Libraries, Archives and Museums (LAMs):
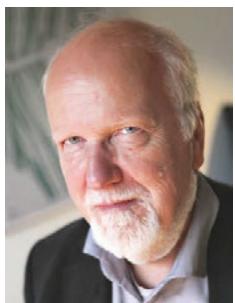# Conceptual Issues with Focus on Their Convergence†

Casper Hvenegaard Rasmussen* and Birger Hjørland**

University of Copenhagen, Faculty of Humanities, Department of Communication,
South Campus, building 14, 2. Floor, Karen Blixens Plads 8, 2300 Copenhagen S, Denmark,
* <c.hvenegaardrasmussen@hum.ku.dk>, **birger.hjorland@hum.ku.dk>

Casper Hvenegaard Rasmussen is an associate professor at the Department of Communication, Section of Galleries, Libraries, Archives and Museums (GLAM) at University of Copenhagen (formerly Royal School of Library and Information Science). His long-term research interest involves library studies and cultural policy studies. Currently his research is focusing on the relations between libraries, archives and museums.

Birger Hjørland holds an MA in psychology and PhD in library and information science. Since March 2020, he has been Professor Emeritus at the Department of Communication, University of Copenhagen and formerly professor in knowledge organization at the Royal School of Library and Information Science/Department of Information Studies (2001-2020) and at the University College in Borås (2000-2001). He is a member of the editorial boards of Knowledge Organization, Journal of the Association for Information Science and Technology and Journal of Documentation. His h-index on 2020-114 is fifty in Google Scholar and twenty-nine in Web of Science.

Abstract: Libraries, archives, and museums (LAM) have existed since Antiquity in many different sizes and forms, and these institutions are not always easy to define and to separate from each other. Since the turn of the millennium, LAM has frequently been used as an acronym for these institutions, indicating an increasing interest to consider them together, partly motivated by a perceived ongoing convergence between them. This article describes and discusses this issue from ancient times to the present with the focus on convergence and conceptual issues, with emphasis on the practices, debates, and research over the two last decades. Distribution of documents via the Internet has been a catalyst for renewed interest in the relations between the LAMs, where increased use of digital resources is claimed to blur the traditional borders between the institutions (labelled "digital convergence"). In the first decade after the millennium, the research agenda was marked by a limited focus on digital point of access portals for cultural heritage. Thereafter, the research agenda broadened. In addition to digital convergence, other kinds of convergence are a nascent topic for research, focusing on physical mergers, collaboration, shared professional practice, proximity in government agencies and an increasing dependency on common external trends, etc. LAM has also increasingly been the name for new educational programs and university departments, thus pointing towards LAM as a concept used about an emerging discipline or interdisciplinary field. There have formerly been attempts to construe a research field, which include these three kinds of institutions, and the notion LAM is more extended term than the study of these institutions, because each of them has developed research fields with a broader focus.

† Derived from the article titled "Libraries, archives and museums (LAMS)" in the ISKO Encyclopedia of Knowledge Organization, Version 1.0 published 2021-09-01. Article category: KO in different contexts and applications

1.0 Introduction: Some basic concepts and distinctions

LAM is an acronym for libraries, archives, and museums, indicating that these different institutions[1] have been considered together and therefore have something in common. Historically, all LAMs are 'collecting institutions' that are concerned with collecting, documenting, preserving, and organizing different kinds of documents.[2] All three kinds of institutions may be public or private (non-profit or for-

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profit), and we therefore disagree with definitions that limit these concepts to non-profit institutions.[3] In this section we are drawing on some core concepts (document, print, publication, literature, record, information and cultural heritage), which are presented in Appendix 1, but should be read together with Section 1.1.

1.1 Brief characterization of the difference between the LAMs

A characterization of the difference between the LAMs and their hybrid counterparts may be formulated this way:

– Libraries[4] focus on the collection of published documents ("publications"), which for a long period was practically considered a synonym for "printed materials".[5] Before printing was invented, libraries collected tablets, scrolls, sheets of papyrus and hand-bound, elaborate manuscripts known as codices. Later in the development of libraries print materials were extended to other media such as music records and film, and today to electronic media (much of the non-printed materials in libraries is harder to distinguish from archival materials). Publications mostly exist in many identical copies (e.g., in other libraries), and as a rule they are not unique (although the Internet has changed this, as we shall see below). However, the multiplication of books was not unknown before print[6] and copied books and manuscripts may have some similarity to the concept of "publications".[7] Libraries also needs to be characterized by their functions: libraries and books are mainly for study (whereas archives and records are mainly serving administrative purposes).[8] Their dominant way of communicating information to users is by providing physical access to documents (by reading rooms, borrowing services, copying facilities and online). In addition, they build collections of reference works and databases, which serve the function of document and information searching. Libraries also serve recreational reading (just as archives and museums also serve recreational activities, which perhaps, in an increasingly commercial context, is one of the reasons they for many appear to be similar).
– Archives[9] focus on the collection of unpublished documents, often called "records".[10] These may be texts, pictures, written music etc., but generally not three-dimensional objects. As a rule, each record is unique.[11] Archival records tend to have been naturally and necessarily generated as a product of regular legal, commercial, administrative, or social activities, rather than as deliberate attempts to provide tools for learning and research.[12] A society needs population registers, for example, for collecting taxes and recruiting soldiers, and deeds for document property rights. All organizations and institutions pro-

duce records. Churches, for example, made the parish registers (which today are often kept in governmental public archives such as county archives, and are often digitalized and much used for genealogical research). Records tend to be so numerous that just a fragment is selected and preserved in archives and partly for that reason, the focus in archives is seldom on the description of individual records, but rather on a body of records (see Thibodeau 2015).[13] Archives have a secondary function serving research, for which their records often are considered primary sources of evidence. Distinctions between library documents versus archive documents seem to go far back in time,[14] although Hedstrom and King (2003, 12)[15] found that "the articulation of libraries as collections of published works and archives as repositories of unpublished primary sources is a relatively recent aberration that developed as a consequence of industrial rationalization and specialization and that is increasingly difficult to sustain in light of the potential for digital convergence".
– Museums[16] focus on the collection of physical, three dimensional objects (museum objects or museological objects) [17] Examples are cultural products like clothes, furniture, musical instruments, paintings, sculpture, tools etc. or natural phenomena like animals, minerals, plants etc. (specimens). Such objects are usually unique, and the concept "authenticity" often plays an important role here, although there are exceptions, mostly perhaps in science museums. (See Brenna, Dam Christensen and Hamran (2019) about the role of copies in museums). It may be remarked that museum objects are considered documents according to the documentation tradition (see Appendix 1.1), and the issue of whether some types of documents should be kept in libraries rather than museums was also discussed by Kyle (1959, 19). Museums seem, like libraries, to have their primary roles as institutes for learning.[18] Exhibitions and narratives are for them dominant ways of communicating information to users (including what have been called object lessons).[19]
– Converged (or hybrid, merged, aggregated, amalgamated, lumped) institutions are institutions that combine library, archive, and museum functions. Different generic labels have been attached to such converged institutions[20] and there are different meanings of the word convergence in this context.[21] Different terms for kinds of merging are institutional convergence (Vårheim, Skare and Lenstra 2019), physical convergence (Warren and Matthews 2019) or digital convergence (searchable by the same query). Robinson (2019, 10) wrote:

Reflecting the fluidity of the convergence model and the variety of converged institutions that have come into being, a strong and binding definition of 'conver-

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gence' remains elusive. The blanket usage of the term conceals the diversity of institutional partnerships, mergers and restructures it is used to describe. Converged or hybrid institutions differ considerably at the level of sharing and collaboration between the constituent organisations. There appears to be no consensus surrounding the explicit meaning of the term and what exactly it entails for the design of staff roles, institutional missions and public programs.

Further (Robinson 2019, 11):

> [G]enuine convergence is a situation where organisations become integrated and mutually reliant to a point where they can no longer function as autonomous units. Bastian and Harvey (2012) elaborated the model by identifying three key facets of convergence: the co-existence and integration of different kinds of collection documentation, the formulation of common information management practices and the leveraging of traditional, domain-based processes towards the development of innovative cultural programs and services (Bastian and Harvey 2012, 2-3):

> A converging cultural heritage institution is one that combines library, archival and museum material, and is working towards a set of standards and best practices that unites traditional theory and operations from each.

Before we consider the relation between LAMs further, we need to consider the wide spectrum of libraries, archives, and museums.

1.2 Kinds of LAMs

The lists of kinds of LAM institutions presented below are neither exclusive nor exhaustive but are made here to give an impression of the wide spectrum of institutions, with which we are dealing. Further information and references about some of these are provided in the notes.

Kinds of libraries include:
- National libraries[22]
- Research and educational (or academic) libraries[23]
- Public libraries[24] (including children's libraries)
- Private libraries (including corporate libraries)
- Digital libraries[25]

Kinds of archives include:
- National archives[26] (with government archives)
- Academic archives (with institutional repositories)
- Business archives (in for-profit institutions)[27]

- Archives of religious institutions/church archives
- Film archives ("cinematheques")[28]
- Digital archives, digital repositories, and web archives[29]

Kinds of museums include:
- National museums[30]
- Cabinets of curiosities/"Wunderkammern".[31]
- Museums focusing on natural history and natural objects, for example:
  - Natural history museums, specializing in, for example, (dead) animals and plants, minerals and gems.
  - Botanical gardens, zoological gardens, safari parks, and planetaria (although normally not considered museums, at least some of them are "collecting institutions" and all seem to fulfill similar purposes. Zoos were explicitly considered by Briet (1951) to be part of documentation).
- Museums focusing on aspects of human history and culture, for example:
  - Art museums[32]
  - Local museums (including city museums)
  - Military museums
  - Science and technology museums focusing on the history of science and humanly constructed technological products such as airplanes, cars, instruments, weapons etc. (often including natural objects)
- Ecomuseums (which seems partly to challenge the understanding of museums as collections in a traditional sense) [33]
- Virtual museums/digital museums[34]

It is not possible in the present article to study possible tendencies towards convergence of all such different kinds of LAMs, but clearly the full spectrum of institutions should be kept in mind in order not to overgeneralize. As Martin (2007, 84) wrote, exemplifying with museums:

> My point is simply that we must not base assessments of overlapping missions and potential convergence on misleading stereotyped notions of what museums [or libraries or archives] are and what they do. Some museums are much more like libraries than they are like other museums. I would assert, for example, that natural science museums, with their taxonomic collections, have more in common with research libraries, in both their processes and their use, than they have with art museums.

It may also be the case, that generic terms suggested for LAMs are better suited to some kind compared to others.

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For example, *cultural heritage institution* may better fit national libraries and museums than public libraries, while *information institution* may be a more appropriate term for research libraries than for art museums or for public libraries.

2.0 A brief history of relationships between LAMs

Although the present paper focuses on the current tendency of the convergence of the LAMs, it is also important to examine why they were separated in the first hand, or whether they were so from the beginning? What are the arguments for and against convergence? In other words, it is important to consider both the drivers towards convergence as the drivers towards divergence.

Some authors (e.g., Given and McTavish 2010, Marcum 2014 and Rayward 1998) indicate that LAMs formerly were not separated, and they therefore consider contemporary tendencies towards convergence to be a reconvergence of LAMs. On the other hand, the separate developments of LAMs also seem to be deeply rooted in historically developed cultural practices, probably most clearly seen in how archives developed as necessary collections for administrations to maintain social order in different spheres of society.

2.1 Ancient institutions

Under the headline *Institutional Form and Function Since the Dawn of Time*, Cunningham (2017, 181) wrote:

> Posner (1972, 71-85) has argued that the first archives were created by the Sumerians in the middle of the fourth millennium B.C. These records took the form of clay tablets with cuneiform characters. The archives were used to support commercial activity and property ownership. Later ancient societies such as the Hittites, Assyrians, and Mesopotamians all kept archives, although one can only speculate today on just how institutionalized these archives were and what form, if any, such institutions took? In at least some of these societies, archives were kept in temples and courts for religious, legal, administrative, commercial, and genealogical purposes.

Posner (1972) further wrote that Greco-Roman Egypt offers to the historian of archives administration a nearly perfect example of a bureaucratic autocracy whose functioning was based on intensive use and remarkable care of the written record, which could not function without a well-staffed clerical apparatus. Moreover (136):

> To carry out this process [of looting Egypt for its resources], the centralizing character of Egyptian government, obvious under the Pharaohs, was not only preserved but intensified, so that Egypt under the Romans has been described as the biggest business organization of the Ancient World. Alexandria became the seat of the government and of its chief officers (... 154). We do not know what the archives buildings in Alexandria and in the nomes looked like (the nomes were the thirty-six territorial divisions of ancient Egypt). The latter were undoubtedly rather modest. Those in Alexandria might have been more substantial structures; and, since the physical make-up of archives did not differ from that of library material, the remnants of Hadrian's library in Athens and those of the Ephesus library may give us some idea of the arrangements in the Alexandria archives.

Thus, the special development of ancient archives may be explained by the special functions they served supporting a broad variety of administrative practices and they seems not to be integrated LAM institutions (see further in Brosius 2003). But what about the library and the museum of Alexandria? Were they integrated or separate institutions? Erskine (1995, 38) describe them as separate, although "linked"[35] institutions:

> Within the palace complex in Alexandria, the city founded by Alexander in Egypt, a community of scholars was established in what was known as the Museum (or Mouseion); linked to this was a library, the Great Library of Alexandria. These two institutions are often celebrated for their role in the history of scholarship, but they were also the products of the Hellenistic age and of the competition which arose between the successors of Alexander.

It does not seem strange that the museum and the library were connected, since both institutions served learning. Erskine (1995, 38):

> The Museum was a community of scholars which was both academic and religious. It was religious in so far as it was centred on a shrine of the Muses, the Greek deities of artistic and intellectual pursuits, hence the name, the Museum. These scholars were engaged in the study of science (for instance, medicine, mathematics, astronomy) and in the study of literature (editing the major Greek texts such as Homer). As well as studying they seem also to have act as teachers.

Centers for learning and science need libraries, as well as, for example, observatories, botanical gardens, museum collections etc.[36] Therefore, libraries and museums seem functionally more related to each other compared to archives,

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which mainly serve administrative purposes, but this does not make them converged institutions. Of course, such a division is never absolute, libraries may contain museum objects and archival records, museums may contain library collections and archival records, and archives may also contain documents mainly connected to libraries and museums, but still, they may maintain their separate identities.

Our reading does therefore not support the claim made by Robinson (2019, 12),[37] quoting Martin (2007, 81)[38] that the ancient library of Alexandria was an archetypal converged collecting institution.

2.2 Institutions in the Middle Ages through the Early Modern period

Friedrich (2018) has the title *The Birth of the Archive: A History of Knowledge* and describes the emergence of public archives. A reviewer summarized it (Schreibman 2019, 202):

> For those in power, archives reinforced their claim to power, be it social, legal, political, or religious. Laws could only be upheld if they were written down and legal disputes could only be solved upon examination of the written record. Archives upheld the social order, or so the ruling establishment thought (and expected).
>
> And it was not just jurisprudence that owed its birth to the archive, but cartography. Those who controlled the maps controlled the territory. Maps and words became the new technologies of the Middle Ages and the Early Modern period. Archives could become the bridge between knowledge and power, not simply by their existence, but through what Friedrich terms a complex "activation" process that could be abused and misused, especially through the "ploys of power-hungry early modern princes".

The impression is that archives in this period continue to be separate institutions strongly linked with administrative functions. The relation between libraries and museums provides, however, a different impression.

A frequently used example of pre-modern convergence is the cabinet of curiosities (or Wunderkammern), where "cabinet" may refer to a room or to a piece of furniture. The first cabinets of curiosities emerge just before the turn of the sixteenth century; they could contain any notable objects. Roppola (2012, 13) wrote, citing Hudson (1987, 21) that the "meaning of 'curious' in the sixteenth to eighteenth centuries was not foremostly 'strange, odd, queer', but a curiosity spurring learning" and that collecting curiosities signified an inquisitive, open mind. In modern terminology, the objects could be a mixture of art, ethnography, natural items, religious relics or other valuable objects but, for pre-modern col-

lectors, there were no sharp distinctions between documents, books and objects. In museum studies, the cabinets of curiosities are perceived to be a precursor to the modern museum because they were collections, but they did not allow public access (Roppola 2012), and as Zytaruk (2011, 1) wrote: "If cabinets were implicated in new taxonomic projects to order the natural world, they also acted as preserves of older, more imaginative readings of nature".[39]

One example of a cabinet of curiosities is the one made by the Irish physician Sir Hans Sloane, who collected more than 71,000 items before his death in 1753. His huge collection consisted of different kinds of items: 50,000 books, hundreds of herbariums, thousands of objects from ancient times, etc. It contained specimens of plants, animals, birds, fossils, minerals, as well as antiquities, works of art, coins, books and ethnographic materials. After his death, the collections became the core of the British Museum, the Natural History Museum, and the British Library (Delbourgo 2017).

