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D2.3 Conceptual framework and model of participatory management and sustainable growth v3.0

Validation and refinement of the integrated conceptual framework

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Contributor(s)	Rubalcaba L., Windrum P., Solano E., Fuglsang, L., Arundel, A., Es-Sadki N., Mergel I., Schmidt C., Gallouj F., Desmarchelier B., Tuominen T., Hyytinen K. Schartinger D., Triantafillou A., Pronk M, Peralta A., Gago D., Moscoso, F., Gupta V., Willems, M.
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Executive Summary

This deliverable (D2.3) presents the validation and refinement of the conceptual framework developed in Work Package (WP2) of the LibrarIN project. The central objective of the WP2 is to develop a robust, multi-actor and multidimensional framework to understand and guide innovation and co-creation processes in public and academic libraries across Europe. Building on the inputs obtained from D2.1 and the framework itself (D2.2), **this deliverable ensures that the framework is not only firmly grounded from a theoretical perspective but it also aligned with the empirical evidence found by LibrarIN project** (though case studies, international survey and use cases). Thus, the framework proposed is useful for understanding digital transformation, social innovation and living labs in libraries, and also for developing strategies and policy recommendations to foster co-creation in libraries and promote innovation in different types of libraries (national, public or academic)

This deliverable has two specific objectives. First, it seeks to validate the conceptual framework based on the evidence generated by all WPs of the project, including case studies by thematic, measurement tools, policy briefs, stakeholders inputs and recommendations and use cases. Second, it aims to refine the framework based on new evidence found by the whole research project. In this way, this D2.3 contributes to the general objective of LibrarIN, that is to understand and reimagine libraries as a driver of sustainable innovation and a European sense of belonging through a continuous engagement with society, citizens and economic sectors.

The validation process was structured around two complementary levels of analysis: dimensions and research questions. Three dimensions were defined as central to the framework. The *What/What for* dimension captures both the characteristics of innovations and the purposes they pursue. The *Who* dimension highlights the plurality of actors involved in innovation and co-creation, recognising that outcomes depend on the competences and motivations that each of them brings. The *How* dimension focuses on the processes through which innovations are developed, implemented, and sustained, emphasising collaboration, experimentation, and iterative learning. In parallel, four guiding research questions were articulated to operationalise these dimensions. RQ1 asks what kinds of innovations libraries are undertaking, while RQ2 investigates for what purposes these innovations are pursued. RQ3 examines who participates in these processes, identifying the diversity of stakeholders and their roles. RQ4 addresses how innovations are developed, exploring the mechanisms, practices, and methodologies through which co-creation occurs. The three dimensions and four research questions provide a coherent structure for validation. The dimensions set the conceptual boundaries of what must be observed, while the research questions translate them into operational terms that can be systematically addressed. This dual structure ensures that the framework is consider the nature of innovations, the actors who drive them, and the processes through which they are developed.

The methodology for validation and refinement followed a multi-level approach, as stipulated in the original LibrarIN proposal. These levels were divided in an internal stage and an external stage. Internal validation was achieved, in a first level, through the integration of evidence produced in WP3



(thematic innovations in digital transformation, social innovation, and living labs), WP4 (measurement, monitoring, and surveys). In a second level, internal validation was made also with inputs coming from LIBER, in order to ensure that the multi-agent frameworks elements are present in strategies by relevant international libraries associations. External validation was supported, on the one hand, on collaborations, work sessions, meetings and events with stakeholders panels that provided inputs to the framework, on the other hand, on policy briefs, external agents inputs, use cases and dissemination events, in which the framework was confronted with the perspectives of policymakers, professionals, and European library associations (WP5 and WP6). The findings show that the conceptual framework is valid and relevant for capturing the diversity of innovation in libraries. WP3 confirmed that digital transformation, social innovation and living labs in libraries go beyond technology and traditional use of libraries, involving organizational, cultural, social change and a new self-conception of libraries. WP4 demonstrated that the dimensions of the framework can be implemented in survey instruments, validating its empirical applicability while identifying areas requiring further methodological development. WP5 evidenced, through real-life use cases, how libraries mobilise different actors and competences to co-create public value. WP6 and the three policy briefs validated the framework externally, showing its alignment with stakeholder expectations and its usefulness for policy dialogue. Taken together, the four research questions were systematically addressed: innovation characteristics, drivers and barriers, actor interactions, and value creation.

D2.3 includes short illustrations-boxes from LibrarIN case studies that capture the fundamental dimensions of the multi-agent conceptual framework: characteristics, preferences, competences and ecosystems. In terms of new services or characteristics, the illustrations show a remarkable diversity around the co-creation spaces, from sustainability spaces such as World Space in Aarhus (Box 1), to digital labs and makerspaces such as those in Oodi Marketspace (Box 2) or the Living Lab Digital Humanities in Utrecht where librarians and academics collaboratively develop hybrid spaces for digital literacy, research and other educative services (Box 13). These initiatives illustrate how European libraries are expanding their traditional role to become living labs environments for open innovation, experiential learning knowledge production and network enablers. In other cases, such as the Retrotool of the National Library of the Netherlands (Box 8) or the Automatic Indexing system in Estonia (Box 9), innovation takes a technological form, oriented towards efficiency, heritage preservation and digital sovereignty. Many innovations also happened in the social innovation area. Examples include the French in RepairCafé @Vélizy at the Paris Region (Box 10), on small electric and electronic appliances to get them repaired by volunteers and was setup by a network of partners, and the Spanish Purchena city hall 'Human Library' (Spain) where migrant youth shared their life experiences through dialogue, fostering empathy and mutual understanding. Together, the thirteen cases empirically validate the conceptual framework, demonstrating that innovation in libraries is built at the intersection between service, process, and public value.

Panel stakeholders meetings in WP5 have also validated the framework indicating relevant managerial implications like these ones: i) the WP2 framework is important to provide scientific rationale for policy adoption and the need to justify innovation in libraries beyond purely technological change; co-creations opens managerial and policy implications from moving from "collections to



connections” as new functional definition of libraries ii) innovation and co-creation should not be understood as a uniform or prescriptive process but as a phenomenon that takes different paths and styles, sometimes even coexisting within a single library; iii) co-creations as something good per se cannot be taken into account, the risk of false or superficial co-creation processes is there so stressing that genuine co-creation must acknowledge and manage tensions among stakeholders rather than attempting to eliminate them.

As results of different validation exercises, some refinement was made by adding library dimensions to study innovative libraries. Innovation in libraries encompasses a very broad set of activities that can involve different types of services (educational, health, financial, social, among others) that can also be co-created in different ways (with users as the main designers of the service, with library managers as the main responsible, with strategic alliances, among other methodologies). Thus, understanding all these processes requires the definition and analysis of a set of core dimensions. The dimensions proposed were based on the one hand on inputs from WP3, which proposed that libraries, as physical spaces, undergo a conceptual transformation that enable them to deliver three interconnected types of services: 'space-place services,' 'processional learning services' and 'democratic engagement services'. On the other hand, these inputs were considered when analysing the surveys carried out by WP4 and the following was proposed:

- Degree of organizational autonomy – Ranges from highly independent libraries with significant decision-making authority to small local branches whose strategies and services are determined externally.
- Conception of the library's core role – Spans from an emphasis on education and learning (e.g., collections, digital education services) to an understanding of the library primarily as a community hub or agora.
- Type of user engagement in service development – Varies from services mainly designed and delivered by professional staff to models where users take an active and leading role in co-design and delivery.
- Staff skills and resources – Extends from strong capacities in open innovation and cross-organizational collaboration to a more traditional profile where competences are concentrated in core librarianship.
- Professional orientation towards innovation – Encompasses staff attitudes supportive of experimentation and change on one end, and resistance to innovation and preference for established practices on the other.
- Focus of value creation – Ranges from addressing complex societal challenges (e.g., inclusion, sustainability) to enhancing cultural enrichment and individual user experiences.

From the WP2 work, policy recommendations can also be drawn. Libraries should conceive innovation not as isolated technological improvements but as co-creation processes embedded in collaborative service innovation multiagent ecosystems. Policymakers should recognize the dual



value generated by libraries—for both individual users and society—and support policy actions that promote those two levels. There is a need to continue refining evaluation tools and surveys to more accurately measure both outcomes and user competences. Policy implications from WP2 are covered by two policy briefs published inside the LibrarIN web page. Four major policy areas are included and developed: policies for co-creation of new or improved services, co-creation of new policies towards libraries, library policy integration in existing innovation policy areas, and specific thematic policies in particular topics such as digital transformation, living labs and networks for social innovation.

From this validation and refinement exercise there are some lessons learned that can be taken:

- **Library professionals have their own language to refer to innovations.** Literature reviews made by all WPs of LibrarIN project showed that libraries use a specific and practice-oriented vocabulary when describing or referring to new or improved library services, often different to the language used by scholars. This is a very important issue to consider when making research in the field of innovations in libraries
- **There is still considerable work to be done in order to integrate the research field of innovation studies within the research field of library and information science.** Although libraries have long been recognised as institutions that adapt and transform in response to societal and technological change, innovation has rarely been studied as a systematic phenomenon within library research. The conceptual framework developed in LibrarIN demonstrates that theories and methods from public sector innovation, service-dominant logic, and co-creation studies can substantially enrich library science, providing analytical tools to understand how libraries create value collaboratively
- **Stakeholder participation is crucial for innovation and co-creation in libraries theory and practice.** Both theoretical and empirical evidence and findings by LibrarIN project confirm that innovation in libraries should be designed and implemented following a multi-agent approach, and this stakeholders participation is also useful.

In sum, this deliverable consolidates the theoretical and empirical achievements of WP2 by presenting a conceptual framework that is validated, refined, and ready to guide both research and practice. It offers foundational inputs for LibrarIN's contribution to understanding innovation in libraries, serving to actionable recommendations for researchers, professionals, and policymakers seeking to reimagine the role of libraries in democratic societies.

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List of Terms and Abbreviations

Abbreviation	Definition
AI	Artificial Intelligence
GA	Grant Agreement
PSL	Public Service Logic
RQ	Research Questions
SDL	Service Dominant Logic
WP	Working Package

1 Introduction

1.1 Purpose and Scope

The main objective of WP2 is the realization of an integrated conceptual framework to understand the process of value co-creation in public libraries service delivery. This framework has been developed and defined in task 2.2. Based on reviews of the existing scientific literature (LibrarIN 2023), a Lancasterian and Service Dominant Logic approach (Vargo and Lusch 2016, Osborne 2016) was used to generate a new multi-agent conceptual framework that considers all the contingencies of co-creation of value in library services. Likewise, task 2.2 defined a typology of innovative services offered by libraries, which offers a broad and integrative theoretical-analytical framework when carrying out empirical research in the field of libraries. The multi-agent framework of task 2.2 includes a main theoretical model that aims to analyse and understand specific particularities in innovation and co-creation in libraries. Figure 1 presents the relationships between tasks and deliverables in WP2

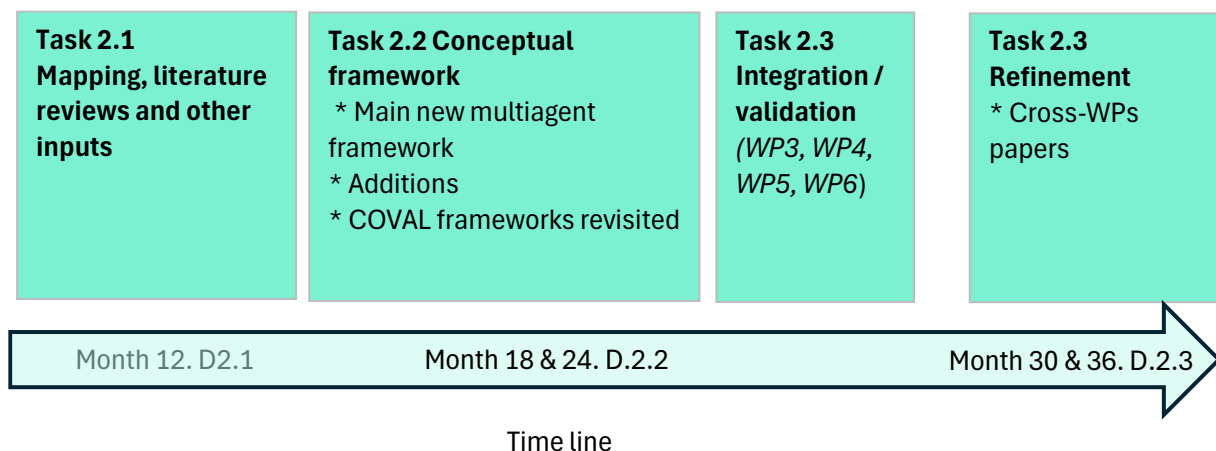


Figure 1: Relationship between Task and Deliverables in WP2

The LibrarIN project has proposed task 2.3, which consists of the validation and refinement of this multi-agent conceptual framework. Validation refers to the process of contrasting the theoretical framework with different sources of evidence – both internal to the consortium and external through stakeholders and use cases – in order to check its coherence, relevance and applicability in real contexts (Calciolari et al 2022). Refinement involves adjusting, correcting, nuanced, or expanding the framework based on the results of the validation, incorporating empirical and theoretical feedback so that the final model is more robust, operational, and sensitive to the heterogeneous dynamics of innovation and co-creation in libraries (Agbali et al 2019).



1.2 Approach for Work Package and Relation to other Work Packages and Deliverables

In order to guarantee the validation and refinement of the multi-agent conceptual framework, the work carried out by WP2 is based literature reviews and theoretical developments and on the empirical findings of the other work packages of the project, as well as the fulfilment of all the objectives set by LibrarIN. Likewise, the findings of other work packages have demonstrated the relevance of the multi-agent framework proposed for the study of innovation in libraries.

- WP3 (Digital Transformation, Social Innovation and Living Labs): The evidence generated in WP3 offers essential thematic and empirical inputs on how libraries innovate through digital tools, new organisational networks models and participatory experiences. The WP3 findings validate the main dimensions of the conceptual framework proposed in WP2. These results allow us to contrast the conceptual framework with concrete cases studies of innovation and co-creation.
- WP4 (Measurement, monitoring and design of surveys): WP4 provides methodological and empirical tools that strengthen the validation process. Questionnaire design, cognitive tests, and innovation indicators provide robust mechanisms for validating and understanding the applicability and operational value of the conceptual framework.
- WP5 (Stake holders and use cases): WP5 ensures that the findings made by WP2 are useful when studying practical and concrete cases of innovation in libraries, the use cases of this Work Package as well as the What Works database are an example of this.
- WP6 (Communication and policy briefs): WP6 ensures that the validation process incorporates diverse external perspectives, including the stakeholder panel and broader communities of practice. Thus, the collaboration activities, co-creation sessions and feedback obtained through the work carried out with stakeholders panel and external actor has provided valuable inputs for the multi-agent framework refinement. The Policy Briefs made by this WP6 has use insights from WP2 to make strategies for innovation in libraries for both policy makers and managers. These policy briefs show how key dimensions of the conceptual framework are operationalized to develop concrete strategies for library innovation. These interrelationships between stakeholders generate a co-produce work that reinforce the central role of Task 2.3 as a point of convergence within the project, as it allows the multi-agent conceptual framework to be tested internally and externally, adjusted based on evidence and consolidated as a common reference for researchers, practitioners and policymakers in the field of library innovation.

Figure 2 illustrates the relation of WP2 with the other WPs of LibrarIN Project. It shows how the conceptual framework provided analytical tools for the tasks of all LibrarIN WPs. Likewise, the findings

and inputs by WP3, 4, 5 and 6 are the main element for doing task 2.3 since they are crucial to validate the main dimensions and propositions of the multi-agent conceptual framework and, at the same time, provide theoretical and practical foundations for the refinement.

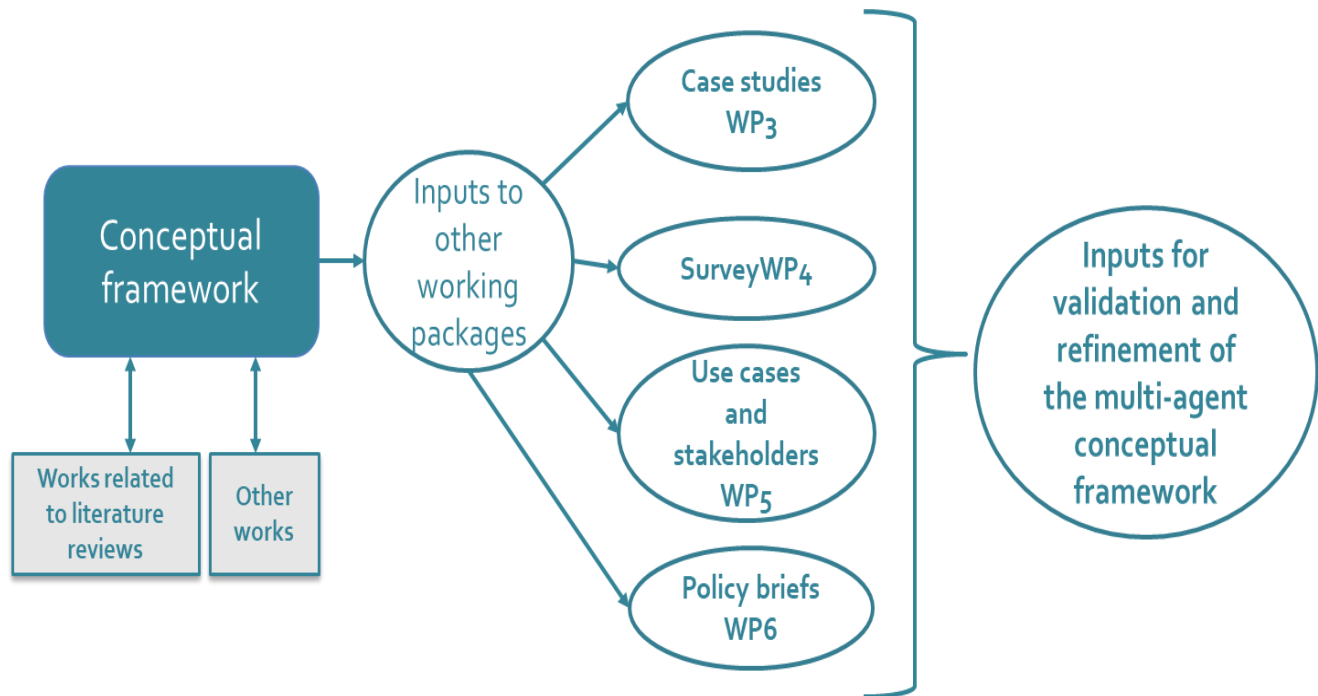


Figure 2: Work Package 2 and Relation to other Work Packages

1.3 Methodology and Structure of the Deliverable

As proposed in Task 2.3. Validations will take place at different stages that considers all the members, collaborators, outcomes and findings of the project. The first, is the internal stage, that considers two levels: a first level will take place with interactions with other WPs and views and approaches from the work of other WPs. Second, we will consider some LIBER documents and strategies to validate the framework. The second stage is the external one, that considers another two levels; a level that will take place with the stakeholders' panel and other stakeholders participating in the project, and finally, validation will also happen at the 25 use cases promoted by LibrarIN. In addition, boxes have been produced in which a series of case studies are analyzed that illustrate the fundamental dimensions of the conceptual framework and, therefore, validate it. In order to make an effective validation, this process was based on the main dimensions of the conceptual framework: the What/What for dimension, which studies and analyses innovation itself, focusing on its particularities and the services it offers. The Who dimension, that focus in the heterogeneity of stakeholders that participate in library innovation process (users, managerial staff, non-managerial staff, public sector, third sector. And the How dimension, that give attention on the processes and methodologies through which innovations



are developed, emphasising collaboration as a central strategy in libraries. This methodology is fully explained in chapter 3.

