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**LibrarIN [101061516]: Value Co-creation and Social Innovation
for a new Generation of European Libraries**



**D2.2 Conceptual framework and model of participatory
management and sustainable growth v2.0**

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Editors	Paul Windrum (VTT) and Luis Rubalcaba (UAH)
Main Contributor(s)	Paul Windrum (VTT), Luis Rubalcaba (UAH), Lars Fuglsang (RUC), Ernesto Solano (UAH), Faiz Gallouj (ULILLE), Benoit Desmarchelier (ULILLE)
Other Contributor(s)	Kirsi Hyytinen (VTT), Tiina Tuominen (VTT), Sari Vainikainen (VTT), Gabriela Montealegre (UAH), Varun Gupta (UAH)
Reviewer(s)	Lars Fuglsang (RUC)
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Disclaimer

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Vo.3	02/03/2024	Updated version of the conceptual framework	Paul Windrum
Vo.4	03/05/2024	Inputs for the policy brief No 1	Luis Rubalcaba and Ernesto Solano
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Executive Summary

This report includes all the theoretical advances that the LibrarIN project has made for the construction of an analytical framework for understanding the process of value co-creation in libraries, shows all the steps taken to develop said framework and demonstrates its applicability, and its relevance when studying innovation in libraries. Likewise, these theoretical advances started in Y1 have now been materialized in papers presented at conferences, one paper published in world-class journal, and inputs to other WPs in the LibrarIN project.

The main outcome of this second year of work is the production of the conceptual framework that explains drivers and enabling factors of the value co-creation process in libraries facing the needs derived from scarce funding, legal obligations, potential over/under-use of their collections, societal detachment, service transformations and evolutions. This conceptual framework is based, on the one hand, on the Kelvin Lancaster's theory of consumer demand, that identifies a set of 'service characteristics' which are delivered to, and consumed by, the end user. On the one hand, on the service dominant logic approach, that considers value as experiential because its creation and assessment is understood from the perspective of individuals. From these two bases, a multi-agent framework was created and takes into account the characteristics of the services as well as the preferences and competencies of users, librarians and policy makers and how these are influenced by the context in which they meet. Furthermore, the multi-agent framework establishes direct and indirect interactions between all the agents inside the library innovation ecosystem.

The outcomes obtained in the second year of the project have been aligned with some of the literature results obtained in year 1 providing inputs for the Y2 generation of this multi-agent framework. For instance, The VTT literature review showed that librarians around the world are currently developing a radically new portfolio of services which reinvented the public library as a place connects, this was confirmed by UAH literature review for the case of academic libraries, showing that libraries offers services in the following fields: Reading and lifelong learning services, community services, health and wellbeing services, creativity services and business and finances services. The framework proposed by LibrarIN project allows us to understand all the variety of services that the different kind of libraries can offer. Based on this service innovation framework a paper just published on Research Policy has been produced.

All the research carried out for the realization of this multiagent framework has had an important impact on other work packages and has allowed joint and collaborative work with them. The conclusions obtained in the first year of work regarding the importance of effective collaboration and strategic partnerships within the world of libraries have been one of the fundamental elements in the creation of the first LibrarIN Policy Brief *Sparking Collaboration for Innovation to Tackle Libraries' 21st Century Challenges*, as well as in the design of the use cases (WP5). WP2 outcomes have also been under use by the WP3 design of case studies and by WP4 work for the surveys on national, academic and municipal public libraries. All the objectives set for the second year of work have been met.



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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
UAH	University of Alcala
VTT	Teknologian Tutkimuskeskus VTT Oy
WP	Working package



1 Introduction

1.1 Purpose and Scope

The key objective in the second year of the project is to address Task 2.2: Definition of the Conceptual Framework. This Report presents the highlights and key findings of the work conducted by WP2 on the elaboration of the LibrarIN project conceptual framework, as well as other WP2 related-results from the second year of work of the LibrarIN project.

One of the main conclusions of work of the LibrarIN project was that, despite the fact that innovation is still a vague concept without a single definition within the world of libraries, the concept of collaboration, understood as the coordinated work between libraries, stakeholders and users, is fundamental in all strategies, programs and policies to generate new in better services in libraries. This effective collaboration in libraries has a multi-agent approach that has certain particularities and key elements that need to be addressed. On the other hand, libraries are public institutions, whose main functions include serving the general public. For this reason, this document presents a multiagent conceptual framework that allows us to address all these aspects of libraries.

The progress and conclusions obtained by Work Package 2 have been reflected in scientific publications that are referenced in this document, and the contributions that Work Package 2 has made to Work Packages, 3, 4 5 are presented.

1.2 Approach for Work Package 2 and Relation to other Work Packages and Deliverables

The LibrarIN project proposal establishes the following three case study areas: i) digital transformation linked to ICT development in libraries, ii) social entrepreneurship and the use of public-private-third sector networks for library services, and iii) library living labs. Likewise, the project proposal establishes these three areas as “the best example of integration among the WPs” (p. 13) and develops concepts, typologies, theories, metrics, case studies, and economic policy recommendations. To guarantee the integrative theoretical grounding for all work packages of the project, WP 2 generates a conceptual framework that serves as a guide for the activities implemented throughout the project. The framework aims to offer theoretical groundings that facilitate the study of the three case study areas (WP3), help in the preparation of surveys to measure innovation in libraries (WP4), promote work with Stakeholders (WP5). Besides, conceptual framework has been fundamental for research presented in important congress and a publication in a world-class journal, Research Policy. The interconnections and relations of Work Package 2 others Work Packages are illustrated in figure 1

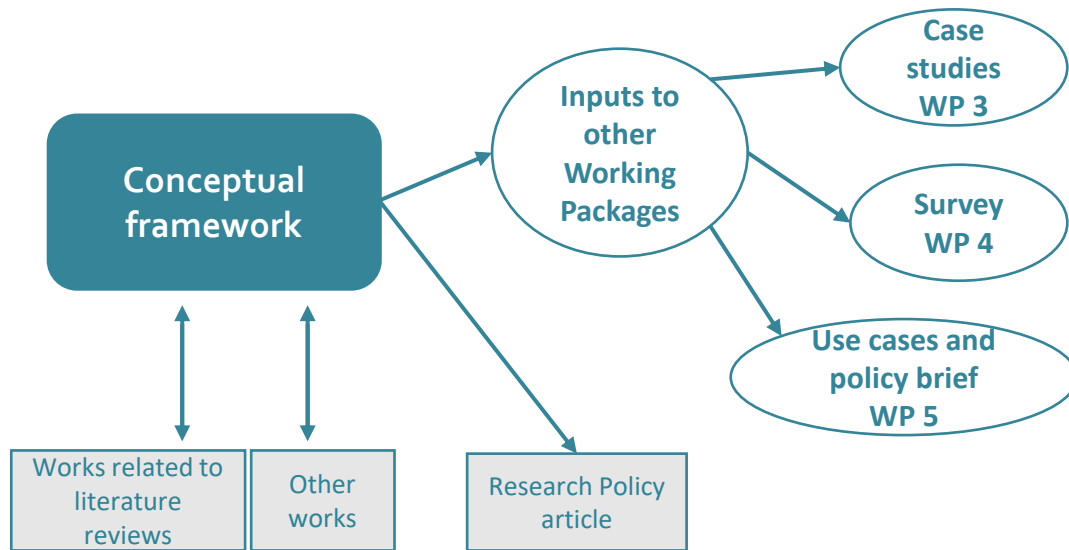


Figure 1: Work Package 2 and Relation to other Work Packages

This conceptual framework is based on the findings of the different literature reviews implemented in WP2 and enriched by the service innovation multiagent approach which identifies cross-cutting dimensions for all WPs. Key dimensions are:

WHAT AND WHAT FOR

- Service characteristics (new or improved characteristics)
- Public and private values
- Innovation outcomes and impacts

WHO

- User preferences/goals and user competencies/capabilities
- Provider preferences and competences

HOW

- Co-production and co-creation among different agents
- Innovation processes and the role of technology
- Role of stakeholders, policymakers, and ecosystems

Related to these dimensions are several key research questions (RQs).

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: How libraries struggle to be relevant in the context of users value creation, public value in particular? Value co-creation drivers, barriers, and impacts. What 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?

1.3 Structure of the Deliverable

The structure of the deliverable is as follows:

- Definitions of the conceptual framework
- Publication: “Innovation in libraries: a service-oriented perspective”
- Other works inside WP2 in Year 2
- Inputs to work package 5 – policy brief



2 Conceptual Framework (by Paul Windrum)

2.1 Stated Objectives

The general objectives of this workpackage are set out in the proposal document.

Theoretical framework. An integrated conceptual framework to understand the process of *value co-creation in public libraries service delivery*, developing and operationalising the service dominant logic (SDL) and public service logic (PSL) approaches (knowledge creation) and *integrating service and social innovation multi-agent frameworks*. This will be complemented by an evaluation of different approaches to knowledge transformation in public libraries, both in terms of their process and their impact.

Work conducted within WP2.2 is intended to interact, in a reciprocal manner, with the empirical research conducted in WPs 3 and 4 over the course of the project lifetime and, thereby, achieve five intermediate targets:

1. To develop a **conceptual framework of value co-creation** in libraries service delivery from different perspectives, including the SDL paradigm, the service innovation, and co-innovation frameworks leading to change, enrichment or complementing of existing public governance perspectives;
2. To identify the **contingencies of value co-creation** (and value co-destruction) in public service delivery in relation to a range of key stakeholders (e.g. users, citizens, public service organisations, politicians) and consider if they are congruent or competing;
3. To examine the **tensions between individual values and social values** and how they might be resolved.
4. 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; and
5. To analyse the conceptual relationship between co-creation of values and traditional forms of participation in order to assess co-creation in terms of **inclusiveness, meaningfulness, and legitimacy**

2.1.1 Proposal for WP2.2

The proposal is that the research contained in this document is used

- To stimulate ideas and discussion for research in the empirical WPs 3 and 4.
- Provide a conceptual framework that is as simple as possible (to which other layers can be added when implemented in empirical work, e.g. case studies).
- Build upon the findings of the literature review (WP2.1)



2.2 Innovation as an Outcome, Innovation as a Process.

Within the services literature, the word 'innovation' is used by some scholars to discuss new services and their impact, whilst others use the term to discuss the processes used by organisations to develop new services.

Following Toivonen, Tuominen, and Brax (2007): *A service innovation is a new service or a renewal of an existing service which is put into practice and which provides benefit...; the benefit usually derives from the added value that the renewal provides to the customers.*

Public sector services are expected to provide value and private benefits to a number of different stakeholders in addition to service users, and to additionally generate public value.

In the public sector, a radical service innovation must be new to a government agency or department, and must involve some element that can be repeated in new situations, i.e. it must show some generalisable feature(s).

An incremental innovation is the modification or adaptation of a pre-existing service to local needs. Where local user needs and preferences are highly heterogeneous in different locations – as they may well be for libraries serving different local communities in different countries (and possibly different regions within a single country) – this process of adaptation can lead to very different services being developed.

Toivonen, Tuominen, and Brax (2007) define a service innovation process as the *process through which the renewals described are achieved*. This section reviews different types of 'process' which have been discussed in the services literature.

2.3 Planned Processes vs Practice-Based Processes

There are two forms of innovation process: practice-based and planned (Tuominen et al. 2020). Practice-based change originates from everyday practice with individual actors seeking ways to incrementally improve existing practice and services in order to deliver better performance to users. Planned processes involves an intentional change project, initiated outside the scope of everyday practice in order to develop new artefacts (e.g. guidelines, process models and tools) and new services.

It worth noting that there is no assumed correlation between the type of process and its outcome. For example, a planned stage-gate process may generate a service that is new to the organisation but not new to the world, or it could produce a completely new service.



2.3.1 Planned stage-gate process

A common description of the planned innovation 'process' is the stage-gate model. The process involves a number a number of phases, or 'stages', in the development of a new service. Each stage needs to be carefully managed as each is essential to the final quality of the final service. The set of stages may proceed linearly or there may be some feedback loops and cycling through (also see Kline and Rosenberg's 1986 chain link model of innovation where the stages are iterative with recursive feedbacks between stages rather than a strictly sequential ordering).

1. creation (idea/need)
2. define the design
3. development and prototyping
4. evaluation and diffusion

The initial stage is that of idea creation, or 'ideation'. It involves the brainstorming of potential new services, often based on the identification of unmet user needs. Another influence for public services may be new national or regional/municipal policy directives. This has been highlighted in, for example, public service logic literature (PSL) (e.g. Arundel et al 2022, Nabatchi et al 2017, and Osborne 2021).

The defining stage involves the identification and collection of ideas on key features, functions and other service elements, and the building of a clear business case for a new service. The service must clearly solve the problem at hand or else help users to (re)solve problems themselves. This stage can involve team members of the service provider, customers, and other stakeholders.

The development and prototyping stage should result in a functional service that is ready to test. This is a highly resource intensive stage. By the end of this stage, there will be a better understanding of the service's limitations and a clearer view of how real world users would behave, think and feel when they interact with the service.

The evaluation stage involves the assessment of prototyping of one or more alternative services. As this is an iterative process, this may involve redefine one or more further problems and looping back to a previous stage. Once completed, and a potentially successful service is identified, the successful dissemination or 'diffusion' of the service may require complementary activities such a marketing strategy to raise service awareness and demand amongst users and other stakeholders.

'Design thinking' has become widely used in government service development. As a process, design thinking is also a stage-gate model from ideation to prototyping. Brown (2009, p.16) identifies three stages in the process: inspiration, ideation, and implementation. Kelley and Kelley (2013, pp.22-24) offer a variation in inspiration, synthesis, ideation, experimentation, and implementation. Like Kline and Rosenberg's (1986) chained linked model of innovation, the stages may be iterative with feedbacks rather than following in a strictly sequential ordering, and the designer may move backwards and



forwards in order to solve problems (Brown 2009, Cross, 2011, Johansson-Sköldberg et al. 2013).

A set of useful questions for assessing user involvement in stage-gate processes is available at:
[UKRI-131021-DesignStageGateReviewDraftGuideForAwardees.pdf](#)

2.3.2 Practice-based processes

Fuglsang and Sørensen (2011) discuss three types of practice-based change process: 'ad hoc innovation' (Gallouj & Weinstein, 1997), 'a posteriori recognition of innovation' (Toivonen et al., 2007) and 'bricolage' (Fuglsang and Sorensen 2010).

In contrast with planned processes, these do not involve an ideation stage or a deliberative initial design stage. Practice-based change originates from everyday practice with individual actors seeking ways to incrementally improve existing practice and/or service quality in order to deliver better performance to users.

'A posteriori' involves a process of ongoing, incremental service improvements over time through normal practice. At a certain moment, these incremental changes are recognised to have led to a novelty that can be applied and repeated (possibly to other areas). In a second stage the 'discovery' is developed so that it can be reproduced. Included here are service innovations that are developed slowly, unintentionally over time, and pure accidents (akin to the penicillin and 3M post-it story).

The 'ad hoc' process begins as a specific, tailored service solution for a particular given client. "Such tailored services are frequently seen in consultancy services and in IT software, for example. Highly specialised services are, in general, non-reproducible (and so no diffusion to other users can occur). However, some tailored solution may be identified as being capable of being made more general and of value to other clients. A key stage of development involves making the service repeatable and deliverable to many clients (Gallouj, 2002).

Baker and Nelson (2005) define bricolage as "making do by applying combinations of the resources at hand to new problems and opportunities." (ibid, p.333). Highlighted in this 'making do' is the (re)combination of pre-existing resources for new purposes, rather than funding and fabricating resources from scratch. This process of bricolage can sometimes "reach brilliant unforeseen results." Lévi-Strauss (1967: 17). Fuglsang and Sørensen (2011) highlight the problem-solving activity of employees. Where existing protocols (prescribed ways of doing things) are found to be wanting, employees create structures and adjust protocols using available resources in order to improve organisation and/or service performance. This may, for example, involve local work-arounds to overcome the limitations of existing protocols, or tinkering with protocols in order to adjust them to unforeseen events.



2.3.3 Adaptation processes for incremental innovation

An alternative process by which incremental innovation are developed has been put forward by Athony Arundel in WP4.

In contrast to practice-based incremental innovations, an organisation may deliberately seek to adopt and adapt a service concept which has previously been introduced elsewhere. This process could involve a variation of the stage-gate model in which the creation (ideation) stage is omitted while the other stages of defining, developing and prototyping, and evaluation are retained.

This empirical question is to be addressed by WP4. The WP4 survey will ask about different stages and users' involvement by stage. In so doing, the research will be able to find out if ideation or other stages are skipped when an incremental innovation is based on a tried and tested concept from elsewhere.

With respect to service outcomes, the act of modifying and adapting the basic service concept to local needs may lead to novel and new features (service characteristics) being developed locally and, if successful, later adopters may adopt these new features when adapting and developing their own solutions. Thus, the diffusion of novel service concepts by libraries across the world involves adaptation and qualitative change in service features over time rather than pure imitation and the implementing of the same service everywhere.

2.3.4 Combinations of processes over time

In real-world case studies there might be elements of these different processes being used over time. A number of possible scenarios exist. For instance, a longitudinal study may pick up a phase in which there was a top-down planned stage-gate. Later in time, more incremental practice-based processes may have been used in meting resistance and renewal.

An alternative potential scenario is that a planned stage-gate process begins by collecting together a number of small novelties which were developed through incremental practice-based processes.

This is an empirical issue which can be explored in the WP3 case studies.

2.4 Service Dominant Logic

2.4.1 Service

In SDL, service is a verb: it is the process of doing something beneficial for, and in conjunction, with some actors (Vargo and Lusch 2008), and is achieved through "the application of specialized competences (knowledge and skills)" (Vargo and Lusch, 2004, p. 2).



2.4.2 Value in Use and Value Creation

A key feature of SDL is its emphasis on 'value in use'. This is contrasted with what Vargo and Lusch (2008) call product-dominant logic, where value is created internally by an organization and subsequently consumed by the service user. In SDL, the locus of value creation is the user's interests and experience, which takes place during service encounters and within the context of the service users' own life (Vargo and Lusch 2008).