Another, but later, example is the collector Myron Eells, described by Paulus (2011). Eells was a missionary, scholar and collector, born in Canada in the Pacific Northwest in 1843. Throughout his life, Eells had a passionate interest in the Northwest, its people and religious institutions. For Eells, a natural outcome of this interest was a rapid growing collection, where records were mixed with books and artifacts. There is no doubt that Paulus (2011) saw Eells' collection as a real case of a hybrid LAM, integrating all three institutions in one. Although this is clear enough about library and museum, the question whether Eells collection also was an archive is more problematic and is connected to the definition of records and archives. Paulus (2011,195) wrote:

> Like the earliest human collections, Eells's earliest collection was of records, writing intended "to make past experience available for future reference" (Posner 2003, xxxi, 14, 27-28; Casson 2001, 2-3).[40] Eells kept archival and literary materials together, reflecting a view of documents that was not uncommon before mechanical reproduction helped divide documents into forms "directed toward a mass audience" and those "grounded in personal interactions and organizational transactions" (Jimerson 2009, 60, 64).[41] For Eells, both types of material were important sources for his inquiries (Eells catalog of his library, 30 and passim, Myron Eells Collection, Whitman College and Northwest Archive).

Paulus (2011, 186) also wrote that "[a]s he spoke, Eells held in his hands and read from manuscripts of early missionaries", and "Eells also became a student and curator of "the written and unwritten records" of the people and places around him".

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Paulus understanding of archives and records corresponds to the kind of materials (like letters) which are often found both in archives and in libraries, but not to the archetypal archival records connected to administration. We tend therefore to understand Eells' collection (as well as cabinets of curiosities in general) as exemplifying hybrids between libraries and museums, but not to the same degree including archives. This view is supported by the fate of the collection: after Eells' death in 1907, huge parts of his collection were donated to Whitman College, where the objects, Eells´ notes, photographs, and drawings were the foundation of a new ethnological museum, while the books became a special collection in the library. Today, as already mentioned, cabinets of curiosities are often considered forerunners of the modern museum (Impey and MacGregor 1985).

The literature about cabinets of curiosities seems to indicate that they combined books and objects, either serving as simple entertainment and as a mean to establish of status for its owner, or, when more serious purposes were fulfilled, were closely connected to science and learning although there were mixed opinions about their relevance.[42]

2.3 Institutions in the modern and late-modern period

It was not until the British Library Act 1972 that the British Library was detached from the British Museum (and the British Museum still contains its own libraries, as do many other museums).[43] An argument for keeping L, A and M institutions together is that any study of a specific issue (e.g., an artist) demands access to the works by this artist, the literature about her and the correspondence and other archival records by or on that person. Therefore, collections of L, A and M are often kept together, in particular in subject specialized institutions.[44] The main argument for separating the British Library from the British Museum was probably that the British Library is part of a national system of libraries, coordinating their processes, systems, and services.[45]

Another example is that the British Film Institute National Archive (one of the largest film archives in the world) was founded as the National Film Library in 1935 but changed its name to the National Film Archive in 1935 (and in 1992 to the National Film and Television Archive, and in 2006 to BFI National Archive). What, if anything, is the difference between a film library and a film archive? If we emphasize that the library collects publications (and today often lends documents), while the archive collects documents that are unique, we may suggest, that if films in the *BFI National Archive* are mainly unique, the term *archive* seems justified, but the example demonstrates that the terminology is loose.

While the above examples are mainly terminological, other instances are clear examples of hybrid institutions. According to Given and McTavish (2010), the natural history societies that sprang up at the end of the nineteenth century also combined collections of objects and books. The aim of the natural history societies was to educate the local inhabitants and, for many of the founding fathers of the societies, a proper way of obtaining knowledge was to combine books on natural science with collections of minerals, dried plants, and stuffed animals, etc. The objects illustrated the topics in the books and the books described the objects in the exhibits. Therefore, some of the natural history societies' collections were a library and a museum at the same time.

The mixture of books and objects can also be traced in American public libraries around the turn of the twentieth century. According to Dilevko and Gotlieb (2003) the vision of combining books and objects was not uncommon among the founding fathers of public libraries. One of the most prominent examples is J. Cotton Dana, who is perceived today as a pioneer in both the history of public libraries (Mattson 2000) and museum studies (Anderson 2012). As a director of Newark Public Library, he established a museum within the library and sought to make both institutions relevant to the daily lives of the citizens. Dana perceived that many of the museums in his time were "mausoleums of curios". Instead of this, he wanted his museum to be "a living, active and effective institution". However, Dana was not only creating a seamless cultural institution, but he was also designing exhibits in new ways. An example is Dana's description (Dilevko and Gotlieb 2003, 187-8) of an exhibit of porcelain in the Newark library-museum:

> In the pottery and porcelain exhibit of 1915, people in large groups, and especially children, stood in fascination before a potter at work. They saw the relation between ancient and modern processes, traced through tools, designs, forms, and objects, the primitive bowl or jar, the modern teacup or bathtub.

Some other cultural institutions may disguise that they are integrated LAMs. One example is the European Solidarity Centre in Gdansk, which honors the victorious Solidarity movement. For most visitors, the Centre is primarily a museum, because of their well-attended exhibition, but the Centre also provides access to a library and an archive. This type of cultural institution (combining a library, an archive, and a museum) can also be found in the fields of architecture and cinematography (Beasley 2007).

However, ongoing professionalization throughout the twentieth century can be seen as supporting the differences between and the separation of the LAMs. In the case of Eells, his collection was split and distributed to a library and a museum. The manuscript and archival records were managed by the library (Paulus 2011, 193).

According to Given and McTavish (2010), for the Carnegie Corporation of New York (founded by the Scottish

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American industrialist and philanthropist), distinct professionalism was a prerequisite for financial support to libraries and museums. Therefore, the history of the LAMs in the twentieth century is the history of a divergent development due to the increased separation of books, documents, objects, and professionalization (Tanackovic and Badurina 2009).

Marcum (2014, 82) found that in the twentieth century the separation of LAM professions became complete:

> Slowly, professionalism within these collecting institutions evolved. Starting in the late nineteenth century, separate professional societies appeared: in 1876 the American Library Association, in 1906 the American Association of Museums, in 1936 the Society of American Archivists. The latter came out of the American Historical Association, founded, in 1884, as did the American Association for State and Local History, representing historical societies, in 1940. These associations held their own conferences, published their own journals, and created their own professional standards and codes of ethics.[46] And separate educational programs developed to teach what had become the methodological particularities of each field. Thus in the twentieth century the separation of professions as well as of types of collecting institutions became complete.

This separation of collections and their professionals seems to contrast with the modern urge to classify the entire world. The Belgian lawyer and documentalist Paul Otlet (1868-1944), for example, who designed the Universal Decimal Classification (UDC) to classify documents also thought of it as a system for classifying objects. Wright (2014, 224) mentions how Otlet encountered some jellyfish on the beach and labeled them 59.33, the (now obsolete) UDC code for Coelenterata. His dream was clearly to make one unified classification of publications, records, and objects, anything in the world. Corresponding to this principle, LAMs, as a main rule, try to classify their objects in accordance with scholarly conceptions and classifications. Miksa (1994,147) discussed the background for modern library classifications such as the Dewey Decimal Classification (DDC):

> The seedbed for these efforts [about 1870] to organize the books in libraries was the set of beliefs already described pertaining to the idea of the universe of knowledge as it had developed over the previous three centuries. Pioneers in library classification such as Melvil Dewey and Charles A. Cutter, imbued with those beliefs through their education, simply took it for granted that the very best approach to the organization of a library's books was to classify them systematically. The connection for them between a library's books and the organized universe of knowledge [provided by scientists/scholars and philosophers] was that the essential topic treated of in each book was the same as one of the elements of the universe of knowledge. When arranged according to those categories, a library's collection would then reflect the true organization of the universe of knowledge. This, in turn, would serve two purposes: First, it would aid in the library's role as an adjunct to education by providing a systematic basis for a librarian to determine the best books by the best authors for the mental cultivation of each reader. Second, it would provide a reliable retrieval device.

One example is the Hornbostel-Sachs Classification of Musical Instruments (Lee 2020), which is used to classify musical instruments in ethnological museums but is also used in bibliographical systems (and for classifying articles about instruments in Wikipedia). This example underlines the principle that classifications for LAMs tend to reflect classifications developed by scholarly research, and not to vary according to the kind of curating institution.[46] Although the systems for organizing documents may basically reflect "the universe of knowledge" or scientific taxonomies, they may still be modified according to practical demands. The Bliss Bibliographical Classification, 2nd ed., for example, classifies chemical elements according to the Periodic Table, but also takes the principle of literary warrant into account.[47]

A collection of books, a collection of records, and a collection of objects tend to be divided into different types of LAMs (Hvenegaard Rasmussen and Jochumsen 2007). This may be reinforced by different organizational contexts. In a Nordic context, public libraries, public archives, and museums have their own legislation and public funding, supporting a clear division of labor between the institutions. Within these different historical traditions, the LAMs have established different communities of users. Traditionally, scholars have been frequent users of research libraries and archives, whereas museums and public libraries normally have broader user-groups.[48]

The different ways in which collections are divided within the three institutions reflect, according to Robinson (2012), that LAMs, on a general level, are dealing with memory in divergent ways. With point of departure in Hjørland (2000), she argues that the library is a machine for retrieving information. They have created sophisticated ways of selecting, classifying, organizing, and enabling frictionless access to the information embedded in the collections. Traditionally, libraries have tried to provide broad access to their entire collections by creating universal or special

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classification systems. Archives deal with memory in a different way. They primarily focus on preserving information contained in unique records. Traditional archives do not use universal classification systems and thesauruses like libraries. Instead, the principle of provenance is the guiding light for storing archived documents. The principle of provenance (or 'respect des fonds') dictates records of different origins (provenance) to be kept separate to preserve their context. The traditional archival imperative is to avoid placing layers of interpretation on the collection.[49]

This difference between the subject approach (or the principle of pertinence) of libraries and the principle of provenance of archives is an example of how these institutions have moved apart, rather than approaching each other. Taylor (2015, 281) wrote (italics in original):

> From the seventeenth to the early nineteenth century, archivists' approaches to arrangement were influenced by libraries' classification methods, so that arrangement schemes based on subject headings (pertaining to names of *persons*, places, and thematic keywords) were adopted, and provenance and original order were disregarded (Miller 1997).[50] This made the task of arranging and describing extremely onerous: since the creators of the records had not arranged them according to subject, it was necessary to physically dismantle and rearrange the records after accessioning (Miller 1997). As a result, it was impossible for researchers to detect the relative importance of individual *archival fonds* within this new classification scheme, while, from a purely practical point of view, the allotment of storage space could not be determined in advance, and finding aids could never be finished, because accruals could be added to any section of the records, rendering the finding aid instantly out of date (Miller 1997).With the growth in complexity of administrative practices in the nineteenth century and the concomitant explosion of *recordkeeping*, the new government-run archives in France and Prussia found themselves overwhelmed by records, so that it was necessary to reassess the practicability of arranging records by pertinence (Miller 1997).

Therefore, while libraries have mainly relied on subject arrangements of their documents, the principle of provenance achieved dogmatic status in archives due to both practical and theoretical reasons[51] (although slower and more uneven in the USA due to significant influences from history and library science). Museums tend to follow the principle of subject arrangement of their objects. We have already encountered the Hornbostel-Sachs classification of musical instruments. Other examples are the *Art and Architecture Thesaurus* (Getty Information Institute 2017) and the *Nomenclature for Museum Cataloging* (Dunn and Bourcier 2020).

There are other conditions that provide fundamental differences between knowledge organization in libraries as opposed to both archives and museums.

First, because library documents as a rule exist in many copies in different libraries, the activities of describing, indexing, and classifying those documents need not be done by each library from the scratch but can for the most part be done collectively or by a central agency.[52] The resulting bibliographical records can be shared among the libraries (in union catalogs). National libraries mostly try to collect all publications published in their country and provide a national bibliography covering all those publications.[53] This is one reason that the focus of library science (or library and information science, LIS) goes beyond the institution and has a strong interest in the universe of publications.

Another reason for a difference between libraries on the one side and archives and museums on the other side is that libraries traditionally have been core sites for document- and information searching. Among the publications they collect, the so-called reference works (bibliographies, encyclopedias, many kinds of handbooks etc.), play an important role by allowing users as well as staff to search documents and information in a systematic way. Again, this is a core activity for the library as an institution, but the focus of education and research in LIS is broadened to what has been termed "the universe of recorded knowledge." To put things on the tip: for LIS, the main focus is not the library as institution, but the study of describing, indexing, classifying, searching and using publications in order to help users finding what Wilson (1968, 21) called "the best textual means to an end".

A third reason for a different situation is the already mentioned issue that libraries rapidly are developing "from collections to connections": to the extent that this is the case, they do not, as archives and museums, own the documents they mediate to users. They may provide kinds of classification and indexing (as mentioned this is today mostly centralized), but the best opportunities to create metadata exists no longer by the libraries (even as a collective sector with central institutions), but by the publishers, who increasingly provide "digital libraries" and innovative search possibilities. One example is that publishers make their documents findable in different ways, including by search engines. Library catalogs play today a strongly reduced role compared to, for example, Google (Centre for Information Behaviour 2008). Another example is CrossRef, a mechanism allowing the user to click on a bibliographic reference in an article and thereby be connected to the online version of that document. This mechanism is developed by agreements among publishers, and even if the libraries normally have a role in paying toll-access for the users and we there-

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fore do not have a full example of "library bypass", it demonstrates the reduced role of libraries in their mediation of documents to the users.

2.3.1 The Mundaneum and the Internet

The idea of integrating the LAMs seems to culminate in the ideas of the Mundaneum (an international documentation center), and of the Internet. Both seems to be the best realized dreams of cataloging or indexing the world, spanning all kind of documents (and facts/information) and to represent a culmination of modernist thought.

The Mundaneum was an idea and a project (or rather a family of projects) led by Otlet. His projects are described by, among others, Wright (2014). Together with another Belgian lawyer, Henri La Fontaine, Otlet embarked at the end of the nineteenth century on an ambitious enterprise to create a comprehensive listing of everything that had been written since the invention of printing, a *Répertoire bibliographique universel*, in English the *Universal Bibliographical Repertory* (UBR), which was published by their Institut International de Bibliographie (IIB). For this purpose, they developed (based on the Dewey Decimal Classification 5th edition from 1895) a new universal classification system, Classification décimale universelle (CDU) or, in English, Universal Decimal Classification (UDC) (first edition published in French 1907, since then numerous editions in many languages). UDC was originally designed to index the UBR but later became a classification system for many research libraries around the world. With the development of microfilm technology, Otlet planned to store full-text documents on standard-sized microfiche together with their bibliographic cards.

This UBR was a huge registry on indexing cards (11 million cards by 1914). It was not just a passive registry. Wright (2014, 160) wrote:

> Otlet would eventually establish a research service that allowed researchers to submit queries via mail or telegraph. For the modest sum of 27 francs, anyone in the world could send in a request. Otlet's staff would then try to answer the question by poring through the catalog. Within a matter of months, with the world happily pursuing its prewar research and business enterprises, inquiries poured in from all over the world—more than 1,500 a year, on topics as diverse as boomerangs and Bulgarian finance.

UBR was, however, just the library part of the project. Otlet and Le Corbusier (1928) is a publication about Mundaneum which, according to Wright (2014, 183) would consist of five major components:

- The International Associations Building: a sprawling office complex to host the headquarters of various international associations, along with a meeting hall to accommodate up to 3,000 spectators.
- The Library: a universal library with an enormous card catalog modeled on the Universal Bibliographic Repertory, along with additional lecture halls.
- The University: an international university intended to accommodate at least 500 students that would build close relationships with other universities all over the world.
- Exhibition space: publicly accessible spaced with room for permanent and temporary exhibits on a wide range of topics.
- The World Museum: a museum divided into three parts: Works, Time, and Place.

Otlet's philosophy was explicitly positivist, which became most visible in his thoughts about books, documents, and indexing. He wanted to downplay concepts like "work" and "author", and to focus on the facts in the documents, and the interpretation of facts in the documents, statistics, and sources. The integration of the archives can be seen in his idea of registering all facts from all kinds of documents. Although he published a great deal, he had reservations about the value of books, and imagined their replacement by loose-leaf pages or publication direct onto library cards![54] Such ideas are problematic according to contemporary philosophy of science in which theories play important roles, not just by interpreting facts, but by establishing facts in the first place.

Otlet's work has been termed "the analog internet" and Google today supports the Mundaneum museum in Mons, Belgium, in recognition of its ideas. That Google shares some thoughts with Otlet, can be seen in the formulation (2019) "[o]ur mission is to organize the world's information and make it universally accessible and useful".[55] The idea that "information" exists as a thing without human interpreters, and can therefore be processed with purely mechanical procedures (without the need for LAMs, for example) seems to be related to Otlet's positivism. Information, like meaning, is something made, not found, and the social processes by which information is made is necessary to know about in order to organize and retrieve it (see further Hjørland 2021).

