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Cataloging 2.0 and collaborative metadata enrichment in GLAM institutions: a systematic mapping in the field of Knowledge Organization

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Abstract

Cataloging in GLAM institutions has historically been based on technical-normative models that guarantee standardization and interoperability, but which can limit the contextualization of culturally diverse collections. Faced with these limitations, cataloging 2.0 emerges, driven by interactive digital environments and multiple descriptive sources. Within this scenario, social cataloging is understood as a technical-methodological strategy that operationalizes mechanisms for collaboration and controlled user contribution in the production and enrichment of metadata. Given this context, this study seeks to understand how cataloging 2.0 approaches, with an emphasis on social cataloging, can contribute to improving descriptive cataloging and informational contextualization in the collections of GLAM institutions. The general objective is to analyze the potential of cataloging 2.0 to expand the coverage and contextualization of descriptive records in these environments. As specific objectives, it proposes to discuss the potential of cataloging 2.0 in the context of GLAM institutions; This study aims to describe the challenges and limitations of applying Cataloging 2.0 in GLAM institutions. The research adopts a quantitative-qualitative, exploratory, and descriptive approach, based on a systematic literature review conducted using the StArt tool, drawing from the databases Library, Information Science & Technology Abstracts (LISTA), SCOPUS, Web of Science (WoS), and Taylor & Francis. The results reveal a scarcity of empirical studies and implementation reports in GLAM institutions. It concludes that there is a need for further investigations that examine, in greater depth, the impacts of Cataloging 2.0 practices and social cataloging on metadata quality, information retrieval, and the construction of more participatory knowledge organization systems within GLAM institutions.

1.0 Introduction

Memory institutions (galleries, libraries, archives, and museums), grouped under the acronym GLAM (Galleries, Libraries, Archives, and Museums), play a central role in the organization, preservation, and access to the informational and cultural heritage of societies. In these organizations, cataloging constitutes one of the main mechanisms for producing descriptive records, defining access points, and ensuring the sustainability of information retrieval systems; that is, it is an activity that goes beyond the simple description of objects, directly influencing data modeling, interoperability between systems, and information access.

Throughout history, cataloging in GLAM institutions has been structured based on normative and standardized models, developed to ensure consistency, bibliographic control, and interoperability of records. These models, anchored in consolidated principles of cataloging and Knowledge Organization, have significantly contributed to the organization of institutional collection systems and to the integration between distinct databases.

However, by adopting universalizing structures and rigid descriptive schemes, such models may present limitations regarding the retrieval of specific contexts, semantic singularity, and the informational contextualization of heterogeneous collections. Within this context, the technical-normative centralization of cataloging begins to be problematized as it is recognized that the processes of description and representation are not neutral.

The terminological, classificatory, structural, and descriptive choices involved in cataloging processes stem from technical guidelines oriented by consolidated standards, controlled vocabularies, and predefined classification schemes. While these decisions are fundamental to ensuring standardization and the reliability of records, they also condition how informational objects are described and retrieved. Cataloging models then play a key role in the systemic organization of collections and in the efficiency of information retrieval in GLAM environments.

However, in light of contemporary technological and informational transformations, especially within digital environments, there is an expansion of strategies aimed at enriching metadata and increasing the flexibility of descriptive processes in these digital environments. In this scenario, the term cataloging 2.0 emerges; this concept becomes associated with such developments because it incorporates into its practices the resources of Web 2.0, along with participatory architectures, multiple sources of descriptive data in cataloging systems, and interactive interfaces.

Cataloging 2.0 is not characterized by the replacement of normative models, but rather by their expansion, allowing for greater extensibility and contextualization of informational records in digital environments. Within this theoretical-conceptual framework, social cataloging is configured as one of the technical-methodological strategies of cataloging 2.0, guiding the incorporation of contributions distributed throughout the metadata enrichment process. These contributions, when integrated into curation and evaluation flows conducted by professionals working in the information field, enable the complementation of descriptive records, expanding the semantic coverage and

contextualization of informational records. In this context, social cataloging acts as a mechanism of controlled extensibility, capable of articulating external contributions to consolidated normative structures without compromising the internal consistency of the data, the interoperability of the systems, and the technical principles that underpin the organization of knowledge.

