Studying the Co-production of AI Implementation in National Public Libraries

Ines Mergel

Abstract AI implementation in National Libraries is a multi-actor endeavour that includes many internal as well as external contributors. The literature on the subject is, however, sparse and still developing. In this chapter, I provide the theoretical framework and the research design for the EU LibrarIN project that is built on the co-production literature in the public management field. The resulting theoretical framework of digital co-production has guided the case study selection and inquiry and set the foundation for the empirical data analysis of the 12 case studies on AI implementation in National Libraries.

Keywords Artificial intelligence (AI) · Co-production · National Libraries · Digital transformation · Stakeholder engagement

1 Introduction

The study of AI implementation in the public sector is still in its infancy. While there are first steps towards understanding how artificial intelligence (AI) approaches in their wide varieties can be adopted in publicly funded organisations, there is still little empirical evidence of their actual implementation steps [1]. The general assumption is that new technologies, such as AI, will have a positive impact on how organisations are working—be it that the general expectation is that they become more efficient and effective by replacing more costly human labour with automated processes or that AI can process data to the extent that other types of (combinations

I. Mergel (✉)
Department of Politics and Public Administration, University of Konstanz, Konstanz, Germany

Fraunhofer FOKUS, Fraunhofer Institute for Open Communication Systems, Berlin, Germany

School of Management, Public Management, University of Vaasa, Vaasa, Finland
e-mail: ines.mergel@uni-konstanz.de

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of) technologies or humans with the support of technology cannot process (see, for example, [2]).

Despite the growing interest in AI adoption across all disciplines, there is little evidence on how organisations are going about its implementation. As part of the EU LibrarIN grant, we therefore set out to understand how National Libraries implement AI. National Libraries are responsible for collecting, cataloguing, preserving, and storing the cultural heritage of their country. As part of their tasks, they collect and preserve a country's literature, publications, manuscripts, and other documents, both in digital and analogue forms. They publish national bibliographies and make the collected artefacts available to researchers and the general public.

In the big data world, this task has become especially humongous, given that the national heritage includes not only formal publications going through a publication process with the support of publishers or dissertations that are reviewed and accepted by universities and published through official agreements. The task has expanded to the digital sphere now: cultural heritage now also includes social media expressions, such as blog posts or videos, that must be preserved and passed down through generations. AI tools are therefore not only used for the existing formal published artefacts but also help National Libraries to expand the scope of their preservation work to include other digital artefacts, such as social media posts in the form of audio, text, and visual expressions.

A specific challenge emerges for National Libraries: They cannot rely on existing AI tools, mostly created in the Anglo-Saxon hemisphere—instead, they need to develop their language models so that the technologies can process the artefacts in their local languages. Given the size of the countries, this is a very expensive task because National Libraries can rarely buy AI technologies off-the-shelf, instead, they have to invest in developing local solutions in their native languages.

However, National Libraries cannot tackle this task alone—they elicit input from citizens, publishers, researchers, and authors to co-implement the AI tools to preserve their country's national heritage. Given the extent of the task, engage in so-called digital co-production processes [3, 4]—otherwise, they won't be able to create the public value they are tasked with.

In the following, I will outline the theoretical foundations of co-production, its research design that guided the data generation and analysis steps and will provide a theoretical framework for the study of AI implementation in publicly funded National Libraries.

2 Theoretical Foundation: Co-production Framework for the Study of AI Implementation

Since the beginning of the renewed AI revolution in November 2023 and its publicly available GPTs, AI has also caught the attention of many researchers interested in how new technologies are applied in publicly funded organisations. However, most

of the literature so far focuses on challenges and barriers, such as algorithmic governance [5], ethical aspects [6], or legal requirements to protect individual knowledge, copyright, privacy, etc. [7].

What has been neglected or not yet reported in the literature is the way that publicly funded organisations are implementing AI in their organisations, what the necessary steps are, and how they engage different actors (external or internal) to support these processes [1]. The reasons might be that researchers can't get access to these otherwise black boxes of decision-making that are made in-house or the still rather experimental nature of most of the AI projects that go beyond the installation of chatbots that are mostly operating based on an existing thesaurus but are not able to learn and expand their interaction base.

To study the implementation of AI, we selected a specific theoretical lens: the co-production of digital public services. So far, co-production—the process of engaging different types of stakeholders in the process steps of creating and then delivering a public service for their recipients—has been predominantly studied in the context of the delivery of social services [8–10]. Citizens or service recipients are seen as co-producers of the service when they, for example, recycle their trash into the right trash bins and bring them to the curb on pick-up day. The service in the designed form cannot be performed without the explicit actions of citizens who are willing or are forced by law to separate their trash into recyclable plastic packaging, glass, paper, or biodegradable trash.

More recently, the notion of co-production has been expanded beyond this value-in-use phase (the phase where citizens actually separate and carry out the trash). Strokosch and Osborne [11] proposed that there is a vast ecosystem of experiences necessary which creates opportunities for different types of actors to be involved. Similarly, Osborne et al. [12] urged their readers to move beyond co-production steps to include also co-value production phase and consider co-value production.