The relation of LAMs to the Internet is further discussed in Section 3.

2.4 Conclusion of section

Our historical overview of the relations between LAMs have seen many diverging tendencies. The changing ratio of similarities and differences, depending on the chosen perspec-

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tive, and the blurred borders between LAMs and similar institutions, make it difficult to make any definitive conclusions about developments other than that their identities as well as their relations are complex and ever changing. Most researchers dealing with LAMs agree that the relations between the institutions change over time (Given and Mctavish 2010; Paulus 2011). Some researchers primarily focus on the similarities, while other researchers are preoccupied with the differences (Latham 2015; Klimaszewski 2015). In addition, the growing number of similarities, or convergence, between LAMs is a primary topic in North America, Australia and Scandinavia (Warren and Matthews 2019; 2020).

We have not been able to confirm a claim made in the literature, that LAMs originally were united, although many examples of hybrid institutions exist from different historical periods. The main split seems to be between institutions serving administration and management (archives) on the one side, and institutions serving science, scholarship, and learning (libraries and museums) on the other side. This points to a general conclusion: one cannot just study LAMs as isolated institutions, comparing similarities and differences in their content, structure, and functions. The primary perspective must be to study the activities that LAMs are made to serve, and here the great variety of institutions mentioned in Section 1.2 must be considered.

3.0 LAMs and digital convergence

Library and information scholar Boyd Rayward (1998, 207) prophesied that the distinction between libraries, archives and museums would make little sense when the digital revolution has advanced sufficiently:

> The thesis of this chapter is that the advent of electronic sources of information and their ever-increasing volume and variety will require a major redefinition and integration of the role of archives, museums and research libraries. It is my view that the distinction between all of these apparently different types of institutions will eventually make little sense, though we can anticipate turf battles between the professional groups that manage them as we get to this point.

Rayward (1998, 213) found that the cabinet of curiosities with its integration of LAMs represents the optimal solution from the point of view of the user:

> The point being made here is simple and perhaps obvious. It is that the functional differentiation of libraries, museums, and archives as reflected in different institutional practices, physical locations, and the specialist work of professional cadres of personnel is a

relatively recent phenomenon. This functional differentiation was a response to the exigencies of managing different kinds of collections as these have grown in size and have had to respond to the needs and interests of an ever-enlarging body of actual and prospective users. It does not reflect the needs of the individual scholar or even the member of the educated public interested in some aspect of learning or life. For the individual, the ideal is still the personal cabinet of curiosities that contains whatever is needed for a particular purpose or to respond to a particular interest, irrespective of the nature of the artefacts involved-books, objects, data, personal papers, government files.

According to Marty (2014), Rayward's chapter is the beginning of a distinct research agenda on the topic of digital convergence. In the chapter, Rayward argues that "information organizations" have developed differently due to the separation of prints, records, and objects, but the differences in organizational activity, function and technique no longer apply in the same way when there is a common electronic format. It will make it possible for information organizations to "create ever-changing virtual[56] cabinets of curiosities in which any kind of digitized document, text, image, or object, can be introduced" (Rayward 1998, 214). For Rayward the digital possibilities are a kind of "science fiction-like" speculation of Otlet's attempts to catalogue the entire knowledge of the world.

To examine whether the tendency that Rayward foresaw is becoming a reality, we must not just rely on the theoretical literature in this field,[57] we must also examine the development of digital libraries, digital archives, and virtual museums to see whether there is a tendency towards convergence. Even this is not enough, however. Because the terms *digital libraries*, *digital archives*, and *virtual museums* are often, if not dominantly, used about databases which have not been developed by LAM institutions (but by publishers, computer companies and many kinds of database providers). The term *digital library* for example, is typically not used about a transformed library or something produced by a library or by librarians, but is used about, for example, a publisher's online bookstore (e.g., the *ACM Digital Library*), or, in the case of the *Internet Archive*, a huge web-harvesting database supplemented with documents obtained in other ways, or, in the example of *Project Gutenberg*, started by a university student with the aim of publishing free e-books. There are examples of digital LAMs, especially of virtual museums, that have developed from physical LAMs (e.g., the Science Museum in London) but even if most LAMs today have web presence, the overall picture seems to be that digital LAMs, taken as a whole, are institutions developed independently of physical LAMs, and therefore they are not an indication of their convergence. Many new kinds of ser-

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vices, for example, music streaming services (e.g., Apple Music, Deezer, Google Play Music, Groove Music, Napster, Spotify and TIDAL) dominate the market and have almost completely taken over a role formerly fulfilled by public libraries.[58]

Whether there are converging tendencies between digital libraries, digital archives, and virtual museums is hard to estimate. Firstly, because the terminology is vague and ambiguous. For example, Borgman et al.'s (1996, 4) definition "[d]igital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information" makes no distinction between digital libraries, digital archives and digital museums. If we consider the archives, the digitalization of records means that they (like library documents) become individually searchable by full text retrieval techniques.[59] On the other hand, the special nature of archives, including the principle of provenance means that archives still need to be treated differently. Encoded Archival Description (EAD) is a standard developed for encoding information regarding archival records (see Pearce-Moses 2005, 146). There should therefore still be differences in the organization of library publications and archival records. If we consider virtual museums, they seem distinct from digital libraries and archives, although there also are many related issues (for example social tagging, linked data, and many other approaches applied in both libraries and museums). There seems therefore not to have been an obvious convergence between such digital institutions and services. Rather, the picture seems to be that the digital revolution has produced a myriad of services of which many offer services that are related to services that used to belong to LAMs. For example, commercial online genealogy platforms such as MyHeritage from 2003 provide access to 13 billion archival records among other kinds of information.[60] Because the digital format can represent texts, pictures, moving pictures and sounds there is little need for many providers to limit to online one of the kinds of digital documents traditionally covered by libraries, archives, or museums. Therefore, many kinds of digitally integrated mixed media have evolved. If Rayward's prophecy is partly fulfilled, this development seems to be much more independent of the different professional cultures (librarians, archivists and museologists) than he imagined, because new kinds of actors and institutions have influenced the information ecology to a high degree. Besides the convergence of LAMs themselves, there are tendencies toward convergence of LAM institutions with IT departments, as Finney (2013) wrote:

> On the other end of the convergence pincer are our colleagues in IT. There is an equal (but mostly opposite) pressure for records management functions to be located within IT departments and disciplines. I'm

not going to talk about this in any detail, but I'm sure that those of you operating within IT departments or other 'digital' parts of your organisations can speak to the benefits and pitfalls of these mergers. In many organisations it just makes business sense to cluster information disciplines. In others, I'm sure, these mergers are initiated with a view of recordkeeping as a technology rather than a business function. The move to merge archives and recordkeeping functions with IT is operating at state level too. Agencies such as the NSW Office of Information have taken on the whole newish cluster of functions being called 'information governance', including information security, security classification and labelling, cloud services and information risk management and data custodianship.

To study tendencies towards digital convergence of LAM institutions, we also need to consider digitalization projects in libraries, archives, and museums to see if digitalization of these physical institutions give rise to a convergence. Here we must distinguish between real and aggregated collections. Aggregation-based digital collection is a term for digital collections or gateways that are primarily based on aggregation, harvesting, or linking other digital repositories. They are often called aggregation-based digital libraries[61] or virtual libraries, but since they may include archives and museums, we here prefer the generic term collection. They may also be understood as cross-institutional portals. The difference is seen, for example, by comparing *Library and Archives Canada* (LAC)[62] with *Europeana*. LAC is a merging of two former institutions (the National Library of Canada and the National Archives of Canada), offering their own physical and digital collections (and is thus a true example of a hybrid institution between L and A). *Europeana*, the European Union's digital platform for cultural heritage is, by contrast, a portal that provides shortcuts to items in many separate organizations, including internationally renowned libraries, gallery, and museum collections from many different European capital cities (e.g., the Rijksmuseum in Amsterdam, the British Library, the Louvre). Taken together more than 3,000 institutions across Europe have contributed to *Europeana*. When users find relevant documents in *Europeana*, they may obtain them by click through to the original site that holds the content (Valtysson 2012). This is not an example of a real convergence between institutions, but it is an example of a common gateway between many independent LAMs.

Other examples of aggregation-based digital collections are *Deutsche Digitale Bibliothek* (DDB) (in English, *German Digital Library*)[63] and the Australian *Trove* (which unfortunately was subject to severe budget cuts and staff reductions from 2016 which threatens to destroy much of its

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basic idea. Belot (2016) wrote: "The library will also cease aggregating content in Trove from museums and universities unless it is fully funded to do so").[64]

The main point is that such aggregation based digital collection are not hybrid LAM institutions because the libraries, archives and museums still exist as separate institutions, which may not have changed their processes deeply, as the concept of converged institution suggests. However, the establishing of cross-institutional portals providing access to digital heritage is a focal point for research on digital convergence and collaboration is a prerequisite for its success. Therefore, it is not surprising that collaboration and convergence are used interchangeably and imprecisely throughout the literature to describe the increasingly close relationships between LAMs (Warren and Matthews 2019, Zorich et al. 2008). This confusion of the terms *cooperation* and *convergence* is, however, strongly criticized by Klimaszewski (2015, 353), who wrote:

> It was common throughout much of the literature to see collaboration and convergence being used either somewhat interchangeably (see, for example, Allen 2002; Dupont 2007; Duff et al. 2013). This is potentially problematic because each term implies a different end: collaboration means people working together, while convergence implies a physical or theoretical coming together. This lack of intentionality in term usage may be having undue influence over discussions about the nature and feasibility of collaboration and convergence because each outcome potentially has very different implications for LAM practitioners and their institutions.

In some cases, collaboration is perceived as unproblematic and enriching (Hunter et al. 2010) but, at other times, sporadic and ad hoc (Tanackovic and Badurina 2009). Finally, collaboration can lead to turf battles, as Rayward predicted (Robinson 2016; 2018).

Rayward's predictions have not all been realized today. The boundaries between the LAMs remain but the digital potential for convergence was not just a dream for Rayward. As we have seen there have been examples of convergence such as *Library and Archives Canada* and aggregation-based digital collection established user-friendly gateways to many different collections. Whether or not the real convergence (as exemplified by LAC) is a fruitful tendency or too primitive (reductionist) an idea (or a way to save money), remains to be seen. The important thing to consider is whether the basic functions of libraries, archives and museums are fulfilled in optimal ways, or whether the driving forces are dominated by, for example, more populistic goals.

4.0 Drivers and motivations of convergence

Based on a literature review, Duff et al. (2013, 6) discussed the following driving forces behind collaboration and convergences:

1) to serve users better;
2) to support scholarly activity;
3) to take advantage of technological developments;
4) to achieve budgetary and administrative efficiencies.

(Duff et al. also included two more drivers: to adapt to an evolving understanding of digital surrogates as objects and to obtain a holistic view of collections, not to be discussed in the present article).

In addition to the drivers discussed by Duff et al. (2013) we shall also consider:

5) common cultural policy;
6) LAMs and professional practice;
7) research and education.

What is not considered by Duff et al. is that most of these points can be considered from different perspectives ("paradigms"), which will provide different answers.

4.1 To serve users better

To serve users is, on the one hand, a trivial goal: of course, the purpose of these institutions is to serve users best possible. But what does that mean? Duff et al. wrote about the goal of a website: "'as a place to go to find something interesting, like a magazine. Part of this thinking is market-driven". It is hereby indicated (1) that to serve users better can be understood as something related to attract a broad audience, to attract funds for the library and (2) that an alternative understanding is possible, to serve users in deeper ways, more related, for example, to support scholarly activities. Probably, in certain domains, the integration of publications, source documents, pictures and museum objects will serve users best, but not necessarily in other domains. An underlying assumption is that search systems can provide 100% effectiveness (i.e., 100% recall and 100% precision), and that this is already achieved in the separate institutions, therefore a convergence will provide the perfect solution. We know from research in information retrieval (IR), that 100% effectiveness is a utopian goal. To make an optimal solution presupposes knowledge about user needs, i.e., which kinds of documents needs to be made more visible to the target groups. The tendency to merge collections and databases may also fail to realize the importance of context in the formulation of queries.[65]

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4.2 To support scholarly activities

If collections are used for scholarly purposes, they should be selected, described, and indexed to support scholarly goals, which means that the staff should have subject knowledge and knowledge about science. Whether convergence of LAMs serves this is probably different from domain to domain and highly dependent on how it is done. Each institution may have developed knowledge, that serve this purpose in optimal ways. For example, archival records should not be indexed by the same principles as library catalogs but should maintain the principle of provenance (Tognoli and Guimarães 2019).

It may also be the case, that scholarly purposes in the end serve most users best. Researchers are contextualizing museum objects and provide narratives about them. The objects in themselves would probably be of little interests to most users without this scholarly mediating.

4.3 To take advantage of technological developments

This seems also to be a trivial goal. There is no doubt that advances in information technology (IT) have enormous possibilities for making all kinds of documents physically available users as well as supporting their search possibilities. But how IT should be implemented is not primarily a technological issue, but an epistemological one because IT is not neutral (see Hjørland 2020). Different kinds of materials (e.g., books and archival records) need different kinds of metadata. Therefore, it is not given that convergence between LAMs is the optimal solution although this allows for higher investments in IT.

4.4 To achieve budgetary and administrative efficiencies

This is again a trivial goal, and it seems obvious that information technology has contributed strongly to achieve it. However, it should be presupposed, that the goal is to optimize the collections/databases and institutions to best serve their purposes. Often this seems not to be the case. Schwirtlich (2013a) raised questions about the merging of libraries and archives, and also (2013b) wrote:

> It is necessary to question the motives of the decision-makers, those above librarians and archivists who decree these mergers – what do they want? Some senior bureaucrats or ministers might really like fewer CEOs – the latter are people they only really know when there is a difficulty. An administrative change may be just one person's idea, a brand to build their career on. Or it may be a tool to remove someone who is underperforming in some way.

Finney (2013) wrote: "Underneath all this is the common fear among libraries, archives and museums that in the digital world we will become irrelevant. That bigger is better. That we need to speak with one voice in order to be heard". Here convergence is associated with the fight for institutional legitimacy.

This must be seen in the broader perspective of closing and merging libraries and other cultural institutions. Holder and Lannon (2015) describes the closing and merging of academic libraries. Public libraries have also closed many branches and, for example merged their former music departments into general departments (and thus loose the special competencies of the music librarians), which is related to a declining trend in library lending. The merging of LAMs may therefore also be understood as simply related to budget cuts.

We are not concluding that LAMs should not be converged or that IT should not be used be used. We are just claiming that merging of institutions and the use of IT sometimes seems to serve other goals than providing optimal solutions for users.

4.5 Common cultural policy.

According to Brown and Davis-Brown (1998), LAMs are not only engaging with memory; they are also producing memory for the benefit of nations. In a modern world with rapid changes and contingency, a shared past can contribute to social stability and solidarity. From a Nordic cultural policy perspective, the public-founded LAMs are cultural institutions that support the enlightenment of the entire population by giving access to their different collections (Vestheim 1997, 102). With a point of departure in the concept of the public sphere (Habermas 1989), Larsen (2018) argue that the LAM-institutions are an important part of the infrastructure of the Nordic public sphere by supporting access to knowledge, freedom of speech and deliberative activities. Throughout the 20th century libraries, archives, and museums have shared some vital similarities. Traditionally, they are buildings containing collections that serve shared political purposes, such as supporting enlightenment, democracy, and national identity. Today, LAMs are not only perceived as infrastructure by the public by giving access, but all types of LAMs are also being used as an arena for public debate (Audunson et al. 2019a; 2019b; Davis and Howard 2013). The intersecting cultural policy aims are sometimes reflected in the changes of government agencies, such as the *Institute of Museum and Library Services*, established in 1996 in USA, and the formerly mentioned *Library and Archives Canada*. Previously, Norway had *The Norwegian Archive, Library and Museum Authority* (Hindal and Harriet Wyller 2004) and the United Kingdom had *The*

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Council for Museums, Archives and Libraries (Hooper-Greenhill 2004).

4.6 LAMs and professional practice

There are many worldwide examples of public libraries and museums located under the same roof, but this tendency is most widespread in Australia and New Zealand. The *Australian Albury Library Museum* (since 2007) is one of the first examples from this millennium. On their homepage, they describe themselves as: "a community hub bringing together state-of-the-art technology, reading and research facilities, a diverse exhibition schedule and a dynamic program of events".[66]

The collaborative output from merging LAM institutions is described and analyzed in Robinson (2016; 2018) and Wellington (2013). This research presents qualitative case studies from three New Zealand institutions and four Australian institutions, documenting some of the turf battles Rayward was predicting. According to Wellington (2013, 312):

> The differing professional domains create a framework for silos, but the personalities still hold the agency to determine how much that difference manifests in the integrated institutions converged organizational culture.

