# Recommendations for the AI Implementation in Libraries

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**Abstract** AI implementation is part of the digital transformation efforts of National Libraries. To understand what the challenges are and derive recommendations for other libraries, we researched the AI implementation. Based on 90 interviews with library and AI experts, we identified ten European National Libraries and included the Library of Congress and the British National Library in our case analysis. Here, we derive the challenges that National Libraries face when implementing AI technologies. Based on these insights, we provide recommendations for libraries that plan to also implement AI solutions in their organisations. This chapter focuses on sustainable governance structures that ensure long-term strategic alignment of funding and implementation goals, the promotion of technical independence of international providers through internal competence and upskilling efforts, and the involvement of information specialists and users to ensure adoption and acceptance of AI tools. Furthermore, we highlight the importance of collaborative and interdisciplinary approaches as well as transparency, responsible data management, and ethical AI.

**Keywords** Policy · Strategy · Artificial Intelligence · Recommendations · AI · eGovernment · Libraries · Public Sector Innovation · Digital Transformation · Cultural Heritage · Metadata Quality

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I. Mergel, C. Schmidt (eds.), *AI Innovations in Public Services*,
https://doi.org/10.1007/978-3-032-01344-6_14

# 1 Introduction

National Libraries have been engaged in the implementation of AI technologies for several years [1]. Their efforts precede the time of the publicly available tools such as OpenAI or GenAI tools and focus predominantly on cataloguing solutions that are designed to support the data collection and artefact classification efforts that have become necessary with the emergence of new forms of writing and other types of literary outputs generated in the social media age [2].

As part of the EU LibrarIN research grant, we studied the implementation efforts of AI technologies as part of the digital transformation efforts of libraries. We started our inquiry by conducting 12 initial interviews with the executive directors of international library associations. We amended these interviews with additional interviews with 19 library experts who helped us understand how libraries are digitally transforming their services for their patrons and are aligning their internal digital processes using AI technologies. From these interviews, we identified National Libraries as pioneers in the implementation of AI. The interviewees pointed us to the most innovative National Libraries that they consider as role models for other libraries. Given that they were frequently mentioned as role models by many of our interviewees, we decided to focus on National Libraries instead of research libraries or other types of public libraries. As a result, we included ten National Libraries in the EU and added the Library of Congress (USA) and the British Library (UK). Using 59 interviews with National Library staff members in charge of implementing AI. To understand their challenges, we conducted a content analysis of the interviewees' statements and derived the challenges that National Libraries face during these technological transformation processes.

In the following, we highlight the type of challenges and derive recommendations on how other (National) Libraries might address them in their implementation processes. The findings are organised along the following recommendation dimensions: (1) ethical and legal considerations; (2) human resource issues, such as skills, human-in-the-loop, staff rotation, interdisciplinary collaboration; (3) technological expertise; (4) securing long-term, reliable funding.

# 2 Challenges for the Implementation of AI in National Libraries

## *2.1 Ethical and Legal Issues*

The ethical and legal issues surrounding AI implementation that remain unresolved focus on the problems of data protection, copyright, and privacy, but also on the question of whether the AI use should be disclosed to patrons who are reusing the resulting data. Ethical considerations related to the use of AI, especially in relation to the context of language models, are pervasive. Several National Libraries

emphasised the importance of considering ethical issues in developing and training AI models, particularly those using already materials related to sensitivity to ethical issues. This also includes the importance of ensuring that AI models are trained on appropriate data to mitigate bias and ethical concerns. Furthermore, the discourse highlights the dilemma institutions face regarding whether the decision to make their high-quality content available for training AI models, given the potential ethical implications and legal restrictions.

## *2.2 Data Protection, Copyright, and Privacy*

The main challenges National Libraries are reporting focus on General Data Protection Regulation (GDPR) compliance and privacy issues.

