoff

DOI:

Year:

2019

Publication Type:

Conference

Discipline/Domain:

Artificial Intelligence, Multi-Agent Systems

Subdomain/Topic:

Cognitive agents, Explainable AI, Agent-based simulation

Contextual Background:

The paper is situated in the context of developing and refining cognitive agent-based simulations, where

Geographic/Institutional Context:

TU Clausthal (Germany) and Victoria University of Wellington (New Zealand)

Target Users/Stakeholders:

Simulation developers, AI researchers, decision analysts relying on simulation outcomes

Primary Methodology:

Conceptual development with simulation-based illustration (traffic scenario)

Primary Contribution Type:

A method for aggregating individual agent explanations to interpret collective behaviour in simulations

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General Summary of the Paper

This paper presents a method for obtaining actionable understanding of aggregate behaviour in cognitive

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper implicitly defines actionability as the capacity of aggregated explanations to support simulation

> "...obtain useful (and actionable) insight into the behaviour of agent-based simulation..." (p. 129)

> "...this link would become less used. This hypothesis was therefore tested by re-running the simulation.

What Makes Something Actionable

- Specific to the scenario and time frame (not just generic dynamics)

- Links aggregate behaviour to identifiable causal factors

- Supports hypothesis testing via simulation modification

- Enables detection of unintended or unrealistic behaviours

- Relates factors directly to agent decision logic and environment conditions

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Aggregated Explanation Mechanism

- **Methods/Levers:** Logging explanatory factors in agent code; aggregating factors across relevant age

- **Operational Steps / Workflow:**

  1. Pose a query about aggregate behaviour

  2. Identify relevant agents

  3. Generate individual explanations using BDI-based mechanism

  4. Aggregate factors and count frequencies

  5. Filter and interpret most common factors

  6. Optionally run counterfactual simulations to test hypotheses

- **Data & Measures:** Counts of explanatory factor occurrences per agent for a given query

- **Implementation Context:** Applied to a simplified traffic simulation with road network, bridges, and rou

> "A straightforward way to aggregate explanations is to count the occurrences of all explanatory factors

> "...we might modify c (or the parameters) and re-run the simulation to check..." (p. 138)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Explanations are explicitly linked to decision logic, making cause understandabl

  > "...preferred the road from 1 to 2 over the road from 1 to 3 because there was traffic..." (p. 137)

- **CR (Contextual Relevance):** Yes — Explanations are scenario- and query-specific.

- **FE (Feasibility):** Partial — Hypotheses can be tested via simulation reruns.

- **TI (Timeliness):** Partial — Insights are generated in sync with simulation analysis.

- **EX (Explainability):** Yes — Mechanism based on BDI folk psychology concepts.

- **GA (Goal Alignment):** Partial — Explanations align with agents' stated goals (e.g., reach destination)

- **Other Dimensions Named by Authors:** Testability, specificity, frequency-based relevance.

Theoretical or Conceptual Foundations

- BDI model of cognitive agents

- Folk psychology explanation concepts (Malle, 2004)

- Explanation frameworks in AI (Winikoff et al., 2018)

Indicators or Metrics for Actionability

- Frequency of explanatory factors across relevant agents

- Presence of causal, scenario-specific factors in top-ranked list

- Change in observed behaviour after modifying implicated conditions

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Barriers and Enablers to Actionability

- **Barriers:** Noise from less relevant factors; difficulty in filtering relevant factors; unrealistic agent logic

- **Enablers:** Structured logging of decision rationale; aggregation process; human-in-the-loop query ref

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Relation to Existing Literature

Builds on work explaining single-agent behaviour (e.g., Winikoff et al., 2018) and extends to independent

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Summary

The authors propose a method to explain aggregate behaviour in cognitive agent-based simulations by a

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Scores

- **Overall Relevance Score:** 87 — Strong implicit definition of actionability tied to explanation usefulnes

- **Operationalization Score:** 85 — Detailed step-by-step process with implemented case study; robust

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Supporting Quotes from the Paper

- "...obtain useful (and actionable) insight into the behaviour of agent-based simulation..." (p. 129)

- "A straightforward way to aggregate explanations is to count the occurrences of all explanatory factors..

- "...preferred the road from 1 to 2 over the road from 1 to 3 because there was traffic..." (p. 137)

- "This hypothesis was therefore tested by re-running the simulation..." (p. 140)

Actionability References to Other Papers

- Malle, B.F. (2004) — Folk psychology framework for explanation

- Winikoff et al. (2018) — Single-agent explanation mechanism

- Harbers et al. (2010) — Early proposal for explaining collective behaviour

Paper Summary

<!--META_START-->

Title: Evidential Reasoning Approach for Predicting Popularity of Instagram Posts

Authors: L. Rivadeneira, I. Loor

DOI: 10.1109/ACCESS.2024.3510637

Year: 2024

Publication Type: Journal

Discipline/Domain: Computer Science / Social Media Analytics

Subdomain/Topic: Predictive modelling of social media engagement using evidential reasoning

Eligibility: Eligible

Overall Relevance Score: 78

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (MAKER)

Operationalization Present: Yes

Primary Methodology: Quantitative / Predictive Modelling (Machine Learning)

Study Context: Instagram post popularity prediction using visual and textual features

Geographic/Institutional Context: Harvard University (USA) & University of Oxford (UK) Instagram accoun

Target Users/Stakeholders: Social media managers, marketing professionals, academic institutions, cont

Primary Contribution Type: Methodological framework and comparative evaluation

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Yes

GA: Partial

Title:

Evidential Reasoning Approach for Predicting Popularity of Instagram Posts

Authors:

L. Rivadeneira, I. Loor

DOI:

10.1109/ACCESS.2024.3510637

Year:

2024

Publication Type:

Journal

Discipline/Domain:

Computer Science / Social Media Analytics

Subdomain/Topic:

Predictive modelling of social media engagement using evidential reasoning

Contextual Background:

The paper evaluates the MAKER (Maximum likelihood evidential reasoning) approach for predicting Insta

Geographic/Institutional Context:

United States (Harvard University) and United Kingdom (University of Oxford).

Target Users/Stakeholders:

Social media managers, marketing teams, academic communication officers, influencers, and analytics re

Primary Methodology:

Quantitative — predictive modelling with machine learning algorithms (MAKER, DT, SVM, KNN).

Primary Contribution Type:

Methodological framework and empirical validation.

General Summary of the Paper

The study applies the MAKER algorithm, grounded in evidential reasoning, to predict the popularity of Ins

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Implicitly defined as the capacity of model outputs to guide content strategy decisions through transparen

> "MAKER's interpretability means that it provides actionable insights… help users make informed decisi

> "While this study focuses on proposing a model for prediction purposes, it is essential to translate these

What Makes Something Actionable

- Ability to identify specific post attributes correlated with higher popularity.

- Transparency in reasoning (weights, reliabilities, evidence interdependencies).

- Interpretability enabling justification of model outputs.

- Context-specific feature patterns rather than one-size-fits-all rules.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** MAKER (Maximum likelihood evidential reasoning).

- **Methods/Levers:** Integration of textual and visual post features into interpretable evidential reasoning

- **Operational Steps / Workflow:** Data collection → Preprocessing → Feature extraction (textual/visual)

- **Data & Measures:** Median likes threshold, emoji/hashtag/mention counts, sentiment, season, image

- **Implementation Context:** Official university Instagram accounts.

> "This transparency yields an interpretable model… examining the relationship between output and inpu

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — outputs are interpretable and grounded in transparent parameter assignment.

- **CR (Contextual Relevance):** Yes — feature influence patterns are institution-specific.

- **FE (Feasibility):** Partial — focuses on achievable content adjustments but omits resource constraints

- **TI (Timeliness):** No explicit link.

- **EX (Explainability):** Yes — full traceability of decision process.

- **GA (Goal Alignment):** Partial — aligns model with engagement improvement goals but not broader c

- **Other Dimensions Named by Authors:** Transparency, interpretability, data completeness handling.

Theoretical or Conceptual Foundations

- Evidential reasoning (ER) rule, based on Dempster-Shafer theory.

- Transparency and interpretability in AI (Rudin, 2019).

- Multimodal content engagement theory from prior social media analytics research.

Indicators or Metrics for Actionability

- Precision, recall, F1-score, AUC, RMSE (used to assess predictive reliability).

- Likelihood scores for evidence patterns.

Barriers and Enablers to Actionability

- **Barriers:** API restrictions limiting automated data collection; exclusion of non-picture post formats; li

- **Enablers:** MAKER's robustness to incomplete data; integration of multimodal features; transparent n

Relation to Existing Literature

Extends prior predictive models for Instagram by addressing interpretability and transparency gaps. Unlik

Summary

The paper demonstrates how MAKER—a maximum likelihood evidential reasoning approach—can delive

Scores

- **Overall Relevance Score:** 78 — Strong implicit definition of actionability and systematic feature linka

- **Operationalization Score:** 85 — Clear step-by-step operational process tied directly to achieving acti

Supporting Quotes from the Paper

- "MAKER's interpretability means that it provides actionable insights… help users make informed decisio

- "Transparency yields an interpretable model… examining the relationship between output and input vari

- "It is essential to translate these findings into actionable strategies for decision-makers…" (p. 13)

- "Harvard's popular posts typically show positive or neutral sentiment… Oxford's popular posts… use mo

Actionability References to Other Papers

- Rudin, C. (2019) on interpretable models vs. black-box AI.

- Yang & Xu (2017) on inferential modelling with data in evidential reasoning.

- Aramendia-Muneta et al. (2021) on key image attributes for engagement.

Paper Summary

<!--META_START-->

Title: Enhancing Student Digital Skills: Adopting an Ecosystemic School Analytics Approach

Authors: Stylianos Sergis, Demetrios G. Sampson, Michail Giannakos

DOI: 10.1109/ICALT.2017.87

Year: 2017

Publication Type: Conference

Discipline/Domain: Educational Technology / Learning Analytics

Subdomain/Topic: School Analytics, Digital Skills, Educational Decision-Making

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 80

Contains Definition of Actionability: Yes (implicit and explicit in decision-making framing)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Quantitative (fsQCA), Conceptual-empirical

Study Context: K-12 schools, cross-European dataset

Geographic/Institutional Context: Europe (2995 schools; EU Commission study)

Target Users/Stakeholders: School leaders, policymakers, educators

Primary Contribution Type: Methodological and empirical model for deriving actionable school improveme

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Yes

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Enhancing Student Digital Skills: Adopting an Ecosystemic School Analytics Approach

Authors:

Stylianos Sergis, Demetrios G. Sampson, Michail Giannakos

DOI:

10.1109/ICALT.2017.87

Year:

2017

Publication Type:

Conference

Discipline/Domain:

Educational Technology / Learning Analytics

Subdomain/Topic:

School Analytics, Digital Skills, Educational Decision-Making

Contextual Background:

Focuses on enabling K-12 school leaders to use *School Analytics*—a layered, ecosystemic data framew

Geographic/Institutional Context:

European cross-national dataset from an EU Commission survey.

Target Users/Stakeholders:

School leaders, educational policymakers, teacher professional development coordinators.

Primary Methodology:

Quantitative (fsQCA), supported by conceptual framework building.

Primary Contribution Type:

Development and validation of a School Analytics ecosystemic factor model + demonstration of fsQCA fo

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General Summary of the Paper

The paper introduces a School Analytics approach integrating an ecosystemic factor model with fuzzy-se

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is conceptualized as *the translation of school ecosystem data into targeted, evidence-based

> "[…] translate these analyses to specific remedying actions for targeted improvement" (p. 1)

> "[…] inform leaders on the specific school areas to improve to meet their goal" (p. 2)

What Makes Something Actionable

- Derived from **holistic, multi-layered data** spanning micro, meso, and macro school levels.

- **Configurable causality**: recognition that multiple different factor combinations can lead to the same o

- **Alignment with desired goals** (here: improving digital skills).

- Clear identification of **specific factor configurations** present/absent that produce the target outcome.

- Context-sensitive applicability—school-specific diagnosis.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** School Analytics Ecosystemic Factor Model + fsQCA-based decisio

- **Methods/Levers:** Collect data across school layers; calibrate factors into fuzzy sets; run fsQCA to ide

- **Operational Steps / Workflow:**

  1. Define factor model (macro, meso, micro).

  2. Collect and validate data (survey-based, Likert-scale).

3. Calibrate into fuzzy sets.

4. Run fsQCA to extract configurations linked to high digital skills.

5. Interpret results for leadership decision-making.

- **Data & Measures:** 4-point Likert survey items; principal attitudes, teacher practices, equipment, cultu

- **Implementation Context:** EU schools, ICT integration and digital skills development.

> "[…] outline which configurations of the factors… can explain high levels of students' digital skills, and t

> "[…] eight distinct configurations… lead to high students' digital skills" (p. 4)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – model clearly identifies factor relationships and configurations.

  > "[…] outline… specific school areas to improve" (p. 2)

- **CR (Contextual Relevance):** Yes – configurations are context-specific to school ecosystem profiles.

- **FE (Feasibility):** Partial – feasibility is implied through practical applicability of identified configuration

- **TI (Timeliness):** No explicit reference.

- **EX (Explainability):** Yes – causal configurations and underlying factors are transparent.

- **GA (Goal Alignment):** Yes – directly tied to improving student digital skills.

Other Dimensions Named by Authors: Coverage and consistency metrics to assess robustness.

Theoretical or Conceptual Foundations

- School Analytics conceptual framework (Sergis & Sampson, 2016).

- Extensive Digital Competence (EDC) model.

- ICT Competence Profiling framework.

- Configurational theory via fsQCA (Ragin, 2000, 2008).

Indicators or Metrics for Actionability

- fsQCA coverage (analogous to R^2).

- fsQCA consistency (adequacy of causal configuration).

- Reliability & validity measures (Cronbach's alpha, AVE).

Barriers and Enablers to Actionability

- **Barriers:** Lack of integrated data systems; absence of certain enabling factors (e.g., ICT equipment,

- **Enablers:** Strong leadership attitudes; positive teacher attitudes; supportive culture; sufficient ICT inf

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Relation to Existing Literature

Positions itself as moving beyond descriptive ICT adoption studies to **prescriptive, configuration-based

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Summary

This paper offers a robust, empirically validated method for converting multi-level school data into actiona

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Scores

- **Overall Relevance Score:** 85 – Strong implicit definition of actionability tied to targeted decision-mak

- **Operationalization Score:** 80 – Provides a detailed process and tool (fsQCA) to derive actionable ins

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Supporting Quotes from the Paper

- "[…] translate these analyses to specific remedying actions for targeted improvement" (p. 1)

- "[…] outline which configurations… can explain high levels of students' digital skills" (p. 2)

- "The fsQCA analysis revealed 8 distinct configurations… which can lead to high students' digital skills" (

- "[…] inform leaders on the specific school areas to improve to meet their goal" (p. 2)

Actionability References to Other Papers

- Sergis & Sampson (2016) – School Analytics framework.

- Aesaert et al. (2015) – EDC model.

- Ragin (2000, 2008) – fsQCA methodology.

- Pappas et al. (2016, 2015) – fsQCA applications in other domains.

Paper Summary

Overall Relevance Score: 85

Operationalization Score: 80

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: No

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Conceptual framing + industry survey)

Study Context: Industry adoption of Organizational Data Mining across sectors

Geographic/Institutional Context: USA; University of North Carolina at Greensboro

Target Users/Stakeholders: Executives, decision-makers, analysts, CRM managers

Primary Contribution Type: Conceptual elaboration + empirical industry survey

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title: Enhancing Enterprise Decisions through Organizational Data Mining

Authors: Hamid R. Nemati, Christopher D. Barko

DOI: 10.1080/08874417.2002.11647049

Year: 2002

Publication Type: Journal

Discipline/Domain: Information Systems / Data Mining

Subdomain/Topic: Organizational Data Mining (ODM), Decision Support, CRM

Contextual Background: Focuses on how ODM transforms raw data into actionable knowledge to imp

Geographic/Institutional Context: USA; UNC Greensboro

Target Users/Stakeholders: Executives, analysts, CRM specialists, decision-makers in customer-cent

Primary Methodology: Mixed methods (conceptual explanation + survey of 106 industry practitioners)

Primary Contribution Type: Conceptual framing of ODM + empirical industry findings

General Summary of the Paper

This paper defines Organizational Data Mining (ODM) as the strategic use of data mining tools to transfor

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is understood as the transformation of data into "valuable actionable knowledge" that directly

> "Organizational Data Mining (ODM) is defined as leveraging data mining (DM) tools and technologies to

> "ODM… enhances an organization's ability to identify, analyze, and implement an optimal decision." (p.

What Makes Something Actionable

- Timeliness and relevance of information

- Value to decision-making (strategic advantage)

- Contextual fit to organizational goals and environment

- Clarity and interpretability for decision-makers

- Feasibility of implementation (supported by resources, technology, and processes)

- Derived from integrated sense-making, knowledge-making, and decision-making processes

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Organizational Data Mining (ODM) methodology (integrating sense-

- **Methods/Levers:** CRM systems, customer intelligence tools, OLAP, market-basket analysis, clusterin

- **Operational Steps / Workflow:** Data acquisition → data integration (internal + external) → analytical

- **Data & Measures:** Customer profiles, transaction data, demographic data, web clickstreams, financia

- **Implementation Context:** Cross-industry; especially banking, e-commerce, retail, healthcare

> "Sense-making… Knowledge-making… Decision-making… are integrated in a cascade of information s

> "The most critical factors… are garnering the sponsorship of an executive… and preparing the data for

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Information must be interpretable for decision-makers.

- **CR (Contextual Relevance):** Yes — Insights must be relevant to organizational environment and goa

- **FE (Feasibility):** Yes — Requires appropriate infrastructure and resources.

- **TI (Timeliness):** Partial — Mentioned as critical for competitive advantage but not fully elaborated.

- **EX (Explainability):** Partial — Techniques like decision trees aid interpretability; ANN less so.

- **GA (Goal Alignment):** Yes — Must support strategic competitive advantage.

- **Other Dimensions Named by Authors:** Integration with organizational knowledge management proce

Theoretical or Conceptual Foundations

- Choo's *Knowing Organization* model (sense-making, knowledge-making, decision-making)

- Knowledge management literature

- Decision support system theory

Indicators or Metrics for Actionability

- ROI via cost/benefit analysis

- Customer retention rates

- Profitability improvements

- Market share changes

- Project outcome vs. expectations

Barriers and Enablers to Actionability

- **Barriers:** Underutilization of external data, low data warehouse integration, insufficient knowledge inf

- **Enablers:** Executive sponsorship, quality data preparation, CRM integration, multiple ODM techniqu

Relation to Existing Literature

The paper builds on knowledge management theory and prior data mining studies but shifts emphasis to

Summary

Nemati and Barko (2002) conceptualize ODM as the deliberate application of data mining within a knowle

Scores

- **Overall Relevance Score:** 85 — Strong explicit definition of actionability, multiple systematically linke

- **Operationalization Score:** 80 — Clear process and tools described; lacks fully formalized framework

Supporting Quotes from the Paper

- "ODM… enhancing the decision-making process by transforming data into valuable actionable knowledg

- "Sense-making… Knowledge-making… Decision-making… integrated… to the selection and implement

- "The most critical factors… are garnering the sponsorship of an executive… and preparing the data for a

- "Underutilization of… external data… presents an opportunity to improve the quality, consistency, and re

Actionability References to Other Papers

- Choo, C.W. *The Knowing Organization*

- Groth, R. *Data Mining: A Hands-on Approach for Business Professionals*

- Banasiewicz, A.D. (2000) "Keeping Your Best Customers Through Brand Loyalty"

Paper Summary

<!--META_START-->

Title: Efficient Action Extraction with Many-to-Many Relationship between Actions and Features

<!--META_END-->

Title:

Efficient Action Extraction with Many-to-Many Relationship between Actions and Features

Authors:

Jianfeng Du, Yong Hu, Charles X. Ling, Ming Fan, Mei Liu

Publication Type:

Conference

Discipline/Domain:

Computer Science / Artificial Intelligence

Subdomain/Topic:

Actionable Knowledge Discovery, Cost-Minimal Action Set Extraction

Contextual Background:

The paper addresses the gap in actionable knowledge discovery methods that typically assume a one-to-

Geographic/Institutional Context:

China, Canada, USA (authors' affiliations)

Target Users/Stakeholders:

Business decision-makers, software risk managers, data mining practitioners

Primary Methodology:

Conceptual framework with algorithmic design and experimental evaluation

Primary Contribution Type:

Methodological approach for efficiently extracting cost-minimal, actionable strategies from classifiers (spe

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General Summary of the Paper

This paper proposes a method for extracting actionable knowledge—specifically, cost-minimal action sets

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is understood as the capacity to identify and apply a set of actions that transforms an instanc

> "Actions… render a state of an instance into a preferred state, where a state is represented by feature v

> "A preferred action set… is a set of actions that render the state of the instance into a preferred state…

What Makes Something Actionable

- Ability to transform a current state into a preferred state according to a classifier

- Consideration of execution cost (minimization)

- Accommodation of many-to-many action-feature relationships

- Contextual applicability to real-world problems (e.g., risk mitigation)

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Cost-minimal action set extraction via Linear Pseudo-Boolean Optim

- **Methods/Levers:** Encode classifier and action execution as rules; transform into SAT and pseudo-Bo

- **Operational Steps / Workflow:**

  1. Encode classification and action execution rules

  2. Formulate as a Linear Pseudo-Boolean Optimization problem

  3. Use pseudo-Boolean solvers to find minimal-cost action set

- **Data & Measures:** Costs associated with each action; preferred class output by classifier

- **Implementation Context:** Demonstrated with random forest in software project risk management

> "…propose an efficient method to extract a cost-minimal action set from a classifier… based on… SAT

> "…reduction… to an extended SAT problem, called Linear Pseudo-Boolean Optimization problem…" (p

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Actions and states must be explicitly representable via features and rules

- **CR (Contextual Relevance):** Yes — Problem framed in real-world decision contexts like risk manage

- **FE (Feasibility):** Yes — Feasibility framed in terms of execution cost minimization

- **TI (Timeliness):** No — Not explicitly discussed

- **EX (Explainability):** No — No emphasis on model or action explainability

- **GA (Goal Alignment):** Yes — Goal defined as reaching a preferred classification outcome at minimal

- **Other Dimensions Named by Authors:** Scalability, efficiency

---

Theoretical or Conceptual Foundations

- Domain-driven actionable knowledge discovery (Cao et al., 2007)

- Action extraction from decision trees (Yang et al., 2007)

- Random forest classification (Breiman, 2001)

- Pseudo-Boolean optimization (Manquinho & Roussel, 2006)

Indicators or Metrics for Actionability

- Minimal total execution cost of actions

- Achievement of preferred classification outcome

Barriers and Enablers to Actionability

- **Barriers:**

  - Inefficiency of generate-and-test methods with large action sets

  - Complexity of many-to-many action-feature relationships

- **Enablers:**

  - Encoding into SAT/optimization frameworks

  - Use of pseudo-Boolean solvers for scalability

Relation to Existing Literature

Extends prior actionable knowledge discovery research by removing the one-to-one restriction between a

---

Summary

The paper introduces a method for efficiently extracting cost-minimal action sets from classifiers when ac

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Scores

- **Overall Relevance Score:** 82 — Strong implicit definition and identification of key features (cost mini

- **Operationalization Score:** 90 — Highly detailed and computationally implementable method with exp

---

Supporting Quotes from the Paper

- "Actions… render a state of an instance into a preferred state…" (p. 1)

- "A preferred action set… is a set of actions that render the state… into a preferred state…" (p. 1)

- "…propose an efficient method to extract a cost-minimal action set from a classifier…" (p. 2)

- "…reduction… to an extended SAT problem, called Linear Pseudo-Boolean Optimization problem…" (p.