SDL conceptualises value as experiential; the creation and assessment of value is to be understood from the perspective of individuals (Trischler et al. 2023). This is made clear by Vargo and Lusch (2016) when putting forward a set of five axioms which underpin the SDL perspective. Axiom 4 states that it is the user who uniquely and phenomenologically determines what value is (Vargo and Lusch 2016, p.8).

When it comes to the assessment of value, from the individual's perspective, this involves both an individual and a broader social valuation. The first is personally determined through the use and consumption of a service. The second is determined by value-in-social-context, which includes whatever public value is dominant within a particular society, implying that the assessments are shaped by collective perceptions and social norms (Edvardsson, Tronvoll, and Gruber 2011). If both individual and collective perspectives are taken into account when assessing value, then value is synonymous with increased personal and social wellbeing (also see Vargo, Maglio, and Akaka 2008).

Trischler et al. (2023) discuss the tension which arises when the concept of user-driven value and valuation is applied in public services. SDL and PSL advocate an understanding of value as experiential and individually subjective (within a social context). However value creation in a public service context is a politically mediated expression of collectively determined preferences (Alford 2016). In the public value perspective, value is not determined by individuals but constitutes a "set of values expressing the perceived relationship quality between an individual and a social entity (group, community, nation)" (Meynhardt 2009, p.215). This is why PSL, and more widely public administration scholars emphasise the need to include the collective aspects of value creation when adopting a service logic approach (see, for example, Alford 2016; Osborne et al. 2022; Trischler et al. 2023).

Axiom 2 of Vargo and Lusch (2016) states that value is created through an interaction of service organisations and users,

"value is not completely individually, or even dyadically created, but rather it is created through the integration of resources, provided by many sources, including a full range of market-, private- and public-facing resources and actors" (Vargo and Lusch 2016, p.9).

Hence, from an SDL lens, value is understood as something that is not only determined by the service user through its use but is also co-created by the user (Edvardsson, Tronvoll, and Gruber 2011). The user combines a service provider's resources with those of other actors, and transforms them into increased



wellbeing (value) in their everyday lives (McColl-Kennedy et al., 2012). The service provider is rarely the only contributor to the user's wellbeing (Sweeney, Danaher and McColl-Kennedy, 2015).

For PSL scholars, this represents an important break from New Public Management (NPM), which privileges the objectives of the (public) service provider. Here the focus is on what happens for the user rather than what happens within a public organization (Osborne, Radnor, and Nasi 2013).¹

2.4.3 Resources

Given the centrality of resources in the SDL approach, it is surprising that these are commonly left unspecified and defined in discussions. Take, for example, the following passage on competences - specifically the application of different actors' competences – which are highlighted as important to value creation;

“actors apply their competences, and other resources for others' benefit, and receive a similar kind of service (others' applied resources) in return” (Akaka, Koskela-Huotari, and Vargo 2021, p.380).

Edvardsson, Tronvoll and Gruber (2011) note that intangible resources are rarely specified beyond knowledge, skills, and information. There is a need to unpack the nature of 'resources' and the relationship between resources and value. Eriksson and Hellström (2021), for instance, suggest that highly relevant resources may include cognitive as well as competences such as knowledge and skills, finances, social networks, and organisational culture.

There is also a need to develop a more concrete understanding of resource integration among multiple actors. For value creation from an SDL perspective, it is important to know and understand the different actors which a user integrates resources from, and how these resources are combined and applied in the user's broader life world.

Whilst interactions and relationships are highlighted as enabling the integration of resources between actors, the concept of resource integration among multiple actors has not been thoroughly elaborated within SDL (Eriksson and Hellström 2021). The need for increased understanding of joint value creation, guided by the needs of the service user, is highlighted in the PSL literature by Osborne (2018) and Skålén et al. (2018), and in the broader public management literature by Bryson et al. (2017).

Exchanges can occur directly in person or else indirectly through a service, which acts as a vehicle for

¹ Note by the internal reviewer: Most of the LibrarIN work builds on the construct of value as something created in the context of users, which is consistent with both SDL and SL. Besides, it also explore how libraries struggle to be relevant in the context of users value creation, public value in particular.



service provision. In addition, service exchange may occur through financial transaction (i.e. money), but it may also occur through social relations (e.g. family, friends) and public access (i.e. by being a member of a nation or political community).

Section 4 unpacks various types of resources which affect value co-creation. These include the relationship between service provision and service product, the material and immaterial components of the product and how it is assembled and organised by different actors; the importance of heterogeneous competences (social and technological knowledge and skills, and social power and influence) and cognitive preferences of the different actors; and the impact of asymmetries in power and influence amongst actors on value co-creation.

2.4.4 Service ecosystem

Vargo and Lusch (2016) propose that an ecosystem lens should be used to analyse value co-creation within a multi-actor context, and define the service ecosystem as “a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (Vargo and Lusch 2016, pp.10–11).

The service ecosystem is a means by which one can begin to identify the contingencies of value co-creation 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).

The service ecosystem concept has been developed by SDL and PSL scholars such as Mars et al. (2012) and Osborne et al. (2022). The latter define a public service ecosystem as one that contains the key actors whose resource integration leads to improvements in public services and systems to better meet the needs of citizens and users, while simultaneously addressing societal challenges.

Complementary work on interdependent value co-creation in ecosystems has been developed by the Adner (2017). He highlights two different types of perspective. One is ‘ecosystem as structure’, the other is ‘ecosystem as affiliation’. Each has a different focus, different approaches to research, and one or other may be best suited depending on the real world phenomena being analysed.

‘Ecosystem as affiliation’ views ecosystems as communities of associated actors defined by their networks and platform affiliations. This is particularly suitable for situations in which there is a breakdown of traditional industry boundaries and the rise of cross-industry interdependence. It focuses on questions of network access and openness, highlighting measures such as number of partners, network density, and actors’ centrality in larger networks. Positions are derived from links, leading to characterisations such as platforms, brokers, and hub-and-spoke.

The affiliation approach is focused on actors with direct ties to a focal organisation. Empirically, the



'healthcare ecosystem' and the 'Silicon Valley ecosystem' are examples of this category. Adner argues that these are helpful for descriptions of interactions at a macro level but, due to the tendency to look at aggregates, guidance offered by this perspective tends to focus on general governance and community enhancements, with limited insight into the specifics of value creation.

By contrast, 'ecosystem as structure' concerns a value proposition and identifies the set of actors and the way in which these actors need to interact for this value proposition to come about. This focus on the value proposition, and interaction between providers, users and other actors in realising the value proposition has a natural synergy with SDL and PSL. What is more, it is the proposed value proposition that creates the (endogenous) boundary of the relevant ecosystem. This perspective is more suitable for situations for the study of value creation and co-creation within a industry / sector boundary. It also gives a clear sense of which actors are included in the primary analysis – it is those actors who are directly involved in defining and realising the value proposition. Actors and organisations further removed may have an indirect influence and/or set context but they are not directly involved in the creation, production, or realisation of value.

The 'ecosystem as structure' perspective highlights four elements. The first is 'alignment structure'. Members of an ecosystem have defined positions and activity flows between and amongst them in a structured way. Effective alignment depends on consistency across actors of their positions within the configuration of activities. It also requires mutual agreement among the members regarding these positions and flows. This requires compatible incentives and motives amongst the actors.

Different actors may well have different end states and different goals in mind. Structural alignment becomes particularly important during times of change, e.g. when a radically different value proposition is being developed. This throws open new positions within the ecosystem for interaction, and potential for conflict to arise.

Of particular interest are cases where a new value proposition (e.g. due to the development of a novel service) displaces an existing value proposition and service. This requires work by different actors to achieve new structural alignment between actors. It may also require realignment and restructuring within an actor's organisation. Some members within a service organisation, and likewise with users, may hold on to old value propositions and services whilst others are strong advocates of the new value proposition that will replace and destroy the old value proposition.

Second, an ecosystem is inherently 'multilateral', not just in the sense that there are multiple partners, but also that the relationships cannot be decomposed to a set of bilateral interactions. Multilateral interactions concern the structure of links specifying transfers across actors – the hand-off of what, when, and between whom – of materials, information, influence, funds etc. For the ecosystem construct to matter, there must be a critical interaction across these relationships. Hence, ecosystem relationships cannot be reduced to a series of direct and indirect ties.

Third, the 'set of partners' has defined membership, i.e. it is not open-ended. The defining attribute of



partners is that they are actors on whose participation the value proposition depends, regardless of whether or not they have direct links to a focal organisation. The participating actors in the system have a joint value creation effort as a general goal. Different actors may well have different plans and perceptions regarding the composition of the set of partners, and having a defined set of partners does not imply that membership is complete, unvarying, or uncontested.

Fourth, realising a value proposition requires partners to reach a 'threshold level of coordination'. Adner observes that different actors may well have different views on the value proposition and different interests and perspectives (e.g. on value creation and value distribution). It is therefore necessary to consider the extent to which an ecosystem can sustain divergence and still bring about the promised value. Here coordination is concerned with those activities which together give rise to value creation and realisation.

The need to develop strategies that recognize and manage indirect links is one of the key distinctions between traditional strategy and ecosystem strategy. With its focus on actors' resources, multilateral links specifying activities and flows across actors, the 'ecosystem as structure' approach extends the strategic view to include activities and actors over which a focal organisation may have no control, and with whom they have no direct contact.

2.5 SDL within a Multi-Agent Framework

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.

Here the Windrum and García-Goñi (2008) multi-agent model of service innovation is used to

1. Assist in unpacking resources into a set of clear categories for each agent
2. Identify links between the resources required of achieve a value proposition
3. Roles and coordination.
4. Impact of the service proposition and the creation of value – Static and dynamic value creation (e.g. education).

2.5.1 User valuation of the service value proposition

The multi-agent approach, based on the Kelvin Lancaster's theory of consumer demand (Lancaster 1966), identifies a set of '*service characteristics*' which are delivered to, and consumed by, the end user. In terms of SDL, the *value proposition* of the set of *service characteristics* is represented by the vector S .

Lancaster's insight was that users do not desire a service product for itself but rather the *quality levels* of the set of intrinsic attributes – the service characteristics - of the product. Moreover, it is the overall

quality offered by the set of service characteristics (S) which is of interest to user, not the number of characteristics per se.

The characteristics approach was developed by Saviotti and Metcalfe (1984) into a framework to analyse innovation in manufactured products characteristics and was subsequently developed by service innovation scholars such as Gallouj and Weinstein (1997) and Windrum and Goñi (2008) of the study of private and public sector service innovations.

In the SDL perspective, user evaluation depends on value in use (Trichler et al. 2023). Given the quality of the set of service characteristics (S) offered, each user values S based on two factors: their current preferences (Up) and their existing competences (Uc) to apply and use the service in practice (Figure 2).

Different users have heterogeneous preferences and competences. For example, a person who cannot read has a zero existing competence in this skill. This very likely affects their valuation of the (online and physical) books and other reading material offered by a library. They are likely to under value the opportunities afforded by a library. By contrast a person who is literate and has a wide range of interests is more likely to attach a high valuation to the same set of service characteristics.

More generally, user preferences are heterogenous, reflecting differences in tastes, needs, social context and other user network effects, while individual users' competences are heterogeneous due to differences in prior experience and knowledge of how to use a service.

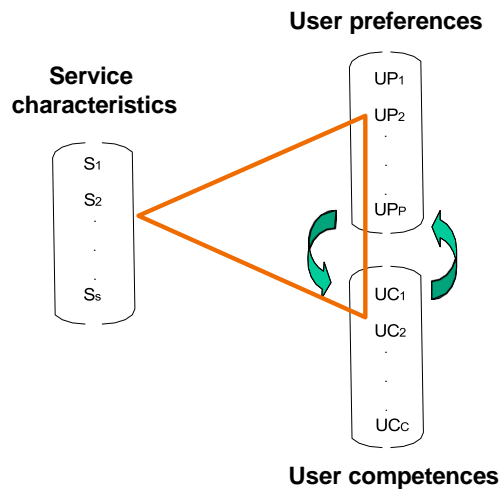


Figure 2: User valuation of the service proposition

2.5.2 Tangible and intangible resources in value creation

Realising a value proposition S requires the development and delivery of an effective 'service product'. This service product is typically a combination of key tangible and intangible resources. For example, a lending service for physical books offered by a library will include a set of fiction and non-fiction books, which are catalogued under sections of bookshelves (using the Dewey Decimal Classification or something similar) in one or more rooms of a library building, with tables and chairs for onsite reading, computers to search the library catalogue of books and other physical media, and a section of the library building given over to the lending and return of books.

The set of physical artefacts (A) is combined with the intangible competences of one or more service providers (PC) in order to successfully deliver the service proposition to the user (Figure 3 below).

These intangibles include general knowledge and skills of its staff in delivering services, technological understanding required to use the collection of supporting artefacts for service delivery, work routines and organisational experience, and financial resources. Thus, the vector of provider competences can, in case study research of WP3 be specified and more finely tuned into different categories of technological, organisational and other competences.

Note that a service provider 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). The service provider may also, in certain instances be a citizen.

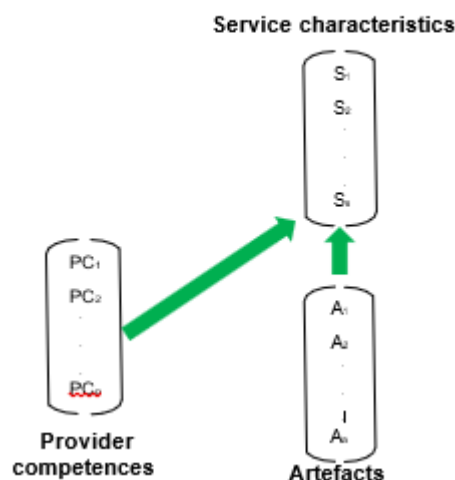


Figure 3: Creating a service proposition by combining physical artefacts and intangible competences

2.5.3 Value co-creation

2.5.3.1 Multiple service providers

So far the discussion has been simplified by assuming there is a single integrated service provider. This assumption is readily relaxed in order to take into account situations where there are two or more service provider organisations. Figure 4, for example, provides an example of a case where there are two service providers involved in service creation and delivery. Each contributes to the set of underpinning artefacts parts and intangible competences (i.e. intangible assets, human resources, and organisational resources).

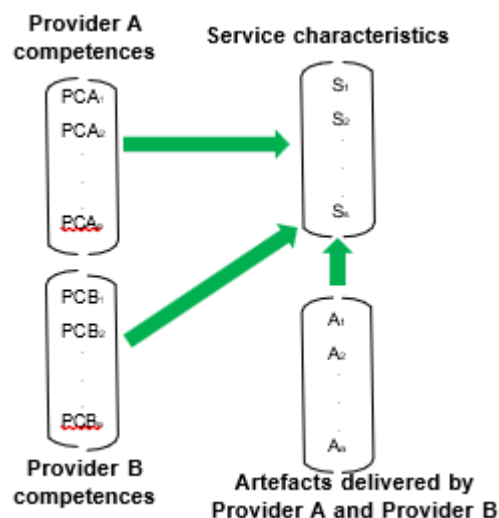


Figure 4: Example of two service providers involved in service creation and delivery.

The intangible competences and tangible artefacts of each provider organisation must be brought together and coordinated effectively in order to create and deliver the service proposition. Referring back to Adner (2017), there needs to be an 'alignment structure' in which each provider has a defined position and an agreed set of activity flows, and these must be consistent.

Here lies a link to the research conducted in WP3.2 on 'producer networks' involving public and private actors emanating from the service and non-profit sectors. Case study research conducted here can shed light on the basis of partnerships and the alignment structure of multiple service providers.

For example, one question that can be asked is 'When is it most likely that multiple providers will be involved?'. One possible factor is the possession of one or more key competences by an external organisation (e.g. a knowledge-intensive service provider), which the main service provider lacks. New technological competences could be involved. For example, an IT specialist company may be engaged in the development of a new digital platform by a municipal library if its staff lack these particular



competences. Once introduced, the embedding and subsequent ongoing delivery of this new service proposition process is likely to require training and new competences development for librarians, unless the service is outsourced to a third party.

In the library setting, Winberry and Potnis (2021) discuss a number of factors which can influence partnerships for co-production. These include positive engagement by the outside delivery organisation, whether different partners have competing or complementary interests and goals, whether there needs to be extensive planning and coordination with partners, the benefits for the partners, and whether and how partnerships can meet the needs of a particular community. The investment required to build and develop partnerships is such that public libraries need to be strategic in their decision on whether to enter into partnerships.

2.5.3.2 External providers operating within the library

A note of caution needs to be taken when defining a 'partnership'. The VTT library literature review (Windrum, Tuominen, Hyytinen and Vainikainen, 2023) highlights a number of examples where the local library 'hosts' services developed and delivered by third parties, without the active involvement of librarians. These include health and wellbeing classes, and community services delivered in libraries.

This situation is more akin to that represented in Figure 2. A third party owns the key intangible resources and defines, controls, and delivers the service proposition. The library and its staff has no involvement beyond provision of some basic artefacts, e.g. a room with some chairs and tables. In effect, the third party provider is renting space within the library.

2.5.3.3 Citizens and community groups as service providers

The VTT literature review (ibid) highlights cases where Individual citizens and community groups are using space within their local library to provide services. These can be volunteers and/or citizens with specialisms such as gym and yoga teachers providing wellness classes, or artists providing arts and crafts classes. There may be, for example, be community groups hiring a library room to hold meetings which promote and sustain the culture (cultural heritage) and language of a local communities, or ethnic minorities.

Research conducted in WP3.2 case studies will no doubt identify a number of factors at play here, enabling the analysis to be elaborated further.

2.5.4 User involvement in value co-creation

As the names indicate, interactions between 'providers' and 'users' are often mediated through the service (bilateral orange pathways indicated in Figure 5 below). Additionally, there are also 'direct interactions', the quality of which are also shaped by the preferences and competences of users and service providers.

A key aspect of the LibrarIN project is understanding when and how value is co-created by users, i.e. how the intangible user competences of knowledge, skills, and contextual experience, together with the preferences of users contribute to value co-creation. An example of value co-creation is public library storytimes in which parents and their children are brought together in a group, mediated by a trained librarian. The service proposition is to stimulate toddlers and pre-schoolers interest in story books, and begin the process of early reading and learning. This increases children’s early literacy and school readiness skills.

