Paper Summary

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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

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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

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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. 70

- **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 scie

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Summary

This paper bridges big data analytics theory and practical decision-making by providing a framework for c

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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

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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*