

BrCris as a Socio-Technical Infrastructure for Innovation in Scientific Information Management

Analysing Brazil's national research information system through the lens of the four dimensions of innovation.

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The Challenge of Scientific Information in Brazil

Brazilian scientific production is highly diverse, encompassing articles, theses, dissertations, books, software, patents, and research datasets. This plurality, while enriching, poses significant challenges to collection, integration, organisation, and analysis — especially when generating consistent, comparable indicators in Science, Technology & Innovation (ST&I).

Current Research Information Systems (CRIS) play a strategic role by enabling structured aggregation, certification, and analysis of scientific information, supporting evidence-based decision-making and Open Science practices.

What is BrCris?

Origin & Purpose

Developed by Ibict, BrCris is inspired by international models such as PTCris (Portugal) and LA Referencia (Latin America). It integrates, certifies, visualises, and disseminates data on scientific and technological activity in Brazil.

Key Data Sources

- Lattes Platform & Sucupira
- Oasisbr & BDTD
- Espacenet & Crossref
- DOAJ and other national/international repositories

Technical Foundations of BrCris

VIVO Ontology

Enables semantic modelling and qualified reuse of scientific information across institutions.

CERIF Metamodel

Provides international interoperability standards for structured representation of research data.

Open Formats

Data exported in open, reusable formats with customisable dashboards and filters, broadening Open Science contribution.

Auditable Metrics

Architecture supports generation of traceable, auditable bibliometric and scientometric indicators.

Research Question & Methodology

How do the dimensions of innovation proposed by Bessant and Tidd (2009) manifest themselves in the BrCris Platform, and what limits and potentialities can be observed in its configuration as a socio-technical infrastructure of Brazilian science?

A qualitative approach was adopted, combining systematic document review of Ibict institutional publications, technical reports, scientific articles, and publicly available platform features. Empirical and conceptual evidence was mapped against each of the four innovation dimensions, producing a summary table relating dimensions to BrCris functionalities and institutional objectives.

Product Innovation

BrCris offers innovative resources including **interactive dashboards**, thematic reports, institutional profiles, and structured data exports for bibliometric and scientometric analysis. These products transform how scientific information is made available, interpreted, and used in public science management.

The platform aligns with the facets of "data visualisation," "science assessment," and "scientific communication" in the Open Science taxonomy (Silveira et al., 2023), demonstrating commitment to transparency, accessibility, and the valorisation of public knowledge. Persistent identifiers (DOI, ORCID) and export compatibility with tools such as VOSviewer and Gephi further enhance reusability.

Process Innovation

Data Integration

Complex integration of heterogeneous institutional sources into a unified information flow, consolidating previously dispersed practices.

Disambiguation & Deduplication

Continuously improved algorithms ensure accuracy in linking authors, institutions, and publications, promoting standardisation and traceability.

Controlled Vocabularies

Use of interoperable metadata and controlled vocabularies technically reconfigures how scientific data circulates and is managed.

VIVO Ontology

Semantic technologies align BrCris with Open Science requirements, promoting efficiency and technical alignment (Pinto et al., 2022; Silva et al., 2023).

Positioning Innovation

BrCris repositions Brazil in the international landscape of scientific information governance. Articulation with **OpenAIRE**, adoption of international interoperability standards, and alignment with **FAIR principles** make BrCris a strategic link between national scientific production and global research data ecosystems.

Inclusion in networks such as **La Referencia** increases Brazil's representation in the global Open Science ecosystem, promoting openness, transparency, and transnational collaboration in the production and use of scientific information (Dias et al., 2025).

Paradigm Innovation

Paradigmatic innovation is the most disruptive among the dimensions, as it implies the revision of consolidated assumptions, values, and modes of operation. — Bessant & Tidd (2009)

BrCris induces **data certification practices**, author disambiguation, transparency, and standardisation, contributing to a profound change in the mental and organisational model of scientific information management in Brazil. This structural transformation reconfigures the ways of organising, processing, and using scientific information, aligned with UNESCO (2022) guidelines and the principles of informational justice (Johnson, 2014; Smith, 2001).