The refinement made in Task 2.3 had the fundamental objective of adding elements that allow a deeper analysis of libraries as an ideal arena for effective collaboration between different stakeholders. To this end, a review was conducted of the different types of innovation and innovative services offered by libraries, and a series of dimensions were proposed to better understand each individual library and its propensity for innovative activities. These dimensions were added to the framework.

In terms of its structure, this deliverable starts with a recap of the multi-agent conceptual framework, highlighting its main elements and theoretical propositions, in this section we also show the main publications related to the framework. The next section explains the methodology and the analytical tools for making the validation process and how the framework was validated by all LibrarIN WPs and also by external actors. Following the refinements for the conceptual framework are explained and presented. Finally, the conclusions and lessons learned are synthesized and recommendations are formulated.

2 Conceptual framework (by Windrum et al. 2023) recap

The conceptual framework developed in Task 2.2 represents the main theoretical and conceptual contribution of the LibrarIN project. It is built on Windrum and García-Goñi (2008) neo-Schumpeterian model of health services innovation and integrates complementary theoretical perspectives on co-creation (Vargo and Lusch 2004, 2008, Osborne 2018, Osborne et al 2022) with insights from consumer theory (Lancaster 1966) to explain the generation of innovative services in libraries, understood as complex public service institutions (see figure 2). Rather than presenting innovation as a linear or technology-driven process, the framework emphasizes the multi-agent interaction between service characteristics, providers, users, resources, practices, and broader contextual conditions.

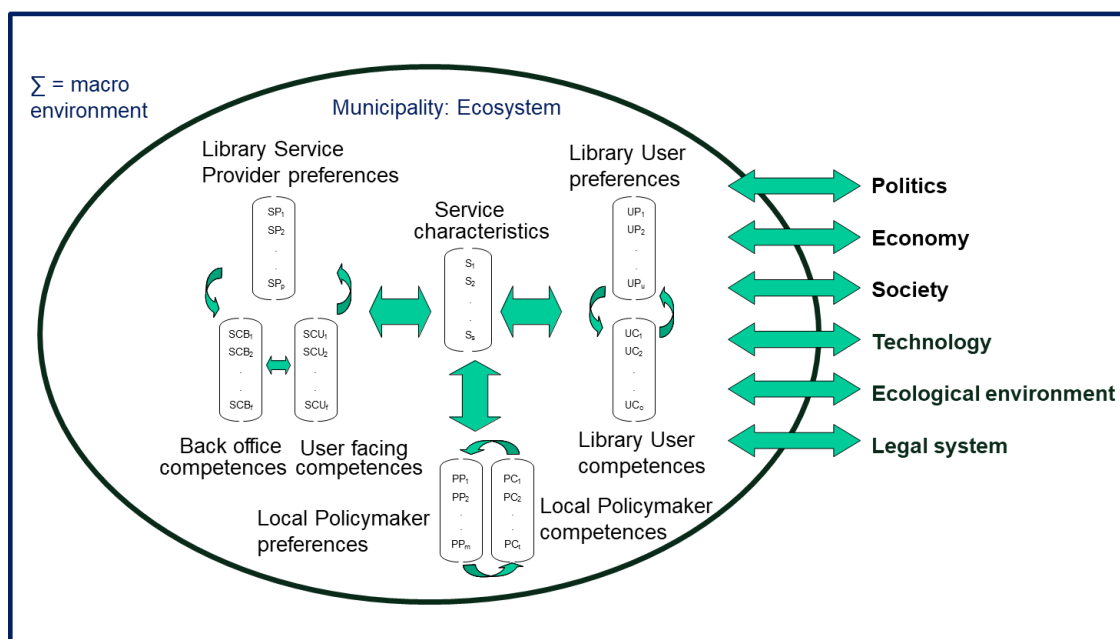


Figure 3: Multi-agent conceptual framework of value cocreation in libraries
D2.2. Windrum et al (2023)

Deliverable D2.3 takes this foundation as a starting point and focuses on validating and refining its main assumptions, components, and analytical categories. The main components of this multi-agent framework are:

2.1 Service-dominant and public service logic

"The LibrarIN research proposal for WP2.2 is to develop and operationalise the SDL and PSL approaches to value creation by integrating this within a multi-agent framework" (LibrarIN 2023 p. 19). While both SDL and PSL conceptualize value as experiential and subjectively constructed by individuals within a social setting, the public service perspective introduces a further dimension. In public services, value creation is shaped not only by personal perceptions but also by politically mediated, collectively defined preferences (Alford, 2016). From a public value standpoint, value



represents “a set of values expressing the perceived relationship quality between an individual and a social entity (group, community, nation)” (Meynhardt, 2009, p. 215). Consequently, PSL—and more broadly the public administration literature—underlines the importance of capturing the collective dimensions of value creation when applying a service logic approach (Alford, 2016; Osborne et al., 2022; Trischler et al., 2023). By articulating these two perspectives, the multi-agent framework situates libraries as service institutions that not only provide individual benefits (access to knowledge, skills, and cultural experiences), but also generate collective goods such as social inclusion, trust, and civic participation. The challenge – and thus one of the focuses of validation and refinement – is to determine whether this dual orientation adequately reflects the reality of libraries and, if so, to adjust the framework to better capture the tensions between private and public value creation.

In this sense, the SDL–PSL integration provides a conceptual bridge: it recognises users not only as consumers of services but as active participants in value co-creation, while at the same time acknowledging the institutional and political responsibilities that libraries assume as public service providers. In this sense, the preferences and competencies of users and providers play a central role in the characteristics of the services offered by libraries, which in turn directly influence the value (both individual and social) that these organizations create.

2.2 Innovation as a social and co-creative process made in a service ecosystem

According to the LibrarIN Proposal, the multi-agent framework “to place the role of social innovation and innovation networks in the transformation of public libraries, by building an analytical bridge between social innovation approaches and innovation in libraries services” (LibrarIN 2022 p. 10). The provision of services in libraries arises from interactions in a service ecosystem in which different actors experiment, adapt and generate new practices and services in response to the needs of the community. The service ecosystem is a means by which one can begin to identify the contingencies of value cocreation in relation to a specific set of key actors or stakeholders (e.g. users, citizens, public service organisations, politicians) who are directly involved in service development; and their relationships (whether cooperative or competing) (Adner 2017).

Thus, innovation is something dependent on the daily practices of the context, rather than being reduced to a purely technological or managerial intervention. Validation is necessary to check whether this conceptualization happens in the empirical cases analyzed in Europe, while refinement may involve the integration of new dimensions such as digital transformation, transitions towards sustainability and inclusive participation mechanisms. In this sense, the framework must remain open to adjustments that keep it aligned with the evolution of real practices.

The service ecosystem approach situates innovation as a non-linear and emergent process, where outcomes are co-produced through the dynamic alignment of resources, competences, and interests. It highlights that value is not delivered by providers to passive users, but rather co-created through ongoing interactions within a network of stakeholders.



2.3 Multi-agent model

The multi-agent approach constitutes a central component of the conceptual framework developed in LibrarIN, and finds its theoretical foundation in the multi-agent approach proposed by Windrum and García-Goñi (2008) to analyze innovation in health services. From this perspective, the generation of innovations cannot be attributed solely to the action of an individual agent, but emerges from the interaction between multiple actors that contribute diverse resources, capacities and motivations. Applied to the field of libraries, this model recognizes that innovation transcends the work of library staff and involves a network of users, policy makers, technology providers, civil society organizations and private actors. Each of them introduces specific competencies and differentiated perspectives, and it is precisely their interaction that shapes the processes of co-creation and innovation. However, the model needs to be empirically validated to assess how power relations, coordination mechanisms, and dynamics of collaboration or conflict between actors manifest themselves in practice. Likewise, the refinement process will allow the conceptual framework to be adjusted based on the evidence collected in the living labs, in the public-private networks and in the stakeholder engagement activities developed by the project, ensuring that it adequately represents the real practices of innovation in libraries.

The multi-agent model makes it possible to analyse libraries as complex systems of interdependence, where innovation results from both formal collaborations and informal exchanges between actors. Rather than privileging a single source of novelty—such as technology or managerial reform—the model acknowledges that users may generate ideas, policymakers may set enabling conditions, and providers may adapt organisational routines, all of which converge in shaping new services. It also draws attention to the potential tensions inherent in these interactions: asymmetries of power, conflicting goals, or uneven access to resources can significantly affect the trajectory of innovation. This analytical lens thus not only foregrounds collaboration but also opens space for studying contestation, negotiation, and adaptation as integral to co-creation. In the context of libraries, the model positions them as nodal points in broader ecosystems where multiple logics intersect, reinforcing the need for an empirical validation that can capture the dynamics of cooperation, conflict, and compromise among diverse stakeholders.

2.4 Libraries as ecosystems embedded in PESTEL factors

The framework places libraries within PESTEL ecosystems shaped by the following factors: Politics, Economy, Society, Technology, Ecological environment, and the Legal system (LibrarIN 2023). These external determinants influence both the opportunities and constraints for innovation. For example, policy priorities can create supportive or restrictive policy environments; economic pressures can limit resources while driving efficiency-oriented innovations; and technological advances reconfigure the forms of access and interaction. Validation is necessary to assess which PESTEL dimensions exert the greatest influence in different contexts, while refinement must specify how libraries can strategically



adapt to these factors. Thus, the framework must remain flexible and sensitive to transnational variations in the European space.

The PESTEL perspective highlights that libraries are never isolated innovation arenas, but are deeply embedded in broader structural and contextual conditions. Political agendas may prioritise inclusion, digitalisation, or austerity, shaping what types of innovations are feasible or incentivised. Economic conditions determine not only available funding but also user needs, as crises or growth phases alter demand for services. Social dynamics such as demographic change, migration, or shifting cultural expectations can redefine libraries' missions and target groups. Technological transformations—from AI to makerspaces—create new opportunities while also demanding new competences and infrastructures. Ecological imperatives, including sustainability and climate resilience, increasingly require libraries to adapt their practices and even their physical infrastructures. Finally, legal frameworks regulate issues such as intellectual property, data protection, and accessibility, with direct impact on service design. Considering libraries through this multidimensional lens reinforces the need for a validation process that assesses how different PESTEL factors interact in specific contexts, while refinement ensures that the framework can integrate new external pressures as they emerge. This approach ensures that libraries are conceptualised not only as service providers but also as adaptive institutions embedded in evolving socio-political environments.

2.5 Research questions related to the conceptual framework

A set of four general research questions are outlined in the LibrarIN deliverable D2.1 (Rubalcaba et al. 2023, pp. 10-11).

- Identification of innovation and co-creation - the loci where they happen, and the ecosystems that support them. How to identify innovation and co-creation in libraries? Which innovation types are produced in libraries? Which types of services are produced? Which types of libraries do innovation and co-creation? Where do innovation and co-creation take place? What are the objectives of innovation in libraries?
- Innovation drivers, barriers, and impacts. How to define the impact or value of library innovations? What are the drivers, facilitators, determinants, and barriers to innovation in libraries?
- Value co-creation drivers, barriers, and impacts. What is the process of value co-creation (and value co-destruction) in libraries in collaboration with multiple stakeholders (such as users, citizens, public service organizations, and policymakers); what are value expectations, and are they congruent or competing?



- New ways of participation – co-creation process. How to conceptualize the relationship between value co-creation and traditional forms of participation to assess co-creation in terms of inclusiveness, meaningfulness, and legitimacy?

Research questions are following:

RQ1. What type of process is used to develop a new service? Is it an intentional, top-down innovation process or a bottom-up practice based innovation process? If it is a Stage Gate process, how many stages are involved? Is it a modified Stage Gate process that locally adapts a pre-existing service? If it is a practice based process, which one is it? I.e. is it a posteriori, ad hoc, or bricolage?

RQ2. What is the role of users in new service development? To what extent are users *active* in proposing and developing the new service, or is the process managed by a service provider organisation? What is the level of decision making power by users? What is their intensity of involvement (frequency, changes made to idea) or the source of the idea?

2.5.1 Service questions

RQ3. What are the key service characteristics of a new service proposition?

RQ4. Who defined the set of characteristics? Did these change during the development of the service? If so, why? Which actor(s) led the way in making changes?

RQ5. What is the underpinning set of artefacts? Are these technological artefacts (e.g. 3d printers, computers), or other types of artefacts (a room, desk, chairs etc)?

RQ6. Who provides and controls the artefacts? Are these provided and controlled by one or more service providers, or are some provided by users?

RQ7. How do these service characteristics create private user value and public societal value? Which user competences (e.g. skills, knowledge, social connections) is the service seeking to improve or upgrade? What is the link between these improvements in user competences and wider societal impacts (e.g. employment opportunities, health and wellbeing, social mobility)?

RQ8. What role is played by librarians in diffusing ideas for novel service propositions developed elsewhere?

2.5.2 Ecosystem questions

RQ9. Who are the key actors within the local library ecosystem being studied? Service providers may be a public or private sector organisation, a third sector organisation (a charity, voluntary and community organisation, social enterprise or cooperative, or an NGO), or a citizen in some cases.



Service users may include one or more type of library user. Other citizens (non-library users) may have an impact on service development, such as in the case of resistance to homeless services being offered. Policy makers can include local municipalities, and national government initiatives that directly lead to establishing the new service. External funding bodies (e.g. EU or OECD) are other potential actors in some cases.

RQ10. What kind of resources does each actor bring to service co-creation? What are the specific sets of competences and cognitive preferences of the different actors? [Key competences include: technological knowledge and skills, work routines and organisational experience, social power and influence, and financial resources.]

RQ11. What is the alignment structure of the service ecosystem? How are actors and their resources integrated in order to realise value? e.g. are there formal or informal agreements for coordination, are there informal practices? Who established these agreements? Are there asymmetries in power and influence amongst actors in network alignment for value co-creation? What is the affect of these on service delivery and further service development?

RQ12. What are the minimum threshold levels for coordination how are these affected by the characteristics of the innovation? how are these affected by the combination of partners?

RQ13. What is the Library's strategy for managing the ecosystem? How does it engage with other provider organisations with which it has little control?

RQ14. Does new value creation involve the destruction of old value propositions? If so, what are the areas of conflict and how is conflict resolution achieved within a new alignment structure? Examples include resistance by some librarians, resistance by citizens, resistance by local policy-makers.

2.6 Additional library service research related to the conceptual framework

There are two main outcomes of the multi-agent conceptual framework theoretical propositions published in 2025.

In first place, the article *Innovation in libraries: A service-oriented perspective* published in *Research Policy* (Desmarchelier et al 2025) represents a particular development related to the conceptual framework, as it introduces the study of library innovation into the mainstream of service and innovation economics. By adopting a service-oriented approach, the article conceptualises the library as a complex or “architectural” service that integrates material, informational, cognitive, and relational functions. It illustrates this representation through the identification of three innovation logics—horizontal, vertical, and diagonal—that systematically capture the diverse trajectories and kind of interactions of library innovation (See figure 2). In doing so, it provides both theoretical grounding for

the multi-agent perspective developed in WP2, thereby positioning the LibrarIN framework as a robust analytical tool that can connect library and information science with the broader fields of service studies and innovation research

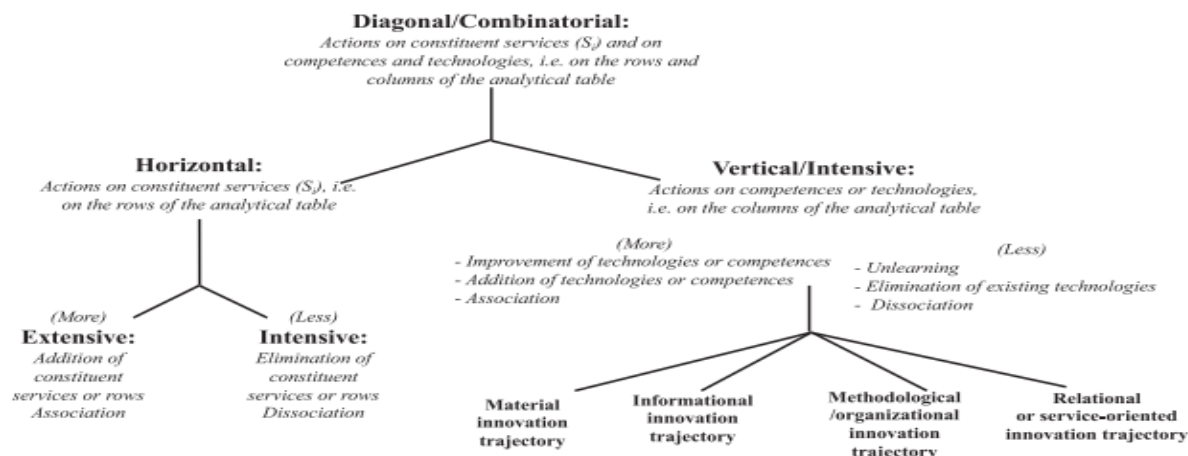


Figure 4: innovation logics (Desmarchelier et al 2025a)

In second place, the article *Beyond the reverse product cycle: An exploration of the digital, social and spatial transformation of libraries* published in *Research Policy* (Desmarchelier et al 2025b), that provides another significant development connected to the conceptual framework. By revisiting Barras's reverse product cycle (RPC), the article not only validates its relevance for service innovation in libraries but also extends it by incorporating new waves of enabling technologies linked to Industry 4.0 and 5.0. In doing so, it demonstrates how libraries evolve through successive phases of process and product innovations, but also how ICTs may act both as enabling forces and existential threats. This enriched perspective aligns with the multi-agent framework by highlighting that innovation dynamics are not purely technological but result from the interaction of technological, organizational, and social logics. By integrating these diverse trajectories into the analysis of service innovation, the article offers a broader theoretical grounding for the LibrarIN conceptual framework and reinforces its applicability to the study of libraries as complex service systems.