Other authors have started to emphasise the role of digital co-production, but specifically look at the types of technologies that can be used to support co-production processes [4, 13, 14], not the co-production of digital public services. Here, however, we are interested in understanding how a new technology (AI) is implemented and how the National Libraries are engaging in co-production steps to include different types of stakeholders along the way.

Therefore, the inquiries described in the following case studies focus on the co-production steps outlined in Mergel et al. [3], who separate the overall process of co-producing digital public services into the following four steps and six phases (Table 1):

2.1 Initiation

The initiation phase includes two co-production phases: *(1) The co-commissioning phase*, in which the initiation of an AI project is started. An AI project can either be initiated by in-house units who are interested in innovating with AI, such as the

Table 1 Implementation phases and co-production phases

Implementation phases	Co-production phases
I. Initiation	*(1) Co-commissioning phase* *(2) Co-design phase*
II. Implementation	*(3) Co-implementation*
III. Use	*(4) Co-delivery phase* *(5) Co-assessment phase*
IV. Outcome	*(6) Public value creation*

Chief Information Officer or the Chief Innovation Officer. Or, it might also be triggered by external funding opportunities or pressure from society to upgrade to new technologies. In this phase, the overall outcome is decided, the necessary budget is defined, and potentially, the necessary competencies are decided. In this phase, a lot of co-envisioning of a future with AI is conducted to understand where the project might go. *The co-design phase (2)*, as part of the initiation, is focused on involving potential service users in the first round of design of new services. A lot of responsibility is given to current and future users to envision what they might be interested in doing in co-creative processes with AI.

2.2 Implementation

The implementation phase focuses on *(3) the co-implementation* of AI services. This is the phase where, oftentimes, National Libraries have to either reach out to their already established IT service providers to support their implementation efforts. Others might have to involve other libraries that are willing to share established IT solutions and make them available also for use in other languages. In this phase it is also important to work across organisational silos to include the IT department—in case the AI project was initiated outside, for example, in an innovation office. They must also include the legal department, information specialists for testing, and factual knowledge of the previous analogue processes.

2.3 Use

The use phase includes the *(4) co-delivery* phase, which can be labelled the value-in-use phase: The phase in which users start to use the AI tools, and the hope is that it supports them in their interactions with the National Libraries. This is the phase in which both service users and internal information specialists use the newly developed AI tools by contributing their knowledge, input, and the way that they use the outputs. Think, for example, about a PhD student who uploads their dissertation, the

AI tools automatically suggest how to catalogue the entry, and an information specialist approves the output to prevent any hallucinations or faulty entries.

The use phase also includes the *(5) co-assessment* phase, which helps to create feedback during the use of a new digital service while users are engaging with it. This can be simple frequencies of use and the reduction of analogue services as an indicator of the usefulness of a new digital service. It can also be feedback on the quality of the service, for example, is the output mostly faulty, and information specialists need to intervene manually. The assessment results can be iteratively fed back and incorporated into the design to improve the outcomes.

2.4 Outcome

The outcome of the co-production phases can be seen in two dimensions. (*6) Public value creation* can either happen in each of the phases by including the right stakeholders to support the digital transformation of digital public services with AI, or, it can be evaluated at the end of the co-production phases in terms of increased efficiency and effectiveness, or as an increased range and quality of service delivery—which both might lead to greater acceptance and support for the tools and processes.

In summary, the overall theoretical framework derived from the above-described theoretical phases of co-production is displayed in Fig. 1:

3 Research Design

The research design to understand how National Libraries are co-producing AI implementation and how they generate public value is based on the theoretical framework (Fig. 1). It is guiding the data generation for the EU LibrarIN research project.

The research design includes three phases: (1) systematic review and computational analysis of the existing literature on digital public library services, (2) expert interviews with the directors of the international library associations, and (3)

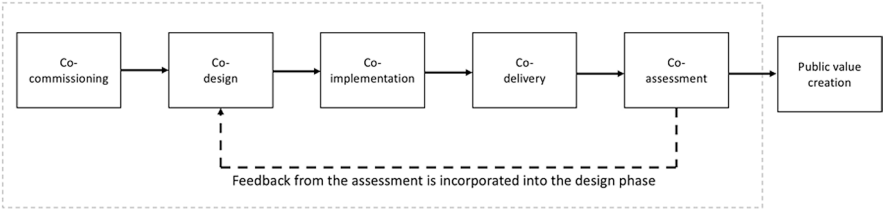

Fig. 1 Co-production framework for the implementation of AI based on Mergel 2025 et al. [3]

country-level case studies to understand the implementation of AI in National Libraries.

With the knowledge of the literature, we identified the most important international library associations and conducted expert interviews with their executive directors to derive the most pressing issues when it comes to current societal challenges that libraries are facing, as well as the digital transformation issues that are currently being discussed. The interviews then led to the identification of issues and cases, which we present here in this book. The executive directors identified the implementation of AI as the most pressing issue. However, they also highlighted that the adoption and implementation should be studied in National Libraries where funding and the necessary expertise are available.

