

Has FRBR Revolutionised Our Catalogues? A Comparative Analysis of AACR2 and RDA-Formatted Records to the FRBR Model

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This dissertation was submitted in part fulfilment of requirements for the degree of MSc Information and Library Studies

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Abstract

FRBR was published over twenty years ago and critical voices have been raised ever since that question the conceptual model and the benefits that it brings to the cataloguing community and the users of the catalogues. The conceptual model revolutionised the perception of the bibliographic universe as it was known until then by dividing it into entities, attributes and relationships placing the user in the centre of its design. FRBR was believed to better respond to the fast-changing digital environment, and most importantly, to the users and their needs. Although no extensive user studies were conducted, the model was soon adopted as the starting point for a new cataloguing standard.

Many questions regarding FRBR, RDA and the user-centred approach still need to be investigated. Tosaka and Park (2013, p.655), for instance, observed that the user was the least studied component of RDA. The aim of this dissertation was to find out to what extent the RDA-formatted catalogue was FRBRised, to what extent the underlying FRBR structure became apparent when the RDA-formatted catalogue records were compared to their AACR2-formatted counterparts, and to what extent these findings would have an impact on the four user tasks defined by FRBR.

A comparative analysis of AACR2 and RDA-formatted records to the FRBR model was conducted in order to highlight similarities and differences between the records, and to investigate to what extent these resulted from, were in line with or contradicted the FRBR model. The analysis revealed that the AACR2 and RDA-formatted records did not significantly differ from one another. Most of the records were catalogued on core level, which means that they included many elements that were relevant for users when searching the catalogues. RDA's underlying FRBR structure became apparent in the way information was displayed in the NEBIS catalogue. For instance, related resources were identified and clustered in the catalogue's list of search results. Those observations, however, did not suffice to speak of a revolution of the RDA-formatted catalogue triggered by FRBR.

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1. INTRODUCTION

Metadata standards are a set of codes that have been developed by national and international library associations in order to control bibliographic data, to facilitate the exchange of data, to maintain a certain level of consistency within the library catalogues and to help users discover resources. The metadata standards give guidance and instructions on how metadata can most effectively be used, how information resources should be described and what information should be recorded. Metadata needs to be of the highest possible quality in order to fulfil those core bibliographic functions. The history of standardisation showed that the evolution of cataloguing standards was not straightforward, but rather difficult and challenging. Throughout the different time periods, cataloguers have searched for the best possible way to approach cataloguing and the compilation of cataloguing standards with the objective of maintaining high quality metadata and consistency within the catalogue records in order to support users when searching the catalogues.

The emergence of new technologies has a significant impact on library and information professionals, as the latter have to constantly seek and find new solutions in order to ensure that users have access to high quality information at all times. With the emergence of computers and the world wide web, libraries have moved from card catalogues to machine-readable catalogues that are online accessible. Nonetheless, this is not the endpoint. New cataloguing standards and frameworks have been developed, while the linked data (LD), semantic web and big data movements challenge old metadata schemas and standards that have been well-established in the cataloguing communities for decades.

In the early 1990s, the International Federation of Library Associations and Institutions (IFLA) revised the second edition of the Anglo-American Cataloguing Rules (AACR2) and published the results in a new report entitled *Functional Requirements for Bibliographic Records* (FRBR). FRBR was not a new cataloguing standard, but a conceptual model that divided the bibliographic universe into entities, attributes and relationships placing the user in the centre of its design. Its structure was revolutionary, because former cataloguing standards such as AACR2 outlaid their chapters according to the types of resources. The

idea behind FRBR was not to approach cataloguing from the type-of-resource perspective, but from the entities-attributes-relationships perspective that enabled to make relationships between entities not only within a catalogue record but also beyond. Furthermore, FRBR was developed to embrace all types of resources even those that were not yet invented. Based upon these facts, FRBR was believed to better respond to the new digital environment, and primarily, to the needs of the users. FRBR assumed that the tasks users performed when searching a library catalogue could be summarised by four user tasks: find, identify, select and obtain.

After the publication of FRBR, it was soon agreed that a new cataloguing standard based on the conceptual model had to be developed, because former standards were considered as not being able to cope with the changes the implementation of FRBR would bring about. The response was RDA (Resource Description and Access). Over 20 years have passed since the publication of FRBR, and critical voices have been raised ever since that, even with the adoption of RDA, the library catalogues have not yet been FRBRised. This dissertation was based upon these assumptions and aimed to find out to what extent the FRBR influence would become apparent in the RDA-formatted catalogue records when they were compared to their AACR2-formatted counterparts, and to what extent these findings impacted the four user tasks defined by FRBR.

This dissertation is divided into five main sections starting with the introduction outlining the topic. The second section is dedicated to the literature review reviewing the literature that has already been published on FRBR, RDA and AACR2, while it also focuses on the history of standardisation with the aim to provide a broader view on the topic and the many challenges that the development of a cataloguing standard implies. Section three addresses the methodology that was chosen in order to conduct this research project, and it also provides background information on the two networks a-z.lu and NEBIS whose records were subject to this comparative analysis. The fourth section focuses on the analysis and the observations that were made when comparing the records produced by the previously mentioned networks. The fifth and last section concludes with a summary of the findings and thoughts about what caused these, while also making suggestions as to how this research project could impact future studies.

2. LITERATURE REVIEW

2.1 A brief history of cataloguing and standardisation

Metadata standards have a long history. The scrolls kept at the Great Library of Alexandria (280 BC), for instance, were each individually tagged at one end with title, subject and author in order to facilitate their findability and to help patrons decide if a particular scroll would be useful without having to unroll each one of them (Foote, 2019). This method resembled the card catalogues which were still in use up until the late 20th century. However, as libraries grew bigger with new materials and media being constantly added, there was a growing need for metadata standards to help managing the increasing amount of metadata. Their aim was to guarantee and maintain high metadata quality in the library catalogues in order to ensure that the patrons' information requests could be satisfied. This meant that catalogues "had to be constructed in a systematic and consistent way in order to be effective" (Hider, 2018, p.129). This required that rules were developed and put down on paper, which were then applied by the whole cataloguing department of a library.

It was during the French Revolution that card catalogues were first mentioned. Around the year 1789, the Revolutionary French government seized all the properties of the French religious houses, including those that belonged to their libraries (Smalley, 1991, p.2). Even though they were first unsure of what they were supposed to do with the books, it was Abbé Tuet who suggested in 1790 that those books could be used as a "basis for a new system of public libraries" (Smalley, 1991, p.2). During the meetings of the Commission des Quatre-Nations, the decision was taken that new libraries should be established in France and that they should be united by a union catalogue. It was then ordered that all the books seized were catalogued, so that there would be exact records of what books could be found in the collections (Massieu, 1791, p.3). In order to ensure that the union catalogue could most effectively be used, a cataloguing code was created that gave explicit guidance on how to catalogue a book (Massieu, 1791, pp.3-4). This event in French history was a milestone in the history of cataloguing rules and standardisation as it did not only mark the birth of the catalogue but also of the first national code for descriptive cataloguing (Hopkins, 1992, p.378).