In this way, the problem does not lie in the opposition between normative models and social collaborative practices, but in the need to articulate technical rigor with descriptive flexibility. Therefore, in this context, the present emphasis on social cataloging practices is considered for the improvement of cataloging in the collections of GLAM institutions. Thus, the question arises as to how cataloging 2.0, associated with social cataloging practices, can contribute to expanding the coverage and contextualization of descriptive records in the collections of GLAM institutions, while maintaining the technical rigor of normative knowledge organization models?

Therefore, the overall objective is to analyze the potential of Cataloging 2.0 to expand the coverage and contextualization of descriptive records in these environments. Specific objectives include identifying theoretical approaches to Cataloging 2.0 and social cataloging in the scientific literature; analyzing international experiences in applying these practices in GLAM institutions; and systematizing guidelines for adopting hybrid cataloging models that combine normative rigor and descriptive extensibility.

2.0 Normative cataloging models in GLAM institutions: technical foundations and operational limitations

The organization and representation of information in GLAM institutions (Galleries, Libraries, Archives, and Museums) have historically been structured based on technical-normative cataloging models, designed to ensure standardization, descriptive consistency, and interoperability between systems. These models are grounded in consolidated codes, standards, and conceptual frameworks such as AACR2r, RDA, and the FR family of models, which play a central role in guaranteeing the stability of bibliographic records and enabling large-scale cooperative catalogs.

According to Tillett (2003), the FRBR conceptual model represents a significant advance by describing the bibliographic universe through entities, attributes, and relationships, favoring more precise language and reducing ambiguities in description. By structuring records around the entities work, expression, manifestation, and item, the model enables the user to perform fundamental tasks, find, identify, select, and obtain resources, more efficiently. In GLAM contexts, this conceptual modeling contributes to the integrated retrieval of different manifestations of the same informational object, promoting more semantic and relational navigation.

However, the need to consolidate these three models of the FR Family was identified, since, because these models offer distinct solutions to the same problems by adopting different points of view (bibliographic data, name authority data, and subject authority data). Therefore, the IFLA Library Reference Model (IFLA LRM) was developed as a model that

harmonizes, consolidates, and clarifies the understanding of the FR Family into a single model (Riva *et al*. 2017).

Since the IFLA LRM consolidated and harmonized the FR family of models, it became necessary for the object-oriented version of FRBR, FRBRoo, to also align with the IFLA LRM modeling. Thus, LRMoo emerged, as an object-oriented model developed from the version 2.4 of FRBRoo and as an extension of the CIDOC Conceptual Reference Model (CIDOC CRM), a model from the domain of museums, with the purpose of integrating the structure and decisions made in the IFLA LRM (Riva et al. 2022).

Studies such as that of Bennett et al. (2003) demonstrate that applying the hierarchical conceptions of FRBR in cooperative catalogs, such as WorldCat, results in more coherent grouping of records and a reduction of descriptive inconsistencies, especially with regard to subject headings and classification numbers. These results highlight the potential of normative models to improve both the user experience and the efficiency of cataloging work in distributed environments.

However, despite their technical gains, traditional normative models present relevant operational limitations when applied to culturally diverse collections in dynamic digital environments. The rigidity of controlled vocabularies, the difficulty of incorporating multiple perspectives, and the slowness in updating descriptors can restrict the contextualization of informational objects and the expansion of the semantic coverage of records. In GLAM institutions, which deal with plural narratives, heterogeneous heritage, and varied audiences, these limitations become even more evident.

In this sense, although normative models remain essential to ensure interoperability and technical coherence, it becomes necessary to think about complementary strategies capable of expanding the expressiveness of knowledge organization systems. This need opens space for approaches that do not replace normative foundations, but rather extend and reconfigure them in dialogue with the potential of digital environments, preparing them for the emergence of cataloging 2.0.

3.0 Cataloging 2.0: Technical foundations and collaborative practices in the context of knowledge organization systems.

Cataloging 2.0 is configured as a conceptual milestone that emerges from the convergence between normative cataloging models and the participatory dynamics of interactive digital environments. Unlike proposals that seek a rupture with the cataloging tradition, cataloging 2.0 is characterized by the expansion of existing models, incorporating mechanisms of descriptive extensibility, data reuse, and semantic interoperability among systems of GLAM institutions.