According to Wellington, converged institutions can work well if differences between the professional domains are considered, while Robinson is more skeptical. She is primarily considering the impact on museum services, particularly the exhibitions, and concludes that the interpretive potential for visitors is lacking because of convergence. On the contrary, a quantitative Swedish study documents several overlaps in professional experiences between employees in libraries, archives and museums (Huvila 2016). In this study, there is a broad consensus among the respondents of the main role of all the LAMs in contemporary society: they are cultural institutions serving democracy by giving access to cultural heritage and knowledge. Furthermore, professionals from all of the LAMs are focusing on their role as educators and perceive user orientation as a changing force for their institution. Despite notable differences between the professional practices in libraries, archives and museums, Hvenegaard Rasmussen (2019) argues that general user orientation, participation as a buzzword in all three LAM fields, increased market orientation in cultural policy and a collaborative imperative are converging forces for professional practice among LAM professionals. An obvious example is the collaboration on joint digital portals. In addition to these collaborative practices, each LAM institution shares a common need for mapping user needs and libraries,

archives and museums all have an increasing focus on events, workshops and the use of volunteers.

4.7 Research and education

Research and higher education about LAMs should, in a way, be the main driver in the development of these institutions because professional activities should be based on research and knowledge at the highest possible level. Such research and teaching should provide the perspectives on which LAMs are ideally developed and underlie all main decisions made.[67] Today, developments in LAMs seem to be more influenced by computer science, or by common-sense political decisions, rather than by information studies (or whatever generic term to use for the disciplines concerned with LAMs). Although there seems to be an agreement in the literature that the core problems of LAMs are not just of a technological nature, the clarification and communicated of research to LAMs need to be improved.

Institutionalized education seems not to be well developed. Trant (2009) noticed that convergence had been a hot topic among the LAMs, but this was not yet evident in the education of the professionals who work in them. More than 10 years later, Hider and Kennan (2020) concluded that closer relations between LAMs do not appear in the same way in the educational field as they do on an institutional level. For Hider and Kennan, a lack of proximity is a major barrier for convergence. Departments of library and information science (LIS) and museum studies (MS) are often located at different universities and if a university covers both departments, LIS is generally located in units covering ICT and social science, whereas MS tends to be connected to the humanities. Finally, LIS, AS and MS are different research fields, publishing in different journals and presenting at different conferences. However, there is a minor corpus of literature discussing closer educational collaboration between LIS, MS and AS. With a point of departure in information science and information technologies, the LIS department of the *Technological Educational Institute of Athens* have developed a LAM curriculum at BA level (Giannakopoulos et al. 2012). In a Scandinavian context, the professional education of employees at LAMs are integrated to some degree. In Sweden, two universities have LAM departments; in Denmark BA and MA degree, pertaining to all three institutions is offered, and in Norway there is a *Department of Archivistics, Library and Information Science* (Hvenegaard Rasmussen 2019).

The potential for a combined GLAM curriculum in Australia has been explored and discussed in several papers (Howard et al. 2016; Hider and Kennan 2020). All papers highlight different skills in relation to digitalization. These include digital curation, digitization, and the design of digital information systems. Knowledge organization, user

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studies and skills connected with cultural policy, and community work are also mentioned as important shared skills for LAM education. However, a common LAM curriculum is mainly discussed in a North American context. According to Cox and Larsen (2008), archive programs have been connected to LIS for more than half a century, while the relation between LIS and MS is less well developed. At the University of Toronto in Canada, The Faculty of Information is offering both a Master of Information and a Master of Museum Studies; the only department doing so in North America. Instead, some MS programs offer elective courses from LIS programs, or other departments, at their institution. Conversely, some LIS programs have incorporated more museum-related topics in their curriculum (Kim 2012). LIS programs at the University of Illinois and Florida State University have offered courses in museum informatics, defined as "the sociotechnical interactions between people, information, and technology in museums" (Marty and Twidale 2011). Another, and cognate sub-discipline in LIS programs, is cultural heritage informatics, which deals with the use of technology for the representation, documentation, preservation and communication of cultural heritage knowledge (Latham 2015). The summary outline of educational collaboration is that convergence is still at an embryonic stage and there is no clear direction for development. In addition, the relations between LIS, AS and MS are not symmetric. LIS is related to both AS and MS but there is no educational relation between AS and MS.

The different research fields associated with libraries, archives and museums are perhaps not equally interested in developing a shared research and educational field. Library science (LS) is still used as a label but is mostly replaced by library and information science (LIS) (or by information science IS), which should indicate a broadening of focus from libraries as institutions to information institutions in general. Archives are studied by archival science (AS) and museums by museum studies (MS), but these two fields tend to see themselves as independent fields rather than as a part of LIS. One reason for this asymmetrical relation is that LS may be more motivated to expand its domain compared to AS and MS because its publications are not unique and may therefore be mediated to the users by publishers or other actors (the so-called library bypass phenomenon). In the eyes of an archivist (Finney 2013), "Increasingly, they [the librarians] are turning their attention to the archivist's natural habitat of managing and distributing unique material in what should be (or might have been) our territory of digital repositories, research data initiatives and documenting the digital present".

That LIS is more preoccupied with LAM than AS or MS can be seen in that most of the entire corpus of LAM literature (approximately 200 texts) has been published in LIS journals and that encyclopedias of library and information science mention archives and AS, museums and MS frequently, while reference works in AS and MS do not mention the other fields in the same way.[68] Thus, seen from a LIS perspective, LAM convergence and similarities are much more common than from the perspective of AS or MS. One reason for this difference is, as already said, that the term LIS represents an extension of the term library science (LS) with the term information science, which is about information understood as all kinds or information, including archival records and museum objects. As Sweeney and Estabrook (2017, 2768) wrote:

> The LIS domain extends to the structures of the institutions that make information available and usable—such as libraries, archives, and museums, whose primary purpose is collecting, preserving, organizing, and making useful information and cultural artifacts. The field also includes systems—such as information resource management—within business and organizations.

However, one may ask whether research and teaching made under the label LIS has also really considered AS and MS? One may notice, for example, that despite the claim to cover all LAMs, Sweeney and Estabrook's article does not refer to archival or museum studies as part of LIS and does not say anything about these fields' influence on LIS. Therefore, it seems that tactically, LIS claims to include those fields, but that this is not fulfilled in practice and not integrated in the theoretical perspective of LIS. As Oliver (2010) concluded his article, the first thing to do must be to acknowledge each other's perspectives:

> Libraries and archives have much to learn from each other, but in the absence of a generally accepted theory for information management which clearly acknowledges the contribution of the various occupations involved, we will remain working within our professional silos. Awareness of the issues and problems in each other's domains is likely to assist in providing new insight, and new perspectives on what may appear to be intractable problem areas. The information continuum model is recommended as the theoretical framework to underpin any research which spans the two distinct domains of libraries and archives. It provides a secure basis which should encourage exploration of colleagues' specialist domains, which have the potential to yield rich benefits for all concerned.

This lack of recognition of each other has to do with the fact mentioned by Marcum (2014, 82) that in the twentieth century the separation of LAM professions became complete: until these different groups work together by, for example,

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joining conferences and journals, no real integration seems possible.

4.7.1 Different research perspectives

LIS, like AS and MS may be studied from many different theoretical frames of reference, and during their history this is so. See, for example, Hjørland (2018a; 2018b) for a discussion of theoretical positions in LIS. Here only a few points will be mentioned. We saw in Section 2.3.1 how Paul Otlet tried to establish a fully converged LAM institution based on positivist, modernist, and objectivist ideas. The main theoretical problem with his vision seems to be that it neglects the subjectivist point of view, as Ketelaar (2014, 20-1) wrote:

> [T]he meaning of a record or of any other cultural artefact may be understood in two different ways: the meaning of the object and the meaning for someone or for an occasion. The first views "the" meaning of an artefact in objectivist terms as the Idea (in the Platonic sense) of that artefact, which can be inferred from the object by whoever approaches it. The latter recognizes in subjectivist terms "that information resources do not 'have' meanings, but that different meanings are assigned to the same resource by different people at different times, and that 'the' conventional meaning of a given resource is a matter of intersubjective consensus".

In other words, the subjectivist perspective acknowledges the need for recognizing subjective perspectives in the description and mediation of all kinds of documents, and emphasizes that cultural institutions put layer after layer of interpretations on their objects and that these layers should be made as transparent as possible for the users. The subjectivist perspective is probably better understood in AS and MS compared to LIS, and it implies thinking about convergence that is vastly different from that of Paul Otlet. Again Ketelaar (2014, 18) has an important point:

> Reflecting on integrative practice between galleries, libraries, archives and museums involves thinking about the characteristics the commonalities, the differences and distinctions, the convergence and divergences between at least four constituents: GLAM materials, GLAM users, GLAM professionals, and GLAM institutions. In the abundant literature the order is mostly reversed, starting with GLAM as institutions. However, I would like to present some reflections on: what is used, by whom and why, curated and managed by whom, and in what institutional setting?

Another issue is important to consider. LAMs should, of course, serve users in the best possible ways. However, much user-orienting in LAM research may be associated with the commercialization of LAM institutions. A contemporary trend in the convergence of LAMs seems to be that they all face pressure to document increasing statistics about their use. This may not in itself be a bad thing, but it comes with a risk of increasing populism and downplaying of critically important functions that are serving minorities (and all research activities are highly specialized and thus represent minorities). LAM institutions have always served highly specialized functions and should also do so in the future. For such functions, tendencies towards commercialization, populism and userism seem poisonous.

5.0 The critique of convergence

Zerubavel (1996) used the term lumping about the mental process of grouping similar things together in distinct clusters and the term splitting about separating different clusters from one another. The terms similar and different are understood by Zerubavel in the sense that what is considered similar and different is neither personal nor logical but is based on a social construction of what have been considered important characteristics of things. Klimaszewski (2015) uses these concepts, and the underlying view to consider tendencies to lump LAMs respectively, to split them to provide a critical analysis on the converge of these institutions. He wrote (352):

> The process of lumping and splitting, then, is not the result of a recognition of innate sameness or difference to be found within the things themselves but, rather, a reflection of ideas about sameness and difference that we have been socialized to see. Therefore, who is doing the lumping and splitting (and why) is as relevant as what is being lumped or split.

In contrast to the many authors who tend to lump LAMs, Klimaszewski (2015, 350-1) wrote:

> It is by no means a stretch to say that libraries, archives, and museums (LAMs) are different types of institutions. They are seen as being "split", to use Eviatar Zerubavel's (1996) term, both because they are conceptually different and because they exist as physically separate entities even when they are organized within the same overarching structure. For instance, a university might have a museum, a library, and an archive, but it is likely that each will be run relatively autonomously because each employs a different approach to practice.

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Klimaszewski found that different narratives emerge based on whether authors are insiders (practitioners) or outsiders (researchers, grant-funding agencies, and policy makers), where outsiders were the ones emphasizing the similarities whereas insiders emphasized the differences among LAMs. Researchers on digital convergence and the public servants focusing on rationalization and marketization are both lumping, while Robinson's (2012; 2016; 2018; 2019) persistent pointing out of the differences between libraries, archives and museums is an example of splitting.

The overall impression of reading Klimaszewski's article is that the devil is in the detail: it is easy to say that all institutions are about, for example, memory or information, but the ways they have to carry out their tasks are different, and such differences are not understood and recognized by outsiders. One of the supporting arguments comes from Robinson (2012), who argued:

> [T]hat, rather than revealing the essential affiliation between museums, libraries and archives, their sweeping classification as 'memory institutions' in the public sector and the academy oversimplifies the concept of memory, and marginalises domain-specific approaches to the cataloguing, description, interpretation and deployment of collections that lead museums, libraries and archives to engage with history, meaning and memory in significantly different ways.

Other critiques are the lack of empirical evidence and theoretical foundation. Concerning empirical evidence Duff et al. (2013) found that "little research exists documenting the experiences of these institutions as they engage in different forms of collaboration and convergence", while Klimaszewski (2015, 364) found that "[w]hile the current story of LAMs is of a convergence driven by idealism, it often lacks a critical assessment of the role of technology and assumes user needs as opposed to relying on evidence-based impact studies. For now, the effects and outcomes of the current trend toward lumping LAMs remains to be seen".

About the lack of theoretical foundation of the reason for convergence, Willey (2017) wrote:

> An examination of papers devoted to the convergence of LAMs shows that while they do not directly address theory and scholarly publishing, they do suggest that distinct professional identities can be considered a barrier to convergence. It is concluded that while LAMs may be converging in some areas, they are not converging in the area of theory, possibly due to a desire to maintain discrete professional identities and low engagement with theory by some archivists.

Hvenegaard Rasmussen (2019, 1268) found:

For all publicly funded cultural institutions, new public management is a step toward decreased autonomy, because actors outside of the cultural field are primarily defining the efficiency of practice and the quality of content. Furthermore, the instrumentalization of cultural policy potentially poses a threat to the autonomy of the cultural field.

And (1269):

> ... if the field has less autonomy, the main driver will normally come from environmental conditions. Such an external driver can be digital solutions per se, but it can also be the new spirit of capitalism or the participatory turn. As is apparent from this paper, most drivers of convergence are related to environmental conditions due to a lack of autonomy.

Both these quotes suggest that the main drivers for convergence do not come from research and theory, and therefore lack a solid basis in knowledge about the best way of developing these institutions.

Klimaszewski (2015) also used the term technological determinism about the convergence of LAMs (but without defining or discussing this term; for a brief introduction see endnote[69]). Perhaps it is sufficient here to say that this concept is used about the view that convergence is perceived as an inescapable fact and represents the outsiders, which, as explained above, neglect a deeper examination of the kinds of knowledge needed for an optimal management of the institutions, implying, of course, an examination of what different goals they shall fulfill. In this respect, a quote from Vårheim, Skare and Stokstad (2020, 136) is relevant:

> Digitization would cause – it was expected – that all the documents we surround ourselves with will eventually be retrievable in the same digital format, and that the differences between formats and media will, therefore, disappear: "Digitization makes the signals themselves equal, regardless of what kind of information or communication they represent. As a result, it was assumed that convergence would take place" (Fagerjord and Storsul 2007, 20).

Fagerjord and Storsul (2007, 27) wrote, that despite such criticisms (also raised by Bolter and Grusin (1999), Manovich (2001) and Noll (2003)) and despite the empirical basis for the assumptions of convergence being questionable, the concept of convergence remains strong in political, economic, and academic circles.

Considered retrospectively, it seems that research from the first decade after the millennium overemphasizes the effect of digitalization. Although Rayward (1998) was right about the

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possibilities for common digital access to cultural heritage, borders between LAMs remain. As Rayward, and many other researchers, predicted, we are not witnessing a fundamental convergence, not even in a digital environment.

On a general level, the convergence discourse between LAMs echoes a broader discourse of digitalization. In the advancement of the Internet, the new digital possibilities were perceived as positive forces supporting democracy, diversity etc. Over time, the positive forces have lost pace and the critique increases (Lindgren 2017; Cannon 2013; Klimaszewski 2015). Secondly, institutional convergence has been expounded because of increasing marketization in cultural policy and government of the heritage sector. For some researchers, such as VanderBerg (2012) and Beasley (2007), the focus on convergence is primarily an attempt to rebrand libraries, archives, and museums. VanderBerg (2012, 136) wrote:

> ... a more pointed examination of archives in museums provides grounds to question the ability of technology to facilitate deep-rooted collaboration. This reading of the history of LAMs and their current challenges raises a concern that convergence is nothing more than a rebranding exercise, in which archives appear vulnerable to lose their defining characteristics.

According to Cannon (2013) and Robinson (2018), the main driver for mergers of LAMs has been lowering the cost of public governance and the day-to-day running of LAMs.

According to the Canadian archivist Terry Cook, the focus on LAM convergence is a disease and there is a revival of "The war of independence" in the wake of mergers between several LAM institutions in Canada (Cannon 2013). This concern about being absorbed in huge institutions is common in LAM literature when written from an archival point of view. With a point of departure in a merger of an archive and a museum, Jones (1997) entitled his article *Archives and Museums – Threat or Opportunity?*, and found that there are many benefits from merger, but that "it is important to stress the need for maintaining the distinctions between archivists and other professions. Archivists should be justly proud of their own specialist skills and knowledge, and not be drawn too readily into sacrificing this identity for the undoubted benefits of closer co-operation and integration".

For Marsden (2001, 20), one conclusion is that "[t]he disadvantages are also well known: domination by a larger partner, usually the library, the exasperation of trying to persuade librarians to understand archival needs, and pressure to accept unsuitable working arrangements and IT provision". On this basis, it is not surprising that archivists in an Australian study are the most negative profession when it comes to increased collaboration between the LAMs (Howard et al. 2016).

