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Provenance as a Domain Analysis Approach
in Archival Knowledge Organization

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Abstract: Considering domain analysis as an important methodological approach to research on knowledge organization, this paper discusses its applicability to the archival universe. To this end, it begins with a historical and conceptual approach of domain analysis in information science to reach the universe of the organization of archival knowledge based on its core processes. In this context, the principle of provenance in its genesis and development is discussed as a domain analysis approach for archival science, as we draw on the social assumption that the producer, considering its structure and its function, characterizes a discourse community for which the classification process and description become effective. Thus, the concept of archival bond, as discussed by Duranti, becomes an effective methodological evidence of provenance as a domain analysis approach, and it is specifically applicable for archival knowledge organization.

1.0 Introduction

The fact that information is socialized by means of its materialization in a record—"information as thing" (Buckland 1991) —makes it possible to consider that such materiality stems from, as highlighted by Hansson (2013), a context of social production of documents, constituting a material basis for the concept of epistemology to the extent it becomes discernible only through the production and dissemination of material documents. However, for this socially produced knowledge to achieve its social use, a mediating process of organization is necessary, when "surrogates of knowledge" are established (Olson 2002), enabling a dialog between contexts of production and use.

Currently, this mediating process between socially produced knowledge and its posterior social use is deeply connected to knowledge organization, which transcends information science (IS), and today occupies one of the most significant areas of theoretical and methodological reflection, and more recently, has been addressed based on its cultural context. In this context, the knowledge organization approach regarding the processes inherent to archival science has been recently discussed as archival knowledge organization (Tognoli et al. 2013).

In search of its own identity, knowledge organization as an area of study finds in domain analysis (DA), a methodological support since, as highlighted by Smiraglia (2012), without DA we would not have ontological matter to con-

stitute our knowledge organization systems (KOSs). Thus, this paper aims to address the issue of domain analysis within archival knowledge organization, especially regarding to provenance as a specific approach of DA in archival context.

2.0 Domain analysis (DA)

The concept of DA was first used by Neighbors in 1980 in the area of computer science, aiming to identify the elements (operations, objects and relationships) that experts of a given domain consider as significant for their activities (Kerr 2003). In information science, DA has been studied for two decades, as highlighted by Smiraglia (2015, 1):

> Toward the end of the twentieth century, the KO community turned to a postmodern view of knowledge (Mai, 1994, Smiraglia, 2012) in which domain-centric points of view and interoperability among them replaced the search for global (universal, catholic, unitary, etc.) systems. In this new reality domain analysis, or the study of the knowledge bases of specific, definable contexts, has become a core paradigm within the knowledge organization community.

In this context, we highlight the seminal text of Hjørland and Albrechtsen (1995), which was later delved into more deeply by Moya Anegón and Herrero Solana (2001), Hjørland (2002, 2004), Tennis (2003), and Smiraglia (2011; 2012), among others.

DA is an important approach to characterize and assess science, as it allows to identify the conditions for the construction and socialization of scientific knowledge. Thus, and without disregarding a traditional realistic-materialistic perspective, it is possible to conceive knowledge as constructed in a social and communicative interaction (Sundin 2003, 172). As highlighted by Herrero-Solana (2001) and Danuello (2007), DA enables verification of what is really important or meaningful in a given field, so aspects such as tendencies, patterns, processes, agents and their relationships can be identified and analyzed, constituting an important source of study for both information science and studied scientific communities. Characterized by the study of the theoretical aspects of a given context, usually represented by a body of literature or a community of researchers, and constituting a way to create new knowledge about the interaction of a given community with information, DA focuses on instruments, concepts, meanings, information structures, information needs and relevant criteria reflected in the discursive communities (Hjørland, 2002; Danuello, 2007; Smiraglia, 2012).

