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The Mother of All HERM Mappings: Sector-wide Insight of Impact Changes and Common Services

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Abstract

Higher Education Reference Models (HERM) provide a structured, sector-specific framework for describing business capabilities, conceptual data domains, application components and technology services in higher education. This paper formalises the 'Mother of All HERM Mappings' (MoHM) approach, which enables institutions and national bodies to analyze how external drivers — legislation, shared services, and technology trends — affect Higher Education Institute operation, information and IT systems. In addition, the approach includes extensions of the HERM model by national reference architectures and vocabularies. We synthesise current HERM governance, outline a reproducible multi-level mapping method, and report findings from early pilots. The approach supports interoperability, transparency and evidence-informed decision making across European, national and institutional contexts (CAUDIT, 2026; EDUCAUSE, 2025).

1 Introduction

Digital transformation in higher education increasingly requires a shared architectural vocabulary and understanding of the artefacts. Generic enterprise architecture standards often overlook the unique value streams and data structures of higher education, creating fragmentation. HERM addresses this gap by offering an integrated Business Capability Model (BRM, earlier BCM), Data Reference Model (DRM), Application Reference Model (ARM), and Technology Reference Model (TRM), curated collaboratively by CAUDIT, UCISA, EUNIS and EDUCAUSE (Nauwerck et al., 2022; Ferrell et al., 2022).

Building on this foundation, the MoHM methodology provides a systematic way to map sector development drivers — including EU regulations, national initiatives and institutional initiatives — to HERM elements but also a way to map current state of architecture artefacts of common interest like national shared services. Its core objective is to create a consistent, multilingual repository that supports strategic alignment, investment planning and architectural transparency across diverse institutional landscapes.

2 Background: HERM and European Adoption

HERM governance follows a community-driven approach: catalogue updates, versioning and documentation enhancements are coordinated collaboratively, ensuring that HERM remains a living reference model. It's vital to have a common, widely used and commonly updated model. Version 3.x introduced significant improvements to ARM and TRM, expanded entity definitions and enhanced metadata structures (CAUDIT, 2026; EDUCAUSE, 2025).

European adoption accelerated through EUNIS EA SIG publications, which provided translations, use cases and early adopter insights. Case studies from Finland, France and Spain demonstrate how HERM supports capability maturity assessments, governance dialogues and sector-wide benchmarking (Ferrell et al., 2022; Nauwerck et al., 2022). Since work with translations has continued and EUNIS EA SIG has published 9 European translations of the HERM-BRM.

3 Related Work

Nauwerck et al. (2022) introduced HERM as a sector-specific reference architecture, outlining key EA principles and operational contexts. Their contribution established the conceptual groundwork for European collaboration.

Ferrell et al. (2022) examined the governance implications of business capability models and highlighted the need for harmonised terminology, interoperability and translation across HEI ecosystems.

Boyatt (2023) expanded the understanding of the DRM by improving conceptual definitions, entity relationships and links between capability modelling and data governance.

4 Methodology: Mother of All HERM Mappings

Strategic institutional agility requires a robust "connective tissue" to bridge the gap between external change drivers and internal technical architecture. This is the role of "The Mother of All Mappings." By linking external pressures—such as shifting EU mandates or the adoption of national services—directly to internal HERM components, leadership gains an unprecedented view of how external volatility impacts institutional stability.

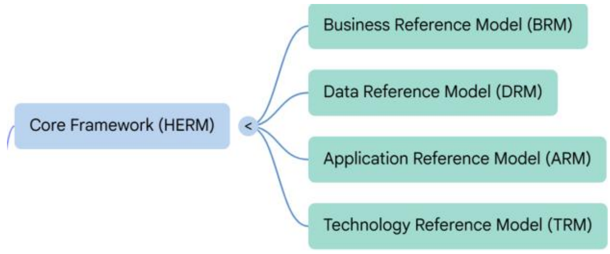

Figure 1: Core Framework Components

MoHM classifies drivers at European, national and institutional levels and maps each to one or more HERM elements across BRM, DRM, ARM and TRM. The shared repository contains items mapped to HERM elements, and related report views enable viewpoints to the mappings with multilingual support. The stable HERM model update method provides a strong foundation for this type of work.

