Conceptualizing an AI Module for HISinOne RES: Pilot Planning at FernUniversität in Hagen

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Extended abstract

Modern research institutions face increasing challenges in managing and leveraging large volumes of heterogeneous research information. Current Research Information Systems (CRIS/FIS), such as HISinOne RES, provide structured environments for recording publications, projects, funding, collaborations, and patents, and thus support reporting and strategic decision-making (Rybinski et al., 2017; Biesenbender et al., 2019; Fabre et al., 2021). However, despite their strengths, traditional systems operate predominantly retrospectively, offering static insights rather than proactive guidance. This lack of forward-looking functionality limits the timely detection of emerging research trends, identification of optimal collaboration opportunities, and evidence-based evaluation of funding applications (Sivertsen, 2019). Increasing complexity in research landscapes, disciplinary diversity, and administrative workloads intensify these challenges. Institutions therefore require solutions capable not only of handling large, heterogeneous datasets but also of transforming them into actionable insights for researchers, administrators, and institutional leadership (Schöpfel & Azeroual, 2024). Addressing this gap forms the central motivation of the present project.

To tackle these challenges, we propose a modular Artificial Intelligence (AI) component designed to extend HISinOne RES with predictive analytics, semantic enrichment, automated classification, and collaboration recommendations. Unlike conventional add-on tools, the proposed AI module is conceived as an integrative layer that operates directly within the existing CRIS/FIS infrastructure, preserving established workflows and governance structures. Key design principles include data privacy compliance, explainability,

transparency, and adherence to ethical AI practices, ensuring that the generated insights remain interpretable and trustworthy for diverse user groups (Balasubramaniam et al., 2022). The module will provide predictions on emerging research areas, highlight promising collaboration networks, and estimate the potential success of funding applications, thus supporting strategic decision-making at multiple institutional levels (Azeroual, 2025a).

The FernUniversität in Hagen—Germany's leading distance-learning institution—has been selected as the pilot site for conceptual development and future implementation. Its distributed research environment, heterogeneous project landscape, and highly digital administrative infrastructure make it an ideal real-world laboratory for exploring AI integration in research management. This setting enables iterative co-design processes involving researchers, administrative staff, and institutional leadership, ensuring that both technological functionalities and user interfaces meet practical requirements and organizational realities.

Figure 1 illustrates the conceptual architecture of the AI module. The diagram depicts the flow from raw research metadata within HISinOne RES through AI-driven predictive analytics, semantic enrichment, and network analysis, culminating in actionable insights presented via user dashboards. It also highlights iterative feedback loops and the integration of ethical and data privacy governance. The figure emphasizes the system's modular design, enabling scalability and transferability to other universities and CRIS/FIS environments.