In case archival artefacts are used for online displays or exhibitions that are based on private citizens' historical accounts, National Libraries need to resolve copyright issues as well as other technical integration and accessibility challenges with the rest of the library system. The copyright status of most records imposes limitations on the extent to which National Libraries can utilise them: "*Most of our collection, yes, is copyright protected, and there are legal, strict legal limits on what you can and cannot do with it.*" Similarly, submitted e-books (e.g., dissertations or publishers' e-books) face the challenge of the copyright law. One of the interviewees stated, "*If you're using rights-restricted material, where there's a copyright on content, can you use machine learning to feed the content into this black box of a machine, and then what will it do with the content once the modelling is done? Will it delete it? Will it store it? Will it use it for some other purpose that you didn't realise?*"

Especially in cases, where the AI-developed content will be placed on a public digital collection, copyright issues need to be resolved, as one of the interviewees highlights: "*There's a difference between just showing something works on one person's laptop, to we need to get developers in, we need to think about a public interface, we need to make sure that interface meets the accessibility standards that the library's website must have. That's a different phase of development work that necessarily also takes time. Another part of that, though, was the licensing issues to be able to show this material. Technically, they're copyrighted, the postcards, even though we're not always sure who produced them. It's not like a book where we know we have the author of this is X, Y, and Z.*"

## *2.3 Resolving Data Bias Issues of International AI Products*

On the macro level, the development of AI by big commercial companies is a challenge and even a dangerous undertaking that conflicts with national security: "*[In] the current situation is quite dangerous because the development of the best AIs is*

*basically being done by these big companies in California mostly or in China, and there's not that much transparency into what they are doing.*"

National Libraries see the need to develop their own unbiased AI tools not only to provide tools that can learn small languages but also to compensate for the bias of English language tools. One of the interviewees explained the role of National Libraries as follows: "*So, I see that the role of libraries as well as other public institutions could be to form a counterbalance against this, to try to use AI not to make money, but also for purposes that benefit society in general and also to counter bias, to try to come up with solutions to the ethical issues.*"

Therefore, libraries must constantly keep track of the AI development and direction to learn and apply AI in ways that benefit their local interests. In addition, there are challenges to using AI and handling copyright: "*We can do things in-house, usually, but giving out this material to researchers or even to companies, it's not clear if it's allowed. The laws around this are evolving, but it's a little bit of a grey area.*"

## *2.4 Disclosing AI Use to Patrons*

One challenge that National Libraries face is deciding how transparent they should be with their patrons, mostly other libraries that use their catalogued records. Specifically, there is a question of whether patrons should be made aware if a record was created using AI and whether the record should include information about the confidence level of the AI-produced record: "*It's something we have to think about, what do we want to say, do we need to say something in our record that says 'this record was created with machine learning'" do we need to say something about its confidence level?*"

Some National Libraries have adopted a radical transparency approach. As an example, the German National Library data records are recognisable as having been created by machine or created intellectually by hand. Nevertheless, the question arises as to whether uniform labelling of AI-generated outputs is necessary and feasible over time: "*Perhaps even a kind of stamp, a watermark, indicating what kind of information was generated by AI.*"—an issue that is not yet resolved.

## *2.5 Keeping the Human Factor in the Loop*

The human resource development and integration challenges focus on interdisciplinary collaboration, operational and task force development, organisational learning as part of the AI implementation process, and also on how librarians can overcome technological challenges.

## *2.6 Interdisciplinary Collaboration*

AI implementation demands the expertise of many different stakeholders in National Libraries, and it can't be implemented top down as a strategic project initiated by top management and implemented by the IT department alone. The National Libraries we interviewed for this project identified the necessary interdisciplinary in-house collaboration as one of the significant challenges in the implementation process.

Given the broad inclusion of different departments within National Libraries, one of our interviewees mentioned that "*Everyone had a different idea of what a research question is because everyone came from a different discipline.*" The relatively large list of internal and external collaborators turns out to be a management challenge that needs time to overcome. Large-scale projects, such as AI projects, need to support the effort to understand each stakeholder's disciplines and the resulting differences in methods and theoretical background: "*It's more of a collaboration issue where the time that it takes to coordinate and discuss takes away from time doing things, but it's also part of the work. I think we hadn't really anticipated—I think from the library, we knew, but I think for the researchers, they hadn't quite understood some of those compromises that would be necessary.*"

At times, the project managers overlooked that each stakeholder had essential but mundane tasks to fulfil, such as cleaning datasets and matching metadata. These laborious tasks take a lot of time. The effort was often underestimated due to the pressure on the researchers to publish papers quickly: "*So, it was not always easy to get as much attention on those boring bits when people were felt pressure because they were on this high-profile project to also be publishing papers all the time. In some ways, it was less productive for people who were looking at how many papers they could get to add to their CV because everything is slower when you're working across disciplines and when you're doing that negotiation around what's important to you.*" The different notions of experiences, task-related burdens, and research needs require that AI implementation projects need to balance out the needs of the implementers, information specialists, and the researcher reusing the research-related data.