A further milestone in the history of cataloguing and standardisation was achieved by Sir Anthony Panizzi in the 19th century. Panizzi who was the Principal Librarian and Keeper of Printed Books at the British Museum's Department of Printed Books that later became the British Library, was appointed with the task to develop a new printed catalogue (Miller, 1967, p.4). While he had to decide which rules to follow in order to maintain a clear consistency in the catalogue, Panizzi created the famous 'ninety-one rules' for compiling a catalogue. Panizzi's *Rules*, for instance, served as the basis for the American Library Association (ALA) and the British library association's (LA) first cataloguing rules published in 1878 and in 1881 respectively (Hider, 2018, p.130). More recent cataloguing standards, like the Anglo-American Cataloguing rules (AACR) were influenced by Panizzi's 'ninety-one rules' (Carpenter, 1985, p.2).

Over thirty years later, in 1876, Charles Cutter published his *Rules for a Dictionary Catalog*. In this publication, he gave guidance on how to catalogue and what information was important to record. In the introduction to his *Rules*, Cutter highlighted the main objectives of a catalogue:

- 1. To enable a person to find a book of which either:
 - (A) The author
 - (B) The title
 - (C) The subject is known.
- 2. To show what the library has:
 - (D) By a given author
 - (E) On a given subject
 - (F) In a given kind of literature.
- 3. To assist in the choice of a book
 - (G) As to its edition (bibliographically).
 - (H) As to its character (literary or topical). (Cutter, 1904, p.12)

The library's collections could thus be discovered by five different access points: author, title, subject, edition and genre. The rules were very much patron-centred and resembled the four user tasks of finding, identifying, selecting and obtaining defined by FRBR, which

were published about a century later and which will be further discussed below. According to Hider (2018), Cutter's *Rules* highlighted the libraries' mission ever since "to provide the best possible intellectual access to a collection of resources" (Hider, 2018, p.131).

Another influential character in the history of cataloguing was Seymour Lubetzky. According to Gorman (1977, p.588), nearly all assumptions that were ever made by the cataloguing community of the twentieth century were challenged by him. In his work *Cataloguing rules and principles* (1953, 1970), Lubetzky wrote about his assigned task at the Library of Congress (LC) to analyse ALA's cataloguing practices, to assess ALA's cataloguing rules and to simplify them if necessary, and consequently, to formulate a new list of cataloguing principles with the aim to be published not only in the United States, but also in Britain and other parts of the world (ALA, 1993, p.523; Galeffi, 2009, pp.230-231). His unfinished draft of the *Code of cataloguing rules: author and title entry* (1960) informed the *Paris Principles* that were drawn up at the International Conference on Cataloguing Principles (ICCP) in Paris in 1961, and which provided the basis for the first edition of AACR published in 1967. The cataloguing rules and standards created by Panizzi, Cutter and Lubetzky have informed cataloguing rules and standards ever since.

2.2 From AACR to RDA

2.2.1 AACR

Fifty countries participated in the ICCP in Paris, which was hosted by IFLA. During this conference, the different countries agreed on the *raison d'être* of the catalogue and its objectives. Furthermore, they decided that the principles they agreed on would henceforth serve as "the basis for rules of entry and heading" (Joudrey, Taylor and Miller, 2015, p.37). The internationality of the conference and the decisions that were taken turned this conference into a major event in the history of standardisation and marked the first steps towards an "international cooperation in the development of cataloguing rules" (Manning, 2000).

AACR emerged from the *Paris Principles*, and developed them further. Major changes affected the rules for entry. Influenced by Lubetzky, it was recorded in AACR that the chief source of information for a monograph would be its title page (ALA, CLA and CILIP, 2005,

2.0B1). However, if the title page was lacking important information, the cataloguer was then required to gather information from other parts of the item, for example, from the cover, the text itself, the colophon or other preliminaries. In this case, the cataloguers were asked to clearly identify this information by putting it in square brackets (ALA, CLA and CILIP, 2005, 1.0C1.). Furthermore, AACR did not only address entry and heading, but rules were added that referred to the description and cataloguing of any types of media that existed at that time; they were thus not only limited to books (Joudrey, Taylor and Miller, 2015, p.37).

Even though the publication of AACR was a major step towards a first international bibliographic standardisation, there were drawbacks. Despite its intention to be adopted by a worldwide cataloguing community and hence its translation into more than twenty different languages, AACR was less a success in non-English-speaking countries. According to Hider (2018, pp.131-132), these countries' reluctance in adopting AACR could be explained first by the economic and financial costs that a transition to a new cataloguing code would bring about, and by the fact that they already had their own codes in their own languages based on bibliographic and publishing conventions that dominated in their own countries.

In contrast to the rest of the world, AACR was rather a success in Britain, Canada and the United States, but difficulties also arose here. While Britain and the United States anticipated the creation of a union code, they failed in their undertaking to do so. Instead of having a joint code, they each adopted a slightly different version of AACR as they were not able to agree on a common text (Joudrey, Taylor and Miller, 2015, p.37). Despite the adoption of two slightly differing texts of AACR, the latter became nonetheless the first international cataloguing code of the Anglo-American countries as it replaced all previously published cataloguing codes in those countries, while it also got adopted by the LC.

In his article, Gorman (1987) highlighted the difficulties that the adoption of AACR brought about for the US-American cataloguing community. The so-called policy of superimposition caused a "bibliographic anarchy" (Gorman, 1987, p.111) in the catalogues of US libraries. The policy of superimposition implied that established headings created prior to AACR

would not be changed and that only new headings "would be framed in accordance with the new rules" (Gorman, 1987, p.111). Gorman considered this practice of cross-mixing existing codes as "schizophrenic" (Gorman, 1987, p.111), as they would cause a mess in the libraries' databases. Almost twenty-five years later, Taylor (2012) recalled the problem of superimposition that the introduction of AACR in the late 1960s caused to the US cataloguing community. Similar to Gorman's account, she remembered that cataloguers were told that the practice of cataloguing would not change with the new rules and that they did not have to learn them unless they had to establish a new entry and heading (Taylor, 2012, p.123).

This "pollution" (Gorman, 1987, p.112) of the libraries' databases continued with the publication of IFLA's ISBD model (International Standard Bibliographic Description). In 1969, the IFLA Committee on Cataloguing met in Copenhagen in order to discuss the creation of a model that would ensure maximal standardisation in the libraries' catalogues. The aim of the then compiled ISBD model was "to offer consistency when sharing bibliographic information" (ISBD Review Group, 2014). As a result, there was a growing demand within the cataloguing communities, especially in the United States, to abandon the policy of superimposition and to create a unification of the British and North American versions of AACR. In 1974, the Joint Steering Committee (JSC) presided by ALA, LA, LC and CLA (Canadian Library Association) met with the aim to develop one single text incorporating the ISBD model as well as any new revisions and developments regarding cataloguing principles, rules and codes that had been developed up to that point (Hider, 2018, p.132). The resulting second edition of AACR, hereafter referred to as AACR2, was published in 1978 and it was hoped that this code would become widely accepted and adopted by non-English-speaking countries as well.