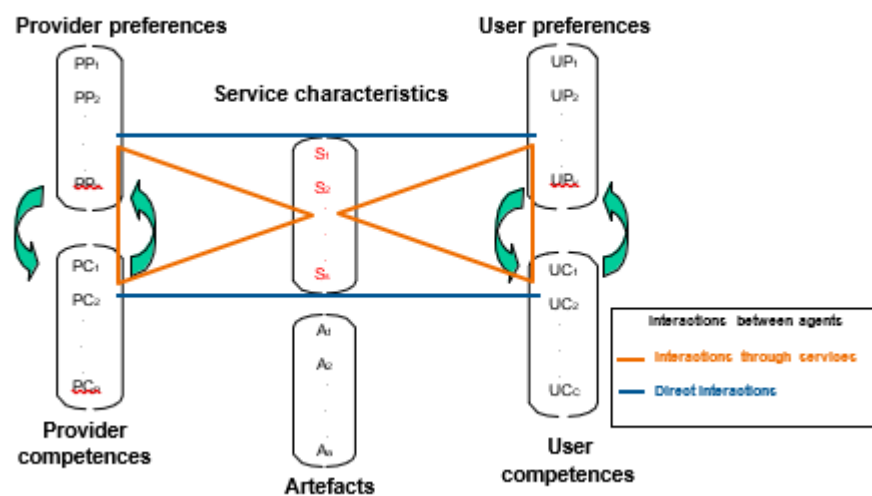


Figure 5: Agents’ interactions and mutual shaping hypothesis.

2.5.5 Creation of social connections

The public library has an important social function, helping to foster democracy and increasing social cohesion. The exercise of democratic rights is based on certain preconditions such as having educated citizens, and access to the information which is needed to inform and exercise such rights (Stilwell, 2018). Klinenberg (2018) highlights the role of the public library in supporting social coherence. It is a place where individuals from different groups within society can meet and learn about each other, dispelling myths and prejudices, while creating tolerance and understanding. This has benefits in terms of fostering social coherence and equality.

A service proposition may intentionally seek to foster new interactions amongst (otherwise different) groups of library users as part of its stated goal. Take, for example, the seed library case being studied by the University of Lille group in WP3.2. This is a joint project between a municipal library and a

community group that has the goal of bringing together individuals who would otherwise not interact around a common interest: collectively creating a seed collection (or 'seed library') with each participant contributing and being able to draw seeds from the seed collection.

As illustrated in Figure 6, bringing together people from different parts of society to meet and get to understand one another can alter the preferences and competences (social skills and knowledge) of different user groups. help create a community, or at least an association, creating new 'direct interactions' between users.

The storytelling programme recognises that the competences of parents are an essential aspect to realising this outcome. Hence, in addition to the storytelling activities with children within the library, the librarian trains parents how to become good storytellers in their own right – using different engagement techniques – in order to continue high quality storytimes at home. In so doing, the programme positively impacts the knowledge, skills, and contextual experience of children and their parents (Cahill et al 2020, Cahill and Ingram 2021).

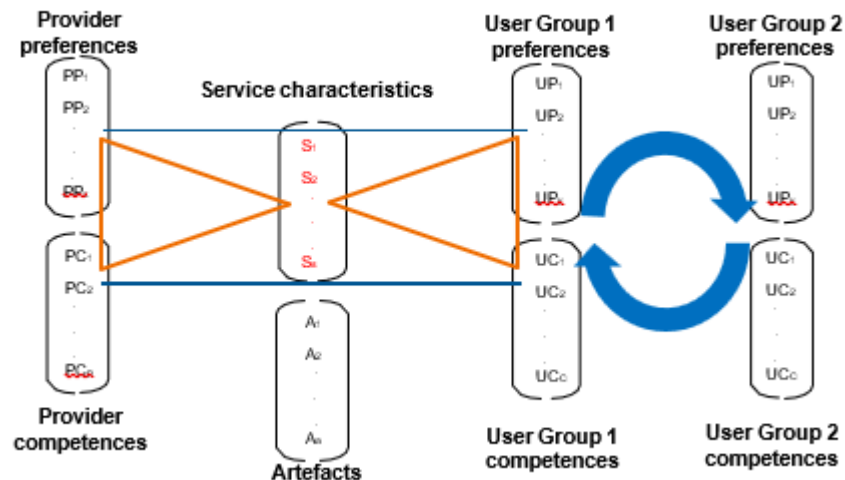


Figure 6: Creating direct interactions between different user groups.

WP3.2 will be looking at the value creation through new user networks. Research conducted in WP3.2 case studies will no doubt enable the analysis on this topic to be elaborated further.

2.6 Public Library Service Ecosystem: Insights from the Literature Review (WP2.1)

Research on the transformation of the public library ecosystem has direct links with WP3.3 with its focus on the library as an innovative and experimental setting for developing a broad range of new services in living labs.



This section examines the public library service ecosystem as “a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (Vargo and Lusch 2016, pp.10–11).

In defining the public library service ecosystem, this section discusses the ethos that underpins the local public library, the key agents / actors of the service ecosystem, and the localism which each local library ecosystem reflects.

2.6.1 Ethos of public libraries

The public library is a mid-19th century invention. At its heart is the idea that all people – women as well as men, poor as well as rich – have a right to education and learning, and that the benefits of education are not limited to the individual but improve society as a whole.

The public library was a place where one could learn to read - opening up a wide range of life opportunities for the individual such as work and education – and it provided, for the first time open access to literature (fiction and non-fiction), newspapers for engagement with local and world news and events, sport and other interests. “Public libraries offered all users the ability to improve one’s own physical, mental and spiritual well-being.

It was a radical social and political idea, part of a wider movement that sought to improve public health and wellbeing through the creation of ‘social infrastructure’ Klinenberg (2018). Here the municipal public library part of a wider development that also included the creation of public parks, universal education, and improved working conditions in industrialised cities across Europe and North America as well as the development. The (local) tax-supported public library became the commonly accepted model for funding.

As discussed in section 4.5, the public library has an important social function in supporting social coherence. It is a place where individuals from different groups within society can meet and learn about each other, dispelling myths and prejudices, while creating tolerance and understanding. This has benefits in terms of fostering social coherence and equality.

The portfolio of services and the library space has altered much over the past couple of decades, reflecting technological change such as the internet and the rise of e-books, and the changing needs and interests of citizens. Still, the individual and social dimensions of service provision remain core within the ethos of the modern municipal library.

This is reflected in a degree of continuity across the service characteristics of the set of new service propositions developed within library service ecosystems.



2.6.2 Key agents in the public library service ecosystem

Three key agents are consistently found within public library ecosystems: the service provider, the service user, and the local policy-maker.

In addition to these, other agents may be found depending on the type of innovation. For example, a service which is funded by national government or a supra-national body (e.g. the EU) will have an influence in shaping the new service that is offered.

2.6.2.1 Service provider

Historically, the primary service provider within the public library service ecosystem is the librarian. In more recent times, librarians work with other organisations and private citizens in order to deliver a portfolio of different service propositions. This can include public and private sector organisations, sector organisations (charity, voluntary and community organisations, social enterprises and cooperatives).

A service may be developed and delivered by one or multiple organisations and many such combinations of provider are possible in principle. For example, a new digital service may involve the IT expertise of a private sector company as a key provider. This may be the sole provider or it may be working alongside, and with, the expertise of the library in order to deliver the new service.

To simply, we will refer to a '*Library Service Provider*'. This may or may not involve a librarian depending on the particular innovation.

2.6.2.2 Active service users and wider community (citizens)

Service users and their potential contributions to value co-creation has been discussed extensively in section 4.

It is important to draw a distinction between the user of a library service, and the wider local community of citizens. Not all citizens are active library users. Indeed, the relationship between library service users and the wider community is far from straightforward. For instance, new community services that situate the public library as a force for social change may benefit the community as a whole but these can experience pushback from certain sections of the community. Examples are storytelling programmes given by LGBTQ+ (Kitzie et al. 2022), or the creation of spaces within the library for homeless people (Hill and Tamminen, 2020; Provence 2020).

Active resistance from the wider community, or powerful sections within the wider community can lead to the destruction of existing service propositions, or the prevention of new service propositions developing, even when these citizens are not actually users of a local library.



2.6.2.3 *Local policy-makers*

Since its inception, the public library is funded by local taxes. Consequently, local politicians' directly affect funding, and their preferences influence the type of services which are offered (Jaeger et al. 2013). There may well be performance indicators for different services and choices to be made on what to fund, and the amount of funding to be given.

In practice, local politicians may be acting at arms length with little direct influence on a specific innovation, as long as it doesn't raise community ire (as described in 6.2.2).

Given their role as key funders, local policy-makers commonly require municipal libraries to provide written strategies, and implement cost and activity accounting as well as benchmarking performance indicators. The latter allow municipal funders to measure and assess change over time, and to compare one library's processes, costs and activities with those of other libraries within the municipality and/or nationally (Düren, Landøy and Saarti 2017).

2.6.3 Localism

The local public library reflects its own local geography and population. For this reason a variety of municipal libraries exist. At one end of a spectrum there exists 'world city libraries' (Mainka et al 2013). These are central libraries in large capital cities such as New York, Amsterdam, Paris, and London. Often housed in prestigious new buildings or extensively refurbished buildings, their focus is situating their home city within a global informational structure of globally linked, information cities (Dresel et al. (2020).

At the other end of the spectrum is the local suburban public library and the local library in a small town or village. These account for the vast majority of local libraries worldwide. Their focus in on small local libraries is more on social and community service innovations. They reflect different realities of their local communities. For example, a social question being tackled in many city suburb libraries in western Europe is how to integrate foreign immigrant communities. By contrast, a key social challenge being tackled in highly rural libraries is how to support and maintain the languages and traditions of indigenous communities who themselves are minorities within a national context, and which are possibly enduring population loss as the youth migrate to large urban cities.

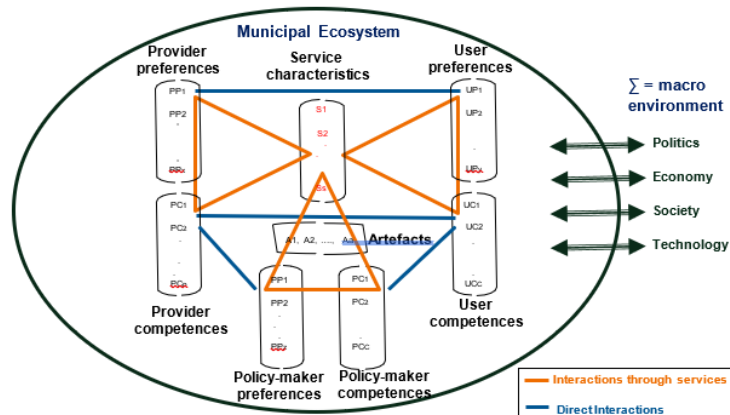


Figure 7: Local public library service ecosystem within its macro environment

In this three-agent model example we have the following resources:

- the set of new service characteristics (in red) of the novel service proposition,
- a set of underpinning artefacts,
- the set of competences which providers bring to the service and the preferences of providers,
- the set of competences which users bring to the service and their preferences,
- the set of competences which local policy-makers bring to the service and their preferences
- the structure of direct and service-mediated interactions between the three agents regarding the service characteristics and the delivery of the service.

Here the external environment of this municipal library service ecosystem is represented as a set of PESTEL factors that can directly influence the service ecosystem. These are: Politics, Economy, Society, Technology, Ecological environment, and the Legal system.

As previously, the model can be opened up further in order to consider situations where there are multiple providers and/or multiple users.

Drawing upon the findings of the VTT literature review (Windrum, Tuominen, Hyytinen and Vainikainen, 2023), this section applies the model to the impact which external PESTEL factors have had on libraries and how this has stimulated new portfolios of library services.

2.6.4 Value destruction, an existential challenge, and the creation of a new portfolio of local public library services

As discussed, the public library was founded on an ethos of public education and learning, founded on the technology of the printed book. At the start of the 21st century two major external factors arose which diminished, or even destroyed, the value of the core service proposition. These were the

development of the internet, which brought with it e-books, and wider changes in society associated with new patterns of online education, work, and leisure, particularly amongst the young (Godin 2016; Field and Tran 2018, Heseltine 2020; Kajberg 2018; Mathysen and Glorieux 2022).

The destruction of value created an existential threat to public libraries. They were viewed by large segments of the wider community as an anachronistic irrelevance – their role being reduced to that of repositories for old books that (almost) no-one had an interest in reading beyond a small and rapidly ageing set of users (Field and Tran 2018).

Local government bodies in many countries questioned the continued funding of local libraries in an age of austerity and with competing demands for scarce public tax revenue. If they were to survive, local libraries would need to embrace links with business, develop business practices, and customise their services to meet new demands (Kajberg 2018).

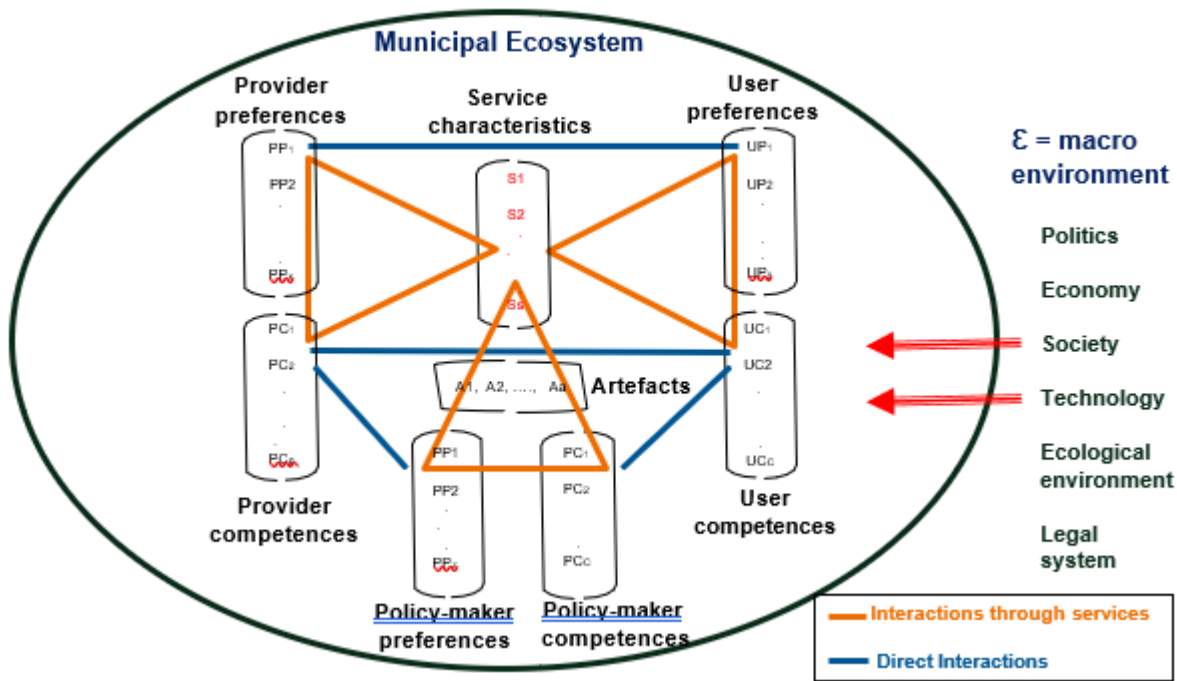


Figure 8: External changes leading to existential threat.

The VTT literature review (*ibid*) shows that librarians around the world rose to this existential challenge and adapted to changing political and community needs and expectations; developing a radically new portfolio of services which reinvented the public library as a place connects communities and fosters lifelong education, creativity, and social interaction in new ways. It is a transformation that embraces continuity as well as change, creating positive social, economic, and environmental outcomes for



individuals and communities.

Five categories of new public library services are discussed in specialist library journals. This illustrates the diversified portfolios of services which have been developed in response to external societal and technological change. These categories are:

1. **Reading and lifelong learning services** include literacy and lifelong learning for multiple societal groups. This includes basic literacy for very young children; capability building in specific topics such as science, technology, engineering, and mathematics (STEM) services and digital technologies for older school children; adult literacy services; basic digital literacy (from how to navigate the internet to basic programming); and cultural services (incl. music, cinema and cultural heritage).
2. **Community services** have a focus on promoting social inclusion, community building and ensuring equal opportunities for different citizen/ societal groups. These include, amongst others, new advisory services and spaces for homeless people, young people who are at risk for societal exclusion; new services for promoting and sustaining the culture (cultural heritage) and language of a local communities and providing services to serve for various ethnic minority groups.
3. **Health and wellbeing services** include services that aim to foster the health, physical activity, and well-being of the library users. These include advisory services (advice on personal health-related matters, such as cervical cancer screening services and health insurance); and (preventative) wellbeing services such as yoga and exercise classes, provided on-site or online. The category may include services directed at a specific user group, such as strength training or memory cafes for the elderly people.
4. **Creativity services** include services that enable and support library users to engage in new forms of creative activities, collaboratively or individually. These may be intended for the development of new creative ideas, new skills, or prototyping of solutions for individual or community use. The services include combinations of services (tutoring, guidance in workshops, etc.) and spaces/resources equipped with materials, machines and other technologies. Examples are makerspaces and other learning environments, living labs, journals presenting users' artworks, contests and exhibitions showing users' creative works, and author services.
5. **Business and finance services** include assisting businesses fill in their annual tax forms and assisting in financial law. Providing resources, advice and spaces for businesses.

An important connection exists between new digital services and service variety. Digitisation means less physical space within the library building is given over to housing books, newspapers, magazines



etc. This enables physical space to be committed to the development of new community, health and wellbeing, and creativity services discussed above.

It is interesting to ask why service activities such as health and community services are now being delivered within libraries rather than at other locations, such as health centres and community centres.