Fostering interdisciplinary collaboration, early resource allocation, balancing speed with preparation, ensuring long-term technical support, raising staff awareness, and promoting knowledge sharing emerged as essential measures to overcome collaboration challenges. As one of the interviewees stated, "*I think there was quite a lot of difficulty in finding because it was such an interdisciplinary project or multidisciplinary project, finding things that resonated for everyone. We probably didn't spend enough time sharing and really understanding what was inspiring for each other's disciplines and what the gaps were in each other's disciplines, because things that are really established in one field might be new in another. But also, a lot of the practical work, because everyone was a researcher, even the software engineers, were publishing papers based on their work. Some of the really boring stuff isn't necessarily something that you can publish a paper on.*"

AI tools enabled a shared platform where contributions from various scholars (philologists, historians, and technologists) could be pooled to enhance the transcription and analysis process. This also demonstrates that AI can be a catalyst for cross-disciplinary cooperation.

## *2.7 Operational and Workforce Development*

Even though many National Libraries already have relatively large IT departments, implementing AI requires more developers and specialists for this emergent field of technology. In the first couple of years, the development of AI tools seemed to have emerged coincidentally. "*It wasn't planned, but it had a very positive effect on our development. The IT perspective offered new insights into methods and processes, enabling us to set a course that IT, which was too far removed from our specialist topics, could not achieve at the time.*" During the initial exploration phases of AI, National Libraries used the opportunity to gain experiences by building their own AI tools to gain the relevant experience. One interviewee stated: "*We needed this experience. We worked with an external company, learned a lot, and were able to redo everything. […] You also need the mistakes to learn from them. And the good thing for us was that we had a managing director at the time who gave us this freedom, who invested money, who invested people, who gave us the freedom to tackle the issues*."

The key competencies for excelling in AI development include motivation, a strong interest in the field, and the necessary education to understand the concepts. Furthermore, creating an AI solution is an ongoing process, as one interviewee noted: "*But little bit by little bit, the way we are working now was one year of work, trial, and error … You cannot say from the beginning, 'That's very good.' No, you have the idea, you have the tools, and then you have the planning, and then all together we came to the way where we are now today here.*"

In the future, National Libraries will need high-level IT knowledge and skills to keep up with the current speed of development. This also includes the task of staying up to date on the newest developments, having access to training and education, and intentionally recruiting highly skilled specialists with expertise in technology were intentionally recruited.

Initially, National Libraries started to use fully automated AI processes strategically. Some of these decisions are currently being reviewed to determine whether a semi-automated process would be more advantageous, at least for specific applications. One interviewee commented: "*This is all justified, but experience shows that fully automated processes do not deliver the results that we would like. That's why these feedback processes with intellectual evaluation are more important.*"

Another interviewee highlighted that their next AI project will be staffed with people who will eventually use the tools: "*The technology is there to serve humans and bring humans along the way. It's always the way to go.*" Including librarians and information specialists from day one will help to develop internal AI expertise

and competence, eventually improve AI literacy, and not rely only on external providers.

## *2.8 Learning as Part of the AI Implementation Process*

The National Libraries in our sample also highlighted that it is crucial to approach machine learning and AI projects with a fresh and unbiased perspective, recognising the value in embracing mistakes as a part of the learning process. The fresh look perspective allows for an initial naivety and impartiality to make mistakes and learn from them. Consequently, top management must foster an environment that embraces experimentation, accepts missteps to allow mistakes, and encourages innovation. It is crucial to understand and recognise that such projects are iterative processes, necessitating the establishment of effective team dynamics as well.

As an example, in one of the National Libraries, the AI project team highlighted that only over time a better understanding of what machine learning means developed: "*I didn't understand and I don't think any of us really understood what a cataloguer-assisted workflow, what that meant, what does cataloguer-assisted workflow mean. It couldn't even—the concept didn't even make sense to me.*" However, upskilling helped to gain basic knowledge about the technology and process: "*And then we had a workshop conversation with different cataloguers, with people from the company, to try to talk about what would make your life easier or how do you find cataloguing e-books, what's difficult about that, what would make it easier.*"

Another National Library emphasised the need for iterative learning through prototyping: "The focus should shift to creating a functional prototype. The prototype will serve as a proof of concept, demonstrating the potential benefits and addressing any employee concerns. It is essential to involve the staff during this phase, gathering their feedback and making necessary adjustments to align the solution with their needs and expectations. Once the prototype has been refined and thoroughly tested, the final step is to move it into production. This phase should only proceed when the AI solution works reliably and effectively. Continuous monitoring and support will be necessary to ensure smooth integration and address any issues that may arise." Prototyping can then be tested with internal or external users as early as possible to gain insights into their needs and learn from their feedback.