Ketelaar (2014, 28) provided the following point of view:

> It strikes me that most, if not all, successful mergers between libraries and archives, sometimes with a museum too, have not happened at a national level, top down, but in places where they are embedded in a local or regional community with a strong sense of identification, self-understanding and commonality, like Friesland, Québec, and Tasmania.

The picture is confused because people tend to become enthusiastic when budgets are increasing and negative when they are decreasing.[70] The convergence movement started with many well-funded projects, but often ended with budget cuts. The official descriptions of the convergence projects are, of course, enthusiastically described, but who has examined the real effects?

6.0 Concluding remarks

The literature tends to consider the convergence between libraries, archives, and museums as the object of research. An important issue is, however, that the focus needs to be extended to the information ecology as a whole. There are other institutions involved, as well as publishers, databases, and other media. We have seen, for example, how former independent music departments in public libraries have been closed or merged with lending divisions, because of the challenges met from new providers of digital music services. The development has therefore not just been about the merging of LAMs but also merging within such institutions. The merging of, for example, a music department, with a general lending division means a loss of qualified staff dealing with music. The qualifications needed for working as a librarian in, say, a children's library are vastly different from those needed for working in a music department, although they both belong to public libraries. Therefore, already libraries, archives and museums are, as we also saw in Section 1.2, abstract concepts, lumping a range of quite different institutions. There are also, at the least in some countries, tendencies to concentrate institutions in larger units (e.g., by the closing of branch libraries). The development of these institutions therefore needs to be considered from a broader perspective.

At the beginning of the article, we characterized LAMs as collecting institutions, but, as we have seen, there has been a tendency in libraries to develop "from collections to connections" because libraries increasingly go from physical materials of their own to offer users access to publisher's digital libraries. Similar developments may, to a lesser degree, also take place in relation to archives and museums. This means that physical collections become a less im-

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portant characteristics and concern in considering the functions of different kinds of information institutions.

In public libraries the circulation of physical materials tends to decrease while the circulation of online materials tends to increase, and the number of physical visits to libraries seems to stabilize at a high level (according to Statistics Denmark; see also Vårheim et al. 2020). With 37.4 million visitors in 2019 public libraries are still among the most visited cultural institutions in Denmark. In line with such tendencies, Audunson et al. (2020) among other researchers consider the main role for both libraries and LAM-institutions in general to be democratic spaces or low intensive meeting places. Editor-in-chief of the Danish newspaper *Politiken*, Christian Jensen (2021, here translated from Danish), formulated a similar point of view:

> Has the library as an institution not become its own museum? No, even if the lending of physical books decreases, the number of visits nationwide increases. The library has every opportunity to become the provincial towns' cultural houses with theater performances and concerts in addition to lending books and music. Precisely in a digital age marked by misinformation and increasing social isolation, it is more than ever crucial that a wide range of cultural offerings and verified information from books and credible media are made available to the population. One can discuss whether the DKK 10 million that the government will invest in libraries annually can lift that task. But you can hardly make yourself an opponent of the plan if you want to do well for both the culture, the enlightenment and the province.

A function of public libraries as low intensive meeting places can be confronted with a vision as an institution that "maintains and strengthen the status of public libraries as an irreplaceable element in Denmark's position of strength in a globalized world".[71]

We may ask how Audunson's view on libraries and other LAM institutions corresponds to research and education in LIS? Bjørklund, and Audunson (2021) made a survey of qualification requirements in Norwegian public libraries as they were described in job advertisements and found "that a development has taken place with a reduced weight on library education and an increased weight on personal and interpersonal traits between 2005 and 2015. [...] The tendency not to ask for library education is strongest with the very small authorities and a few very large cities".

A hypothesis is therefore, that the focus of libraries (and to a lesser degree other LAMs) as institutions with the focus on creating democratic spaces or low intensive meeting places may not require people educated in LIS (or AS, MS), whereas the focus of learning and information provision

might. From the perspective of LIS, AS and MS, the question is which approach is needed to develop a practice that is informed by research in these fields?

Audunson and Aabø (2013) found that three issues need to be separated:

> The relevancy of librarianship as an institutionalized profession and the relevancy of libraries as institutionalized organizations are two different issues. Librarianship might be relevant or irrelevant independent of the relevancy of libraries, just as journalism might be a relevant or irrelevant profession independent of the relevancy of traditional newspapers. Discussing the relevancy of libraries and the relationship between profession and institution is a third topic.

And further:

> That which constitutes library and information science as a distinct science and demarcates it from other scientific fields also preoccupied with information, is its links with a professional field – information professional – with the mission of organizing collections of knowledge in order to optimize access, mediating from these collections etc. [...]. It is, however, crucial to underline that we are preoccupied with the links between information science and librarianship as an institutionalized profession, not libraries as an institutionalized organizational form.

Audunson (2018, 358) wrote about the need for professional librarians:

> We see that clearly in the disciplines most dependent upon basing their research and practice on updated knowledge, e.g., medicine. There, librarians with the competencies need to perform systematic searches, securing that one finds that which is relevant, are indispensable parts of clinical teams and research groups. Educational program in LIS must see to it that we educate librarians with these competencies.

This is an example, contrary to the one focusing on low intensive meeting places, in which deep professional skills are necessary, and it corresponds very well with the traditional role of information specialists as qualified in literature searching, bibliographical databases and in helping developing users' information competency. This is, however, connected to theoretical issues about the knowledge and technologies needed. Are specific information qualifications still needed after Google? Hjørland (2021) argues that Google and the dominant tradition in IR research are based on assumptions which should be challenged. Simplified we

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can say that whereas traditional IR research try to match words in documents and queries, thus taking an atomistic approach, LIS, AS and MS tend to approach the mediating problem from a holistic approach, in which specific fields of knowledge, cultural norms, literatures, traditions and different paradigms are natural points of departure. Bazerman (2012) made the same point writing that digital technologies can readily draw together heterogeneous pieces from heterogeneous circumstances, but for many purposes the users need to understand provenance, genre, activity context, and social and institutional structures from which the information arises and in which it is intended to be used.

Where does this leave the issue about LAMs and the interest in their possible convergence? We have seen that there have been many attempts to unite these institutions (and the studies of them) under one label, whether called documentation centers, information institutions, memory institutions, cultural heritage institutions, or other terms. LAMs are similar in some ways and different in other ways. Many attempts to combine them, has, as Robinson (2012) exemplified, tended to neglect important differences. It is important that these institutions learn from each other, but it is equally important that core characteristics of each field are maintained. Many attempts to unite the institutions and previous attempts to develop an overall information science (or whatever it has been called) seem based on too reductionist (or imperialist) perspectives. This should not be an argument, however, not to cooperate in developing a field of study based on a common theoretical framework. The name for this field should not be the names of some institutions, because, as Audunson and Aabø (2013) argued,

> It is […] crucial to underline that we are preoccupied with the links between information science and librarianship as an institutionalized profession, not libraries as an institutionalized organizational form.

The same is true for archival science and museum studies. Digital development challenges existing institutions, systems, and processes. We should not be constrained by the existing institutions and practices but must focus on how to provide systems and services that serve the users. This is not primarily a technical issue but is intimately connected to an understanding of the value and relevance of what is mediated.

Acknowledgements

Notes

1. In colloquial language, *organization* and *institution* are often used as synonyms. However, according to Kangas and Vestheim (2010) the difference between organization and institution is the difference between the concrete organization and the abstract institution. Organizations are The New York Public Library, New York State Archives and The Museum of the City of New York. Each of these organizations are part of a larger institution, the field of libraries, archives or museums. Despite the different meanings of organization and institution, the difference between, for example, "information organization" and "information institution" is not huge, because "information" indicates what the organizations have in common. The term *organization* also has another meaning, as in "knowledge organization", i.e., the way something is ordered or systematized.

2. Rayward (1998, 208) used the term "collecting institutions" about libraries, archives and museums. Desvallées and Mairesse (2010,26-8; "Collection") defined: "Generally speaking, a collection may be defined as a set of material or intangible objects (works, artefacts, mentefacts, specimens, archive documents, testimonies etc.) which an individual or an establishment has assembled, classified, selected, and preserved in a safe setting and usually displays to a smaller or larger audience, according to whether the collection is public or private."

3. Desvallées and Mairesse (2010,56-60; "Museum") wrote (56-7): "Most countries have established definitions of museum through legislative texts or national organisations. The professional definition of museum most widely recognized today is still that given in 2007 in the Statutes of the International Council of Museums (ICOM): "A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment." See also Brown and Mairesse (2018).

4. The *Oxford English Dictionary* relates the history of the word *library* to *book*, to the bark of a tree used as writing material: "Latin *librārium* (French *libraire* bookseller), substantive use of *librārius* adjective, concerned with or employed about books, < *libr-* , *liber* book, believed to be a use of *liber* bark (see LIBER *n.¹*), the bark of trees having, according to Roman tradition, been used in early times as a writing material. Late Latin *librāria* (sc. *taberna*) occurs with the sense 'bookseller's shop'." Posner (1972, 141) wrote: "A biblion, it should

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be remembered, signifies a roll of papyrus regardless of the content of the writing that appears on it; hence a bibliotheke is a container for papyrus rolls and, in a wider sense, an institution or agency that preserves such rolls, whether of literary or business character. Thus, a bibliotheke may be a repository for books, that is, a library, or a repository for records. In our context it is the latter: a record office or archival agency." Ryholt and Barjamovic (2019, 7) wrote: "What do we understand by the term library? Common reference works show that there is no consensus on the matter, even with regard to its modern definition. In order to facilitate comparison, we have therefore deliberately decided against any attempt to establish a narrow definition or the coining or use of periphrastic terminology. We feel this would be more pedantic than useful. We have instead opted for a freer use of the term, and have allowed authors the liberty to formulate their own personal definition of this and other key terms, such as 'archive', 'literature', 'genre', 'books', etc., as they find best fits the material they discuss. For the purpose of this introduction, the term 'library' is taken to refer to any collection, irrespective of size, of nondocumentary or epistolary texts that were deliberately kept together, as well as the places intended for the storage of such collections while they were in use. There have naturally been several attempts to establish more narrow definitions. One proposal, within an Egyptian context, has been to reserve the term 'library' only for those collections of texts that had 'the aim of handing down the cultural memory of a community or society, and of ensuring the continued availability of its knowledge and skills' (Zinn 2007, 172; 2011, 181)." The article presents further suggestions for defining libraries and concludes the section: "We choose a less rigid approach and use the term 'library' to refer to any collection of non-documentary texts found together, without regard to its purpose, access, and ownership. Such a broad definition in turn leads to the question of how to define non-documentary or 'literary' texts in order to distinguish libraries from archives. Since modern classification matches ancient material only in part, we opt for a definition that allows the introduction of some degree of flexibility into our comparisons. Accordingly, we take 'literary' texts to include composition that reflects 'broader mental activities' as opposed to a unique event. This would include texts that are not constrained by their date of creation, and possess a broader usefulness, in contrast to documentary records and letters. This includes poetic and narrative literature, wisdom literature, manuals of mathematics, medicine, and divination, sign lists and lexical works, historical, ritual, and cultic texts".

5. Printed materials include internal prints from corporations. These are in national libraries often kept in separate departments together with pamphlets etc. Such materials seem to represent a conflict in relation to the concept "publication".

6. For example, the ancient *Library of Alexandria* borrowed and copied many books, and the medieval European monasteries often contained a scriptorium in which handwritten documents were copied, thus library collections needed not to consist of unica before Gutenberg. Before that time, books were often copied by students as part of their exercises for learning to write (see Delnero 2019).

7. Dardano (2019, 205-6) discussed the differences between libraries and archives and wrote: "Some scholars do not differentiate between 'archives' and 'libraries', while others seem to prefer distinctions along the lines of 'archive' and 'living archive'. The difference between the use of these terms is usually predicated upon the nature of the texts gathered in the collection—the term 'library' normally being used to designate a collection of literary texts, whereas an 'archive' is reserved for collections of evidentiary texts and documents of practice (cf. Ryholt and Barjamovic [2019] §1.3). There are, however, other factors in play in the differentiation, including the presence of only one or of several exemplars of a given work and its length of preservation within a collection. Whereas the documents contained within an archive tend to be unique and are discarded and/or updated after a certain period, texts contained in a library have an agency of their own, and often are reserved in several copies and (at least in the ideal world) indefinitely".[11] "In addition to the existence of multiple copies for use in different places at different times, libraries may be said to consist of the texts of tradition. Often our mental categories are overlapping, and often a few library texts are found in an archive, or a few archival texts in a library [references here omitted]." Dardano found that both types of documents, characterizing libraries and archives, were found within the same collection and concluded: "The observation that both types of material were kept in the same buildings suggests that any distinction between archives and libraries was of no great consequence in the case in question and that any notional categories of genre reflected in the catalogues were not maintained in practice."

8. If libraries and archives were only defined by the respective kinds of documents they collect, the history of libraries would only go back to the evolution of the printing press (around 1440). However, the history of libraries is considered much older and associated with the history of the book and the development of written literatures (whether in the form of, for example tablets,

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scrolls, sheets of papyrus or codices). Traditionally, the history of libraries includes the great libraries of Alexandria from the 3rd century BC and even further back in time (see Tucker and Goedeken 2017; Ryholt and Barjamovic 2019).

9. Cunningham (2017, 179) wrote: "Common dictionary definitions of "archives" state that they are either places where historical records are kept or the organizations responsible for collecting and storing such documents. Beneath such seemingly simple, straightforward, and innocuous definitions lies a fascinating and far more interesting terrain of complex, contestable and dynamic views of archives and their role in society." A distinction has been made between archives as institutions (see Nesmith) and archives as material, the last term is explained in this way (Duranti 2015): "An archives is the whole of the *documents* made or received by a physical or juridical *person* in the course of activity and kept for further action or reference by this person or a legitimate successor. The documents by means of which a practical activity has been carried out are reciprocally linked by a relationship determined by the nature, mandate, and *function(s)* of their creator, called the *archival bond*."

10. Archives are therefore sometimes called "record offices" (see Yeo 2015, 315).

11. Archival records may, of course, be published, and thus gain higher visibility and thereby also become library objects. There are also examples of archival records being systematically copied, for example for local and central administrations, see Posner (1972, 141).

12. Etymologically, the word *archive* comes, according to the *Oxford English Dictionary*, from the Greek ἀρχεῖον magisterial residence, public office, < ἀρχή government. Archives are not originally designed for scholarship, but it is well known that historical research consider records "primary sources" and therefore archives have an important role serving scholarship. As Posner (1972, xxxi) wrote: "Now essential source material for the re-creation of our early history, records are, in their genesis, the tools of administrative endeavor".

13. Rayward (1998, 207) characterized the contents of archives as: "the paper records of organizational activity" which helps to explain that some unpublished records, such as manuscripts and letters from individuals are also commonly found in libraries (or, one could say, libraries often contain kinds of archives within their organizations). Nesmith (2015, 93) wrote: "Distinct entities called archives, rather than libraries, museums, or history or heritage centers, exist for a reason within this mixture of institutional configurations. They are descendants of a long tradition of archival thought and work that has produced an extraordinary number and

variety of such institutions. They are a response to the particular substantive challenges of identifying, preserving, and making available a certain type of the overall human record—the largely unpublished record—rather than the largely published record concentrated in libraries, and other types of artifacts [or natural objects] found for the most part in museums. They have nurtured the creation of the archival profession because the chief characteristics of the documentary record require for its care the *archivist*'s specialized approach rooted in extensive knowledge of the record's complex *provenance*, or multiple *contexts* of *creation*, or histories. The distinguishing features of these records are: they originate in and are typically very rare *evidence* of a myriad of often ongoing institutional or personal actions and processes; they are expanding and thus generally massive bodies of records of multiple provenance; they have a constitutive *interrelatedness*, whether in a highly organized or less formal recordkeeping system; they come in highly varied media types (such as paper, still and moving film images, sound, and now digital materials) and in even more varied individual documentary forms (ranging from letters, memoranda, diaries, scrapbooks, census forms, passports, and wills to photographs, maps, videos, and more recently born-digital counterparts of these documents, as well as new digital multimedia documents); their complex institutional and personal origins, systems, media, and forms are constantly evolving over time; and they are unrelentingly aging".

14. A distinction between "prescriptive texts" and "descriptive texts" was suggested by van den Hout (2002, 863–70), here cited from Dardano (2019), in relation to the Tablet Collections of the Hittite State, c.1650–1080 BCE. These two kinds of texts were treated in a way corresponding to the distinction between library and archival documents: the prescriptive texts existed in more copies, were listed in the catalogs, and included historiography, treaties, edicts; instructions; laws; celestial oracle theory; hymns and prayers; festivals; rituals; mythology (Anatolian and non-Anatolian); Hattic, Palaic, Luwian, Hurrian texts; lexical lists; Sumerian and Akkadian compositions. Descriptive texts, on the other hand, existed in only one copy, were not listed in the catalogs and included letters; title deeds; hippological texts; court depositions; non-celestial oracle theory and oracle practice; vows and administrative texts. Both kinds were, however, in the same collections and buildings, why the concepts "library" versus "archive" seems not yet established.