Even though AACR2 was published in 1978, it was not taken into force by major national libraries until January 1981. Despite its initial difficulties, the second edition proved itself to be more successful than its predecessor, because AACR2 was implemented not only in the cataloguing community of Britain and the United States, but also in Canada, Australia and other English and non-English-speaking countries. During its heyday, AACR2 was subject to continuous revisions and updates as they were necessary in order to keep up

with the new media and type of resources that were constantly developed and published. Revisions were published in 1988, in 1998 and in 2002, which were then followed by updates made in 2003 and 2004 with the last update published in 2005 (Joudrey and Taylor, 2018, p.80). Amendments were made annually. The JSC that was founded in 1974 and that was primarily responsible for the publication of AACR2 in 1978, operated until the year 2007 when it then changed its name into JSC for Development of RDA (Joudrey, Taylor and Miller, 2015, p.39).

AACR2 was divided into two parts whereat the first part addressed the bibliographic description of resources based on the ISBD model, while the second part defined rules for access and dealt with headings, uniform titles, and references. Four appendices titled 'Capitalizations', 'Abbreviations', 'Numerals' and 'Glossary' were arranged at the end, with a fifth one 'Initial Articles' being added in the latest version of AACR2 (ALA, CLA and CILIP, 2005). Besides the addition of a fifth appendix, other changes were made. As Joudrey and Taylor (2018, p.297) observed, AACR2R 2002, the 2002 revision of AACR2, divided any "resources into two mutually exclusive groups": finite and continuing resources. Finite resources could be monographs or any other resource that had a "predetermined conclusion" (ALA, CLA and CILIP, 2005, 12.0A1.), in other words that were complete in themselves. In contrast to finite resources, continuing resources also known as serials were ongoing. In many libraries, the cataloguing departments were often divided into two different working departments, with one specialising in the cataloguing and acquisition of monographs, and with the other specialising in the cataloguing and acquisition of serials. For this reason, many integrated library systems (ILS) were set up in different modules as well (Joudrey and Taylor, 2018, p.298).

The term 'serials', however, was abandoned in the latest edition and it got replaced by 'Continuing Resources'. Other terms were updated as well. Chapter 9 initially called 'Computer Files' changed into 'Electronic Resources'. The former, rather restrictive terms were hence replaced by broader terms encompassing new media sources. Those changes were made in order to better respond to the ongoing changes and rapid developments of the internet and other types of resources. Those name changes demonstrated a certain degree of openness in relation to new technologies, but they did not suffice. In order to be

up-to-date with ongoing developments, rules had to be changed. Joudrey and Taylor (2018, p.331) criticised the rules of AACR2 as being inadequate to respond to complex resources, such as online resources, born-digital resources or the emergence of Web 2.0.

Another flaw of AACR2 highlighted by Joudrey, Taylor and Miller (2015) was the 'rule of three' in descriptive cataloguing. This rule, a remnant of Panizzi's infamous 'ninety-one rules', corresponded to the latter's third rule, which said that in any case that more than one name appeared in the title of a work, only the first one would be taken into account (British Museum, 1841, p.v). Rule 1.1F5. of AACR2 was similar. It said that if more than three names of persons or corporate bodies would appear in the statement of responsibility with all of them exercising the same function or degree of responsibility, then only the first one would be considered followed by the Latin abbreviation et al. as mark of omission (ALA, CLA, CILIP, 2005, 1.1F5.). If an article, for instance, was written by Koulouris, Kyriaki-Manessi, Giannakopoulos and Zervos, only Koulouris' name would be recorded followed by et al. Hence, patrons searching the catalogue for Zervos would not be able to find that particular article. The 'rule of three' became optional in RDA. Joudrey and Taylor (2018) saw further limitations in the possible access points (APs). The authors perceived the choice of APs in AACR2 as being too "book-oriented" (Joudrey and Taylor, 2018, p.408). While APs would include persons, for instance, editors, corporate bodies, geographic names, titles, collaborators or translators, they left out programmers, photographers, choreographers, performers, cartographers and many other functions (Joudrey and Taylor, 2018, p.408).

Besides the flaws identified in AACR2, Joudrey, Taylor and Miller (2015) and Joudrey and Taylor (2018) also acknowledged AACR2's strengths. AACR2, for instance, granted cataloguers more freedom in their cataloguing practice. The latter were encouraged to make use of the cataloguer's judgment, a practice allowing cataloguers to subjectively interpret cataloguing rules and to decide, thereupon, what information they think would be important to record. Instances, where the cataloguer's judgment was required, were indicated by phrases such as "if necessary" (ALA, CLA and CILIP, 2005, 0.9). This rule recognised "the fact that uniform legislation for all types and sizes of catalogue is neither possible nor desirable" (ALA, CLA and CILIP, 2005, 0.9). As long as those judgments would

be made consistently in relation to the patrons' needs, to the item being catalogued and to the cataloguing conventions of the institution, this practice would not "contradict the value of standardization" (ALA, CLA and CILIP, 2005, 0.9). Furthermore, rules 0.29 and 1.0D. (ALA, CLA and CILIP, 2005) allowed cataloguers to choose from three different levels of detail when doing the bibliographic description of a resource. Level one required a bare minimum of bibliographic elements that needed to be included in a record. Those mandatory elements were clearly outlined in the rule itself. Level two included more metadata, while the third one required to include the metadata that was mandatory in level one and two. But again, the depth and level of description depended on the library and its resources.

2.2.2 FRBR

During the Stockholm Seminar on Bibliographic Records in 1990, the decision was made to conduct a study that would revise the *Paris Principles* and hence AACR2. Multiple factors influenced this decision. First, there were new technologies emerging, there was a remarkable increase in publishing output and electronic publishing, whereas economic realities pressured libraries to record only a minimum set of elements in a catalogue record in order to save time, and to reduce the cost of cataloguing by simplifying its process (IFLA, 2009, p.1). Furthermore, there was a continuous debate among the cataloguing community if bibliographic description of an information resource should be made on item or work level. This concern was the reason for a debate between two influential librarians of the twentieth century: Seymour Lubetzky and Michael Gorman. The latter, an editor of AACR2, was convinced that descriptions should be made on the item level, whereas Lubetzky pleaded that bibliographic descriptions should be made on the work level (Joudrey and Taylor, 2018, p.294).

In 1998, IFLA published the results of its study in a report entitled *Functional Requirements for Bibliographic Records*. The model that is now mainly known by its acronym FRBR, was not a new cataloguing standard, neither a new digital format, but a conceptual model of the bibliographic universe based on Cutter, Lubetzky and the *Paris Principles* (Gonzalez, 2005, p.13; Schaffner, 2012, pp.18-19). As mentioned above, Cutter's cataloguing objectives were user-centred and referred to the tasks, users would perform when

searching a catalogue. Lubetzky highlighted the fact that patrons have different information needs. As Galeffi (2009, p.234) said, there are those users who want to find *a* book in the catalogue and there are those readers who are looking for a particular book of a particular edition. For this reason, metadata needs to be tailored to the users' needs (Bruce and Hillmann, 2004, pp.3-4). The idea behind FRBR was to combine these concepts into one model.