2.7 Revisiting Co-VAL frameworks to address digital co-creation in libraries

For the empirical evidenced in WP3-1 digital transformation of services, the multiagent framework has been complemented with a revision of the previous public service frameworks developed in the COVAL project. It is particularly relevant the work by Mergel et al. (2025) , Co-Production Phases in the Development and Implementation of Digital Public Services. This Co-VAL revised framework is based on the different coproductions phases with the users, as showed in the figure below.

	Co-Commissioning	Co-Design	Co-Implementation	Co-Delivery	Co-Assessment
	<i>Prospective co-production phase</i>		<i>Concurrent co-production phase</i>		<i>Retrospective co-production phase</i>
Phase definition	Co-commissioning involves citizens and service users in planning the key components of the digital public service by identifying user's needs.	Co-design involves citizens and other service users in the design of a digital public service to develop prototypes and experiment with services together with public administration.	Co-implementation represents the collaboration between public administration and private sector IT providers to implement a digital service.	Co-delivery is characterized by the active use of digital public services instead of the existing analog service.	Co-assessment engages service users actively or passively in the ongoing evaluation of services.
Roles	Citizens or other service users provide ideas and voice their needs Experts: provide knowledge Public servants: listener, open-minded to users' needs and experiences	Citizens or service users contribute knowledge and time Private sector organizations contribute expert knowledge Public servants facilitate co-design process	IT service providers provide technical competence and infrastructure Design experts provide knowledge on service design and usability servants providing legal framework	Citizens or service users use digital services Public servants use information provided through the digital service	Citizens or service users provide feedback to the service Public servants implement feedback
Methods	Workshops, consultation formats, e.g., participatory budgeting Living labs	Design-workshops Living labs Prototypes Online tools that involve the participants are rarely used in this stage	Develop and implement Web sites, apps or specific online services IT providers, design experts and public servants collaborate to implement the service	Citizens or service users use online services in form of Web sites or apps Improving services by devoting time to updating public databases or digitizing public files	Commenting functions Surveys or feedback apps Workshops

Figure 5: Co-production phases (Mergel et al 2025)



3 Conceptual framework integration and validation

3.1 Approach

Validation of conceptual and theoretical frameworks is increasingly recognized as a critical step in the development and generation of scientific knowledge. As highlighted in diverse research fields such as implementation science (Cane et al., 2012), health systems integration (Calciolari et al., 2021) or competence frameworks in education (Child & Shaw, 2023)—validation is not a single act but a multi-layered and iterative process that must be adapted to the subject of study. It implies theoretical refinement, empirical testing, and stakeholder engagement, with the ultimate goal of consolidating credibility, transferability, and utility of the framework in guiding action and policy.

Following this approach, WP2 proposed a validation strategy that is aligned with the project's collaborative nature and multi-agent orientation. Frameworks validated in recent literature indicate that the validation process rests on two fundamental pillars: (i) the inclusion of diverse agents—researchers, practitioners, and stakeholders—whose perspectives provide complementary insights into the framework, and (ii) the triangulation of validation methods across levels (Calciolari et al., 2021; Ng'etich et al., 2021; Zarghani et al., 2024). This logic underpins the design of our validation process, which combines internal, cross-consortium, stakeholder-based, and case-level validations. This perspective sometimes include the use methods such as the combination of expert review or field application (Ng'etich et al., 2021; Zarghani et al., 2024).

Task 2.3 defines four levels at which the LibrarIN framework will be tested and refined, these levels will be divided in internal stage and external stage. At the internal stage validation will occur, in a first step, through interactions with other WPs, ensuring that the conceptual dimensions are present in the empirical insights and methodological approaches used by the members of the project the project. This will determine whether the concepts are verifiable in the empirical evidence or not (Cane et al 2012). The second step is internally within the consortium, with LIBER's inputs used to validate and produce of the framework. This step ensures the internal coherence of the conceptual framework and the use of concepts based on the object of study, which is fundamental in the process of creating theoretical frameworks. (Calciolari et al., 2021). At the external stage, validation will be conducted, firstly, with the stakeholders' panel and additional project participants, guaranteeing that external voices are incorporated and that the framework is credible for its intended users. As Gaborov et al. (2024) suggest in its model validation, stakeholder engagement is very valuable to confirm relevance and identify refinements not visible from a purely theoretical standpoint. Finally, the framework was used to study and analyse 25 use cases, providing the empirical robustness that is indispensable for ensuring validity and transferability across contexts.

To operationalize this multi-level validation, we rely on three cross-cutting dimensions—the “What/What for,” the “Who,” and the “How”:



- **What and what for:** Service characteristics (new or improved characteristics); Public and private values; Innovation outcomes and impacts; Alignment of innovation typologies with empirical cases identified in WP3; Contribution of innovations to strategic policy objectives
- **Who:** User preferences/goals and user competencies/capabilities ; Provider preferences and competences; Policy makers
- **How:** Co-production and co-creation among different agents; Innovation processes and the role of technology; Role of stakeholders, policymakers, and ecosystems

These dimensions are not abstract; they are directly tied to the project's research questions (RQ1–RQ4,):

- **RQ1: Identification of innovation and co-creation,** the loci where they happen, and the ecosystems that support them. How to identify innovation and co-creation in libraries? Which innovation types are produced in libraries? Which types of services are produced? Which types of libraries do innovation and co-creation? Where do innovation and co-creation take place? What are the objectives of innovation in libraries?
- **RQ2: Innovation drivers, barriers, and impacts.** How to define the impact or value of library innovations? What are the drivers, facilitators, determinants, and barriers to innovation in libraries?
- **RQ3: What and how is the process of value co-creation in libraries in collaboration** with multiple stakeholders (such as users, citizens, public service organizations, and policymakers); what are value expectations, and are they congruent or competing?
- **RQ4: New ways of participation – co-creation process.** How to conceptualize the relationship between value co-creation and traditional forms of participation to assess co-creation in terms of inclusiveness, meaningfulness, and legitimacy?

Validation, therefore, becomes a process of triangulation across levels (internal, inter-WP, stakeholder, empirical) and across dimensions (what, who, how). This triangulation ensures that the framework is not only theoretically sound but also empirically anchored and legitimate. As Lynch et al. (2024) demonstrate with their validation of a theory-based questionnaire, iterative refinement through empirical testing and confirmatory analysis strengthens reliability and usability. Similarly, the LibrarIN validation strategy adopts an iterative logic, recognizing that each level and dimension provides complementary evidence. Ultimately, the validation of the LibrarIN framework is not an endpoint but a dynamic process of consolidation and adaptation. By combining lessons from

validation studies across disciplines (Calciolari et al., 2021; Cane et al., 2012; Ng'etich et al., 2021; Sá-Pinto et al., 2021; Zarghani et al., 2024), the project positions itself to deliver a framework that is both conceptually rigorous and practically applicable. Its credibility will derive from the integration of diverse forms of evidence and perspectives, ensuring that the framework can guide innovation in libraries while also contributing to broader debates on value co-creation, public service logic, and service-dominant innovation.

To provide methodological clarity, it is useful to distinguish between dimensions of validation (the substantive content that must be assessed) and levels of validation (the arenas and methods through which assessment is carried out).

Table 1: Focal dimensions of validation and their link to the research questions

Dimension	Focus of validation	Connection with RQs
What / What for	Examines whether the framework captures the scope and nature of innovations, their main characteristics and elements, drivers, barriers, and main goals	Anchored in RQ1 (innovations and co-creation identified and located) and RQ2 (drivers, barriers, and impacts of library innovations).
Who	Validates the inclusion of relevant actors—libraries, users, communities, and policy-makers—and their roles in shaping innovation ecosystems.	Directly related to RQ3, which addresses the roles, perspectives, and goals of different stakeholders in value co-creation.
How	Focuses on mechanisms of co-creation and participation, governance arrangements, and the use of technology in supporting innovation processes.	Linked to RQ4, which explores participatory and governance forms that underpin inclusive innovation.

Table 2: Levels and methods of validation

Stage of validation	Level of validation	Objective	Methods	Wp involved in the level
Internal	First: WPs interactions	Guarantee alignment with empirical insights and methodological diversity across WPs.	Review of methodologies used by WPs researchs, Identify concepts and dimensions of the framework in the case studies, boxes that illustrates framework dimensions	WP3 and WP4
	Second: (WP2, using inputs from LIBER)	Ensure internal coherence	Review of LIBER strategies and documents, internal meetings.	WP2
External	First: Stakeholders	Validate relevance, clarity and legitimacy from	Review of events with stakeholders, review of participatory interviews.	WP5 and WP6

Stage of validation	Level of validation	Objective	Methods	Wp involved in the level
	(panel and external actors)	user/community perspective.	Analysis of policy briefs, boxes that illustrates framework dimensions	
	Second: Use cases (25 pilots)	Test empirical applicability and transferability.	Review of methodologies used for use cases, comparative analysis of cases.	WP5 and WP6

In addition, this validation process will be complemented by the inclusion boxes with case studies that illustrates how the key dimensions of the multi-agent conceptual framework proposed are present in some activities and services provided by the most innovative libraries in Europe. These boxes are presented as described in tables 3 and 4.

Table 3: Internal illustrations (from LibrarIN case studies)

Library & country & Authors	Illustration Focus	Conceptual framework dimension (<i>What services/characteristics, what for/goals, how/process, who/actors/networks/ecosystem</i>)
Dokk1. Denmark. Lars Fuglsang	Co-creation and living lab	What (co-creation space for SDGs at the citizen level) and how (citizen learning environment, make the complex concrete, fun and hopeful)
The Central Public Library of Veria. Greece. Anna Triantafillou	Introduction of new digital and co-creative services (Media Lab, Maker Space, workshops).	What (co-creation service)
Oodi Library. Finland. Kirsi Hyytinen	Co-Creative innovation in a public library living lab	What (co-creation service) and with whom (users and ecosystem partners)
Vienna Libraries. Austria. Doris Scharinger	Innovation in an ecosystem perspective	What (co-creation service) and with whom (ecosystem partners)
MediaLab-Tabakalera. Spain. David Gago	A catalyst for innovative action	How (co-creation process) and what (co-creation services)
BiblioLab, Spain David Gago	Connecting communities across the territory	Who (co-creation actors) and what for (co-creation goals)
Purchena Reception Library. Spain. Fabio Moscoso	Social Innovation for Inclusion through a Library-based Community Network	What (co-creation service) and what for (co-creation goals)

Library & country & Authors	Illustration Focus	Conceptual framework dimension (<i>What services/characteristics, what for/goals, how/process, who/actors/networks/ecosystem</i>)
Retrotool. Netherlands. Carsten Schmidt	Automating metadata generation for books and documents acquired over centuries	What (co-creation service) and how (co-creation process)
Automatic Indexing at the National Library. Estonia. Carsten Schmidt	How national cultural institutions can harness AI to serve broader strategic goals	What (co-creation service) and how (co-creation process)
RepairCafé @Vélizy. France. Benoît Desmarcheleir and Faïz Gallouj	Importance of social innovation in libraries	How (co-creation process) and who (networks actors)

Table 4: External illustrations (From use cases provided by stakeholders panel members)

Library & country & Authors	Illustration Focus	Conceptual framework dimension (<i>What services/characteristics, what for/goals, how/process, who/actors/networks/ecosystem</i>)
Oodi Library. Finland. Robert Seitovirta	Value co-creation by community management	How (co-creation process) and who (co-creation actors)
Oeiras Municipal Library Portugal, Filipe Leal	Network innovation	What (co-creation services) and what for (co-creation goals)
Utrecht University Library. Netherlands. Arja Firet	Living labs digital humanities	What (co-creation service) and how (co-creation process)

3.2 Internal validation – From WP3 case studies and WP4 survey

3.2.1 Digital transformation (WP3.1)



Digital transformation has emerged as one of the most visible and debated areas of innovation in contemporary libraries. WP3.1 provides systematic evidence of how libraries across Europe are adopting, adapting, and experimenting with digital technologies, AI in particular, and its applications. The 13 case studies analyzed in D3.2 demonstrate that digital transformation is not limited to technological substitution but involves deeper organizational and cultural changes. It requires libraries to rethink their mission, restructure workflows, and develop new capabilities, while safeguarding their public value role.

WP3.1 has used different conceptual frameworks, in particular the one by Mergel et al (2025), what complements the service innovation multiagent one presented in D.2.2 and in previous section. The WP3.1 interview guide for the these 13 case studies is in itself a validation of the basics of these conceptual frameworks. Among the objectives of WP3's interview guide is "to understand how different stakeholders are involved in the implementation of AI solutions and what value(s) they perceive" this is in line with value propositions in the conceptual framework and it also highlight the central role of stakeholders in library innovations. The question on why AI projects had been initiated and how will the AI solution be useful for library services are directly related to *what* and *what for* dimension (RQ1 and RQ3 in overall LibrarIN guidelines). Besides, the study of value co-creation contingencies is one of the main objectives of the frameworks.

The interview questionnaire also asks about the new forms of collaboration in libraries that AI has promoted, this in line with RQ4 of the conceptual framework: new ways of cocreation processes. The interview guide did not simply focus on the role of the library itself but explicitly asked about the participation of patrons, the society, other libraries external providers and research community (*who* dimension included in the multiagent framework). What in the framework appears as "user competences," "provider preferences," and "policy-maker involvement" was translated into direct questions about who had participated, what competences were mobilised, and whose goals were prioritised. This structure, and related findings in the related WP3.1 deliverables, somewhat validate the relevance of the multiagent framework and generated evidence to address RQs on the process of value co-creation across stakeholders. In short, the research plan and related-fundings of WP3.1 are therefore aligned with the key framework developed by Mergel et al 2025 as well as by the basic elements of the overall LibrarIN conceptual framework.

3.2.2 Social innovation WP3.2

Social innovation has increasingly become a defining dimension of how libraries contribute to their communities. WP3.2, through the analysis presented in D3.5, shows that social innovation is best understood not as isolated initiatives but as dynamic and relational processes. Libraries function as hubs that bring together diverse actors, aligning competences and resources in order to generate collective value. In methodological terms, WP3.2 provides not only an exploration of innovation practices but also a validation of the LibrarIN conceptual framework, as it explicitly addresses the plurality of agents involved and the networked interactions that sustain innovation.



WP3.2 conceptualises social innovation as the formation and maintenance of networks in which an essential element is the interactions between stakeholders. These interactions—between library institutions, users, partners, and wider societal stakeholders—are what allow value to be co-created and sustained. This directly reinforces the How and Who dimensions of the framework, confirming that the drivers and impacts of innovation (RQ3) and the new forms of co-creation processes (RQ4) must be analysed through the lens of multi-agent dynamics rather than through single organization. The multi-agent conceptual framework proposed that interactions in co-creation might be direct interactions or interactions through services, this is validated by WP3.2, since they conclude that Interactions can happen in the making of the innovation, or as a result of it. Likewise, these networks might also be approached as the ecosystems proposed in the multi-agent framework. By treating networks and their internal exchanges as the locus of innovation, WP3.2 provides methodological confirmation of the framework's emphasis on relational processes.

Methodological approach used by WP3.2 also validates the Who dimension of the framework. The use of semi-structured interviews with different types of stakeholders such as directors, former directors, officers, non-managerial staff among others show the relevance of different agents for innovation and co-creation process and ensures that the voices of all this agent are considered when doing research. This diversity of perspectives validates the Who dimension since this is valuable for generating robust empirical research, showing that social innovation depends on the mobilisation of heterogeneous competences and the alignment of multiple goals. At the same time, the analysis of how these perspectives interact provides evidence for the How dimension, confirming that innovation is constituted through active processes of collaboration and co-creation. WP3.2 highlights that social innovation in libraries is purpose-driven and oriented towards broader social goals. By examining the rationales behind initiatives, the work provides empirical grounding for the What and What for dimensions of the framework, corresponding to RQ1 and RQ2. In this way, WP3.2 demonstrates that social innovation cannot be understood solely as the introduction of new services, but must be assessed in terms of its intentions, its agents, and the interactive processes through which outcomes are generated.

Concrete analysis of the WP3.2 case studies also showed evidence for this validation. Initiatives such as the Human Library, the Storytelling cafés in Vienna, or the Living Books project at C3 Library highlight that what matters most are not the networks themselves but the interactions they generate, thereby confirming the How dimension of the framework and its focus on co-creation processes (RQ4). Likewise, Repair Cafés and makerspaces demonstrate the diversity of stakeholders—users, librarians, NGOs, volunteers—working together to create self-sustained communities, which provides strong evidence for the Who dimension and the framework's multi-agent orientation (RQ3). Other cases, such as Likustartti in Vantaa or the children's programmes at Oodi, illustrate how libraries act as facilitators of broader outcome networks involving families, schools, and civil society actors, thereby validating the What and What for dimensions (RQ1 and RQ2). In sum, the evidence from WP3.2 demonstrates that social innovation in libraries is best captured through the multi-agent conceptual framework,



which accounts for the plurality of actors, the relational nature of co-creation, and the societal purposes that library innovations pursue.

3.2.3 Living Labs WP3.3

Living labs are defined in D3.8 as open and experimental environments in which libraries act as facilitators of co-creation and co-innovation. They are not confined to the delivery of pre-designed services but constitute socio-technical arrangements where diverse actors interact to explore, test, and refine new solutions. In this perspective, the library is re-conceptualized as a living infrastructure: a space that enables processes of prototyping, iterative learning, and participatory governance. The deliverable underlines that this transformation is not only organizational but also conceptual, as libraries reposition themselves as platforms where communities and stakeholders can collectively address social challenges. Given the nature of living labs as participatory and networked arenas, they provide particularly clear evidence for all the dimensions and research questions that underpin the framework's validation criteria.