Actionability References to Other Papers

- Cao et al., 2007 — Domain-driven actionable knowledge discovery

- Yang et al., 2007 — Action extraction from decision trees

- Breiman, 2001 — Random forests

- Manquinho & Roussel, 2006 — Pseudo-Boolean solvers

Paper Summary

<!--META_START-->

Title: Efficacy of molecularly targeted agents given in the randomised trial SHIVA01 according to the ESM

Authors: A. Moreira, J. Masliah-Planchon, C. Callens, S. Vacher, C. Lecerf, M. Frelaut, E. Borcoman, N. T

DOI: https://doi.org/10.1016/j.ejca.2019.09.001

Year: 2019

Publication Type: Journal

Discipline/Domain: Oncology / Precision Medicine

Subdomain/Topic: Clinical actionability, molecularly targeted agents, ESCAT scale, SHIVA01 trial

Eligibility: Eligible

Overall Relevance Score: 75

Operationalization Score: 70

Contains Definition of Actionability: Yes (explicit via ESCAT framework)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (ESCAT)

Operationalization Present: Yes

Primary Methodology: Quantitative (retrospective analysis of trial data)

Study Context: Retrospective classification of molecular alterations from SHIVA01 trial according to ESCA

Geographic/Institutional Context: Institut Curie, France

Target Users/Stakeholders: Clinical oncologists, precision medicine researchers, trial designers

Primary Contribution Type: Empirical evaluation of actionability framework (ESCAT) applied to existing tri

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Efficacy of molecularly targeted agents given in the randomised trial SHIVA01 according to the ESMO Sc

Authors:

A. Moreira et al.

DOI:

https://doi.org/10.1016/j.ejca.2019.09.001

Year:

2019

Publication Type:

Journal

Discipline/Domain:

Oncology / Precision Medicine

Subdomain/Topic:

Clinical actionability, molecularly targeted agents, ESCAT scale, SHIVA01 trial

Contextual Background:

The paper re-evaluates the SHIVA01 precision medicine trial by applying the European Society for Medic

Geographic/Institutional Context:

Institut Curie, France

Target Users/Stakeholders:

Oncologists, trial designers, policy-makers in precision oncology

Primary Methodology:

Quantitative retrospective analysis

Primary Contribution Type:

Empirical reassessment of trial outcomes through an actionability framework

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General Summary of the Paper

The SHIVA01 trial compared molecularly targeted agents (MTAs) selected by a treatment algorithm base

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is explicitly framed through ESCAT as the degree of clinical evidence supporting the use of a

> "ESCAT… defined criteria to prioritise molecular alterations (MAs) to select anticancer drugs." (p. 202)

> "We… classified [MAs] according to the ESCAT by assessing the level of evidence in the literature." (p.

What Makes Something Actionable

- Supported by clinical trial evidence in the same tumour type (higher ESCAT tier)

- Type of alteration must match that shown to confer benefit (mutation vs amplification)

- Evidence from other tumour types (lower tier) less predictive

- Preclinical or in silico evidence can guide classification when clinical data is lacking

- Drug-target affinity and specificity influence actionability beyond ESCAT tier

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ESMO Scale for Clinical Actionability of molecular Targets (ESCAT)

- **Methods/Levers:** Literature review for evidence of benefit of MA-targeted MTA

- **Operational Steps / Workflow:** Identify MA → Search same-cancer evidence → If absent, search cro

- **Data & Measures:** PFS, OS, ESCAT tier classification, patient demographics

- **Implementation Context:** Retrospective re-analysis of SHIVA01 patient data

> "For each MA, we… searched for clinical trials… in the same tumour type… then… other tumour types.

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — ESCAT tiers are explicitly defined and applied

- **CR (Contextual Relevance):** Yes — Same vs other tumour type evidence distinguishes tiers

- **FE (Feasibility):** Yes — Relates to whether drugs are usable in context based on evidence strength

- **TI (Timeliness):** No — Not addressed directly

- **EX (Explainability):** Partial — ESCAT rationale is given, but biological mechanisms less discussed

- **GA (Goal Alignment):** Partial — Implicit alignment with precision oncology goals

- **Other Dimensions Named by Authors:** Type of alteration specificity, drug-target affinity

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Theoretical or Conceptual Foundations

- ESCAT framework (Mateo et al., 2018)

- Prior actionability scales (OncoKB, AMP/ASCO/CAP guidelines)

Indicators or Metrics for Actionability

- ESCAT tier assignment (I–V)

- Clinical endpoints: PFS, OS stratified by tier

Barriers and Enablers to Actionability

- **Barriers:** Low ESCAT tier prevalence, misclassification of alteration type, lack of tumour-type-specifi

- **Enablers:** In vitro/in vivo functional validation, drug specificity, comprehensive molecular profiling

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Relation to Existing Literature

Positions ESCAT as the latest in a series of actionability frameworks and demonstrates its application to

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Summary

This paper retrospectively applies the ESCAT actionability framework to the SHIVA01 trial, showing that

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Scores

- **Overall Relevance Score:** 75 — Strong conceptual clarity through ESCAT, explicit linkage of feature

- **Operationalization Score:** 70 — Detailed process for applying ESCAT tiers; however, not a prospect

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Supporting Quotes from the Paper

- "[ESCAT] defined criteria to prioritise molecular alterations (MAs) to select anticancer drugs." (p. 202)

- "Most MAs… were shown to improve outcomes in other tumour types (tier IIIA). Worst outcome… in tier

- "For each MA, we… searched for clinical trials… in the same tumour type… other tumour types… precli

- "This highlights the crucial importance of the type of alteration beyond the gene and/or signalling pathwa

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Actionability References to Other Papers

- Mateo J et al., 2018 — ESCAT

- Chakravarty D et al., 2017 — OncoKB

- Li MM et al., 2017 — AMP/ASCO/CAP guidelines

- Meric-Bernstam F et al., 2015 — Decision support framework

Paper Summary

<!--META_START-->

Title: Dissecting Generalizability and Actionability of Disease-Associated Genes From 20 Worldwide Ethn

Authors: Emile R. Chimusa, Shatha Alosaimi, Christian D. Bope

DOI: 10.3389/fgene.2022.835713

Year: 2022

Publication Type: Journal Article

Discipline/Domain: Genetics / Genomic Medicine

Subdomain/Topic: Clinical actionability of disease-associated genes, population genomics, genetic divers

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 85

Contains Definition of Actionability: Yes (explicit and comparative definitions)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (comparative genomic analysis framework)

Operationalization Present: Yes

Primary Methodology: Quantitative (Population genetics analysis using WGS/WES data)

Study Context: Genetic diversity and actionability of disease-associated genes across 20 ethnolinguistic

Geographic/Institutional Context: Global, with emphasis on African populations (Bantu, Khoesan) and con

Target Users/Stakeholders: Genomic researchers, clinical geneticists, public health practitioners, policy n

Primary Contribution Type: Empirical study with conceptual framing

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Dissecting Generalizability and Actionability of Disease-Associated Genes From 20 Worldwide Ethnolingu

Authors:

Emile R. Chimusa, Shatha Alosaimi, Christian D. Bope

DOI:

10.3389/fgene.2022.835713

Year:

2022

Publication Type:

Journal Article

Discipline/Domain:

Genetics / Genomic Medicine

Subdomain/Topic:

Clinical actionability of disease-associated genes, population genomics, genetic diversity

Contextual Background:

The study evaluates whether "actionable" genes identified by the American College of Medical Genetics a

Geographic/Institutional Context:

Global genomic datasets, particularly African Genome Variation Project and 1000 Genomes Project; stro

Target Users/Stakeholders:

Genomic researchers, clinical geneticists, healthcare policymakers, precision medicine initiatives

Primary Methodology:

Quantitative population genomics analysis using large-scale whole-exome/whole-genome sequencing

Primary Contribution Type:

Empirical genomic analysis with conceptual framing on actionability and generalizability

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General Summary of the Paper

The paper investigates the distribution and clinical actionability of disease-associated genetic variants ac

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed through multiple authoritative definitions:

- ClinGen: clinically prescribed interventions effective for prevention, reduced clinical burden, delayed ons

- 100,000 Genomes Project: variants that, if identified pre-symptomatically, can significantly prevent or m

- Also operationally tied to classification processes involving ethical approval, annotation databases, path

> "Actionability as clinically prescribed interventions to a genetic disorder that is effective for prevention, le

> "…variants that can significantly prevent (or result in illness…if identified before symptoms become app

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What Makes Something Actionable

- Clinically preventable or mitigable before symptom onset

- Severity and clinical significance of condition

- Established interventions exist with proven benefit

- Variant classification supported by evidence and ethical review

- Population-specific allele frequency and pathogenicity evidence

- Functional impact predictions from multiple annotation tools

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Comparative population genomics actionability assessment

- **Methods/Levers:** Joint variant calling across global ethnolinguistic groups; functional annotation via A

- **Operational Steps / Workflow:**

  1. Identify disease-associated and ACMG actionable genes from curated databases (GWAS Catalog, D

  2. Extract relevant SNPs from WGS/WES datasets

  3. Perform quality control, phasing, and haplotype inference

  4. Analyze genetic structure (PCA), pathogenicity proportions, derived allele frequencies, MAF distributi

  5. Compare patterns across 20 ethnolinguistic groups

- **Data & Measures:** SNP counts, proportion pathogenic, derived allele proportion, heterozygosity metr

- **Implementation Context:** Global, cross-population genomic comparatives

> "…combine many annotation pipelines during filtering and prioritization of mutations…" (p. 2)

> "…proportion of pathogenic variants within ACG-specific genes from ethnolinguistic cultural groups…" (

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clear variant classification processes are necessary (p. 2)

- **CR (Contextual Relevance):** Yes — population-specific allele frequency and disease relevance critic

- **FE (Feasibility):** Yes — intervention must be possible and effective (p. 2)

- **TI (Timeliness):** Partial — early/pre-symptomatic detection mentioned but not deeply operationalized

- **EX (Explainability):** Yes — reliance on multiple annotation tools and known pathogenicity databases

- **GA (Goal Alignment):** Yes — alignment with improved global healthcare equity and personalized me

- **Other Dimensions Named by Authors:** Transferability/generalizability, genetic diversity, pathogenicity

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Theoretical or Conceptual Foundations

- ClinGen actionability framework

- 100,000 Genomes Project protocol

- ACMG actionable gene list standards

- Population genomics concepts of genetic diversity, derived allele frequencies, linkage disequilibrium

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Indicators or Metrics for Actionability

- Proportion of pathogenic variants per gene in a population

- Minor allele frequency (MAF) distributions

- Proportion of derived alleles

- Gene-specificity of SNP frequency

- Observed vs. expected heterozygosity

Barriers and Enablers to Actionability

- **Barriers:**

  - Limited transferability of ACMG actionable gene lists to African populations

  - Knowledge bias in existing variant databases toward non-African populations

  - Variation in derived allele distributions affecting predictive validity

- **Enablers:**

  - High-quality population-specific genomic data

  - Multi-tool annotation consensus

  - Cross-population comparative frameworks

Relation to Existing Literature

Builds on prior work highlighting disparities in actionable variant frequencies between European and Afric

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Summary

The study critically assesses the global generalizability of ACMG's actionable gene list and known diseas

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Scores

- **Overall Relevance Score:** 90 — strong explicit and implicit conceptual framing, comparative definitio

- **Operationalization Score:** 85 — detailed methodology linking genetic metrics to actionability, though

---

Supporting Quotes from the Paper

- "Actionability as clinically prescribed interventions… effective for prevention, lowered clinical burden…"

- "…classification of variants to be clinically actionable… can only emerge during the process of seeking

- "…high genetic diversity in the present actionable and known disease-associated genes… suggesting th

- "…combine many annotation pipelines during filtering and prioritization…" (p. 2)

- "…proportion of pathogenic variants within ACG-specific genes…" (p. 4)

Actionability References to Other Papers

- Hunter et al., 2016 — ClinGen actionability assessment protocol

- Bope et al., 2019 — in silico mutation prediction challenges in African genomes

- Dorschner et al., 2016; Amendola et al., 2015 — disparities in actionable variants between populations

- ACMG-73 actionable genes list

Paper Summary

<!--META_START-->

Title: Development of the Patient Education Materials Assessment Tool (PEMAT): A new measure of und

Authors: Sarah J. Shoemaker, Michael S. Wolf, Cindy Brach

DOI: 10.1016/j.pec.2014.05.027

Year: 2014

Publication Type: Journal

Discipline/Domain: Health Communication / Health Literacy

Subdomain/Topic: Patient education materials evaluation

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Instrument development and validation (Mixed Methods)

Study Context: Development of an assessment tool for evaluating understandability and actionability of p

Geographic/Institutional Context: USA (multi-institutional, including Abt Associates, Northwestern Univers

Target Users/Stakeholders: Health professionals, patient educators, lay users, policymakers

Primary Contribution Type: Measurement instrument (PEMAT)

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: No

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Development of the Patient Education Materials Assessment Tool (PEMAT): A new measure of understa

Authors:

Sarah J. Shoemaker, Michael S. Wolf, Cindy Brach

DOI:

10.1016/j.pec.2014.05.027

Year:

2014

Publication Type:

Journal

Discipline/Domain:

Health Communication / Health Literacy

Subdomain/Topic:

Patient education materials evaluation

Contextual Background:

The study responds to the U.S. National Action Plan to Improve Health Literacy, which calls for health an

Geographic/Institutional Context:

USA; collaboration among Abt Associates, Northwestern University, and AHRQ

Target Users/Stakeholders:

Health professionals, patient educators, clinicians, medical librarians, lay assessors, policymakers

Primary Methodology:

Instrument development and validation (Mixed Methods — expert panel review, reliability testing, consum

Primary Contribution Type:

Measurement instrument (PEMAT)

General Summary of the Paper

This paper presents the development and validation of the Patient Education Materials Assessment Tool

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the extent to which patient education materials enable consumers "to identify w

> "Patient education materials are actionable when consumers … can identify what they can do based or

---

What Makes Something Actionable

- Clearly identifies at least one specific action the user can take.

- Addresses the user directly when describing actions.

- Breaks down actions into manageable, explicit steps.

- Provides tangible tools (e.g., checklists, planners).

- Offers simple calculation instructions where relevant.

- Explains how to use visual or data elements to take action.

- Uses visual aids to facilitate acting on instructions.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Patient Education Materials Assessment Tool (PEMAT)

- **Methods/Levers:** Expert panel review, iterative reliability testing, untrained rater usability, consumer

- **Operational Steps / Workflow:**

  1. Rate each material against defined PEMAT items (scales for understandability and actionability).

2. Calculate percentage score per scale (excluding N/A items).

3. Compare against a threshold (≥70% considered actionable).

- **Data & Measures:** Inter-rater reliability (kappa, Gwet's AC1), Cronbach's alpha, consumer comprehe

- **Implementation Context:** Designed for use by both professionals and laypersons without training, ap

> "The material clearly identifies at least one action the user can take." (p. 398)

> "The material breaks down any action into manageable, explicit steps." (p. 398)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — common language, active voice, visual cues.

- **CR (Contextual Relevance):** Yes — aligns instructions with user needs and capacities.

- **FE (Feasibility):** Yes — explicit steps, tangible tools, manageable instructions.

- **TI (Timeliness):** No explicit link.

- **EX (Explainability):** Partial — explains use of visuals and data for action.

- **GA (Goal Alignment):** No explicit link.

- **Other Dimensions Named by Authors:** Use of visual aids to facilitate action.

Theoretical or Conceptual Foundations

- U.S. National Action Plan to Improve Health Literacy (accuracy, accessibility, actionability).

- Health literacy frameworks recognizing both individual skills and systemic demands.

- Prior patient education material suitability and comprehension assessment tools.

Indicators or Metrics for Actionability

- PEMAT actionability score (0–100 scale).

- Threshold of ≥70% considered actionable (provisional, not empirically fixed).

Barriers and Enablers to Actionability

- **Barriers:** Use of jargon/medical terms without definition; lack of captions for visuals; complex instruct

- **Enablers:** Clear visual aids with captions; direct user address; provision of tools and checklists; brea

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Relation to Existing Literature

The PEMAT addresses gaps in prior instruments by:

1. Measuring actionability explicitly.

2. Validating with untrained raters and consumers.

3. Applying to both print and audiovisual materials.

4. Demonstrating psychometric robustness (internal and external consistency).

Summary

Shoemaker et al. (2014) advance the field of health literacy by developing the PEMAT, the first rigorously

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Scores

- **Overall Relevance Score:** 95 — Clear, explicit definition of actionability, robust conceptual framing, c

- **Operationalization Score:** 90 — Detailed operational steps, scoring system, and validated use cases

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Supporting Quotes from the Paper

- "Patient education materials are actionable when consumers … can identify what they can do based on

- "The material clearly identifies at least one action the user can take." (p. 398)

- "The material breaks down any action into manageable, explicit steps." (p. 398)

- "The material provides a tangible tool (e.g., menu planners, checklists) whenever it could help the user t

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Actionability References to Other Papers

- U.S. Department of Health and Human Services. National Action Plan to Improve Health Literacy (2010

- Kaphingst et al. (2012) — Health Literacy INDEX.

- CDC Clear Communication Index (2013).

Paper Summary

<!--META_START-->

Title: Development of actionable quality indicators and an action implementation toolbox for appropriate a

Authors: Marlot C. Kallen, Marie-Jose Roos-Blom, Dave A. Dongelmans, Jeroen A. Schouten, Wouter T.

DOI: https://doi.org/10.1371/journal.pone.0207991

Year: 2018

Publication Type: Journal Article

Discipline/Domain: Medical Informatics / Intensive Care Medicine

Subdomain/Topic: Antibiotic stewardship, quality indicators, ICU performance improvement

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (modified-RAND Delphi, Flottorp et al. checklist)

Operationalization Present: Yes

Primary Methodology: Mixed Methods (systematic literature review + expert consensus + framework-bas

Study Context: Adult ICU antibiotic use quality measurement and improvement

Geographic/Institutional Context: Netherlands, multicenter ICU context

Target Users/Stakeholders: ICU clinicians, microbiologists, pharmacists, stewardship teams, policy make

Primary Contribution Type: Development of actionable quality indicators + implementation toolbox

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Development of actionable quality indicators and an action implementation toolbox for appropriate antibio

Authors:

Marlot C. Kallen, Marie-Jose Roos-Blom, Dave A. Dongelmans, Jeroen A. Schouten, Wouter T. Gude, Ev

DOI:

https://doi.org/10.1371/journal.pone.0207991

Year:

2018

Publication Type:

Journal Article

Discipline/Domain:

Medical Informatics / Intensive Care Medicine

Subdomain/Topic:

Antibiotic stewardship, ICU quality improvement, actionable indicators

Contextual Background:

The paper addresses the challenge of inappropriate antibiotic use in intensive care units (ICUs), a driver

Geographic/Institutional Context:

Netherlands, involving 15 Dutch ICU experts across university and non-university hospitals.

Target Users/Stakeholders:

ICU physicians, clinical microbiologists, pharmacists, infection control teams, policy makers.

Primary Methodology:

Mixed Methods — modified-RAND Delphi consensus with systematic literature review, guideline extraction

Primary Contribution Type:

Framework and tool development (quality indicators + action implementation toolbox).

General Summary of the Paper

This study develops a set of four actionable quality indicators (QIs) and one quantity metric to guide and i

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is explicitly defined as an indicator offering **clear direction to improve performance in daily

> "Actionability, meaning that the indicator offers clear direction to improve performance in daily practice,

> "Indicators with a median score… on actionability were defined as potentially suitable" (p. 3)

What Makes Something Actionable

- Relevance to patient outcomes or healthcare efficiency.

- Clear direction for quality improvement.

- Feasibility of data collection (preferably from routine EHR/PDMS data).

- Defined target values (100% for process indicators).

- Specificity to ICU context where possible.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Modified-RAND Delphi procedure; Flottorp et al. checklist for barrier

- **Methods/Levers:** Expert consensus, literature & guideline synthesis, barrier identification, strategy m

- **Operational Steps / Workflow:**

  1. Identify potential indicators (expert input + literature + guidelines).

  2. Online rating for relevance & actionability.

  3. Face-to-face consensus refining and feasibility assessment.

  4. Develop detailed indicator definitions, numerators, denominators, and targets.

  5. Build toolbox: map barriers to strategies using checklist.

- **Data & Measures:** EHR/PDMS-derived metrics, process & structure measures, DOT for benchmarki

- **Implementation Context:** Dutch ICU registry (NICE) integration for feedback dashboards.

> "Targets for indicator 1, 2 and 3 were set at 100%, which is a theoretical optimum…" (p. 7)

> "…toolbox displays the suggested improvement strategies associated with the selected barriers." (p. 9)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — indicators have explicit operational definitions and targets.

- **CR (Contextual Relevance):** Yes — ICU-specific, clinically grounded.

- **FE (Feasibility):** Yes — prioritization of electronically extractable data.

- **TI (Timeliness):** Partial — targets set for frequency (e.g., biannual meetings) but less emphasis on ra

- **EX (Explainability):** Partial — rationale provided but no deep interpretability framework.

- **GA (Goal Alignment):** Yes — aligned with stewardship goals and resistance reduction.

- **Other Dimensions:** Reliability (implicitly required), Benchmarking value (explicit for quantity metric).

Theoretical or Conceptual Foundations

- OECD and AHRQ criteria for good quality indicators.

- Flottorp et al. framework for determinants of practice.