The report's views provide three analytical viewpoints:

1. the Mapping View for item-to-element inspection,
2. the Heatmap View for density analysis and
3. the Content View for exportable lists.

These viewpoints are provided not only for the Business Capability level (BRM), but for all other HERM-model elements across the Framework models DRM, ARM and TRM providing a deeper analysis of each architectural layer. Extending the future Frameworks candidates like the Service Reference Model (SRM) is simple and expected, once the maturity of new Frameworks is mature for release.

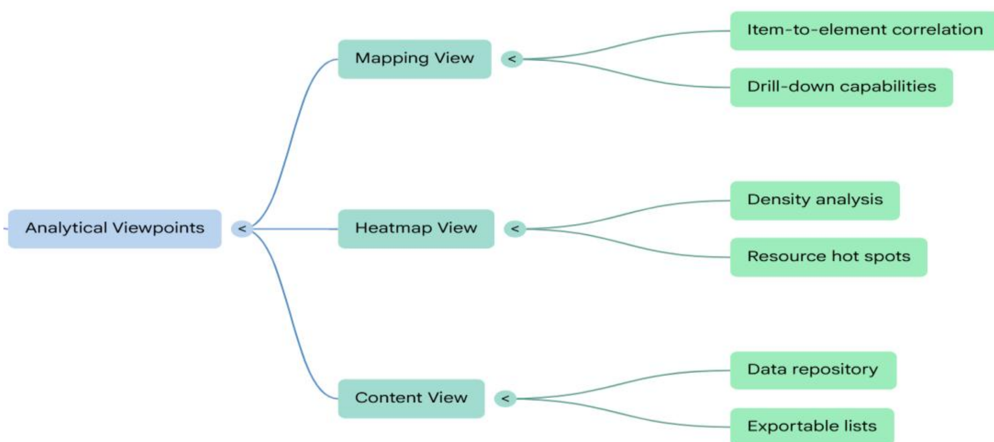

Figure 2: Analytical Viewpoints

The mapping process comprises the definition of shared items, the establishment of common mapping criteria, the publication of iterative releases, and the application of systematic quality assurance routines. Together, these activities formalise governance practices and promote consistent reuse and collaboration across higher education institutions (HEIs). The mapping itself is guided by a set of questions that vary depending on the type of issue being examined.

When assessing the impacts of a forthcoming change - such as a legislative amendment, an identified development need, or a project initiative - a preliminary understanding of the change context is required. Based on this, the following questions can be addressed:

1. Which BRM capabilities will be affected by the change?
   The scope should be limited to capabilities whose components are expected to undergo substantive modifications. For instance, although communication activities occur in all projects, the communication management capability need not be included unless its implementation is anticipated to change significantly.
2. What changes will occur in the capability's components—such as personnel and expertise, operating models and processes, data assets, and information systems?

It is not necessary to list commonplace infrastructure (e.g., email systems or office spaces). However, if the capability under examination concerns timetable management, then the systems, data, and processes that are critical for timetable management must be explicitly identified.

When mapping the components required for the implementation of a capability, the key question becomes which components are essential for that specific capability within the operational context of the institution.

From a strategic perspective, the multi-level mapping approach (European, national, and institutional levels) functions as a primary mechanism for cost avoidance. By identifying shared or duplicated efforts through the EUNIS EA SIG network, institutions can conduct mapping once at the European level and subsequently reuse the results. This collaborative hierarchy can save hundreds of working hours per institution, enabling local enterprise architects to concentrate on institution-specific value creation rather than repetitive foundational analysis. The process typically begins with low-threshold collaborative tools—such as shared Google Drive sheets—to maximise efficiency, before later evolving toward more sophisticated reporting environments.