Methodologically, WP3.3 investigated living labs through the analysis of sixteen European cases, using semi-structured interviews, desk research, and document analysis to capture how libraries operate as experimental and participatory spaces. The inclusion of multiple stakeholders—librarians, users, community partners, local authorities, and policy representatives—ensured that the evidence reflected the plural and multi-agent character of living labs. This diversity is directly aligned with the Who dimension of the framework (RQ3), while the focus on interactions and collaborative practices documents the How of innovation (RQ4). At the same time, the attention given to the rationales behind initiatives and the perceived benefits links the methodology to the What and What for dimensions (RQ1 and RQ2), showing how living labs pursue social purposes through new forms of service design and delivery. In this sense, the research design itself substantiates the validation criteria, as it provides systematic evidence across all dimensions and research questions of the conceptual framework.

WP3.3 highlights that living labs in libraries can be understood through three interconnected types of services. First, space- and place-based services emphasize the role of the library as a physical environment for experimentation and collective activity. In these cases, the library is not only a venue but also an infrastructure that enables stakeholders to meet, prototype, and interact. This service type validates the What and What for dimensions (RQ1 and RQ2), as it demonstrates how innovation materializes in tangible settings and pursues purposes that extend beyond traditional library functions, including community engagement and social inclusion. It also substantiates the Who dimension (RQ3), as the reconfiguration of library spaces requires the mobilization of diverse actors and competences. Second, processual learning services capture the iterative, experimental, and learning-oriented character of living labs. Libraries functioning in this way facilitate cycles of co-design, testing, and refinement that involve multiple agents in the development of new solutions. This service type most directly validates the How dimension (RQ4), as it documents that innovation is not a linear



implementation but a negotiated and relational process. At the same time, the co-production of knowledge and the alignment of heterogeneous goals reinforce the *Who* dimension (RQ3), confirming that innovation depends on the collaboration of librarians, users, and external partners. Finally, democratic engagement services extend the scope of living labs by creating arenas for participatory governance and civic dialogue. This validates both the *What for* dimension (RQ2), by showing that living labs aim at democratic and societal purposes, and the *How* dimension (RQ4), by demonstrating that innovation processes are embedded in shared decision-making and collective agency. Together, these three service types provide strong evidence that living labs concretely embody all the dimensions and research questions of the framework.

In sum, the evidence gathered in WP3.3 demonstrates that living labs represent a distinctive form of library innovation that brings together space, process, and participation in a coherent multi-agent ecosystem. By documenting how libraries act as infrastructures for co-creation, as facilitators of iterative learning, and as arenas for democratic engagement, WP3.3 validates the full scope of the LibrarIN conceptual framework. All four dimensions and related research questions are clearly addressed: the *What* and *What for* through the variety of innovations and their societal purposes, the *Who* through the multiplicity of actors and competences mobilised, and the *How* through the relational and participatory processes that underpin co-creation. Moreover, the outcomes of living labs go beyond the introduction of new services: they generate collective learning, strengthen social cohesion, and enhance civic competencies. As such, WP3.3 not only reinforces the analytical relevance of the framework but also provides empirical evidence of how libraries, when operating as living labs, embody the principles of public value creation.

3.2.4 Measurement, monitoring, surveys (WP4)

WP4 constitutes a direct operationalisation of the multi-agent conceptual framework developed in WP2. Building on the literature review and typologies of Task 2.2, WP4 translated the framework's categories into three survey instruments for university, main public, and branch libraries across nine EU countries. This translation is itself a validation: the framework's constructs (innovation types, collaboration patterns, ecosystems description) were shown to be measurable and understandable in survey format. For example, the decision to use "new or improved services" instead of the abstract notion of "innovation" stems from the literature review and framework recommendations. By addressing types of innovations, loci of co-creation, and drivers/barriers, WP4 gave empirical content to RQ1 and RQ2, confirming that the framework provides a valid basis for systematic measurement.

At the same time, one limitation emerged: the framework had not sufficiently covered the outcomes of co-creation and library innovations. WP4 addressed this gap through a novel approach, asking about the usefulness of knowledge obtained from multiple sources. Nonetheless, measuring innovation outcomes remains a challenge, pointing to an area where the framework requires further development.



The surveys were completed by the responsible managers of the libraries, who provided systematic information about the competences, practices, and support structures within their institutions. This choice of respondents ensured comparability across countries and types of libraries, while also validating the framework's multi-agent assumption. From the managerial perspective, WP4 demonstrated that it is possible to capture how different actors—such as users, frontline staff, policymakers, and external stakeholders—contribute to the innovation process, even when their voices are channelled through library leadership. In doing so, WP4 confirmed the feasibility of operationalising the roles of multiple stakeholders in library innovation and co-creation, directly addressing RQ3 on value co-creation with diverse actors. This evidence shows that the conceptual framework provides a reliable basis for analysing the interplay of competences and responsibilities in multi-actor environments.

The methodological design of WP4 embodies the framework's principles. Surveys were structured around both general questions and focal innovations, following international guidelines for innovation measurement. Cognitive testing with 36 interviews across four countries further validated that the framework's categories could be meaningfully applied and understood in practice. Moreover, WP4 addressed three of the four common research questions (RQ1, RQ2, RQ3) and provided partial evidence for RQ4 through regression analyses.

Yet, methodological limitations also emerged. Although the surveys were carefully designed and tested, some aspects of the framework—particularly competences and preferences—could not be fully captured. These limitations do not undermine the validation process but indicate the boundaries of what can be reliably measured through large-scale surveys, reinforcing the need for complementary qualitative approaches in later stages of the project.

3.2.5 Summary of interactions with LIBER

LIBER, the Association of European Research Libraries, constitutes a central platform for promoting and shaping innovation in European research libraries participating in WP2 and in the development of the conceptual framework. Its conferences, publications, and awards offer a rich set of perspectives that has been used as inputs for validations and complement and extend the conceptual framework of LibrarIN. In particular, LIBER activities consistently highlight libraries as drivers of change in areas such as open science, digital infrastructures, participatory services, and community engagement. The LIBER Conference proceedings, policy positions, and the journal LIBER Quarterly provide continuous evidence of how libraries across Europe are experimenting with new forms of service provision, technological adoption, and stakeholder collaboration.

Dimensions from the multi-agent conceptual framework might be seen in LIBER Strategy 2023-2027. For instance, among the characteristics that research libraries should have by 2027 are the following elements: they should be engaged and trusted hubs, they should be places for open science and they should offer State-of-the-Art services, thus, although Research Libraries must continue to offer their



traditional services, they should also take into account that their own perception must change to transform traditional services - to make knowledge and information findable, accessible and reusable today and in the future - serving their academic communities and facilitating research and education taking place in a highly digitised, collaborative and international environment and additionally to offer other types of services. This is in line with the what and what for dimensions of the framework. Likewise, among the driving factors of this strategy is the drive for openness, in fact the stimulation of collaboration and communication is explicitly proposed as a priority to achieve the general vision of LIBER, in this sense, the how dimension of the framework is verified in the LIBER strategy, evidencing that libraries are an ideal arena for co-creation.

Taken together, the inputs from LIBER demonstrate that the association not only shapes the strategic orientation of research libraries across Europe but also provides an external confirmation of the LibrarIN conceptual framework. By linking long-term priorities with concrete practices, LIBER strengthens the argument that libraries are key innovation ecosystems where multiple actors, purposes, and processes converge.

3.3 External validation

3.3.1 Validation through the LibrarIN stakeholders panel

The involvement of stakeholders through the LibrarIN Stakeholder Panel has been a central element of the project's validation strategy. As reported in D6.2, the panel was designed to bring together a diverse range of external actors—public, national, and academic libraries, international organizations, NGOs, policymakers, and representatives of civil society—so as to ensure that the conceptual framework was confronted with perspectives beyond the consortium itself. The activities developed with the panel, including workshops, structured dialogues, and interactive exercises, provided a unique arena where the framework's assumptions could be tested against the practical concerns, expectations, and experiences of diverse actors. In this way, stakeholder engagement functions not only as a dissemination tool but also as a crucial dimension of external validation, generating evidence that speaks directly to the What/What for, Who, and How dimensions and their related research questions. Even before considering the specific activities carried out, the very existence of the Stakeholder Panel represents a form of validation of the Who dimension of the conceptual framework. By formally including external actors beyond the consortium—ranging from library directors and professional associations to NGOs, policymakers, and representatives of civil society—the project acknowledges that innovation and co-creation in libraries cannot be understood in isolation. Instead, they depend on the active involvement of a plurality of agents whose competences, expectations, and roles need to be aligned. The panel itself thus becomes empirical evidence of the framework's assumption that diverse stakeholders are central to the dynamics of library innovation, confirming the relevance of RQ3 on the actors involved in processes of value co-creation.



The activities undertaken with the Stakeholder Panel demonstrate how external engagement has concretely contributed to the validation of the conceptual framework. The first occasion was the pre-conference workshop organized at LIBER 2023 in Budapest (5 July 2023), where librarians, policymakers, and representatives of international associations discussed the role of libraries as ecosystems of innovation, since they are hubs of digital and social innovation. This was followed by an online preparatory meeting in September 2023, which introduced the panel members to the project's objectives and created a platform for gathering preliminary views on innovation drivers and barriers in different library contexts. The most significant activity took place during the first in-person meeting of the Stakeholder Panel in Amsterdam (5–6 October 2023), which brought together a broad range of participants—directors of public and national libraries, NGOs, European associations, municipal representatives, and policy actors. During this two-day event, interactive methodologies such as World Café discussions, thematic break-out groups, and poster-based exchanges were used to elicit contributions. These activities not only highlighted which types of innovations were considered most relevant (What/What for – RQ1 and RQ2), but also illustrated the diversity of actors involved (Who – RQ3) and the collaborative methods through which innovation is generated (How – RQ4). More recently, Paul Windrum presented the complete multi-agent framework at the key note session of the LibrarIN International Conference 2025 on Innovation and Value Co-Creation for a New Generation of Libraries (22–23 May 2025). This session was presented alongside Stuart Snyderman, Managing Director for Library Technology at Harvard University, who highlighted the alignment between the framework's dimensions and the practical and professional reality of libraries. Finally, All the outcomes and findings of all WPs were presented to the stakeholders panels in the LibrarIN Stakeholder panel meeting (30 September 2025), This final session served as an advanced reflection and validation arena where stakeholders discussed the scientific rationale for policy adoption and the need to justify innovation in libraries beyond purely technological change. Participants emphasised that innovation should not be understood as a uniform or prescriptive process—"Oodi is not a must for everyone"—but as a phenomenon that takes different paths and styles, sometimes even coexisting within a single library. Discussions also addressed the risk of false or superficial co-creation processes, stressing that genuine co-creation must acknowledge and manage tensions among stakeholders rather than attempting to eliminate them.

3.3.2 Validations through 25 use cases

One of the activities set out in the LibrarIN project proposal was the implementation of twenty-five use cases. These use cases were designed as a practical arena in which the conceptual framework could be confronted with the day-to-day realities of libraries and their stakeholders. By embedding innovation initiatives in diverse institutional and community settings, the use cases created the conditions to observe how the framework's dimensions—What/What for, Who, and How—manifest in practice. They therefore operate as a direct mechanism of external validation, showing whether the framework is capable of capturing the variety of purposes, actors, and processes that characterize innovation in contemporary libraries. In doing so, the pilots ensure that validation goes beyond



theoretical discussion and stakeholder consultation, providing empirical confirmation that the framework is both applicable and relevant.

The conceptual framework did not only provide analytical categories for interpreting innovations in libraries, but was also implemented in the design of the use case template. Each section of the template was structured to capture evidence corresponding to the framework's dimensions and research questions. The *What/What for* dimension (RQ1 and RQ2) is reflected in the request for metadata, summary, and description of the challenges and objectives behind each initiative, making explicit both the type of innovation and the purposes it pursued. The *Who* dimension (RQ3) guided the inclusion of a section on stakeholders and beneficiaries, asking contributors to specify which actors were involved, their roles, and who benefitted from the innovation. The *How* dimension (RQ4) was translated into the section on co-creation processes, which requires a description of the participatory methods and collaborative practices that shaped the initiative. Finally, the template also asked for lessons learnt, success factors, and bottlenecks, thus providing complementary evidence on the contingencies that condition co-creation. In this way, the template ensured that the data collected from the 25 pilots was fully aligned with the conceptual framework and directly usable for its empirical validation.

The twenty-five pilots provide strong empirical confirmation of the framework's dimensions. The *What/What for* dimension is visible, for example, in Bib Analytics, which introduces a dashboard to support evidence-based management decisions, or in the Training Course for the artistic and cultural awakening of very young children, which pursues explicitly social and cultural objectives. These cases show that innovations can be both technologically oriented and socially driven, yet in all instances they clarify their purposes in ways consistent with RQ1 and RQ2. The *Who* dimension is exemplified by projects such as STEM Revolution, which involves schools, families, and NGOs to foster scientific literacy, and TinkerLib, where adult learners co-create educational experiences together with library staff and local partners. These cases underline that innovation depends on heterogeneous constellations of actors, confirming RQ3. The *How* dimension is evident in initiatives like AI Parade, which relies on interactive workshops and public engagement to build awareness around artificial intelligence, or Pepper and CuratorBot, where the introduction of robots and chatbots was developed iteratively with user feedback. These pilots illustrate that innovation processes unfold through co-creation, experimentation, and collective learning, validating RQ4. Taken together, the pilots show that the framework's dimensions capture the essential dynamics of library innovation and co-creation across highly diverse contexts.

In sum, the use cases demonstrate that the framework is not only theoretically sound but also empirically resilient, capable of capturing library innovation across diverse contexts, scales, and purposes. Together with the evidence generated through stakeholder engagement and policy briefs, the pilots complete the external validation process by showing that the framework can effectively guide the description, analysis, and evaluation of innovations in libraries.

3.3.3 Validation through policy work and managerial implications work with librarians

An additional layer of validation is provided by the LibrarIN policy work, including what is reflected in the LibrarIN policy briefs, which function as outputs co-created with stakeholders and experts. The first brief, *Sparkling Collaboration for Innovation to Tackle Libraries' 21st Century Challenges*, highlights the centrality of collaboration and multi-actor engagement, thereby reinforcing the Who dimension of the conceptual framework. The second brief, *Boosting and Evaluating Collaborative Innovations in Libraries*, goes further by offering managerial guidelines and evaluation tools, validating both the What/What for (RQ1 and RQ2) and the How (RQ4) dimensions through concrete strategies and indicators. Finally, the third brief, *Collaborative Innovation and Best Practice Diffusion in European Libraries: Adapting for Local Impact*, demonstrates how practices must be adapted to diverse contexts, providing strong external confirmation of the relational and processual nature of innovation captured in the How dimension. These briefs are not merely dissemination documents: they integrate evidence and voices from the Stakeholder Panel and international experts, making them a clear example of external validation that grounds the framework in the realities and priorities of the broader library ecosystem.

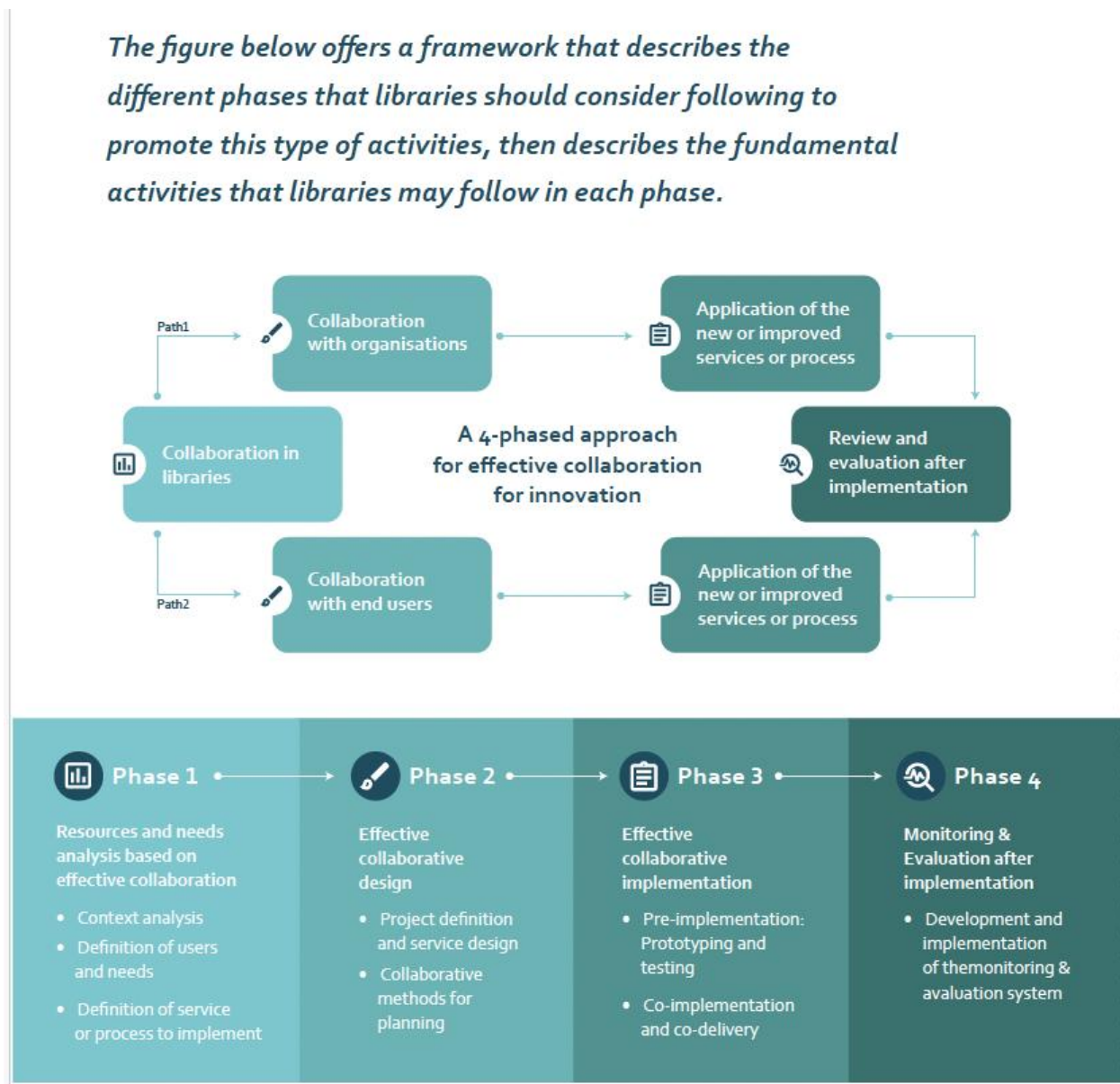


Figure 6: Policy focus areas for co-creation and innovation in libraries (First Policy Brief)

Specifically, the proposals made by the first policy report are strongly anchored in the findings of WP2. (see figure 6). The document outlines four policy focus areas that guide collaborative innovation in libraries. These include: the co-creation of services across educational, cultural, social, creative, and business domains; thematic areas promoting digital transformation, collaboration spaces, and living

labs; cross-cutting co-creation frameworks that ensure stakeholder participation, organizational support, and evaluation tools; and innovation areas aimed at strengthening research, developing new services, and building sustainable library ecosystems. Together, these focus areas provide a comprehensive roadmap for embedding collaboration and co-creation within library policy and practice.