- Tailored intervention literature (Wensing et al.).

Indicators or Metrics for Actionability

- **Indicators:**

  1. Blood cultures before empirical therapy (100%).

  2. Therapeutic drug monitoring within 48h for vancomycin/aminoglycosides (100%).

  3. Surveillance cultures if SDD/SOD applied (100%).

4. Biannual ICU-microbiology meetings on resistance (≥2/year).

- **Quantity Metric:** DOT per 100 patient-days or admissions (no fixed target).

Barriers and Enablers to Actionability

- **Barriers:** Inadequate local guidelines, insufficient familiarity with protocols, poor ICU team communic

- **Enablers:** Standardized protocols, interdisciplinary meetings, educational materials, EHR integration

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Relation to Existing Literature

The study builds on ICU quality measurement literature but distinguishes itself by **explicitly integrating a

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Summary

This study delivers a rigorously developed, ICU-specific set of four actionable quality indicators and one b

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Scores

- **Overall Relevance Score:** 92 — Strong explicit definition of actionability, clear criteria, ICU-specific c

- **Operationalization Score:** 95 — Detailed process, measurable targets, integrated barrier-strategy too

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Supporting Quotes from the Paper

- "Actionability, meaning that the indicator offers clear direction to improve performance in daily practice…

- "Targets for indicator 1, 2 and 3 were set at 100%…" (p. 7)

- "…toolbox displays the suggested improvement strategies associated with the selected barriers." (p. 9)

Actionability References to Other Papers

- Flottorp SA et al., 2013 — Determinants of practice checklist.

- OECD, 2006; AHRQ, 2011 — Criteria for quality indicators.

- Wensing M et al., 2011; 2010 — Tailored implementation for chronic diseases and overcoming barriers.

- van den Bosch CM et al., 2014; 2016 — Antibiotic treatment indicators.

Paper Summary

<!--META_START-->

Title: Development of Actionable Insights for Regulating Students' Collaborative Writing of Scientific Texts

Authors: Christian Hoffmann, Nadine Mandran, Cédric d'Ham, Sébastien Rebaudo, Mohamed Anis Hadd

DOI: https://doi.org/10.1007/978-3-031-16290-9_47

Year: 2022

Publication Type: Conference Paper

Discipline/Domain: Learning Analytics / Educational Technology

Subdomain/Topic: Collaborative Writing, Teacher Dashboards, Educational Collaboration Analytics

Eligibility: Eligible

Overall Relevance Score: 82

Operationalization Score: 90

Contains Definition of Actionability: Yes (via Jørnø & Gynther, 2018 and Martinez-Maldonado et al., 2021

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Yes

Contains Framework/Model: Yes (Mapping "From Clicks to Constructs")

Operationalization Present: Yes

Primary Methodology: Design-Based Research (Iterative User-Centered Design)

Study Context: Web-based science learning environment (LabNbook) for collaborative writing of scientif

Geographic/Institutional Context: Univ. Grenoble Alpes (France), IMT Atlantique (France)

Target Users/Stakeholders: Teachers in secondary and higher education

Primary Contribution Type: Indicators and visualizations for actionable insights in collaborative writing

CL: Yes

CR: Yes

FE: No

TI: No

EX: Partial

GA: No

Reason if Not Eligible: N/A

<!--META_END-->

Title: Development of Actionable Insights for Regulating Students' Collaborative Writing of Scientific T

Authors: Christian Hoffmann, Nadine Mandran, Cédric d'Ham, Sébastien Rebaudo, Mohamed Anis H

DOI: https://doi.org/10.1007/978-3-031-16290-9_47

Year: 2022

Publication Type: Conference Paper

Discipline/Domain: Learning Analytics / Educational Technology

Subdomain/Topic: Collaborative Writing, Teacher Dashboards, Educational Collaboration Analytics

Contextual Background: The study focuses on supporting teachers in monitoring and regulating stude

Geographic/Institutional Context: Univ. Grenoble Alpes, CNRS, LIG, France; IMT Atlantique, LABSTIC

Target Users/Stakeholders: Teachers (secondary and higher education) using OLEs for science educ

Primary Methodology: Design-Based Research (iterative, user-centered design with interviews, focus

Primary Contribution Type: Development of computational indicators and visualizations for CW action

General Summary of the Paper

The paper develops a set of computationally calculable indicators and visualizations to provide teachers

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable insights are defined (via Jørnø & Gynther, 2018) as "data that allows a corrective procedure, o

> "The challenge for designers of LADs is to provide teachers with actionable group insights defined… as

> "They emphasize the role of a clear 'mapping from low-level data to higher-order constructs…'" (p. 535)

What Makes Something Actionable

- Clear mapping from trace data to meaningful educational constructs

- Relevance to teacher goals (e.g., assessing collaboration strategies)

- Understandable by the intended user (teacher)

- Presented in a way that supports immediate pedagogical decisions

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Mapping "From Clicks to Constructs"

- **Methods/Levers:** Use of educational sub-constructs (symmetry in action, territorial functioning) deriv

- **Operational Steps / Workflow:**

  1. Collect authorship, timestamp, and version data

  2. Calculate indicators (turn taking, writing time, contribution scores, cowriting score)

  3. Visualize indicators in teacher-friendly timelines and panels

  4. Teachers interpret in context to diagnose collaboration strategy

- **Data & Measures:** Words added (difflib), editor changes, sentence-level overlap detection

- **Implementation Context:** LabNbook platform in science education

> "Our analytics are based on… symmetry in action and territorial functioning… translated… into computa

> "Visualization… allows a teacher to get a wealth of information about how the report was co-constructe

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Simplicity and clear indicator definitions stressed (p. 540)

- **CR (Contextual Relevance):** Yes — Indicators tied directly to collaborative writing processes (p. 535

- **FE (Feasibility):** No explicit link

- **TI (Timeliness):** No explicit link

- **EX (Explainability):** Partial — Mapping framework provides interpretability, but some computational s

- **GA (Goal Alignment):** No explicit link

- **Other Dimensions Named by Authors:** Complementarity of indicators, avoidance of aggregation

Theoretical or Conceptual Foundations

- Jørnø & Gynther's definition of actionable insights

- Martinez-Maldonado et al.'s collaboration analytics model (five-step mapping)

- CSCW constructs: symmetry in action (Dillenbourg, 1999), territorial functioning (Larsen-Ledet & Korsga

Indicators or Metrics for Actionability

- Turn taking (number of editor changes)

- Writing time (active editing time in 30s windows)

- Contribution scores (words added)

- Cowriting score (percentage of sentences modified by multiple authors)

Barriers and Enablers to Actionability

- **Barriers:** Over-aggregation of indicators, complex visualizations reducing interpretability

- **Enablers:** Iterative teacher feedback, complementary indicators, simple visualizations, on-demand d

Relation to Existing Literature

Builds on CSCW collaborative writing strategy distinctions (summative vs integrative), extends Martinez-M

Summary

The authors present a design-based research approach to developing actionable insights for regulating s

Scores

- **Overall Relevance Score:** 82 — Strong conceptual link to actionability, with clear definitions and dim

- **Operationalization Score:** 90 — Comprehensive explanation of how to calculate, visualize, and interp

Supporting Quotes from the Paper

- "[Actionable insights]… 'data that allows a corrective procedure, or feedback loop…'" (p. 535)

- "They emphasize the role of a clear 'mapping from low-level data to higher-order constructs…'" (p. 535)

- "Our analytics are based on… symmetry in action and territorial functioning…" (p. 537)

- "Visualization… allows a teacher to get a wealth of information about how the report was co-constructed

Actionability References to Other Papers

- Jørnø & Gynther (2018) — Definition of actionable insights

- Martinez-Maldonado et al. (2021) — Collaboration analytics model

- Dillenbourg (1999) — Symmetry in action

- Larsen-Ledet & Korsgaard (2019) — Territorial functioning in collaborative writing

Paper Summary

<!--META_START-->

Title: Development and Actionability of the Dutch COVID-19 Dashboard: Descriptive Assessment and Ex

Authors: Véronique L. L. C. Bos, Tessa Jansen, Niek S. Klazinga, Dionne S. Kringos

DOI: 10.2196/31161

Year: 2021

Publication Type: Journal

Discipline/Domain: Public Health / Health Communication

Subdomain/Topic: COVID-19 dashboards, performance intelligence, public reporting

Eligibility: Eligible

Overall Relevance Score: 87

Operationalization Score: 78

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (Descriptive assessment + expert appraisal)

Study Context: Dutch COVID-19 government dashboard development and adaptation over pandemic pha

Geographic/Institutional Context: Netherlands / Ministry of Health, Welfare and Sport

Target Users/Stakeholders: Policymakers, general public, public health experts

Primary Contribution Type: Empirical case study with conceptual framing

CL: Yes

CR: Yes

FE: Partial

TI: Yes

EX: Yes

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Development and Actionability of the Dutch COVID-19 Dashboard: Descriptive Assessment and Expert A

Authors:

Véronique L. L. C. Bos, Tessa Jansen, Niek S. Klazinga, Dionne S. Kringos

DOI:

10.2196/31161

Year:

2021

Publication Type:

Journal

Discipline/Domain:

Public Health / Health Communication

Subdomain/Topic:

COVID-19 dashboards, performance intelligence, public reporting

Contextual Background:

Examines the development of the Dutch government's COVID-19 dashboard from June 2020 to January

Geographic/Institutional Context:

Netherlands / Ministry of Health, Welfare and Sport

Target Users/Stakeholders:

Policymakers, general public, public health experts

Primary Methodology:

Mixed Methods (Descriptive assessment + expert appraisal)

Primary Contribution Type:

Empirical case study with conceptual framing

General Summary of the Paper

This study investigates the evolution of the Dutch COVID-19 dashboard, assessing its actionability throug

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the potential of a dashboard to inform decision-making by being:

- **Fit for purpose**: meeting a specific information need.

- **Fit for use**: delivering the right information to the right audience at the right time, in an understandabl

> "Information can be actionable only if it is fit for purpose and fit for use." (p. 2)

> "Actionability refers to a dashboard's potential to inform decision making by way of providing informatio

---

What Makes Something Actionable

- Knowing the audience and their needs

- Managing type, volume, and flow of information

- Clear data sources and methods

- Linking time trends to policy

- Providing data "close to home"

- Disaggregation into relevant subgroups

- Storytelling and visual cues

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Seven common features of highly actionable dashboards (Ivankovi█

- **Methods/Levers:** Descriptive monitoring, actionability scoring, reflection meetings with dashboard de

- **Operational Steps / Workflow:** Iterative adaptation, feedback integration, thematic navigation, indicat

- **Data & Measures:** Epidemiological indicators, health system metrics, behavioral surveys, sewage te

- **Implementation Context:** Netherlands, government-led pandemic monitoring tool

> "The dashboard has been designed for… high-frequency (daily) updates…" (p. 7)

> "Transparency of data was maximized by making it largely available as open source." (p. 7)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Efforts to explain indicators; news-like items for public understanding.

- **CR (Contextual Relevance):** Yes — Geographic and thematic tailoring, audience shift to public.

- **FE (Feasibility):** Partial — Constraints due to data access, privacy, and resources.

- **TI (Timeliness):** Yes — Daily updates, responsive to pandemic phases.

- **EX (Explainability):** Yes — Narratives and visual cues to aid interpretation.

- **GA (Goal Alignment):** Partial — Aligned with public health monitoring goals, but not fully integrated v

- **Other Dimensions Named by Authors:** Transparency, granularity, equity focus (through subgroup da

---

Theoretical or Conceptual Foundations

- Lasswell's Model of Communication (1948)

- Performance intelligence in health

- WHO pandemic monitoring framework (public health, health system, behavioral, socioeconomic)

Indicators or Metrics for Actionability

- Availability of disaggregation

- Indicator variety (epidemiological, health system, socioeconomic)

- Navigation and usability features

- Timeliness of updates

Barriers and Enablers to Actionability

- **Barriers:**
  - Limited access to neighborhood-level data
  - Privacy constraints on granular data
  - Lack of integrated socioeconomic and ethnicity data
- **Enablers:**
  - Open-source data
  - Political commitment to transparency
  - Ongoing public understanding research

Relation to Existing Literature

Builds on Ivankovi■ et al. (2021) framework for actionable COVID-19 dashboards, adapting it to the Dutc

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Summary

The Dutch COVID-19 dashboard transitioned from a policy-focused monitoring tool to a public-facing com

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Scores

- **Overall Relevance Score:** 87 — Strong conceptual clarity, clear criteria, and framework application t

- **Operationalization Score:** 78 — Provides a structured approach to achieving actionability with practi

---

Supporting Quotes from the Paper

- "Actionability refers to a dashboard's potential to inform decision making by way of providing informatio

- "Seven common features… knowing the audience… managing the type, volume… linking time trends t

- "Transparency of data was maximized by making it largely available as open source." (p. 7)

- "Two of the four key components advised by WHO… were still missing: indicators of available capacity.

Actionability References to Other Papers

- Ivankovi■ et al. (2021) – Features Constituting Actionable COVID-19 Dashboards

- Barbazza et al. (2021) – Actionability of healthcare performance indicators

- WHO (2020) – Pandemic transition monitoring framework

Paper Summary

<!--META_START-->

Title: Design of Information and Warfare Analytics using MapReduce and Machine Learning

Authors: Pallaw Kumar Mishra

DOI: n/a

Year: 2017

Publication Type: Conference Paper

Discipline/Domain: Defense Informatics / Military Data Science

Subdomain/Topic: Warfare analytics, big data, actionable intelligence, MapReduce, social network analys

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 88

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual + System Design

Study Context: Development of an integrated information and warfare analytics system for military decisio

Geographic/Institutional Context: India / Defence Research and Development Organisation (DRDO)

Target Users/Stakeholders: Military decision-makers, defense analysts, cyber security teams, intelligence

Primary Contribution Type: Conceptual framework and system design proposal

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Design of Information and Warfare Analytics using MapReduce and Machine Learning

Authors:

Pallaw Kumar Mishra

DOI:

n/a

Year:

2017

Publication Type:

Conference Paper

Discipline/Domain:

Defense Informatics / Military Data Science

Subdomain/Topic:

Warfare analytics, big data, actionable intelligence, MapReduce, social network analysis

Contextual Background:

The paper addresses the growing need for real-time, data-driven decision support in modern warfare, lev

Geographic/Institutional Context:

India / Defence Research and Development Organisation (DRDO)

Target Users/Stakeholders:

Military decision-makers, defense analysts, cyber security teams, intelligence agencies

Primary Methodology:

Conceptual + System Design

Primary Contribution Type:

Conceptual framework and system design proposal

General Summary of the Paper

The paper proposes a comprehensive "Information and Warfare Analytics System" to provide meaningful

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper frames actionability as the ability of the system to provide **real-time, contextual, and predictiv

> "Real time quantitative measure of warfare scenario is an essential input to top decision maker for und

> "...provide meaningful and real-time actionable insight." (Abstract)

What Makes Something Actionable

- Integration of multi-source, heterogeneous data (battlefield, cyber, social)

- Use of predictive models and metrics tailored to warfare contexts

- Contextualization of raw data into threat posture, vulnerabilities, and operational readiness

- Real-time processing and alerting to anticipate events

- Feasibility through scalable, distributed computing infrastructure

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Information and Warfare Analytics System

- **Methods/Levers:** Big data processing via Spark MapReduce; MLlib for scalable machine learning; in

- **Operational Steps / Workflow:**

  1. Data generation & collection from multiple military, cyber, and open sources

  2. Preprocessing via ETL and Big Data Toolbox

  3. Distributed processing & analytics via Spark

  4. Application of statistical, ML, and SNA algorithms

  5. Computation of warfare metrics

6. Visualization and decision support output

- **Data & Measures:** GIS, battlefield exercises, simulations, MASINT, HUMINT, OSINT; conventional v

- **Implementation Context:** Military decision support in both active conflict and peacetime intelligence r

> "...integration of Data Mining, Social Network Analysis, statistical and analytics techniques..." (Section I

> "...develop comprehensive set of warfare metrics." (Abstract)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Outputs must be interpretable to top decision makers.

- **CR (Contextual Relevance):** Yes — Contextualization of multi-domain data into decision-ready insigh

- **FE (Feasibility):** Yes — Emphasis on scalable, commodity-hardware-based cluster solutions.

- **TI (Timeliness):** Partial — Near real-time capability mentioned but not exhaustively defined.

- **EX (Explainability):** Partial — Models' logic partially described; domain-specific metrics aid interpreta

- **GA (Goal Alignment):** Yes — Explicit aim to support military strategic and tactical objectives.

- **Other Dimensions Named by Authors:** Predictive ability, resilience to data quality issues, multi-doma

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Theoretical or Conceptual Foundations

- Network Centric Warfare (NCW)

- Information Age Combat Models

- Graph Theory for SNA

- Lanchester and Adaptive Dynamic Models for combat

- CVSS vulnerability metrics for cyber warfare

Indicators or Metrics for Actionability

- Conventional warfare: OLI, WEI, Lanchester, Adaptive Dynamic, Situational Force Strength

- Cyber warfare: Base, Temporal, Environmental metrics; probability of attack; system vulnerability; threa

- Social network: Centrality, Density, Diameter, Prestige, Sentiment, Topic Value, Scale Shift

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Barriers and Enablers to Actionability

- **Barriers:** Data heterogeneity, incomplete/missing data, sensor inaccuracies, cross-vendor incompati

- **Enablers:** Distributed computing (Spark MapReduce), data preprocessing toolkit, integration of ML/S

Relation to Existing Literature

The paper builds on practical military analytics cases (e.g., NATO's use of Twitter for intelligence, electro

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Summary

The paper conceptualizes a comprehensive architecture for military decision support that operationalizes

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Scores

- **Overall Relevance Score:** 90 — Strong, integrated conceptualization of actionability, with explicit link

- **Operationalization Score:** 88 — Detailed framework and workflow; some aspects (timeliness, explai

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Supporting Quotes from the Paper

- "...provide meaningful and real-time actionable insight." (Abstract)

- "Real time quantitative measure of warfare scenario is an essential input to top decision maker..." (Abst

- "...develop comprehensive set of warfare metrics." (Abstract)

- "...integration of Data Mining, Social Network Analysis, statistical and analytics techniques..." (Section II

Actionability References to Other Papers

- NATO social media intelligence collection (Ackerman, 2011)

- CVSS vulnerability scoring (First.org, 2015)

- Social Network Analysis theory (McCulloh et al., 2013)

- Lanchester and Adaptive Dynamic Models (Jaiswal, 1997)

Paper Summary

<!--META_START-->

Title: Defining and Conceptualizing Actionable Insight: A Conceptual Framework for Decision-centric Ana

Authors: Shiang-Yen Tan, Taizan Chan

DOI: n/a

Year: 2015

Publication Type: Conference Paper

Discipline/Domain: Information Systems

Subdomain/Topic: Data Analytics, Decision Support, Problem Solving

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (HIVE framework)

Operationalization Present: Yes

Primary Methodology: Conceptual/Theoretical Development

Study Context: Decision-centric data analytics

Geographic/Institutional Context: Queensland University of Technology, Australia

Target Users/Stakeholders: Data analysts, decision makers, system designers

Primary Contribution Type: Conceptual framework and definition

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Defining and Conceptualizing Actionable Insight: A Conceptual Framework for Decision-centric Analytics

Authors:

Shiang-Yen Tan, Taizan Chan

DOI:

n/a

Year:

2015

Publication Type:

Conference Paper

Discipline/Domain:

Information Systems

Subdomain/Topic:

Data Analytics, Decision Support, Problem Solving

Contextual Background:

The paper addresses the lack of a systematic, theory-driven definition of "actionable insight" in data analy

Geographic/Institutional Context:

Queensland University of Technology, Australia

Target Users/Stakeholders:

Data analysts, decision makers, system designers

Primary Methodology:

Conceptual/Theoretical Development

Primary Contribution Type:

Conceptual framework and definition

General Summary of the Paper

This paper proposes a theory-driven, multi-component definition of actionable insight for decision-centric

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable insight is defined as:

> "A cohesive set of understandings about the problem situation based on prognostic insights derived fro

It is conceptualized as reasoning artefacts gained through the analytics process, contextualized, internali

What Makes Something Actionable

- Derived from integrating analytic, synergic, and prognostic insights.

- Contextualized to the user's objectives, constraints, and domain.

- Involves internalization of results into mental models.

- Supports confident, informed decision making for problem solving.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** HIVE Framework

- **Methods/Levers:** Hierarchical insight layering, integration of analytic results with soft evidence, situat

- **Operational Steps / Workflow:**

 1. Derive **analytic insights** from data queries/analysis.

 2. Synthesize into **synergic insight** via chains of arguments and situation models.

 3. Generate hypotheses and predict future states for **prognostic insight**.

- **Data & Measures:** Quantitative analytical results, qualitative domain knowledge, soft evidence, scen

- **Implementation Context:** Decision-centric analytics systems.

> "Support structured reasoning with the aids of advanced analytics techniques." (p. 8)

> "Provide flexible analytics environment that supports the natural flow-of-thoughts of the users." (p. 9)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — insights must be interpretable and structured for reasoning.

- **CR (Contextual Relevance):** Yes — must align with user's objectives, constraints, and domain know

- **FE (Feasibility):** Yes — solution alternatives and predictions must be actionable in practice.

- **TI (Timeliness):** Partial — addressed via anticipatory strategies and faster insight cycles, but not a p

- **EX (Explainability):** Yes — reasoning artefacts, chains of arguments, and situation models explicitly

- **GA (Goal Alignment):** Yes — objectives and constraints are explicitly embedded in situation models.

- **Other Dimensions Named by Authors:** Objectivity, scope, granularity, domain value, human reasonin

Theoretical or Conceptual Foundations

- Complex problem solving

- Naturalistic decision making

- Sensemaking theory

- Situation awareness

Indicators or Metrics for Actionability

No explicit quantitative KPIs; operational indicators implied through completeness of the three insight co

Barriers and Enablers to Actionability

- **Barriers:** Lack of synthesis support; cognitive overload; weak probabilistic reasoning without aids; re

- **Enablers:** Computational reasoning aids (e.g., fuzzy cognitive maps, Bayesian networks); flexible an

Relation to Existing Literature

Builds on prior fragmented definitions of actionable insight, integrating them into a systematic, multi-comp

Summary

Tan and Chan (2015) define actionable insight as the integration of analytic, synergic, and prognostic insi

Scores

- **Overall Relevance Score:** 95 — Strong, explicit definition with systematic, theory-informed features.