Lyons and Tappeiner (2008) emphasize that the possibility for users to add tags to informational objects represents an ongoing effort to improve cataloging services, since these contributions reflect the language effectively used by the public. In this context, cataloging 2.0 articulates controlled vocabularies and user-generated metadata, exploring

the complementarity between normative structures and descriptions arising from the experience of use.

Inserted within this scope, social cataloging can be understood as a technical-methodological strategy of cataloging 2.0, oriented toward the structured incorporation of distributed contributions in the process of bibliographic description. As pointed out by Hassani et al. (2020), most studies on social cataloging converge on the idea of coexistence between controlled vocabularies and social tags, rejecting the replacement of traditional models but advocating their evolution through the integration of user-generated metadata.

From a technical perspective, social cataloging operates as a mechanism of controlled extensibility of records, in which user contributions are integrated into curation and validation workflows conducted by information professionals. This process makes it possible to expand the semantic coverage and contextualization of informational objects without compromising the internal consistency of the data and the interoperability of systems. Studies reviewed by Hassani et al. (2020) indicate that the combination of social tags and controlled vocabularies tends to improve information retrieval by offering multiple access points and reflecting different terminological perspectives.

In GLAM institutions, cataloging 2.0 and social cataloging prove particularly relevant given the diversity of informational objects and cultural narratives. The possibility of integrating distributed contributions favors the representation of local contexts, contemporary uses, and semantic relationships that are not always contemplated in traditional normative schemes. At the same time, the adoption of conceptual models such as FRBR/LRM and metadata standards such as Dublin Core ensures the maintenance of interoperability between systems and the reuse of data in cooperative environments.

Souza et al. (2016) demonstrate that the articulation between conceptual metadata standards aimed at authority control can significantly enrich records by establishing semantic relationships among authors, works, and institutions through persistent identifiers and semantic links. These results reinforce the role of cataloging 2.0 as an approach capable of integrating collaborative practices with robust normative structures.

Thus, cataloging 2.0 redefines the role of catalogers in GLAM institutions, which cease to be static structures and instead become dynamic environments for informational navigation and contextualization. Social cataloging, as a technical component of this approach, contributes to the evolution of knowledge organization systems by articulating normative rigor, distributed participation, and descriptive extensibility, promoting a richer, more plural, and interoperable representation of cultural collections.

Although the concepts of Cataloging 2.0 and Social Cataloging are related to user participation in digital informational environments, they present relevant conceptual differences. Cataloging 2.0 refers to the incorporation of Web 2.0 principles into bibliographic catalogs, favoring more dynamic and interactive environments, in which users can participate through evaluations, comments, recommendations, and free tagging. As Ribeiro and Silva (2016) observe, 2.0 bibliographic catalogs seek to encourage active

user participation, differentiating themselves from traditional catalogs by expanding the possibilities for interaction with bibliographic records.

Social Cataloging, on the other hand, focuses specifically on the direct involvement of users in the description and organization of informational resources, allowing 'ordinary individuals' to catalog items 'according to their own interests' (Santos 2015, 5). Thus, Cataloging 2.0 maintains a greater commitment to bibliographic standards, while Social Cataloging emphasizes user subjectivity and collaborative experience.

4.0 Methodology

The research adopts a quantitative-qualitative, exploratory, and descriptive approach, with a bibliographic delimitation, aiming to analyze the technical potential of Cataloging 2.0 to expand the coverage of descriptive records in digital informational environments. The study is based on the systematic mapping of the scientific literature, seeking to identify concepts, models, and practices related to cataloging 2.0 and Social Cataloging within the scope of Knowledge Organization.