15. Hedstrom and King (2003) has no pagination and seems also in other ways like an unfinished manuscript, e.g., p. 18: "Discussion of classification: [This will be a

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discussion of the kind of epistemological framework that this type of classification imposed (e.g., encyclopedic, rational, universal, Anglo-American, "scientific."]. Also, it is not registered in WorldCat. Although it is rather different from Hedstrom and King (2006), it may perhaps be considered an initial version of the 2006 chapter.

16. The *Oxford English Dictionary* writes: "*Etymology:* < classical Latin *mūsēum* a place holy to the Muses, a building set apart for study, especially the institute for philosophy and research at Alexandria < ancient Greek *μουσεῖον* a place holy to the Muses, in Hellenistic Greek also a school of art or letters, an institute for philosophy and research, especially that at Alexandria, use as noun of neuter of *μούσειος* of or belonging to the Muses < *μοῦσα* MUSE *n.*[1] + *-είος* , suffix forming adjectives ... " Bennett (1995, 92): "Let me now turn, in the light of these considerations, to the origins and early history of the public museum, an institution whose distinguishing characteristics crystallized during the first half of the nineteenth century. In doing so I shall foreground three principles which highlight the distinctiveness of the public museum with respect to, first, its relations to the publics it helped to organize and constitute, second, its internal organization, and, third, its placement in relation both to kindred institutions as well as to those – both ancient and modern – to which it might most usefully be juxtaposed". See also Findlen (1989) about the etymology of *museum* and Simmons (2017) about the history of museums.

17. The concept of "physical object" as the name for what is collected by museums (in contrast to libraries and archives) is somewhat teasing in that all kinds of documents are physical objects. A book, for example, is also an object. Libraries have been called "museums of books" (e.g., by Goode 1889), which is sometimes a proper term, e.g., for libraries concerned with the history of books, collecting examples to illustrate the history of books. It is a less proper term for most kind of libraries, for which the content and subject matter is the main issue, including libraries collecting literature about book history as a field. As Braziūnienė (2018) wrote, the development of book museums is closely related to the development of book studies (whereas the development of libraries in general is connected to all fields of knowledge). Sometimes the term *musealia* or *museological object* is used instead of *physical object*, but this involves a circular definition: If museums are defined by collecting musealia, and musealia are defined as the things collected by museums, then we have not been given any information about what characterized the objects that are being collected by museums. An aspect of the difference is that museum objects are mainly

communicated by exhibitions, while library and archival documents are mainly communicated by loans, copies, or electronic access. Books and manuscripts may be communicated as museum objects by being kept in display cases. Desvallées and Mairesse (2010, 61) wrote: "The object is not in any case raw, reality or simply a given item which it would be sufficient to collect, for example, to be part of a museum's collection, as one would collect seashells on the shore. It is an ontological status which, in given circumstances, a particular thing will assume, on the understanding that the thing would not be considered an object in other circumstances. The difference between the thing and the object lies in the fact that the thing has become a concrete part of life and that the relationship we have with it is a relationship of affection or symbiosis."

18. While we argue that libraries and museums are more closely related because of their roles for learning and that their objects should also be considered kinds of documents, Bates (2007) argued otherwise. Discussing what to include in the information disciplines, she wrote: "But what about museum studies? Is it not different— a discipline focused on things, rather than recorded information? Well, yes and no. Museum studies is rather like a cousin to library science and archives, rather than a sibling. A way to show both the family relationships and the differences between museum studies and the other disciplines is to begin with what we might call the "collections disciplines." [...]. To do that, many of the same issues arise with museum management that arise in any other institutions dealing with collections— acquiring, registering, organizing, preserving, securing, and displaying its collection to suit its objectives. It is in these senses that museum studies resides in the same family as the other information disciplines. However, museum studies is more like a cousin than a sibling, because it collects objects, artifacts, and specimens, rather than documents, for the most part. In recent years, that distinction has been fading a bit, because increasing portions of museum collections are being digitized, placed on websites, and made viewable and searchable online. Thus, at least part of museum collections in many cases are now documents (images). Thus, because museum studies is a member of the family of collections disciplines, and because it seems to be marrying into the document branch of the family of late, it has been included in the definition of the coverage of the encyclopedia."

19. Geismar (2018, xv): "object lessons are arguments about the world made through things. They are educational, performative and fundamentally material. As Lorraine Daston [2007, 16] describes, object lessons are ideas brought into being by things, not just as com-

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municating vehicles, but as sites of meaning animated by their materiality. Museums are the perfect sites for the production and dissemination of object lessons."

20. Among the many terms used about LAMS as a generic term can be mentioned:
    – Hedstrom and King (2003) were, as far as we are aware, the first to use the acronym *LAM*, and today it seems to be the preferred term. Other acronyms are: *ALM* (archives, libraries and museums, see Larsen 2018), *BAM* (Kirchhoff et al. 2008), *GLAM* (Davis and Howard 2013; Lewi et al. 2020) and *LAMMS* (libraries, archives, museums, monuments, and sites, see Gwinn 2009). ELIS (Bates and Maack 2010) used "library and information sciences" (in the plural) as a generic term including AS, MS, LIS, and many other fields, while LIS is termed "library and information science" in the singular (Estabrook 2010).
    – The documentation movement preferred the term *documentation center* (see Section 2.3.1).
    – Hjerppe (1994) coined the term *memory institutions*, which, followed by Dempsey 1999 and others became the most commonly used term as a practical term including libraries, archives and museums in the first decade after the turn of the century.
      Hjerppe (173) used the term to include "'libraries, archives, museums, heritage (monuments and sites) institutions, and aquaria and arboreta, zoological and botanical gardens.'". Robinson (2012) criticized this term arguing first that a wider variety of organisations, such as schools, universities, media corporations, government or religious bodies could also legitimately be ascribed this title; second, she argued that the term does not reflect how the libraries, archives and museums deal with memory in different ways (which, however, is an argument that can be used about any generic expression).
    – Wilson (2007) used the term *knowledge institution*. Usherwood, Wilson and Bryson (2005) used the term *repositories of public knowledge* (RPKs) but suggested that libraries, archives and museums are some of only a relatively small number of true information organizations.
    – Rayward (1998) used the term *information organizations*, which has been supplemented with information institutions (Smiraglia 2014), information professions (Bates 2015) and "information systems" (Buckland 1991a, 62-65). Buckland (2012, 1) wrote however: "A related problem concerns the analysis of information services. Some progress can be made towards a coherent, unified view of the roles of archives, libraries, museums, online information services, and related organizations if they are treated as

information-providing services (e.g., Buckland, 1991a), but such an approach seems significantly incomplete on ordinary understandings of the providing of information. Public libraries, for example, do more than simply provide information. Here again a deeper or wider or different explanation is needed".

21. Noll (2003, 12) found: "The very term "convergence" is so all encompassing of a large number of concepts that by attempting to be everything, convergence is nothing more than an over hyped illusion. The future can be no more certain than that which is being examined, and thus the undefined and illusionary nature of convergence means that its future is equally undefined and illusionary". Jenkins (2006, 282) wrote: "Convergence: A word that describes technological, industrial, cultural, and social changes in the ways media circulates within our culture. Some common ideas referenced by the term include the flow of content across multiple media platforms, the cooperation between multiple media industries, the search for new structures of media financing that fall at the interstices between old and new media, and the migratory behavior of media audiences who would go almost anywhere in search of the kind of entertainment experiences they want. Perhaps most broadly, media convergence refers to a situation in which multiple media systems coexist and where media content flows fluidly across them. Convergence is understood here as an ongoing process or series of intersections between different media systems, not a fixed relationship.

22. McGowan (2017, 3320) wrote: "The question of definition is one that has exercised many writers on national libraries. Because these libraries can differ dramatically in size and function, their nature is not subject to a straightforward, and short, definition". One development was the trend of supporting nation building by establishing central libraries with national level responsibilities, e.g., the *Bibliothèque Nationale de France* about 1795 (Tucker and Goedeken 2017, 1801). One minimal common characteristic of national libraries today is probably, that a national library tries to maintain a complete collection of publications of national origin or interest and are somehow involved in maintaining a national bibliography. They also often contain important collections of non-published documents, such as letters, manuscripts, photos, etc. They often provide free services for all citizens, e.g., by digitalizing documents that are no longer copyrighted and make the freely available on the Internet. The concept "national library" is also often associated with the terms *royal library*, *legal deposit* and *national bibliography*.

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23. Young and Belanger (1983, 213) defined: "*Research Library*. 1. A library which contains an in-depth collection in a particular subject field (such as a technical library) [i.e., a 'special library'] or in-depth collections in several subject fields (such as a university library or a large private or public library) ["universal library" if it aims to cover all fields]. The collections include primary sources and provide extensive chronological and/or geographical coverage. 2. A *reference library*." Cotta-Schønberg (2012; in Danish) describes the strategic situation for academic libraries and found that the three decisive questions for the scenarios are:
    – To what degree will the print literature disappear from the university library?
    – Will the university library succeed maintaining its role in the mediation of e-books?
    – Will the university library be able to maintain and develop its special support-functions for research?

24. A public library is not defined as a library that is public (because many research libraries and national libraries are also public; we here see a good example of the failure of the principle of compositionality, i.e., the principle that the meaning of a complex expression is determined by the meanings of its constituent expressions and the rules used to combine them). Compared to libraries in general, the concept of public libraries is of recent origin, often dated to the 19th century (see Sessa 2017, 1836), who characterized it as "a public institution supported by taxation, one that opens its collections, facilities, and services, without distinction, to all citizens". This is, however, often also characteristic of many other kinds of libraries, why it may be better to say that public libraries are not just open for all citizens, but are designed for them, and provide broad services local communities in contrast to special services provided by other kinds of libraries. Public libraries may or may not contain archival and museum documents related to local history.

25. Digital libraries (synonyms: "electronic libraries", "virtual libraries", "libraries without walls"), antonyms: "physical libraries" or "brick-and-mortar libraries", are generally not well defined in the literature (e.g., they sometimes include digital archives and museums, sometimes they do not). The literature in the field is mostly about technical issues rather than conceptual ones. Borgman (1996, 4-5; 2000a, 415-6) suggested the following two definitions:
    "1. Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information. In this sense they are an extension and enhancement of information storage and retrieval systems that manipulate digital data in any medium (text, images, sounds; static or dynamic images) and exist in distributed networks. The content of digital libraries includes data, metadata that describe various aspects of the data (e.g., representation, creator, owner, reproduction rights), and metadata that consist of links or relationships to other data or metadata, whether internal or external to the digital library.

    2. Digital libraries are constructed – collected and organised – by [and for] a community of users, and their functional capabilities support the information needs and uses of that community. They are a component of communities in which individuals and groups interact with each other, using data, information, and knowledge resources and systems. In this sense they are an extension, enhancement, and integration of a variety of information institutions as physical places where resources are selected, collected, organised, preserved, and accessed in support of a user community. These information institutions include, among others, libraries, museums, archives and schools, but digital libraries also extend and serve other community settings, including classrooms, offices, laboratories, homes and public spaces."

These definitions seem, however, to neglect a fundamental issue that makes the difference between a physical and a digital library very big, and may render the term "library" misplaced in this context: where the physical library typically has one (or a few) copies of books/journals/documents available in many other libraries, which it makes available to visitors/users at the physical library at no costs (and has paid the publisher for the physical copy), this cannot work the same way in a digital library, because everybody may access it, at the publisher therefore cannot sell multiple copies of the same work. Therefore, either the publisher self makes the work available in its "digital library" (which is therefore rather a digital bookstore) or sell access to libraries for their users (but not for outside users). In the second case the library does not own the document and typically does not maintain a copy but relies fully on providing access to the publishers stored documents (and then are not collecting institutions any longer).

Some documents are not copyrighted, however. Therefore, libraries may digitalize older books and make them freely available to everybody. Again, when one library has done so, there is no need for other libraries to do the same for the same documents. Therefore, such projects tend to be large cooperative projects, not typical activities made by the single physical library, and the term "full-text data-

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base" would probably be a better term than "digital library".

Therefore, whereas physical libraries tend to be distributed and multiple, digital libraries tend to be centralized and fewer in number. Also, as all kinds of documents may be digitalized, including museum objects (if not born digital), the borders between digital libraries, digital archives and digital museums may become blurred, and as already suggested, the term *database* (including picture databases etc.) therefore seems a more precise term than *digital library*? This view was denied, however, by Borgman (1999, 231):

> The term 'digital library' serves as a convenient and familiar shorthand to refer to electronic collections and conveys a sense of richer content and fuller capabilities than do terms such as 'database' or 'information retrieval system'. At the same time, such uses of the term convey a far narrower sense of a library than one of a full-service institution with long-term responsibilities. Predictions by computer scientists of a declining role for librarians in a digital age [...] are predicated on a constrained view of the present and future role of libraries.

We need an explanation, however, how the traditional libraries can evolve to such "a full-service institution with long-term responsibilities" in the digital world given the publishers' "digital libraries" and other fundamental changes for their operations.

Skjerdingstad (2020, 241): wrote: "the paradoxical myth of the digital era: the library is everywhere and nowhere. On the one hand everything seems immediately available on the web, as if the library has expanded to be all over. On the other hand, to delineate the presence or absence of the Internet library is impossible. In our everyday life the Internet library fulfils our information needs, while we at the same time also know that what is most relevant may be hidden behind pay walls or need expert excavation or a physical inquiry".

26. Posner (1940, 161) wrote: "The French Revolution marks the beginning of a new era in archives administration. First of all, the framework of a nation-wide public archives administration was established. The Archives Nationales, originally founded in 1789 as a parliamentary archives office of the Assemblé Nationale, developed under the decree of June 24, 1794 (7 Messidor II), into a central archives establishment of the state, to which the then existing depositories in the provinces were subordinated."

27. See, for example Turton (2017).

28. See, for example, Ricci (2017), Gracy and King (2017) and *Wikipedia*: https://en.wikipedia.org/wiki/Cinematheque

29. The terms "digital archives, digital repositories, and web archives" are often used as synonymous with "digital libraries". *The Internet Archive*, for example, defines itself: "Internet Archive is a non-profit library of millions of free books, movies, software, music, websites, and more". See also the following articles: About digital archives, for example, Theimer (2015); about digital repositories, for example, Bak (2015); about web archives, for example: LeFurgy (2015); Finneman (2019); Milligan (2016).

30. For academic discussions of the concept of "National Museum", its role and development, see Aronsson and Elgenius (2014), Knell (2011), Kutalad (2017) and Wilson (1993).

31. See Impey and MacGregor (1985); Daston (1988); Delbourgo (2017); Paulus (2011).

32. See, for example, Smith (2021) and Putnam (2009).

33. Chang, Annerstedt and Herlin (2015, 16): "An ecomuseum is defined as a kind of museum that is for, by, and about people at home in their environment (Keyes, 1992). This means that an ecomuseum is a kind of museum where people actually live inside the museum and have their daily life in their original environment".

34. Svilicic (2010) discusses the many terms such as online, electronic, web, internet, digital, virtual and cyber museums. Other terms may be added, such as "museum without walls", "wired museum" and "hypermedia museum". Li and Liew (2015) define: "Digital museum is a museum exhibition platform that utilizes computer and information technology, on which cultural relics and historical collections can be preserved and displayed in digital format. It is one of the main outcomes of digital curation." Bowen (2000) is an editorial for two issues of *Museum International* dedicated to online museums. Carrozzino and Bergamasco (2010) studied kinds of virtual installations made in "real" museums. Hoptman (1992) saw the virtual museum as the only real opportunity for presenting a variety of opinions and schools of thought. He wrote (148; italics in original): "Most of the critical factors that will help establish the credibility of a *Virtual Museum* will not reside in the domain of hardware systems. Instead, our biggest challenge will be to reexamine current paradigms and emerging theories of knowledge. This is an essential element in developing new information systems which, unfortunately, is routinely ignored by most managers of information systems and designers of educational programs"; Marty, Rayward and Twidale (2003, 260): "Museum professionals have found that

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information technologies provide a new range of functionalities to enhance what can be done within the museum environment. The possibilities go well beyond simple computer automation, raising fundamental questions about the job of the museum professional, the experience of visiting a museum, and the very definition of what a museum is". Marty and Jones (2007, 8): "The relationship between museums, museum professionals, and museum visitors is constantly involving in response to the changing demands and problems of information organization, access, management, and use in museums. If museums are to remain relevant in the information society, museum professionals and researchers will need to embrace the growing role of museum informatics in the 21st century museum and continue to explore the sociotechnical implications of people, information, and technology interacting in museums." Schweibenz (2019) emphasize that a museum is not just a collection of objects, but also of information about objects, which can be much better managed by virtual museums and remind us that the worth and importance of an institution is not what it accumulates within its walls, but what it sends forth to the world. Sylaiou et.al. (2009) surveyed various types of virtual museums.