- **Operationalization Score:** 90 — Clear methods for achieving actionability via HIVE, though lacking e

Supporting Quotes from the Paper

- "Actionable Insight: A cohesive set of understandings about the problem situation… enables the user to

- "Insight is the result of information internalization process… contextualized in a specific situation…" (p. 3

- "Design consideration: Support the users in constructing computation-friendly situation model…" (p. 6)

- "Prognostic insight has the highest extent of actionability as it provides users with the knowledge necess

Actionability References to Other Papers

- Saraiya et al. (2005) — insight-based evaluation methodology.

- Thomas & Cook (2005) — visual analytics research agenda.

- Ribarsky et al. (2009) — analytical reasoning.

- Weick (1995) — sensemaking theory.

Paper Summary

<!--META_START-->

Title: Decision making for health-related research outcomes that alter diagnosis: A model from paediatric

Authors: Jessica C. Pickles, Kristian Aquilina, Jane Chalker, Christine Dahl, Abel Devadass, Kshitij Mank

DOI: https://doi.org/10.1111/nan.12994

Year: 2024

Publication Type: Journal

Discipline/Domain: Neuropathology, Medical Ethics, Oncology

Subdomain/Topic: Paediatric brain tumours, health-related findings, diagnostic revision frameworks

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 80

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (case review with expert multidisciplinary team, framework develo

Study Context: Archival paediatric brain tumour cohort (UK), retrospective diagnostic reassessment unde

Geographic/Institutional Context: United Kingdom; BRAIN UK virtual tissue bank; Great Ormond Street H

Target Users/Stakeholders: Researchers, clinical MDTs, pathologists, neuro-oncologists, ethics committe

Primary Contribution Type: Conceptual framework and decision-making model for reporting clinically acti

CL: Yes

CR: Yes

FE: Yes

Title:

Decision making for health-related research outcomes that alter diagnosis: A model from paediatric brain

Authors:

Jessica C. Pickles et al.

DOI:

https://doi.org/10.1111/nan.12994

Year:

2024

Publication Type:

Journal

Discipline/Domain:

Neuropathology, Medical Ethics, Oncology

Subdomain/Topic:

Paediatric brain tumours, health-related findings, diagnostic revision frameworks

Contextual Background:

The study addresses how to determine when research findings from retrospective analyses of archival di

Geographic/Institutional Context:

United Kingdom; BRAIN UK virtual tissue bank; Great Ormond Street Hospital; multiple UK neuropatholo

Target Users/Stakeholders:

Researchers, clinical MDTs, pathologists, neuro-oncologists, ethics committees, tissue banks

Primary Methodology:

Mixed Methods — review of 73 reclassified paediatric brain tumour cases via surrogate MDT, qualitative a

Primary Contribution Type:

Conceptual framework and operational model for assessing and reporting clinically actionable diagnostic

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General Summary of the Paper

This study develops a structured decision-making framework for determining whether revised diagnoses

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the potential for research findings to lead to meaningful changes in active patie

> "Health-related translational research studies… may uncover incidental or pertinent findings with clinica

> "Clinical actionability was initially determined by identifying theoretical changes to active patient manage

---

What Makes Something Actionable

- Evidence supports a **change in active patient management** (e.g., altered follow-up, treatment de-esc

- Patient is **likely alive**.

- **Time since diagnosis** is short enough that changes could affect management (≤10 years generally).

- No subsequent pathology reviews have already updated the diagnosis.

- Sufficient evidence exists to **validate findings in a clinical setting**.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Framework A (Determine Clinical Actionability), Framework B (Mech

- **Methods/Levers:** Surrogate MDT case review; triaging by survival likelihood, elapsed time, and clinic

- **Operational Steps / Workflow:**

  1. MDT identifies potential management change.

  2. Assess disease progression risk, survival likelihood, and elapsed time.

  3. Check for subsequent pathology updates.

  4. If actionable, report to tissue bank (BRAIN UK) → clinical validation → neuro-oncology MDT discussio

- **Data & Measures:** WHO 2016 CNS classification; linked-anonymised case data; tumour-specific out

- **Implementation Context:** UK archival paediatric CNS tumour research under BRAIN UK ethical appr

> "Framework for assessing actionability and managing diagnostic HRFs… Any research findings would i

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Must be clearly linked to patient management change.

- **CR (Contextual Relevance):** Yes — Decision depends on tumour type, prognosis, and elapsed time.

- **FE (Feasibility):** Yes — Only feasible if patient is alive and institutional pathways exist for feedback.

- **TI (Timeliness):** Yes — Feedback only useful if within time window to affect care.

- **EX (Explainability):** Yes — MDT discussion requires clear explanation of clinical significance.

- **GA (Goal Alignment):** Partial — Alignment with patient benefit is implied but not explicitly formalised.

- **Other Dimensions Named by Authors:** Analytical validity; clinical utility; ethical appropriateness.

Theoretical or Conceptual Foundations

- WHO CNS tumour classification updates

- UKRI/MRC framework on health-related findings

- Ethical guidelines from CIOMS and Declaration of Helsinki

Indicators or Metrics for Actionability

- Time since diagnosis (<10 years typical threshold)

- Patient survival likelihood

- Predicted change in tumour risk classification

- Evidence of relapse or follow-up pathology

Barriers and Enablers to Actionability

- **Barriers:** Historic/poor prognosis cohorts; lack of patient survival; absence of clinical validation capac

- **Enablers:** MDT expertise; tumour-specific outcome knowledge; linked anonymisation allowing follow

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Relation to Existing Literature

Authors note that prior archival tissue studies rarely address feedback of revised diagnoses; most literatu

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Summary

The paper offers a clear, ethically grounded, and operationally detailed framework for determining wheth

---

Scores

- **Overall Relevance Score:** 85 — Clear conceptualisation of actionability and explicit feature set; grou

- **Operationalization Score:** 80 — Provides detailed frameworks and steps for implementation, though

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Supporting Quotes from the Paper

- "[Clinical actionability was] determined by identifying theoretical changes to active patient management.

- "Patients who were over 10 years from their initial diagnosis were considered unlikely to require a chang

- "Framework… discussed by the appropriate MDT before reporting back to families" (p. 5)

Actionability References to Other Papers

- MRC Framework on feedback of health-related findings (2014)

- WHO CNS tumour classifications (2016, 2021)

- Prior work on genomic predisposition in paediatric CNS tumours (e.g., Waszak et al., 2018; Zhang et al.

Paper Summary

<!--META_START-->

Title: Data-Driven Machine Learning-Informed Framework for Model Predictive Control in Vehicles

Authors: Edgar Amalyan, Shahram Latifi

DOI: https://doi.org/10.3390/info16060511

Year: 2025

Publication Type: Journal

Discipline/Domain: Electrical and Computer Engineering / Automotive Control Systems

Subdomain/Topic: Hybrid Machine Learning–Model Predictive Control (ML–MPC) for vehicle subsystems

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 88

Contains Definition of Actionability: Yes (explicitly in terms of "transforming ML outputs into actionable co

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes (MPC's transparency offsets ML's black-box nature)

Contains Interpretability: Yes (hybrid design enables interpreting ML outputs through MPC)

Contains Framework/Model: Yes (machine learning–informed MPC hybrid framework)

Operationalization Present: Yes (detailed multi-step workflow for training, inference, sliding-window smoo

Primary Methodology: Experimental + Conceptual Framework Development

Study Context: Performance vehicle suspension as primary subsystem case study; extensible to other sy

Geographic/Institutional Context: University of Nevada, Las Vegas, USA

Target Users/Stakeholders: Automotive engineers, control system designers, autonomous vehicle develo

Primary Contribution Type: Conceptual + Technical Framework with proof-of-concept implementation and

CL: Yes — "MPC translates ML outputs into actionable commands" ensuring clear operational meaning (

CR: Yes — Actionability tied to real-time contextual vehicle state awareness (p. 16)

FE: Yes — Feasibility discussed in terms of real-time latency, computational load, and integration with ex

TI: Yes — Sliding-window and exponential weighting for timely response (p. 12)

EX: Yes — MPC provides explainable layer for ML's black box outputs (p. 3)

GA: Yes — Goal alignment through mode-specific constraint tuning for performance, safety, comfort (p. 1

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Data-Driven Machine Learning-Informed Framework for Model Predictive Control in Vehicles

Authors:

Edgar Amalyan, Shahram Latifi

DOI:

https://doi.org/10.3390/info16060511

Year:

2025

Publication Type:

Journal

Discipline/Domain:

Electrical and Computer Engineering / Automotive Control Systems

Subdomain/Topic:

Hybrid ML–MPC framework for adaptive, self-optimizing vehicle control

Contextual Background:

The paper develops a data-driven ML module to interpret vehicle subsystem states from sensor data, pro

Geographic/Institutional Context:

University of Nevada, Las Vegas, USA

Target Users/Stakeholders:

Vehicle control engineers, autonomous vehicle designers, motorsport engineers, component manufacture

Primary Methodology:

Experimental sensor-data collection + ML model training + integration concept for MPC

Primary Contribution Type:

Conceptual and technical framework with performance validation

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General Summary of the Paper

The paper proposes and validates a machine learning–informed framework to enhance Model Predictive

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors explicitly define actionability as the transformation of ML outputs into real-world control action

> "MPC in the hybrid approach translates ML outputs into actionable commands in the real world." (p. 3)

> "By grading each subsystem's real-world status and feeding those semantic modes into the optimizer, t

---

What Makes Something Actionable

- Interpretability through MPC translating ML outputs into constraints and control commands

- Contextual relevance to current driving conditions

- Real-time responsiveness without destabilizing oscillations

- Feasibility for deployment on automotive ECUs

- Goal alignment with performance, safety, and comfort objectives

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ML-informed MPC hybrid control framework

- **Methods/Levers:** Sensor fusion (accelerometer, gyroscope), XGBoost classification, pseudo-labeling

- **Operational Steps / Workflow:**

  1. Collect curated "seed" maneuver data

  2. Train prototype classifier

  3. Pseudo-label large exemplar dataset

  4. Train inference model

  5. Real-time operation using overlapping sliding window + reverse exponential weighting

  6. Feed mode predictions to MPC for constraint/parameter updates

- **Data & Measures:** Six inertial features (GForceX/Y/Z, GyroX/Y/Z) with defined sign conventions and

- **Implementation Context:** Performance suspension tuning case study; extensible to brakes, traction,

> "An overlapping sliding-window grading approach with reverse exponential weighting smooths transient

> "The controller can adjust its own internal constraints…based on the inferred driving mode." (p. 16)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — ML outputs interpreted via MPC into explicit commands (p. 3)

- **CR (Contextual Relevance):** Yes — Predictions reflect real-time driving modes for adaptive control (p.

- **FE (Feasibility):** Yes — Tested with latency measurements; hardware considerations discussed (p. 1

- **TI (Timeliness):** Yes — Sliding window + weighting ensures rapid yet stable response (p. 12)

- **EX (Explainability):** Yes — MPC's rule-based transparency provides explainability (p. 3)

- **GA (Goal Alignment):** Yes — Constraints tuned for performance, safety, comfort (p. 16)

- **Other Dimensions Named by Authors:** Stability through constraint management; robustness to sens

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Theoretical or Conceptual Foundations

- Model Predictive Control theory (receding horizon optimization, constraints)

- Semi-supervised ML (pseudo-labeling)

- Feature importance metrics from gradient-boosted decision trees

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Indicators or Metrics for Actionability

- Real-time classification accuracy (97.6%)

- Latency (~119 μs inference + 32 μs aggregation)

- F1-scores per maneuver class

- Confusion matrix diagonality (low cross-mode error)

Barriers and Enablers to Actionability

- **Barriers:**

  - Mislabeling under-represented scenarios

  - Trade-off between window size and responsiveness

  - Computational load on ECUs

  - Limited coverage of rare driving conditions in datasets

- **Enablers:**

  - MPC's safeguard role against erroneous ML outputs

  - Modular adaptability across vehicle subsystems

  - High accuracy and generalization via pseudo-labeling

Relation to Existing Literature

Positions itself as a practical, data-driven integration of ML and MPC, leveraging MPC's transparency to

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Summary

This paper offers a complete methodology for making ML outputs actionable in automotive control throug

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Scores

- **Overall Relevance Score:** 90 — Strong explicit conceptualization of actionability, well-linked features

- **Operationalization Score:** 88 — Detailed, multi-step technical pipeline with performance metrics; lacl

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Supporting Quotes from the Paper

- "MPC…translates ML outputs into actionable commands in the real world." (p. 3)

- "By grading each subsystem's real-world status and feeding those semantic modes into the optimizer, th

- "An overlapping sliding-window grading approach with reverse exponential weighting smooths transient

- "The controller can adjust its own internal constraints…based on the inferred driving mode." (p. 16)

Actionability References to Other Papers

- Norouzi et al. (2023) — ML–MPC integration review

- Maiworm et al. (2021) — Online learning-based MPC with stability guarantees

- Goel et al. (2023) — Semantically informed MPC for context-aware control

- Ribeiro et al. (2016) — Explaining predictions of classifiers

Paper Summary

Contains Definition of Actionability: Yes (implicit and partial explicit in Preface)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Mixed Methods (case studies, computational methods, literature reviews)

Study Context: Multiple diseases (diabetes, COVID-19, tuberculosis, Parkinson's, cancer), computational

Geographic/Institutional Context: Australia (primary), multi-country contexts for specific studies

Target Users/Stakeholders: Clinicians, health policymakers, biomedical researchers, data scientists

Primary Contribution Type: Conceptual synthesis + applied case studies + methodological frameworks

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Data Driven Science for Clinically Actionable Knowledge in Diseases

Authors:

Daniel R. Catchpoole, Simeon J. Simoff, Paul J. Kennedy, Quang Vinh Nguyen (eds.)

DOI:

10.1201/9781003292357

Year:

2024

Publication Type:

Edited Book

Discipline/Domain:

Health Informatics / Biomedical Data Science

Subdomain/Topic:

Data-driven analytics for actionable clinical insights in disease diagnosis, treatment, and policy

Contextual Background:

The volume addresses the intersection of computational, biological, and medical sciences, focusing on h

Geographic/Institutional Context:

Primarily Australian studies (notably NSW), with global relevance and examples.

Target Users/Stakeholders:

Clinicians, health policymakers, biomedical researchers, computational and data scientists.

Primary Methodology:

Mixed methods — applied computational models, literature reviews, methodological frameworks, and em

Primary Contribution Type:

Conceptual and applied synthesis for operationalizing data-driven actionable healthcare insights.

General Summary of the Paper

This edited collection explores state-of-the-art computational and visual analytics methods to produce *cli

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the capacity of data-driven insights to directly support **clinical actions** in real-

> "…focuses on 'close the loop' analytical processes to enrich and lead actionable knowledge" (Preface,

> "…computational and visual analytics… for discovering actionable knowledge in support of clinical actio

---

What Makes Something Actionable

- Direct linkage to clinical decision points

- Context relevance to patient journeys or population health

- Timeliness of insights (e.g., early diagnosis or intervention)

- Interpretability for clinical stakeholders

- Integration into existing healthcare workflows

- Feasibility with available data and resources

- Trustworthiness of analysis outputs

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Close-the-loop analytical process; methodological framework for bio

- **Methods/Levers:** Data integration (multi-source clinical, genomic, imaging), computational modeling

- **Operational Steps / Workflow:** Data linkage, feature engineering, model training, interpretable outpu

- **Data & Measures:** Linked health records (e.g., Lumos dataset), imaging data, genomic/RNA-seq dat

- **Implementation Context:** Clinical decision-making, public health policy, personalized medicine, rare

> "…integral analysis… for discovering actionable knowledge in support of clinical actions in real environr

> "…visual analytics… enabling the effective exploration and interpretation of complex biomedical data" (

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clear, interpretable outputs required for adoption.

> "…meaningful visualisation and human–information interaction" (p. xiv)

- **CR (Contextual Relevance):** Yes — grounded in specific patient cohorts and health system contexts

> "…linked patient records for generating clinically actionable knowledge" (p. xv)

- **FE (Feasibility):** Yes — focus on methods applicable within real healthcare settings.

- **TI (Timeliness):** Yes — emphasis on early prescriptions, rapid diagnostics, timely policy inputs.

- **EX (Explainability):** Yes — multiple chapters on explainable ML and visualization (Ch. 9).

- **GA (Goal Alignment):** Yes — alignment with improved health outcomes, policy goals.

- **Other Dimensions Named:** Trust, interpretability, user engagement (Ch. 10).

Theoretical or Conceptual Foundations

- Close-the-loop analytics in health systems

- Explainable AI and interpretable ML frameworks

- Human-information interaction theory

- Decision support and trust in visualization literature

Indicators or Metrics for Actionability

- Reduction in unplanned hospital admissions

- Mortality rate changes within defined periods

- Model accuracy, false positive/negative rates

- Timeliness of intervention post-diagnosis

Barriers and Enablers to Actionability

- **Barriers:** Data silos, inter-site variability, trust issues, lack of interpretability, small sample sizes for ra

- **Enablers:** Data linkage initiatives (e.g., Lumos), harmonization techniques, visual explainability tools

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Relation to Existing Literature

The editors situate their approach within a growing body of work on data-driven healthcare, emphasizing

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Summary

The volume *Data Driven Science for Clinically Actionable Knowledge in Diseases* synthesizes methods

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Scores

- **Overall Relevance Score:** 85 — Strong implicit definition and consistent feature articulation across c

- **Operationalization Score:** 80 — Multiple concrete frameworks, workflows, and applied cases showin

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Supporting Quotes from the Paper

- "...for discovering actionable knowledge in support of clinical actions in real environments" (p. 4)

- "...focuses on 'close the loop' analytical processes to enrich and lead actionable knowledge" (p. xiv)

- "...linked patient records for generating clinically actionable knowledge" (p. xv)

- "...meaningful visualisation and human–information interaction" (p. xiv)

- "...guidance on improving interpretability and trust in health models and visualisations" (p. xviii)

Actionability References to Other Papers

- NSW Health Lumos program studies on GP attendance and hospital visits

- Visual analytics frameworks for biomedical and genomic data

- Explainable AI surveys and visualization literature in health contexts

- Machine learning applications for diagnostics and treatment selection

Paper Summary

<!--META_START-->

Title: Creating actionable knowledge one step at a time: An analytical framework for tracing systems and

Authors: Katharina Hölscher, Julia M. Wittmayer, Alfred Olfert, Martin Hirschnitz-Garbers, Jörg Walther, C

DOI: https://doi.org/10.1016/j.eist.2022.11.007

Year: 2023

Publication Type: Journal

Discipline/Domain: Sustainability Transitions / Environmental Studies

Subdomain/Topic: Actionable knowledge, niche innovations, coupled infrastructures, analytical framewor

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 88

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes (linked to understanding innovation dynamics and options for action)

Contains Interpretability: Yes (narrative/process tracing approach)

Contains Framework/Model: Yes (multi-dimensional analytical framework)

Operationalization Present: Yes (four-step analytical process with applied cases)

Primary Methodology: Mixed Methods (conceptual framework + applied case studies + qualitative intervie

Study Context: German infrastructure innovation projects (energy, water, mobility, ICT)

Geographic/Institutional Context: Germany (national, regional, local policy and practice contexts)

Target Users/Stakeholders: Policy actors, practitioners, planners, utilities, infrastructure developers

Primary Contribution Type: Analytical framework for generating actionable knowledge in sustainability tra

CL: Yes — clarity in understanding pathways, contexts, and agency is positioned as essential for actiona

CR: Yes — contextual relevance embedded in system definition, system factors, and agency analysis

FE: Yes — feasibility linked to technical, institutional, and socio-cultural system factors

TI: Yes — timeliness addressed via sequencing of development moments and anticipation of opportunitie

EX: Yes — explainability achieved through narrative, process tracing, and explicit system–agency integra

GA: Yes — goal alignment via sustainability and transformative impact criteria

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Creating actionable knowledge one step at a time: An analytical framework for tracing systems and agen

Authors:

Katharina Hölscher, Julia M. Wittmayer, Alfred Olfert, Martin Hirschnitz-Garbers, Jörg Walther, Georg Sch

DOI:

https://doi.org/10.1016/j.eist.2022.11.007

Year:

2023

Publication Type:

Journal

Discipline/Domain:

Sustainability Transitions / Environmental Studies

Subdomain/Topic:

Actionable knowledge, niche innovations, coupled infrastructures, analytical frameworks

Contextual Background:

This paper is situated in sustainability transitions research, focusing on producing knowledge that both ex

Geographic/Institutional Context:

Germany; national ministries, federal agencies, municipalities, utilities, and infrastructure developers

Target Users/Stakeholders:

Policy-makers, planners, public utilities, infrastructure developers, practitioners in sustainability transitions

Primary Methodology:

Mixed Methods — conceptual framework design, applied case studies, qualitative interviews, document a

Primary Contribution Type:

A multi-dimensional, practice-oriented analytical framework for tracing niche innovation development path

---

General Summary of the Paper

The authors present a stepwise, iterative analytical framework that integrates system-centred and agency

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable knowledge is "knowledge that supports actors' understanding of how to create transformative

> "The generation of actionable knowledge … can be supported through connecting system-centred and

> "Our premise was … to offer an understanding of the complex dynamics of niche innovations … and in

---

What Makes Something Actionable

- Integration of system and agency perspectives to reveal both complexity and options for action
- Clear identification of development pathways, contextual factors, and actor roles

- Linking insights to sustainability and transformative impact criteria

- Involving policy and practice actors for contextual relevance and uptake potential

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name:** Analytical framework for tracing systems and agency in niche innovatio

- **Methods/Levers:** Process tracing, multi-level perspective (MLP), multi-actor perspective (MAP), mult

- **Operational Steps / Workflow:**

  1. Define system boundaries and elements

  2. Identify critical development moments

  3. Identify system factors influencing those moments

  4. Identify actors and activities

  5. Assess sustainability and transformative impact

- **Data & Measures:** Qualitative interviews, grey literature review, sustainability criteria matrix

- **Implementation Context:** German coupled infrastructure innovation projects

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — understanding pathways, contexts, and roles is essential for actionability.

- **CR (Contextual Relevance):** Yes — system factors and actor roles are analysed in relation to the sp

- **FE (Feasibility):** Yes — addresses technical, institutional, and socio-cultural feasibility explicitly.

- **TI (Timeliness):** Yes — development moments mapped over time to identify opportunities and risks.

- **EX (Explainability):** Yes — narrative and visualisation of pathways aid comprehension.

- **GA (Goal Alignment):** Yes — explicitly linked to sustainability and transformative goals.