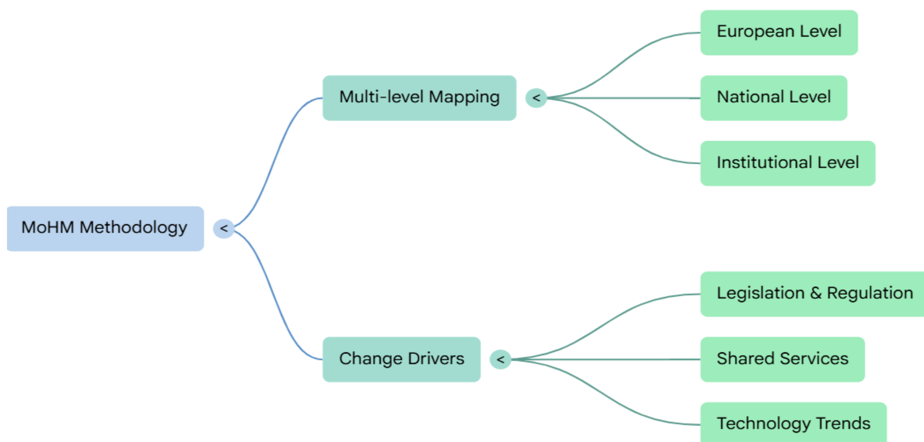

Figure 3: MoHM Methology Structure

5 Results of Use Cases

Use case A — National or common development need: In this example Multilingual support – development need is reviewed. Mapping results revealed extensive impacts on BRM elements related to communication, student information and academic processes, while DRM analysis exposed dependencies on multilingual vocabularies and metadata.

Use case B — National applications: In this case national learning platforms, identity systems and research information services are mapped to ARM components highlighted gaps and functional overlaps, enabling institutions to rationalize portfolios.

Use case C — National technology services: Mapping cybersecurity, collaboration tools and analytics platforms to TRM exposed areas with high change velocity and systemic risk, supporting investment governance and roadmap prioritization.

Use case D — European regulation: In this example AI Act is mapped to BRM capabilities, and the impact of the AI Act has been assessed from several perspectives, such as interoperability and the impact on key components of business capability, such as information/data, resources, processes, and technology. (AI Act mapping)

Use case E — National vocabularies. The BRM capabilities are widened by mapping national Teaching and Education vocabulary terminology (OKSA). In this perspective, the terminology of official vocabulary is linked to capability description. The view includes a link to the description of the linked term in the OKSA vocabulary.

Use case F — National project. The Digivisio 2030 -project (Digivisio) is a project where Finnish higher education institutions are building a future of learning together. The goal is a new era of learning where each of us can learn more easily and flexibly, thus accumulating the expertise needed in a constantly changing world. In this kind of project there will be plenty of changes into capabilities - resources and skills, processes, information and IT systems. Originally identification of impact changes created by University of Helsinki, but because of mappings to the BRM, the results were re-usable in other universities and in Digivisio -project itself in communication.

Use case G — National reference architectures: In this case BRM capabilities are mapped to

1. the business services of the Finnish national Learning and teaching reference architecture (OPI3),
2. the business capabilities of the Research data management (Daha) reference architecture and
3. the business services of the reference architecture of the Higher Education Institutes Business Services.

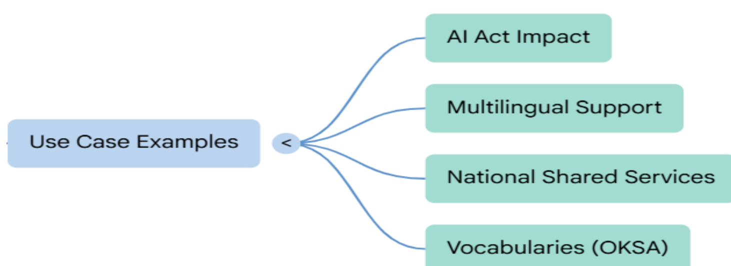

Figure 4: Use Case Examples

6 Analysis: Power of Analytical Views

Architectural visibility constitutes a foundational prerequisite for information-based decision-making. Strategic advisors rely on visualised analytical outputs to enable business owners to identify areas of heightened activity or significant organisational risk without the need to manually interpret raw data. The mapping framework supports this objective by providing three executive-level analytical viewpoints:

1. **Mapping View**:
   This view establishes direct correlations between specific items—such as development projects—and the relevant HERM elements. A critical feature of this view is its drill-down

functionality, which enables decision-makers to move seamlessly from high-level summaries to granular project- or capability-level detail.