FRBR became a very much user-centred model defining four main user tasks: find, identify, select and obtain. User awareness thus became central to the model, as FRBR conceptualised the bibliographic universe in such a way that it would best serve the users' needs. Zhang and Salaba (2009a, p.91) said that the goal of FRBR was to allow users to perform quick and effective searches in order to find relevant information sources that fulfilled their information need. Furthermore, the amount of results returned should be reduced with only the most relevant results being displayed. Furthermore, they should also be ranked in a clear and comprehensive way for all users, not only for information specialists. In order that the catalogue was able to fulfil these tasks, cataloguers had to predict what the users aimed for, what information they searched for, how they searched for it, and how they would like to search for it (Welsh and Batley, 2012, p.8). According to Welsh and Batley (2012, p.8), FRBR has the potential to facilitate this task by establishing a relationship between the item cataloguers have to catalogue and "any other things in the bibliographic universe".



Fig.1 E-R model based on FRBR

FRBR is based on an entity-relationship model (E-R) (Fig.1). Relationships are fundamental in representing the bibliographic universe as they offer contextual information that go beyond the "familiar library environment of the bibliographic record" (Welsh and Batley, 2012, p.95). FRBR divides the bibliographic universe into three groups, with each group being further divided into entities. The latter contain important bibliographic data and are associated with a various number of attributes (Zhang and Salaba, 2009a, p.1). The Group 1 entities are "products of intellectual or artistic endeavours" (IFLA, 2009, p.13) and encompass all resources that can be accessed by the means of the catalogue. They include work, expression, manifestation and item (WEMI). Group 2 entities are persons, families and corporate bodies (PFC), while Group 3 includes concept, object, place and event (COPE). Relationships are established among the entities of a same group and entities across groups. Responsibility relationships, for instance, are established between Group 1 and Group 2 entities, whereas subject relationships are established between COPE, PFC and WEMI with the work entity. The arrows linking two entities show what kind of relationship both entities share (IFLA, 2009, pp.13-17); if it is a many-to-many relationship or a one-to-many. A PFC, for example, can create one or more than one work, while a work can be created by one or more than one PFC (many-to-many relationship) (Fig.2). A manifestation, in turn, can be exemplified by one or more than one item, but an item can only exemplify one manifestation at a time (one-to-many relationship) (Fig.3).



Fig.2 Many-to-many relationship



Fig.3 One-to-many relationship

These entities and relationships are represented on a high-level, meaning that only the main or principal entities and their relationships are depicted (IFLA, 2009, p.9). The focus of this paper will be the FRBR model as it focuses on bibliographic content. IFLA, however, published two additional reports: FRAD (Functional Requirements for Authority Data, 2009) and FRSAD (Functional Requirements for Subject Authority Data, 2010). In 2017, IFLA published a new model IFLA LRM (Library Reference Model), a model consolidating the three previously mentioned models into a "unified model of the bibliographic universe" (Žumer, 2018).

Zhang and Salaba (2009a) highlighted the benefits of FRBR. As the relationships between entities and groups and the attributes associated with each entity supported the four user

tasks, the FRBR model provided a structured framework that mapped the users' needs to the data that was recorded in the catalogue records that the users retrieved. Based on these attributes and entities, national bibliographic agencies defined a minimum level of metadata that was required in a bibliographic record (IFLA, 2009, p.7). As a consequence, catalogues would become more structured, systems were improved, cataloguing became more efficient, and managing resources in the digital environment was facilitated (Zhang and Salaba, 2009a, pp.4-7). The idea was that the underlying syndetic structure of FRBRised catalogues would improve the navigation experience, link bibliographic records with one another, which was an impossible task for card catalogues, while it simultaneously contributed to a "better arrangement and collocation of records in bibliographic databases" (Gonzalez, 2005, p.12). From a user perspective, Zhang and Salaba (2009a) perceived that the E-R model supported the user tasks, as users were interested in the entities and would search by those, while the attributes and relationships supported their search and helped them to navigate the catalogue and to interpret the resources they had retrieved (Zhang and Salaba, 2009a, p.2). As mentioned above, the aim of the publication of FRBR was among others to reduce the number of search results. For that reason, FRBRised catalogues were supposed to cluster results on the work level, then on the expression level, and finally on the manifestation level (Zhang and Salaba, 2009a, p.91). According to Schaffner (2012, p.14), clustering works on a work level was particularly useful as it reduced the number of search results, while it also improved the quality of data representation. From the cataloguers' perspective, FRBR could be really useful as it improved the quality of metadata and structured the data that had been placed in a record. This allowed, in turn, to share data, to copy-catalogue and to easier modify data in a record (Zhang and Salaba, 2009a, p.57).

Nonetheless, FRBR also created issues. The most recurring issue in literature was the lack of information regarding the WEMI entities and their relationships. Zhang and Salaba (2009a, p.13) acknowledged that the aim of FRBR was to simplify the description of the bibliographic universe, but the definitions and information it provided were too vague. For instance, it did not provide boundaries that clearly separated a work from an expression, that said when a new work, expression or manifestation was created, or when an expression became a new work (Hider, 2018, p.27; Zhang and Salaba, 2009a, p.29). Zhang

and Salaba (2009a, p.66) gave an example of a journal article to illustrate this problem. Was the journal article a work in itself or part of another work? Schaffner (2012) pointed out that works might not be immediately identifiable as such. For instance, she analysed Kafka's *Der Process* (English: *The Trial*) in relation to the work entity and noticed that Kafka's work was difficult to pinpoint. First, it was published posthumously, and second, it was his editor, Max Brod, who was responsible for arranging the chapters and editing the text, while Kafka himself ordered to have all of his works incinerated after his demise (Schaffner, 2012, p.36). Nonetheless, Pisanski and Žumer (2010, p.645) declared a work to be "a mechanism for pulling together all of the different 'versions'". Ambiguous terminology was then the result of having either too broad or too vague definitions, which in turn resulted in subjective interpretation and slightly differing records.

Another limitation of FRBR was that it was mainly limited to the library setting only. The model served the creation of a bibliographic record and it helped accessing information in the catalogue. However, as users searched the catalogue either by work (a title of a work for example), expression (a translation for instance) or manifestation (a particular edition of a work), the FRBR model assumed to some extent that users were informed and that they rather knew what they were looking for. In other words, the FRBR model did not support browsing. Le Boeuf (2005) saw the reason for this in the origin of the online catalogues. According to him, online catalogues originated from the card catalogues that only "served to locate a 'known item' or to answer a precise query" (Le Boeuf, 2005, p.5).