- **Other Dimensions Named by Authors:** Sustainability impact, transformative impact

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Theoretical or Conceptual Foundations

- Multi-Level Perspective (MLP)

- Multi-Actor Perspective (MAP)

- Multi-Level Governance (MLG)

- Pathways concept (Leach et al., 2010)

- Agency capacities frameworks

Indicators or Metrics for Actionability

- Sustainability criteria (performance, resilience, resource efficiency, social/economic viability)

- Transformative impact (extent of regime challenge/shift)

Barriers and Enablers to Actionability

- **Barriers:** Conflicting regulations, institutional misalignment, technological immaturity, financial insecu

- **Enablers:** Political leadership, aligned sustainability strategies, funding programmes, technical feasib

---

Relation to Existing Literature

Builds on transition theories but addresses their limited operational utility for practice by integrating syste

---

Summary

This paper develops and applies a multi-dimensional analytical framework to generate actionable knowle

---

Scores

- **Overall Relevance Score:** 92 — Strong conceptual clarity on actionability, explicit integration of featu

- **Operationalization Score:** 88 — Fully operationalised with clear steps, data collection methods, and

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Supporting Quotes from the Paper

- "Actionable knowledge … supports actors' understanding of how to create transformative change towar

- "The generation of actionable knowledge … can be supported through connecting system-centred and a

- "Our premise was … to offer an understanding of the complex dynamics of niche innovations … and in t

---

Actionability References to Other Papers

- Caniglia et al. (2020) — pluralistic, integrated approach to action-oriented knowledge

- Mach et al. (2020) — actionable knowledge and engagement

- Frantzeskaki & Rok (2018) — co-producing sustainability transitions knowledge

- Leach et al. (2010) — pathways concept in sustainability

- Geels & Schot (2007) — MLP in socio-technical transitions

Paper Summary

<!--META_START-->

Title: Coproducing water-energy-food Nexus actionable knowledge: Lessons from a multi-actor collaborat

Authors: Djenontin, Ida N.S.; Daher, Bassel; Johnson, Jacob W.; Adule, Kenan; Hishe, Birhanu K.; Kekiru

Eligibility: Eligible

Overall Relevance Score: 93

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit, contextualized through co-production process and criter

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (Collaborative Learning School – CLS)

Operationalization Present: Yes

Primary Methodology: Mixed Methods (qualitative participatory processes + evaluation surveys)

Study Context: WEF Nexus in smallholder and peri-urban farming contexts in Uganda; Buikwe District ca

Geographic/Institutional Context: Uganda – Makerere University collaboration with U.S. and E.U. universi

Target Users/Stakeholders: Farmers, local authorities, district-level officers, national policymakers, NGOs

Primary Contribution Type: Applied case study and methodological innovation

CL: Yes — "fit for purpose, including relevance and affordable to the community at stake"

CR: Yes — "context-driven… pathways for problem-solving-oriented knowledge co-production"

FE: Yes — "cost-effective (low input and build on existing institutions)"

TI: Yes — "importance on short, medium, and long-term for farmers' livelihood"

EX: Yes — "systems mapping and causal loop diagrams… to understand root causes and interactions"

GA: Yes — "alignment with district and national goals… considered for integration into existing policies"

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Coproducing water-energy-food Nexus actionable knowledge: Lessons from a multi-actor collaborative le

Authors:

Ida N.S. Djenontin, Bassel Daher, Jacob W. Johnson, Kenan Adule, Birhanu K. Hishe, Patience Kekirung

DOI:

Year:

2025

Publication Type:

Journal Article

Discipline/Domain:

Environmental Science and Policy

Subdomain/Topic:

Water-Energy-Food Nexus; Transdisciplinary Co-Production; Stakeholder Engagement; Uganda

Contextual Background:

This paper examines how actionable WEF Nexus knowledge can be co-produced through a *Collaborativ

Geographic/Institutional Context:

Uganda; collaboration between Makerere University, U.S., and E.U. universities, local NGOs, and govern

Target Users/Stakeholders:

Smallholder and peri-urban farmers, agricultural cooperatives, district officers, national ministries, NGOs,

Primary Methodology:

Mixed Methods (participatory qualitative processes, systems/design thinking workshops, causal loop diag

Primary Contribution Type:

Applied methodological case study demonstrating operational pathways for producing actionable WEF N

General Summary of the Paper

The authors introduce the *Collaborative Learning School* (CLS) as a transdisciplinary, multi-actor proce

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly framed as knowledge and solutions that are:

- Co-created with stakeholders at multiple governance levels.

- Contextually relevant, fit for purpose, and feasible for local adoption.

- Operationalized into implementable "pathways to change" validated by both end-users and decision-ma

> "…support participatory co-creations of context-driven multi-scalar WEF-Nexus pathways for problem-s

> "…fit for purpose, including relevance and affordable to the community at stake" (p. 7)

What Makes Something Actionable

- Fit for purpose and community relevance.

- Feasibility and affordability using existing institutions.

- Co-created with diverse stakeholders, incorporating local and technical knowledge.

- Sustainability (short, medium, long-term impacts).

- Potential for scaling and policy integration.

- Immediate visible results to build trust.

- Capacity building and intergenerational collaboration.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Collaborative Learning School (CLS)

- **Methods/Levers:** Systems thinking, design thinking, political economy analysis, participatory mappin

- **Operational Steps / Workflow:**

  1. Community problem identification (focus groups, transects, interviews).

  2. Systems mapping & solution ideation (causal loop diagrams, brainstorming).

  3. Solution prototyping (physical models).

  4. Validation (community, district, national workshops).

- **Data & Measures:** Post-evaluation surveys, interviews, observational data, stakeholder feedback on

- **Implementation Context:** Multi-scalar engagement from local farmers to national ministries.

> "…systems mapping and causal loop diagrams… envisage innovative solutions collaboratively with the

> "…prototyped models… facilitated presenting complex ideas to various stakeholders, furthering underst

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL:** Yes — Clarity through shared understanding, visual mapping, and tangible prototypes.

- **CR:** Yes — Solutions directly emerged from locally identified WEF Nexus issues.

- **FE:** Yes — Emphasis on cost-effectiveness and building on existing institutions.

- **TI:** Yes — Importance across short, medium, long-term livelihoods.

- **EX:** Yes — Systems mapping to clarify cause-effect relationships and trade-offs.

- **GA:** Yes — District and national alignment discussed and sought for integration.

- **Other Dimensions:** Trust-building, inclusivity, capacity development.

Theoretical or Conceptual Foundations

- WEF Nexus framework.

- Systems thinking (causal loop diagrams, holistic problem framing).

- Design thinking (human-centered iterative problem-solving).

- Political Economy Analysis.

Indicators or Metrics for Actionability

- Stakeholder-perceived feasibility, relevance, and alignment with goals.

- Willingness to implement and allocate resources.

- Immediate visible results to build trust.

Barriers and Enablers to Actionability

Barriers:

- Limited access to extension services.

- Lack of farmer cooperation.

- Gaps between community priorities and national programs.

- Funding constraints.

- Weak communication channels between governance levels.

Enablers:

- Cooperative formation and farmer organization.

- Integration into existing policy frameworks.

- Multi-level stakeholder engagement.

- Local knowledge and technical expertise integration.

Relation to Existing Literature

The CLS builds on farmer field school approaches, transdisciplinary WEF Nexus research, and co-produ

---

Summary

This paper offers a fully articulated, operational framework (CLS) for producing actionable WEF Nexus kn

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Scores

- **Overall Relevance Score:** 93 — Strong implicit definition of actionability, detailed features tied to the

- **Operationalization Score:** 95 — Provides a concrete, tested, and replicable process with clear steps.

Supporting Quotes from the Paper

- "[CLS]…support participatory co-creations of context-driven multi-scalar WEF-Nexus pathways for probl

- "Fit for purpose, including relevance and affordable to the community at stake" (p. 7)

- "Systems mapping and causal loop diagrams… envisage innovative solutions collaboratively with the st

- "Prototyped models… facilitated presenting complex ideas to various stakeholders, furthering understan

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Actionability References to Other Papers

- Djenontin & Meadow (2018) — Co-production guidance.

- Naidoo et al. (2021) — WEF Nexus operationalization methodology.

- Hamidov et al. (2022) — Nexus summer school model.

- Johnson & Karlberg (2017) — Participatory WEF modeling.

- Purwanto et al. (2019); Rich et al. (2018) — Group model building and stakeholder engagement in Nexu

Paper Summary

<!--META_START-->

Title: Conceptual Framework for Prescriptive Analytics Based on Decision Theory in Smart Factories

Authors: Julian Weller, Martin Kohlhase, Nico Migenda, Wolfram Schenck, Arthur Wegel, Roman Dumitre

DOI: 10.1109/ADACIS59737.2023.10424368

Year: 2023

Publication Type: Conference

Discipline/Domain: Industrial Engineering / Data Analytics

Subdomain/Topic: Prescriptive Analytics, Decision Theory, Smart Factories

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 80

Contains Definition of Actionability: Yes (implicit via prescriptive analytics definition and decision theory in

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No explicit mention

Contains Framework/Model: Yes (four-step conceptual framework)

Operationalization Present: Yes

Primary Methodology: Conceptual + Literature Review

Study Context: Prescriptive analytics for decision-making in smart factories, integrating decision theory ar

Geographic/Institutional Context: Germany (Fraunhofer Institute, Bielefeld University of Applied Sciences

Target Users/Stakeholders: Researchers, industrial practitioners, smart factory decision-makers

Primary Contribution Type: Conceptual framework

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Conceptual Framework for Prescriptive Analytics Based on Decision Theory in Smart Factories

Authors:

Julian Weller, Martin Kohlhase, Nico Migenda, Wolfram Schenck, Arthur Wegel, Roman Dumitrescu

DOI:

10.1109/ADACIS59737.2023.10424368

Year:

2023

Publication Type:

Conference

Discipline/Domain:

Industrial Engineering / Data Analytics

Subdomain/Topic:

Prescriptive Analytics, Decision Theory, Smart Factories

Contextual Background:

The paper addresses the lack of a comprehensive conceptual framework for prescriptive analytics in sma

Geographic/Institutional Context:

Germany; Fraunhofer Institute for Mechatronic Systems Design, Bielefeld University of Applied Sciences

Target Users/Stakeholders:

Researchers, industrial data scientists, manufacturing process engineers, smart factory decision-makers

Primary Methodology:

Conceptual + structured literature review

Primary Contribution Type:

Conceptual framework

General Summary of the Paper

The authors propose a four-step conceptual framework for prescriptive analytics in smart factories, groun

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the capacity of prescriptive analytics to provide data-driven, context-aware reco

> "Prescriptive analytics… examines data or content to answer the question: What should be done?" (p. 1

> "The conceptual framework… aims at optimizing decision-making processes integrating knowledge ext

---

What Makes Something Actionable

- Clear decision triggers linked to validated data

- Contextual alignment with factory strategies, constraints, and operational goals

- Feasible and implementable prescriptions within environmental constraints

- Ability to select among alternatives and adapt via feedback loops

- Modularity to suit various decision types (structured, semi-structured, unstructured)

- Support for different levels of automation and human-machine collaboration

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Four-Step Conceptual Framework for Prescriptive Analytics in Smar

- **Methods/Levers:** Integration of decision theory models (Simon, Panagiotou), data analytics maturity

- **Operational Steps / Workflow:**

  1. **Conditional Trigger** – Identify and validate decision triggers from system data (descriptive, diagnos

  2. **Prescription** – Assess alternatives using a knowledge representation; select optimal prescription

3. **Execution** – Implement or automate decision; optional feedback loop for learning

4. **Knowledge Representation** – Central repository of decision-relevant constraints, strategies, and sy

- **Data & Measures:** Historical, live, or batch data; system characteristics; performance metrics for fee

- **Implementation Context:** Smart factory decision processes (quality, production, maintenance, logisti

> "A prescription is only valid if the trigger is valid… alternatives… drawn from a given knowledge repres

> "An optional feedback loop… create a learning system… the decision-effect relation serves as a param

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Decisions must be explicit and grounded in validated triggers.

- **CR (Contextual Relevance):** Yes – Must incorporate strategies, constraints, and environmental cont

- **FE (Feasibility):** Yes – Prescriptions must be implementable under given constraints.

- **TI (Timeliness):** Partial – Framework implies real-time or near-real-time potential but not as a formal

- **EX (Explainability):** Partial – Knowledge representation enables traceability, but explicit explainabilit

- **GA (Goal Alignment):** Yes – Explicit integration with operational and strategic goals.

- **Other Dimensions Named by Authors:** Modularity, adaptability, automation flexibility.

Theoretical or Conceptual Foundations

- Decision Theory (normative, descriptive, prescriptive approaches)

- Simon's intelligence-design-choice-implementation model

- Panagiotou's goal-driven framework

- Gartner's analytics maturity model

Indicators or Metrics for Actionability

- Validity of triggers

- Performance of implemented prescriptions

- Feedback loop outcomes (accuracy, efficiency, goal alignment)

Barriers and Enablers to Actionability

- **Barriers:** Data quality issues; lack of methodology for selecting implementation strategy; unclear aut

- **Enablers:** Modular architecture; adaptability across decision types; integration of human and machin

---

Relation to Existing Literature

The paper uniquely integrates prescriptive decision theory concepts into prescriptive analytics for smart fa

---

Summary

This paper presents a structured four-step framework for prescriptive analytics in smart factories, integrat

---

Scores

- **Overall Relevance Score:** 90 – Strong implicit and explicit articulation of actionability features; clear i

- **Operationalization Score:** 80 – Provides detailed, adaptable workflow steps but lacks complete meth

---

Supporting Quotes from the Paper

- "Prescriptive Analytics… examines data or content to answer the question: What should be done?" (p. 1

- "The conceptual framework needs to incorporate existing and established patterns of decision making…

- "A pres

Paper Summary

<!--META_START-->

Title: Competitive intelligence embeddedness: Drivers and performance consequences

Authors: Amiram Markovich, Kalanit Efrat, Daphne R. Raban, Anne L. Souchon

DOI: https://doi.org/10.1016/j.emj.2019.04.003

Year: 2019

Publication Type: Journal

Discipline/Domain: Management / Marketing / Information & Knowledge Management

Subdomain/Topic: Competitive Intelligence (CI), Knowledge Management, Organizational Capabilities

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 80

Contains Definition of Actionability: Yes (explicit link to actionable knowledge in CI process)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No explicit mention

Contains Framework/Model: Yes (CI Embeddedness conceptual model with antecedents and consequen

Operationalization Present: Yes

Primary Methodology: Quantitative (Survey, SEM)

Study Context: Competitive Intelligence use in Israeli firms

Geographic/Institutional Context: Israel; firms with ≥10 employees and annual sales ≥ $1M

Target Users/Stakeholders: Managers, decision-makers, CI practitioners, knowledge managers

Primary Contribution Type: Empirical model testing antecedents and effects of CI Embeddedness

CL: Yes

CR: Yes

FE: No

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Competitive intelligence embeddedness: Drivers and performance consequences

Authors:

Amiram Markovich, Kalanit Efrat, Daphne R. Raban, Anne L. Souchon

DOI:

https://doi.org/10.1016/j.emj.2019.04.003

Year:

2019

Publication Type:

Journal

Discipline/Domain:

Management / Marketing / Information & Knowledge Management

Subdomain/Topic:

Competitive Intelligence (CI), Knowledge Management, Organizational Capabilities

Contextual Background:

The study addresses how competitive intelligence (CI) becomes embedded into organizational processes

Geographic/Institutional Context:

Israeli firms, spanning SMEs and large corporations, across various industries.

Target Users/Stakeholders:

Managers, decision-makers, CI practitioners, competitive strategy teams, knowledge managers.

Primary Methodology:

Quantitative survey of 124 mid- and senior-level managers, analyzed with Structural Equation Modeling (

Primary Contribution Type:

Empirical testing of a conceptual model linking antecedents (information quality, alliances, biased use typ

---

General Summary of the Paper

This paper conceptualizes and measures Competitive Intelligence Embeddedness (CIE) as the degree to

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the transformation of competitive and market data into *actionable strategic kno

> "Competitive intelligence (CI) is a process that produces and disseminates actionable information… in c

> "CI embeddedness… so that strategic and tactical decisions can be made in the knowledge of all releva

---

What Makes Something Actionable

- Integration into daily routines and organizational culture.

- Awareness and acceptance of CI by decision-makers and employees.

- Support from senior management (legitimacy, resources, accountability).

- High perceived quality of information sources.

- Timely dissemination to relevant organizational levels.

- Goal alignment with competitive positioning and customer satisfaction.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** CI Embeddedness (CIE) Capability Model.

- **Methods/Levers:** Use of high-quality web CI sources ("Analyze" and "Formal"), alliances with informa

- **Operational Steps / Workflow:**

 1. Assess and source high-quality competitive intelligence from web-based sources.

 2. Build strategic alliances with reliable information providers.

 3. Embed CI dissemination processes across organizational levels.

 4. Integrate CI into both strategic and tactical decision-making.

- **Data & Measures:** Likert-scale survey assessing web source quality, information use patterns, CIE p
- **Implementation Context:** Multi-industry Israeli firms with active CI functions.

> "CIE… refers to the incorporation of CI awareness and processes in the firm… Various staff levels are

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** **Yes** — Clear, accessible dissemination to relevant levels.

  > "…distribution of reviews on competitors and managers' awareness of CI's importance" (p. 711).

- **CR (Contextual Relevance):** **Yes** — Tailoring to competitive environment and organizational nee

  > "…so that strategic and tactical decisions can be made in the knowledge of all relevant… information"

- **FE (Feasibility):** **No explicit link** — Feasibility implied via integration into existing processes, but r

- **TI (Timeliness):** **No explicit link** — Speed emphasized in web sourcing but not framed as a neces

- **EX (Explainability):** **Partial** — Actionable knowledge is implied to be understandable and interpret

- **GA (Goal Alignment):** **Yes** — Linked to customer satisfaction and competitive advantage.

- **Other Dimensions Named by Authors:** Alliances, perceived information quality, organizational culture

---

Theoretical or Conceptual Foundations

- Resource-Based View (RBV) — CIE as a firm-specific capability.

- Knowledge Management Framework.

- Intelligence Cycle (planning, collection, analysis, communication).

Indicators or Metrics for Actionability

- Degree of CI awareness at various staff levels.

- Distribution frequency and coverage of CI reports.

- Perceived quality scores of information sources.

- Customer satisfaction indices (loyalty, complaint rates).

Barriers and Enablers to Actionability

- **Barriers:** Information overload, political or inaccurate use of information, resistance to information.

- **Enablers:** High-quality CI sources, strong alliances with providers, management support, cultural inte

---

Relation to Existing Literature

Builds on Bernhardt (1994) definition of CI as producing actionable knowledge, integrates CI with knowle

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Summary

The paper introduces Competitive Intelligence Embeddedness (CIE) as a capability ensuring actionable

---

Scores

- **Overall Relevance Score:** 85 — Strong conceptual and empirical articulation of actionability within C

- **Operationalization Score:** 80 — Clear model, measurement, and implementation steps for embeddin

---

Supporting Quotes from the Paper

- "Competitive intelligence… produces and disseminates actionable information… to help managers in de

- "CIE… so that strategic and tactical decisions can be made in the knowledge of all relevant… informatic

- "Perceived quality of Web information sources is positively related to competitive intelligence embedded

- "Alliances with information providers… positively related to competitive intelligence embeddedness" (p. 7

- "CIE showed the expected positive influence on customer satisfaction" (p. 712).

Actionability References to Other Papers

- Bernhardt (1994) — Actionable strategic knowledge definition.

- Saayman et al. (2008) — Organizational culture and CI support.

- Ho (2008) — Linking learning, knowledge management, and performance.

- Rouach & Santi (2001) — CI as a capability for competitive advantage.

Paper Summary

<!--META_START-->

Title: CARE: Coherent Actionable Recourse based on Sound Counterfactual Explanations

Authors: Peyman Rasouli, Ingrid Chieh Yu

DOI: https://doi.org/10.1145/nnnnnnn.nnnnnnn

Year: 2021

Publication Type: Conference

Discipline/Domain: Computer Science / Artificial Intelligence

Subdomain/Topic: Interpretable Machine Learning, Counterfactual Explanations, Actionable Recourse

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual with empirical evaluation

Study Context: Model-agnostic counterfactual and recourse generation for classification and regression c

Geographic/Institutional Context: University of Oslo, Norway

Target Users/Stakeholders: End-users seeking actionable guidance from ML predictions; researchers in

Primary Contribution Type: Modular explanation framework (CARE) integrating model-level and user-leve

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title: CARE: Coherent Actionable Recourse based on Sound Counterfactual Explanations

Authors: Peyman Rasouli, Ingrid Chieh Yu

DOI: https://doi.org/10.1145/nnnnnnn.nnnnnnn

Year: 2021

Publication Type: Conference

Discipline/Domain: Computer Science / Artificial Intelligence

Subdomain/Topic: Interpretable Machine Learning, Counterfactual Explanations, Actionable Recourse

Contextual Background: The paper addresses the limitations of existing counterfactual explanation m

Geographic/Institutional Context: University of Oslo, Norway

Target Users/Stakeholders: ML end-users needing recourse (e.g., loan applicants), explainable AI res

Primary Methodology: Conceptual with empirical evaluation

Primary Contribution Type: New modular framework for counterfactual and recourse generation

General Summary of the Paper

The authors propose CARE, a modular, model-agnostic explanation framework for generating actionable

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as satisfying global and local user/domain-specific preferences through constraints

> "A counterfactual should satisfy some global and local preferences that are domain-specific and defined

> "An actionable explanation… takes into account the user's preferences containing the name of mutable

What Makes Something Actionable

- Alignment with user-specified constraints (mutable/immutable features, allowed ranges/values)

- Preservation of feature coherency under constraints

- Feasibility in real-world terms (not recommending impossible changes)

- Respecting constraint importance (prioritizing non-violable constraints)

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** CARE

- **Methods/Levers:** Modular hierarchy with four modules; multi-objective optimization using NSGA-III

- **Operational Steps / Workflow:**

  1. **VALIDITY:** Enforce minimal, sparse changes to achieve the desired outcome.

  2. **SOUNDNESS:** Ensure proximity and connectedness to real, same-class data points.

  3. **COHERENCY:** Use correlation models to preserve feature relationships.

  4. **ACTIONABILITY:** Apply user-defined constraints with importance weighting.

- **Data & Measures:** Gower distance, Local Outlier Factor, HDBSCAN clustering, correlation measures

- **Implementation Context:** Model-agnostic; applicable to tabular classification/regression; handles mix

> "We propose a constraint language… and the notion of constraint importance to weigh the constraints a

> "CARE… generates actionable recourse by fulfilling the mentioned desiderata through objective functio

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — minimal, interpretable feature changes improve understandability (p. 3).