2. **Heatmap View:**
This visualisation employs colour density to represent the concentration of mappings. Darker tones reflect higher mapping density, thereby signalling areas of concentrated strategic activity or, alternatively, potential resource constraints and emergent "hot spots" requiring immediate management attention.
3. **Content View**:
Provides the underlying data repository of all mapped items, allowing for detailed export and further analytical processing.

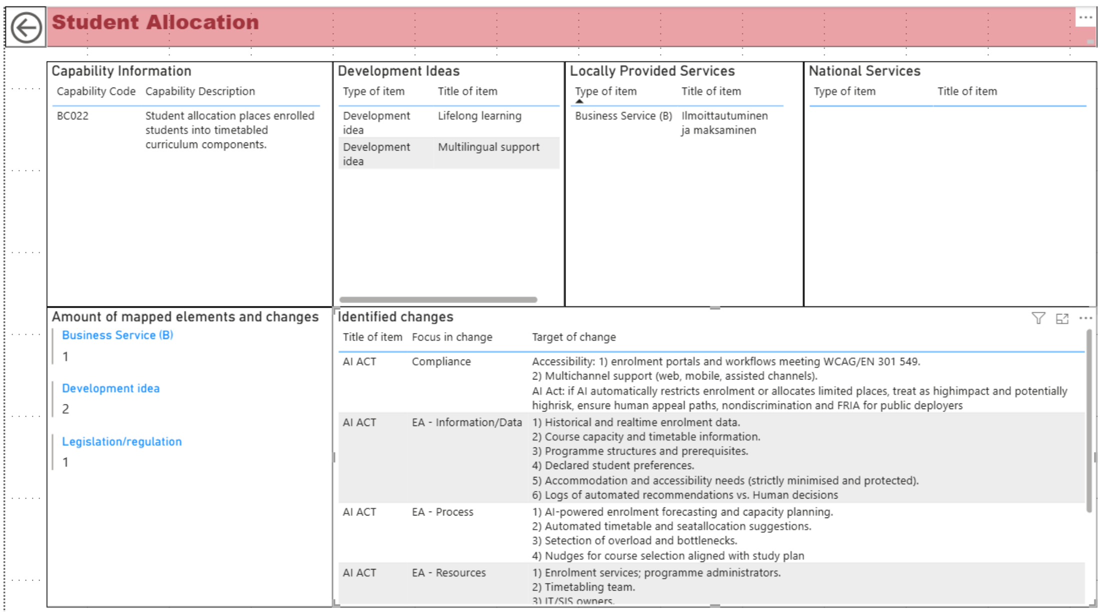

Figure 5: Example view of single Capability viewpoint

The analytical value of these visualisations is most evident in horizontal impact analysis. For example, a development need such as Multilingual support may appear as a discrete requirement; however, heatmap analysis typically reveals its cross-cutting character, demonstrating how it affects nearly all capabilities within both the Learning & Teaching and Enabling Capabilities domains. Similarly, architectural maturity is demonstrated by the differentiated mapping of CSC National Services: National Application Services align with ARM components, whereas National Technology Services correspond to TRM components. This degree of precision supports comprehensive monitoring of institutional architectural health across all layers of the architecture stack.

Even seemingly minor or peripheral mappings may have substantial implications for institutional risk exposure. A key consideration is whether the underlying change affects application usage or technological infrastructure. The skills, competencies, and resource requirements differ significantly: the organisational question shifts from "Do we need to train end users?" to "Do we need to hire and develop new subject-matter expertise?"