In their study, Harej and Žumer (2013) compared the FRBR user tasks with interactive information retrieval (IIR), a sub-discipline of information behaviour. IIR tries to understand where interaction between user and system happens, what information needs to be displayed, how information should be searched, how it can be found, and on what grounds users make decisions regarding its relevance. Harej and Žumer (2013, p.745) perceived IIR as promising in analysing FRBR's user tasks, as IIR is both a user and system-centred approach, and user tasks generally involve interaction between user and system. The authors based their research project on two criteria: users should already have a well-informed information need as this equalled the stage of knowledge required by FRBR's four user tasks, and the project would only refer to the library environment as FRBR was most

likely applied in this environment (Harej and Žumer, 2013, p.747). Purpose of the study was to analyse to what extent FRBR's four user tasks helped to analyse situations of the real world (Harej and Žumer, 2013, pp.750-751). However, only two of the FRBR tasks (select and identify) were analysed. They were then applied to Ellis' model of information seeking behaviour and Belkin's model of information seeking strategies. Results showed that FRBR's user tasks originated from the interaction between user and system, two entities that were highly complex, dynamic and interdependent (Harej and Žumer, 2013, p.756). In conclusion, the authors highlighted the importance of comparing the FRBR user tasks with and applying them to other models, as this would improve the comprehension of the concepts, give guidance, help to understand and explain which attributes and relationships supported a search activity.

In their article published in 2012, well after the 2009 amendment of the FRBR model, Pisanski and Zumer critiqued that no user studies were conducted neither during the creation of FRBR nor later, and that there was thus no proof that FRBRised catalogues would "enhance user experience" (Pisanski and Žumer, 2012, p.583). In an earlier study, Pisanski and Žumer (2010b) observed that the opposition to FRBR could be explained by the fact that FRBR, a user-centred model, was never user tested, and that there was no proof that the model actually worked. In Pisanski and Žumer's 2012 study, students from the University of Ljubljana who were unfamiliar with FRBR, were presented with a list of WEMI entities and a series of graphs representing the WEMI relationships. Their task consisted in choosing the graph that they considered to be most appropriate, while they were also allowed to make changes to the graphs or build new ones. These options provided an opportunity to suggest changes to the FRBR model, or to make suggestions for improvement. Issues were detected, such as placing a translation of a work on the same level as the original text (expression level). In an article published well before Pisanski and Žumer's 2012 study, Le Boeuf (2001, p.19) already pointed out that WEM entities were not hierarchical, but that very different entities, such as the 1818 original text and the French translation of Frankenstein for example, would be equalled on the same level. Even though the participants in Pisanski and Žumer's 2012 study made comments about the graphs, none of the participants made suggestions how the graphs could be modified (Pisanski and Žumer, 2012, p.588). However, as most of the participants grasped the basic concepts of

the FRBR model, Pisanski and Žumer (2012, p.592) saw this as a proof that basic FRBR relationships could be understood intuitively and that this would have a positive impact on the acceptance of FRBR in the cataloguing community.

In contrast to Pisanski and Žumer's study (2012), Zhang and Salaba (2009b, p.237) recruited participants provided that they either published, researched or served on FRBR. The method chosen was the Delphi method, as it protected the participants' anonymity, allowed iteration and provided feedback (Zhang and Salaba, 2009b, p.237). The study revealed five core issues of FRBR. The first issue concerned the evaluation and modification of FRBR as well as of other models in order to see if they were efficient and would provide users with what they needed. Developing cataloguing rules that were in line with FRBR was a second issue raised, and the desire for guidelines and examples how to apply FRBR in specific settings was a third issue. The relatively vague definitions of FRBR were perceived as problematic by the participants of the study as this would leave too much room for subjective interpretation. If records would significantly differ from one another based on different understandings of FRBR terminology, this would have negative repercussions on interoperability. Fourth, the participants required that systems were developed and tested that would simplify the FRBRisation of the catalogues. Last, the research conducted in the matter of FRBR was critiqued and participants expected more user testing in the future and guidelines for implementation. In conclusion, issue two and five were predominant. There was a general agreement that cataloguing and encoding standards based on FRBR should be developed as well as frameworks for implementation.

More recent studies conducted by O'Neill and Žumer (2018) and Strader (2017) also explored the issue that FRBR still lacked a framework of implementation as well as a clear and comprehensive terminology. According to O'Neill and Žumer (2018, p.177), explicit implementation guidelines as well as unambiguous definitions of the WEMI entities were necessary for the sake of consistency in order to ensure interoperability. By the time their article was written, O'Neill and Žumer (2018, p.185) noticed that the FRBR model still provoked confusion and controversy in the cataloguing community. They acknowledged that FRBR had been "widely accepted and extensively studied" (O'Neill and Žumer, 2018, p.176), but in practice, it had not yet been fully implemented. The authors considered FRBR

as being too "print oriented" (O'Neill and Žumer, 2018, p.185) and not adequate to deal with the many types of information resources that existed, the rapid development of technology and information digitisation. Strader (2017, p.348) emphasised that no progress could be made unless the terminology issues were resolved, and extensive user studies were conducted that would help to better understand the users and their needs.

2.2.3 RDA

As technology constantly evolves with new technologies emerging, user needs are changing, and hence, metadata has to change too. New metadata elements need to be created or updated as more descriptive metadata is required (Chapman, 2010, p.210). With the publication of the FRBR model in 1998, it was soon agreed that the current standard AACR2 was no longer appropriate and that a new standard had to be developed that would better respond to the new needs of the users and the cataloguing community. However, as these changes were significant, it was generally agreed that a new name had to be found. Plans to call the new standard AACR3: Resource Description and Access were soon dismissed, as AACR3 was perceived as "not adequately addressing the perceived flaws in AACR2" (Chapman, 2010, p.210). Consequently, it became clear that major changes were about to affect the cataloguing community.

The response was RDA. First released in 2010 by the LC, it became subject of a test stage, and was then officially implemented in 2013 (Lisius, 2015, p.42). Introducing a new standard to the detriment of AACR2, which was until then implemented in many cataloguing communities around the world since the 1960s, was not an easy undertaking. The particularity of RDA was that it was a code that emanated from a conceptual, theoretical model that underlay a particular set of principles, namely FRBR. This was a new approach in the creation of a new cataloguing code and caused major upheavals. The chapters of AACR2, for instance, were divided according to format, whereas the chapters in RDA now dealt with entities, attributes and relationships matching those outlined in FRBR (Ehlert, 2010, p.18, p.20; Welsh and Batley, 2012, p.90). The main focus of RDA was thus content. Because it focused on content and not format, RDA could be applied to any type of resource, and was hence better able to respond to the fast-changing digital environment (Hider, 2018, p.134; Oni, Oshiotse and Abubakar, 2018, p.110).

Questions emerged in relation to AACR2 records and if they should be updated to the new standard (Lisius, 2015). No clear answer was, however, given. As a consequence, hybrid records were emerging. Lisius (2015, p.61) explained that hybrid records were created when RDA core elements were added to AACR2 records, without completely changing them to RDA. These additions would involve mentioning "rda" in the field 040\$e or adding the new content, media and carrier fields 336, 337 and 338 to an existing record. The resulting hybridization was, however, not bad practice, in contrast, it was in line with OCLC (Online Computer Library Center) and LC's policy statements (Lisius, 2015, p.61). Furthermore, Lisius (2015, p.61) added that hybridized records would soon become undistinguishable from original RDA records. In general, every new standard that is created, should be able to coexist with the records of any old standard in the same catalogue. Hider (2018, p.143) highlighted that the millions of AACR2 records that have been created still need to operate in an RDA environment. According to Oliver (2010, p.37), AACR2 and RDA records can coexist in a same catalogue, because RDA was originally developed from AACR2, and therefore, some of the rules in RDA are based on AACR2. Participants of Wiesenmüller's study (2017, p.189), however, perceived the aggregation of records from different standards in a same catalogue as problematic and confusing, because the catalogue then lacks uniformity.