In addition to these new service categories, new modes of delivery have been developed. New delivery modes combine with new /pre-existing services to facilitate greater accessibility services. Extending the scope of access includes new ways of delivering physical services – such as home delivery of physical books via mobile libraries - and the digital delivery of existing physical services such as ebooks and digital catalogues and ordering over apps. These new delivery modes and substitutions of pre- existing technology by new technologies but which serve the same core function. For example, a physical book – e.g. War and Peace - is written once but can subsequently be delivered to the reader via different physical means, or as a digitised version. The main advantage of these new delivery modes is in terms of convenience of access. It does not change the quality of the core service (e.g. the quality of a novel) itself. This extends the library beyond the physical building. An example is delivering reading programmes for mothers in prison. Here mothers in prison record their voice reading a story and the library delivers the recording to their children.

2.6.5 Role of librarians in disseminating and diffusing innovations

General trends in new library services across different countries around the world raises the question of what is causing this. One factor to consider is the interaction between librarians.

Librarians are a professional community through which shared ideas and practices are communicated. This includes the sharing of ideas for new service development, and also of communicating experiences on what works and why, and challenges in development and implementation. These sources include library journal, conferences, LIS education programmes, and professional representative bodies such as IFLA. This community may give rise to path dependency and trends along certain trajectories of new service development.

There are other factors which may also lead to a narrowing of focus to a more limited set of options. One factor is the interests of municipal governments, who are the primary funders of local libraries. Another is changing preferences and lifestyles of library users. Each can affect the direction of new service development.

2.6.6 Social Innovation: Creation of private user value and public societal value

Researchers in social innovation commonly define their area as being concerned with innovations that are social in their process and social in their outcome. This involves an understanding of how users / citizens can be more actively involved in the (co-)creation of an innovation – whether in a planned stage-



gate or more incremental ad hoc process (see section 3 above). It also involves considering how a new service impacts private user value and wider societal value. This is the focus of this section.

A common objective of the new portfolio of services developed across the world by local public libraries is the improvement or upgrading of user competences. This upgrading of competences has a direct impact on the individual user, which creates 'private user value' within a short period of time. In the medium- to long-term, this upgrading of user competences can also lead to increased 'public societal value' by, for example, improving employment opportunities, or leading to a healthier population (with decreased health costs and higher average life expectancy).

Reading and lifelong learning services address basic literacy and digital literacy in order to open up new economic opportunities (employment and income) and quality of life opportunities by putting in place the fundamentals required for personal learning and development. Health and wellbeing services seek to improve users' quality of life through the development of new competences to better manage their own health, diet, and physical activity. The objective of new community services is to develop users' social competences and network links and, thereby achieve goals of greater social and democratic inclusion and community building. These are explicitly social and political goals. Creativity services seek to develop new technological and creative competences in service users. These, in turn, improve economic and technological opportunities.

Figure 9 shows the transmission process from the development of a portfolio of new services (service characteristics in red) offered within local public libraries and their positive impact on users' competence (also in red) which creates private user value. Improving the life opportunities of individual users has potential long term impacts on each of the P-E-S-T-E-L areas of social public value (in red) such as higher employment benefits (higher tax base and lower unemployment costs) due to a literate and educated workforce, higher social health benefits (e.g. lower health service) costs due to healthier citizens, and democratic and societal cohesion benefits (e.g. increased political engagement, reduced civil unrest, lower crime rates and associated policing and prison costs) due to greater social inclusion.

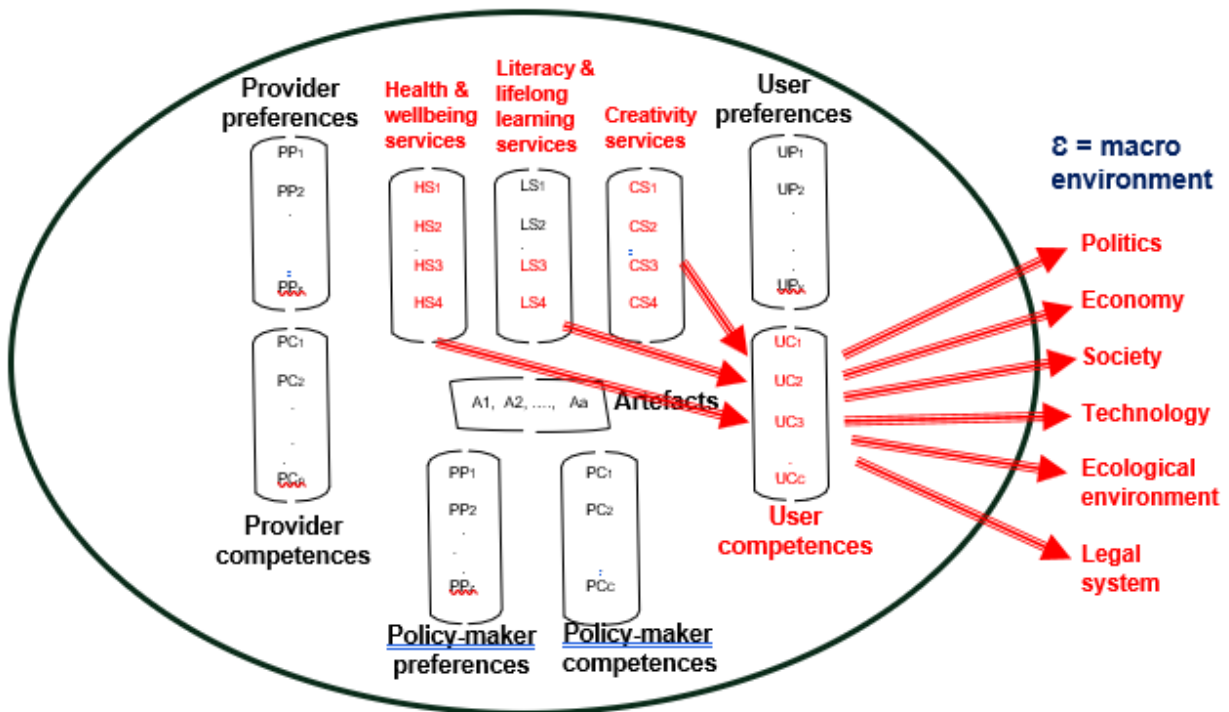


Figure 9: Transmission mechanism between new service impact on private user value and social public value.

There may be service changes which impact the macro environment through different transmission mechanisms. For example, the presence of new service may change political discourse, or influence a change in the legal system without working through changes in user competences. In such a case, a new set of mapping would exist between new service characteristics – or perhaps a sub-set of key new service characteristics – and indirect impacts on one or more of the P-E-S-T-E-L. It would be interesting to identify and compare the transmission mechanism of the 'indirect service characteristics' with those of the 'direct service characteristics'.

Research conducted in WP3 case studies will no doubt enable the analysis on this topic to be elaborated further.

2.6.7 Valuation of the portfolio of services

A distinction has been made between the creation of value and service evaluation (sections 5.1 and 5.3 above). This section considers (e)valuations of service quality and impact made (a) by different agents within the ecosystem, (b) by agents outside the ecosystem, and (c) interactions between the two.



2.6.7.1 Valuation by individual agents within the library ecosystem

The first, and most obvious is the end user of the library service. As noted previously, Lancaster (1966) observed that it is the quality of the set of service characteristics, not the total number of service characteristics per se, which benefits the user. User preferences are used to evaluate the quality of the set of service characteristics through actual use and consumption.

For service providers, there exist a range of possible bases for evaluating service delivery. Their preferences reflect their own needs, experiences, and expectations, and a mapping between the provision of the service and enhancing their own preferences.

As previously discussed, providers can be different types of organisations - public, private, third sector, or a combination thereof. For a private sector firm, the service is evaluated on the basis of its contribution to current and future firm profits, the latter linked to growing market shares and other measures. For non-profit organisations, such as public sector providers and third sector providers, other measures are used to evaluate the benefits of producing a service. These are based on a range of different goals and mission statements and how the service aligns with these.

Local policy makers are elected officials and thus their preferences are founded on the likelihood of being re-elected through high profile service development (e.g. projects that involve cutting red tape and gaining media attention).

2.6.7.2 Valuation by agents outside the library ecosystem

The multi-agent framework does not explicitly define the set of actors/agents outside the library ecosystem who may have an indirect effect on its innovation and who, in turn evaluate its new service innovations. This is deliberate since these will differ on a case-by-case basis, depending upon the particular service innovation being considered.

National policy makers tend to be exogenous to the local municipal ecosystem and, as such, act at a distance. One factor affecting the degree of autonomy of local policy makers is their budget independence from national government. Another factor is whether national legislation affects the local policy makers discretion in setting and achieving independent local targets

National policy-makers, even when they are not directly involved in the local ecosystem, have an interest in the outcomes of library innovation when these spill-over into other key indicators. For instance, new library services which improve literacy and lifelong learning of its users will, ceteris paribus, have a beneficial local impact on employment opportunities, numbers of young people entering higher education, numbers of older workers being able to retrain and find new employment, higher numbers of new start-up businesses etc. These are impacts that are of interest to, and are evaluated by national policy-makers when making budget and policy decisions. These inform wider discussion of the value of



literacy and education, and the types of education policy that is socially desirable and where, when and how public service is to be delivered.

The ecosystem framework draws a distinction drawn between active library users and the wider public - citizens - who are not active users. Generally, citizens do not evaluate, express preferences about, or engage with, their local library. This lack of engagement becomes a problem for the sustainability of the local library when there are large numbers of local citizens who do not use or wish to engage with it (see section 6.4).

Lack of engagement tends to mean that a non-user is unaware of the precise set of services (and the quality of the service characteristics) offered and therefore, hence, has not the wherewithal or interest in making an evaluation of library services. However, certain services may provoke opposition or resistance from certain segments of local citizens. Examples already highlighted include storytelling programmes given by LGBTQ+ (Kitzie et al. 2022), or the creation of spaces within the library for homeless people (Hill and Tamminen, 2020; Provence 2020). Highly vocal opposition groups, with media and political connections may act to remove such services by putting pressure nonlibrary managers and/or local politicians.

There are also interactions between the local library ecosystem and other local service ecosystems, such as health, social services, and school ecosystems. It is an interesting question why these service activities are now held and delivered within libraries rather than delivered in other ecosystems, and how these ecosystems interact. These are changes which are seen in many different countries across the world (section 6.4).

2.6.7.3 Interactions between agents' valuations

Finally, this discussion opens the door to a consideration of how the multiple criteria used by different actors interact and how this interaction affects the development of new services over time. This is beyond the specification of the LibrarIN project but it may be an issue raised in one or more case studies.

2.7 Research Questions

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?

The discussion in this report provides a set of structured research questions which suggest a more finely grained approach for the empirical research to be conducted in WP3 and Wp4. These offer a menu of options, from which LibrarIN partners may choose to select according to their relevance to the selected cases. As such, they are complementary to the criteria used for case study selection.

2.7.1 Process questions (from section 3 of this report)

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?



2.7.2 Service questions (from sections 4 and 5 of this report)

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?

2.7.3 Ecosystem questions (from section 6 of this report)

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

- a) how are these affected by the characteristics of the innovation?
- b) 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.

2.8 Summary and Steps Forward

The work presented in this Report is the first output for WP2.2. It summarises work conducted this far
D2.2 Conceptual framework and model of participatory
management and sustainable growth v2.0
LibrarIN -101061516 — HORIZON-CL2-2021-HERITAGE-01-02



during the first three months of WP2.2. The goal of this first phase, as set out in the original project proposal, is to set up an integrated conceptual framework that can be operationalised for empirical work which aims to explore and understand the process of value co-creation in public libraries service delivery.

The Report has brought together service dominant logic (SDL) / public service logic (PSL) and service and social innovation multi-agent theories in a novel way, setting up a new conceptual synthesis. This new framework has, in turn, stimulated ideas, discussion, and an initial set of research questions for research in WP3 and WP4.

Looking forward, the next phase for WP2.2 is to develop and refine the conceptual framework based on the findings of the empirical research conducted in WP3 and WP4 throughout 2024.



3 Innovation in libraries: A service-oriented perspective (by the Lille team).

Below is the most important scientific publication related to the results obtained during the elaboration of the multi-agent framework. The Research is entitled *Innovation in libraries: A service oriented perspective* and it was published by the journal *Research Policy*, which currently has an impact factor of 7.5, a 5 year impact factor of 10.1 and is ranked 32/401 in the Management category of the Web of Science. Following we present the paper in Research Policy format.



Innovation in libraries: A service-oriented perspective

Benoît Desmarchelier ^a, Faridah Djellal ^b, Faïz Gallouj ^{c,*}

^a University Sorbonne Paris Nord, Faculty of Economics and Management, 99, Av. Jean Baptiste Clément, 93430 Villetaneuse, France

^b University of Lille, Faculty of Economics and Sociology, Building SH2 - Office 110, 59655 Villeneuve d'Ascq Cedex, France

^c University of Lille, Faculty of Economics and Sociology, Building SH2 - Office 223, 59655 Villeneuve d'Ascq Cedex, France

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ABSTRACT

This article is devoted to the question of innovation in libraries. Ignored by 'service studies', this question occupies an important place in library and information science, but is all too often approached in a way that is factual and descriptive. Drawing on advances in service economics and management, this article adopts a perspective of the library as an 'architectural' or 'assembled' service bringing together a number of core and peripheral services, and mobilizing competences and different types of technology to collaboratively generate, utilities for the user or community. We discuss how such a representation of the product can systematically account for the full complexity of the forms and dynamics of innovation in libraries. We have thus identified and empirically illustrated three general innovation logics (horizontal, vertical and diagonal), which differ according to the components of the library service on which they act, and which operate according to different modalities, reflecting different innovation trajectories.

1. Introduction

Inspired by a similar exercise carried out by Ben Martin (2016) for 'innovation studies' in general, Gallouj and Djellal (2018) identify the main challenges facing 'service innovation studies' in the future in a book entitled 'A research agenda for service innovation'. These include the identification and exploration of forgotten service sectors whose nature and innovation dynamics need to be understood. Paradoxically, libraries do not appear among these sectors. And yet, these are services well and truly forgotten by 'service innovation studies'. Indeed, to our knowledge, there are no articles devoted to innovation in libraries in the main journals, either in the field of services or in the field of innovation. As part of the European research project LibrarIN ('Value Co-creation and Social Innovation for a New Generation of European Libraries'), Rubalcaba et al. (2023) identified over 400 references on innovation in academic libraries, using the Web of Science database. None of these references had been published in innovation and services journals.

This lack of interest in library innovation across both service and innovation studies is all the more paradoxical, given that a major innovation (namely the internet and all its offshoots and associated

services) has led to fears of the outright disappearance of libraries (Goulding, 2006; Leadbeater, 2003; Coates, 2004) under the effect of the Schumpeterian principle of creative destruction. It is only because libraries have themselves been innovative in the face of this competition – even making internet access a core mission (McClure et al., 2009) – that libraries have not, as was once feared, disappeared in the face of invasive online access to information and knowledge (e.g. Google Scholar, Wikipedia, e-books and e-journals, etc.).

While this struggle (through innovation) for survival has been of little interest to researchers in the field of services and innovation (more concerned with market services, and more recently with public administrations¹), it has been the object of extensive literature in the general field of library and information science (LIS),² including in the corresponding professional literature. This literature is of great interest in its description (mainly through significant case studies) of the nature of innovation in libraries and the way it is organized. However, it remains overly descriptive and factual. Though it does offer definitions and typologies of innovation in libraries, it more often than not lacks the theoretical foundation that would enable systematic mapping and analysis (Yeh and Ramirez, 2016). Both Rubalcaba et al. (2023) and

* Corresponding author.

E-mail addresses: Benoit.Desmarchelier@univ-Paris13.fr (B. Desmarchelier), Faridah.Djellal@univ-Lille.fr (F. Djellal), Faiz.Gallouj@univ-Lille.fr (F. Gallouj).

¹ For a recent review of the literature on service innovation, see Gallouj et al. (2023).

² LIS relies on a number of specialist journals that regularly publish articles on innovation in libraries. Examples include: Journal of Academic Librarianship, Journal of Librarianship and Information Science, Library Hi Tech, International Journal on Digital Libraries, Library Philosophy and Practice, Public Library Quarterly, Journal of Library Administration, Library Management, etc.

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Desmarchelier and Gallouj (2023) have produced recent reviews of the literature on innovation in libraries (see also Jantz, 2012; Brundy, 2015; Pellack, 2022). The typologies proposed in librarianship represent a departure from the traditional Schumpeterian categories, which are deemed incapable of taking into account the specificities and the totality of the forms of innovation in libraries. Thus, specific typologies are proposed. For example, Rubin et al. (2011) identified 10 “areas of innovation”: technology, service, culture, vague, character, use, program, facility, resource, and partnership. Nicholson (2017) proposed 5 types of innovation: in collections, customer services, technology, programs, and library buildings. Using a database of 80 cases of innovation compiled from interviews with 108 librarians in the United States, Potnis et al. (2020) identified 4 types of innovation, each with different modalities: program (access-oriented/use-oriented), process (efficiency-driven/effectiveness-driven), partnership (internal/external), and technology (web-based technologies/assistive technologies/artificial intelligence). Most of these typologies are less than entirely satisfactory, either because they include too many types, or strange types (such as ‘vague’ – when the subject of innovation cannot be identified – in the typology by Rubin et al., 2011), or because the boundaries between some of these types are difficult to establish. It should also be noted that social innovation, which plays an important role in public libraries, is not included in any of the abovementioned typologies. However, rather than being absent from the literature, it is the subject of separate typologies. For example, Winberry and Potnis (2021) distinguish six types (or fields, to be more precise) of social innovation in public libraries: lifelong learning, emergency response, civic engagement, health, and diversity and inclusion.

The aim of this article is to mobilize a number of theoretical constructs established in the field of service (and service innovation) economics and management, in order to provide theoretical support for this professional literature. Our plan is thus to bring together fields of research that have, until now, essentially ignored each other: the economics and management of services (and service innovation), on the one hand, and librarianship, on the other.

This article is organized into three main sections. In Section 2, we take a service-oriented approach to library activity, based on Gadrey’s (1991, 1996) definition of service (popularized by the ‘service triangle’ metaphor), and the resulting functional breakdown of the ‘product’. In particular, this functional breakdown makes it possible to identify the evolution over time of the different perspectives conceivable for understanding library service: the library as collection, the library as information system and the library as complex service. In Section 3, this functional breakdown is enriched by adding in the competences and technologies mobilized by the various actors (librarians, users and other partners) involved in the service, and the direct and indirect utilities (or use values) generated for users (individual or collective) by the library service. A general representation of the ‘product’, developed in ‘services studies’ to account for so-called ‘architectural’ or ‘assembled’ services (i. e. those defined as the association of a number of other constituent services) is thus adapted to the library activity (Djellal and Gallouj, 2005, 2008; Djellal, 2023). Lastly, in Section 4, we discuss the way in which such a representation of the product makes it possible to account, both analytically and systematically, for all the complexity of the forms and dynamics of innovation in libraries.