As Hjørland and Albrechtsen (1995) pointed out, DA is presented as a new perspective to investigate the area,

whose emphasis focuses more on the context (the sociological perspective) and less on the individual (the cognitive perspective). Such perspective, as highlighted by the authors, stems from the conception of information science as a social science, considering the psychosocial and sociolinguistic contexts, and the sociology of knowledge and science (Danuello 2007, 51). Assuming the existence of a discursive community emerging from the social division of labor, whose members are active participating members (where this academic complicity helps defining the boundaries of the domain), the domain can show parallelisms with disciplines, contributing to the identification of a "labor ecology." For Nascimento and Marteleto (2004, 1), the study of domains is essential for IS insofar it includes the "synchronized distinct social groups in thought, language and knowledge, constituents of modern society."

Thus, based on a group with a coherent ontology that shares one single epistemology, which provides the intellectual frontiers, an invisible college that presupposes common intellectual elements and an effective discourse that occur in a socially structured unit is formed. It is thus possible to identify, on the one hand, theoretical lines, and, on the other, a "social networking" of academia (Smiraglia 2012). Thus, the domain reveals a social construction in such a way that the definition of any specific domain depends on pragmatic considerations of its members, here inserting aspects such as discourses, theoretical assumptions, inter-subjective agreements (Smiraglia 2012, 112).

Because the domain reflects a social construction (an intersubjective agreement) that depends on pragmatic considerations of its members and social interaction between them, DA allows to identify the fundamental categories of the domain (from the issues and topics that researchers consider relevant for the area) and therefore, the bases for literary warrant (Beghtol 1995). Thus, the domain is, as highlighted by Smiraglia (2012, 111), an important unit to construct a knowledge organization system because, as pointed out by Mai (2009), the reference to knowledge presupposes interpretation, which can only be understood and applied in a given context and in a given community. That same knowledge can be understood differently in other communities, which reflects pluralism.

According to Hjørland (2002), DA relies on the study of discursive communities that make up the social division of labor constituting, from the author's eyes, the best theoretical approach that can be applied to IS in order to better understand information. Based on the analysis of a specific environment in order to identify its language, culture and activities (Smiraglia 2011), DA contributes substantially to the "conceptual basis for the definition of knowledge in a given community" (Smiraglia 2012, 111). Bringing the matter to professional world, Tanaka (2010, 248) highlights

that through DA information professionals have a comprehensive reference of knowledge required to support the work of a given group of users.

This perspective, as highlighted by Hjørland (2003, 125), "in contrast to the alternative metatheories of cognitivism and information systems, which direct attention to psychological processes and technological processes, respectively." Thus, for Hjørland, "Concepts have been understood as socially negotiated meanings that should be identified by studying discourses rather than by studying individual users or a priori principles" (Hjørland 2009, 530). Thus, as highlighted by Abrahamsen (2003, 154), DA does not relate specifically to mental models, but rather to a knowledge socially constructed, and expressed through theories, paradigms, and epistemologies. Such aspects show what the author regards as the two central elements of DA, "the epistemological and sociological influences on information in a field."

Thellefsen and Thellefsen (2004, 179) define the domains of knowledge as "a demarcation of given knowledge, whether anchored in a professional or non-professional context." Discursive communities, on the other hand, as highlighted by Hjørland and Albrechtsen (1995, 400), are distinct social groups synchronized in thought, language and knowledge, constituents of modern society. As pointed out by Danuello (2007, 51), referring to Thellefsen and Thellefsen (2004), "knowledge is constructed through the interaction of knowledge units that are the concepts, which are articulated in a specific area, reflecting knowledge of a discursive community in particular." In short, it can be observed in Thellefsen and Thellefsen (2004) that domains of knowledge have their own systematic for creating and structuring new knowledge as well as their own ways to construct and structure theories and methodologies.

In 2002, the conceptual dimension of DA became clearer and more operational for information science, when Hjørland enunciated a set of eleven approaches that, in his view, characterized domain analysis, as applying more than one approach on the same domain is the best way to know it as such. The approaches were: production of reference works, construction of indexing languages, information indexing and retrieval, user studies, bibliometrical studies, historical studies, genre/document typology studies, epistemological and critical studies, terminological studies, scientific communication, scientific cognition, expert knowledge and artificial intelligence.