Similarly, National Libraries should engage staff members who will use AI tools in the future to make sure the developed solution is trustworthy and efficient, that it meets the needs of its employees and enhances the library's operations. Engaging staff throughout the process will foster a collaborative environment and increase acceptance of the new technology. Therefore, keeping staff members informed about ongoing developments is crucial to build confidence and transparency in the process.

We also encountered several instances where library staff struggle to integrate AI into their daily work due to time constraints, as one of the interviewees suggested:

"*So, it's a bit difficult between finding the time to do and willing to do it.*" *Training a model comes with several technical challenges. One such challenge is handling situations where the model is not functioning optimally and needs to be retrained automatically. However, there has been a recent development where models can automatically retrain themselves based on the data collected. Another challenge is deploying the model in different environments, such as development, test, and production environments. Microsoft is investing a lot of money in the Power Platform to address this challenge and is making significant progress in introducing new functionalities and possibilities. Finally, the budget for AI projects at the [National Library] is challenging:* "*… we don't have a lot of money, so we have to think about every Euro we spend.*"

At the same time, librarians are concerned that the AI tools might replace human workers and lead to layoffs: "But what I'm worried about is that it's seen on the upper levels/management level as something that may help reduce staff … That has, I think, been from the very beginning something that many people, in addition to myself, are afraid of, that it's been used—that it will be used in this way as an excuse to reduce staff." These fears are very real, given that information specialists are helping to train AI to conduct the jobs they have been doing for decades based on their education and experience. At the same time, some library staff have strong opinions about the low quality of the output of AI: "the quality is getting worse, and you're embarrassing yourself to the outside world. So that has been a factor because, of course, we also have a lot of mistakes in there, so the processes are not perfect, and especially in the library context, this perfectionism was and is very pronounced, which is also right and important."

However, in this phase of exploration and investment into AI development, we have not come across a case where National Libraries have replaced human workers.

## *2.9 Overcoming Technical Challenges*

Integrating AI into the organisational structure is a multifaceted task. For many traditionally trained librarians or information specialists, it remains a challenge to adjust to AI's complexities, which extends to questions about methods and implementation. One interviewee summarises this: "*Looking back, I would say that it is very important that the institution is aware that this is not a sprint, but a marathon. It's not enough to select a method and implement it. That's a bit of a suggestion because the technology is developing so quickly. The methods are only a small part of the whole.*"

Furthermore, no technical applications should be implemented solely based on their current popularity, just because they are fashionable. Instead, only technical applications that provide demonstrable added value for National Libraries will also convince librarians that their implementation is favourable. One interviewee elaborated: "*We don't need to adopt technical applications that don't add value for us. We don't have to follow every trend. However, as a National Library, we need to be*

*knowledgeable about this environment to have a say. What is effective, what can be effective, and what might be*." Ultimately, a rethinking process towards ML and AI must take place at all levels in the library, which takes time: "*People expect quick results and are not prepared for the fact that it is so time-consuming and that the result will also look different to what they were used to before*."

Implementing AI provides National Libraries with digital transformation opportunities: As an example, they might start a debate as to whether metadata in the familiar form is still needed at all. Over time, one of the National Libraries decided that metadata is still necessary but no longer needs to be created according to library rules. One interviewee described the discourse session: "*This also led to controversial positions because colleagues who are trained accordingly naturally have a completely different relationship to the library rules. And the discussion as to whether the results of the automated processes are good enough was also conducted from the point of view of whether the bibliographic rules are being adhered to. No, they are not adhered to, but the aim of the automated processes was exclusively to find and support*." As a result, one National Library increased the number of eBooks they used to train their AI system from around 20,000 to 100,000 to increase the confidence in the accuracy of the output.