Nonetheless, RDA was also perceived as innovative and as a means to increase access to information resources. Abbreviations and the 'rule of three' were abandoned or optional in RDA, while terminology changed too. AACR2's chief source of information, for instance, became preferred source of information in RDA as this would encompass multiple information sources and not only one (Thuku, 2016, p.8). Thuku (2016, p.10) said that RDA unified different manifestations on the work level and allowed users to perceive differences between resources that seemed to be similar. The most frequently mentioned innovation in RDA, however, was the creation of the three new fields for content, media and carrier types. Those three fields (336, 337, 338) allowed to record all types of resources, while also leaving room for those that would be developed in the future (Hart, 2010, p.30; Tosaka & Park, 2013, p.653; Welsh & Batley, 2012, p.90; Wiesenmüller, 2017, p.179). According to Cakmak (2018, p.37), RDA was implemented in Turkish libraries

because the new standard was perceived as a means to create more user-friendly catalogues by including more information in the records, and hence, to increase access. According to Intner (2018), RDA allowed more in-depth searching by adding new search elements to the traditional ones.

Wiesenmüller's study (2017), however, revealed that RDA created confusion among cataloguers. Participants of the study complained about the lack of time to learn RDA and to practice it. The RDA Toolkit, initially designed to be used online, was not perceived as helpful either, because users of the Toolkit needed some experience of RDA to be able to navigate and understand the table of contents, they would get easily lost when following the many links, and searching by keywords would retrieve either too many results, or none at all (Wiesenmüller, 2017, p.194). Furthermore, cataloguing was perceived as becoming more time consuming, because RDA mentions some core elements to be included in a record, while other elements are left to the cataloguer's judgment, then leaving it to the cataloguer to decide which information to record (Wiesenmüller, 2017, pp.190-191). This practice has the potential to create problems and inconsistencies in a catalogue as some records might contain a lot of information, whereas other records might be limited to RDA's core elements. Participants observed that some knowledge of RDA is necessary in order to be able to make those judgments (Wiesenmüller, 2017, p.187). For this reason, some libraries have created in-house rules defining elements that should be included in a record. In contrast, other studies (Oni, Oshiotse and Abubakar, 2018; Unkoff-Giske, 2018) have shown that the cataloguer's judgment is an advantage, because cataloguers have less rules to remember and greater freedom in their practice.

As mentioned above, studies on FRBR revealed that the model still lacks an implementation framework, precise terminology and user studies. RDA is based on this conceptual model, and one might wonder to what extent it irons out the flaws identified in the FRBR model. Wiesenmüller (2017) asked her participants to what extent they think that the new standard RDA would serve the users' needs, and some of them did not know how to answer that question. Some explained that they were not actually working with patrons so they would not know, others said that even though they worked with patrons, they would not exactly know how RDA served the users (Wiesenmüller, 2017, p.187). According to

Wiesenmüller's participants, user friendliness did not result from the cataloguing task or the standard, but from the presentation of the catalogue, and as they did not think that the catalogues had been FRBRised yet, they assumed that FRBR would probably not benefit the users as it should (Wiesenmüller, 2017, p.177, p.189).

2.2.4 Translation as a means to internationalisation

After the publication of RDA in 2011, the JSC met in Glasgow. The presence of a representative of the DNB (German National Library) marked the first time that a non-English-speaking country assisted in a JSC meeting, and it was the first step towards an internationalisation of RDA (Dunsire, 2016, p.310). Alongside the DNB who acted on behalf of libraries and library organisations in Germany, Austria and German-speaking Switzerland, other countries also expressed their interest in RDA. Among those could be found other European countries, countries from South and Central America, New Zealand, and some Asian countries such as Taiwan, China and Malaysia (Dunsire, 2016, p.311).

As English was not the national or primary language in many of those countries, the translation of the standard was inevitable. Translations into a language that was spoken in more than one country such as German or French, was applicable to the whole linguistic community. The German translation was a joint venture among Germany, Austria and German-speaking Switzerland, while the French translation was a quadripartite enterprise among the BnF (French National Library), ASTED (*Association pour l'avancement des techniques et des sciences de la documentation*), LAC (Library and Archives Canada) and BAnQ (National Library and Archives of Quebec), while the Spanish translation would serve all Spanish-speaking countries – Spain, Mexico, Colombia and other Spanish-speaking communities. In some countries, RDA was fully translated, while in other countries, such as Sweden, only a partial translation of RDA was made, most of the times because of financial reasons (Ducheva and Pennington, 2019, p.394).

Oehlschläger (2015) reported that the German cataloguing community would never accept an English standard that was not translated into German. For this reason, a German translation of RDA was inevitable. The DNB had the exclusive rights to translate RDA into German. By the legal agreement they had with the co-publishers of RDA and the ALA

publishers, the DNB was bound by contract to literally translate RDA, to translate the RDA Toolkit interface, to not change the structure of RDA and to keep the same numbering scheme. In turn, the DNB was granted the right to use the German translation for presentations, for example, for RDA training sessions or conferences, and to make it freely available on the RDA website for twelve months. Other cataloguing agencies that were responsible for translating RDA were bound to similar contracts. Those contracts were important to ensure that the translations were very close to the original text as this would facilitate the translation of future updates, but also to ensure that the translation remained a translation of RDA and did not become a new version of RDA.

The approach to translation was in many countries similar. The translations generally started with the translation of the glossary (Arsenault, Paradis and Riva, 2014; Bianchini and Guerrini, 2018; Garcia, 2014). Starting with the translation of the glossary meant that the translators had specialised and highly complex jargonised terminology available for consultation and reference during the translation process, which would then ensure a certain consistency in the translation. This was also important in cases where the translators were separated by a geographic distance, as it was the case for French and Canadian translators. To avoid that major differences appeared between the French and Canadian translations, strict guidelines were imposed on translators. They required that a person had (almost) native language skills of both languages, a deep knowledge of cataloguing, of the RDA development, of other cataloguing standards and formats, was willing to enter a long-time commitment, and paid detailed attention to form and content (Arsenault, Paradis and Riva, 2014, p.718; Garcia, 2014, p.725). Translators also compared RDA terminology against words that occurred in other standards and documents on which RDA rested. These were FRBR, FRAD, ICP (International Cataloguing Principles) and AACR2 (Garcia, 2014, p.726). It was noticed that RDA would allow the adoption of some of the terminologies of these publications, but it was also acknowledged that RDA created new words such as 'core elements' or 'carrier types', or that it assigned new meaning to existing words, like 'work', 'expression' and 'manifestation'. Terms had to be found in the language of the translation that would express exactly the same meaning as the English equivalent.