Aiming to characterize a scientific domain from the knowledge it generates, Hjørland (2003) considered domain analysis as an organizational process *par excellence* that, by combining theory and practice, provides a more comprehensive overview of the main concepts of the area, allowing to unite different sub-disciplines such as

bibliometrics, knowledge organization and information retrieval (Hjørland 2004).

In order to specify Hjørland's proposals to grant them wider applicability, Tennis (2003) proposed two axes from which DA can be addressed: the areas of modulation and degrees of expertise. Modulation areas, when referring to the extent of a domain, provide the parameters to name it and to establish its objectives and its boundaries (i.e., what is inserted in it and what is not) (193). As a complement, the degrees of specialization qualify and establish depth—the specificity—of a domain, which requires the establishment of degrees of specialization, involving focus (parameter used to qualify a given domain) and the intersections (dialogic relationships with other domains, creating or not new domains from there).

DA's approach has been especially important for knowledge organization as treatment processes are now approached from the context of production and use of that specific knowledge, which meets the current cultural approaches of the area, which has been the subject, as mentioned earlier, of concern of researchers such as Antonio Garcia Gutierrez, Hope Olson, Claire Beghtol, Grant Campbell, Maria Jose Lopez Huertas and others.

Therefore, DA is especially important for research on knowledge organization, particularly with regard to studies on the epistemological configuration of the area, the social processes that permeate the construction of the area (e.g. production and scientific communication) and also to the development of knowledge organization systems (such as indexing languages, for example) because this aspect will provide an increasingly contextual approach, in accordance with the values inherent to its production and use processes, without disregarding the idiosyncratic elements that permeate the entire process of organization itself.

Despite all this wide range of approaches, DA assumes a new configuration when inserted into the archival universe. This aspect arises from the fact that archival science possesses a distinctly social assumption, based on a context of records production, which concede to the document a specific context, without which information is meaningless and consequently organizing it becomes impossible. This context, in turn, is guided, among others, by an archival principle that dates back from the nineteenth century, called the principle of provenance.

3.0 The principle of provenance in archival science

The principle of provenance is, probably, the most important principle of modern and contemporary archival theory. Its establishment fosters the scientificity of the archives' discipline, from the nineteenth century. Since then, the organization of archival knowledge is based on provenance and context of a documental set. Thus, classification

and description, considered the core functions of archival knowledge organization, are based on the application of this principle. For this reason, the theoretical and conceptual understanding of provenance and archival fonds becomes relevant in the context of knowledge organization.

Archives has its practical origin in antiquity, but its theory, as knowledge, appears, according to some authors, between the sixteenth and nineteenth centuries, due to the advent of regulations. After the French Revolution and the Enlightenment ideals, with the opening of the archives to the people, the documents were organized by thematic categories instead of by arrangements of documentary sets. As a result, documents from various agencies and governments were treated as one single group and original order was disregarded. This thematic organization adopted by the French National Archives, brought serious problems such as the disarticulation of archival systems entirely. This problem would be solved later with the formulation of the first archival principle: the principle of provenance.

With a purely pragmatic objective the principle of provenance (or respect des fonds) was promulgated in 1841. To the French bureaucrat and head of the administrative section of the departmental archives of the Interior Ministry, Natalis de Wailly, is attributed the enunciation of the principle during a service instruction of the Ministry (Instructions pour la mise en ordre le classement des archives départementales et communales), and approved by minister T. Duchatel on April 24, 1841, which proposed (Duchein 1983, 64) "to gather together by fonds, that is to unite all the deeds (i.e., all the documents) which come from a body, an establishment, a family, or an individual, and to arrange the different fonds according to a certain order." In the words of Duchein (64) "respect des fonds means to group, without mixing them with others, the archives (documents of every kind) created by or coming from" an administration, establishment, person, or corporate body. This grouping is called the fonds of the archives of that administration, establishment or person.