1. A service-oriented definition of library activities

Library science defines the library as a place and set of activities available to all citizens, with the following objectives: “information, education, recreation, culture and economic regeneration” (Williamson, 2000, p. 179). This broad definition encompasses both longstanding (historical) conceptions of libraries (focused on inventorying, cataloging, curating, and making available books) and contemporary conceptions of libraries as providers of multiple services (sometimes having no connection whatsoever to books or written documents). Within this

general framework, the literature highlights a diversity of library types: national library, public library, academic library, virtual library, specialist library, professional library, school library, and public agency library (Edwards, 2009; Hansson, 2010), distinguished by their specific objectives and the publics they serve, with national particularities. However, the distinction most frequently used in the literature is between the academic library and the public library (Nicholson, 2017; Hansson, 2010).

In their efforts to define and typify libraries, library science and service science seem to mutually ignore one another. Yet every library is a service provider, regardless of form/type. Defining it in terms of service theory is therefore both desirable and relevant.

The most conceptually elaborate definition of services is attributed to Hill (1977). In distinguishing goods from services, this definition foregoes the use of technical criteria (intangibility, heterogeneity, interactivity, perishability),³ relying both on an analytical dissociation between customer and service medium, and on a distinction between service as a process and service as a result. For Hill (1977, p. 318), a service is thus “a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit”. Gadrey (1991, 1996) enriches and refines this definition, providing a schematic representation: the ‘service triangle’ (see Fig. 1).

The service is thus defined as a set of operations for processing (transforming) the state of a medium (SM), implemented by a service provider (SP) for the benefit of a customer/user (C), and in many cases in collaboration with him or her, with SM, SP and C constituting the vertices of the service triangle. The medium (which belongs, or is linked in various ways to the customer) may be: goods or a technical system; codified information (including monetary symbols); collective skills and knowledge (of organizations), as well as individuals themselves in their “physical and bodily dimension (health, maintenance, transport), intellectual dimension (training, culture), relational dimension (communications, leisure, information)” (Gadrey, 1991, p. 9).

Applying this general definition to traditional (contemporary) library services, we can describe them as a set of processing operations carried out by the librarian on a medium that is the user themselves, in their intellectual and relational dimensions, and in collaboration with this user. Indeed, the purpose of the library service is to improve individuals’ education and cultural knowledge, inform them and provide them with leisure activities.

However, this general definition is abstract and simplistic. As Gadrey

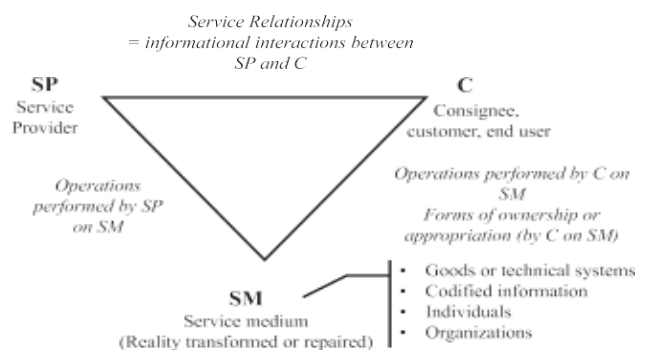


Fig. 1. The service triangle (after Gadrey, 1996).

³ The so-called IHIP paradigm.

(1991, 1996) himself acknowledges, with regard to services in general, it conceals the fact that, in reality, a service activity (and that of libraries in particular) can, to varying degrees, be carried out *on several media at once*. Indeed, it can be seen as the combination (in differing proportions and varying in space and time), of various groups of operations (or functions) involving the different media established by the service triangle (cf. Fig. 2):

- ‘material’ operations or functions [M], which consist of ‘processing’ tangible objects (books, in the case of libraries, but also other objects in, for example, the case of the so-called ‘library of things’), i.e. transporting, storing, transforming, maintaining, repairing them, etc. Insofar as the library is a ‘physical space’, we propose to add to these functions the operations of organizing and arranging spaces and furniture;
- ‘informational’ operations or functions [I], which consist in ‘processing’ ‘codified’ information, i.e. producing, capturing, transporting it and so on. In the case of libraries, informational operations can be divided into two different groups: on the one hand, operations concerning the digitization of collections and the provision of IT-based services, and on the other, operations concerning the administrative and accounting management of libraries. These operations take place in a ‘digital space’, which complements (and sometimes replaces) the ‘physical space’;
- ‘cognitive’ or ‘methodological’ or ‘organizational engineering’ operations or functions [K], which focus on the collective skills and knowledge of organizations (in this case, libraries and their partners), and on their structures, which need to be transformed. These operations may involve the implementation of new or improved methods (i.e., codified routines, intangible techniques) or new or improved organizations/structures. In the case of libraries, examples of methods implemented include those relating to the classification of books and documents;
- ‘contactual’ or ‘relational’ service operations [R], those whose main medium is the customer or user themselves, and which consist of direct (in-contact) service.

Fig. 3 shows how the proportion of the four library functions (‘material’, ‘informational’, ‘methodological’ and ‘relational’) has varied over time, highlighting three different conceptions of the library: as collection, as information system, and as complex service (the dominant contemporary conception).

Historically, then, library activity has long focused essentially on relatively rare material objects (M): books, manuscripts, parchments, documents, which had to be collected, stored, referenced and maintained in order to be made available to readers, or lent out (Hayes and Walter, 1996; Hansson, 2010). These objects, which are stored and made available to users in appropriate physical spaces, have an obvious materiality, even though what the reader and curator are primarily interested in is the (immaterial) information and knowledge they convey. This physical dimension of the object (the book) is a longstanding one. It is the heir to clay tablets, papyrus rolls, parchments and codex (Martin,

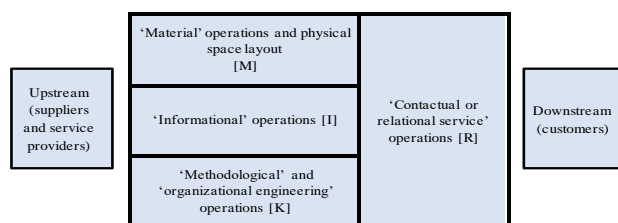


Fig. 2. Functional breakdown of the service.
(Adapted from Gadrey, 1991).

1996). We label this first conception ‘collection-oriented library’, although the literature uses other expressions conveying the same idea of domination of the material (physical) medium of the service: paper-based library, material-based library, (books) warehouse-library (Bee, 2008). The material dimension of library services is not limited (at least in contemporary libraries) to the supply of books. Other objects can also be offered, making up what is known as the ‘Library of Things’. These include bicycles, musical instruments, cameras, board games, fishing rods, balls and kitchen appliances. Seed libraries also belong to these ‘Libraries of Things’.

With the advent of information technology, the internet and digitization, the main target of the service has shifted from the material object (M) to codified information (I), giving rise to another conception of the library: the ‘library as information system’. Relying on referencing and management systems that have themselves been digitized, the library now manages an extreme bulk of digital resources: out-of-print antiquarian books/documents, which are the subject of a digitization policy, contemporary books published in digital form from the outset, digital journals, etc. It thus organizes ‘access packages’ for users who no longer necessarily travel to the library (Calenge, 2015). Some of these resources (digital journals, for example) do not belong to the library, which must itself negotiate access and subscribe to them. In turn, the library provides users with access and technical support. Although there are borderline cases where material processing functions (M) disappear with the rise of informational processing functions (I) (the so-called – strictly – digital library), more often than not, the two coexist. The literature uses the term ‘hybrid library’ (Rusbridge, 1998; Oppenheim and Smithson, 1999), to describe this conception of the library, combining traditional material processing functions of collections (M) (physical library) with informational processing functions (I) (digital library).

A third conception of the library can be envisaged, reflecting the growing importance of the cognitive (K) and, above all, of the in-contact services and relational components (R) of its ‘product’. We propose calling it ‘library as complex service (or architectural or assembled service)’. Without neglecting other targets, the one libraries are now increasingly concerned with is the users themselves (R), whose characteristics they are striving to change, in a direct, in-contact relationship. Libraries are now ‘people-centered’ rather than ‘collection-centered’. Some academic libraries, for example, are becoming ‘Learning Centers’, offering users numerous opportunities for experimentation and interaction, and are concerned not only with the transmission of information and knowledge, but also with their emotional and social well-being. The library is thus also a place for socializing, experimentation, conviviality and relaxation — a third place. It offers music, exhibitions, meetings with authors and more. In this conception of the library, the librarian acts as a ‘tour operator’, a guide, a hub integrating a certain number of services (in an ‘architectural’ logic) for the well-being of users (training services, social services, advisory services in multiple fields, etc.). It is no longer just the information and knowledge transmitted that is important, but also the general context in which potential readers/learners evolve, and the efforts made to empower them.

This evolution in these different conceptions of the library (from ‘library as collection’ to ‘library as information system’, then to ‘library as complex service’) parallels several other developments:

- the shift in the main targets of service: from the object to the information, then to the organization in its cognitive and structural dimensions, and finally to the individual (in various aspects) — in other words, the shift ‘from collection to connection’ (technological and/or human) (Nybo, 2014).
- the shift from scarcity (of collections) to plethora of information/knowledge.
- the shift from accumulation (memory) to transmission and interaction (knowledge), then to genuine co-production (in different ways).

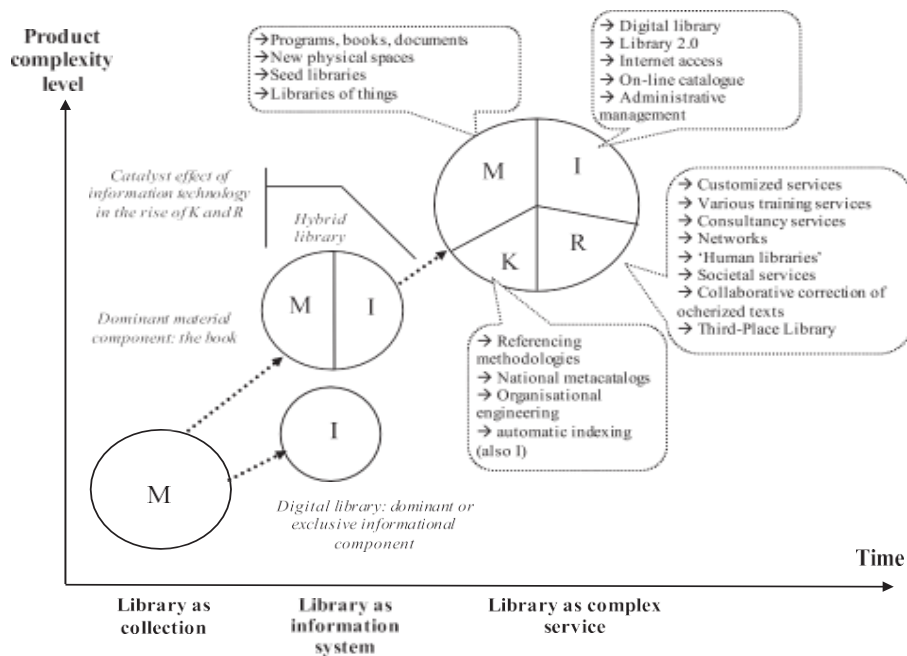


Fig. 3. Product functional breakdown and evolution of library concepts.

- the shift from product standardization to service customization.
- the shift from linear interaction models to diverse interactive models, involving users in particular.

It is important to note that in reality, at each stage of its evolution, the library implements all four of the functions/activities envisaged (material, informational, methodological and relational). Thus, what differs from one stage to the next is, in fact, the proportion (relative importance) of each function. In other words, although material functions (book processing and logistics) are indeed dominant in the ‘library as collection’, this is not to the exclusion of informational, methodological (referencing methods) and relational (consultancy) functions. Both the rise of a given function/activity and the evolution towards the ‘library as a complex service system’ are often reflected in the addition of sub-functions/activities within a given function. As we shall see in Section 4, this increase in complexity is generated by innovation trajectories (and extension trajectories in particular).

1. An ‘architectural’ approach to library activity

The nature of library service has thus changed and become more complex over time. The rise of the ‘library-as-complex-service-provider’ concept has reinforced the architectural dimension of contemporary library service. In other words, library activity is increasingly akin to what we call ‘architectural or assembled services’, to designate services which, like hospital services, airports, amusement parks, large-scale retail outlets, etc., are more or less complex packages of other constituent services, added to a core service (Djellal, 2023). Here, too, it is possible to draw on the contributions of service economics and management in building our understanding of contemporary library services.

The theoretical representation of ‘architectural’ (or assembled) services proposed by Djellal and Gallouj (2005, 2008) seems particularly well-suited to the multiplicity of services offered by contemporary libraries. This product representation incorporates theoretical elements from service economics and management, in particular the definition of

service based on the service triangle metaphor, and the functional breakdown of service provision (see previous section). It also incorporates a Lancasterian-inspired, characteristics-based approach to services (Gallouj and Weinstein, 1997; de Vries, 2006; Windrum and García-Gonçá, 2008), and certain contributions from service marketing — in particular, the core-peripheral service approach (Eiglier and Langeard, 1987; Lovelock, 1996).

Like any architectural service provider, the library can be described by linking the following six variables (Djellal and Gallouj, 2005, 2008) (see Table 1):

- 1) the constituent services (S_i) making up the library package.
- 2) the user competences (C^u).
- 3) the user technologies (T^u).
- 4) the competences (C) of the librarians involved in the various ‘constituent services’.
- 5) the technologies (T) of the service providers, associated with the various possible targets/media of the library’s services.
- 6) the final service characteristics or utilities obtained or sought by/for users and/or the community (Y).

1. The constituent services (S_i) making up the library package are represented by the rows in Table 1. They belong to two different categories highlighted, in particular, by service marketing (Eiglier and Langeard, 1987; Lovelock, 1996): 1) the core service or services, which constitute (at least historically) the heart of the package, and which justify its existence (lending of books in a library), and 2); peripheral services, which bring together a more or less broad range of secondary services, which come in support of the core service (e.g., internet access, cafeteria, social area, in libraries).

In the now dominant concept of the library as a complex (or architectural) service, the provision of collections (the library’s core service) is just one service among many. The book (or, more precisely, its lending), formerly the core service, may become a peripheral service, or even disappear altogether (from the offer itself or from the user’s preference system), as the user comes to the library



Table 1
A framework for analyzing architectural service provision: an application to libraries.

Constituent services	User competences	User technologies	Service provider competences	Service provider technologies (T) associated with a service medium and with corresponding operations or functions	(External) use, final or service characteristics or
$S_1 (s_1, s_2, \dots, s_n)$	C^U Competences in (the use of) technologies or competences directly mobilized	T^U Mainly informational technologies	C Competences in (the use of) technologies (C_M, C_I, C_K, C_R) or competences directly mobilized	T_M 'Material' technologies corresponding to 'material' operations (M) (including organizing and arranging spaces and	Y_d Direct service characteristics
				T_I 'Informational' sciences and technologies corresponding to 'informational' operations (I)	Y_i Indirect service characteristics
				T_K 'Methodological and organizational engineering' sciences and technologies corresponding to 'methodological and organizational	
				T_R 'Contextual or relational' sciences and technologies corresponding to 'contextual or relational' service operations (R)	
S_1 Book lending					
S_2 Internet access					
S_3 ...					
S_4 ...					
S_5 ...					

(Adapted from Diellal and Gallouj, 2008).

looking for something else than a book: for example, a workspace, a space for socializing, leisure activities, support in drawing up administrative documents, etc. The reduction in centrality (or even the disappearance) of the historical core service of access to collections depends on the type of library. For example, books remain central in national libraries, while 'social' services are tending to supplant books in some public libraries. This possible loss of centrality of the core service is a particularity of library services compared to other architectural services. For example, regardless of the package of services considered, care remains the main reason for patient recourse to the hospital.

1. User competences (C^U) are not those that libraries are likely to pass on to users through their activities, and which constitute their core business. These last are 'output competences' that are either new constituent services (S_i) offered by librarians (for example, 'information competences' or 'information literacy' (Mosele and Wang, 2014) or, more generally, the fruit of educational services of all kinds), or general utilities generated by the library's activities (Y_i). The 'input competences' (C^I) referred to here are the initial competences held by users and mobilized by them in order to take advantage of library services (e.g. technological literacy).
2. Users can use a number of technologies (T^U) to access library services. These are essentially information technologies (T^I) (computers, tablets, e-readers, personal cell phones, etc.). Here again, when some of this equipment is lent out by libraries, it is no longer a question of T^U , but of constituent services delivered (S_i), for example, the lending of a reading device.
3. The competences (C) of the librarians involved in the different services may be competences in the different technologies brought into play during the different operations (C_M, C_I, C_K, C_R) or more general competences, or competences independent of these technologies (C_G) (interpersonal and mediation competences, creative, operative/manual competences). These competences can be individual or collective. The rise of the information function (I), of the corresponding digital technologies and of digital-based services is leading to a rise in the digital competences (C_I) of librarians. Similarly, the growing importance of libraries' social and societal missions is leading to an increase in their social/civic competences. Both types of competences (digital and social/civic) can also be sought or obtained through partnerships with other agents, e.g. public administrations or non-profit organizations.
4. Depending on the main target/medium of the service, and the corresponding transformation operations (M, I, K, R) (see Section 2), specific technologies (material technologies — T_M , informational technologies — T_I , cognitive and organizational engineering technologies — T_K , relational technologies — T_R) will be mobilized to produce the (core or peripheral) service. Even if there is some overlap, the different operations/functions making up the service (material, informational, cognitive and relational operations/functions) generally correspond to different technological families (for example, T_M , robotics and mechanics, but also architecture and interior design, for function M; T_I , information technology and telecommunications, for function I; T_K , various methodologies and protocols and organizational engineering, for function K, etc.).
5. The Y variable (the utilities or service characteristics generated by the library service) is based on a Lancasterian characteristics-based approach to service (Gallouj and Weinstein, 1997). The Y_i reflect the library's impact on user well-being, in other words, the 'value' of the library service. A distinction has to be made between a *direct* or *immediate* value/utility (the satisfaction obtained immediately by users in their own service experience — in this case, the use of a



library service) and an *indirect or mediate* value/utility (outcome, satisfaction obtained in the longer term, for example, the impact of using the library on increasing skills, passing exams and obtaining a diploma or job, etc.) (Eleuche, 2017). The utilities in question are most often desired by both the user and the librarian, though they can also be positive or negative externalities generated unintentionally. In research on digital literacy, Ginger (2015) describes the unexpected utilities of free internet access in the public library of a small town in the United States. This free service reaches beyond the library walls insofar as — even after closing time, young people gather in cars in the nearby car park to take advantage of the internet access to listen to music or watch YouTube videos. A distinction has also to be made between utilities for users themselves and utilities for the community as a whole. For example, independently of its success, measured by various volumes (e.g., attendance volumes), a library (like an incubator, a swimming pool, etc.) produces reputation for the community that owns one (Hayes and Walter, 1996).