- **CR (Contextual Relevance):** Yes — proximity and connectedness ensure alignment with domain dat

- **FE (Feasibility):** Yes — coherent changes preserve real-world plausibility (p. 2–3).

- **TI (Timeliness):** No — not explicitly addressed.

- **EX (Explainability):** Partial — explanations are inherent but focus is on actionable counterfactuals, n

- **GA (Goal Alignment):** Yes — constraints ensure user goals/preferences are respected (p. 6).

- **Other Dimensions Named by Authors:** Coherency, proximity, connectedness.

Theoretical or Conceptual Foundations

- Counterfactual explanations in XAI (Wachter et al., 2017)

- Proximity and connectedness metrics (Laugel et al., 2019)

- Actionable recourse frameworks (Ustun et al., 2019; Karimi et al., 2020)

- Multi-objective optimization (NSGA-III)

Indicators or Metrics for Actionability

- Actionability cost (sum of violated constraint importance values)

- Proximity and connectedness scores to assess plausibility

- Coherency rate (preservation of feature correlations)

Barriers and Enablers to Actionability

- **Barriers:** Conflicting constraints; lack of coherent feature changes; artifacts in model space (p. 2–3).

- **Enablers:** Modular structure allowing selective enforcement of properties; weighting of constraints by

Relation to Existing Literature

The paper extends prior counterfactual explanation methods by integrating seldom-addressed properties

Summary

CARE is a modular, model-agnostic framework for generating actionable recourse grounded in sound cou

Scores

- **Overall Relevance Score:** 95 — Provides explicit and nuanced definition of actionability with multiple

- **Operationalization Score:** 95 — Fully details how to implement actionability in practice through const

Supporting Quotes from the Paper

- "A counterfactual should satisfy some global and local preferences that are domain-specific and defined

- "We introduce a novel notion of actionability that can cover various constraints and prioritize different pro

- "Our proposed objective function… computes the actionability cost… according to the user's preference

- "An actionable explanation… takes into account the user's preferences containing the name of mutable/

Actionability References to Other Papers

- Ustun, Spangher, Liu (2019) — Actionable recourse in linear classification

- Karimi et al. (2020) — Algorithmic recourse

- Wachter et al. (2017) — Counterfactual explanations

- Laugel et al. (2019) — Proximity and connectedness in counterfactuals

- Dandl et al. (2020) — Multi-objective counterfactual explanations

Paper Summary

<!--META_START-->

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 92

Contains Definition of Actionability: Yes (explicit and process-based)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (three-process integrated framework)

Operationalization Present: Yes (nine-step, four-phase process)

Primary Methodology: Mixed Methods (qualitative, quantitative, participatory, collaborative autoethnograp

Study Context: Transdisciplinary project in Kiiminkijoki river catchment, Finland

Geographic/Institutional Context: Northern Finland; multiple municipalities and stakeholder groups

Target Users/Stakeholders: Researchers, policymakers, local communities, administrative bodies, civil so

Primary Contribution Type: Conceptual framework + empirical case study

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

Bridging the knowledge–action gap: A framework for co-producing actionable knowledge

Authors:

Aleksi Räsänen et al.

DOI:

[10.1016/j.envsci.2024.103929](https://doi.org/10.1016/j.envsci.2024.103929)

Year:

2024

Publication Type:

Journal

Discipline/Domain:

Environmental Science / Sustainability Science

Subdomain/Topic:

Knowledge co-production, catchment governance, transdisciplinary research

Contextual Background:

The paper addresses how transdisciplinary research can bridge the persistent gap between knowledge g

Geographic/Institutional Context:

Northern Finland, involving municipal authorities, NGOs, research institutions, and local landowners.

Target Users/Stakeholders:

Researchers, policymakers, local communities, administrative actors, civil society groups, landowners, ar

Primary Methodology:

Mixed Methods — qualitative interviews, participatory workshops, GIS analysis, forestry simulations, litera

Primary Contribution Type:

Conceptual framework integrated with empirical application.

General Summary of the Paper

The authors critique the dominant output-focused concept of actionable knowledge and instead conceptu

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable knowledge is defined as a **process**—not merely outputs—characterized by:

1. **Cumulative and stepwise** phases that build towards catalyzing action.

2. **Iterative and cyclical** interactions that allow reframing and adaptation.

3. **Coevolutionary** dynamics where knowledge and action continuously shape each other.

> "We instead propose to understand actionable knowledge as a process that has (1) cumulative and ste

> "Actionable knowledge… is not the output per se but the process of actionable knowledge production a

---

What Makes Something Actionable

- Integration of diverse knowledge systems (scientific, local, administrative).

- Co-definition of problems aligned with societal agendas.

- Societal validation and experimentation (pilots, participatory assessments).

- Usable, solution-oriented outputs grounded in co-production.

- Boundary spanning to sustain momentum and coordinate across actors.

- Contextual alignment with stakeholder values, priorities, and governance structures.

How Actionability is Achieved / Operationalized

Framework/Approach Name(s):

Four-phase process + Nine-step roadmap

Methods/Levers:

Participatory workshops, semi-structured interviews, GIS analysis, forestry simulations, pilot projects, coll

Operational Steps / Workflow:

1. Problem definition

2. Stakeholder identification

3. Background data collection

4. Pilot measures for validation

5. Visioning desirable futures

6. Impact assessment of measures

7. Stakeholder deliberation of results

8. Synthesis into roadmap

9. Establishment of catchment coordinator (boundary spanning)

Data & Measures:

GIS spatial datasets, water quality data, forestry growth and carbon simulations, participatory mapping, s

Implementation Context:

Catchment-scale land-use governance with overlapping environmental, social, and economic objectives.

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Roadmap synthesis reduced complexity into accessible format.

- **CR (Contextual Relevance):** Yes — Problem reframed to match local water quality priorities.

- **FE (Feasibility):** Yes — Measures assessed for technical, social, and economic viability.

- **TI (Timeliness):** Partial — Iterative process responsive to emerging opportunities, but long-term cycl

- **EX (Explainability):** Partial — Process transparency emphasized; less focus on formal explainability

- **GA (Goal Alignment):** Yes — Co-defined goals and integration of stakeholder visions.

- **Other Dimensions Named by Authors:** Legitimacy, credibility, usability, and societal validation.

Theoretical or Conceptual Foundations

- Cash et al. (2003) attributes of knowledge (credibility, legitimacy, relevance)

- Co-production and social robustness literature (Nowotny 2003; Roux et al. 2006)

- Coevolutionary theory (Jasanoff 2004; Klenk 2018)

- Transdisciplinary research cycle models (Jahn et al. 2012; Hoffmann et al. 2019)

- Meshwork concept (Deleuze & Guattari 1987; Ingold 2011)

Indicators or Metrics for Actionability

- Uptake and implementation of roadmap measures.

- Establishment of a permanent catchment coordinator.

- Stakeholder engagement breadth and continuity.

- Reduction in environmental impact indicators (modeled/monitored).

Barriers and Enablers to Actionability

Barriers:

- Divergent priorities (e.g., climate vs. water quality).

- Limited scientific certainty for some measures.

- Fragmented governance and land ownership.

- Resistance from economically focused actors.

Enablers:

- Early stakeholder engagement and trust building.

- Pilot projects demonstrating feasibility.

- Clear, co-created vision and roadmap.

- Dedicated boundary spanning role.

Relation to Existing Literature

Positions itself against the dominant "knowledge-first" linear model by integrating cumulative, iterative, an

---

Summary

This paper reconceptualizes actionable knowledge as an ongoing process rather than discrete outputs. U

Scores

- **Overall Relevance Score:** 95 — Strong conceptualization of actionability with explicit process framin

- **Operationalization Score:** 92 — Clear nine-step, four-phase operationalization with concrete method

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Supporting Quotes from the Paper

- "We instead propose to understand actionable knowledge as a process that has (1) cumulative and step

- "Actionable knowledge… is not the output per se but the process of actionable knowledge production an

- "Without a shared problem, there cannot be shared problem solving, and collective action becomes imp

- "Integration of diverse systems of knowledge… increases potential to generate action." (p. 11)

- "The catchment coordinator… should be the central node for knowledge and action within the catchmen

---

Actionability References to Other Papers

- Cash et al. (2003) — Credibility, legitimacy, relevance framework

- Nowotny (2003) — Socially robust knowledge

- Roux et al. (2006) — Knowledge interfacing

- Jasanoff (2004) — Co-production of science and social order

- Jahn et al. (2012) — Transdisciplinary phases

- Hoffmann et al. (2019) — Iterative processes in transdisciplinary research

- Klenk (2018) — Meshwork concept

Paper Summary

<!--META_START-->

Title: Big data analytics: transforming data to action

Authors: Daniel Bumblauskas, Herb Nold, Paul Bumblauskas, Amy Igou

DOI: 10.1108/BPMJ-03-2016-0056

Year: 2017

Publication Type: Journal

Discipline/Domain: Business Process Management, Data Analytics

Subdomain/Topic: Actionable Knowledge from Big Data, Dashboard Decision Support

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes (explicit via Argyris, applied to big data)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes (tied to actionability)

Contains Interpretability: Partial (interpretation implied in conversion process)

Contains Framework/Model: Yes (Actionable Knowledge Model + Performance Triangle + Dashboard Fra

Operationalization Present: Yes (detailed processes, tools, and case)

Primary Methodology: Conceptual + Case Application

Study Context: Big Data analytics in operations, decision-making, and business process management

Geographic/Institutional Context: USA; ESP International case

Target Users/Stakeholders: Business managers, operations managers, decision-makers, analysts

Primary Contribution Type: Conceptual model and applied case study

CL: Yes — "Humans give data meaning by adding context and reference points… relevant and purposefu

CR: Yes — "Information must be valid, timely, and relevant to the changing business world" (p. 708)

FE: Yes — "Ability to make informed choices" and "monitoring implementation" (p. 708)

TI: Yes — "Valid and timely information" (p. 708)

EX: Yes — "Interpret meaning in the data and communicate effectively" (p. 710)

GA: Yes — "Action with positive outcomes that add value to the organization" (p. 708)

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Big data analytics: transforming data to action

Authors:

Daniel Bumblauskas, Herb Nold, Paul Bumblauskas, Amy Igou

DOI:

10.1108/BPMJ-03-2016-0056

Year:

2017

Publication Type:

Journal

Discipline/Domain:

Business Process Management, Data Analytics

Subdomain/Topic:

Actionable Knowledge from Big Data, Dashboard Decision Support

Contextual Background:

The paper addresses how organizations can convert vast big data sets into *actionable knowledge* that l

Geographic/Institutional Context:

USA; case study with ESP International in Cedar Rapids, Iowa.

Target Users/Stakeholders:

Business process managers, operations managers, decision-makers, analysts, executives handling large

Primary Methodology:

Conceptual + Case Application

Primary Contribution Type:

Conceptual model + applied example

General Summary of the Paper

The authors propose a conceptual framework for transforming big data into actionable knowledge, addres

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionable knowledge is explicitly defined per Argyris (1995) as:

> "Information that actors could use… to craft conversations that communicate the meanings they intend.

Actionability here means the ability to derive meaning from data that leads to informed, timely, and releva

---

What Makes Something Actionable

- Valid and timely information

- Ability to make informed choices

- Vigilant monitoring of input validity and implementation outcomes

- Continuous re-evaluation of data in changing contexts

- Human interpretation and integration of multiple data sources

- Alignment of decisions with organizational goals and value creation

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How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):**

  - Data → Information → Knowledge → Actionable Knowledge conversion model

  - *Performance Triangle* (Culture, Leadership, Systems)

  - Dashboard framework with KPIs

- **Methods/Levers:**

  - Data contextualization, KPI selection, dashboard visualization, virus identification & mitigation

- **Operational Steps / Workflow:**

  1. Acquire and clean data

  2. Add context to create information

  3. Integrate and interpret to form knowledge

  4. Convert to actionable knowledge via decision-making frameworks

  5. Use dashboards to visualize KPIs linked to performance drivers

  6. Monitor and adjust continuously

- **Data & Measures:**

  - KPIs relevant to revenue, working capital, expenses, opportunity costs, risk

- **Implementation Context:**

  - ESP International dashboards for supplier performance monitoring

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Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — "Humans give data meaning by adding context… relevant and purposeful" (p. 7(

- **CR (Contextual Relevance):** Yes — "Information must be valid, timely, and relevant to the changing

- **FE (Feasibility):** Yes — "Ability to make informed choices" and "monitoring implementation" (p. 708)

- **TI (Timeliness):** Yes — "Valid and timely information" (p. 708)

- **EX (Explainability):** Yes — Leaders must "interpret meaning in the data and communicate effectively

- **GA (Goal Alignment):** Yes — "Action with positive outcomes that add value to the organization" (p. 7

- **Other Dimensions Named by Authors:** Risk awareness, adaptability, feedback loops

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Theoretical or Conceptual Foundations

- Argyris (1993, 1995, 1996) on actionable knowledge

- Davenport & Prusak (1998) on data–information–knowledge hierarchy

- Michel's *Performance Triangle* model

- KPI theory and dashboard design principles (Few, 2006)

Indicators or Metrics for Actionability

- Validity and timeliness of input data

- Causal link between KPIs and performance outcomes

- Evidence of positive organizational change from decisions

Barriers and Enablers to Actionability

- **Barriers:**

  - Information overload, data "viruses" (obsolete systems, irrelevant data, low trust culture, outdated lead

  - Poorly designed dashboards, irrelevant KPIs

  - Security breaches and data privacy risks

- **Enablers:**

  - Valid, timely, relevant data

  - Strong culture of trust, leadership interpretive skills

  - Effective dashboard design and KPI alignment

Relation to Existing Literature

Builds on BDA literature (Chen et al., 2012; Fosso Wamba et al., 2015) and integrates management scier

---

Summary

This paper bridges big data analytics theory and practical decision-making by providing a framework for c

---

Scores

- **Overall Relevance Score:** 95 — Strong explicit definition of actionability, rich conceptual framing, mu

- **Operationalization Score:** 90 — Clear, detailed process and applied example; could be enhanced by

---

Supporting Quotes from the Paper

- "Information that actors could use… to craft conversations that communicate the meanings they intend"

- "Having valid and timely information; the ability to make informed choices; and vigilant monitoring of bot

- "Leaders who are able to interpret meaning in the data and communicate effectively are essential eleme

- "Dashboards… provide the information that leads to actionable knowledge" (p. 713)

Actionability References to Other Papers

- Argyris, C. (1993, 1995, 1996)

- Davenport, T., Prusak, L. (1998)

- Michel, L. (2013) *The Performance Triangle*

- Few, S. (2006) *Information Dashboard Design*

Paper Summary

<!--META_START-->

Title: AWARENESS-IN-ACTION: A Critical Integralism for the Challenges of Our Times

Authors: Daniel J. O'Connor

DOI: n/a

Year: 2013

Publication Type: Journal Article

Discipline/Domain: Integral Theory, Interdisciplinary Studies

Subdomain/Topic: Critical Integral Meta-paradigm; Actionable Knowledge; Interdisciplinary Response to (

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 70

Contains Definition of Actionability: Yes (implicit and partial explicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (meta-paradigmatic framing)

Operationalization Present: Yes (meta-paradigmatic approach across domains)

Primary Methodology: Conceptual/Theoretical

Study Context: Development of a meta-paradigm for human awareness-in-action applicable across politic

Geographic/Institutional Context: United States

Target Users/Stakeholders: Scholars, policymakers, activists, journalists, social workers, interdisciplinary

Primary Contribution Type: Conceptual framework linking awareness practices to actionable knowledge

CL: Yes

CR: Yes

FE: Partial

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

AWARENESS-IN-ACTION: A Critical Integralism for the Challenges of Our Times

Authors:

Daniel J. O'Connor

DOI:

n/a

Year:

2013

Publication Type:

Journal Article

Discipline/Domain:

Integral Theory, Interdisciplinary Studies

Subdomain/Topic:

Critical Integral Meta-paradigm; Actionable Knowledge; Interdisciplinary Response to Complex Challenge

Contextual Background:

The paper proposes *Awareness-in-Action* as a meta-paradigm integrating presupposed perspectives an

Geographic/Institutional Context:

United States

Target Users/Stakeholders:

Scholars, policymakers, activists, journalists, social workers, interdisciplinary practitioners

Primary Methodology:

Conceptual/Theoretical

Primary Contribution Type:

Meta-paradigmatic framework

General Summary of the Paper

O'Connor's *Awareness-in-Action* framework is presented as a critical integral meta-paradigm that conne

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is implicitly defined as the capacity to generate "actionable knowledge within, across, and be

> "Awareness-In-Action may therefore provide the meta-paradigmatic means to create actionable knowle

> "…so that those of us concerned with such matters might learn how to respond more effectively to the i

---

What Makes Something Actionable

- Integration of perspectives and practices of human awareness-in-action.

- Cross-disciplinary applicability.

- Responsiveness to interconnected political, economic, social, and ecological challenges.

- Grounding in validated presuppositions that serve as premises for inquiry and hypothesis formation.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Awareness-in-Action meta-paradigm

- **Methods/Levers:** Integration of meta-theoretical and meta-practical reconstructions.

- **Operational Steps / Workflow:** Summarization of primary features, philosophical grounding, applicati

- **Data & Measures:** Not empirical; conceptual synthesis.

- **Implementation Context:** Political, economic, social, ecological spheres, and various professions (jou

> "…summarize the primary features of Awareness-in-Action before elaborating on some of its philosoph

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — The framework seeks to clarify presuppositions across contexts.

- **CR (Contextual Relevance):** Yes — Tailored to diverse and interconnected fields.

- **FE (Feasibility):** Partial — Feasibility implied via meta-level applicability, but not operationally detaile

- **TI (Timeliness):** Partial — Linked to urgent societal challenges, though not time-bounded.

- **EX (Explainability):** Partial — Philosophical grounding aids explainability, but lacks explicit operation

- **GA (Goal Alignment):** Yes — Explicitly tied to responding effectively to pressing global challenges.

- **Other Dimensions Named by Authors:** Interdisciplinarity, reflexivity.

Theoretical or Conceptual Foundations

- Jürgen Habermas's Critical Theory

- Ken Wilber's Integral Theory

- Chris Argyris's Action Science

Indicators or Metrics for Actionability

No quantitative metrics; actionability is judged through conceptual fit and cross-disciplinary utility.

Barriers and Enablers to Actionability

- **Barriers:** Disciplinary silos, entrenched institutional boundaries.

- **Enablers:** Meta-paradigmatic integration, philosophical grounding, cross-sector dialogue.

Relation to Existing Literature

Positions itself at the intersection of integral theory and critical theory, extending their applicability to actio

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Summary

The paper presents *Awareness-in-Action* as a meta-paradigm designed to unify diverse perspectives a

---

Scores

- **Overall Relevance Score:** 85 — Strong conceptualization and features tied to actionability; implicit d

- **Operationalization Score:** 70 — Provides a meta-paradigmatic pathway but lacks concrete implemen

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Supporting Quotes from the Paper

- "Awareness-In-Action may therefore provide the meta-paradigmatic means to create actionable knowle

- "…so that those of us concerned with such matters might learn how to respond more effectively to the i

- "…summarize the primary features of Awareness-in-Action before elaborating on some of its philosophi

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Actionability References to Other Papers

- Jürgen Habermas's Critical Theory

- Ken Wilber's Integral Theory

- Chris Argyris's Action Science

Paper Summary

<!--META_START-->

Title: An Open-Source Tool-Box for Asset Management Based on the Asset Condition for the Power Syst

Authors: Gopal Lal Rajora, Miguel A. Sanz-Bobi, Carlos Mateo Domingo, Lina Bertling Tjernberg

DOI: 10.1109/ACCESS.2025.3551663

Year: 2025

Publication Type: Journal

Discipline/Domain: Electrical Engineering / Power Systems

Subdomain/Topic: Asset Management, Predictive Maintenance, Machine Learning for Power Grids

Eligibility: Eligible

Overall Relevance Score: 90

Operationalization Score: 95

Contains Definition of Actionability: Yes (implicit and explicit operational framing)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual + Quantitative Case Study

Study Context: European ATTEST project; predictive maintenance for TSOs and DSOs

Geographic/Institutional Context: Spain (Universidad Pontificia Comillas), Sweden (KTH), European partr

Target Users/Stakeholders: Transmission System Operators (TSOs), Distribution System Operators (DSO

Primary Contribution Type: Framework + Open-source Tool

CL: Yes

CR: Yes

FE: Yes

TI: Yes

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

An Open-Source Tool-Box for Asset Management Based on the Asset Condition for the Power System

Authors:

Gopal Lal Rajora, Miguel A. Sanz-Bobi, Carlos Mateo Domingo, Lina Bertling Tjernberg

DOI:

10.1109/ACCESS.2025.3551663

Year:

2025

Publication Type:

Journal

Discipline/Domain:

Electrical Engineering / Power Systems

Subdomain/Topic:

Asset Management, Predictive Maintenance, Machine Learning for Power Grids

Contextual Background:

Developed under the European ATTEST project, the toolbox targets proactive asset management for ele

Geographic/Institutional Context:

Spain (Universidad Pontificia Comillas), Sweden (KTH Royal Institute of Technology), EU partners.

Target Users/Stakeholders:

Transmission and Distribution System Operators.

Primary Methodology:

Conceptual framework with quantitative case study (real-world and synthetic datasets).

Primary Contribution Type:

Modular open-source software integrating AI-based analytics for asset condition assessment and strateg

General Summary of the Paper

The paper introduces an open-source asset management toolbox designed for TSOs and DSOs, integra

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The paper explicitly links "actionable insights" to the ability to inform prioritized, effective maintenance stra

> "The toolbox provides actionable insights for planning maintenance strategies and optimizing resource

> "Each asset's condition is evaluated… facilitating effective prioritization and decision-making for mainte

What Makes Something Actionable

- Measurable condition indicators across four dimensions: Life Assessment, Health Condition, Maintenan

- Ability to compare across heterogeneous assets.

- Prioritization thresholds for intervention.

- Integration of predictive analytics (clustering + SOM) for early identification of risks.

- Strategy recommendation system (Q-learning) that adapts to changes without manual rule rewriting.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ATTEST Asset Management Toolbox

- **Methods/Levers:** Data normalization, clustering (K-means, SOM), condition indicator computation, re

- **Operational Steps / Workflow:**

  1. Identify critical asset data.

  2. Compute multi-dimensional condition indicators.

  3. Cluster assets for pattern recognition.

  4. Apply Q-learning to recommend optimal actions.

  5. Simulate long-term strategies (Monte Carlo).

- **Data & Measures:** Asset age, failure probability, internal temperature, dissolved gas analysis, MTTR

- **Implementation Context:** Tested on European TSO/DSO datasets; compatible with CIM, IEC 61850,

> "This Module compares assets… recommending the most convenient actions… simulate and quantify t

> "The Q-learning algorithm… suggests actions with the highest potential reward." (p. 8)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Explicit, interpretable indicators for each dimension.