The central methodological procedure consists of a systematic mapping of the literature, carried out with the aid of the StArt tool. A protocol was created to be inserted into the tool, inclusion and exclusion criteria were defined, and an analysis protocol was developed and applied to scientific databases in the field of Information Science, namely Library, Information Science & Technology Abstracts (LISTA), SCOPUS, Web of Science (WoS), and Taylor & Francis, with a time frame from 2010 to 2025. The delimitation of the corpus focused on international experiences of applying Cataloging 2.0 and Social Cataloging in GLAM institutions, prioritizing empirical and applied studies. The searches in the selected databases, as indicated in the protocol, were initially carried out on February 13, 2026. The search strategy was defined based on terms identified in the literature and their respective variations in Portuguese, Spanish, and English. The conjunction of these terms was established using the Boolean operator 'AND', and their variations using the operator 'OR'. Therefore, the following search expression was used: ((“social cataloging” OR “social catalog” OR “cataloging 2.0” OR “catalogación social” OR “catalogación 2.0” OR “catalogação 2.0”) AND (“GLAM” OR “Galleries” OR “archives” OR “libraries” OR “museum” OR “galerías” OR “archivos” OR “bibliotecas” OR “museos”)).

The inclusion criteria established for the verification of each article were: ‘Studies within the thematic scope’ and ‘Works that address methods, initiatives, cases, etc., on cataloging 2.0 in GLAM institutions’. The exclusion criteria defined were: ‘Studies outside the scope of cataloging 2.0 among GLAM institutions’; ‘Articles not in the established languages’; and ‘Articles outside the established time frame’. The research protocol can be seen in Appendix A of this article.

5.0 Results and Discussion

Figure 1 demonstrates the number of articles retrieved after performing the search in the selected databases:

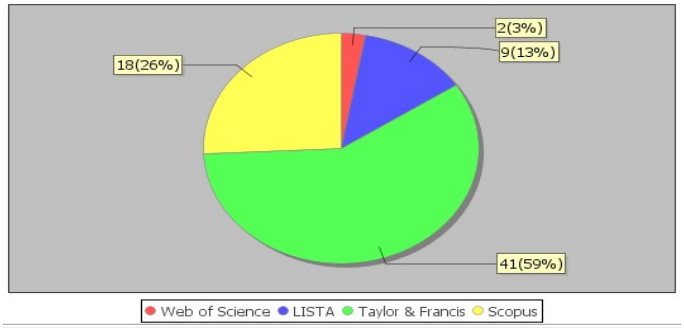


Figure 1. Number of articles retrieved

Source: Authors (2026)

As evidenced by Figure 1, the search of the databases using the search string defined in the research protocol resulted in two articles in Web of Science; nine in LISTA; eighteen in SCOPUS and forty-one in Taylor & Francis, totaling 70 (seventy) articles. The fact that Taylor & Francis concentrates most of the articles is due to the fact that the database concentrates a larger number of journals specialized in Information Science. Of the 70 records, 19 (27%) were duplicates, indicating the overlap between databases; 50 (71%) were rejected based on the determination of the exclusion criteria, and only 1 (1%) was accepted after systematic mapping.

This result proves that the theme of social cataloging focused on GLAM institutions is limited, suggesting that this theme is still little explored in studies of the scientific literature in the area of Information Science. Figure 2 clearly illustrates the results verified.

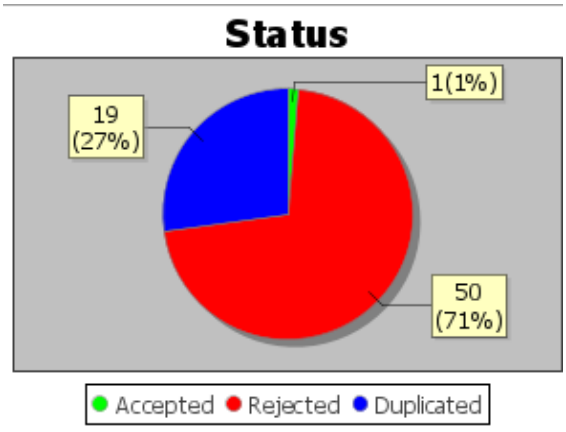


Figure 2. Conjecture of the retrieved articles

Source: Authors (2026)

After performing the extraction (verification of the relevant information in the body of the article), it was found that the accepted document by Alemu (2018) provides clear definitions of social cataloging, presents initiatives of social cataloging participation in GLAM institutions, and also proposes a metadata model to facilitate the cataloging of informational resources.