It should be noted that we have enriched Djellal and Gallouj's (2005, 2008) analytical representation of 'architectural' services in several ways (shown in gray in Table 1):

1. By introducing a column in Table 1 representing user competences (C'). Users may be more or less skilled in service interaction and the use of technology. Combating illiteracy (including technological illiteracy) is a key social objective of libraries.
2. By introducing the user's own technologies (T') (e.g. computer, tablet, cell phone) — which can be mobilized as part of the service relationship. In some cases, libraries offer these technologies on loan; they are then peripheral services (S_i) added to the core service.
3. By introducing distinctions between direct service characteristics (short term effects) and indirect service characteristics (outcome, long term effects), individual and collective/community service characteristics, and also by accounting for unintended service characteristics, generated as externalities (positive or negative).
4. By emphasizing the dual nature of competences and techniques in libraries. These can refer to skills and technical characteristics (i.e. [C] and [T] vectors, respectively) as well as services characteristics ([Y] vector).
5. By introducing technologies linked to (buildings) architecture, interior design and corresponding furniture in the vector of material technologies [T_M].

The first two enrichments emphasize user participation in the co-creation of value [Y], i.e. the co-production and co-creation dimensions of a library service by users.

As an 'architectural' service, the 'theoretical' contemporary library (of any type) can be defined and represented as simply the association of a number of constituent services (core service(s) plus peripheral services). These, in turn, can be described as the mobilization of external competences and technologies (those of users) and internal competences and technologies (those of librarians), relating to groups of operations for processing different material, informational, cognitive or individual media — which are transformed to generate use value for individuals and communities.

1. From analyzing the library 'product' to analyzing library innovation

The architectural representation of the library product we have proposed, based on contributions made by service economics and management, can be used to provide a theoretical (but systematic) account of innovation dynamics in libraries, regardless of the type of library in question, from an evolutionary and neo-Schumpeterian perspective that emphasizes innovation not only as an outcome, but also as a process (innovation trajectories).

In a way, it can be said that innovation is reflected in (more or less significant) change in one or more boxes of the analytical framework constituted by Table 1. To make these diverse changes more intelligible, we can classify them into three main 'innovation logics' (i.e. 'organizing principles'), the first two of which are ideal-types (pure logics), while the last is in reality the commonest operating logic:

1. a horizontal logic (operating in two modes: extensive and regressive)
2. a vertical (or intensive) logic operating in four modes (material, informational, cognitive and contactual/relational)
3. a diagonal (or combinatory) logic, which links the different modalities of the preceding logics in various configurations

4.1. A horizontal innovation logic

The horizontal innovation logic reflects an innovation dynamic that affects the lines of the analytical framework illustrated in Table 1. It can take either an *extensive* form, which consists of adding peripheral constituent services (S_i) to the library's core service (in other words, adding lines to the table) or a *regressive* form, which consists, conversely, of deleting constituent services (i.e. deleting lines from the table). The regressive form, which is common in other architectural services (and whose canonical form is 'low-cost'), seems to be less so in library services. Nevertheless, some highly specialized libraries (e.g., those specializing in particular collections) are, in a way, the fruit of implementation of this logic, and the strategies for outsourcing certain activities (Goulding, 2006) implemented by libraries as part of the New Public Management paradigm are also part of this logic.

The extensive modality of this horizontal logic is much more frequent. It can be envisaged at organizational level (the reference library), intra-organizational level (a department, a component of this library) and inter-organizational level (a network of various organizations collaborating with the reference library). In the latter case, the extensive logic blurs together with the network logic. Indeed, it consists of 'adding' organizations to the reference library (which can themselves be seen as packages of constituent services). 'Adding' here means establishing a partnership of any form, including the merger of organizations.

A survey of the literature (Windrum et al., 2023; Gilbert, 2010; Nicholson, 2017; Calenge, 2015, etc.) makes it possible to identify six generic categories of services into which the new services (introduced according to an extensive innovation logic) can be grouped. These categories, which are considered here regardless of library type (academic or municipal) are as follows: 1. Reading, education and lifelong learning services; 2. Community and government services; 3. Social services (for vulnerable people); 4. Health, wellbeing, leisure and cultural services; 5. Creativity services; and 6. Research, business and employment services.

These six generic categories are illustrated (cf. Table 2) by examples drawn from two sources: first, a survey of the scientific and professional literature which entailed the collection of examples of new services, and second, our own empirical work (interviews conducted at some 20 libraries) as part of a European research project. These six generic categories of services and their illustrations can themselves be divided into different sub-groups, depending on the main medium of the service: ICT, books, various other objects, the individual, the physical space.

The 'Reading, education and lifelong learning' category corresponds to traditional library services focused on reading at different stages of life: reading services for very young children; services to support secondary education (science, technology, engineering, and mathematics (STEM) services); lifelong learning for adults. This category may consist of ICT-based (reading and learning) services (e.g. providing access to and support for numerous online self-training services (MOOCs) across multiple fields, coding clubs for young children to learn the rudiments of programming, lending various learning technical devices: e-readers, etc.). However, it may also consist of traditional library services,



Table 2

Examples of new services introduced as part of extensive horizontal innovation (source: literature survey and our own empirical work).

Category of services added (S)	Examples
1. Reading, education and lifelong learning	<ul style="list-style-type: none"> - Providing access to and support for numerous online self-training services (MOOCs) across multiple fields - Training in the use of social media - Technology petting zoos: a collection of technical tools (e.g. e-readers, laptops, tablets, digital audio-services) made available for users to try out and learn how they work - Personalized online librarian query services, 24/7 - Early learning (play-based) sessions for young children (e.g., 'coding clubs' to learn the rudiments of programming) - Reading boxes in the city - Home library services - Hospital libraries - Mobile libraries - Beach reading huts - Library in town shops - Library services at airports and public transport stations - Use of bicycles to bring books for loan or mobile Wi-Fi hotspots in particular locations or events (pop-up libraries/ephemeral libraries) - Multimedia language laboratory - A bookshop in the library. Example: St Pancras Library - Book vending machines - Event space, e.g. for meetings with authors - Provision of library 'spaces' where users can temporarily deposit books
2. Community and government services	<ul style="list-style-type: none"> - Internet and e-government training - Community services: provision of general information for the community, covering a wide range of fields (road safety, various local events, etc.) - Legal services (beyond simply providing documentation) - New emergency service functions - Library housing relays for national or municipal public services (help with administrative procedures) - Services for ethnocultural minority groups in Canada
3. Societal services (childhood, aging, migrants, minorities, precariousness, unemployment, etc.)	<ul style="list-style-type: none"> - Talking book programs (for the blind, the elderly) initially based on cassettes and now on computer equipment - Services for seniors: training seniors to surf the web for reliable medical information. Seniorsgamer: a games program for people with early-onset dementia (Drammen Library, Norway) - Homework help and school failure prevention
4. Health, wellbeing, leisure and cultural services	

Table 2 (continued)

Category of services added (S)	Examples
1. Creativity services	<ul style="list-style-type: none"> - Talking book programs, audio books (for the sick) previously with cassettes, now with computer equipment - Sports halls within libraries - Lending of sport equipment (balls, skiing equipment, etc.) - The library as a 'Third Place' in the original sense of the term - Cafeterias, restaurants within libraries - Seed libraries - Art galleries and exhibition spaces in libraries - Toy libraries - Yoga sessions in libraries - Online Catalog 2.0, which allows users to add their inputs (comments, notes, tags) to a document - Game-coding workshops - Music recording studios and stages in libraries - The library as a 'Third Place' in the new sense of the term - Introduction of the 'human library' concept: users come and talk about themselves, their particular experience, a particular book (speed-reading inspired by speed-dating) - Users can share their collections (rare documents, family heirlooms, pictures), possibly through digitization - Author-related services (writing workshops, collective creation of a theater piece, etc.) - Encouragement of 'content creation' by users (in various forms: paper works, digital works, artistic works, etc.). These diverse productions are integrated into library collections - Collaborative proofreading of ocerized texts - Lending of various material objects: musical instruments, kitchen appliances, cameras, etc.
2. Research, business and employment services	<ul style="list-style-type: none"> - Services for university researchers: personalized bibliographic support, training in bibliographic management tools, support in obtaining research contracts - 'Borrow a librarian' service - Transmission of information skills to university library students (new pedagogical service) - Library support for user training leading to recognized qualifications - Collections and services (especially information) to the local economic community
	<ul style="list-style-type: none"> - Services to combat illiteracy - Services linked to professional integration and employment: CV writing, job dating, career reorientation advice, interview preparation - Services for migrants and foreigners - Services for the homeless - Library integrating social center services - Collections and services for LGBT people - Setting up crèches - Lending (in bygone era) of videocassettes, CDs, DVDs providing health information and advice - Training service to help find relevant health information on the web



services, particularly tax administration (e-government).

The third category is that of ‘Societal services’. This is a set of services provided by libraries in response to (sometimes interrelated) major social problems (‘wicked problems’), involving school drop-out, aging, migration and minorities, long-term unemployment, illness, etc. These new societal services are often synonymous with social innovations, i.e. innovations that are social in both their end (solving a social problem) and their means (empowering users, multi-agent collaboration). Indeed, they are often developed within collaborative networks, which can be referred to as ‘public service innovation networks for social innovation- PSINSIs’ (Desmarchelier et al., 2020, 2021). These new services can also be based on ICTs (coding clubs for young children in deprived areas; talking book programs (for blind and elderly people), which used to be audio cassette based but now use computer equipment; training seniors to surf the web for reliable medical information, games programs for people with early-onset dementia, etc.). They may be part of new physical spaces established in libraries (setting up creches) or correspond to the offering of new, clearly-differentiated collections (e.g. collections and services for LGBT people, etc.).

First and foremost, the ‘Health and well-being services, leisure and culture’ category covers information, advice and training services focused on health and well-being (prevention of various types of illness, yoga classes, dietetics classes, etc.). It also covers facilities for sporting activities (sports halls within libraries), relaxation, meeting and socializing (cafeterias, restaurants within libraries). It should be noted that while libraries can incorporate this traditional type of “third place” (cafeterias, restaurants within libraries), they can also set up relaxation and socialization facilities independently of these old modes. This generic category also includes leisure and cultural services (other than those centered on books): seed libraries, art galleries and exhibition spaces in libraries, toy libraries, lending board games, etc.

The ‘creative services’ category covers the provision of activities, materials and spaces to facilitate people’s creativity. This is another category that can be divided into several sub-groups. The first sub-group is made up of creative services based on ICTs (online Catalog 2.0, which allows users to add their inputs – comments, notes, tags – to a document, game-coding workshops, collaborative proofreading of ocerized texts) or other technologies (music recording studios and stages in libraries, lending of various material objects – musical instruments, kitchen appliances, cameras, etc. – in the general context of what is known as the ‘library of things’). The second sub-group is that of activities in which users themselves are either the actual service or the service providers, and content producers. In the case of ‘human libraries’ (Calenge, 2015), for example, users come to talk about themselves and their particular experiences. This category also includes examples in which users transform themselves, as it were, into librarians, depositing works for loan in dedicated spaces, or making their own collections of rare documents, family heirlooms or photos available to libraries (particularly in digitized form). It also includes author-related services (writing workshops, collective creation of a theatrical production, etc.). The third sub-group concerns the provision of spaces for creative collaboration: third places. But beyond the simple quest for socialization and conviviality mentioned above, ‘Third Places’ offered by libraries now cover numerous structural arrangements (informal in their operation), and physical spaces dedicated to learning in its various forms (learning by doing, using, trying, etc.) and to collaboration between users around a common project. These include Coworking spaces, but above all Fab Labs or Makerspaces, Living Labs and so on.

Lastly, the ‘Research, business and employment services’ category concerns information, consulting, training and engineering services linked to scientific or economic activities. It includes support services for researchers, in university libraries (personalized bibliographic support, training in bibliographic management tools, support in obtaining research contracts), but also support services for local economic communities and business creation (for example, training users to obtain recognized professional qualifications, fee-based documentary research

on a given subject, technology watch services, space rental, etc.).

This typology of service categories or functions offered by libraries calls for a number of comments.

It should be noted that the ‘digital services’ category, which is found in many typologies of library services (see in particular Windrum et al., 2023), is absent from the typology used in this paper. Indeed, it is considered a transversal category, reflecting a natural trajectory of innovation that concerns all six of the service categories/functions considered.

The six service categories identified are not always completely independent of each other. For example, while a game-coding workshop offered by a public library does belong to the ‘creative services’ category, it is also a way of engaging users (particularly younger ones) in learning about science, technology, engineering and mathematics (STEM) (Bolstad, 2016). From this point of view, it also belongs in the ‘Reading, education and lifelong learning’ category. Similarly, some services providing access to the administration may fall into service categories 2 and 6 — depending on whether the citizen simply needs information on tax processing, or whether they need to deal with the tax authorities when setting up a business.

4.1. A vertical or intensive innovation logic

Particularly strong in library services, the vertical or intensive innovation logic focuses on modifying the way in which a given S_i service (or combination of services) is produced. This innovation logic therefore concerns what Eiglier and Langeard (1987) call ‘servuction’. It operates through action(s) on the columns of Table 1, representing our analytical framework. It consists of modifying, in various ways (addition, deletion, improvement, etc.), the competences and technologies relating to the material, informational, cognitive or relational processing functions (T_M , T_I , T_K , T_R) of the service – in other words, in deploying or strengthening material, informational, cognitive/methodological or relational innovation trajectories (Table 3).

4.1.1. The material innovation trajectory

The material innovation trajectory manifests itself in the M component of the service provided by libraries (and their partners, when a network approach is adopted), where the main medium for the transformation process is a material object (in this case, the book⁴), whose logistics and material transformation (curation, lending) must be ensured by implementing the corresponding technological innovations. This material trajectory, which is one of increasing mechanization and economies of scale, illustrates what Nelson and Winter (1982) call a ‘natural technological trajectory’, i.e. one that is a ‘categorical imperative’ imposed on all economic sectors. In the case of the core book lending service, examples of technological innovations that fall under the M component include handling technologies, carts and shelving, and, in the case of the makerspace service, sewing machines, 3D printers, laser cutters and milling machines. It should be noted that these essentially material processing technologies increasingly also have an information processing dimension, insofar as they also have a digital component (cf. paragraph 4.3). This material trajectory also includes all changes concerning the library as a physical space. For example, the disappearance of ‘reception desks’, the reorganization of spaces and the use of adapted furniture are all part of this material innovation trajectory.

4.1.2. The informational innovation trajectory

The informational innovation trajectory affects the informational component I of the library product. Two different innovation dynamics

⁴ Material media differ, of course, depending on the peripheral service in question. For example, food and beverages in a cafeteria, seeds in a seed library, material objects on loan in a “Library of Things”....



Table 3

The different types of innovation trajectories at work in the vertical or intensive innovation logic.

Type of innovation trajectory	Examples of innovation ^a
Material innovation trajectory	<ul style="list-style-type: none"> – Relocation of a public library to a new building – Redesign of library interior – Provision of sewing machines, 3D printers, laser cutters, milling machines in makerspaces – Implementation of handling, storage and logistics systems – Implementation of automated loan and return systems (kiosks) for books – Implementation of automated loan and return systems for laptops
Information and telecommunications innovation trajectory	<ul style="list-style-type: none"> – Biometric access cards – Online user accounts to reserve books or extend books lending – Online public access catalog – Specialized software (multimedia creation, programming) in makerspaces – RFID (Radio Frequency Identification) technology used in smart shelves
Cognitive/methodological/organizational engineering innovation trajectory	<ul style="list-style-type: none"> – Dewey Decimal Classification – Invention of new collection classification systems – Implementation of a quality management system in a university library – Automatic indexing
Relational or service innovation trajectory	<ul style="list-style-type: none"> – Consulting services – Training services – Customized services – Open shelves – Home visits – Library services for disabled people – ‘Rent a librarian’

^a It should be noted that some examples used to illustrate one trajectory may also illustrate others, insofar as they involve hybrid technologies.

can be distinguished. The first is not specific to library services; it brings together innovations in information and communication systems that are aimed at reducing the cost of communication and information processing, and at networking and producing both new information, and new uses for information. The information in question here is administrative, accounting, financial, statistical and library management information (including catalog management). The second dynamic is specific to library activities; it is akin to a ‘specific natural trajectory’ in the sense of evolutionary theory. The innovations at work in this second case are induced by the introduction of new or improved digital technologies into the services that make up the library (digitized collections and traditional IT-based services first and foremost, but also all other services). Given the growing importance of digital collections using quality metadata, recent initiatives based on Artificial Intelligence are also part of this informational trajectory (Brygfjeld, 2019).

The trajectory of informational innovation in libraries seems to confirm Barras’ (1986, 1990) reverse cycle model. Indeed, the introduction of information technologies (mainframe computing, then mini- and micro-computing, and finally networks) have respectively induced, in this order: incremental process innovations (for example, innovations in administrative and library functions: administrative management, archiving, cataloging); radical process innovations (e.g., automatic loan and return systems for books and other physical artifacts), and product innovations (online catalogs and numerous remote electronic services, all of which are part of what we call the horizontal/extensive logic). This cycle is the opposite of the one observed in manufacturing industry. In the traditional industrial cycle, the dominant product innovation phase precedes the dominant process innovation phase (Abernathy and

Utterback, 1978).

