Seeing Through Data: A Systematic Literature Review on the Role of Visualization and Interface Design in the Organizational Use of Data Objects

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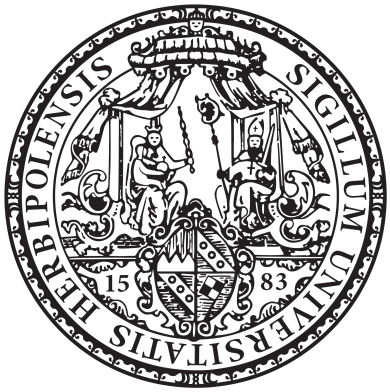

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Abstract

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List of Abbreviations

DO Data Object

ML Machine Learning

1 Introduction

Alaimo and Kallinikos (2022)

2 Theoretical Background

2.1 Boundary Objects

2.2 Data Objects as Epistemic Artifacts

3 Methodology

The review follows a structured approach based on the guidelines provided by Okoli (2015).

3.1 Purpose

Planning - Explicit + Comprehensive + Reproducible

Purpose of this review is to identify and analyze existing literature that address the role of visualization and interface design in the organizational use of Data Objects (DOs) within Machine Learning (ML) contexts.

3.2 Draft Protocol

Planning - Explicit + Comprehensive

3.3 Practical Screening

Selection - Quantitative + Qualitative

- Content: Data Objects, Visualization, Interface Design in Organizational Use
- Language: English, (German)
- Time Frame: 2005 - present
- Publication Type: Peer-Reviewed Journals, Conference Proceedings
- Setting: Organizational/professional
- Participants: Professionals, managers, analysts, data scientists
- Artifact: Dashboards, ML interfaces, analytics tools
- Design: Empirical or strong conceptual

3.4 Literature Search

Selection - Quantitative + Qualitative

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("data object*" OR "data artefact*" OR "boundary
object*" OR "digital twin" OR "data representation")
AND ("machine learning" OR "artificial intelligence" OR
"algorithmic system" OR "data-driven") AND
("organization" OR "management" OR "decision making" OR
"organizational knowledge") AND ("visualization" OR
"interface design" OR "dashboard" OR "representation"
OR "human-computer interaction")
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3.5 Data Extraction

Selection - Quantitative + Qualitative

3.6 Quality Appraisal

Selection - Quantitative + Qualitative + Explicit

3.7 Study Synthesization

Execution - Quantitative + Qualitative + Quantitative & Qualitative - Explicit

3.8 Writing the Review

Execution - Explicit + Reproducible

4 Structured Literature Review Results

4.1 Overview of Identified Literature

4.2 Technical Origin of Data Objects in ML Contexts

4.3 Data Objects as Boundary Objects in Organizational Contexts

4.4 Visualization and Interface Design as Epistemic Factors

5 Discussion

6 Future Research Directions

7 Conclusion

References

Alaimo, C., & Kallinikos, J. (2022). Organizations decenterded: Data objects, technology and knowledge. *Organization Science*, *33*(1), 19–37.

Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, *37*, 879–910.

Eidesstattliche Erklärung

Hiermit versichere ich, die vorliegende Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt sowie die Zitate deutlich kenntlich gemacht zu haben.
Ich erkläre weiterhin, dass die vorliegende Arbeit in gleicher oder ähnlicher Form noch nicht im Rahmen eines anderen Prüfungsverfahrens eingereicht wurde.

Würzburg, den 10. Januar 2026 Linus Schärmann