7 Discussion

MoHM strengthens interoperability, enhances evidence-based decision-making, and provides a shared architectural narrative for sector-wide initiatives. It reduces redundancy, increases transparency, and enables structured dialogue among stakeholders. With the intensification of European digitalisation regulation in recent years, extensive cooperation within the EUNIS community has positioned MoHM as a mechanism for accelerating institutional preparedness and improving coordinated responses to sectoral change.

Nevertheless, several challenges persist, including terminology alignment, governance overhead, and maintaining version accuracy. These can be mitigated through periodic review cycles, formalised criteria, and coordinated sector-level governance. Iterative refinement represents a core characteristic of digitally mature ecosystems. To evolve MoHM from a set of reports into a robust, automated ecosystem for institutional optimisation, the following strategic roadmap is proposed:

- **Institutionalise Automated Dependency Analysis**:
  Strengthen the integration across BRM, DRM, ARM, and TRM models to enable automated dependency analysis and advanced modelling. Automated propagation of change—e.g., identifying how a technology-layer modification (TRM) cascades to affect applications and business capabilities (BRM)—will enhance proactive decision-making.
- **Integrate the Service Reference Model (SRM)**:
  Expand the framework to incorporate the SRM once sufficiently mature. This will provide a granular view of shared service delivery and enable sector-wide benchmarking at a level not currently feasible.
- **Operationalise Ontological Refinement**:
  Improve the precision of mappings by refining ontology structures. This includes linking official domain vocabularies—such as the national Teaching and Education vocabulary (OKSA)—directly to capability descriptions to minimise ambiguity and strengthen semantic consistency.
- **Institutionalise Sustainable Open Tooling**:
  Although current reporting relies primarily on Power BI, long-term sustainability requires the transition toward open, license-independent tools such as SVG-based reporting pipelines, Python, and Google Looker Studio. This transition ensures continued accessibility and shared stewardship across the community and removes financial barriers that may impede architectural transparency.

Collectively, this evolutionary roadmap ensures that the framework remains a sustainable instrument for evidence-based decision-making.

8 Conclusion

This paper has formalised MoHM as a practical, low-cost, high-impact, and reproducible method for modelling how legislative, national, organisational, and technological drivers shape higher education architectures. By aligning mappings with the HERM framework and fostering shared governance practices, MoHM strengthens transparency, comparability, and digital maturity across institutions. Future advancements include the expansion of multilingual catalogues, further ontological refinement, and tighter integration between mappings and institutional capability and technology roadmaps.

The HERM mapping framework thus represents a shift from abstract architectural theorisation to a model grounded in scientific rigour. By anchoring institutional analyses in the repeatable and validated structures of the HERM BRM, ARM, and TRM models—and ensuring alignment with CAUDIT/APQC—the framework embodies a globally recognised methodology for institutional optimisation.

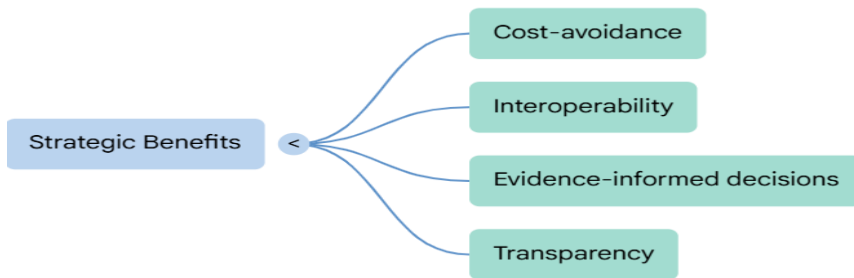

Figure 6: Strategic Benefits

In an increasingly interconnected European higher education landscape, architectural mapping is no longer an administrative formality; it is a competitive imperative. Institutions that adopt this framework will gain the transparency, efficiency, and strategic adaptability required to thrive—ensuring that all strategic shifts remain visible, measurable, and aligned with the broader institutional architecture.

9 Acknowledgment

AI use disclosure. An AI-assisted reviewer (NotebookLM, Google, Copilot) was used to scan this manuscript for structural consistency and completeness. The final wording was also checked using NotebookLM. The authors made all substantive content decisions and remain fully responsible for the accuracy and interpretation of the final manuscript.

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