Despite these measures, difficulties occurred, because linguistic variations within a language existed and they had to be taken into account (Arsenault, Paradis and Riva, 2014; Garcia, 2014, p.727). Bianchini and Guerrini (2018, p.4) reported that there were either more than one word in Italian that was equivalent to its English pendant, or vice versa. Arsenault, Paradis and Riva (2014, p.707, p.713, p.715) added that the French translation raised issues regarding grammatical gender, stylistic variations and special characters, and that a uniform agreement had to be found regarding the translation of these. Nonetheless, the translations into another language did not always agree, nor did they always adequately respond to the needs of a particular cataloguing community (Ducheva and Pennington, 2017, p.9).

Küssow and Märchy (2017) draw attention to the translation situation of German-speaking Switzerland. The Swiss-German network NEBIS adopted the German translation of RDA, but some libraries in their network were not German-speaking. In fact, the NEBIS network is bilingual having German and French as working languages, which means that everyone can catalogue in their own language, catalogue records are available in both languages, communications are bilingual, while simultaneous interpreters are present at events and trainings when French-speaking persons participate (Küssow and Märchy, 2017, p.18). The Swiss-German community outsourced the French translation of RDA D-A-CH AWR (Germany, Austria and German-speaking Switzerland's code of practice of RDA) to two translation agencies, which made the translation process even more complex, as the translators were not familiar with the highly complex cataloguing terminology. Furthermore, it was noticed that the French and German translations did not agree, because the former was not regularly updated. The D-A-CH button built in the RDA Toolkit linked to the German RDA guidelines and not to the French ones, while the Integrated Authority File (GND) was and still is only available in German for both the German and French cataloguers.

A translation of RDA is inevitable in order to make it an international standard. Even though the translation process is challenging, Ducheva and Pennington (2019, p.388) and Guerrini (2015, p.3) emphasised that RDA more than AACR2 is an international standard as it allows the adoption and application of local, cultural and linguistic variations of a community.

Furthermore, Ducheva and Pennington's study (2019, p.395) showed that a full translation of RDA supports learning and makes it more approachable.

2.3 Literature Review in context

Almost 230 years have passed since the first national code for descriptive cataloguing has been developed in France. During that time, cataloguers and researchers have spent a lot of time reflecting on catalogues, their *raison d'être*, and how they should be constructed. With the publication of his *Rules*, Cutter was the first who placed the user in the centre of attention. Later cataloguers like Lubetzky or Ranganathan adopted this patron-centred view, which still informs cataloguing standards and codes today. Nonetheless, the publication of the FRBR model in 1998 questioning former cataloguing codes, the ISBD and even MARC, was an "earthquake" (Le Boeuf, 2001, p.18). The fact that the term 'navigation' was used multiple times in FRBR was, according to Le Boeuf (2001, p.17), a hint that the catalogue turned into "an entirely electronic device". Hart (2010, p.31) agreed with Le Boeuf and continued that everything had changed since the publication of FRBR. Denton (2007, p.35) highlighted that even though future cataloguing codes would rest on FRBR, the model should not be *"the* end point" but *"an* end point", leaving room for future studies, research and developments.

At the Annual CILIPS (Chartered Institute of Library and Information Professionals in Scotland) Conference in June 2019, Jane Cowell (2019) talked about innovation in the library sector. According to her, "innovation rethinks experience" (Cowell, 2019). Libraries should provide and work on delivering meaningful experiences to their users, rethink how users can connect with the content, and they should become more serious in delivering this task. Developing new cataloguing codes is a logical consequence of the rapid developments of technology, the ever-changing user needs and the enormous amount of information that is produced and needs to be managed. Nonetheless, whatever happens, libraries' collections and the content have to be made available and accessible at all times. In another talk at the same conference, Kirsty Lingstadt (2019) reminds that all library platforms, hence catalogues, should be user focused and not client focused. Catalogues serve the users and the latter should be able to use them with ease, not the information professionals who construct and feed them (Fig.4).



Fig.4 Client VS user perspective (It's Foss – Linux Blog, 2019)

FRBR was developed, because it was assumed that the catalogues had to become more user-centred and better able to respond to new technologies. Even though no extensive user-based studies were conducted, FRBR was largely accepted as the starting point for the development of a new cataloguing standard. Even though 20 years have passed since the publication of FRBR, voices are still raised that question the efficiency of FRBR. These critical voices can still be heard even after successful implementation of RDA in the international cataloguing community. In 2013, Tosaka and Park (p.655) observed that the user was the least studied component of RDA. Five years later, Hider (2018, p.143) said that it is still not clear if it is actually important to distinguish between the WEM entities.

Since there are still many questions about FRBR, RDA and the user-centred approach, this dissertation aimed to find out to what extent the underlying FRBR structure became apparent when the RDA-formatted catalogue records were compared to their AACR2-formatted counterparts, and to what extent these findings would have an impact on FRBR's four user tasks. Questions that guided through the analysis were the following:

- Are the RDA-formatted records in line with FRBR?
- Does FRBR benefit users as it should?
- To what extent do RDA-based records serve the users better than AACR2-based records?
- If at all, to what extent are our catalogues FRBRised?

3. METHODOLOGY

3.1 Case study

The present project was case study based. This method was considered to be most appropriate as case studies generally involve an in-depth analysis and rich investigation of a situation or a case in order to understand the complex matters behind. Most of the time, case studies involve a qualitative analysis including fewer samples with the aim to better understand reality or to investigate an established theory. However, as the data analysis is generally based on a subjective analysis of the investigators' observations, the latter have to clearly justify their reasoning. (Ruthven, n.d., pp.5-7)

As mentioned above, this project focused on FRBR and to what extent RDA's underlying FRBR structure became apparent when the RDA-formatted catalogue records were compared to their AACR2-formatted counterparts. RDA is a standard that has been developed after the publication of the FRBR model, it is based on FRBR and adopts its user-centred approach. AACR2, for instance, was developed long before FRBR, and as a consequence, one might assume that this cataloguing code would not be as effective in responding to the users' needs as RDA. In order to see to what extent FRBR and hence RDA serve users better than old cataloguing standards, an in-depth analysis and rich investigation of AACR2 and RDA-based records was undertaken. The aim was to analyse if there were major differences between both standards and to what extent this would impact the users and their experience of the catalogue.

The comparative analysis of records based on two different cataloguing codes was considered to be an appropriate method for this project, because it helped to gain a deeper knowledge of descriptive and bibliographic cataloguing and of the underlying principles, to gain a better understanding of FRBR, to understand relationships between entities, to use metadata schemas and to apply metadata standards. Furthermore, case studies and the associated analysis fostered the acquirement of well-developed analytical skills, as one had to understand the information that was recorded, to compare and interpret the data.

The comparative analysis is a method most commonly used in social sciences to make comparisons across different countries, different societies or different cultures. In these studies, one entity is compared with other entities, while one component could be a theoretical framework (Mills, 2008). The aim is to identify and investigate similarities and differences, and to illustrate possible relations (Mills, 2008). According to Hantrais (1995), comparative studies help to identify, explain and analyse similarities and differences between the entities studied in order to gain a deeper understanding of their functioning and structure. Pickvance (2005, p.2) highlighted that the comparative analysis should focus on the why-question in order to explain why those differences and similarities exist. Rihoux (2006) focused in his article on qualitative comparative analysis (QCA) and perceived it as a strategy "designed for more theory-driven work" (Rihoux, 2006, p.691). According to the author, QCA is a type of data analysis that achieves results by having a "dialogue with the data" (Rihoux, 2006, p.684). Furthermore, Rihoux (2006, pp.683-684) associated five important qualities with QCA that supported this dialogue. First, QCA allowed to summarise data, second to identify coherence within the data, third to test and challenge established theories, fourth to formulate new ideas, to test, and finally, to elaborate these.