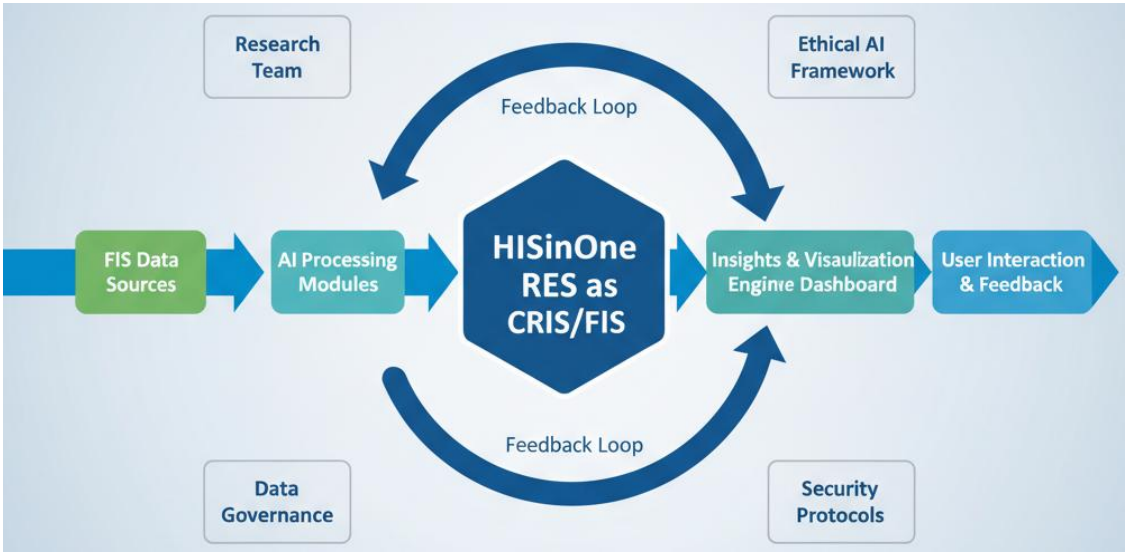

Fig. 1. Conceptual Architecture of the AI Module for HISinOne RES at FernUniversität in Hagen.

Methodologically, the architecture brings together several analytical layers. Natural Language Processing (NLP) will enable semantic clustering of publications, projects, and other research outputs. Supervised and unsupervised machine learning approaches will support predictive modeling for research trends and funding success. Network analytics will help identify potential internal and external collaboration partners. Explainable AI techniques will make model rationales transparent, enhancing user trust and fostering informed decision-making (Azeroual, 2025b). The modular design ensures adaptability and scalability, allowing adoption by other institutions and CRIS/FIS platforms.

Although the AI module has not yet been implemented or validated, the project outlines a clear roadmap from conceptualization to pilot deployment. Key workstreams include harmonizing and engineering features from existing CRIS/FIS data, developing predictive and explainable AI models, integrating them with HISinOne RES, conducting iterative participatory testing with end-users, and preparing governance and ethical frameworks. The project also aims to produce guidelines and best-practice documentation to support national transferability and sustainable adoption across universities (Azeroual et al., 2025). Embedding these processes within a real operational environment will help mitigate common barriers to AI deployment, such as data heterogeneity, quality issues, governance complexities, and user resistance.

The expected benefits of the conceptual design are substantial. For researchers, the AI module will provide actionable insights into trends, funding opportunities, and collaboration networks. Research managers will gain analytical support for evaluating institutional performance, planning strategic initiatives, and optimizing resource allocation. University leadership will benefit from predictive indicators that inform policy and investment decisions. More broadly, the project advances the evolution of research information systems from static data repositories to dynamic, intelligence-driven infrastructures that enable institutions to respond proactively to evolving scientific landscapes.

From a scientific perspective, the project contributes to understanding how AI can be integrated into CRIS/FIS environments while maintaining compliance with data protection and ethical standards. It addresses key questions concerning explainability, transparency, and user-centered design in AI-supported research management. Moreover, the pilot at FernUniversität serves as a testbed for documenting challenges and solutions, generating transferable knowledge for the euroCRIS community and other European research institutions, functioning as a central hub for this topic (Azeroual, 2025c).

The project emphasizes participatory development and incorporates social science methods to assess user needs, workflows, and acceptance factors. Workshops, focus groups, and iterative feedback cycles ensure that the AI module meets practical requirements, aligns with governance policies, and provides interpretable, actionable insights. Ethical and data privacy considerations are embedded throughout the design process, reinforcing responsible deployment and long-term trustworthiness.

In conclusion, this project presents a comprehensive conceptual framework for an AI module designed to transform HISinOne RES from a passive data repository into an active, predictive, and user-centered research information system. The pilot at FernUniversität in Hagen offers a robust environment for iterative development, user engagement, and methodological refinement. While implementation and validation remain future steps, the project provides a structured blueprint for AI-enhanced CRIS/FIS architectures, combining technical innovation, explainable decision-making, ethical governance, and practical applicability. Ultimately, it presents a scalable and responsible model for integrating AI into research information systems across universities.

Keywords

Artificial Intelligence (AI), Current Research Information Systems (CRIS) / Forschungsinformationssysteme (FIS), Predictive Analytics, Explainable AI (XAI), University Research Management, HISinOne RES.

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