Another National Library expert suggests not starting with the most technological AI solution. For example, automated subject indexing requires skills and competencies in manual subject indexing and description. For this reason, they advise that beginners or non-professionals avoid using the tool. One interviewee recommended using the tool carefully and thoughtfully to improve metadata, but urged more cautious usage: "*I think that if it would be always used in a careful and well thought out manner, then it could actually make a difference or give us better metadata. But we have to, or we should maybe be, I think, a bit more cautious than we are now.*" Furthermore, they started embracing open access, data, and software. Progress has been slow, but there has been a gradual shift towards these principles.

Technological challenges also remain because of the quality of input and the status of sophistication of the AI tools: much of the needed input is not transcribed yet. While tools might recognise print from older books or texts, errors persist due to factors like challenging handwriting, crossed-out sections, document contamination or other soiling, or translucency.

## *2.10 Information Accuracy and AI Hallucination*

As mentioned in the previous section, many National Libraries noticed that especially training large-language models requires vast volumes of data, including born-digital materials, which can be challenging: "*I think one of the most complicated things is getting the training data right. So, definitely more is better*."

Another critical task is the evaluation of information librarians receive from AI applications, as AI tools are neither complete nor always neutral. At first glance, it becomes easier as everyone can now have access to knowledge. Still, the demands

on librarians' information literacy requirements increase as the information needs to be evaluated by humans. Procedural questions focus on issues such as: Where does this information come from? How is this information labelled? Do I remember where the source was? What was the source? Is the source actually "clean"? One interviewee emphasised: "*I believe that libraries will face a debate about how we position ourselves as places where you can find reliable information and also information where it is clear how it came about*."

Identifying, for example, the title and author of an e-book through AI is a complex task due to the varying design of title pages. Each e-book has a unique typography, layout, and font size, making it difficult for the AI to differentiate between, for example, the title and author. Moreover, predicting the content of an e-book requires the machine to scan more than just the initial 50 pages to identify the most frequently used terms in the book. However, identifying words and phrases that are not part of the controlled vocabulary remains challenging, and it is uncertain whether the machine can identify them successfully. In addition, the predicted words and terms generated by the machine are not always useful nor provide any information about the e-book's content: "*Some of them are not useful, like 'it', 'one', 'she', 'this', not useful.*" As they are only machine-generated output, they cannot be corrected yet.

As many libraries are aiming to determine the accuracy of AI-generated output, one of the open questions is what level of accuracy is considered acceptable: "*I think something we're still grappling with is accuracy and still trying to figure out what's good enough, what's close, what's relevant, is relevant the same as good enough or does it have to be a 100% one-to-one match.*" Moreover, "*… it's not close enough to acceptable levels to allow it to go on without human interventions and the human in the loop has been this mantra.*" To ensure the accuracy of the output, a cataloguer is required to identify possible mistakes and correctly input the information into the record. This is closely related to the necessity of creating quality standards and policies specifically for AI. It is therefore important—not just during the AI training phase—to keep human specialists' knowledge and expertise "in the loop" to continue to monitor the quality of the automatically generated output.

## *2.11 Resource and Funding Constraints*

A remaining challenge—as is true for most publicly funded services—is the limited availability of financial resources. Some of our interviewees highlight that it remains a constant battle between personnel and material resources. Public tenders can have the potential to complicate project implementation, often resulting in significant delays in project implementation, with the growing demand for greater agility of administrative processes to facilitate better and faster, more efficient, and timely project execution.

Large language models, for example, require a substantial amount of energy and resources. One interviewee therefore suggested: "*And you should bear that in mind.*

*Or are there simpler solutions that are also efficient but don't consume these resources?*" At the same time, there is a risk of ineffective solutions connected to the fear of investing resources into solutions that may not work or could worsen existing issues: "*The biggest risk is that we're going to pay for something that doesn't work, that we're going to implement something that makes things worse. … and lose our credibility with the public and undermine people's faith in reality and truth*."