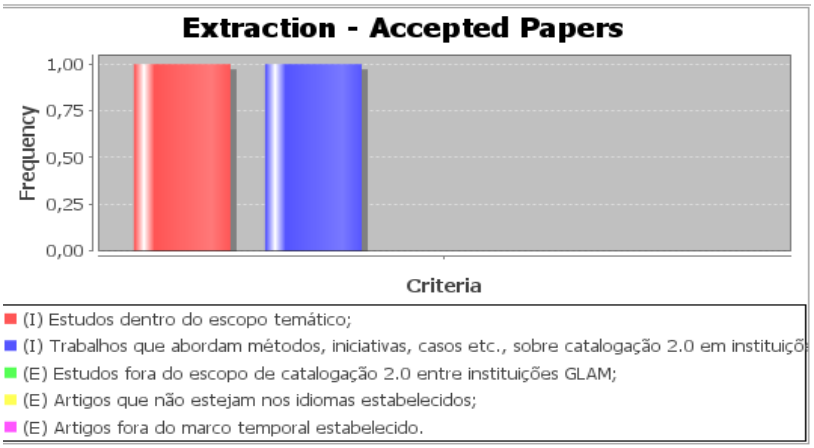


Figure 3. Number of accepted articles

Source: Authors (2026)

It was found that, in most of the rejected documents that address Cataloging 2.0, the relationship with the scope of GLAM institutions is not addressed, which therefore constitutes a gap in the scientific literature. In addition, most articles did not provide a concept of Cataloging 2.0, presenting considerable terminological variation. Also regarding the survey and analysis carried out, no international experiences of applying cataloging 2.0 and social cataloging in GLAM institutions were found in the literature on digital platforms.

It is noted that a significant portion of the retrieved articles, such as the studies by Hider and Steele (2021), Spiteri et al. (2010), Spiteri (2009), and Lyons and Tappeiner (2008), address social cataloging from the perspective of libraries, exploring the collaborative construction of metadata by users and cataloging librarians to improve the cataloging of various informational objects, as well as the use of social software in the process of describing and organizing information. These works address the debate regarding user participation in the thematic and descriptive cataloging of information resources. However, such studies focus predominantly on the context of libraries and do not comprehensively encompass the broader ecosystem of GLAM institutions, which constitutes the delimited focus of this review.

The article "*Metadata Enrichment for Digital Heritage: Users as Co-Creators*", by Alemu (2018), published in the International Information & Library Review, constitutes a central reference for debates on cataloging 2.0, social cataloging, and GLAM. Alemu (2018)

proposes expanding the traditional cataloging model through the active involvement of users in the creation of metadata. The research highlights the insufficiency of exclusively technical standards to represent the interpretative complexity of cultural objects. Thus, a participatory paradigm is advocated as a strategy for informational enrichment.

Alemu (2018) argues that metadata produced only by specialists does not encompass the terminological and cultural diversity of users. Inspired by the concept of “wisdom of crowds”, formulated by James Surowiecki (2005), the author maintains that collective contributions can broaden the semantic representativeness of collections. This movement is close to the logic of Web 2.0 described by Tim O'Reilly. The central proposal is to integrate structured metadata (a priori) with social metadata (post-hoc). In this way, a hybrid cataloging model is consolidated.

In the context of GLAM institutions, Alemu's (2018) article emphasizes that metadata is fundamental for the preservation, access, and visibility of digital heritage. The "enrich then filter" model proposes first expanding descriptions through social participation and then applying filtering and curation mechanisms. This approach seeks to balance collaborative openness and quality control. The user is understood as a "prosumer," a concept associated with Alvin Toffler. This repositioning redefines the dynamics of knowledge organization by incorporating collaborative practices, semantic technologies, and new forms of informational mediation, expanding the role of users and digital networks in the construction and enrichment of knowledge structures.