35. Erskine (1995, 39): "our knowledge of the [library] building is negligible. Was it part of the Museum or a separate building? Nor is much known of the organization of the Library. There was always a librarian in charge, presumably appointed by the king, since the librarian often acted as tutor to the royal family." MacLeod (2004, 3; italics in original) wrote: "In the precinct of the Library were two institutions, the Museum and the Library itself, with overlapping purposes but separate jurisdiction – a *biblion* (or place of books) for scholars and a *mouseion* dedicated to the Muses".

36. Centers for learning and research also need archives for their internal administration, but this is another matter, that does not make them archives. In the present time such records (e.g., about university administration) are often transferred to state archives, when they no longer play an active part of the administration.

37. Robinson (2019, 12): "Writing in 2007 as Director of the IMLS (Institute of Museums and Library Services, USA), Robert Martin pointed to the shared history of libraries, archives and museums, referencing the ancient library of Alexandria (also called the Mouseion, or Temple of the Muses), destroyed in 48 BCE, as the archetypal 'converged' collecting institution.3" (Note 3: "Much like modern-day universities, the Mouseion was a repository of books, documents and objects, as well as a centre of scholarship.")

38. Martin (2007, 81): "First, we must recognize that all libraries, archives, and museums share a common institutional ancestry. The earliest libraries known to history were in actuality archives. What historians often refer to as "temple libraries" or "palace libraries" were collections of texts (cuneiform tablets) that documented the official religious activities of the temple or the government transactions of the palace court. Later, collections of other kinds of texts were called "museums", in that they were buildings dedicated to honoring the muses. The great library of Alexandria, for example, was in fact called the Museon, a temple to the muses. In practice, there was little practical differentiation between a library and a museum until the early modern period, when the development of typographic printing resulted in a dramatic increase in the volume of texts available, which were then distinguished from a collection of objects, library from museum. The practice of separating official records from other kinds of documents also arose around the same time, developing from the rational bureaucratization of governments."

39. "While cabinets participated in modern taxonomic projects to systematize nature, they also registered and proliferated more imaginative readings of the Book of Nature. Similitude and resemblance were key criteria in the selection of cabinet objects. Zoophytes like sea anemones and coral, and botanical specimens that imitated the human form (mandrakes, digitated fruit) were prized by collectors. In time, an order of nature based on such correspondences between the divine, human, and natural realms would give way to the modern taxonomies of John Ray in the seventeenth century and Linnaeus in the eighteenth or a scholarly approach to organization of the knowledge. The collectors were generally scientists, kings, or other wealthy persons and many of their collections became the foundation of a modern collecting institution."

40. It is correct that Posner (2003, xxxi) wrote "Writing was invented to make past experience available for future reference" but he also wrote (same page) "records are, in their genesis, the tools of administrative endeavor". On p. 14 Posner makes the difference between library and archival records clear. On p. 27 he clearly defined the nature of archival records (as opposed to library documents: "It has been estimated that nine-tenths or more of the tablets discovered are 'economic texts-lists and accounts of the accounting office, [and] purchase, lease, and loan contracts, [28] – that is, archival documents -, and so the institutional genesis of most of the accumulations found is no longer in question". Casson (2001, 2-3) also clearly distinguished archival records and library documents: "The contents of the earliest

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clay tablets are simple notations of numbers of commodities—animals, jars, baskets, etc. Writing, it would appear, started as a primitive form of bookkeeping. Its use soon widened to document the multitudinous things and acts that are involved in daily life, from simple inventories of commodities to complicated governmental red tape. Archaeologists frequently find clay tablets in batches, sometimes batches big enough to number in the thousands. The batches consist for the most part of documents of the types just mentioned: bills, deliveries, receipts, inventories, loans, marriage contracts, divorce settlements, court judgments, and so on. These records of factual matters were kept in storage to be available for reference—they were, in effect, files, or, to use the term preferred by specialists in the ancient Near East, archives. Now and then these files include pieces of writing that are of a distinctly different order, writings that do not merely record some matter of fact but involve mental activity. They range from simple textbook material to creative literature—and they make an appearance very early. Near Nippur in southern Mesopotamia, for example, excavation brought to light a group of tablets, dating to the middle of the third millennium B.C., on which were inscribed lists of geographical names, lists of gods, lists of professions, writing exercises, a number of hymns. They could well be from a collection belonging to a school for scribes, perhaps one maintained by a temple, a collection of works that were kept handy for consultation—in other words, its library."

41. The difference between library materials and archival records quoted by Paulus (2011, 195): Those "directed toward a mass audience" and those "grounded in personal interactions and organizational transactions" corresponds partly to our definitions of the difference between "publications" and "non-published documents". It does not, however, consider the important difference between documents produced as part of administrative processes versus documents produced as part of science and learning.

42. Schupbach (1985, 177-8): "The Cabinet: Against and for. One should not infer from this survey that the cabinet of curiosities was considered an essential part of the house of learning. Some, like Descartes, disliked the whole business of curiosity [94]. Within the academy too there was vacillation and doubt. For one scholar, on the one hand cabinets were vitiated by fakes and misinterpretations, but on the other hand, in view of recent surprising discoveries, what should one not believe?[95]. For another authority, cabinets enabled one to see *exotica* without travelling and therefore performed a useful service, but their exhibits were often unrepresentative or trivial fragments of nature which only wasted time.[96] Galileo ridiculed minor cabinets like that of Antonio Giganti, but only to praise major ones like that of Archduke Leopold Wilhelm. [97] The abbey of Ste. Geneviève in Paris had a cabinet [98] but the nearby abbey of St. Germain des Prés made do without one. [99] For many a scholar, his *museum* meant his library, [100] enhanced by no rarities but by dust and cobwebs. [101] Against these negative judgments must be set the actions of creators of cabinets such as Casabona, van Heurn, du Molinet and Franke, whose desire for certain knowledge was not so consuming as to kill their appreciation of the old, the fragmentary and the enigmatic". The notes for this quote ([94]-[101]) are not reproduced here, but can, together with the bibliography be found in Impey and MacGregor (1985, 177-8 + 281-312).

43. Just as it is common for museums to contain libraries within their organization, it is also common for libraries to contain archives and even small museums. The separation of the LAMs is never absolute.

44. Also, the qualified selection, description and classification of materials mostly depends on the subject knowledge of the staff, and this knowledge often crosses the formal criteria used to distinguish L, A, and Ms.

45. Another argument for separating national libraries, is that they did not select materials based on relevance criteria (and thus presupposing subject knowledge) but used to collect printed materials according to legal deposit requirements. Formerly, when printing presses were few and all well known to the given national library, the materials were simply mechanically collected of each unique printed sheet of paper from each printer. But such mechanical collection principles in libraries are the exception, not the rule, and although still important, they have run into difficulties, first by the spreading of new printing opportunities, and then by the tendency to disseminate documents via the Internet.

46. The principle that classifications used in LAMs as a principle are based on scientific/scholarly classifications should not, however, be confused with the issue about monism versus pluralism in scientific classification. Monism represents the view that there is one correct classification, pluralism that different classifications may be justified because they serve different purposes. Pluralism does not imply that librarians, for example, are free to design a classification, that any classification is as good as another.

47. Following the principle of literary warrant and because of its massive literature, organic chemistry is separated from inorganic chemistry in BC2, and acknowledges the well-established division of the subject into inorganic and organic chemistry and not place it as a special

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set of subclasses following CLM Carbon, where it appears in the sequence of elements in their periodic table groups (Mills, Broughton and Coates 2012, xxiii-xxiv).

48. The use of museums and public libraries are generally divergent, however, in the sense that a library visit often is an individual act, whereas the museum experience usually is a social event (Trant 2009; Falk and Dierking 2012).

49. Although Robinson (2012) found that the "traditional archival imperative is to avoid placing layers of interpretation on the collection", she agrees with Cook (2009), saying that the archivists are not only custodians, but they are also, to some degree, co-creators of the archive. Unlike archives, an encounter with a museum collection is a highly mediated experience. According to Robinson (2012, 422): "the distinctive value of museums is their ability to contextualize collection objects within a broader thematic and narrative grouping – enabling visitors to engage with more complex ideas about history and memory".

50. A version of this thesis was published as Miller (2003).

51. Sweeney (2008, 196-7): "Subject classification battled it out with provenance for most of the nineteenth century [*]. As long as public archives did not look after current records, it was possible to employ subject classification. Giroux noted: "In Spain, the *Archivo Historico Nacional*, created in 1866, dealt exclusively with the records of defunct organizations. In England, the *Public Record Office*, created in 1838, went decades without regularly acquiring new records. In France, under the new Napoleonic regulations, records were to be kept in administration for 40 years before being considered for transfer to archives" [Giroux 1998, 42-43]. The weakness of subject classification for records is that it is impossible to maintain a consistent classification scheme for any length of time when records are added [Giroux 1998, 38]. Giroux also has pointed out that if archivists misclassified a document employing subject classification, it could be effectively lost. Or, if archivists were inconsistent in their analysis, documents with a common subject could be dispersed within a repository. [Giroux 1998, 46]. One of the most fundamental objections to subject classification, however, is that records rarely provide information on only a single subject. By classifying documents or even a single document by a single or even a few subjects, one is obscuring other subjects contained in the material. And certainly, by breaking up fonds into subject categories, one destroys the context of the records' creation, thereby negating or eliminating many of the qualities researchers seek in the records. Giroux credited the growth of historicism and the rejection of the mechanistic worldview of the Enlightenment as the spur for the fi-

nal break from subject classification. [Giroux 1998, 54]". * [Sweeney 2008, note 23]: "A number of authors have argued that when archives were decentralized, they followed the principle of provenance because each government department or organization kept its own records. See, for example, [Posner 1967, 25 = Posner 1940, 161]."

52. This principle, that the same document needs only to be described, classified, and indexed once and for all by a central agency (today the dominating central agency is *Library of Congress*) is seldom discussed in the literature, but it contradicts the principle of "request oriented indexing" or "policy-based indexing", see Hjørland 2017, Section 2.4: https://www.isko.org/cyclo/subject#2.4. Ketelaar (2014,20-1) emphasized the same issue: "However, the meaning of a record or of any other cultural artefact may be understood in two different ways: the meaning <u>of</u> the object and the meaning <u>for</u> someone or for an occasion. The first views "the" meaning of an artefact in objectivist terms as the Idea (in the Platonic sense) of that artefact, which can be inferred from the object by whoever approaches it. The Latter recognizes in subjectivist terms "that information resources do not 'have' meanings, but that different meanings are assigned to. the same resource by different people at different times, and that 'the' conventional meaning of a given resource is a matter of intersubjective consensus." [Furner 2010, 4155-6; see also Meszaros, Gibson and Carter 2011, 43-6] Meaning is something made, not found. [Duff et al. 2012] Any researcher, viewer, or user by assigning a meaning to an object, can find uses (or, vice versa, finding a use by assigning a meaning) that no creator, collector, archivist or curator ever imagined. The object is thus standing-in for the meanings people find in it. Of course, an archival document, a book, a museum object, a painting has an authorial meaning given by the author, the sculptor, the painter."

53. In some countries, for example, in Denmark, the national bibliography is not produced by the national library alone, but primarily by other institutions (in Denmark: Danish Bibliographic Centre, DBC). This fact does not, however, reduce the importance between the relations between library cataloging and the developing and maintaining of the national bibliography.

54. Wright (2014, 101): "Instead of printing books and journals on paper, Otlet envisioned that one day publishers would publish their contents directly onto index cards as 'autonomous elements' that could slot neatly into the catalog, ready for future scholars to retrieve and reuse in new forms. In 1907, he persuaded the Belgian Sociological Society to produce one of its publications directly onto index cards. The catalog would be-

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come more than a repository; it would become an active tool for the production of knowledge". See also Rayward (2013, 6).

55. http://web.archive.org/web/20190428121852/https://about.google/intl/da/

56. By evoking the concept "virtual cabinets of curiosities" it has to be considered that images of objects are not the same as the objects themselves. For traditional museums, this would be an issue.

57. Considering the literature, we must distinguish ideas and realities, and among the realities between the short lived and the more viable projects. An example of an inspiring, but unfortunately short-lived project is NOKS ("Nordjyllands Kulturhistoriske Søgebase" in English: The Cultural Historical Database of the North of Jutland in Denmark), which is an example of a regional level where nine libraries, archives, and museum in the North of Jutland created a database containing different kinds of digitized printed materials, audios, photos, and films (Hedegaard 2004; Hedegaard, Hellum and Topholm 2005). The project was closed down 2011 due to lack of funding ttps://da.wikipedia.org/wiki/Nordjyllands_Kulturhistoriske_S%C3%B8gebase

58. In Denmark public libraries created their own music service, Bibzoom, but most public libraries found it too expensive and left Bibzoom and recommended instead the commercial streaming services to their users.

59. Ketelaar (2014, 33) "let's not be blind to the differences between for example digital publications and electronic records, differences due to distinct processes that result in the creation of digital publications and electronic records. As Library and Archives Canada has found out, convergence through combined digital asset management is possible. But 'Beyond such systems procedures, the ingest of digital information assets, more generally, is a point of divergence in the acquisition and management of digital publications and electronic records. [Bak and Armstrong 2008, 284]' Divergence is inevitable because "digital publications and electronic records differ in many particulars, including their descriptive metadata requirements, their volume and, in many cases, their logical file formats [Bak and Armstrong, 291]".

60. MyHeritage provides access to archival records such as birth registers, parish registers, social security administrations, censuses, and much more, which are integrate with information from printed sources; the users may upload other kins of information too, including photos, DNA information and biographies.

61. For a non-exhaustive list see https://en.wikipedia.org/wiki/Category:Aggregation-based_digital_libraries

62. Bak and Armstrong (2008, 279): "In 2004, Canada's national library and national archives merged to form *Library and Archives Canada* (LAC). LAC has become more than the sum of its parts, creating synergies between library and archives collections and services, realizing efficiencies and satisfying user demands for seamless access to all holdings. LAC has already created and launched Fed Search, an online search tool that provides clients with single search access to library, archives and online collections. LAC is in the process of building a Trusted Digital Repository that will combine ingest, preservation, management and dissemination services for archives and library collections." Unfortunately, however, LAC faced severe budget cuts since 2004.

63. *Deutsche Digitale Bibliothek* (DDB) was launched in the full version in 2014. A former version was the *BAM-Portal* (Kirchhoff, Schweibenz and Sieglerschmidt 2008), which, contrary to the terminology suggested in the present article, described it as "the convergence of libraries, archives, and museums in Germany from traditional brick-and-mortar institutions to a digital memory institution on the Internet". It is a virtual library in the German language which networks 30,000 cultural and research institutions and aims to make millions of books, films, pictures, and sound recordings freely accessible on the Internet to the public using a common platform. The aim is to integrate the DDB into Europeana at the European level and is a project acting in conscious competition with Google.

64. Cathro and Collier (2009) wrote about Trove: "Late in the project this new service was given the name 'Trove' – meaning a 'treasure trove', defined in one dictionary as a 'collection of valuable or delightful things. The name derives from the French "trouver", a verb meaning to find, or to discover". The name thus suggests the three concepts of (1) a collection, (2) of treasured or valuable collection items, and (3) the process of discovery. This portal contains more than 500 million online resources: books, images, historic newspapers, maps, music, archived websites, etc. Trove is not only an access point to a huge collection of Australian heritage, but also an invitation to participate. As a user, you can tag or comment the online resources, upload pictures, and create your own special collection. GLAM Peak Bodies (10 March, 2016) wrote: "Since its release in 2010, Trove content has increased exponentially. There are now 471 million items in the digital collection, with more than 20 million unique users each year. This demonstrates the enormous appetite for cultural content to support education, research, industry, community and especially the arts and creative industries. A consequence of the 2015 Mid-Year Economic and Fiscal Outlook Statement is that libraries, museums, archives, historical societies and smaller institutions

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across Australia will be unable to add their digital collections to Trove without paying. This will hamper the development of our world leading portal and will be a major obstacle to exposing the collections of smaller and regional institutions. Without additional funding, Trove will not fulfil its promise as the discovery site for all Australian cultural content."

65. The problem of disregarding contexts for information retrieval and query formulation can be illustrated by an example: If you search for "lead" in the psychological database PsycINFO, you may assume that all records are about the influence of lead on behavior and psychological processes, which therefore should not be part of the query. However, when merged into an interdisciplinary database, most records found by the keyword "lead" will not be about influences on behavior and it is necessary to include this in an inquiry about the impact of lead on psychological processes, which, however, may cause some relevant records to be excluded. In this way, any search must take the context into account to understand the content of the collection/database.

66. The homepage of the Australian Albury Library is https://www.alburycity.nsw.gov.au/leisure/museum-and-libraries/locations/librarymuseum.