Other National Libraries have made the experience that while they might have received funds for early prototyping, they don't have enough resources to implement, launch, and maintain the resulting tools. It is therefore necessary to allocate more generous resources towards the AI projects that cover the whole development, implementation, and use cycle: "*…we should, or we should have put even more resources into it, yes. We should have invested, both in personnel and financially, as well as simply something like hardware, yes, and yes, I think that's what I would do differently.*"

## 3 AI Implementation Recommendations for Libraries

### *3.1 Implementation Recommendation 1: Technical Independence of Large Vendors*

AI systems require structured, adaptable, and extensible (meta)data management. National Libraries must avoid reliance on external AI solutions that are heavily biased towards English language programming and outputs. Libraries should therefore ensure that in-house AI capabilities are available to limit external dependencies. The applied technical infrastructure should be scalable, interoperable, and reusable to allow for the learning and processing of a country's artefacts. This will be ensured by allowing for continuous testing and improvement of AI models, provision of sandboxes, and standardisation of AI-generated content and technical solutions. At the same time, technological developments are driven by large vendors, and we recommend that libraries find a balance between technical independence and continuing the conversations with big vendors to stay on top of the development.

### *3.2 Implementation Recommendation 2: Keeping the Human in the Loop*

AI solutions are usually developed by the IT department or external vendors but need to be trusted by librarians and information specialists. Therefore, keeping them informed about the strategic and operational decisions is essential to allowing them to learn and adjust to the new circumstances. This is especially true given the

many so-called AI hallucinations or, frankly, errors, that are resulting in correct-looking but erroneous outputs. Libraries should therefore keep humans in the loop to ensure that they consider the processes and outputs as trustworthy over time.

### *3.3 Implementation Recommendation 3: Collaborative Governance*

To address cross-collaboration challenges in AI implementation projects, it is essential that library staff proactively address collaboration tasks across different departments. Moreover, training and guidance should be provided to develop, utilise, and share expertise. Knowledge acquisition should encompass technical knowledge as well as legal, conceptual, and ethical aspects. Interdisciplinary collaboration is crucial for the acceptance and adoption decisions of AI tools, and the governance structures should be aligned to allow for these digital transformation efforts. As part of the governance structures, it is necessary to create transparent decision-making processes, involve all team members early on, and share knowledge and training within and across the teams.

### *3.4 Implementation Recommendation 4: Sustainable Funding for Implementation and Maintenance*

Sustainable funding models are necessary for long-term AI acceptance and adoption. Investment needs to be made in internal AI expertise and literacy, as well as workforce development. Collaboration with external experts, e.g., public-private partnerships, can accelerate AI creation and implementation, but should not be done at the expense of internal specialists who need to know how to use AI.

Energy-efficient AI models should be considered and prioritised (carbon footprint and sustainability), and cost-benefit analyses are useful to consider all available, cheaper options.

Both factors need to be part of the funding decision for AI.

### *3.5 Implementation Recommendation 5: Consider Implementation as a Digital Transformation Opportunity*

Automation through AI tools must complement human expertise, not replace it, to avoid mistrust and rejection of AI solutions. We therefore recommend prototyping, sandboxing, incremental, and gradual implementation to reduce the risk of rejection

by clients and information specialists. Especially, the involvement of users and internal experts is key to AI adoption. Their early engagement with end-users (librarians, researchers, public users). Rethinking the current requirements and processes together with users will allow libraries to transform their existing processes and help create public value digitally.

Ethical AI use must be embedded in operations, e.g., audits can ensure AI is biassing or providing misinformation.

AI governance frameworks should be continuously reflected, revised, and updated.

## 4 AI Policy Recommendations for Libraries

### *4.1 Policy Recommendation 1: Policy Should Be Guiding Rather than Stipulating*

Most European countries in which we conducted our research have established AI policies that are complementing the EU's policies and provide country-level hints on how to deal with AI. Future policy amendments should however consider the fast-changing nature of the technology. In an environment that grows faster and innovates at higher rates than usual, it is difficult to keep up the policy framework that governs them. From our research, we recommend that national and supranational policy frameworks should support the implementation efforts by providing broad guidelines that allow for guarding heritage and national values, instead of stipulating the use and implementation approaches of AI.

### *4.2 Policy Recommendation 2: Invest in Digital Literacy of Librarians and Information Specialists*

Many of the cases we showed in this edited volume highlight the work of highly specialised IT professionals who are experimenting with different types of AI tools. However, in order to be successful in the adoption and use of the tools, the countries need additional policies and funding to increase the digital literacy of library staff across the board—and not just for IT specialists. Similar to the growth of digital literacy among their patrons, libraries need the funds to invest in the digital literacy of their employees.