4.1.1. The cognitive, methodological or organizational innovation trajectory

This innovation trajectory emerges in the cognitive and structural component (K) of library service provision and library organization. It describes the adaptation of organizations both through the design and implementation of formalized methods i.e. knowledge-processing protocols, and through organizational engineering. According to Pungitore (1995), the Public Library Association introduced a major managerial innovation in 1980 (based on two books: ‘A Planning Process for Public Libraries’ (Palmour et al., 1980) and ‘Output Measures for Public Libraries’ (Zweizig and Rodger, 1982)), which spread to all American libraries. Such managerial innovation is part of the trajectory of cognitive innovation (K). It consists of a set of techniques “developed and promoted by their national professional association, that allows public librarians to engage in user-oriented planning, community-specific role setting, and the self-evaluation of their library’s performance” (Pungitore, 1995, p. xi).

4.1.2. The relational or service innovation trajectory

The relational or service innovation trajectory manifests itself in the R ‘relational’ or ‘in-contact service’ component of a library service. Here, the main medium of activity is the user, with whom the service provider establishes a more or less significant interaction. This trajectory describes the changes in the direct service and the ways in which the user and service provider interact, as well as the introduction of new in-contact services and new ways of interacting. It also describes strategies for linking users together in networks, i.e. strategies for community building (Desmarchelier and Gallouj, 2023). This trajectory is sometimes difficult to dissociate from other innovation trajectories (material, informational, methodological) insofar as downstream changes in in-contact service operations or the implementation of new relationship modes can certainly rely exclusively on competences (C) — but also, more often than not, they mobilize upstream technologies for processing matter, information or knowledge, and a new structural arrangement (cf. Fig. 2). Examples include the provision of a wide range of consulting and training services, or the introduction of open shelves as an expression of self-service. It should be noted that this relational or service-based trajectory (considered here as a modality of vertical logic) can (because it involves the addition of new constituent services to existing ones) in some cases be confused with an expression of extensive horizontal logic.

4.2. Diagonal (combinatory) innovation logic

The horizontal (extensive) and vertical (intensive) logics discussed above are ideal-types (‘pure logics’), and are particularly useful for mapping the full diversity of innovation dynamics in libraries. However, it is not always easy to distinguish between horizontal innovation logics (focused on the product) and vertical innovation logics (focused on the process for a given product). The assignment of certain innovations to one category or another (Tables 2 and 3) is sometimes subjective. This difficulty can be explained by the specific nature of service activities in general (beyond libraries) — in which, precisely because “in many cases, the ‘product’ (...) is in fact a process” (Gallouj, 2002, p. 40), it is not easy to distinguish product from process. The concept of “vague innovation” (Rubin et al., 2011) used in the library literature reflects both this blurred dimension of ‘product’ and the problem of the boundary between product and process. More generally, innovation rarely takes place within pure logics, but rather within hybrid, combinatory or diagonal logics, which mobilize both horizontal and vertical logics. These last are able to link several innovation trajectories at once, in different ways.

In a diagonal/combinatory logic, then, depending on the scale of the innovation in question, innovation affects several rows and columns of



our analytical framework (Table 1) at once, rather than a single row or column at a time. It consists of simultaneously adding (or even deleting) one or more constituent services to the core service of lending books (rows of the table/horizontal extensive or regressive logic) and acting (again, through the mechanisms of addition, deletion, association, dissociation, and/or improvement) on the competences and technologies relating to one or more functions of these services (columns of the table/vertical or intensive logic) (see Fig. 4). Like ‘pure’ logics, this diagonal/combinatory logic can be considered at organizational, intra-organizational and inter-organizational levels.

At the organizational level, the manifestation of the diagonal logic can be illustrated by the implementation of totally new and innovative organizations (libraries). The UK’s ‘Idea Stores’ offer one example of this. This library concept (which goes as far as renouncing the name of ‘library’) is inspired by the retailing model, particularly in terms of the diversity of services offered (horizontal logic) and technologies mobilized (vertical logic), and geographical location and opening hours (Pateman and Williment, 2017). Another example is that of ‘Learning Centers’, which are increasingly replacing traditional university libraries, multiplying the number of new services offered (horizontal/extensive logic) and becoming part of different trajectories of innovation (vertical/intensive logic), particularly the informational trajectory.

The introduction of new services (horizontal logic) to a given library is often accompanied by innovations in one or more of the technologies falling within the scope of one or more of the four identified innovation trajectories (vertical logic). For example, the introduction of a makerspace to a library is an expression of a horizontal/extensive innovation logic, since a new constituent peripheral service is offered to users. This is a new service belonging to the ‘services linked to ‘new spaces’ in libraries’ category illustrated in Table 2. However, by offering material processing tools – such as sewing machines, 3D printers, or information processing tools such as creative software packages – the introduction of a makerspace is also part of both material and informational technological trajectories, respectively (vertical logic). We might add that, by proposing new modes of relationship between both users and librarians and between users themselves, this service also falls within the scope of a relational innovation trajectory. Similarly, the introduction of ‘book vending machines’ in hospitals (Khan, 2013) falls within the scope of both a horizontal logic (the addition of a peripheral service) and several modalities of the vertical logic: a material (processing of a material

object: a book), informational (use of RFID technologies) and a relational (new form of relationship-building: self-service) innovation trajectory. Further, in this particular example these different logics manifest themselves at an inter-organizational level insofar as they involve a partnership between library and hospital. Lastly, innovations around the provision of personalized 24/7 online librarian inquiry services, such as ‘Le Guichet du Savoir’ in Lyon, ‘Ask a Librarian’, or Ubib (Gilbert and Jacquinet, 2011) fall within the scope of both a horizontal/extensive (a new service) logic and a vertical/intensive (relational and informational) logic.

The diagonal/combinatory logic is also often expressed at the level of the different modalities of the vertical (intensive) innovation logic. At this vertical level, combination can take place in two different ways. The first is the simple juxtaposition, within a library or library department, of several innovation trajectories (columns in the table), which remain essentially independent of one another. The combination (via juxtaposition) of (independent) technologies relating to the processing of material operations (T_M) and the processing of informational operations (T_I) reflects the notion of the ‘hybrid library’ that is developed in the literature (Rusbridge, 1998; Oppenheim and Smithson, 1999). The second modality of combination is the hybridization (in the literal sense) of trajectories and corresponding technologies, which are combined in a single artifact (merging of table columns). For example, automated storage and retrieval systems can be said to reflect both a material and an informational innovation trajectory, since they integrate, within a single artifact, a traditional storage technology component (T_M) and an informational technology component (T_I), such as RFID. The same is true of the 3D printers used in the makerspaces of certain libraries, or the automatic loan and return systems that are part of both a material (mechanical/automatic) and informational/communicational (RFID technology) innovation trajectory. The provision of social media training by libraries is part of both an informational and relational innovation trajectory, while the implementation of automatic collection indexing processes (such as the Finnish National Library’s Annif Project, see Suominen, 2019) or of national metacatalogs (such as Swissbib, see Hipler and Witzig, 2019) reflect a hybridization of methodological and informational trajectories.

The combination of innovation trajectories, whether by simple juxtaposition or by hybridization per se, presupposes a combination/hybridization of libraries’ competences (C). Thus, the existence of the

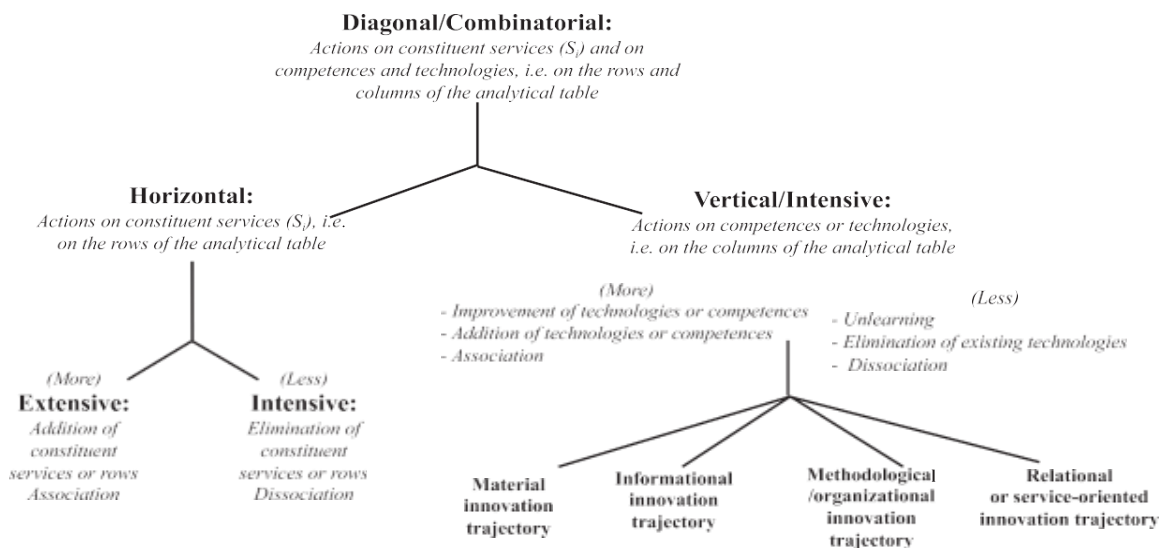


Fig. 4. The combinatory/diagonal principle (logic) as the implementation (in multiple configurations) of ‘pure’ principles (logics).



‘hybrid library’ presupposes the existence of ‘hybrid librarians’ bringing traditional librarianship competences (focused on printed documents) together with technological and informational competences (computing and telecommunications) (Allen, 2005). Of course, this hybridization of competences also goes beyond technical competences; it also concerns service competences (relational and human-centered).

At the inter-organizational level, partnerships, by their very nature, fall within the scope of a diagonal/combinatory logic. They combine the services of different agents (horizontal/extensive logic) while mobilizing different competences and technologies (vertical/intensive logic). One such example are the ‘Discovery Centres’ in the county of Hampshire, UK, which assemble under one roof a whole range of ‘cultural facilities – public libraries, museum, heritage center, art gallery, performance space, community café’ (Pateman and Williment, 2017).

1. Conclusion

This article was prompted by two observations: first, the absence of libraries from the growing literature on innovation in services, and second, the undeniable presence of the innovation issue in the field of library science that is more often than not reduced to a mere patchwork of heterogeneous cases.

In response to these observations, we have attempted to construct a systematic framework for analyzing innovation in library services that is based on solid theoretical foundations and thus avoids the overly descriptive and factual nature of existing librarianship work. The proposed framework draws on advances in service economics and management – in particular, the definition of service-based on the service triangle metaphor and the functional breakdown of service activity into different groups of operations (material, informational, methodological and relational), the characteristics-based approach to services and a conception of library service as an architectural service. This approach brings together two fields that have until now largely ignored each other: service studies and library science. The dialogue established in this article between service economics and library science has made it possible to build a theoretically-supported analytical framework for innovation dynamics in libraries.

The proposed analytical framework is more than a simple exercise in applying an existing ‘service’ framework to libraries. On the contrary, this new framework introduces to the analysis several new variables that are of great importance to understanding the dynamics of innovation and evaluating their performance (beyond libraries alone): 1. User competences and technologies mobilized in service provision, 2. The characteristics of the services considered at different levels (individual vs. collective, direct vs. indirect (outcome), desired vs. unintended (externalities)), 3. The dual nature of skills and techniques in libraries (‘input’ competences and techniques used to provide the service vs. ‘output’ competences and techniques corresponding to the service provided itself). The addition of these new variables to the initial framework make it possible not only to account for certain specific features of the library service, but also to provide a more general framework that is applicable to all service activities.

Service economics and management allow for three different conceptions of the library, depending on the main medium/target of the service: the library as collection, the library as information system and the now dominant conception of the library as complex service. In the context of this last conception, the analytical tools of service economics and management have been used to highlight several innovation ‘logics’ (or organizing principles) which, unlike the often heterogeneous case inventories drawn up by library science, allow a systematic mapping of the innovation dynamics at work in libraries.

The first two innovation logics are ‘pure’ (or ‘ideal-type’) logics, for which it is not always easy to find (purified) examples. The first of these is the horizontal innovation logic, which is based on the principle of adding/removing constituent services to the core service of lending books. This horizontal logic is said to be extensive when (as is most often

the case) it is based on the mechanism of adding peripheral services. Conversely, it is said to be regressive when based on a mechanism for eliminating peripheral services. The second is the vertical or intensive innovation logic, which operates on the various components (material, informational, methodological or organizational engineering, relational or service-related) of the service activity and feeds the corresponding innovation trajectories. The third innovation logic (diagonal or combinatory logic) is the most frequent operating modality. It consists of the implementation (in different ways and in various combinations) of various pure logics – for example, the introduction of one or more peripheral service alongside the introduction of different types of business process innovations, which are themselves part of different innovation trajectories, simply juxtaposed or hybridized, in the same technical artifacts.

The proposed theoretical framework, which we have discussed from the point of view of the library (organizational level), can easily be extended to the inter-organizational level, where the service or innovation is carried out in partnership with other agents (as is often the case in social innovation, for example). In order to adapt the analytical framework proposed and illustrated in Table 1, we simply need to add as many additional organizations (O_i) as necessary to the reference library representation (O₁), i.e. as many rows in the table as there are partners. Libraries have a wide range of partners in innovation projects. Examples include other libraries, training and research establishments, municipalities, industrial or service companies, associations, central public administrations, etc. (Picard, 2017; Dauphin, 2011; Bolstad, 2016; Yarrow et al., 2008; Walker and Manjarrez, 2003; Bats, 2015).

Our theoretical framework raises a number of scientific, managerial, societal and public policy issues. By way of conclusion, we briefly mention a few of these:

1. The public library has been used as a public policy tool to promote the education and emancipation of citizens as well as cultural equality, social progress and democracy. Not surprisingly, this is an organization that is conducive to social innovation. This form of innovation can form part of any of the innovation logics we have highlighted (and not just one of them). Thus, even if ‘Societal services’ is its preferred domain, social innovation can, in the horizontal/extensive innovation logic, operate within all six categories of generic services identified. Similarly, in the vertical/intensive innovation logic, all innovation trajectories are concerned by social innovation. While this seems self-evident for the relational and service innovation trajectory (new services designed to care for vulnerable people), it is also true for the informational innovation trajectory (indeed, many electronic services are designed to solve wicked problems affecting vulnerable people).
2. The horizontal (extensive) innovation logic benefits from a positive a priori based on the assumption that adding new services is, by nature, always beneficial. However, such an assumption can be challenged by asking whether there may be a limit to the addition of new services (an optimum). In addition to the growing difficulty of coordinating diverse activities, isn’t there also a risk of losing legitimacy by moving too far away from the core service and expertise? Might too many missions kill the mission?
3. In particular, the previous question concerns the addition of administrative and social services to the core library service. We may well ask not only to what extent it is the library’s vocation to replace certain administrative and social services, but also whether these new library missions (for which the librarian is not necessarily well trained) might illustrate a failure of administration and public policy, rather than an improvement in public services thanks to libraries.
4. When it manifests itself in the multiplication of stakeholders (the constitution and reinforcement of networks), this extensive logic poses the question of optimal network size. It also raises the usual questions about the dynamics of innovation networks: their mode of formation (spontaneous or planned), their mode of operation



(horizontal or vertical), and the evaluation of their success and performance.

1. With regard to library performance (whether from the point of view of librarians or public authorities), our analytical framework provides the basis for a multi-criteria evaluation. Indeed, the proposed framework considers different dimensions of output (direct or indirect, individual or collective, desired and unintended), which correspond to different dimensions of performance. One challenge for both librarians and public authorities is the construction of performance indicators associated with these different dimensions.
2. The framework seems compatible with the typology of innovation established by the latest version of the Oslo Manual (OECD/Eurostat, 2018), which distinguishes between two types of innovation: product innovation and business process innovation (BPI). Product innovations concern both goods and services, while BPI covers all innovations concerning the 'product' production process. A parallel can be drawn between 'product' innovations and the horizontal innovation logic (addition of new services), on the one hand, and BPIs and the vertical/intensive innovation logic, on the other. In the Oslo Manual, BPIs are broken down according to the six major management functions as they appear in the discipline's textbooks, and are taught in Business Schools (1. Production of goods and services, 2. Distribution and logistics, 3. Marketing and sales, 4. Information and communication systems, 5. Administration and management (including strategic management, HRM, accounting, etc.), 6. Product and business process development). To some extent, these functions can also be paralleled with the different categories of the functional breakdown of the product (material, informational, methodological, relational operations) and the corresponding technologies. Thus, again to a certain extent, material operations can be associated with the 'production of goods and services' and 'distribution and logistics' functions, informational operations with the 'information and communication systems' functions, cognitive, methodological and organizational engineering operations with the 'administration and management' functions (including strategic management, HRM, accounting, etc.), relational and contact service operations with the 'marketing and sales' functions, and so on. Given this compatibility between our analytical framework and the definitions of the Oslo Manual, it is both possible and desirable for libraries to be included in the Community Innovation Survey based on the Oslo Manual.

Our analysis does, however, have a number of limitations and raise a number of questions, some of which we mention briefly here as potential avenues for further work.

For the sake of simplicity, we have taken a 'standard undifferentiated library' as the reference point for our analysis, without considering its type (national, public, academic, etc.). Clearly, the framework for representing the product, and mapping innovation dynamics, would benefit from being applied separately to each type of existing library in order to highlight similarities and differences in their innovation dynamics. It is therefore possible to hypothesize (subject to empirical verification) that the informational trajectory in academic and national libraries is broader and more powerful than in municipal libraries, or that books (in whatever format) and their curation will always remain a core service in national libraries, while both municipal and university libraries will increasingly welcome users for activities that are totally independent of books (library as a 'third place', 'libraries of things', or 'human libraries' in which individuals present their own experiences, etc.).