  > "Comparable condition indicators… allowing identification of assets requiring special attention."

- **CR (Contextual Relevance):** Yes — Indicators adaptable to available data and operational context.

- **FE (Feasibility):** Yes — Prioritized strategies feasible given operational constraints.

- **TI (Timeliness):** Yes — Short-term and long-term analyses inform timely interventions.

- **EX (Explainability):** Partial — While results are interpretable, underlying ML models' inner workings a

- **GA (Goal Alignment):** Yes — Optimizes for reliability, cost-efficiency, and sustainability goals.

- **Other Dimensions:** Adaptability (tool modularity and format compatibility).

Theoretical or Conceptual Foundations

- Condition-based maintenance theory.

- AI/ML for predictive asset management.

- Reinforcement learning (Q-learning) for adaptive strategy optimization.

- Multi-criteria decision analysis.

Indicators or Metrics for Actionability

- Multi-dimensional condition indicators (0–1 scale).

- Total Indicator threshold (e.g., >0.75 for critical attention).

- Cluster patterns denoting asset health states.

Barriers and Enablers to Actionability

- **Barriers:** Data incompleteness, heterogeneity of formats, variability in monitoring availability.

- **Enablers:** Open-source modular design, integration with industry standards, compatibility with multip

Relation to Existing Literature

Positions itself as advancing AI-driven asset management from descriptive analytics to prescriptive decis

Summary

The paper offers a comprehensive, modular, open-source framework for transforming raw asset condition

Scores

- **Overall Relevance Score:** 90 — Clear conceptualization of actionability through explicit condition-bas

- **Operationalization Score:** 95 — Detailed, replicable methodology with workflow, algorithms, metrics,

Supporting Quotes from the Paper

- "The toolbox provides actionable insights for planning maintenance strategies and optimizing resource a

- "Comparable condition indicators… allowing identification of assets requiring special attention." (p. 6)

- "Optimal actions are determined using a Q-matrix… suggests actions with the highest potential reward."

- "Assets are categorized as requiring priority attention and maintenance when the Total Indicator is near

Actionability References to Other Papers

- Rajora et al. (2024) — AI-based ML models for asset management.

- Žarkovi■ et al. (2021) — ML for transformer diagnostics.

- Li et al. (2023) — ML + blockchain in power management.

- Aminifar et al. (2022) — ML for asset management and protection.

Paper Summary

<!--META_START-->

Title: An Age-Based Framework for Evaluating Genome-Scale Sequencing Results in Newborn Screenin

Discipline/Domain: Medical Genetics, Pediatrics, Genomic Medicine

Subdomain/Topic: Newborn Screening, Clinical Actionability, Next-Generation Sequencing (NGS)

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes (explicit and implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Partial

Contains Framework/Model: Yes (ASQM – Age-based Semiquantitative Metric)

Operationalization Present: Yes

Primary Methodology: Conceptual + Comparative Validation Study

Study Context: Evaluation of gene–disease pairs for genomic newborn screening using a standardized a[...]

Geographic/Institutional Context: North Carolina, USA; University of North Carolina at Chapel Hill

Target Users/Stakeholders: Policy-makers, clinicians, genetic counselors, parents, newborn screening pr[...]

Primary Contribution Type: Conceptual framework with validation against existing panels

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Contextual Background:

The study is grounded in the public health context of newborn screening (NBS) in the United States, spec[...]

General Summary of the Paper

This paper introduces and validates the Age-based Semiquantitative Metric (ASQM), a framework for ass[...]

Eligibility

Eligible for inclusion: **Yes**

The paper explicitly defines clinical actionability, operationalizes it through a standardized scoring system

How Actionability is Understood

The authors define actionability through five explicit criteria: severity, likelihood (penetrance), efficacy of i

> "Each gene–disease pair was scored (0–3 points) on 5 criteria: severity… likelihood… efficacy… accep

> "Gene–disease pairs were placed into… pediatric conditions with high actionability… pediatric condition

What Makes Something Actionable

- High severity of potential outcome

- High likelihood of disease manifestation

- Highly effective interventions available

- Interventions are acceptable in terms of burden and risk

- Strong knowledge base and clinical consensus on gene–disease relationship

How Actionability is Achieved / Operationalized

- **Framework/Approach Name:** Age-based Semiquantitative Metric (ASQM)

- **Methods/Levers:** Structured scoring (0–3) for five actionability criteria; consensus review by multidisc

- **Operational Steps / Workflow:** Literature curation → preliminary scoring → consensus meetings → c

- **Data & Measures:** Severity, penetrance, intervention efficacy, intervention acceptability, knowledge b

- **Implementation Context:** Newborn genomic screening; policy and parental decision-making

> "The ASQM allows a priori categorization… to facilitate decision-making about incorporating genomic s

> "Gene–disease pairs… placed into 1 of 4 categories…" (p. 69)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – explicit scoring rubric with defined terms (p. 70)

- **CR (Contextual Relevance):** Yes – pediatric onset and intervention timing central to classification (p.

- **FE (Feasibility):** Yes – considers intervention efficacy and acceptability (p. 70)

- **TI (Timeliness):** Partial – age-of-onset and age-at-intervention incorporated (p. 69)

- **EX (Explainability):** Yes – transparent scoring and rationale for classification (p. 70, Fig. 1B)

- **GA (Goal Alignment):** Partial – implicit in alignment with NBS goals

- **Other Dimensions Named by Authors:** Knowledge base strength; ethical principle of preserving futur

Theoretical or Conceptual Foundations

- Builds on prior Semiquantitative Metric (Berg et al., 2016)

- Aligns with public health screening principles (Wilson and Jungner, updated for genomics)

- Compares to RUSP and BabySeq frameworks

Indicators or Metrics for Actionability

- Total ASQM score (0–15) across five criteria

- Cut-offs for automatic category assignment (≥12 for high actionability, <9 for low)

Barriers and Enablers to Actionability

- **Barriers:** Lack of effective interventions, insufficient knowledge base, controversial evidence

- **Enablers:** Strong clinical evidence, existing practice guidelines, early intervention potential

Relation to Existing Literature

Positions ASQM as a more integrated and age-aware framework compared to BabySeq's validity/onset/p

Summary

Milko et al. (2019) present the ASQM, an evidence-based, age-sensitive framework for scoring and class

Scores

- **Overall Relevance Score:** 95 – Provides explicit, multidimensional definition of actionability, systema

- **Operationalization Score:** 90 – Offers fully articulated scoring system, workflow, and validation, thoug

Supporting Quotes from the Paper

- "[Each gene–disease pair was scored… on 5 criteria: severity… likelihood… efficacy… acceptability… k

- "[Gene–disease pairs were placed into… 4 categories… based on final ASQM score, age of onset/actio

- "[Lack of effective intervention and/or insufficient knowledge… common reasons… not meet criteria for

- "[Validated our framework against the… RUSP… high ASQM scores assigned to most RUSP conditions

Actionability References to Other Papers

- Berg et al., 2016 – Semiquantitative Metric for Evaluating Clinical Actionability

- Wilson & Jungner screening criteria updates (Andermann et al., 2008)

- Ceyhan-Birsoy et al., 2017 – BabySeq curated gene list

- RUSP methodology references (Kemper et al., 2014)

Paper Summary

<!--META_START-->

Title: AI-Driven Whole-Exome Sequencing: Advancing Variant Interpretation and Precision Medicine

Authors: Faisal Aburub, Mayyas Al-Remawi, Rami A. Abdel-Rahem, Faisal Al-Akayleh, Ahmed S.A. Ali A

DOI: 10.1109/ICCIAA65327.2025.11013653

Year: 2025

Publication Type: Conference Proceeding

Discipline/Domain: Bioinformatics / Genomic Medicine

Subdomain/Topic: Whole-Exome Sequencing, AI for Variant Interpretation, Precision Medicine

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 90

Contains Definition of Actionability: Yes (implicit, as clinically actionable insights in genomic medicine)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (AI-driven WES pipeline with multi-omics integration and XAI)

Operationalization Present: Yes

Primary Methodology: Conceptual / Review with applied case studies

Study Context: AI-enhanced WES in clinical genetic diagnostics

Geographic/Institutional Context: University of Petra, The University of Jordan (Jordan); applied reference

Target Users/Stakeholders: Clinicians, genomic researchers, bioinformaticians, healthcare policymakers

Primary Contribution Type: Conceptual framework with practical application examples for AI-driven WES

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

AI-Driven Whole-Exome Sequencing: Advancing Variant Interpretation and Precision Medicine

Authors:

Faisal Aburub, Mayyas Al-Remawi, Rami A. Abdel-Rahem, Faisal Al-Akayleh, Ahmed S.A. Ali Agha

DOI:

10.1109/ICCIAA65327.2025.11013653

Year:

2025

Publication Type:

Conference Proceeding

Discipline/Domain:

Bioinformatics / Genomic Medicine

Subdomain/Topic:

Whole-Exome Sequencing, AI for Variant Interpretation, Precision Medicine

Contextual Background:

The paper addresses the integration of AI—particularly ML and DL—into WES workflows to improve clini

Geographic/Institutional Context:

University of Petra (Jordan), The University of Jordan; case studies and tools from Taiwan, South Korea,

Target Users/Stakeholders:

Clinical geneticists, bioinformaticians, precision medicine practitioners, healthcare institutions.

Primary Methodology:

Conceptual framework with review of applied AI tools and comparative performance results.

Primary Contribution Type:

Framework and application roadmap for AI-driven WES in clinical precision medicine.

General Summary of the Paper

This paper presents an AI-driven framework for whole-exome sequencing (WES) that aims to improve va

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

The authors implicitly define actionability as the transformation of WES data into clinically relevant, timely

> "AI… can pinpoint disease-associated variants, discover novel biomarkers, and guide personalized trea

> "Integrating multi-omics data and correlating genotype with phenotype further enable personalized inter

---

What Makes Something Actionable

- Accurate identification of pathogenic variants

- Contextual relevance through phenotype-genotype correlation

- Timely reporting and reduced turnaround times

- Interpretability and transparency in AI decision-making

- Integration of multi-omics data for holistic variant assessment

- Feasibility in clinical workflows (automation, reduced manual curation)

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** AI-driven WES pipeline with XAI

- **Methods/Levers:** ML/DL models (DeepVariant, DANN, AI Variant Prioritizer, EVIDENCE), phenotype

- **Operational Steps / Workflow:** Data preprocessing → AI variant calling → AI-based annotation → Ph

- **Data & Measures:** WES datasets, HPO terms, population frequency databases, functional impact sc

- **Implementation Context:** Clinical genetic diagnostics and research workflows

> "An AI-powered WES pipeline… improved diagnostic yield to 41% for trio-WES cases and 28% for sing

> "Federated learning enables secure genomic data sharing… maintaining privacy and compliance" (p. 2)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Output must be interpretable for clinicians via XAI.

- **CR (Contextual Relevance):** Yes – Integration of patient metadata and multi-omics.

- **FE (Feasibility):** Yes – Automation and reduced turnaround time.

- **TI (Timeliness):** Partial – Reporting time reduced to one week in tested pipelines.

- **EX (Explainability):** Yes – SHAP, LIME for AI transparency.

- **GA (Goal Alignment):** Yes – Prioritization aligned with clinical diagnostic objectives.

- **Other Dimensions:** Ethical compliance, fairness, reproducibility.

Theoretical or Conceptual Foundations

- AI interpretability frameworks (SHAP, LIME)

- Federated learning privacy models

- Prior variant prioritization frameworks (ClinPred, REVEL, CADD)

Indicators or Metrics for Actionability

- Diagnostic yield percentage

- Top-N ranking accuracy for causative variants

- Turnaround time (e.g., 1 week)

- Percentage increase in pathogenic/likely pathogenic classification after AI integration

---

Barriers and Enablers to Actionability

- **Barriers:** Data security, black-box AI, bias in training datasets, lack of regulatory clarity.

- **Enablers:** XAI frameworks, federated learning, inclusive datasets, standardization of AI pipelines.

Relation to Existing Literature

Positions AI-driven WES as an evolution over traditional variant interpretation pipelines, improving diagno

---

Summary

This paper conceptualizes actionability in WES as the delivery of accurate, relevant, interpretable, and tir

---

Scores

- **Overall Relevance Score:** 85 — Strong implicit definition of actionability tied to AI-enhanced variant i

- **Operationalization Score:** 90 — Detailed pipeline description with tools, workflows, and metrics expli

---

Supporting Quotes from the Paper

- "AI… can pinpoint disease-associated variants, discover novel biomarkers, and guide personalized trea

- "An AI-powered WES pipeline… improved diagnostic yield to 41% for trio-WES cases and 28% for singl

- "Integrating multi-omics data and correlating genotype with phenotype further enable personalized interv

- "Federated learning enables secure genomic data sharing… maintaining privacy and compliance" (p. 2)

Actionability References to Other Papers

- Huang et al. (2022) – AI Variant Prioritizer for integrating WES and phenotypic data

- Graham et al. (2018) – WES + metabolomics for variant prioritization

- Barcelona-Cabeza et al. (2021) – WES + RNA-Seq for improved variant detection

- Rusch et al. (2018) – Multi-omics integration in oncology

- Pinxten & Howard (2014) – Ethical issues in genome sequencing

Paper Summary

<!--META_START-->

Title: Actionable mutations in early-stage ovarian cancer according to the ESMO Scale for Clinical Action

Authors: F. Camarda, L. Mastrantoni, C. Parrillo, A. Minucci, F. Persiani, D. Giannarelli, T. Pasciuto, F. G

DOI: https://doi.org/10.1016/j.esmoop.2024.104090

Year: 2025

Publication Type: Journal

Discipline/Domain: Oncology / Precision Medicine

Subdomain/Topic: Early-stage epithelial ovarian cancer, genomic profiling, actionable mutations, ESCAT

Eligibility: Eligible

Overall Relevance Score: 85

Operationalization Score: 80

Contains Definition of Actionability: Yes (via ESCAT framework)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: No

Contains Interpretability: Partial

Contains Framework/Model: Yes (ESCAT classification tiers I–III)

Operationalization Present: Yes

Primary Methodology: Quantitative (prospective cohort, genomic profiling)

Study Context: Clinical oncology, early-stage epithelial ovarian cancer, targeted therapy potential

Geographic/Institutional Context: Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Rome, Ita

Target Users/Stakeholders: Oncologists, clinical researchers, precision medicine practitioners, policy-mal

Primary Contribution Type: Empirical study with framework application (ESCAT)

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: No

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

Actionable mutations in early-stage ovarian cancer according to the ESMO Scale for Clinical Actionability

Authors:

F. Camarda, L. Mastrantoni, C. Parrillo, A. Minucci, F. Persiani, D. Giannarelli, T. Pasciuto, F. Giacomini,

DOI:

https://doi.org/10.1016/j.esmoop.2024.104090

Year:

2025

Publication Type:

Journal

Discipline/Domain:

Oncology / Precision Medicine

Subdomain/Topic:

Early-stage epithelial ovarian cancer, genomic profiling, actionable mutations, ESCAT

Contextual Background:

The study focuses on early-stage epithelial ovarian cancer (EOC), assessing the prevalence and distribut

Geographic/Institutional Context:

Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Rome, Italy

Target Users/Stakeholders:

Oncologists, molecular pathologists, clinical researchers, precision oncology practitioners, guideline deve

Primary Methodology:

Quantitative — prospective cohort study with targeted next-generation sequencing (NGS) and ESCAT cla

Primary Contribution Type:

Empirical study applying a conceptual framework (ESCAT) to clinical genomic data.

General Summary of the Paper

This prospective single-center study analyzed 180 patients with FIGO stage I–II EOC, using targeted NG

Eligibility

Eligible for inclusion: **Yes**

The paper explicitly applies the ESCAT actionability framework, providing a structured classification of mu

---

How Actionability is Understood

Actionability is framed through the ESCAT scale, which ranks molecular targets based on clinical evidenc

> "Oncogenic alterations were identified using OncoKB and classified according to the ESMO Scale for C

> "The ESCAT framework… prioritizes molecular targets based on the strength of evidence supporting th

---

What Makes Something Actionable

- Evidence-supported relevance as a clinical target.

- Classification in ESCAT Tier I–III (Tier I = highest clinical evidence; Tier III = emerging evidence).

- Potential to inform therapeutic decisions (drug selection, de-escalation/escalation).

- Relevance to tumor biology and prognosis.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ESCAT (ESMO Scale for Clinical Actionability of molecular Targets)

- **Methods/Levers:** Comprehensive genomic profiling via TSO500 high-throughput NGS panel; annota

- **Operational Steps / Workflow:**

  1. Patient enrollment and staging.

  2. NGS sequencing of tumor tissue.

  3. Variant annotation and filtering for oncogenicity.

  4. ESCAT tier assignment.

  5. Risk stratification integration.

- **Data & Measures:** Mutation type, frequency, co-occurrence, MSI, TMB, recurrence-free survival.

- **Implementation Context:** Applied in a clinical oncology setting for prospective patient profiling.

> "Sequencing was carried out with a mean depth of >500×… only mutations annotated as 'Oncogenic' o

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — ESCAT provides clear ranking criteria.

- **CR (Contextual Relevance):** Yes — Actionability tied to EOC stage, histotype, recurrence risk.

- **FE (Feasibility):** Yes — Technically feasible in a hospital NGS program.

- **TI (Timeliness):** No explicit mention.

- **EX (Explainability):** No direct link made.

- **GA (Goal Alignment):** Yes — Actionability linked to patient outcome improvement and toxicity reduct

- **Other Dimensions:** Risk-stratified application, molecular co-alteration analysis.

Theoretical or Conceptual Foundations

- ESMO Precision Medicine Working Group ESCAT framework.

- OncoKB oncogenicity annotation system.

- Principles of tumor-agnostic targeting.

Indicators or Metrics for Actionability

- ESCAT Tier classification.

- Mutation prevalence and co-occurrence.

- MSI status and TMB values.

- Risk group-specific mutation frequency.

Barriers and Enablers to Actionability

- **Barriers:** Short follow-up; unclear prognostic role of some variants; potential resistance to targeted th

- **Enablers:** High prevalence of actionable variants; feasibility of NGS profiling; established ESCAT fra

---

Relation to Existing Literature

Positions findings within ESMO/ESGO consensus guidelines for EOC, contrasts with mutation prevalence

---

Summary

This study demonstrates that genomic profiling of early-stage EOC using the ESCAT framework reveals

---

Scores

- **Overall Relevance Score:** 85 — Strong use of ESCAT for defining and ranking actionability; integrate

- **Operationalization Score:** 80 — Detailed NGS and classification workflow; some gaps in timeliness a

---

Supporting Quotes from the Paper

- "Oncogenic alterations were identified using OncoKB and classified according to the ESMO Scale for Cl

- "ESCAT… prioritizing them based on the strength of evidence supporting their relevance as clinical targ

- "Sequencing was carried out with a mean depth of >500×… only mutations annotated as 'Oncogenic' or

- "These findings highlight the potential for actionable alterations in most early-stage EOC patients and su

---

Actionability References to Other Papers

- Mosele MF et al., 2024 — ESMO Precision Medicine Working Group recommendations for NGS use.

- Fieuws C et al., 2024 — Identification of actionable variants in EOC.

- Multiple ESMO-ESGO consensus guidelines on EOC pathology and molecular biology.

Paper Summary

<!--META_START-->

Title: Actionable Knowledge: Design Causality in the Service of Consequential Theory

Title:

Actionable Knowledge: Design Causality in the Service of Consequential Theory

Authors:

Chris Argyris

Discipline/Domain:

Organizational Behavior / Management Science

Subdomain/Topic:

Actionable Knowledge; Design Causality; Management Theory

Contextual Background:

The paper addresses the gap between externally valid empirical research and its practical use in manage

Geographic/Institutional Context:

Harvard University (USA)

Target Users/Stakeholders:

Managers, management theorists, organizational researchers

Primary Methodology:

Conceptual

Primary Contribution Type:

Conceptual framework and theoretical proposition

General Summary of the Paper

This paper by Chris Argyris examines how empirical research, while often externally valid, frequently fails

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Argyris frames actionability as the property of knowledge that allows it to be directly applied to real-world

> "Actionable knowledge is that knowledge required to implement the external validity (relevance) in that

> "The claim is made that the concept of causality that underlies much rigorous empirical research makes

---

What Makes Something Actionable

- High external validity **and** the ability to be implemented in everyday decision-making.

- A causal framework that supports adaptability and learning rather than constraining them.

- Relevance to the lived realities and values of the decision-makers.

- Alignment with normative goals of management.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Design Causality

- **Methods/Levers:** Shift from traditional causality models to ones that encourage learning, adaptability

- **Operational Steps / Workflow:** Identify intended consequences, define the activities to achieve them,

- **Data & Measures:** Not quantitatively defined; emphasis on conceptual fit and practical testing.

- **Implementation Context:** Organizational management decision-making.

> "A different concept of causality is proposed that enhances actionability. Design causality is defined, an

---

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — actionable knowledge must be clear enough to guide implementation.

- **CR (Contextual Relevance):** Yes — relevance to "everyday life" and managerial context is explicit.

- **FE (Feasibility):** Yes — tied to ability to "implement" findings.

- **TI (Timeliness):** Partial — implicit in application to "managers in everyday life" but not explicitly elabo

- **EX (Explainability):** Partial — implied in the ability to illustrate design causality but not a standalone c

- **GA (Goal Alignment):** Yes — theories must be consistent with values and intended consequences.

Theoretical or Conceptual Foundations

- Theories of managing as theories of effectiveness.

- Normative theory of management rooted in values and goals.

- Prior works: Argyris (1982); Argyris & Schön (1996).

Indicators or Metrics for Actionability

No quantitative indicators provided; assessment is conceptual, focusing on implementability, consequenc

---

Barriers and Enablers to Actionability

- **Barriers:**

- Traditional causality models that constrain learning.

  - Disconnect between external validity and applicability.

- **Enablers:**

  - Adoption of design causality.

  - Normative alignment of theory and practice.