### *4.3 Policy Recommendation 3: Align European (Democratic) Values with AI Development and Policymaking*

Libraries are the major guardians of national values and heritage. Policies supporting the AI implementation to preserve national heritage, therefore, need to be value-driven and aligned with human prosperity in the EU. Policies should therefore not follow a technology industry's values and logic—instead, they need to be aligned with human values deeply ingrained in the EU's public values. Many libraries will not have the resources and political influence to deal with large vendors to preserve their national values and small languages. We therefore recommend that any future national and EU policy amendments focus on value preservation.

## 5 Outlook and Possibilities for Future Research

We have shown here that Artificial intelligence has become increasingly important in recent years for the implementation of public services. This has also influenced and redefined the digital transformation of National Libraries.

On the one hand, by using AI, formerly complex procedures conducted by information specialists are automated and as a result can be faster, such as the generation of metadata, personalisation of user experiences, and enhanced discovery systems. On the other hand, the usage of AI raises ethical questions as well as challenges related to governance and operations. Based on the outcomes of the EU LibrarIN project and previous initiatives co-financed by the European Union and legislative acts as the so-called AI Act, we highlight here possibilities for future research.

### *5.1 Ideas for Future Research*

Future areas of research should focus on, first, the possibilities of how libraries can work on the alignment of the adoption of AI solutions with existing ethical and legal frameworks. For example, the new AI Act of the European Union [3] or UNESCO's Recommendation on the Ethics of Artificial Intelligence. The documents pay special attention to the ethical implications of AI systems regarding culture, education, science, information, and communication. The document aims to guide policymakers and stakeholders on how to ensure that AI is developed and used ethically [4]. Researchers in the library sciences and in public management of libraries can, for example, identify the value of these policy frameworks. Furthermore, they can help explain bias mitigation and how humans can oversee AI-driven library services, for example, by the regulation foreseen bias detection and correction mechanisms (Art. 10 AI Act).

A second research gap that we have identified is the need to evaluate the possibilities and access to information across the different demographic groups. On the one hand, there is a strong theoretical discourse on how AI and algorithms bias and create digital divides. On the other hand, there is little empirical basis for how AI affects the different kinds of library user groups. This causes the risk that the libraries unintentionally become places of algorithmic exclusion rather than inclusion. Therefore, the research question could be whether AI can reduce or increase the existing digital divides in access to library systems.

Third, the options of human-centric approaches for the development of AI-based solutions were described. The next step could be to further elaborate on which approach of participatory AI design fits most for the public services and resource constraints of libraries and how the libraries can be served as testbeds. During the different phases, the possible research might identify which kind of participatory AI design may have an impact on user trust, satisfaction, and acceptance of AI-based services. Therefore, it could be helpful to study how the different stakeholder groups, like users, librarians, and technicians, collectively develop the new AI tools in a co-design, co-creative, and inclusive way to ensure the outcomes' relevance and usability.

A fourth research topic could be how AI tools can support the digitisation and translation or contextualisation of the assets of different cultures in the environment of National Libraries, with a special focus on small languages or minority cultures. Small languages and minority cultures often contain cultural heritage with sensitive content. Therefore, it could be worthwhile to elaborate on frameworks for how AI solutions can further discover these culturally sensitive materials and make them accessible to a broader audience.

The fifth area of inquiry could focus on the sustainable usage of AI solutions. The development and maintenance of AI services can be pretty costly and resource-intensive, especially energy-consuming, as also described in the Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence [5]. Therefore, investigating how AI solutions can be developed and implemented sustainably, for example, concerning the goals of green strategies like the 2030 Agenda for Sustainable Development of the United Nations [6], could be a worthwhile area for future research.

The research on the use of AI in National Libraries revealed various challenges. These issues are, for example, related to the dependency on global players for technology and AI tools developed for specific languages like English. A common and federated approach for the development of AI solutions and AI infrastructures could ensure independence from large vendors, create flexibility, and ensure that the solution will fit the specific needs of the libraries. This could lead to developing generic, reusable, and extensible building blocks. These building blocks could be commonly sandboxed and based on shared AI models and training datasets. To ensure the long-term sustainability of the results, the GOFA (Governance–Operations–Finance–Architecture) model of the European Union [7], as well as the Once-Only Principle defined by the Single Digital Gateway Regulation [8], should be taken into account.

This would help to ensure the development of meta-standards, decentralised data governance models, and ensure their interoperability on the different levels described by the European Interoperability Framework (EIF) [9].

**Acknowledgements** The work for this chapter was supported by the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement ID 101061516.

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