67. The view that the development of LAM institutions should be driven by research seems to conflict with the view presented by Klimaszewski (2015). She described researchers as "outsiders" (together with grant-funding agencies and policy makers) (360) "based on the generally accepted split that separates research from practice". She further found that different narratives emerge based on whether authors are "insiders" (practitioners) or "outsiders", where outsiders were the ones emphasizing the similarities whereas insiders emphasized the differences among the LAMs.

68. In the *Encyclopedia of Library and Information Sciences*, ELIS (Bates and Maack 2010), AS and MS are sub-themes (and provides articles written by authors related to many disciplines, including AS and MS), just as the *ISKO Encyclopedia of Knowledge Organization* (IEKO) features articles on, for example, "Provenance" and "Nomenclature for Museum Cataloging". Conversely, *The International Handbooks of Museum Studies* (Witcomb et al. 2015) and the *Encyclopedia of Archival Sciences* (Duranti and Franks 2015) do not see the other research fields as sub-themes nor feature articles on the other LAM institutions. (This apparent skewness is perhaps just reflecting that ELIS and IEKO are intended as interdisciplinary works, which include archivist and museum scholars among their authors). ELIS (Bates and Maack 2010) is somewhat paradoxical by using the same term as both a generic term including

AS, MS and many other fields, as well as about one of these fields (LIS) although (although the generic term is in plural "sciences", while the one about LIS is in the singular "science").

69. Kline (2015, 109) wrote: "'Technological determinism' is a term used to describe a set of claims made about the relationship between what we generally call 'technology' and 'society.' Two meanings have come into use: (1) an internal, technical logic determines the design of technological artifacts and systems; and (2) the development of technological artifacts and systems determines broad social changes. The second claim is much more common and is often associated with debates over Karl Marx's theory of history. But the two meanings are often conjoined in the claim that an autonomous technology (in both its development and use) shapes social relations. Other claims are less strong and express the belief that technology is a major cause, but not the sole determinant, of social change. Although scholars have argued for many years against the strong version of technological determinism, the general belief that technology is a major force shaping society, which dates to the early nineteenth century, still pervades popular culture in the United States and Europe. Ironically, critics of the harmful effects of technology tend to reinforce the strong claims of technological determinism. Methods developed to analyze the social construction of technology have moved the debate from questions like 'does technology drive history?' to arguments about a mutual relationship between technological and social change. New research recommends taking technological determinism seriously in order to understand its justificatory role in developing and using sociotechnical systems." Peters (2017, 10) "This essay offers both a genealogy of the concept of technological determinism and a metacritique of the ways academic accusations of fallaciousness risk stopping difficult but essential kinds of inquiry. To call someone a technological determinist is to claim all the moral force on your side without answering the question of what we are to do with these devices that infest our lives". And (10-11; italics in original): "Whatever *technological determinism* is, it is one of a family of pejoratives by which academics reprove their fellows for single-minded devotion (or monomaniacal fanaticism) to their pet cause. At least since "sophist" was launched as a slur in ancient Greece, it has been a regular sport to contrive doctrines that nobody believes and attribute them to one's enemies." See also Wyatt 2008.

70. See Pryor and Towell (2014).

71. The quote is translated part from a job announcement in 2008: http://web.archive.org/web/201105261303 37/http://www.dbf.dk/Default.aspx?ID=5347

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72. The ordinary meaning of the term *book* is a paper-medium consisting of written pages or images, which is composed of many pages, which are bound together and protected by a cover. The word has several other meanings, however. In book history and literary studies, the meaning is broader, including handwritten paper scrolls, e-books, and sound books. Rose (2017) describes the history of the book (and thus the concept "book") very broadly to encompass: "all kinds of documents, including manuscripts, periodicals, newspapers, and ephemera." It seems better however, to use the term "document" in this broad sense, at understand "book" as a narrower term for one family of documents.

73. Audunson et al. (2020, 12, note 10) wrote: "According to Habermas (1989[1962]), the public sphere is a sphere in-between and independent of the private sphere, the market, and the state. In the public sphere, citizens come together to discuss issues of common interest and a public opinion can be formed. The public sphere is a sphere where rationality prevails, and the participants are committed to the value of the better arguments. It is an open sphere, where participants meet on an equal footing – as citizens – not according to rank and status in a hierarchical system." And (12-13, note 11): "Our research indicates that the Habermasian understanding of the public sphere as an arena for forming a public opinion rather should be rephrased as an arena for forming public opinions, i.e. stressing the plural. Through a civilized and respectful public discourse, we refine the opinions we started out with, and we learn to respect and accept the opinions of others, but we do not – maybe we should add hopefully not – develop a, in the sense of one, common opinion."

74. Today the German national bibliography is subdivided in seven series, but still upholds the distinction between publications in and outside the book trade. Deutsche National Bibliothek (2021).

75. Bazerman (2020) and Daum (2009) considered "public knowledge" in the broader societal perspective, not limited to narrow scholarly communities.

76. The demand that researchers must know the relevant literature on the topic they are investigating, is not just a demand put on the individual researcher, but also a demand that all researchers must have a well-organized information infrastructure, that makes it possible to identify the relevant literature, including well-functioning libraries.

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Appendix 1: Some core concepts

Appendix 1.1 Document

Ordinarily, the term *document* is used for written texts, often of legal importance, such as a birth certificate. This meaning is, however, narrower than the original meaning as something that documents a claim. The documentation tradition in library and information science (LIS) developed the concept more in correspondence with the original meaning. A basic motivation for this is that the traditional object for libraries, books,[72] became too narrow, as libraries also collect serials, and other print documents and later documents in other media (microfilm, audiovisual documents, and electronic documents). Also, the documentation movement went beyond libraries. A famous definition by Suzanne Briet (1951, 7; here cited from Buckland 1991a, 47) is: A document is "any concrete or symbolic indication, preserved or recorded, for reconstructing or for proving a phenomenon, whether physical or mental". One of Briet's examples of a document was an antelope, as cited from Buckland (1991a, 47): "A wild antelope would not be a document, but a captured specimen of newly discovered species that was being studied, described, and exhibited in a zoo for educational and research purposes would not only have become a document, but 'the catalogued antelope is a primary document and other documents are secondary and derived' (Briet 1951, 8)." See further in Buckland (2018) and Latham (2012). This broad understanding of the term *document* is important for the present article, because it defines a common fundamental concept for the LAMs: all three are organizations collecting or mediating documents, and all such mediation may be understood from a semiotic perspective, which therefore provides a common theoretical frame of reference. It was, however, opposed by Bates (2007), who wrote: "Though we may develop meaningful understandings from observing the antelope, the animal was not created to communicate or memorialize anything. Its socially mediated status is as a specimen, not a document".

Appendix 1.2 Print

As mentioned above, in library practice, the term *publication* has for a long period been considered a near-synonym for "printed material". Sauerberg (2009) coined the last 500 years "the Gutenberg parenthesis" to express that electronic media after print begin in certain ways to resemble the non-print documents before Gutenberg invented printing. This point was also made by Buckland (1991a, 65):

> The move toward electronic texts may move the situation back in the direction of the manuscript era where there could be a multiplicity of copies that are not necessarily quite the same and the relationships between them and their authenticity become unclear. Perhaps this important distinguishing characteristic of libraries is a temporary one, based on a particular information technology, printing, characterized by mass production.

It may be, however, that we have learned the lesson about sources criticism and therefore will maintain mechanisms to secure the authenticity of publications, for example, by acknowledging publishers' final versions in PDF format. However, the quote makes clear that we need to consider the concept "publication" separately from a particular information technology.

Appendix 1.3 Publication

The meaning of the term *publication* is "a document that has been made public", but what does "made public" mean? The antonym for public is "private". Private knowledge may be what only one person knows (whether in the head or written down). It may be, for example, a recipe for a new cake. This recipe may be shared with a spouse, with the broader family, with all acquaintances etc. What criterion should define when the recipe is made public? It is probably not the number of people knowing it that is the most important. Rather it is that people with different interests have access to it, that it is open to be used, tested, criticized, and discussed by everybody, not just by a selected group (e.g., knowledge shared by members of sects or secret societies should not be considered public, independently of their size). The concept "the public sphere" should be mentioned in this context because it plays an important role about the theory of LAMs by certain authors.[73]

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All spheres of human activity, including science and politics are nourished by dialogue, which presupposes public knowledge. Therefore, public knowledge is probably one of the most basic concepts for both democracy and science. (In our example with a recipe, it may, for example, be criticized from nutritional and ecological perspectives). It is not necessary, for example, that documents are (or have been) for sale in the book trade. This can be seen in the German national bibliography, which from 1931 to 1990 is subdivided into Series A (new publications from the publishers' book trade) and Series B (new publications from outside the publishers' book trade).[74] There is a difficulty here, because "made public" should not mean that unique documents are made publicly available, for example, in archives: they are still unica, and it would confuse things to consider them "publications". Because archival records and museum objects are unique each institution must do the cataloging, whereas the libraries can share bibliographical records, because they share identical documents with other libraries.

When documents are born digital or are digitalized and made publicly available on the Internet the concept of publication becomes yet more difficult. It is a further confusing issue that books, journals, and other library materials are increasingly not kept by the libraries themselves, but often only exist only in the publisher's database, to which libraries provide online access for the users. This has been expressed as a trend in research libraries developing "from collections to connections" (e.g., Audunson and Aabø 2013); from that perspective, they are no longer collecting institutions! Such difficulties evoke the need for a better definition of the term *publication* (and *publishing*).

A serious and impressive attempt to develop a theory of publishing is done by Bhaskar (2013). He sees publishing (34) "as a comprehensible, continuous, but nonetheless changing system", which is about content, market making, making public, and an element of (commonly financial) risk. The publishing process is an active contributor in transforming and mediating the content. Important processes include "filtering" and "amplification". The importance of filtering is growing because times have changed from scarcity to abundance of documents. The purpose of amplification is to get exposure for the content: (115): "[I]f 'making public' is intangible to the point of uselessness, amplification is a definite, traceable process with results that are all too tangible in the increased consumption or awareness of a given work".

Perhaps, we may conclude that to be a publication is not an all or nothing phenomenon: there are levels of visibility and of being public. Records in archives (whether online and open access or not) gets increasing visibility if they are used by historical researchers to provide a well-researched and coherent argument and narrative about some topics and integrated in a new document, which again may have

different levels of being public, from "grey literature" (or "semi-publication"), over a local publication with limited visibility to publication by a journal or book publisher with high visibility (including indexing in leading international databases such as MEDLINE or *Web of Science*).[75] Given this understanding of "publication", archives and museums may be understood as providing raw material for scholarly work which is then primarily covered by libraries. Of course, all LAMs also exist to serve the broader public directly. Archives are used, for example, by many people to do genealogical research and museums for experience the authenticity of important cultural objects.

Appendix 1.4 Literature

In continuation of the conclusion about publications, the term *literature* is relevant. Scholars and scientists often distinguish between what exists in the literature and what does not. It is often a goal to make information available in the literature (i.e., to publish it). It may also be a demand that researchers know what has been published concerning the topic they are researching (this is perhaps a utopian demand on the one hand, but, on the other hand, this demand is nonetheless deeply related to the norm, that researchers must provide new knowledge, and this can only be done by knowing the relevant literature).[76] The term *literature searching* is an important function for libraries to support, and it probably represents the core expertise of librarians, documentalists and information specialists, although, today the term is often replaced by terms like *information searching*, *information seeking* and *information retrieval*.

In the discussion of the concept "publication", we mentioned the concept "grey literature" (also called "semi publication"). Schöpfel and Farace (2010, 2029) wrote:

> There are several definitions of grey literature, the most common being the so-called 'Luxembourg definition', which was discussed and approved during the Third International Conference on Grey Literature in 1997: '[Grey literature is] that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers." In 2004, at the Sixth International Conference on Grey literature in New York City, a postscript was added to the Luxembourg definition for purposes of clarification "...not controlled by commercial publishers i.e., where publishing is not the primary activity of the producing body".

Grey literature may be included in libraries (sometimes as special collections or archives) or they may be included in archives or institutional repositories (often as online data-

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bases of publications by their members and can include publications by faculty and student dissertations and theses). The so-called "clearinghouses" (Marron 1971) may be a central kind of institution collecting and dissemination publications as well as grey literature, such as the well-known clearinghouses under the *Educational Resources Information Center* (ERIC) in the USA. Grey literature represents a category of documents falling between libraries and archives.

Appendix 1.5 Record

The word *record* has different meanings. In computer science, for example, it is used about items in a file that are handled as a unit (e.g., a bibliographical record). In this article, the meaning in archival science is the most important. Yeo (2015) discusses its different meanings in this domain and quotes the definition from ISO 15498, the international records management standard, which is widely used:

> Records are "information created, received, and maintained as evidence and as an asset by an organization or person, in pursuit of legal obligations or in the transaction of business".

In other words, records in archival science are a certain kind of documents, which tends to differ from the kinds of documents collected by libraries and museums by being more related to administrative practices. It is obvious that the dividing line is often blurred, letters, for example, may at the same time be related to administration and to science, culture, and learning, and are found in archives as wells as in libraries, often based on random circumstances. Letters and manuscripts by authors (scientists, writers, philosophers) are often kept in (national) libraries, whereas letters from officials are mostly kept in archives, but both kinds of institutions may often see the same letter as falling within their sphere of interest. See also Pearce-Moses (2005, 326-7).

Record management is described by McLeod and Lomas (2015, 346; italics in original): "A centuries-old practice, yet a twentieth-century construct, record management is concerned with the processes and controls for the creation, capture, and management of an organization's *records* to support that organization's operations. It is also the term used for the professional practice of managing records. Its relationship with *archival science* has been the subject of much debate over the last century, and perspectives on this remain divided". (See also Benedon 2017).

Appendix 1.6 Information

The term *information* became influential after the 1950s. As pointed out by Kline (2004, 19): "Called bibliography, documentation, and scientific information during the first five decades of the twentieth century, the field became known as information science in the early 1960s". The importance for the issue discussed by the present article can be understood by the tendency to consider LAMs kinds of information organizations or systems, for example, by Rayward (1998, 207) who called the LAMs "information organizations" and by Buckland (1991a, 62-65), who consider LAMs kinds of information systems.

There is also a tendency to define libraries as stores of information. Keller, Reich and Herkovic (2003) wrote: "the library is, at root, a collection of information selected for use of, and made useable for, a particular community", while Borgman (2000b, 38) wrote: "Librarians tend to take a broad view of the concept of a library. In general terms, they see libraries that select, collect, organize, conserve, preserve and provide access to information on behalf of a community of users".

These definitions of the library seem not only to be imperialistic by implying that libraries and librarians can deal with all kinds of information. They seem also to be reductionist in a way that is harmful for the understanding of each of the LAMs (including the self-understanding of librarians). The use of the term *information* tends to be associated with information technology (IT) rather than with the specific documents and their social, cultural and scientific importance, and this tendency has been present from the 1950s when the terms *information storage and retrieval* and *information science* became influential. In other words, just as the documentation tradition consider LAMs united by the term *document*, the information tradition considers the same institutions united by the term *information*.

However, these two attempts to find common grounds between the LAMs are not identical and there has been serious criticism about substituting "document" with "information" in relation to LAMs. Spang-Hanssen (2001) traced much of this problematic tendency in the influence of Shannon's "information theory" (which was later abandoned in relation to LAMs). Spang-Hanssen shows how "information" is often used for "documents", for example speaking about an "information explosion", when what is measured is the growth of produced documents. He argues that there is no basis for believing that people become more informed by the growth of documents (as suggested by the term *information explosion* because "information" presupposes that somebody is being informed about something). Spang-Hansen suggested that the continuing use of "information" in this area is related to the prestige it invokes rather than to serious scholarly arguments for using it (another important article for preferring the concept "document" for "information" is Ørom 2007).

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Appendix 1.7 Cultural heritage

Bentkowska-Kafel, Denard and Baker (2012, 261-2) referring to the internationally coordinated attempts to establish core principles and guidelines for computer-based visualization of cultural heritage known as The London Charter defined:

> Cultural heritage. The London Charter adopts a wide definition of this term, encompassing all domains of human activity that are concerned with the understanding of communication of the material and intellectual culture. Such domains include, but are not limited to, museums, art galleries, heritage sites,interpretative centres, cultural heritage research institutes, arts and humanities subjects within higher education institutions, the broader educational sector and tourism.

The term *cultural heritage* (or *cultural heritage institution*) is increasingly associated with information, informatics, LAM institutions etc. Vecco (2010) describes the development of this concept in West European states. The concept is applied by, for example, Davis and Howard (2013), Dempsey (1999), Latham (2015), and Marty (2014). It is related to the field of information studies (see. e.g., Ruthven and Chowdhury 2015), but the relation is difficult to describe. Information studies may be broader by including concepts related to, for example, scientific information (cultural heritage being only one category of information). *Cultural heritage* is also used in phrases such as "cultural heritage studies" and "cultural heritage professionals".