6.0 Final Considerations

In light of the theoretical framework analyzed and the results obtained through the systematic literature review, it is observed that technical-normative cataloging models remain structuring elements in the processes of information organization and representation in GLAM institutions. Consolidated standards, such as AACR2, RDA, and conceptual models derived from the FRBR family, constitute essential foundations for the semantic consistency of records, for descriptive standardization, and for interoperability between information systems. These structures continue to play a central role in mediating between informational objects, retrieval systems, and users, especially in complex institutional contexts that articulate different documentary and patrimonial typologies.

However, the results of the systematic mapping reveal a significant gap in the scientific literature when specifically observing the intersection between social cataloging, Cataloging 2.0, and the expanded ecosystem of GLAM institutions. Of the seventy records initially retrieved from the databases, only one study fully met the inclusion criteria established in the research protocol, indicating that the discussion is still in its early stages in the field of Information Science. Most of the identified studies address social cataloging practices predominantly in the context of libraries, without comprehensively considering the specificities and informational challenges present in archives, museums, and galleries.

In this scenario, Alemu's (2018) study emerges as a central reference for understanding the possibilities of integrating traditional cataloging models and participatory practices of

metadata enrichment. By proposing the involvement of users as co-creators of informational descriptions, the author highlights the limitations of exclusively technical-specialized approaches in the representation of complex cultural objects. Inspired by the concept of "wisdom of crowds," formulated by James Surowiecki, and the collaborative logic of Web 2.0 described by Tim O'Reilly, the study advocates for the articulation between structured metadata produced by experts and social metadata originating from the interpretive experience of users.

With this context of the article, the user-centered approach in Cataloging 2.0 shifts the focus from the description of documents to the needs and experiences of users in searching for and retrieving information. Influenced by Web 2.0, this perspective values interaction, usability, and collaborative participation, incorporating features such as tags, recommendations, and intuitive interfaces. Based on models like the Functional Requirements for Bibliographic Records and the IFLA LRM, Cataloging 2.0 understands the catalog as a dynamic environment for mediation and access to knowledge.

This perspective reinforces the relevance of hybrid models of knowledge organization capable of expanding the semantic representativeness of digital collections and favoring more inclusive forms of informational mediation. In this sense, the integration between controlled vocabularies and collaborative contributions is configured as a promising strategy to deal with the terminological, cultural, and interpretative diversity that characterizes heritage objects in digital environments.

Within the context of GLAM institutions, the "*enrich then filter*" model, presented by Alemu (2018), offers a relevant methodological approach by proposing a participatory enrichment flow followed by specialized filtering and curation processes. This proposal seeks to balance collaborative openness and quality control, preserving the structural integrity of metadata while expanding its interpretative possibilities. In this context, the user assumes the role of "prosumer," a concept associated with Alvin Toffler, indicating a reconfiguration of the dynamics of knowledge production, validation, and circulation in digital information ecosystems.

Based on the results obtained, it can be stated that the integration between professional expertise and collective intelligence constitutes one of the main directions for the evolution of cataloging processes in digital heritage environments. However, the scarcity of empirical studies and reports of implementation in GLAM institutions indicates the need to expand investigations that examine, in a more in-depth way, the impacts of these practices on the quality of metadata, information retrieval, and the construction of more participatory knowledge organization systems.

Thus, this study contributes by highlighting a relevant gap in the literature and by systematizing a conceptual framework that articulates traditional cataloging, social cataloging, and collaborative metadata enrichment practices. As a future research agenda, the need to develop empirical investigations, comparative studies, and applied experiments that explore the implementation of hybrid cataloging models in GLAM institutions, as well as their implications for interoperability, digital preservation, and the

representation of cultural heritage in contemporary informational environments, stands out.

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DECLARATION OF USE OF ARTIFICIAL INTELLIGENCE

It is declared that, for the preparation of this work, no generative Artificial Intelligence (AI) tools or systems were used for the production, writing, analysis, interpretation, or development of the scientific content presented. The text, analyses, arguments, and conclusions were entirely prepared by the authors, based on bibliographic and documentary sources properly identified and referenced throughout the work.

For the preparation of the English version, Google Translate and DeepL were used as translation support tools. ChatGPT was used exclusively for the purpose of comparing translations and for linguistic review of the English version, and was not employed for the preparation, development, or modification of the scientific content, analyses, arguments, or conclusions of the work.

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