Similar exercise has been done with stakeholders, librarians in particular, regarding the implications of WP2 at managerial level. The second policy brief was particularly oriented to the managerial implications that are summarized in the figure below.





Taken together, the activities of the Stakeholder Panel and the co-created policy briefs demonstrate that external engagement has served as a substantive mechanism of validation for the LibrarIN conceptual framework. They provide concrete evidence across its three dimensions: confirming the variety of innovations and their purposes (*What/What for* – RQ1 and RQ2), documenting the plurality of actors whose involvement is essential (*Who* – RQ3), and illustrating the collaborative processes through which innovation is realised (*How* – RQ4). In this sense, the engagement of stakeholders has not only enriched the project’s dissemination but has also produced external confirmation that the framework adequately reflects the realities, priorities, and practices of innovation in the contemporary library ecosystem.

3.4 Illustrations of conceptual framework dimensions in selected case studies

WPs of LibrarIN Project has been in contact with the most important libraries in Europe, which has allowed to make case studies that illustrate how active co-creation and a new self-conception of libraries (from collections to connections) might generate innovative services. These case studies have been analyzed through the lens of the elements and main dimension of the multi-agent conceptual framework proving its rational and its usefulness to study library innovation; this analysis represents the final step of the validation process. This section will show 13 cases studies (13 boxes) that illustrate the main dimensions (what/what for, how and who) of the multi-agent conceptual framework, and after that (in tables 5 and 6) we will point the elements present in the cases (new characteristics of the service, role of users, role of stakeholders, role of staff, role of networks, link to ecosystem, preferences and competences) of the multi-agent conceptual). Following we present the detailed case studies (sections 3.4.1 and 3.4.2) and then we show the elements of the conceptual framework present in the cases (tables 5 and 6).

3.4.1 Illustrations by selected case studies in the LibrarIN project

Box 1: Word Room – A Circular Living Lab for Co-creation. By Lars Fuglsang

Conceptual framework dimension focus: What (co-creation service) and how (co-creation process)

This case description presents World Space (Verdensrummet) at Dokk1 as an illustrative example of co-creation and a living lab. The World Space is a venue area for people to work on the UN Sustainable Development Goals (SDGs), an initiative driven by an ambition to transform a previously empty and unfinished staff room into a platform for a circular library and work with sustainability. The World Space works with the SDGs by transforming them into concrete, everyday-oriented goals for and with citizens. The venue offers various events, exhibitions and a learning environment where citizens can engage in sustainable action communities through activities such as the Seed Library, where seeds can be borrowed and shared, and the Plant Workshop, which teaches practical skills with plants. The World Space also functions as a meeting place and resource centre, with outdoor stages, event spaces and flexible rooms for meetings and workshops. The World Space



was created through a design process and citizen involvement, which began by talking to a large number of citizens about their perspectives on sustainability. The process involved representatives from all library teams. After the World Space went live, a 'Root Net' was established – representatives from all local libraries who meet four times a year to develop together and discuss who they are not reaching.

A central part of the approach was to give users real definitional power and ownership of the space. For example, the library actively sought collaboration with homeless people in the local area to give them a voice. The homeless people identified 'inequality in touch' – the fact that no one touches a homeless person – as their relevant global goal, which led to the creation of touch workshops, talks and outdoor concerts. Through this prototyping and feedback with different user groups (including primary school classes and kindergartens), Dokk1 learned that the space should allow people their own approaches to sustainability and that one should be

World Space case at Dokk1 demonstrates that the library in Aarhus is not just a lending centre, but a "living lab" and a qualified community house that uses design methods to create new relationships

careful with words and approaches that could be exclusionary. The space is designed for 'takeover', where citizens can 'borrow' the World Space and shape it according to their work with sustainability and the SDGs, but must respect the constraints of being circular and considering climate and nature. This distribution of power is also demonstrated by the fact that borrowers of the space are given the code to the door and to the World Space's Instagram account, so that they can create their own narrative about their work. The staff spend time on 'hands-on and relationship work' to build trust and help citizens get started. The imperfect environment in The World Space is intended to make it easier for people to come up with immature or unfinished ideas. Nature and the climate are not just a theme, but an integral co-creative partner in the World Space activities and infrastructure. The World Space attempts to make the complex concrete, fun and hopeful. The agenda ranges from the poetic to the practical (e.g. sewing) – from 'poetry to plumbing'. A major challenge is ensuring representation: There is a significant predominance of female participants (approx. 70%). The library is trying to remedy this by developing new, target group-specific formats that appeal to men, such as technical repairs combined with music, or 'coarser' activities such as tanning fish skins (a by-product of sushi).

In summary the World Space case at Dokk1 demonstrates that the library in Aarhus is not just a lending centre, but a "living lab" and a qualified community house that uses design methods to create new relationships, distribute resources and power, and lead from knowledge to action through concrete and sensory practices, where even nature participates in the learning community.

Box 2: Oodi Library Makerspace: Co-Creative innovation in a public library living lab. By Kirsi Hyttinen

Conceptual framework dimension focus: What (co-creation service) and how (co-creation process)



The Makerspace at Helsinki Central Library Oodi stands as an illustration of how a modern library can function as a living lab, fostering innovation through collaborative processes that actively involve both library staff and users. Oodi's Makerspace was designed not as a static facility, but as a dynamic environment shaped by the needs and aspirations of the citizens and the community. This participatory approach was evident during the planning phase, when the "Dream" campaign gathered over 2,300 ideas from city residents, directly influencing the inclusion of advanced technologies such as 3D printers and audio-visual equipment in the library. The participatory budgeting initiative further empowered citizens to decide how resources would be allocated, ensuring that the Makerspace reflected genuine public demand. In everyday practice, collaboration at Oodi is realized through continuous dialogue and co-creation. Library staff do not simply manage the space; they act as facilitators and mentors, guiding users in the operation of complex equipment and supporting a wide range of creative projects. For example, staff regularly assist users with sewing machines and laser cutters, making these tools accessible even to those with no prior experience. The staff's role extends beyond technical support—they engage in ongoing conversations with users, collecting feedback through both formal channels, such as feedback boxes, and informal daily interactions.

Collaboration at Oodi extends beyond the immediate relationship between staff and users to include a diverse array of stakeholders

Users themselves are central agents in the co-creation process. They are encouraged to propose new workshops, suggest improvements, and even initiate projects within the Makerspace. The introduction of media production tools, for instance, was a direct response to user requests, enabling citizens to create podcasts, videos, and other digital content. This bottom-up approach fosters a sense of ownership and active participation, transforming the library from a passive provider of services into a vibrant community hub where innovation is driven by the collective input of its users. Collaboration at Oodi extends beyond the immediate relationship between staff and users to include a diverse array of stakeholders. The Makerspace benefits from partnerships with private companies, third-sector organizations, and other municipal sectors. A notable example is the collaboration with the Martha Association, a Finnish non-profit dedicated to home economics and sustainable living. By combining their expertise with the resources of the Makerspace, the Marthas offer workshops on repair sewing, helping users develop practical skills that support a sustainable lifestyle.

The Makerspace also functions as a network enabler, facilitating spontaneous encounters and knowledge exchange among users. Groups of young people, for example, regularly gather to work on crafts and digital design projects, taking advantage of the open and collaborative environment. The library's architecture and open spaces are intentionally designed to promote transparency and invite participation, reinforcing the sense of community and shared ownership. These collaborative mechanisms exemplify the key elements of multi-agent thinking. Oodi Makerspace case demonstrates how multi-agent collaboration can drive the evolution of public libraries into strategic partners in co-creation and innovation. Through concrete examples of participatory planning, ongoing dialogue, and stakeholder engagement, the case shows how libraries can respond to societal needs and empower diverse actors to contribute to the creation of public value. This approach aligns closely with the principles of multi-agent thinking, highlighting the importance of distributed agency, iterative co-creation, and the blending of expertise in shaping the future of library services.

Box 3: Vienna Libraries. Links between new services and ecosystems. By Doris Schartinger

Conceptual framework dimension focus: What (co-creation service) and who (co-creation actors)



Library services have evolved from the past in many ways, and collaboration with outside partners is essential in developing new services. The Vienna libraries can be seen as orchestrators of their local ecosystem, following criteria for the setting up of their ecosystem over time. Decisions are framed by national and municipal institutions/policies, as well as the macro environment and international influences like the IFLA Manifesto, the sustainable development goals (SDGs), as well as developments in other libraries, and the EU level.

The Vienna Libraries are a metropolitan area library network. The Vienna libraries network consists of a main library and 37 branch libraries across the different Viennese districts. The main location of the Vienna Libraries is a landmark building, designed by Ernst Mayr, officially opened in 2003. The goal was to use the library as a placemaker in signalling accessibility and locating it between very diverse districts (7th, 15th).

Outreach and co-creation. The outreach and community approach is perceived to be coming very much from within the organisation of the Vienna libraries and seen as increasing. The main form of approaching different kinds of users today is via forming alliances with local associations and local NGOs that represent very different social groups. With the help of NGOs, the Vienna Libraries manage to attract new users out of the groups of non-users, thus enhancing its outreach. NGOs represent (non-) user groups and help serving a larger part of the target audience – which is basically all people living in Vienna.

New services: Many of the services the Vienna Libraries offer are closely linked to media and reading and thus related to the traditional value proposition of libraries. However, other new services are dedicated to inclusion and community services – thereby directly addressing the development of language skills (mostly German), but also bringing together and connecting people, particularly vulnerable groups. Further services center around creativity and entertainment, e.g., makerspaces.

An ecosystem of partners is central to involve users in a systematic way. When libraries offer new types of services, they collaborate with local associations and NGOs.

Conditions have to be met in order to make this approach work. An ecosystem of partners is central to involve users in a systematic way.

When libraries offer new types of services, they collaborate with local associations and NGOs. Ecosystem partners help serving particular groups in local society. Especially in services around inclusion, a high proportion is done together with partnering organisations. Employees and active citizenship. Employees are key in bringing the ecosystem of local NGOs and associations together with the library. Beyond mere ideas, libraries provide one setting to implement new services that make a difference and enhance societal participation, democratic values, inclusion, well-being. Thus, they act as a nutrient medium for ideas based on active citizenship.

This case directly responds to one of the research questions of the conceptual framework (Identification of innovation and ecosystem creation and alignment), as it identifies novel services (innovation) and follows up on partnerships that together develop the new services. The novel services address user needs. The services along these lines actively reach out to new groups of users, engage citizens and provide fun and entertainment thereby fulfilling an active role in society.

Box 4: A catalyst for innovative action: MediaLab-Tabakalera. David Gago

Conceptual framework dimension focus: How (co-creation process) and What (co-creation services)



MediaLab-Tabakalera (ML-T) co-creation process (the *how*) is defined by openness. Anyone—including citizens, staff, artists, technologists, and external partners—can propose and join activities, promoting diversity and avoiding rigid group boundaries. Staff competences are key to support this model, as they act as facilitators offering support, resources, and expertise, but avoid dictating outcomes or intervening unless absolutely necessary (*"be there without imposing"*). The community is trusted to self-organize, with staff stepping in mainly when the group stalls or requires conflict resolution. The process is intentionally experimental—new initiatives are tested, reactions are observed, and activities are adjusted. Not every initiative is expected to succeed; learning from setbacks is valued.

Technology at ML-T is used as 'an instrument to spur co-creation, but not as an end'. Access to a range of tools (e.g., digital manufacturing, electronics) is provided and empowers participants to prototype, repair, and create collectively. This helps users extend their experience beyond the library's physical space, establishing the library as a "third space".

The very features of co-creation process (the *how*) drive the types of services co-created (the *what*). Activities and services co-created are based on observation of user behaviour and preferences, evidence gathered around suggestion boxes available at the library, and direct dialogue. Open Groups play a major role in engaging users as co-creation agents in self-organised & self-sustained processes. Open Groups focus on

MediaLab-Tabakalera's innovative activity is grounded in openness and experimental approaches, effectively supported by the skilled competencies of its staff.

exploring specific topics with the key objectives of generating new knowledge, developing projects, and fostering community cohesion. These groups serve as a vital link to real-world needs by identifying the relevant actors and challenges within the community. Beyond project initiation, they actively produce insights and curate a program of activities aligned with their areas of interest. Examples of Open Groups are textile experimentation, citizen astronomy, hydroponics, Food Hack Lab, or video game analysis. Social inclusion is usually present in the services co-created, as in the case of workshops for people with disabilities, intergenerational knowledge sharing, family reading activities or creation of blogs and podcasts by homeless people.

Activities at ML-T emphasise experiential and integrative learning to foster meaningful knowledge acquisition. For instance, instead of delivering a conventional Photoshop course, the approach adopted is immersive, beginning with outdoor photography, followed by digital editing of those images using Photoshop. Additionally, participants engage in discussions about open licensing and the process of uploading the final work to cloud platforms.

Involving users as co-producers at the early stages is a driver for co-production & co-innovation, as they develop a sense of ownership, considering the library not merely as a provider of resources but as a shared space. A case in point was the project *Open Furniture* that involved users in co-designing the furniture and the tools of the space -under the supervision of a technical team-, before opening it.

Box 5: Connecting communities across the territory: the BiblioLab experience. By David Gago

Conceptual framework dimension focus: Who (co-creation actors) and What for (co-creation goals)



The BiblioLab experience in the province of Barcelona exemplifies a transformative approach to public libraries as living labs that engage a wide range of actors and communities. The innovativeness of BiblioLab lies on the fact that the library network is perceived as a distributed infrastructure, with the legitimacy to unleash citizen-centered innovation processes. Through this model, BiblioLab facilitate the creation of tailored, context-sensitive digital experiences that deepen the connection between residents, their heritage, and emerging technologies. BiblioLab is perceived as a “boundary object”, as: a) they comprise different communities of practice that can be involved in the same project; b) the projects dissolve the distinctions between the physical and virtual library realms, as well as between physical and digital collections while preserving coherence; and c) meeting points can be built between collective action, individual creation, and public cultural heritage.

At the core are the public municipal libraries and the library staff, who act as facilitators and coordinators within the broader network. Their role is essential not only because they provide access to resources, but also due to their ability to interpret users' needs, aspirations, and preferences in the form of the co-creation initiatives delivered. Library staff are equipped with strong competencies—particularly soft skills—that enable them to meaningfully engage users from diverse backgrounds and with a wide range of interests.

Public administration institutions also play a crucial role in Bibliolab. Special emphasis should be placed on the Provincial Council of Barcelona, which acts as a provider of aid and services and facilitates networked collaboration, as well as the Town Halls of the involved municipalities. Additionally, academic institutions, particularly municipal schools, contribute significantly, especially in projects involving intermunicipal collaboration. Third sector and cultural associations also participate actively. A notable example is the Bitlab Cultural Association, which has promoted the creation of digital citizen labs in libraries serving less densely populated areas.

BiblioLab epitomises how public libraries can create and connect communities, empowering them with tailored digital experiences and fostering enduring social and territorial cohesion.

Regarding *what for* (co-creation goals), a major feature of Bibliolab is the ability to connect local communities by empowering individuals with digital skills and critical awareness while strengthening social cohesion across municipalities and diverse demographic groups. It also aims to preserve and create cultural and scientific resources that reflect local realities and collective memory, reinforcing community identity and resilience. The program's networked approach ensures equitable access to innovation and digital technologies regardless of geographical context, positioning BiblioLab as a powerful driver of territorial cohesion, sustainable development, and participatory democracy. Characterized by extensive reach, BiblioLab serves all libraries in the province—including mobile bibliobuses—thus fostering social integration and reducing inequalities related to geographic inclusion by making cultural, educational, and informational resources universally accessible.

In conclusion, BiblioLab aims to transform libraries into spaces where collaborative experimentation and creative methodologies enable learning, social inclusion, and cultural enrichment. This involves democratizing access to technological resources and knowledge across communities.

Box 6: Reception Library – Purchena, Spain Social Innovation for Inclusion through a Library-based Community Network. By Fabio Moscoso

Conceptual framework dimension focus: What (co-creation service) and what for (co-creation goals)



The Reception Library in Purchena (Almería, Spain) is a pioneering example of social innovation in a small municipal library. Founded in 2015, it emerged from the spontaneous use of the library by migrant and local youth at risk of exclusion. The initiative transformed the library into a space for linguistic, cultural, and civic integration, aligning community needs with the design of inclusive public services.

The library developed new services, including Spanish language instruction tailored to levels, foreign language courses led by Erasmus+ volunteers, youth reading clubs, and intercultural creative workshops. A key milestone was the 'Human Library' (2017), the first of its kind in Andalusia, where migrant youth shared their life experiences through dialogue, fostering empathy and mutual understanding. These initiatives redefined the library's traditional role as a civic and intercultural hub

The project's success relies on co-creation and co-production between the municipal library, the City Council, schools, youth centres, and cultural associations. Volunteers, educators, and young users collaboratively designed activities, promoting democratic values and collective agency. Despite limited funding, the initiative achieved national recognition (Social Library Award 2017; CCB Seal) and long-term sustainability through strong partnerships and volunteer engagement..

The innovation process in the Biblioteca de Acogida project of Purchena Library is rooted in spontaneous community participation, where social needs evolved into co-created solutions that redefined the library as a civic hub for inclusion, language learning, and intercultural dialogue.

Conceptually, the project combines service, process, and social innovation, showing how libraries can operate as integrators of local networks that connect education, culture, and social inclusion policies. It contributes directly to the objectives of youth participation, migration integration, and civic engagement at both national and EU levels

This case demonstrates that even modestly resourced libraries can generate high social impact by leveraging relational capital, creativity, and empathy-driven co-design. It exemplifies innovation in libraries as a catalyst for inclusion and democratic participation.

