

E-BOOK OF EXTENDED ABSTRACT

THE 14TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025



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AICAPEXP: A DIAGNOSTIC TOOLKIT FOR ENHANCING AI READINESS IN LIBRARIES

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ABSTRACT

The AI Capability Explorer (AICAPEXP) is a comprehensive diagnostic toolkit designed to help libraries assess, benchmark, and enhance their artificial intelligence (AI) capabilities. Built upon extensive research into AI integration within library environments, this toolkit offers a structured framework to evaluate readiness across multiple dimensions including infrastructure, human resource competencies, data governance, ethical safeguards, and user engagement. AICAPEXP is particularly useful for library leaders, digital transformation officers, and policy makers seeking to align their services with emerging AI-driven innovations. It empowers institutions to identify existing gaps, set strategic priorities, and track progress over time, thereby fostering a culture of continuous improvement and future-readiness. The development of AICAPEXP is grounded in scholarly and empirical insights, incorporating international best practices, stakeholder feedback, and validated indicators of AI maturity in knowledge-centric organisations. Its modular and adaptable design ensures relevance to libraries of various sizes and contexts—public, academic, research, and special libraries alike. With growing global demand for responsible and effective AI adoption, AICAPEXP holds strong commercial potential. It can be packaged as a professional service, consultancy offering, or licensing solution for institutions seeking expert support in AI-readiness planning. Moreover, its evidence-based structure offers credibility and value for accreditation bodies and funding agencies evaluating digital innovation capacity. Whether your library is just beginning its AI journey or seeking to strengthen existing initiatives, AICAPEXP serves as both a strategic compass and an operational guide for sustainable AI integration in library services.

Keywords: Artificial Intelligence (AI) readiness, library innovation, Digital Transformation Toolkit, AI capability assessment

1. INTRODUCTION

The transformative power of Artificial Intelligence (AI) has been widely recognised across sectors, including healthcare, manufacturing, education, and public services (Brynjolfsson & McAfee, 2017). In the domain of libraries, AI promises to revolutionise traditional practices by enhancing resource discovery, automating metadata generation, enabling personalised services, and improving decision-making through predictive analytics (ALA, 2021; Cox et al., 2020). However, despite its potential, many libraries struggle to effectively plan, adopt, or scale AI technologies. This is due to limitations in infrastructure, data governance, skill sets, and ethical preparedness (IFLA, 2022). Moreover, there is often a lack of standardised tools to evaluate AI maturity in library environments, making it difficult for institutions to identify gaps and strategically plan for future AI integration (EC, 2020). The AI Capability Explorer (AICAPEXP) addresses this gap by providing a diagnostic and planning toolkit that assesses a library's AI readiness across multiple dimensions. It is specifically tailored to the needs of libraries and knowledge-centric institutions, grounded in international best practices, and designed to support decision-makers, digital strategists, and policy architects.

2. METHODOLOGY

2.1 Literature Review

The foundation of AICAPEXP is built upon a comprehensive review of global AI readiness frameworks and models relevant to the public and knowledge sectors. Key resources included:

- i. The OECD AI Principles which emphasise inclusive growth, transparency, and accountability in AI deployment (OECD, 2019),
- ii. The European Commission's AI Watch initiative, which provides tools and metrics for assessing national AI strategies (EC, 2020),
- iii. The Singapore Model AI Governance Framework, which offers a modular and practical approach to trustworthy AI use (PDPC, 2020),
- iv. Guidelines and toolkits from library associations such as the American Library Association (ALA) and the International Federation of Library Associations and Institutions (IFLA) (ALA, 2021; IFLA, 2022).

These documents provided a benchmark for identifying critical success factors and common gaps in AI maturity assessment, especially in knowledge-based institutions.

2.2 Interview

Semi-structured interviews and workshops were conducted with professionals, including chief librarians and digital officers. These were carried out in academic, public, and special libraries in Malaysia between 2023 and 2024. This study revealed that while libraries were enthusiastic about AI, they lacked a coherent strategy and consistent metrics to assess progress. Participants emphasised the need for a tool that could help them understand their baseline, plan improvements, and communicate AI goals with stakeholders.

3. FINDINGS

Academic libraries demonstrated higher maturity in infrastructure and experimentation, while public libraries showed strong user-centric approaches but lacked technical infrastructure. Special libraries, particularly those embedded within research institutions, showed advanced data governance mechanisms but often lacked formal ethical guidelines for AI usage. One of the most common issues was weak data governance. Libraries had large volumes of data but lacked frameworks for metadata standardisation, interoperability, or secure data access. These shortcomings limit the development and deployment of AI tools that rely on structured and quality datasets (Floridi & Cowls, 2019).

Another key issue was limited human resource development. Most respondents reported insufficient AI training programs or capacity-building initiatives. AICAPEXP helped institutions recognise the need to invest in digital upskilling and cross-functional collaboration (Cox et al., 2020).

Libraries used the AICAPEXP outputs for:

- i. Building strategic roadmaps,
- ii. Supporting digital transformation funding proposals,
- iii. Advocating for AI policy formulation at institutional levels,
- iv. Educating governing boards and public stakeholders on AI implications.

Participants valued the visual benchmarking feature, which allowed easy comparisons across departments or peer institutions.



Figure 1 AICAPEXP Homepage

4. CONCLUSION

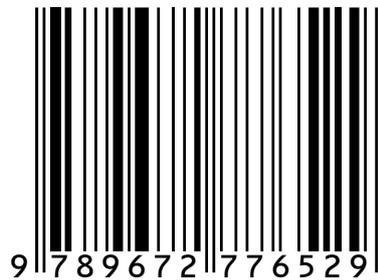
The AICAPEXP diagnostic toolkit addresses a critical gap in the digital transformation of libraries by providing a structured, evidence-based framework for evaluating AI readiness. As libraries reposition themselves as smart institutions in a knowledge economy, the integration of AI must be intentional, inclusive, and ethically grounded. This toolkit not only helps libraries assess their current capabilities but also provides a strategic compass for future planning and innovation. Its modular design and contextual adaptability make it valuable across various library types and sizes. Furthermore, AICAPEXP aligns with global trends in AI governance, transparency, and accountability, and could be instrumental for accreditation bodies and funding agencies in evaluating AI-related digital initiatives. Future directions include the development of multilingual versions, mobile-friendly interfaces, and deeper integration with AI learning platforms and data stewardship dashboards. There is also potential to evolve AICAPEXP into a professional consultancy model or incorporate it into national digital library frameworks.

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