The framework we propose is essentially focused on mapping innovation in libraries. This mapping cannot in itself be up to the task of explaining innovation dynamics as a whole (their drivers, their obstacles). To achieve such an objective, future research will have to explicitly introduce to the framework the economic, social, scientific and political environments that are major determinants of innovation in libraries.

CRedit authorship contribution statement

Benoît Desmarchelier: Writing – review & editing, Writing – original draft. **Faridah Djellal:** Writing – review & editing, Writing – original draft. **Faïz Gallouj:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

No conflict of interest.

Data availability

No data was used for the research described in the article.

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4 Other work related to the conceptual framework (By UAH and VTT)

The results of WP2's second year of work have been reflected in important research that is being presented at prestigious conferences and top journals of the field of libraries. Below is the research presented at conference or published

4.1 WP2 research presented at conferences in Y2:

4.1.1 Paper for the XXXIV International RESER Conference. Helsinki 2024

TITLE: Bibliometric Analysis of Innovation in Academic Libraries: A Study of the Period 2003-2023.
Rubalcaba L., Montealegre G., Solano E., Hyytinen K., Tuominen T, Vainikainen, S, Windrum P.

The aim of this article is to analyze the evolution of innovation and collaboration in academic libraries over a 20-year period through a bibliometric analysis. The objective is to identify trends, patterns, and relationships that help understand the development of these concepts in the literature. The methodology consists of three stages. In the first stage, a search was conducted in Scopus to gather a set of articles addressing the research topics of interest, as described below. In the second stage, a bibliometric analysis was performed using the user-friendly platform Rstudio, Biblioshiny, which allowed for identifying the frequency of terms over time and the co-citation of countries in the literature on the topic. Finally, in the third stage, VOSviewer was used to generate co-occurrence maps among the prominent terms in the literature.

4.1.2 Paper for the 2024 ISS conference in Gothenburg

TITLE: Bibliometric Analysis of Innovation in Academic Libraries: A Study of the Period 2003-2023.
Author(s) with Affiliation Dr. Paul Windrum (University of Nottingham, UK / VTT Technical Research Centre of Finland) Dr. Tiina Tuominen (VTT Technical Research Centre of Finland / University of Tampere, Finland) Dr. Kirsi Hyytinen (VTT Technical Research Centre of Finland) Dr. Sari Vainikainen (VTT Technical Research Centre of Finland) Dr. Ernesto Solano (University of Alcala, Spain) Dr. Luis Rubalcaba (University of Alcala, Spain)

The current staple sources for large sample quantitative research in innovation remains patent data, management surveys (e.g. Community Innovation Survey), and technical specifications for products. Each of these has its advantages. However, there is a set of well-known limitations. These more effectively capturing innovation activities in manufacturing sectors whilst poorly capturing service sector innovation, and better capture private sector activity whilst poorly capturing public sector innovation. In this paper we propose that a potentially untapped resource is scientometrics, and present a case example of service innovations in public libraries. We investigate the content of research papers published within Library and Information Science (LIS) journals. These contain a large number of papers discussing new library services. Through keyword analysis, we identify key factors in the



development and implementation of service innovations. This represents a slight departure from the usual scope of scientometrics, which tends to focus on the scientific contribution of authors, journals, or specific papers on the dissemination and development of scientific knowledge using subsequent citations as proxy. However, by focusing on the content of titles, keywords and abstracts of published papers, one can identify the set of keywords used by scholars when discussing innovations.

4.2 Other research published in journals (papers led by Varun Gupta, UAH)

- Varun Gupta, Luis Rubalcaba, Chetna Gupta and Leandro Pereira, "Social Networking Sites Adoption Among Entrepreneurial Librarians for Globalizing Startup Business Operations", *Library HI Tech*, Emerald, <https://doi.org/10.1108/LHT-05-2022-0234>. (SSCI Indexed and Impact factor: 2.357).

The research studies highlight how libraries can adopt new technologies like social networking sites (SNS) and Figma prototyping tools to better support entrepreneurs and foster innovation. They show that by embracing these technologies, libraries become more agile, helping businesses with market research or rural health innovations. The findings align with the idea of co-creation, where librarians, users, and technology providers work together to create more effective services. By understanding what makes technology useful and easy to adopt, like user-friendliness and previous experience, libraries can smoothly integrate these tools, making them more valuable to the communities they serve. These real-world insights help refine the broader conceptual framework, showing how technology adoption can drive continuous collaboration and growth in libraries.

- Varun Gupta, "Innovating Library Services: Co-Creation, Experimentation, and Enhanced Business Value Tool for Technological Advancements", *Public Library Quarterly*, Taylor & Francis, 2024, <https://doi.org/10.1080/01616846.2024.2364522>. (Indexed in ESCI/JCR, Impact factor: 1.9, Q2, Scopus Q1).
- Varun Gupta, "Navigating Innovation: An Enhanced Business Value Calculator and Its Impact on Library Service Innovations for Entrepreneurs and Businesses", *Internet Reference Services Quarterly*, Taylor & Francis, 2023, <http://dx.doi.org/10.1080/10875301.2023.2289418>. (Indexed in Scopus, Q2).

These articles explore the integration of co-creation in libraries, focusing on how it can enhance services for entrepreneurs, aligned with conceptual model in LibrarIN WP2. Central to the discussion is the Enhanced Business Value Calculator, a tool designed to identify ideal patrons for engaging in co-creation activities, particularly in experimental technology adoptions. By pinpointing the most productive and tech-savvy users, libraries can invite them to collaborate in innovative, hands-on technology experiments. This targeted approach fosters more effective and knowledge-based experimentation processes. The co-creation process is highlighted as a multi-phase effort, where patrons actively participate not only in the design and execution but also in the post-experimentation



evaluation stages. These high-performing users and their peers engage continuously, increasing their involvement and engagement with library services. Over time, this involvement transforms them into advocates for the library, promoting ongoing cooperative technology trials that ultimately lead to the development of novel and tailored services. A real case study illustrates this concept in action, showcasing a collaboration between public libraries and a university library. Together, they strategically experimented with ChatGPT to evaluate its potential for systematic literature review services for entrepreneurs. This case study highlights how libraries can co-create with patrons, combining expertise from different sectors to meet the evolving needs of entrepreneurial users.

Alignment with the conceptual framework

This article is driven by applied research and contributes to the conceptual framework by applying co-creation principles within a multi-agent system involving librarians, patrons, and technology providers. It aligns with the framework by considering both the characteristics of library services (such as experimental technology adoptions) and the competencies of patrons (high-performing users) in driving value creation. The Enhanced Business Value Calculator identifies key patrons through direct collaboration, facilitating interactions that foster knowledge-sharing and experimentation. This dynamic engagement mirrors the framework's emphasis on experiential value creation, highlighting how co-creation in libraries can address evolving service needs.



5 Inputs to other WPs, WP5/policy brief in particular

WP2 has developed different inputs to WP3 (case studies), WP4 (survey) and WP5 (design of use cases and policy brief). These inputs are reflected in internal LibrarIN comments and feedback from WP2 partners to all LibrarIN documents/deliverables presented in Y2. In this sector, just an example is reproduced, as WP5 policy brief No 1 is heavily based on WP2 work.

Work package 2 provided inputs to work package 5 in the elaboration of LibrarIN first policy brief *Sparking Collaboration for Innovation to Tackle Libraries' 21st Century Challenges*. The policy recommendations of this document are based on the fact that the concept of effective collaboration is cornerstone of libraries strategies nowadays. Below are some of the inputs provided to WP5.

5.1 Basics for understanding collaboration and innovation in libraries. Collaboration as a “strategic choice”

When searching for a definition on innovation in the field of libraries, we found that the literature shows a lack of consensus, as evidenced in the following quotes:

- “Literature reviews all provide ideas and examples that may help generate creative solutions; however, none of them are very helpful to novices looking to learn more about the basics of innovation in libraries or identifying best practices for implementing innovation in libraries” (Pellack 2022 p. 5)
- “There is rarely any classification of innovations proposed using empirical research on innovations in libraries or grounded in the library science literature. There are significant contextual differences in terms of strengths, opportunities, weaknesses, and threats experienced by academic, public, special, and school libraries” (Potnis et al 2020 p. 795)
- “As this review indicates, the literature on innovation in academic libraries is scattered, thin, and, considering the importance of the topic, in need of additional empirical inquiry. Most of the work is exploratory or conceptual”. (Brundy 2015 p. 36)
- “Overall, innovation in public libraries is an underdeveloped topic in the literature” (Potnis et al 2021 p. 434)

Nevertheless, literature shows that collaboration plays a fundamental role in some recent definitions and approaches on innovation in libraries. For instance, Brundy (2015) concludes that “Innovation in academic libraries is not primarily the result of top-down decision-making. It is a deeply collaborative process in which leaders facilitate the possibilities of libraries as centers of student learning and knowledge construction” (p. 34), Nicholson (2019) appoints that public libraries towards to a “model that is collaborative, creative and participative, and that places the library at the center of its user’s daily lives.” (p. 331), and for Gupta et al (2022) “A source of competitive advantage will be the ongoing collaboration between libraries and entrepreneurs in the form of strategic alliances (or partnerships).” (p.2). These definitions suggest that collaboration between parties should be at the core of changes, transformations and innovations in libraries, both in public and academics.



In the field of innovation in libraries, collaboration is understood as a “strategic choice” for improving the quality and efficiency of services, it is about working collectively with a group of organizations, stakeholders or users (Lavoie 2022). Although collaboration for innovation is difficult to define (Brown et al 2021), there are some elements that are present in all collaborations that aim to innovate and create value in libraries. On the one hand, most definitions highlight that collaboration for innovation involves free and voluntary exchanges (sharing information, strategic alliances, establishing an agenda of joint activities) between multiple organizations, stakeholders and users aimed at achieving shared objectives or goals (Brown et al 2021). On the other hand, there is great interest in the user's voice guiding the entire process of design, implementation and evaluation of services (Torfing 2019). Thus, we understand collaboration for innovation in libraries as the “strategic choices” that managers and responsible make in order to include organizations stakeholders and specially users in the service providing process.

This approach to collaboration encompasses other words, concepts and practices that also refer to the collective work between different stakeholders. For instance, there are practices such as “library 2.0” or “smart libraries” that aims to promote user participation in the shaping of library services through technology (Huang 2015, Jadhav and Shenoy 2020). Likewise, there are many “partnerships” and “social innovations” in libraries that have addressed problems such as racism, poverty, and homelessness through the participation of the parties in the design of the social services offered by libraries. (Mattke et al 2022). Collaboration in libraries might be associated to many different practices, from big partnerships between libraries and technological parks to participative sessions where citizens can express their needs or ideas, consequently, collaboration is also related to other words such as participation, engagement, user innovation, partnership, co-working, cooperation among others.

Since we define collaboration as a strategy, it could be implemented at different degrees and stages. The impact of collaboration on library innovation will be determined by some elements: first, the intensity of participation, this depends on how stakeholders can influence the staff who make decisions about the design of innovations, therefore, interactive and engaging methods that give stakeholders incentives, freedom and spaces for participation will have a greater impact on innovation (Engen et al 2021). Secondly, the involvement level of the stakeholders in the innovation process, if a stakeholder only participates in the delivery phase of services it will be less likely to innovate than a service in which a stakeholder has a continuous participation in the entire process of innovation, from its design to its evaluation (Bentzen 2022). Thirdly, the managerial and strategic element, since collaboration has many barriers and challenges and must be faced by those in charge and managers of the libraries (Winberry and Potnis 2021).

When the “strategic decision” of collaboration in libraries is made from an efficient strategy and planning, trying to use interactive methods continuously throughout the innovation process, there will be more propensity towards what is understood as value co-creation. Value co-creation is an interactive, dynamic and relational process in which stakeholders get involved with those responsible



and managers in the generation of services, which always results in some positive outcome, such as cost reduction, improvement of services, greater efficiency or innovation.

Finally, when looking at the empirical evidence, the “strategic choice” of collaboration is one the most important policies for libraries in the world. Pacios and Martinez (2019) analyzed the 49 libraries of the Conference of European National Libraries (CENL) and found that collaboration, participation and supporting are some of priority lines of action of National Libraries in Europe. Academic libraries are developing strong associations and partnerships stakeholders such as science technologic parks, public organizations or users associations (Atkinson 2019), and finally, collaboration was a cornerstone in libraries responses during Covid-19 pandemic (Temiz and Salelkar 2020).

At this point, it is worth asking some questions about the collaboration practices in libraries nowadays. Which are the most important collaboration practices in libraries today? What role plays collaboration in the innovative practices that libraries are implementing? Are there studies on the determinants, drivers and barriers to collaboration in the case of libraries? Are there strategies to promote collaboration? Below we answer these questions.

5.2 Forms and methods for collaboration in libraries. Collaborative innovations in libraries

When looking for the existing methods of collaboration in libraries we found important development of good practices and emerging concepts that show how collaboration in libraries may improve its services and amply the life quality of a society. Among the most interesting concepts and collaborative practices are the following: smart library participatory library, innovation hubs in libraries, citizen science in libraries, library living labs, library 2.0 and library 3.0, digital libraries for collaboration, learning spaces and makerspaces and partnerships.

In this practices libraries are conceived as places of collaboration and co-creation where users and stakeholder can participate to propose or shape library services. Thus, public and academic libraries no longer only seek to satisfy the needs of a certain group of academics, students or citizens, but are places where social networks should be fostered in order to generate partnerships between the different members of society. Table 1 show some consolidated collaboration practices in libraries

Table 1: Collaboration practices in libraries

Collaboration practices	Definitions and approaches	Examples
Smart Libraries	<p>“A smart library must, therefore, actively support users in cocreation and dissemination of new knowledge. Academic libraries are moving up the value chain.” (Jadhav and Shenoy 2020, p. 3)</p> <p>“A smart library can achieve high-level service through the following: becoming a learning space, a community centre and a place for citizens’ participation; encouraging communication and cooperation among library users; and providing activities and services</p>	<p>DTU smart library</p> <p>New Town Library</p>



Collaboration practices	Definitions and approaches	Examples
	that promote community knowledge exchanges and improve community relations, such as workshops, book festivals and lectures.” (Cao et al 2018, p 817)	
Participatory library	“ Participatory library is a complex, dynamic and many-layered phenomenon. It encourages the empowerment of all library users and provides them with a holistic experience in both physical and virtual library spaces. ” (Nguye 2015 p 484)	De Krook Library Novi Sad City Library
Citizen Science in libraries	“ Citizen science projects continue to grow in popularity, providing opportunities for non-expert volunteers to contribute to and become personally invested in rigorous scientific research. Academic libraries, aiming to promote and provide tools and resources to master scientific and information literacy, can support these effort” (Cohen et al 2015 p. 1) “As libraries struggle to keep pace with the changing societal landscape, emerging practices such as citizen science initiatives are being incorporated to reinforce the idea of public libraries as gathering, meeting, and collaboration spaces within the context of shared community and shared learning resources ” (Cigarini et al 2022 p. 1)	Citizen Science in Action Citizen Science at your Library Program
Library Living labs	“The Library Living Lab is a space that gathers all stakeholders around the public library with the aim of exploring new methods and tools that allow us to enjoy culture both individually and collectively (...) it is a complete model of inter-institutional collaboration with all relevant actors around the living lab working group ” (Vilariño et al 2018 p. 17) “ Living lab is a conceptualisation of multi-contextual and cross-sectorial experimental user-centric innovation processes with the aim of developing and/or improving welfare products, democratic engagement, services or processes based on the application of co-creation methodologies depicted by trans-disciplinarity” (Fuglsang & Hansen, 2019, p. 45) “ Academic libraries, and innovation labs within those libraries, can foster experimental scholarly communications, with students and others, by advancing key partnerships across campus and by providing a potent mixture of space, technology, and in-house digital literacy skills” (Fletcher 2020, p. 339) “Library Living Lab is a specific expression that shows how it is possible for public libraries to strengthen social cohesion and foster collaborative community practices through situated innovation processes ” (Hernández-Pérez et 2022 p. 24)	Barcelona Library Living Lab Dokk1
Library 2.0 and 3.0	“ Library 2.0 is a change in interaction between users and libraries in a new culture of participation catalysed by social web technologies. Interactivity is the most important part of Library 2.0” (Holmberg et al 2009, p. 677)	Science and Research Branch of Tehran



Collaboration practices	Definitions and approaches	Examples
	Library 3.0 is a “personalizable, intelligent, sensitive and living institution created and sustained by a seamless engagement of library users , librarians and subject experts on a federated network of information pathways.” (Kwanya 2013 p. 187)	
Innovation hubs in libraries	“This article presents a case study of the University of Minnesota (UMN) Libraries collaboration with the UMN Carlson School of Management’s (CSOM) Holmes Center for Entrepreneurship (HCE) to create an innovation hub in our most heavily trafficked undergraduate library” (Leebaw and Tomlison 2020, p. 1)	Toaster Innovation Hub
Digital Libraries for collaboration	“It is recommended to digital libraries to provide an efficient user-friendly website designed to increase user participation and establish close contact with them and in this way increase their intention to use digital library services”. (Pourjahanshahi et al 2023 p. 1)	Digital Society
Learning Spaces and makerspaces	“ Collaboration has been key to finding and establishing real change here at The University of Manchester Library. Having already taken a collaborative and consultative approach with our academic staff and students to establish service needs, we involved staff from across multiple Library divisions in its implementation” (Walsby 2020, p. 4)	University of Virginia Makerspace Forward Space
Partnerships	“The study revealed that the library-Science Technology Parks (STP) relationship underpin links between parks and universities. The IASP members who receive services from related university libraries show the value of library-STP collaboration” (Aportela-Rodriguez and Pacios 2017, p. 235)	



6 Conclusion and next steps

The multi-agent conceptual framework proposed by work package 2 has had great scientific relevance that has materialized in important presentations at conferences and in various high-impact factor publications. Additionally, WP2 work has helped to improve the work by other work packages within the project. In this sense, it can be concluded that the objectives set in task 2.2 have been achieved.

The next steps proposed for the WP2 work in the last year of the project are:

1. Integration of the case studies results in the multi-agent conceptual framework
2. Validation of the conceptual framework with stakeholders
3. Additional publications and presentation at conferences
4. Continuous inputs and feedback to other WPs of the project, to a second policy brief in particular



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