The principle of provenance was quickly adopted by other European countries that incorporated classification by fonds to their practice and archival theory. This is the case of Germany (Provenienzprinzip), England (archive group), Italy (fondo) and Spain (fondo). In the United States, the principle was adopted later, from the twentieth century, under the term "record group". As an extension to the principle of provenance, there is the principle of respect for original order or internal order, defined by the International Council on Archives (2012) as "the principle that archives of a single provenance should retain the arrangement (including the reference numbers) established by the creator in order to preserve existing relationships and evidential significance and the usefulness of finding aids of the creator." Therefore, documents from different

fonds should not be mixed, but located in the documentary fond where they were produced and the organization of the producing institution of such documents must be kept. According to Smiraglia (2014) the principle of provenance and original order underlie all archival functions, and both have to do with the context in which records are created. Provenance guarantees that the context of records or documents creation is maintained, meanwhile original order dictates that the documents or records should be maintained in the order superimposed on them by its creator.

In archival theory, the principle of provenance, although accepted unanimously, still does not correspond to a single term or a single definition. According to Martín-Pozuelo (1996), the scarce normalization terminology remains one of the fundamental problems of archival science, which leads to a lack of consensus about the division on two principles. For some authors maintaining the original order is another principle (Schellenberg 1965; Evans 1991), whereas for others it represents an extension or a second degree of provenance (Carucci 1990, Brenneke 1968). The application of the principle of provenance allows analysis to be made with respect to the set of documents, not the documentary piece, benefiting the classification by fonds and not by subject, allowing an organic organization, where the documents are related, in a "natural" way as a result of the action. To Brenneke (1968), the principle of provenance is characterized by its rejection of any classification that, somehow, is mediated by the subject of the archival records.

Considered as a theoretical and practical basis of modern archival science as a discipline, the principle of provenance has universal application, an aspect justified by Duchein (1983), one of the major representatives of the French Archival tradition, through two arguments. First, a document is considered an archival record precisely because of its characteristic of belonging to a whole. Thus (67), "the archival document, contrary to the object for collection or the file for documentation made up of heterogeneous pieces of diverse origins, has therefore a *raison d'etre* only to the extent that it belongs to the whole." As a second argument, Duchein notes that the archival document is part of a process, and is not conceived in isolation, but as a result of an action, which in turn will generate another action, and thus another document. In this sense, "it always has a utilitarian character, which may only appear clearly if it has kept its place in the whole of the other documents which accompany it."

In this vein, the French tradition goes further than the English one because it not only recognizes the original order of the documents but, also, the organic relationship established between them, what could be called "organicité" (which assumes that the archive is an organic

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whole, reflecting administrative relations that are also organic themselves). In other words, it can be considered the capability of a set of records to interact with each other in order to dynamically compose a complex body as well as to reflect its functions. It is important to point out that those records are created to accomplish the same functions and, because of this, they "behave" the same way, present the same documentary form, interact with each other, and are organized by the same principles. According to Bellotto (2005, 19) "organicity is the quality according to which, archives reflect the structure, functions and activities of the producer/accumulator entity in its internal and external relations." So, the ensemble of those three dimensions ("respect des fond," original order and organicity) compose the contextual instance that the French archival tradition considers as provenance, a methodological tool for understanding records and documents' context of creation and inter-action.

It is understood, therefore, that for a document to be considered an archival record, it must be inserted in a set of documents which keep organic relations with each other, from the same documentary fond. Consequently, to understand a document, it is essential to know exactly where it was created, in the structure of which process, for what purpose, to whom, when and how it was received by the interested person, and how it got into our hands. "Such knowledge is possible only to the degree to which the whole of the documents which accompany it have been kept intact, quite separate from and without confusion with documents of different origins, even if the latter are related to the same subject" (Duchein 1983, 67).

4.0 Provenance as a DA dimension in archival knowledge organization

A first point to consider is the fact that knowledge organization is more deeply centered around the literature of library and information science (LIS). Only recently has it been considered as a study field in archival science. Archival science began to consider information as its object of study more especially in the 1980s, when Couture, Ducharme, and Rousseau, in Canada, proposed the use of the terms "organic information" and "non-organic information," defining the former as information created and received by a physical person or entity in the course of a practical activity, and the latter as information contained in bibliographical records, replacing, therefore, the concepts of archival and bibliographic records, in archival science research. In this sense, archives are conceived as information systems, alongside libraries. In such an approach, both archives and libraries share the purpose of organizing certain knowledge produced and recorded by society, in order to allow its portability in space and its permanence in time (Smit and Barreto 2002) and, as a consequence, to promote its most comprehensive accessibility. In other words, this approach reflects the compromise of both archives and libraries to furnish what Richard Mason (1990, 125) considers "the right information from the right source to the right client at the right time in the form most suitable for the use to which it is to be put and at a cost that is justified by its use." As pointed out by Smiraglia (2014, 31) "archives and records repositories, like libraries, serve a critical role in their social milieus, that of preserving and disseminating the collective knowledge of their cultures."