Box 7: The Central Public Library of Veria, Greece. By Anna Triantafillou

Conceptual framework dimension focus: What (co-creation service) and what for (co-creation goals)

The innovation of the Central Public Library of Veria lies in its transformation from a traditional lending library into a living lab, where technology, creativity, and civic participation converge. The What refers to the redesign of the library's services into an open, participatory ecosystem. The creation of the Media Lab, Maker Space, and user-led workshops has redefined the institution as a facilitator of community innovation that blends education, culture, and technology.



The What for concerns the generation of public and private value through empowerment, inclusion, and lifelong learning. The goal is to position the library as a civic hub that nurtures democratic engagement and supports the social and digital development of Veria's citizens. Public value is achieved through social cohesion and participatory culture, while private value arises from digital literacy, creativity, and personal growth.

Who: The innovation is driven by a network of actors. Librarians act as facilitators and educators, while the Director provides strategic direction and fosters co-creation. Citizens play an active role as co-creators by proposing ideas, leading workshops, and sharing expertise. Municipal and regional authorities provide policy and funding support, and external partners such as schools, volunteers, and local businesses, contribute knowledge and infrastructure. Together, they sustain a community-based innovation ecosystem.

Innovation consists of transforming a traditional public library into a living lab that integrates technology, creativity, and civic participation to co-create educational, cultural, and social value.

How: The process relies on co-production and continuous dialogue between staff, users, and partners. Using design thinking and digital tools, the library enables users to shape services, share resources, and develop projects collaboratively. Acting as a network enabler, it connects individuals and organizations to generate social and educational value. Feedback mechanisms, flexible spaces, and technology ensure adaptability and inclusion.

Research Focus: The case illustrates how public libraries can act as innovation ecosystems that foster community participation and shared learning. Leadership vision, community trust, and funding are key drivers, while staff shortages and limited resources are barriers. The impact is visible in enhanced civic engagement and user-driven learning. Co-creation aligns value expectations between staff and citizens, and participation evolves from passive use to active contribution and ownership.

Box 8: Retrotool at the National Library of the Netherlands. By Carsten Schmidt

Conceptual framework dimension focus: What (co-creation service) and How (co-creation process)

The development of Retrotool at the Dutch National Library (KB) exemplifies a service innovation focused on automating metadata generation for books and documents acquired over centuries. Faced with a growing backlog of uncatalogued historical materials, estimated at over 150,000 items, the KB initiated Retrotool to automate bibliographic metadata extraction using Optical Character Recognition (OCR) and Large Language Models (LLMs). This innovation speaks to the What dimension of the conceptual framework, offering a tangible AI-enabled solution that processes printed books, extracts descriptive data, and assists cataloguers by generating initial catalogue entries.



Retrotool is not positioned as a replacement for human expertise but rather as an augmentation. The How dimension is evident in the participatory development approach adopted by the KB. A cross-functional team of cataloguers, innovation coordinators, developers, and external vendors engaged in iterative co-design and co-implementation phases. Feedback loops with metadata experts ensured that the AI-generated entries adhered to national bibliographic standards and supported existing cataloguing workflows. Librarians continue to review and refine each AI-generated entry, ensuring quality and contextual understanding, a prototypical “human-in-the-loop” process that strengthens trust and uptake.

Retrotool at the National Library of the Netherlands (KB) is a clear example of innovation in how AI-Assisted Metadata can increase access and efficiency

The use of commercial LLMs (e.g. Microsoft’s solution) was cautiously approached, with plans to migrate to open-source solutions that offer greater transparency and data sovereignty. The KB’s strategic roadmap balances technological ambition with ethical responsibility, ensuring that AI adoption aligns with the institutional mission and public accountability.

The value created by Retrotool is multi-layered. Internally, it accelerates cataloguing, reduces repetitive tasks, and frees staff to focus on higher-order bibliographic interpretation. Externally, it enhances public access to materials that had remained invisible due to metadata gaps. One interviewee summarised this transformation: “If books are in our repository without metadata, they might as well not exist for the public.”

Retrotool thus validates the conceptual framework by illustrating how AI-enabled tools can be co-created within a national institution through a process that integrates librarians’ knowledge, upholds ethical standards, and delivers both private and public value. The case also affirms the importance of phased innovation (from MVP to operational prototype), and the strategic layering of automation with human judgment to foster institutional modernisation without displacing professional expertise.

Box 9: Automatic Indexing at the National Library of Estonia By Carsten Schmidt

Conceptual framework dimension focus: What (co-creation service) and How (co-creation process)

The “Automatic Indexing” initiative at the National Library of Estonia (NLE) demonstrates how national cultural institutions can harness AI to serve broader strategic goals, including language preservation, workflow modernisation, and ecosystem-wide innovation. Rather than focusing solely on cataloguing efficiency, the Estonian case is deeply oriented toward value creation for national identity, technical sovereignty, and reuse across the public sector. This reflects the What for dimension of the conceptual framework: the innovation is not merely about automating metadata, but about sustaining Estonian linguistic heritage in the digital age, reducing dependence on large tech platforms, and enabling reuse through open-source tools.

The AI system was developed to tag and index national publications across various formats, including books, PDFs, and newspaper articles, utilising components such as Optical Character Recognition (OCR), content analysis, and metadata extraction. The system integrates into Estonia's broader "Kratt" AI strategy and is interoperable with initiatives such as the government-wide "Bürokratt" chatbot ecosystem. This positions the NLE as both a data provider and an AI adopter within the national innovation architecture.

Automatic Indexing at the National Library of Estonia is a clear example of innovation in how AI can support language sovereignty and collaborative innovation

The Who dimension is prominent in this case. Multiple stakeholders contributed across the co-production phases, including the internal data science team, library staff, external vendors, national ministries, linguistic researchers, and users. The project involved a deliberate strategy of transparency and engagement, especially with staff who expressed scepticism about AI's role in libraries. Weekly newsletters and team meetings, internal workshops, and regular demonstrations helped to demystify AI and cultivate trust. Librarians remained central to the system's training, validation, and refinement, affirming their evolving but essential role in human-AI collaboration. As one interviewee noted, "We're not trying to fully automate cataloguing. The goal is to widen the bottleneck; librarians use AI-generated suggestions and then validate or correct them."

Despite the strong national support, the project also faced significant challenges: low internal IT capacity, fragmented governance (due to external IT outsourcing), and language-specific data limitations that hindered AI accuracy. Yet, these very challenges validated the co-creation logic embedded in the conceptual framework, demonstrating that high-quality public innovation depends on iterative learning, cross-sectoral cooperation, and layered responsibility among actors.

The Estonian case demonstrates how public sector AI innovation can serve dual missions: enhancing internal efficiency and delivering societal value. By investing in open, reusable tools tailored to local linguistic needs, the NLE created a model of responsible digital innovation that others, particularly smaller language communities, can emulate. It also underscores the importance of co-creation processes that take into account cultural sensitivities, staff concerns, and long-term sustainability.

Box 10: RepairCafé @Vélizy, by Benoît Desmarcheair and Faïz Gallouj

Conceptual framework dimension focus: How (co-creation process) and how (actors and networks)

This case is about the creation of a repair café inside the municipal library of the city of Vélizy, in the Paris region. The idea of the Repair Café was proposed in 2016 to the director of the library by readers involved in fablabs of nearby cities. Since then, once per month, people can bring to the library small electric and electronic appliances to get them repaired by volunteers. This initiative is so successful that, in 2019, the library helped set up a fablab in the city, called the Izylab – which works in partnership with 5 other fablabs of the region. Henceforth, the Izylab provides a pool of volunteer repairers to run the repair café within the library.



This Repair café can be characterized as a social innovation because it was setup by a network of partners: the library, volunteer workers, as well as the city hall. Also, it is a social innovation because it creates a new set of interactions within the library between a new category of visitors (i.e. non-readers who want to get their appliances beign reappeared), librarians and repearers, as well as new interacting units, since the repair café is a new organization within the library, and the Izylab is a new organization in the city. As such, this innovation can be labelled as both an architectural and a modular social innovation (please, refer to D3.6 for details).

Librarians cannot possess only the technical skills required to retrieve and store books, but also they need to mobilize relational capabilities, like listening, empathy, and networking.

Interestingly, it appears that, through social innovations, public libraries can also convey tacit knowledge – here in the form of know-how, and the librarian does not stand anymore only as the knowledgeable person who knows books, but also as a connector between other knowledge providers (here, the volunteers possess know how) and users/ beneficiaries. Compared with the traditional role of books curators, librarians cannot possess only the technical skills required to retrieve and store books, but also they need to mobilize relational capabilities, like listening, empathy, and networking.

Apart from reflecting an ongoing transformation in the work of librarians, the case of the repair café illustrate the importance of social innovations: they connect people, help to diffuse knowledge, and they can create a virtuous dynamic of innovations. Indeed, the repair Café is the source of the creation of a novel organization, the Izylab, which then works at perpetuate the Repair Café itself. We also note that, by diffusing technical know how and the practice of repairing and experimenting, the library of the city of Vélizy actually plays an active role in the regional innovation system. In fact, it is now integrated into the regional network of fablabs, called the Hatlab.

3.4.2 Illustrations by the stakeholders panel members

Box 11: Oodi Library. Value co-creation by community self-management. By Robert Seitovirta

Conceptual framework dimension focus: How (co-creation process) and who (co-creation actors)

One of the more relevant innovations in Oodi Central Library in Helsinki is the creation of a model of community self-management, whereby decisions about the organization of work, shared values and operating rules are made collectively by the staff. It is not a new digital service or a different library offer, but a deep organizational transformation that redefines the way the institution is managed and that makes the work culture itself the main innovation. The **How dimension of the multiagent conceptual framework is evident in this case** since its most important element is the innovative processes through which the library is organized, which leads to dynamics of co-creation of value between different stakeholders in an ecosystem of innovation.

The impact of this model is observed, first of all, in the domestic sphere. Workers are not simply executors of tasks, but protagonists of the decisions that affect the library. This empowerment generates greater well-being, motivation and engagement. Innovation, therefore, does not lie in a tangible product, but in the very conception of the library, which fosters an ecosystem that reinforces commitment and active collaboration. In turn, the value created transcends the private: by consolidating a motivated and safe workforce, Oodi creates the



necessary conditions to authentically involve citizens in future processes of co-creation of services. Self-management thus becomes a prerequisite for inclusive and meaningful public participation.

The who dimension is also very significant in this illustration since users and community has a central on it. The actors involved show how this innovation is sustained and at the same time faces tensions. The main driving force has been the staff themselves, who with a willingness to change and a willingness to learn drove the transformation. Management accompanied the process without imposing hierarchies, providing resources and support, and even incorporating external consultants to guide the initial workshops.

Innovation, therefore, does not lie in a tangible product, but in the very conception of the library, which fosters an environment that reinforces the commitment and cohesion of the team.

The municipal administration, although more distant in the day-to-day dynamics, provided the institutional framework and financing that made the experience viable. For their part, users were mainly involved in the planning phase of the library as a space, while the self-management model was defined and implemented internally. The barriers are not minor: rigid external structures, resistance to profound changes or the lack of political support can hinder the continuity of the model. However, Oodi's strength lies in the fact that self-management is not conceived as a static achievement, but as a living process in constant review and adaptation.

The case clearly answers the research question focused on the processes of co-creation of value and the way in which the expectations of different actors can be aligned or come into tension. At Oodi, co-creation begins within the team, which harmonizes their values and builds mutual trust. This internal organizational base is understood as an indispensable condition for extending co-creation to citizens. In short, Oodi demonstrates that the most transformative innovation can be found in the field of management and organizational culture. By reframing how decisions are made and work is organized, the library not only improves the quality of work life of its employees, but also builds the foundations for participatory governance capable of generating private and public value in a sustainable way.

Box 12: Innovation in network. By Felipe Leal

Conceptual framework dimension focus: What (co-creation service) and what for (co-creation goals)

The innovation of the Oeiras Municipal Library Network (BMO) for this illustration is the very configuration of the network as an innovative object. In a strongly hierarchical municipality, with a bureaucratic culture and little tradition of citizen participation, the existence of a network composed of three libraries (Algés, Carnaxide, and Oeiras) represents a significant transformation. ***The What is therefore defined as the creation of a library system in network form, capable of articulating services, sharing learning, and testing novel methodologies.*** This structure differs from the traditional individual library and allows for a more integrated response to citizens' demands. ***The What for is expressed in the network's purpose: to provide high-quality public service, strengthen social cohesion, and open spaces for participation and experimentation among users.*** In a city characterized by high levels of education, business dynamism, and elevated living standards, the library network responds to the need for cultural institutions that match its citizens' profile, generating both private and public value. Private value is observed in the improvement of user and staff experiences; public value is materialized in inclusion, community interaction, and contribution to strategic local policy objectives, such as social innovation and sustainability.



In addition to traditional services, this library network has developed various types of innovative services, such as a music library, an optometry library, an architecture and art library, and special book collections. These attract different types of users to the network and generate a diverse ecosystem that is ideal for the emergence of collaborative and participatory practices. Furthermore, the network has served as a platform for exchanging experiences, launching pilot projects, and mobilizing staff with different skill sets when a library requires support in design, cultural management, or technology. By establishing a common structure (digital platforms, shared Wi-Fi services, management infrastructure), the network enhances operational efficiency and reduces duplication. In a traditional municipal context, this network structure has been innovative because it brings together dispersed capacities, distributes risks, and facilitates experimentation: it allows one library to test collaborative methods while other nodes later join in, adopting previously tested lessons. In this way, the network ensures that innovations are not confined to a single building but flow between libraries, raising the overall level of service and reinforcing its strategic role in the community..

Innovation consists of the creation of a networked library system, capable of articulating services, sharing learning and testing innovative methodologies.

This case aligns directly with one of the research questions of the conceptual framework (Identification of innovation and co-creation), as it allows the identification of an innovation based on the establishment of a municipal library network as an innovation ecosystem. The services produced under this logic go beyond mere cultural provision: they are renewed services that seek to engage citizens and adapt spaces and processes to their expectations. The ultimate objective of this innovation is to provide libraries with a strategic role in local society, positioning them as nodes of cohesion and experimentation in public policy.

Box 13: Living lab digital humanities at the Utrecht University. By Arja Firet

Conceptual framework dimension focus: What (co-creation service) and how (co-creation process)

The case of the Living Lab Digital Humanities (DH) at Utrecht University Library is a clear example of innovation that can be interpreted simultaneously through the What and How dimensions of the conceptual framework. On the one hand, the what is tangible: the creation of a new object of innovation, materialized in a hybrid and flexible space called the Living Lab DH (later DH Workspace), accompanied by a website that integrates all services related to Digital Humanities across the university. This object takes shape as a physical and virtual hub where researchers, teachers, students, and support staff can collaborate, attend workshops, lectures, seminars, and hybrid events, or receive advice during weekly open walk-in sessions. In addition, the Living Lab has become a reference point for digital literacy training, which since 2024 has been formally incorporated as a learning outcome in all undergraduate Humanities programs. Innovation here goes beyond a simple extension of services: it represents a structural transformation of the library's role, shifting from being a mere repository of knowledge to becoming a facilitator of digital competencies and a community-building space for academic innovation.



At the same time, the essence of the case lies in the how: the processes and collaborative mechanisms that made this innovation possible. The Living Lab was not designed top-down as a finished product but rather emerged gradually, iteratively, and participatively through co-creation between Utrecht University Library (UUL) and the Faculty of Humanities. The turning point was the DH2019 conference, held in Utrecht, after which both parties recognized the need for more formal structures and sustained cooperation in the field of Digital Humanities. This shared recognition of a common challenge

Living Lab Digital Humanities (DH) at Utrecht University Library is a clear example of innovation that can be interpreted simultaneously through the What and How dimensions of the conceptual framework.

gave rise to a new mode of governance based on equality and partnership, in which expertise is blended and hierarchies are flattened. The library contributed its experience in open science, FAIR data management, digitisation, and information literacy training, while the faculty contributed its knowledge in academic research, computational methods, and pedagogical innovation. From this convergence a transdisciplinary DH Support Team was born, bringing together researchers, IT specialists, software developers, data experts, statisticians, and librarians. This team exemplifies how innovation in today's universities requires overcoming disciplinary silos and creating collaborative arrangements that enhance the capacity for experimentation and knowledge production.

In conclusion, the Living Lab DH demonstrates that the most relevant innovations in university libraries today are hybrid in nature. They combine a new object of innovation—spaces, services, and digital learning outcomes—with transformative processes of governance and collaboration. The result is not only improved support for Digital Humanities research but also the consolidation of the library as a strategic partner in co-creation, capable of generating private value (for researchers and students) and public value (for the university and society at large).

3.4.3 Summary of illustrations and relationships with the conceptual framework

The case studies analyzed show significant diversity and various ways and methods to produce innovations on libraries. Among the new services or new characteristics of service the co-creation thematic areas of LibrarIN are particularly relevant.

Digital transformation is also present in case studies, Retrotool at the National Library of the Netherlands (Box 8) or the Automatic Indexing system in Estonia (Box 9) show how innovation takes a technological form, oriented towards efficiency, heritage preservation and digital sovereignty, particularly, Retrotoo validates the conceptual framework by illustrating how AI-enabled tools can be co-created within a national institution through a process that integrates librarians' knowledge, upholds ethical standards, and delivers both private and public value.

The cases illustrates how libraries has become ideal arenas for social innovation and, sometimes, the development of networks for collaboration. On this regard, we can highlight social innovation in libraries in RepairCafé @Vélizy at the Paris Region (Box 10) , that is and initiative where people can

bring to the library small electric and electronic appliances to get them repaired by volunteers and was setup by a network of partners: the library, volunteer workers, as well as the city hall. Another example, the Reception Library in Purchena, Spain (Box 6), that emerged from the spontaneous use of the library by migrants and local youth at risk of exclusion. There, the need and preferences by users mixed with the competences by the library staff that transformed the library into a space for linguistic, cultural, and civic integration, aligning community needs with the design of inclusive public services.

Finally, living labs represent one the main innovation in libraries, since they are a complete transformation of library conception. Word Room at Dokk1 (Box 1) show how a library might offer platform for a circular and sustainability work, engaging citizens, artists, and local organizations in collaborative experimentation and dialogue around social challenges. Similarly, the Oodi Library in Helsinki (Box 11) exemplifies a mature living lab model, where users and staff jointly design, test, and manage services, transforming the library into a co-created ecosystem of participation. This open and iterative approach allows Oodi to function as a space of continuous learning and democratic innovation, illustrating how living labs redefine libraries as engines of social creativity and shared governance.