Innovation Dimensions: Evidence Table

Table 1 — Innovation dimensions of the BrCris Platform based on Bessant and Tidd (2009)

BrCris Feature	Product	Process	Positioning	Paradigm
Interactive dashboards with thematic/visual filters	X			
Dynamic ST&I reports	X	X		
Integration of institutional databases with interoperable metadata		X	X	
Linking authors, projects, products, and funding		X	X	
Redesigning governance of scientific information				X
Brazil's integration into global open science networks			X	
Public interface focused on accessibility and transparency	X	X	X	
Georeferenced mapping of scientific production	X	X	X	

Innovation Dimensions: Evidence Table (cont.)

BrCris Feature	Product	Process	Positioning	Paradigm
Unique identification of researchers, projects, and institutions		X	X	
Certification of national scientific data	X	X	X	
Adoption of international standards (CERIF, ORCID, DOI)		X	X	
Automated generation of institutional reports for ST&I management	X	X		
Connecting to open science platforms (La Referencia, OpenAIRE)		X	X	
Unified data model for representing scientific information		X	X	
National and international visibility of Brazilian scientific production			X	

 An "X" indicates a direct and empirically supported association between the innovation dimension and the corresponding BrCris feature.

Key Insight: Multidimensional & Interdependent Innovations

Most innovations identified in BrCris have a **transversal character**, articulating more than one dimension of the Bessant and Tidd (2009) model simultaneously. Items such as data certification (item 10) and the public accessibility interface (item 7) span product, process, and positioning dimensions concurrently.

This interdependence reinforces the understanding of BrCris as a vector for broad reconfiguration of the national scientific information infrastructure — not a collection of isolated features, but a coherent, mutually reinforcing system.

BrCris as a Governance Mechanism



Data Certification

Induces auditability and reliability in national scientific data, aligned with UNESCO (2022) principles.



Informational Justice

Promotes equitable access to scientific information, consistent with Johnson (2014) and Smith (2001) frameworks.



Institutional Coordination

Articulates technological integration with institutional coordination, transforming consolidated assumptions about information management.

BrCris and Open Science Alignment

Open Science Taxonomy

BrCris aligns with Silveira et al.'s (2023) Open Science taxonomy across data visualisation, science assessment, and scientific communication facets.

FAIR Principles

- **Findable:** Persistent identifiers (DOI, ORCID)
- **Accessible:** Open format exports
- **Interoperable:** CERIF, VIVO ontology
- **Reusable:** Standardised, certified metadata