With the help of the experts, we then identified National Libraries that are at the forefront of AI implementation. In each of the cases, we asked a series of questions that were derived from the theoretical framework on co-value creation and the general literature on digital transformation of public services. As we followed along, we noticed that many of the EU-based National Libraries pointed us to two other National Libraries outside of the EU, which they frequently look at as best practice cases. We therefore also included the British National Library (UK) and the Library of Congress (USA).

4 Overview of the Book

The main part of the book (Chapters "Automated Subject Cataloguing at the German National Library, Germany" to "Exploring Computational Descriptions for Meta-Data Creation for E-Books at the Library of Congress, United States of America") consists of 12 case studies of National Libraries describing their AI implementation processes and outcomes. The European Union's National Libraries featured here include:

- Koninklijke Bibliotheek van België, BE
- Deutsche Nationalbibliothek, DE
- Det Kongelige Bibliotek, DK
- Eesti Rahvusraamatukogu, EE
- Biblioteca Nacional de España, ES
- Kansalliskirjasto, FI
- Bibliothèque nationale de France, FR
- Koninklijke Bibliotheek, NL
- Nasjonalbiblioteket, NO
- Kungliga biblioteket, SE

In addition, we included

- British Library (UK) and
- The Library of Congress (US)

because they were frequently mentioned by the interviewees during our data generation phases.

The closing part of the book (Chapter "Recommendations for the AI Implementation in Libraries") provides an overview of the implementation challenges that National Libraries are encountering when they are implementing AI in their countries, authored by Mergel et al. The authors then highlight policy and implementation recommendations for libraries that are embarking on the journey to implement AI tools in their own libraries.

In addition, Willems et al. provide an outlook of a case databank in which the EU LibrarIN consortium has collected their cases of libraries that are engaging in the co-value production activities (Chapter "Innovating Libraries: The LibrarIN Toolkit for Policy and Practice").

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References

1. I. Mergel et al., Implementing AI in the public sector. Public Manag. Rev., 1–14 (2024)
2. S.N. Giest, B. Klievink, More than a digital system: how AI is changing the role of bureaucrats in different organizational contexts. Public Manag. Rev. **26**(2), 379–398 (2024)
3. I. Mergel, N. Edelmann, N. Haug, Co-production phases in the development and implementation of digital public services. Perspect. Public Manag. Govern. **8**, 93 (2025)
4. S. Perikangas, S. Tuurnas, Design for inclusive digital co-production. Public Manag. Rev. **26**(6), 1731–1751 (2024)
5. A. Meijer, L. Lorenz, M. Wessels, Algorithmization of bureaucratic organizations: using a practice lens to study how context shapes predictive policing systems. Public Adm. Rev. **81**(5), 837–846 (2021)
6. P. Henman, Improving public services using artificial intelligence: possibilities, pitfalls, governance. Asia Pac. J. Public Adm. **42**(4), 209–221 (2020)
7. J. Willems et al., AI-driven public services and the privacy paradox: do citizens really care about their privacy? Public Manag. Rev. **25**(11), 2116–2134 (2023)
8. T. Brandsen, M. Honingh, Definitions of co-production and co-creation, in *Co-production and Co-creation*, (Routledge, 2018), pp. 9–17
9. S.S. Flemig, S. Osborne, The dynamics of co-production in the context of social care personalisation: testing theory and practice in a Scottish context. J. Soc. Policy **48**(4), 671–697 (2019)
10. W.H. Voorberg, V.J. Bekkers, L.G. Tummers, A systematic review of co-creation and co-production: embarking on the social innovation journey. Public Manag. Rev. **17**(9), 1333–1357 (2015)
11. K. Strokosch, S.P. Osborne, Co-experience, co-production and co-governance: an ecosystem approach to the analysis of value creation. Policy Polit. **48**(3), 425–442 (2020)
12. S.P. Osborne, G. Nasi, M. Powell, Beyond co-production: value creation and public services. Public Adm. **99**(4), 641–657 (2021)
13. K.K. Larsson, T. Skjølsvik, Making sense of the digital co-production of welfare services: using digital technology to simplify or tailor the co-production of services. Public Manag. Rev. **25**(6), 1169–1186 (2023)
14. V. Lember, B. Taco, P. Tõnurist, The potential impacts of digital technologies on co-production and co-creation. Public Manag. Rev. **21**(11), 1665–1686 (2019)

Ines Mergel is a University Professor of Public Administration in the Department of Politics and Public Administration at the University of Konstanz and a Fellow of the National Academy of Public Administration (Class of 2018). After holding positions at the Harvard Kennedy School of Government as a Doctoral Fellow and Postdoctoral Fellow (2002–2008), Professor Mergel was awarded tenure at the Maxwell School of Citizenship and Public Affairs (Syracuse University, NY) in 2014 (2008–2014) and then served as Associate Professor with tenure (2014–2016). Professor Mergel is a member of the supervisory board of the e-Governance Academy (Estonia). Other board memberships can be found here. Professor Mergel is a founding member of the international initiative Teaching Public Service in the Digital Age, which aims to integrate digital skills into the teaching and training of public managers. As part of this initiative, Professor Mergel was appointed a Schmidt Futures Innovation Fellow in 2022.