In most cases the role of users is key, sometimes since the very design of the services and even of the buildings and furniture. Library staff play a central role as facilitator, mediator and connector. Their role is redefined from technical management to the facilitation of collaborative processes, as shown by the cases of Purchena (Box 6) and Vélizy (Box 10). The Oodi library also show a case of value co-creation by community self-management in Oodi Library (Finland), here staff is key and foster an environment that reinforces the commitment and cohesion. External stakeholders (city councils, associations, universities or technology companies) act as strategic partners, providing resources, knowledge or institutional legitimacy. Examples of this are the collaboration of the Provincial Council of Barcelona in BiblioLab (Box 5) or the academic alliances in Utrecht (Box 13).

In all examples, local networks and ecosystems emerge as essential structures to sustain innovation: urban networks such as those of Oeiras (Box 12) or Vienna Libraries strengthen inter-institutional collaboration and the circulation of learning. Finally, common preferences and competencies among the cases include values of inclusion, sustainability, shared learning, and citizen empowerment, along with facilitation skills, digital literacy, and collaborative project management. Together, the thirteen cases empirically validate the conceptual framework, demonstrating that innovation in libraries is built at the intersection between service, process, and public value.

In sum, the join analysis of the case study show how the competence and preferences by the different stakeholders has direct and indirect interactions in a determined context to produce public and private value. Tables 5 and 6 show the elements of the multi-agent conceptual framework present it the boxes.

Table 5: Illustrations and their relationship with multi-agent conceptual framework (part A)

	Box 1: Dokk1. A Circular Living Lab for Co-creation	Box 2: Oodi Library Makerspace	Box 3: Vienna Libraries	Box 4: MediaLab-Tabakalera	Box 5: Barcelona Bibliolab	Box 6: Reception Library – Purchena, Spain
Profile	Large public library in Aarhus with a circular space for learning and sustainability	Makerspace at Helsinki Central Library Oodi; living lab shaped by citizens' ideas	Metropolitan network with a main library and 37 branches across Vienna.	Media and cultural lab open to citizens, artists, technologists and partners.	Provincial library network in Barcelona acting as living labs for citizen innovation.	Small municipal library in Almería focused on social innovation and inclusion.
Main new function	To organize workshops, exhibitions and dialogues about the UN SDGs	To enable co-creation through participatory planning and everyday making.	To develop new services through collaboration with external partners	To foster co-creation through open, experimental and self-organised processes	To connect communities and promote co-creation through digital projects.	To support linguistic, cultural and civic integration through co-created services.
Examples of new services or new characteristics	Hands-on activities such as a "Seed Library" and "Plant Workshop" that bring sustainability to everyday life.	3D printing, media tools, sewing and laser equipment; born from the "Dream" campaign and participatory budgeting.	Inclusion and language programmes, community and creative activities such as makerspaces.	Co-created workshops and Open Groups (e.g. citizen astronomy, hydroponics, Food Hack Lab) linking creativity and inclusion.	Digital and cultural experiences linking heritage and technology.	Language courses, youth clubs, creative workshops and the "Human Library".
Role of users (examples)	Taking part in designing and running the activities	Design of the library. Propose workshops, start projects, and give feedback through daily interaction	Participate through NGO representing social groups	Propose, join and self-organise activities; act as co-producers from early stages.	To co-create and share projects that reflect local identity.	Migrant and local youth co-design and lead inclusive activities.
Role of Stakeholders	Collaboration with local groups, schools, kindergartens and homeless people; formation of the "Root Net"	Partners from companies, NGOs and city sectors; e.g. Martha Association repair workshops.	NGOs and local associations help reach non-users and support inclusion services	Artists, NGOs and partners collaborate in projects and share expertise	Provincial Council, Town Halls, schools and Bitlab Association support collaboration.	City Council, schools, youth centres and associations co-produce programmes.
Role of Staff	To facilitate design and learning processes and support citizens' initiatives through "hands-on"	To mentor, guide equipment use and collect user feedback.	To connect partners, implement new services and foster active citizenship	To facilitate, support and mediate without imposing outcomes	To facilitate, interpret user needs and guide co-creation.	To coordinate, facilitate and sustain community partnerships.
Role of networks	Root Net connects local libraries to exchange experience and develop outreach to new groups	To connect users and partners for shared projects and knowledge exchange.	Ecosystem of NGOs, local associations and municipal institutions	Open Groups connect diverse participants and real-world needs	Province-wide network of libraries and mobile bibliobuses.	Local network linking education, culture and social inclusion actors.
Link to ecosystem	Connections to local and global policies through SDGs	Integrated in Helsinki's innovation and community networks	Shaped by local policies, SDGs and international library frameworks	Acts as a "third space" linking the library with cultural and social innovation networks	Linked to local administrations and cultural associations.	Embedded in municipal and EU youth and integration policies.
Preferences	Shared ownership, inclusion, creativity and making sustainability tangible	Shared ownership, collaboration, and sustainability	Inclusion, participation and community well-being	Openness, experimentation, inclusion and shared learning	Inclusion, cohesion and digital empowerment.	Inclusion, empathy, participation and social cohesion.
Competences	Design thinking, facilitation, community engagement and practical craft skills	Facilitation, mentoring and technical know-how	Coordination, networking and partnership facilitation	Facilitation, conflict resolution, technical guidance.	Facilitation, community work and digital skills.	Facilitation, coordination and community engagement.

Table 6: Illustrations and their relationship with multi-agent conceptual framework (part B)

	Box 7: The Central Public Library of Veria, Greece	Box 8: Retrotool at the National Library of the Netherlands	Box 9: Automatic Indexing at the National Library of Estonia	Box 10: RepairCafé @Vélizy in France	Box 11: Oodi Library in Findland. Community self-management	Box 12: Innovation in Oeiras library network	Box 13: Living lab digital humanities at the Utrecht University
Profile	Living lab combining technology, creativity and civic participation.	Innovation project to automate metadata generation for historical materials.	AI-based initiative at the National Library of Estonia to tag and index national publications.	Monthly repair café hosted in the municipal library of Vélizy, near Paris.	Central Library of Helsinki with an internal model of community self-management.	Municipal library network in Oeiras with three branches: Algés, Carnaxide and Oeiras.	Hybrid physical and virtual hub at Utrecht University Library for Digital Humanities collaboration.
Main (new) function	To provide open, participatory and technology-driven library services.	To process and extract bibliographic data using AI tools and OCR.	To automate metadata creation and support language preservation through AI tools.	To offer a space where citizens repair small appliances with volunteer support.	To organize work and decision-making collectively among staff.	To coordinate services and foster collaboration across libraries.	To support research, teaching and training in Digital Humanities.
Examples of new services or new characteristics	Creation of a Media Lab, Maker Space and user-led workshops.	Retrotool system using OCR and Large Language Models to create initial catalogue entries.	AI system using OCR, content analysis and metadata extraction integrated with Estonia's "Kratt" and "Bürokratt" strategies.	Creation of a library-based repair café and later a city fablab (Izylab) connected to five regional fablabs.	Organizational transformation turning work culture into the main innovation.	Creation of a networked library system enabling shared learning and experimentation.	Creation of the DH Living Lab and DH Workspace with workshops, events and digital literacy training.
Role of users (examples)	To propose ideas, lead workshops and share expertise as co-creators.	Review and refine AI-generated entries in a human-in-the-loop process.	Validate and refine AI suggestions in a human-AI collaboration process.	Citizens bring devices, learn repair skills and participate in collaborative fixing.	Citizens involved mainly in the library's initial planning phase.	To participate in new services and community activities across the network.	Researchers, teachers and students co-create and participate in activities.
Role of Stakeholders	Municipality, regional authorities, schools, volunteers and local businesses support	Developers and vendors co-design and test the system with KB teams.	Ministries, researchers, vendors and users co-develop and test the system.	City hall and Izylab provide organisation and volunteer repairers.	Municipal administration provides framework and funding; consultants guide workshops.	Municipality provides structure, policies and strategic support.	Collaboration between the University Library and Faculty of Humanities.
Role of Staff	Librarians act as facilitators and educators; Director provides leadership and fosters co-creation.	To validate data, ensure quality, and guide AI implementation.	To train, validate and supervise AI outputs while maintaining trust and quality.	To coordinate activities and connect volunteers, users and the fablab network.	Staff lead self-management, make collective decisions and sustain collaboration.	To share skills, launch pilot projects and collaborate across branches.	To contribute expertise in open science, data management and information literacy.
Role of networks	Network of citizens, institutions and partners sustaining community innovation.	Cross-functional team of librarians, innovation coordinators and external partners.	Cross-sectoral network linking NLE, ministries and national AI initiatives.	Linked with Izylab and the regional Hatlab fablab network.	Internal team supported by management and municipal administration.	Internal network connecting libraries and supporting joint projects.	Transdisciplinary DH Support Team linking researchers, IT staff and librarians.

	Box 7: The Central Public Library of Veria, Greece	Box 8: Retrotool at the National Library of the Netherlands	Box 9: Automatic Indexing at the National Library of Estonia	Box 10: RepairCafé @Vélizy in France	Box 11: Oodi Library in Finland. Community self-management	Box 12: Innovation in Oeiras library network	Box 13: Living lab digital humanities at the Utrecht University
Link to ecosystem	Integrated in local policies and community development strategies.	Part of the KB's digital transformation and national bibliographic strategy.	Embedded in Estonia's national digital and linguistic innovation framework.	Integrated into the city's innovation and community initiatives.	Part of Helsinki's public innovation and participatory governance model.	Linked to municipal goals for social innovation, inclusion and sustainability.	Embedded in Utrecht University's academic innovation and open science strategies.
Preferences	Empowerment, inclusion, learning and civic participation.	Efficiency, transparency, ethics and preservation of professional expertise.	Openness, language sovereignty, collaboration and responsible innovation.	Sharing, sustainability, community learning and inclusion.	Empowerment, trust, collaboration and shared responsibility.	Cooperation, participation, efficiency and community cohesion.	Collaboration, interdisciplinarity, openness and shared learning.
Competences	Facilitation, digital literacy and collaborative project design.	AI literacy, metadata expertise and collaborative problem-solving.	Data literacy, validation, cross-sector teamwork and adaptive learning.	Relational skills, empathy, networking and coordination.	Self-organization, facilitation and adaptive leadership.	Collaboration, cultural management and digital coordination.	Data management, facilitation, digital and pedagogical innovation.



4 Refinements to the Conceptual Framework

WP2 has established a refinement of the model based on the different validation exercises and discussions among researchers and with stakeholders. After this process, we introduced a main refinement that refers to key library dimensions that should be considered when analyzing the type of libraries that generates innovations. This is based on the findings by WP3 and WP4. On the one hand, WP3.3 conclude that libraries, as physical spaces, undergo a conceptual transformation that enable them to deliver three interconnected types of services: 'space-place services,' 'processional learning services' and "democratic engagement services'. Here we ask: what key dimensions or library characteristics should be consider to a deep understanding of these types of innovation in libraries? On the other hand, WP4 surveys results has offered empirical evidence on the core elements of service transformation in libraries, these results were used to determine some key dimension for studying and analyzing innovative libraries.

Following, we develop a review of the different typologies, styles and methodologies for innovation that generate different new and improved services in libraries in order to support the proposition of dimensions for study innovative libraries.

4.1 Typologies of innovative services in libraries.

Literature indicates that "there is rarely any classification of innovations proposed using empirical research on innovations in libraries or grounded in the library science literature." (Potnis et al 2020 p. 795). Contextual and differences among the types of libraries -main public libraries, branch public libraries, academic libraries, national libraries- has made difficult to propose an accepted typology of innovation in libraries (Pellack 2022). "Overall, innovation in public libraries is an underdeveloped topic in the literature" (Potnis et al 2021 p. 434). On the other hand, there is either any classification of innovative libraries themselves, so we propose the following questions: what kind of libraries produce more innovations, public, national or academics? Which are more likely to co-creation activities, main libraries or branch libraries? And more deeply, What dimensions should be considered when analyzing libraries propensity for innovation? In this section, we develop a short review on the existing typologies of services innovations in libraries and innovative libraries

Typologies based on social innovations in libraries.

Winberry and Potnis (2021) provide a systematic typology of social innovations in public libraries, identifying five types: *educational*, *civic*, *economic*, *inclusion*, and *environmental* innovations. Educational initiatives include literacy and digital training programs; civic innovations cover democratic engagement and community dialogue; economic innovations refer to workforce



development and support for entrepreneurs; inclusion initiatives address marginalized groups and accessibility; and environmental innovations concern sustainability and ecological awareness. Their study also emphasizes challenges such as resource limitations, lack of training, and tensions with traditional service models. This framework underscores that social innovation in libraries is not incidental but can be organized around distinct domains of societal value creation, highlighting the library's role as a proactive community institution that responds to pressing social issues while fostering new forms of collaboration and participation.

Suchá et al. (2021) complement this perspective by examining 227 socially oriented projects in Czech public libraries and clustering them into five categories: *educational*, *cultural*, *leisure*, *networking*, and *social support* activities. Their qualitative study also distinguishes the roles libraries play in these innovations—as *providers* (directly organizing initiatives), *enablers* (offering neutral spaces for community-led projects), or *catalysts* (co-creating innovations with stakeholders). Moreover, they develop a four-layer model of stimulators and barriers at structural, local, organizational, and personal levels, showing how legal frameworks, funding, community partnerships, staff competencies, and individual motivation interact to shape social innovation outcomes. Taken together, these typologies demonstrate the diversity of social innovation practices in libraries and the importance of supportive ecosystems. They highlight that libraries are not merely service providers but dynamic actors in social change, capable of reconfiguring their roles to meet evolving community challenges.

Typologies based on areas or domains of action

Nicholson (2017) proposes a typology of innovation in public libraries structured around five domains where new and improved services are more relevant: collections, user services, technology, programs, and the physical building. Each of these areas shows how innovation permeates multiple aspects of library practice, from digitization and open access in collections, to personalized user services, digital transformation in technology, and the reconfiguration of physical space into flexible, collaborative environments. Later, Nicholson (2019) broadens this framework and identifies five emerging areas in public library innovation: participation, making & creating, learning, new outreach, and partnerships. These trends shift the focus toward community engagement and illustrate a move from functional innovations to more collaborative, creative, and participatory dynamics. Together, they reflect an evolution in the role of public libraries as socially embedded institutions responsive to cultural and educational change.

At a different level and in a different type of library, Pacios and Martínez (2019) examine the strategic plans of European national libraries members of the CENL and identify eleven priority areas: collection and preservation, access, participation in cultural and social life, research, physical space, collaboration and alliance building, education, staff training, digital innovation, business support, and working atmosphere. This typology highlights not only the operational and technological priorities of national libraries but also the organizational and human dimensions needed to sustain long-term innovation. When considered alongside Nicholson (2017, 2019) contributions, these perspectives reveal how



typologies vary depending on the scope of analysis—whether functional and community-based or institutional and strategic. Yet they converge in highlighting digital transformation, participation, collaboration and partnerships.

Typologies based on core categories of Innovation in public libraries

The study by Potnis et al. (2020) represents one of the first organic classifications of innovations in public libraries, developed through an empirical investigation with administrators from award-winning institutions in the United States. By analyzing 80 reported innovations, the authors identified four core categories: programs, processes, partnerships, and technologies, each subdivided according to different goals and scopes. Program innovations are oriented toward either access or use of services; process innovations aim to enhance efficiency or effectiveness; partnerships may be internal or external; and technological innovations range from web-based solutions to assistive technologies and artificial intelligence. This framework provides a comprehensive view of how public libraries channel their innovative efforts across functional dimensions.

Subsequently, Potnis and Winberry (2021) expanded this framework with an empirical and statistical analysis that reinforced the fourfold classification while emphasizing the growing role of digital and service innovations with a broader social impact. Their typology highlights innovation as a means to foster equity, sustainability, and community participation, thereby moving beyond operational improvements to position the library as an active agent of social transformation. Together, these studies not only provide practical categories for organizing and understanding innovation in public libraries but also underscore the ability of these institutions to adapt strategically to contemporary challenges.

Typologies Based on Technology-Driven Styles: AI, ML, and Digital Platforms

Kumar and Islam (2021) provide a systematic review of thirty-two studies applying artificial intelligence (AI) and machine learning (ML) techniques in libraries, mapping the emerging technological landscape across multiple functional domains. Their analysis identifies key areas of innovation such as collection management (metadata processing and acquisitions), user services (recommendation systems, rating mechanisms), and internal processes (cataloguing, classification, text mining, and natural language processing). Further applications extend to administrative functions, including security, RFID, and title recognition, as well as reference services supported by conversational agents and chatbots. The review highlights a broad spectrum of techniques, ranging from logistic regression and support vector machines to deep learning and convolutional neural networks, positioning them as essential building blocks for the development of “intelligent libraries.” Despite these advances, the authors note that adoption remains uneven: while theoretical proposals abound, practical implementations are still limited, underscoring the nascent but transformative role of AI and ML in library practice.



Lo (2024) shifts attention from the technical horizon to the professional competencies required to engage with AI in practice. His case study of the GPT-4 Exploration Program at the University of New Mexico demonstrates how structured reskilling initiatives can foster AI literacy, adaptability, and a culture of innovation among academic librarians. Drawing on Malcolm Knowles' adult learning principles, the program emphasized self-directed, problem-oriented, and experience-based learning, allowing participants to experiment with generative AI in areas such as metadata management, staff-patron communication, instructional design, and critical evaluation of AI-generated content. Quantitative and qualitative assessments revealed significant improvements in participants' confidence and proficiency, while the collaborative format cultivated a community of practice. Lo's findings illustrate that the integration of AI in libraries is not merely a matter of technological readiness but of sustained professional development and organizational adaptation. Together, these perspectives highlight the dual nature of technology-driven typologies: the rapid evolution of AI/ML applications on the one hand, and the uneven yet crucial process of librarian reskilling and cultural transformation on the other.