Relation to Existing Literature

Builds on Argyris' prior work and critiques conventional empirical methods, adding a normative and practi

---

Summary

Chris Argyris' 1996 paper "Actionable Knowledge: Design Causality in the Service of Consequential Theo

---

Scores

- **Overall Relevance Score:** 92 — Strong conceptual definition and detailed features directly tied to ac

- **Operationalization Score:** 85 — Offers a defined approach (design causality) and implementation illu

---

Supporting Quotes from the Paper

- "Actionable knowledge is that knowledge required to implement the external validity (relevance) in that v

- "The claim is made that the concept of causality… makes it difficult to transform knowledge with high ex

- "A different concept of causality is proposed that enhances actionability. Design causality is defined, an

---

Actionability References to Other Papers

- Argyris, C. (1982)

- Argyris, C., & Schön, D. (1996)

Paper Summary

<!--META_START-->

Title: A semiquantitative metric for evaluating clinical actionability of incidental or secondary findings from

Authors: Jonathan S. Berg, Ann Katherine M. Foreman, Julianne M. O'Daniel, Jessica K. Booker, Lacey

DOI: 10.1038/gim.2015.104

Year: 2016

Publication Type: Journal Article

Discipline/Domain: Genomic Medicine / Medical Genetics

Subdomain/Topic: Clinical Actionability Assessment in Genomic Sequencing

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 100

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual Framework Development and Application

Study Context: Evaluation of incidental/secondary findings in clinical genome-scale sequencing

Geographic/Institutional Context: University of North Carolina at Chapel Hill, USA

Target Users/Stakeholders: Clinical geneticists, genomic testing laboratories, healthcare providers, policy

Primary Contribution Type: Framework/method for assessing clinical actionability of gene–disease pairs

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Partial

Reason if Not Eligible: N/A

<!--META_END-->

Title:

A semiquantitative metric for evaluating clinical actionability of incidental or secondary findings from geno

Authors:

Jonathan S. Berg et al.

DOI:

10.1038/gim.2015.104

Year:

2016

Publication Type:

Journal Article

Discipline/Domain:

Genomic Medicine / Medical Genetics

Subdomain/Topic:

Clinical Actionability Assessment in Genomic Sequencing

Contextual Background:

The paper addresses the challenge of systematically evaluating the clinical actionability of genomic varia

Geographic/Institutional Context:

University of North Carolina at Chapel Hill, USA

Target Users/Stakeholders:

Clinical geneticists, genetic counselors, genomic laboratories, healthcare providers, professional organiza

Primary Methodology:

Conceptual framework and scoring metric development, applied analysis of multiple gene lists

Primary Contribution Type:

Development and validation of a semiquantitative scoring framework for clinical actionability

---

General Summary of the Paper

This paper presents a semiquantitative metric for evaluating the clinical actionability of incidental or secor

---

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is conceptualized as a **continuum** rather than a binary state, integrating the potential seve

> "The LVBC developed a semiquantitative metric for determining the clinical actionability of gene–diseas

> "The subcategories… approximate the clinical utility of revealing incidental/secondary findings in a pres

---

What Makes Something Actionable

- High severity of the potential health outcome

- Moderate to high likelihood of disease manifestation

- Availability of effective preventive or therapeutic interventions

- Low burden or acceptable risk of intervention

- Substantial and reliable knowledge base supporting decision-making

---

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Semiquantitative Metric for Clinical Actionability

- **Methods/Levers:** Five criteria scored 0–3 (severity, likelihood, efficacy, burden, knowledge base)

- **Operational Steps / Workflow:** Evidence review → Assign scores for each criterion → Consensus sc

- **Data & Measures:** Literature from OMIM, GeneReviews, PubMed, clinical guidelines

- **Implementation Context:** NCGENES project and ACMG incidental findings recommendations

> "All five criteria are scored on a scale of 0–3… The outcome and intervention are defined in advance…

> "The LVBC chose to consider genes with a score ≥11… as meeting the threshold of actionability." (p. 4

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clarity through structured scoring definitions (Table 1)

- **CR (Contextual Relevance):** Yes — Explicit to presymptomatic, incidental/secondary findings contex

- **FE (Feasibility):** Yes — Evaluated through "burden of intervention" score

- **TI (Timeliness):** Partial — Implied in presymptomatic intervention consideration

- **EX (Explainability):** Yes — Transparent, evidence-based scoring with defined criteria

- **GA (Goal Alignment):** Partial — Implicit alignment with clinical utility and patient benefit

- **Other Dimensions Named by Authors:** Knowledge base strength

---

Theoretical or Conceptual Foundations

- Clinical utility concepts from genomic medicine

- Evidence-based assessment models

- Prior ACMG deliberative consensus recommendations

Indicators or Metrics for Actionability

- Total score (0–15)

- Threshold ≥11 for high actionability

- Subscores for severity, likelihood, efficacy, burden, and knowledge base

---

Barriers and Enablers to Actionability

- **Barriers:** Limited evidence base; subjective burden assessment; rare diseases with insufficient pene

- **Enablers:** Structured metric; multidisciplinary consensus; adaptability to different contexts

---

Relation to Existing Literature

The paper builds on and critiques earlier expert consensus models like the ACMG recommendations, add

---

Summary

This paper delivers a rigorous, transparent framework for assessing the clinical actionability of incidental

---

Scores

- **Overall Relevance Score:** 95 — Clear conceptualization of actionability as multidimensional, detailed

- **Operationalization Score:** 100 — Fully developed metric with applied examples and scoring workflow

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Supporting Quotes from the Paper

- "Actionability is a continuum, not a binary state." (p. 468)

- "The LVBC established five core characteristics of clinical actionability…" (p. 469)

- "The LVBC chose to consider genes with a score ≥11… as meeting the threshold of actionability." (p. 47

Actionability References to Other Papers

- ACMG Recommendations for Reporting of Incidental Findings (Green et al., 2013)

- Evidence-based Genomic Applications in Practice and Prevention Working Group (Goddard et al., 2013

- NCGENES project preliminary outputs (Berg et al., 2013)

Paper Summary

<!--META_START-->

Title: A look into travel motivation post-crisis: Insights from means-end chain theory

Authors: Swechchha Subedi, Lali Odosashvili, Marketa Kubickova

DOI: https://doi.org/10.1016/j.jhtm.2025.05.013

Year: 2025

Publication Type: Journal

Discipline/Domain: Hospitality and Tourism Management

Subdomain/Topic: Post-crisis travel motivation, Means-End Chain (MEC) theory

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 88

Contains Definition of Actionability: Yes (implicit, through "actionable insights for tourism practitioners" an

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (Crisis-Modified MEC Framework)

Operationalization Present: Yes

Primary Methodology: Quantitative (hard laddering MEC survey)

Study Context: International leisure travel motivation post-COVID-19

Geographic/Institutional Context: U.S. residents (international travel context)

Target Users/Stakeholders: Destination Marketing Organizations (DMOs), tourism practitioners, policy ma

Primary Contribution Type: Theoretical and practical framework advancement

CL: Yes — clarity of destination attributes and value linkages is explicitly linked to actionability

CR: Yes — contextual relevance (post-crisis, safety, cultural connection)

FE: Yes — feasibility discussed in aligning offerings with traveler needs

TI: Yes — timeliness in responding to evolving post-crisis priorities

EX: Yes — explainability via hierarchical value maps

GA: Yes — goal alignment with traveler values and DMO strategies

Reason if Not Eligible: N/A

<!--META_END-->

Title:

A look into travel motivation post-crisis: Insights from means-end chain theory

Authors:

Swechchha Subedi, Lali Odosashvili, Marketa Kubickova

DOI:

https://doi.org/10.1016/j.jhtm.2025.05.013

Year:

2025

Publication Type:

Journal

Discipline/Domain:

Hospitality and Tourism Management

Subdomain/Topic:

Post-crisis travel motivation, Means-End Chain (MEC) theory

Contextual Background:

Examines how major crises, specifically COVID-19, have reshaped leisure travel motivations, destination

Geographic/Institutional Context:

U.S.-based survey with international travel focus.

Target Users/Stakeholders:

Destination Marketing Organizations, tourism stakeholders, policy makers.

Primary Methodology:

Quantitative (hard laddering MEC survey, hierarchical value mapping).

Primary Contribution Type:

Theoretical expansion (Crisis-Modified MEC Framework) and practitioner guidance.

General Summary of the Paper

This study explores how COVID-19 has altered the cognitive structures underlying international leisure tr

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is framed as the tourism sector's ability to **align post-crisis offerings with restructured trave

> "The study also provides actionable insights for tourism practitioners, emphasizing the need for tailored

> "By addressing key motivators such as safety, relaxation, and cultural connection, DMOs can align thei

What Makes Something Actionable

- Direct alignment with travelers' **core values** (e.g., personal happiness, self-reflection, enhanced enjo

- Incorporation of **repositioned attributes** (e.g., safety, natural scenery) into central offerings.

- Ability to **adapt frameworks** to crisis conditions (flexibility, safety protocols, smaller-scale cultural exp

- Evidence-based linkages between **destination attributes → consequences → values** via hierarchical

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Crisis-Modified MEC Framework.

- **Methods/Levers:** Hard laddering surveys; Hierarchical Value Mapping (HVM); demographic segment

- **Operational Steps / Workflow:** Identify priority attributes post-crisis; map A-C-V chains; detect motiva

- **Data & Measures:** 22 attributes, 9 consequences, 13 values (see Table 2); linkage frequencies from

- **Implementation Context:** DMOs redesigning tourism strategies for post-COVID conditions.

> "…health safety has become a critical driver of destination choice… creating new benchmarks for what

> "Flexible booking options… address uncertainty while fostering trust and reducing perceived risks." (p. 4

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear mapping of attributes to values via HVM.

- **CR (Contextual Relevance):** Yes — Post-crisis travel shifts explicitly tied to safety, cultural relevance

- **FE (Feasibility):** Yes — Practical recommendations like flexible bookings, wellness tourism.

- **TI (Timeliness):** Yes — Responding to immediate post-crisis traveler shifts.

- **EX (Explainability):** Yes — Visual and narrative explanation of cognitive linkages.

- **GA (Goal Alignment):** Yes — DMOs aligning with enduring traveler values.

- **Other Dimensions Named by Authors:** Motivation realignment, compression effect, value resilience.

Theoretical or Conceptual Foundations

- Borgardt's extended MEC framework (macro-environmental influence).

- Hill et al. (2022) on direct attribute-value linkages.

- Classic MEC theory (Gutman, 1982; Reynolds & Gutman, 1988).

Indicators or Metrics for Actionability

- Frequency of A-C-V linkages.

- Attribute prioritization frequencies.

- Shift in pathway lengths (compression effect).

Barriers and Enablers to Actionability

- **Barriers:** Rigid traditional travel motivation models; oversimplified attribute categorizations; uncertain

- **Enablers:** Demographic-specific tailoring; visible safety protocols; integration of nature and culture; fl

Relation to Existing Literature

Challenges push-pull and hierarchical motivation models for their static assumptions, proposing dynamic

Summary

This paper operationalizes actionability as the ability to adapt tourism offerings to post-crisis traveler moti

Scores

- **Overall Relevance Score:** 92 — Strong conceptual clarity on actionability, rich with systematic featur

- **Operationalization Score:** 88 — Detailed process for achieving actionability through mapping and fra

Supporting Quotes from the Paper

- "The study also provides actionable insights for tourism practitioners, emphasizing the need for tailored,

- "Health safety has become a critical driver of destination choice… creating new benchmarks for what co

- "The Crisis-Modified MEC Framework… incorporates both macro-level disruptions and micro-level deme

- "Despite significant restructuring… certain fundamental values… maintain their importance… accessible

Actionability References to Other Papers

- Borgardt (2018) — Extended MEC framework.

- Hill et al. (2022) — Direct attribute-value linkages.

- McIntosh & Thyne (2005) — MEC in tourism.

- Jiang et al. (2015) — Pre-crisis MEC structures in tourism.

Paper Summary

<!--META_START-->

Title: A framework to rank genomic alterations as targets for cancer precision medicine: the ESMO Scale

Authors: Mateo, J.; Chakravarty, D.; Dienstmann, R.; Jezdic, S.; Gonzalez-Perez, A.; Lopez-Bigas, N.; N

DOI: 10.1093/annonc/mdy263

Year: 2018

Publication Type: Journal

Discipline/Domain: Oncology / Precision Medicine

Subdomain/Topic: Genomic targets prioritization, cancer biomarkers, targeted therapy classification

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (ESCAT)

Operationalization Present: Yes

Primary Methodology: Conceptual framework development and consensus guidelines

Study Context: Classification and prioritization of molecular targets for cancer treatment based on clinical

Geographic/Institutional Context: Multinational collaboration (Europe, USA, Canada) led by ESMO

Target Users/Stakeholders: Oncologists, molecular tumor boards, clinical researchers, drug developers,

Primary Contribution Type: Conceptual framework and evidence-based classification system

CL: Yes

CR: Yes

FE: Yes

TI: No

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

<!--META_END-->

Title:

A framework to rank genomic alterations as targets for cancer precision medicine: the ESMO Scale for C

Authors:

Mateo, J.; Chakravarty, D.; Dienstmann, R.; Jezdic, S.; Gonzalez-Perez, A.; Lopez-Bigas, N.; Ng, C.K.Y.;

DOI:

10.1093/annonc/mdy263

Year:

2018

Publication Type:

Journal

Discipline/Domain:

Oncology / Precision Medicine

Subdomain/Topic:

Genomic targets prioritization, cancer biomarkers, targeted therapy classification

Contextual Background:

The paper addresses the lack of harmonization in defining and prioritizing "actionable" genomic alteration

Geographic/Institutional Context:

Led by the European Society for Medical Oncology (ESMO) with contributors from multiple global instituti

Target Users/Stakeholders:

Oncologists, clinical researchers, molecular tumor boards, drug developers, regulatory agencies.

Primary Methodology:

Conceptual framework development via expert consensus and literature synthesis.

Primary Contribution Type:

Framework / classification system.

General Summary of the Paper

The authors present the ESMO Scale for Clinical Actionability of molecular Targets (ESCAT), a structure

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is defined as the clinical utility of a genomic alteration for guiding targeted therapy, grounded

> "The ESCAT defines clinical evidence-based criteria to prioritise genomic alterations as markers to sele

> "We consider a target 'tier I-A', if… data… has demonstrated clinically meaningful improvement of a su

What Makes Something Actionable

- Demonstrated clinical benefit in survival or relevant endpoints in appropriate trial designs.

- Consistency of benefit across tumor types (for tier I-C) or specificity to certain tumor contexts.

- Supporting evidence from retrospective, prospective, or preclinical studies depending on tier.

- Predictive rather than merely prognostic value.

- Feasibility of therapeutic intervention targeting the alteration.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** ESMO Scale of Clinical Actionability for molecular Targets (ESCAT)

- **Methods/Levers:** Evidence-tier system based on trial type, outcome measures, and tumor specificity

- **Operational Steps / Workflow:** Classify molecular targets into ESCAT tiers I–X; integrate into tumor b

- **Data & Measures:** Clinical trial endpoints (OS, PFS), response rates, biomarker presence, preclinica

- **Implementation Context:** Precision oncology decision-making, research prioritization, and reporting h

> "This classification system aims to offer a common language… to place targets within their clinical cont

> "The scale uses the strength of evidence from clinical studies as the basis to assign tiers…" (p. 1900)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — Clear definition and tier structure; standardized terminology.

> "…offer a terminology that can be broadly applicable and help clinicians…" (p. 1901)

- **CR (Contextual Relevance):** Yes — Tiers depend on tumor-type-specific evidence.

- **FE (Feasibility):** Yes — Only feasible therapeutic targets are considered for higher tiers.

- **TI (Timeliness):** No explicit mention as an actionability criterion.

- **EX (Explainability):** Partial — Mechanistic rationale described for examples but not formalized as a r

- **GA (Goal Alignment):** Yes — Focus on improving patient outcomes and guiding therapy choice.

- **Other Dimensions Named by Authors:** Magnitude of benefit; type and quality of evidence.

Theoretical or Conceptual Foundations

- Builds on and harmonizes prior classification schemas (Andre et al. 2014; Van Allen et al. 2014; Meric-E

- Incorporates ESMO Magnitude of Clinical Benefit Scale.

Indicators or Metrics for Actionability

- Clinical trial endpoints: overall survival (OS), progression-free survival (PFS), objective response rate (C

- Magnitude of benefit per ESMO MCBS.

- Level and type of supporting evidence.

Barriers and Enablers to Actionability

- **Barriers:** Lack of harmonized terminology; variable evidence strength; tumor heterogeneity; rarity of

- **Enablers:** ESCAT tier system; existing genomic databases; collaborative curation; prospective regist

Relation to Existing Literature

Positions ESCAT as an integrative and globally applicable framework addressing gaps in prior systems, e

Summary

This paper presents ESCAT, a structured, evidence-based framework for ranking genomic alterations in

Scores

- **Overall Relevance Score:** 95 — Strong, explicit definition of actionability, detailed features tied to cli

- **Operationalization Score:** 95 — Fully developed framework with concrete tiering system, explicit crit

Supporting Quotes from the Paper

- "The ESCAT defines clinical evidence-based criteria to prioritise genomic alterations…" (p. 1895)

- "We consider a target 'tier I-A', if… data… has demonstrated clinically meaningful improvement…" (p. 1

- "The scale uses the strength of evidence from clinical studies as the basis to assign tiers to a target." (p

- "Clear terminology regarding clinical utility should decrease the chance for misinterpretation…" (p. 1901

Actionability References to Other Papers

- Andre et al., Ann Oncol 2014

- Van Allen et al., Nat Med 2014

- Meric-Bernstam et al., J Natl Cancer Inst 2015

- Chakravarty et al., JCO Precis Oncol 2017 (OncoKB)

- ESMO Magnitude of Clinical Benefit Scale (Cherny et al., Ann Oncol 2017)

Paper Summary

<!--META_START-->

Title: A framework for genomic biomarker actionability and its use in clinical decision making

Authors: Smruti J. Vidwans, Michelle L. Turski, Filip Janku, Ignacio Garrido-Laguna, Javier Munoz, Richa

DOI: 10.18632/oncoscience.104

Year: 2014

Publication Type: Journal

Discipline/Domain: Oncology, Genomics

Subdomain/Topic: Biomarker actionability, targeted cancer therapy

Eligibility: Eligible

Overall Relevance Score: 95

Operationalization Score: 90

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes

Operationalization Present: Yes

Primary Methodology: Conceptual framework

Study Context: Genomic biomarkers in cancer diagnosis and treatment planning

Geographic/Institutional Context: USA, Spain (multi-institutional collaboration)

Target Users/Stakeholders: Oncologists, molecular pathologists, clinical researchers

Primary Contribution Type: Conceptual framework and practical categorization

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Yes

GA: Yes

Reason if Not Eligible: N/A

<!--META_END-->

Title:

A framework for genomic biomarker actionability and its use in clinical decision making

Authors:

Smruti J. Vidwans, Michelle L. Turski, Filip Janku, Ignacio Garrido-Laguna, Javier Munoz, Richard Schwa

DOI:

10.18632/oncoscience.104

Year:

2014

Publication Type:

Journal

Discipline/Domain:

Oncology, Genomics

Subdomain/Topic:

Biomarker actionability, targeted cancer therapy

Contextual Background:

The paper addresses the growing use of molecular diagnostics in oncology, particularly genomic biomark

Geographic/Institutional Context:

USA and Spain, involving institutions like MD Anderson Cancer Center, University of California San Dieg

Target Users/Stakeholders:

Oncologists, molecular pathologists, clinical researchers, trial designers.

Primary Methodology:

Conceptual framework development.

Primary Contribution Type:

Proposal of a structured framework for determining biomarker actionability in cancer.

General Summary of the Paper

The authors present a comprehensive framework for evaluating the actionability of genomic biomarkers i

Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability refers to a biomarker being oncogenic and/or differentially expressed in tumor cells such tha

> "A biomarker is actionable if it is oncogenic and/or differentially expressed on tumor cells, and a treatme

> "A gene may be considered theoretically actionable if it has a basis of actionability…." (p. 614)

What Makes Something Actionable

- Functional role in driving malignancy.

- Targetability by approved or investigational drugs.

- Involvement in targetable pathways (directly or indirectly).

- Homology to other actionable biomarkers.

- Differential expression enabling targeted delivery.

- Supportive evidence from clinical guidelines, clinical/pre-clinical studies, or analogous genetic diseases.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Basis of Actionability & Rationale for Actionability.

- **Methods/Levers:** Categorization based on functional role, drug targetability, pathway involvement, h

- **Operational Steps / Workflow:** Identify biomarker → Determine category (basis) → Map rationale (ev

- **Data & Measures:** Clinical trial data, pre-clinical evidence, treatment guidelines, registry data, geneti

- **Implementation Context:** Personalized oncology decision-making.

> "The framework also includes a rationale for actionability in which strength of evidence for a biomarker

> "A biomarker may be considered actionable if it is a direct target of one or more approved drugs…" (p.

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes — clearly defined biomarker-drug relationships are necessary for actionability.

> "…standards exist that outline treatments for individuals harboring aberrations in the biomarker…" (p. 6

- **CR (Contextual Relevance):** Yes — considers histology-specific and histology-agnostic evidence.

> "…extrapolating predictive data from the tumor site of origin with the highest strength of evidence to a

- **FE (Feasibility):** Yes — includes evidence-based categories to guide clinical applicability.

- **TI (Timeliness):** Partial — recognizes rapid adoption of NGS and challenges in matching treatments

- **EX (Explainability):** Yes — detailed rationale for why a biomarker is actionable.

- **GA (Goal Alignment):** Yes — aligns biomarker actionability with optimal patient outcomes.

Other Dimensions Named by Authors:

- Strength of evidence level.

- Functional role versus passenger status.

Theoretical or Conceptual Foundations

- Companion diagnostics in oncology.

- NCCN and FDA treatment guideline frameworks.

- Molecular oncology concepts like oncogenic drivers, passengers, and pathway targeting.

Indicators or Metrics for Actionability

- Approval status of drugs with companion diagnostics.

- Inclusion in treatment guidelines.

- Evidence from clinical trials, pre-clinical studies, or genetic disease contexts.

Barriers and Enablers to Actionability

- **Barriers:** Conflicting data across histologies, novel variants of unknown significance, tumor genomic

- **Enablers:** Systems biology approaches, multi-omic profiling, histology-agnostic trial designs.

Relation to Existing Literature

Builds on existing oncology guidelines and targeted therapy concepts but integrates them into a unified fr

Summary

This paper offers a structured framework for assessing genomic biomarker actionability in cancer therapy

Scores

- **Overall Relevance Score:** 95 — Offers a direct, explicit definition of actionability, detailed categoriza

- **Operationalization Score:** 90 — Provides a clear workflow and categories for applying actionability a

Supporting Quotes from th