As a consequence of this recent information approach to archives, domain analysis concepts are rarely addressed in archival science. This occurs, among other reasons, due to the fact that until the late twentieth century the archival discipline did not recognize information as its object of study, studying only records and archives (Tognoli et al., 2013). With new forms of documentary production resulting from new information technologies, the organization of knowledge is replaced by a more central role in the work of the archivist, who is connected to other information professionals and to new concepts such as DA. In this sense, archival knowledge can be regarded as all the knowledge that is contained in the records produced or accumulated by a particular person or entity and grouped together (Tognoli et al., 2013). This is what makes the respect of fonds an inherent attribute (Duchein, 1983).

In this sense, we understand that the records grouped into fonds reflect the knowledge that was produced about a particular person or entity, acting three main actors in this context: 1) the creator (author), who is the physical or juridical person responsible for the creation of records; 2) the user, who will use the record to evidential or administrative ends or to historical purposes; and, 3) the intermediaries, who are the archivist or other persons responsible for the organization of records. By following the provenance, the archivist favors a context of production instead of assigning a surrogate by subject. In this way, determining the content of a document is no longer under a thematic view, but rather, from the identification and recognition of a given discourse community that is responsible for its production, from pre-determined institutional goals. Thus, and as well exposed by Desjardins (1879 cited by Duchein 1983, 66) "in any other classification than by, fonds, one runs a great risk of not knowing where to find the document." In other words, the concept of aboutness as discussed by Beghtol (1984) assumes a new dimension in archival knowledge organization by the fact that the record's aboutness is no longer considered by its relation to a specific subject but, now, by its relation to a certain producer and, mainly, to its context of production. When the archivist chooses to or-

ganize archival knowledge based on its provenance and not on its subject, the respect for the principle of original order is guaranteed, not committing its reliability as a faithful record of the activities of institutions.

Therefore, one can question how the production context can be understood as a domain for content-extraction. And it can be explained by the fact that both archival science (AS) and LIS are concerned with content-extraction but the contents they deal with are quite different. So, while the content extracted by KO (LIS) procedures is highly related to subjects, the content extracted by KO (AS) is mainly related to the identification and representation of the provenance (through a binomial composed by the recognition of the structural and functional origin of the record (respect des fonds) and the organic relationship between the record and similar records (respect de l'ordre interne) (Héon 1999, 225). In this sense, it is possible to observe that the concepts of original order and "organicité" can be merged into one complimentary dimension.

But how can provenance can be considered as a framework for domain analysis in archival KO? A first consideration is about the characterization of archival KO as a domain itself. In this sense, it is important to observe that archival KO has its core in classification (structural or functional) and in description procedures, with the aim to establish surrogates of knowledge. Those surrogates are built in accordance to the context of records creation, in order to guarantee their trust, reliability, and testimonial and research value. Considering those questions, archival KO becomes a domain composed by a set of researchers from different parts and institutions of the world (e.g., Rousseau, Couture and Ducharme, from Canada; Malheiro and Ribeiro, from Portugal; Tognoli, Barros and Sousa, from Brazil and many others) who integrate an invisible college deeply involved in building an epistemological basis by using a specific discursive structure which merges traditional archival terminology with LIS terminology. One example is the concepts of archival information, archival representation, archival indexing and archival KOS. It also is important to highlight that the mentioned group has been establishing a growing academic interaction in such a way to compose, nowadays, what Smiraglia (2012, 112) refers as a "networking of academia."