Typologies of innovative libraries

Literature show significant evidence on the types of new and improved services that libraries offer nowadays, nevertheless, there is no classification of libraries beyond traditional –public libraries, academic libraries and national libraries-. Considering all the new services, methodologies, changes in their physical and virtual spaces and changes in their own conception, there is a need for a new typology, not only of innovative services offered by libraries, but for innovative libraries themselves. Stapley et al (2022) argue that when making typologies of some aspect of any research field the key dimensions of analysis must be defined. Thus, at the end of this section, we will propose some key elements for studying and analysing innovative libraries and that will allow to understand its the main dynamics and characteristics

Summary of typologies depending on the role of co-creation

- In the library literature, there is a variety of typologies of library innovations, some more related to the libraries innovation outcomes, some more related to services, some more related to technology.
- Not all innovation styles include collaboration and participatory elements in it. But most of them do include relational and organizational innovation dimensions.
- When collaboration is included, this is done in two different ways mainly:
 - i) Collaboration (participation/partnerships) as one type of library innovation (one specific innovation area),

- ii) Collaboration and participation as part of the library social innovation from which different types of activities emerge (one transversal area to different types of outcomes).
- In the scientific literature there is a lack of classifications of typologies of innovative libraries, so there is a need for the propositions of analytical tools that allow to understand the main dynamics and characteristics of innovative libraries

Table 7: Typologies of innovation in libraries

Author (Year)	Setting	Typology Style Proposed and place of co-creation (in bold)	Methodology	Key Contribution
		Social innovation as typology basis		
Winberry & Potnis (2021)	U.S. Public libraries	Five types of social innovations : educational, civic, economic, inclusion, environmental	Empirical survey and typological analysis	Established systematic classification of social innovation domains in libraries; emphasized societal value creation and challenges
Potnis & Winberry (2021)	U.S. Public libraries	Reinforced 4 categories; emphasized digital and service innovations with social impact	Empirical/statistical validation	Extended typology to equity, sustainability, and participation as innovation outcomes
Suchá et al. (2021)	Czech public libraries	Five categories of socially oriented projects : educational, cultural, leisure, networking, social support; roles as providers, enablers, catalysts	Empirical qualitative study of 227 projects	Developed a layered model of stimulators and barriers (structural, local, organizational, personal) influencing innovation outcomes
		Particular co-creation areas		
Nicholson (2017)	Public libraries (international)	Five domains: collections, user services , technology, programs, physical space	Comparative case studies	Functional typology of innovations across core domains of library practice
Nicholson (2019)	Public libraries	Five emerging areas: participation , making/creating, learning, outreach, partnerships	Literature and case synthesis	Shifted focus to participatory and creative community-based innovation
Pacios & Martínez (2019)	European national libraries (CENL)	Eleven priority areas (collection, preservation, access, participation , research, physical space,	Content analysis of strategic plans	Strategic-level typology highlighting operational, technological,



Author (Year)	Setting	Typology Style Proposed and place of co-creation (in bold)	Methodology	Key Contribution
		collaboration , education, staff, digital innovation, business, working atmosphere)		organizational, and human priorities
Potnis et al. (2020)	U.S. Public libraries (award-winning)	Four categories: programs, processes, partnerships , technologies	Empirical survey and statistical analysis	Developed organic, practitioner-grounded classification of innovation
		Technology-driven typologies		
Kumar & Islam (2021)	Libraries (general)	AI/ML applications in collections, services, processes, administration, reference	Systematic literature review (32 studies)	Mapped AI/ML adoption in libraries, identified uneven implementation and emerging techniques
Lo (2024)	Academic libraries (University of New Mexico)	Reskilling typology for AI adoption based on adult learning principles	Case study, mixed methods (quant/qual)	Demonstrated role of reskilling programs in building AI literacy and fostering cultural change

4.2 Dimensions of innovative libraries and changes in the conceptual model

Considering these inputs by literature, we propose adding dimensions for studying the different types of libraries that generates innovations. The refinement of the conceptual framework starts with the following question: What styles of innovation exist in libraries that generate new and improved services? To approach this question, is important to highlight that LibrarIN Project assumes that “Innovative libraries aim at complementing the traditional physical and online services with more interactive services for users, and an active engagement in the production of new or improved economic, social and cultural services.” (LibrarIN proposal, 2022). Thus, innovations might be different in their dimensions and characteristics as they provide solutions to multiple kind of needs, so these dimensions and characteristics are crucial to understanding innovation in public sector organization (Cinar et al 2022) as well in libraries.

Innovation styles can be defined as recurrent and distinctive ways in which organizations approach the development, adoption, and implementation of new or improved services, reflecting their resources, knowledge bases, governance arrangements, and relations with external actors (Cinar et al. 2022 Doloreux et al. 2024). Recent research stresses that innovation is not a homogeneous process but



rather occurs through different modes or patterns, it could be for instance, knowledge-driven versus practice-driven (Doloreux et al. 2024), or bottom-up (Arundel et al 2015) versus management-led (Harel et al 2021). Understanding these styles requires analysing the core dimensions and attributes that innovative libraries display.

Building on the conceptual framework outlined in section 2, the validation and refinement exercise, and using empirical data from the WP4 survey on public libraries, a principal components analysis was conducted to identify underlying dimensions of innovation strategies. The analysis included variables related to drivers, barriers, organizational support, and innovation practices. The motivation for using Principal Component Analysis (PCA) lies in the complexity of innovation processes in public libraries. With numerous interrelated variables, dimensionality reduction was necessary to uncover latent structures that explain patterns in the data. PCA served to assess variance distribution, ensuring that the most informative components were retained. These components were used for further analysis, offering insights into how libraries navigate drivers, barriers, and development practices. From the PCA work, these are the key dimensions:

- **Degree of organizational autonomy** – Ranges from highly independent libraries with significant decision-making authority to small local branches whose strategies and services are determined externally.
- **Conception of the library's core role** – Spans from an emphasis on education and learning (e.g., collections, digital education services) to an understanding of the library primarily as a community hub or agora.
- **Type of user engagement in service development** – Varies from services mainly designed and delivered by professional staff to models where users take an active and leading role in co-design and delivery.
- **Staff skills and resources** – Extends from strong capacities in open innovation and cross-organizational collaboration to a more traditional profile where competences are concentrated in core librarianship.
- **Professional orientation towards innovation** – Encompasses staff attitudes supportive of experimentation and change on one end, and resistance to innovation and preference for established practices on the other.
- **Focus of value creation** – Ranges from addressing complex societal challenges (e.g., inclusion, sustainability) to enhancing cultural enrichment and individual user experiences.

Besides, the analysis revealed a range of approaches. In some libraries, innovation thrives in a supportive environment where management and staff work collaboratively, drawing on user input and creative methods such as design thinking and brainstorming. Other libraries aspire to innovate but face significant barriers. For them, suggestions from NGOs and users act as key drivers, yet obstacles such as time pressure, insufficient staff, and lack of municipal support hinder progress. A third group is characterized by motivated staff and openness to change, but engagement with users and staff in idea generation is minimal. In contrast, some libraries exhibit strong management support but limited

participatory practices also in these libraries user input is rarely considered, suggesting a hierarchical setting. Finally, there are libraries that innovate under constraints. Despite limited budgets, staff remain open to change, developing innovations with modest resources.

The identification of these dimensions and approaches refines the original multi-agent conceptual framework by providing analytical tools for understanding key characteristics of innovative libraries. Each style highlights a particular configuration of the What/What for, Who, and How dimensions: from bottom-up community-driven initiatives to management-led efficiency improvements, from frugal adaptations to open adoption of external ideas. Incorporating innovation styles into the framework makes it possible to capture not only the presence of multiple actors and processes but also the distinctive patterns through which libraries innovate under diverse constraints and opportunities. In this way, the framework is extended beyond a generic account of multi-agent interactions to a more nuanced model that acknowledges the heterogeneity of innovation logics in public libraries. Following we present the refinement of the conceptual framework in the form of a table (table 8).

Table 8: Refinement of the conceptual framework

Level	Category	Element	Type
Macro environment	PESTEL factors	Politics, Economy, Society, Technology, Ecological environment, Legal system	Contextual factor
Ecosystem	Municipality	Local governance / civic context	Institutional
Actors – Users	Preferences	User preferences	Demand side
	Competences	User competences	Demand side
Actors – Providers	Preferences	Library service provider preferences	Supply side
	Competences	Provider competences (staff skills, organizational resources)	Supply side
Actors – Policymakers	Preferences	Local policymaker preferences	Governance
	Competences	Local policymaker competences	Governance
Dimensions of innovative libraries	Dimension	Degree of organizational autonomy, conception of the library's core role, type of user engagement in service development, staff skills and resources, professional orientation towards innovation, focus of value creation	Process styles



5 Publications related to WP2 (conceptual framework, theory developments, inputs for the conceptual framework, cross-WPs papers, and WP2-related policy briefs)

Published:

- Windrum, P., Rubalcaba, L., (Editors) (2024). D2.2 Conceptual framework and model of participatory management and sustainable growth for libraries. LibrarIN Project, <https://librarin.eu/download/21788/?tmstv=1736856875>
- Desmarchelier, B., Djellal, F., & Gallouj, F. (2025). Innovation in libraries: A service-oriented perspective. *Research Policy*, 54(1) <https://doi.org/10.1016/j.respol.2024.105110>
- Desmarchelier, B., Djellal, F., Gallouj, F., & Gallouj, N. (2025). Beyond the reverse product cycle: An exploration of the digital, social and spatial transformation of libraries. *Research Policy*, 54(8) <https://doi.org/10.1016/j.respol.2025.105297>
- Gupta, V., Gupta, C., Swacha, J., & Rubalcaba, L. (2024). Prototyping technology adoption among entrepreneurship and innovation libraries for rural health innovations. *Library Hi Tech*, 42(6), 1760-1795. <http://hdl.handle.net/10017/66208>
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- Gupta, V. (2025). AI experimentation policy for libraries: Balancing innovation and data privacy. *Public Library Quarterly*, 1-21. <https://doi.org/10.1080/01616846.2024.2445356>
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- Rubalcaba, L., Solano, E., Willems, M., & Silvestrini, E., con Pérez, R., Firet, A., Guerreiro, J., Leal, F., Seitovirta, R., Silvestre, S., & Anducas, M. (2024). Boosting and evaluating collaborative innovations in libraries: Managerial guidelines and policy implications [Policy brief]. LibrarIN / The Lisbon Council
- Rubalcaba, L., Solano, E., Silvestrini, E., & Willems, M. (2023). Reimagine libraries: LibrarIN initial policy recommendations from the literature review. Sparking collaboration for innovation to tackle libraries' 21st century challenges [Policy brief]. LibrarIN / The Lisbon Council

Submitted or on-going:



- Tuominen, Tiina; Hyytinen, Kirsi, and Windrum, Paul: Libraries in a changing society: resourcing value propositions for viability and societal relevance. In review, Public Management Review.
- Windrum, P., Tuominen, T., Hyytinen, K., Vainikainen, S., Solano, E., & Rubalcaba, L. Lost-in-Translation: A Scientometric Method for Identifying the Drivers and the Dynamics of Service Innovations with an Application to Public Library Services. Available at SSRN 5333296. Under submission.
- Solano E., Montealegre G., Tuominen, T., Hyytinen, K., Rubalcaba, L. and Windrum P. Value co-creation and innovation. How close are they? The case of academic libraries. Under submission.
- Windrum P., Fuglsang L., Arundel A. Es-Sadki N and Rubalcaba, L. Styles of innovation in public libraries. Submission target: Research Policy.



6 Conclusions

D2.3 represents a synthetic and integrative document of the link between the scientific knowledge generated by WP2 and the entire LibrarIN project throughout its development. The proposed multi-agent conceptual framework has demonstrated the relevance and usefulness of the initial activities carried out by WP2 (conducting structured literature and identifying existing frameworks to understand innovation in libraries) and, furthermore, has fulfilled the fundamental objective set for WP2: to develop and operationalize a conceptual multi-agent framework that could be validated and refined throughout the project life.

The validation and refinement process carried out in D2.3 has demonstrated the applicability of the main concepts and dimensions proposed by the framework. All the elements that the conceptual framework has identified as essential for innovation and co-creation in libraries have been identified in questionnaires, case studies, thematic areas of innovation, strategies to foster innovation, and other studies. Among the main conclusions, these 5 can be highlighted:

- **The LibrarIN conceptual framework has been empirically validated and theoretically consolidated as a multidimensional and multi-actor model of innovation in libraries.** The evidence and findings from WPs 3, 4, 5, and 6 show that the process of innovation and co-creation in libraries is multi-agent in nature, and that the preferences and competencies of these actors play a central role. Furthermore, the context in which libraries operate also determines the innovative services they offer.
- **The multiagent service innovation conceptual framework has integrated library research within the service innovations studies** and this has been complemented by different additions or extensions in the same direction: the different logics for innovation in libraries or the phases of cocreation for innovation are examples of integration performed in LibrarIN. Research on libraries and research on service innovation studies have been highly disconnected areas before LibrarIN. In WP2, LibrarIN has provided the basis for linkages between the two knowledge fields.
- **Co-creation in libraries is an emerging issue, not only in theory, but also in practice.** WP2 has also observed how, in practice, co-creation is a significant and still growing or emerging practice in most libraries, even if many are still out of this area, and perform very traditional book-centers functions, where co-creations has limited role or no role. This report has also illustrate how the multiagent frameworks based on co-creations is already validated by a number of libraries performing new activities, where their own functional set-up is moving “from collections to connections”.
- **From LibrarIN case studies, an internal validation of the multiagent framework has been obtained in terms of service characteristics, preferences, competences and integration in**



local innovation ecosystems. Illustration cover cases in the three Librarian thematic areas, digital transformation, Retrotool at the National Library of the Netherlands (Box 8) or the Automatic Indexing system in Estonia (Box 9), living-labs, Word Room at Dokk1 (Box 1) or the Oodi Library in Helsinki (Box 11), and social innovation for networks in RepairCafé @Vélizy at the Paris Region (Box 10) or the Reception Library in Purchena. In most cases the role of users is key for innovation design and implementation, sometimes since the very design of the library activities and even at the design of buildings and furniture. Library staff play a central role as facilitator, mediator and connector. Their role is redefined from technical management to the facilitation of collaborative processes, as shown by the cases of Purchena (Box 6) and Vélizy (Box 10). The Oddi library also show a case of value co-creation by community self-management in Oodi Library (Finland), here staff is key and foster an environment that reinforces the commitment and cohesion. External stakeholders (city councils, associations, universities or technology companies) act as strategic partners, providing resources, knowledge or institutional legitimacy. Examples of this are the collaboration of the Provincial Council of Barcelona in BiblioLab (Box 5) or the academic alliances in Utrecht (Box 13). In all examples, local networks and ecosystems emerge as essential structures to sustain innovation: urban networks such as those of Oeiras (Box 12) or Vienna Libraries strengthen inter-institutional collaboration and the circulation of learning. Finally, common preferences and competencies among the cases include values of inclusion, sustainability, shared learning, and citizen empowerment, along with facilitation skills, digital literacy, and collaborative project management. Together, the thirteen cases empirically validate the conceptual framework, demonstrating that innovation in libraries is built at the intersection between service, process, and public value.

- **Panel stakeholders meetings in WP5 have also validated the framework indicating relevant implications like these ones:** i) the WP2 framework is important to provide scientific rationale for policy adoption and the need to justify innovation in libraries beyond purely technological change; co-creations opens managerial and policy implications from moving from “collections to connections” as new functional definition of libraries ii) innovation and co-creation should not be understood as a uniform or prescriptive process but as a phenomenon that takes different paths and styles, sometimes even coexisting within a single library; iii) co-creations as something good per se cannot be taken into account, the risk of false or superficial co-creation processes is there so stressing that genuine co-creation must acknowledge and manage tensions among stakeholders rather than attempting to eliminate them.

As a result of the different validation exercises, the framework was refined through the incorporation of additional analytical dimensions designed to capture the complexity and diversity libraries. The evidence gathered confirmed that innovative activity in libraries spans a wide and heterogeneous field, involving educational, social, cultural, and even health-related services. These can emerge through multiple modes of collaboration: in some cases led by users, in others directed by managers, and often through strategic partnerships that link libraries to wider ecosystems



of actors. Understanding such variety required a more nuanced conceptual structure capable of addressing how innovation occurs across institutional, organizational, and participatory levels.

Two main sources informed this refinement. The first came from the thematic results of WP3, which revealed that libraries are undergoing a conceptual transformation as public spaces. They now function not only as repositories of knowledge but also as physical and symbolic environments that support three interconnected categories of activity: spatial or community-oriented services, learning and capacity-building processes, and arenas for democratic interaction and engagement. The second source derived from the survey analysis carried out by WP4, which provided an empirical basis to identify several core features that differentiate libraries in terms of their capacity to innovate. Among these were the degree of autonomy that institutions enjoy in decision making; the way they define their central mission—whether primarily educational or more oriented toward social inclusion; the extent and depth of user participation in designing and delivering services; and the competences and resources available among staff to support open innovation and inter-organizational collaboration. In addition, the refinement considered professional attitudes toward change—ranging from experimental and forward-looking approaches to more traditional or conservative orientations—and the focus of value creation, which may target either societal goals such as inclusion and sustainability or more individualized forms of cultural enrichment.

From the WP2 work, policy recommendations can also be drawn. Libraries should conceive innovation not as isolated technological improvements but as co-creation processes embedded in collaborative service innovation multiagent ecosystems. Policymakers should recognize the dual value generated by libraries—for both individual users and society—and support policy actions that promote those two levels. There is a need to continue refining evaluation tools and surveys to more accurately measure both outcomes and user competences. Policy implications from WP2 are covered by two policy briefs published inside the LibrarIN web page. Four major policy areas are included and developed: policies for co-creation of new or improved services, co-creation of new policies towards libraries, library policy integration in existing innovation policy areas, and specific thematic policies in particular topic such as digital transformation, living labs and networks for social innovation.

Beyond these structural dimensions, the validation process also yielded several lessons learned. One concerns the professional language used by librarians when describing innovation. The review of evidence across all Work Packages showed that practitioners rely on their own practical and experience-based terminology, which often differs from the vocabulary employed in academic studies. Recognizing and translating between these linguistic domains is essential to ensure that research in innovation accurately reflects the realities of library practice. Another insight relates to the integration of research traditions. Innovation studies and library and information science remain only partially connected fields, even though libraries have historically evolved in response to social and technological change. The LibrarIN conceptual framework helps bridge this gap by bringing together approaches from public sector innovation, service-dominant logic, and co-creation theory, thereby enriching the analytical tools available to library research. Finally, the evidence gathered throughout the project reaffirmed the central role of stakeholders in shaping innovation. Co-creation processes in



libraries are inherently multi-agent: they depend on the active participation of users, professionals, policymakers, and community actors. Their involvement not only strengthens the legitimacy of innovations but also enhances their capacity to generate shared public value.

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