Systemic Impact: Reconfiguring Brazilian Science

Technological Integration

Unified data flows and interoperability

Cultural Change

Transparency, justice, Open Science

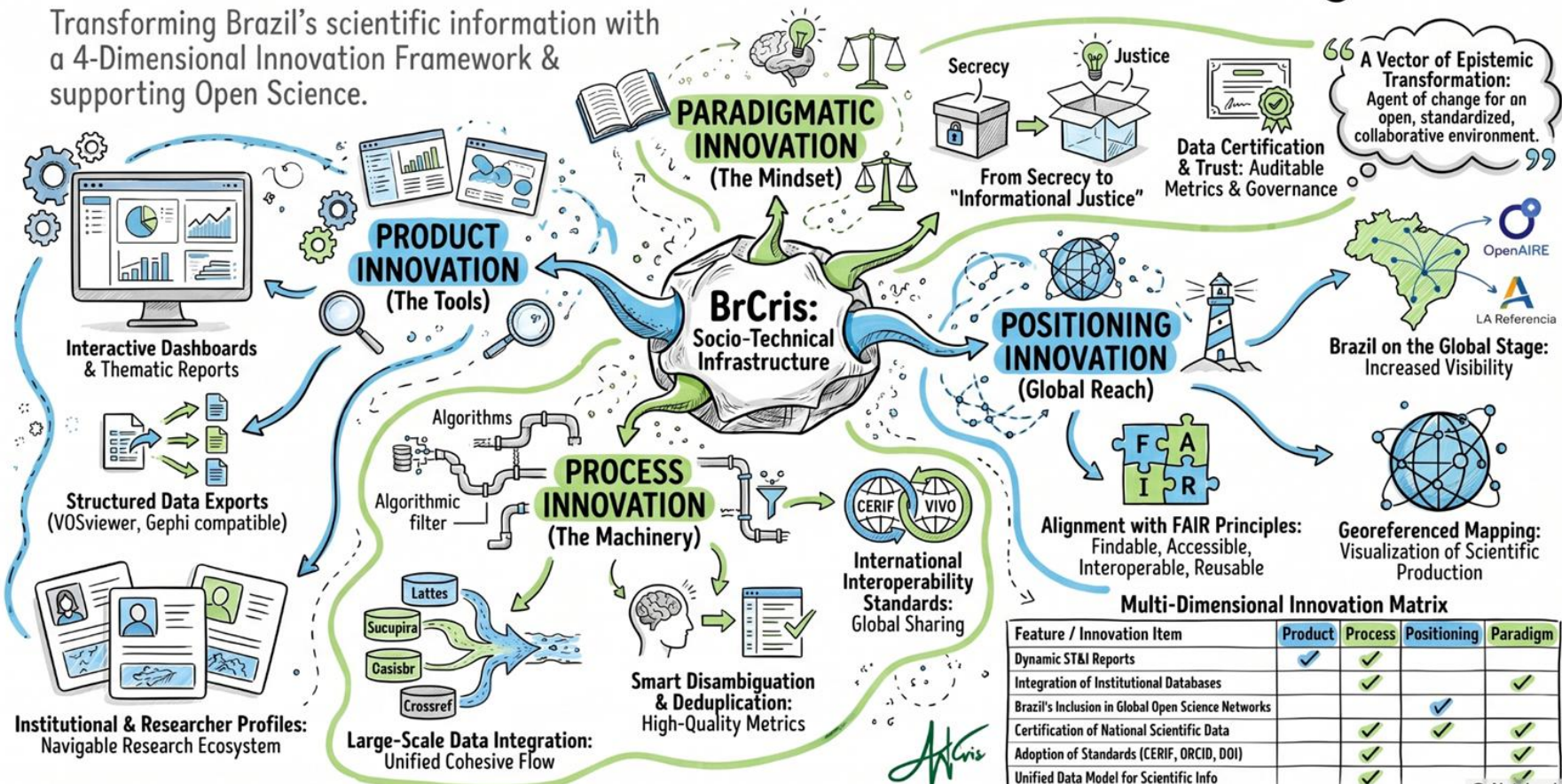


Institutional Coordination

Governance redesign and standardisation

BrCris operates simultaneously as an information infrastructure, a governance mechanism, and an agent of socio-technical transformation — converging technological, organisational, and cultural elements to reconfigure scientific information practices across Brazil.

Transforming Brazil's scientific information with a 4-Dimensional Innovation Framework & supporting Open Science.



Conclusions

The analysis reveals that BrCris incorporates innovative elements expressed across its functionalities, operational processes, strategic alignments, and paradigmatic transformations. By articulating technological integration, institutional coordination, and cultural change, BrCris contributes not only to improving efficiency and transparency in scientific information management, but also to fostering structural transformations aligned with Open Science principles and informational justice.

These findings suggest BrCris represents a **relevant model for other national research information systems** seeking to balance data integration, innovation, and governance.

Avenues for Future Research

1 Impacts on Scientific Policy

Investigating how CRIS infrastructures influence national ST&I policy formulation and evaluation practices.

3 Knowledge Production in Diverse Contexts

Exploring the platform's impacts on knowledge production across diverse national and disciplinary contexts.

2 Evaluation Practices

Examining how BrCris-generated metrics shape institutional research assessment and funding allocation.

4 Comparative CRIS Studies

Comparing BrCris with PTCris, LA Referencia, and OpenAIRE to identify transferable governance models.

Key References

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UNESCO (2022); Johnson (2014); Smith (2001)

UNESCO Recommendation on Open Science; informational justice frameworks underpinning BrCris's paradigmatic dimension.

KEYWORDS: SCIENTIFIC INFORMATION INFRASTRUCTURE · BRCRIS · INNOVATION DIMENSIONS · OPEN
SCIENCE

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Thank you! Obrigado!

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