One of the bases for those discussions is the concept of fond, which is based on a network of structures, functions and activities of the producing entity that will give origin to the "archival bond" of the documentary set, which can be understood as the "network of relationships that each record has with the records belonging in the same aggregation" (Duranti 1997, 215). Also according Duranti (216), "besides determining the structure of the archival fonds, the archival bond is the primary identifying component of each record, as several identical documents become as many distinct records after they acquire the archival bond. The archival bond is what transforms a document into a record (when, after being made or received, it is set aside in the fonds of the physical or juridical person who made or received it for action or reference)." Thus, the concept of archival bond, as discussed by Duranti, becomes an effective methodological evidence of provenance as a domain analysis approach for archival knowledge organization.

In this sense, we defend the idea that provenance studies can be considered more than a framework for domain analysis in archival KO but, actually, as a specific domain analysis approach. Such an idea arises from the fact that provenance studies have specific procedures that comprise: a) the study of the structure of the entity or person that created the record (through the analysis of organization charts, laws and internal statutes); and, b) the study of the functions of the mentioned entity or person (by means of the documentary identification, which defines document's typologies and interactions. After those two complimentary procedures it is therefore possible to determine the fonds or records groups, as well as the arrangement and classification schemes.

This approach profoundly differs from the eleven approaches proposed by Hjørland (2002)—the production of reference works, the construction of indexing languages, the information indexing and retrieval, the user studies, the bibliometrical studies, the historical studies, the genre/document typology studies, the epistemological and critical studies, the terminological studies, the scientific communication, and the scientific cognition, expert knowledge and artificial intelligence—because it presupposes a different context as well as different procedures. Another argument that can be presented for this is the fact that the concepts of "respect the fonds" and the merger between original order and "organicité," act as two axes for establishing the archival bond under a Cartesian coordinate plane, where the search for the fond (the "genealogical" sequence of producers) can be considered an abscissa while the organic comparison (with similar records which are related with each other) can be considered an ordinate.

Thus, the abscissa will provide a hierarchy of the production instances while the ordinate will provide the hierarchy of functions and their organic surrogates (documentary typologies). In the case of documents belonging to permanent archives, like historical university archives, for instance, the following situation can occur:

Example 1:
Abscissa (Respect des fonds)
São Paulo State Government → Public Universities → São Paulo State University

Ordinate (Original order + "Organicité")
– Original Order: Research => Graduate research →
  PhD Research / Master Research
– "Organicité": Dissertation / Thesis.

On the other side, in the case of records belonging to active archives, like university graduate record management departments, the following situation can occur:

Example 2:
Abscissa (respect des fonds)
São Paulo State Government → Public Universities →
São Paulo State University
Ordinate (Original order + "Organicité")
– Original Order: Tuition → Prelims → Defense
– "Organicité": Tuition receipt →Transcripts → Defense minute

As we can observe in the examples above, the abscissa (respect des fonds) does not change. This means that the provenance is the same in both active and permanent documents when the producer is the same. On the other hand, the ordinate changes according to the nature and function of the activities that have been carried out, whether in a long-lasting dimension or in a time-limited one.

5.0 Conclusion

Domain analysis is a growing field of study in knowledge organization especially because it furnishes references for the recognition and the study of discursive communities. In this sense, the traditional eleven approaches proposed by Hjørland are very meaningful when addressed to LIS studies but they assume a new configuration when inserted into the archival universe. This aspect arises from the fact that archival science possesses a distinctly social assumption, based on a context of documental production, which concede the document a specific context, without which information is meaningless and consequently organizing it becomes impossible. Unlike libraries that houses secondary sources, an archives is a place where raw artifacts of knowledge can be found in their original form. To understand the record context of creation archival science counters with the principle of provenance, composed by the respect of the fonds and the merger of original order and organicité.

In this sense, we defend the idea that provenance studies can be considered more than a framework for domain analysis in archival KO but, actually, as a specific domain analysis approach. Such an approach can be obtained by the conception of a Cartesian coordinate plane whose axes are responsible for representing the archival bond: the "re-spect des fonds" (the "genealogical" and structural sequence of producers) and the merger of original order (the functional structure of the producer) and "organicité" (how similar records are related with each other).

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