In their article, Esser and Vliegenthart (2017, p.2) mentioned understanding, awareness, generalisation, relativisation and alternatives as five core functions of comparative analysis. These concepts imply that researchers understand one entity and are aware of the existence of others, and that they test theories across different settings and situations. Furthermore, the technique of comparison prevents an over-generalisation of one's own understanding of concepts and theories, while it offers alternative solutions and approaches. Similar to Mills (2008), Esser and Vliegenthart (2017, p.2) highlighted the importance of comparing entities on the basis of a theoretical framework to extract and explain similarities and differences. The comparative analysis was judged the most appropriate method to investigate the impact of FRBR on current catalogues, because it allowed to compare cataloguing records based on two different cataloguing standards and to extract similarities and differences between those. The aim was to explain the reason why similarities and to what extent these phenomena could be linked to the presence or absence of FRBR in the design of the respective standard.

The literature review served as a scaffold and helped to gain a broader view on the topic, which was essential for this kind of analysis, because the literature review provided knowledge and insights into the topic that helped to find an explanation for the similarities and differences that the data analysis had revealed (Esser and Vliegenthart, 2017, p.4). It was structured chronologically, starting with the first national cataloguing code and the first mentioning of the card catalogue during the French revolution, until the implementation of the most recent standard RDA, which has become a widely accepted and adopted cataloguing code among the different cataloguing communities worldwide. Starting as early as the French revolution favoured a better in-depth understanding of the long history of standardisation and codes, while it also helped to gain a better knowledge of the evolution of thoughts that cataloguers and researchers have put in their development and design ever since. To gain this knowledge was crucial as it is the foundation of what we have today.

Cataloguing items be it books, DVDs, journals or other resources is an indispensable task in order to keep exact records of the resources that belong to a particular collection or the holdings of a library. The rules and codes, in turn, help to maintain consistency in the catalogue. As long as libraries exist, people have been looking for a way to organise their collections. During the long history of standardisation, modifications have regularly been made to the rules in order to improve the codes. In the mid-twentieth century, for example, Lubetzky was assigned with the task to review ALA's cataloguing rules and to simplify them if necessary. With the fast-changing technologies, the creation of new types of resources, and consequently, with the changing user needs, it is important to keep changing, updating, improving and adapting the codes to the new requirements.

The literature review pointed out that the changes were not always welcome, and it was legitimate to question some of the changes that were made. The costs of implementation, of teaching and training staff members, for instance, strengthened the case against adopting a new code. Furthermore, implementing a new cataloguing code also meant that a solution had to be found for the many records that were still based on the former code.

This became a major issue when RDA was published, as it had a new approach to cataloguing. RDA was revolutionary, because it was the first code that was founded on a conceptual model of the bibliographic universe placing the user in the centre of its design. Opinions, however, diverged if this undertaking was successful. RDA emphasises, for example, to practice cataloguer's judgment much more than any other code before. Wiesenmüller's participants (2017), however, observed that uniformity and consistency in the catalogues would be at risk due to the practice of the cataloguer's judgment. The literature showed that not everyone believes that FRBR and RDA adopt a user-centred approach.

The literature highlighted the many challenges that were associated with the implementation of a new cataloguing code, the problems that it caused, the solutions that were found, and the doubts that remained. It is important to keep those in mind for the data analysis that is about to follow, because the analysis rested upon these.

3.2 Data gathering

The data analysis was based on a comparative analysis of AACR2 and RDA-based records to the FRBR model. In order to be able to do this, data was gathered from two different OPACs (Online Public Access Catalogues): NEBIS and a-z.lu. OPACs or online catalogues consist of bibliographic records that are encoded in machine-readable format, with MARC (MAchine-Readable Cataloguing) for instance, so that they can be displayed on a computer (Joudrey and Taylor, 2018, p.655; Reitz, 2013). The catalogues of NEBIS and a-z.lu are online available for users who can do a simple keyword search, or do an advanced search by title, creator, subject or call number, or by choosing different facets to refine the search, such as the date of publication, the resource type or language (Fig.5). Both search interfaces below (Fig.5 and Fig.6) share that the users can further refine their search by the 'search scope'. This is rendered possible, because both OPACs are union catalogues. Union catalogues aggregate the holdings of more than one library, institution or collection (Joudrey and Taylor, 2018, p.671).
NEBIS	NEW SEARCH	HELP	NEBIS LIBRARIES	OTHER CATALOGUES		
Search for: Books, Journals, Images Search Scope: All NEBIS libraries	O Article	es and more	O Everytl	ning		SIMPLE SEARCH
All fields				Resource type All resource types Language	•	
Title ds ▼ contains ▼ Creator				Any language Creation date Any year	• •	
E Topic						
Call Number						

Fig.5 Search interface NEBIS (2019a)

a-z.W		ILL	HELP	CONTACT	ACQUISITION REQUEST	
	Search for: All contents	Digital Library	O eluxe	mburgensia	My bibnet.lu library	SIMPLE SEARCH
	Any field Any field Any field Any field Any field Any Any Any Adm. de la gestion Archives nationales	uxembourg de l'eau s			Publication Date Any year v	

Fig.6 Search interface a-z.lu (n.d.)

The two chosen networks use the same integrated library software, Aleph. An integrated library software, or ILS, is a computer system with "an integrated set of applications" (Reitz, 2013). These include modules, which are designed to perform various functions, such as the acquisition and cataloguing of resources, managing the circulation of items (lending and return of items), as well as ensuring public access (Joudrey and Taylor, 2018, p.643; Reitz, 2013). Aleph was developed in 1980 at the Hebrew University of Jerusalem (Ex Libris, 2018). Today, it is a widespread ILS marketed by the library software company Ex Libris, which was acquired by ProQuest in 2015 (Ex Libris, 2018).

3.2.1 Swiss libraries and the NEBIS network

Switzerland is divided into two different library communities: RERO (Library Network of Western Switzerland) and IDS (Network of German-speaking Switzerland), while the NB (Swiss National Library) is not a member of either of them (Aliverti and Müller, 2013, p.13). RERO is responsible for the French-speaking community in Switzerland, and IDS serves the Swiss-German community. Instead of working together, the two communities and the NB used to work independently from one another. RERO and IDS chose to adopt different software and formats that would rather simplify the exchange of data with one of their neighbour countries with whom they shared the same language (Keller and Uhl, 2018, p.59). Therefore, collaboration and the exchange of data with one another was difficult. As a response to this rather complex situation, the decision was made in 2012 to implement RDA in all Swiss libraries. The objective was to create much more homogenous catalogues, that were interoperable and would facilitate the exchange of data (Aliverti, Behrens and Schaffner, 2016, p.256).

The RDA implementation project, however, became a joint venture not within Switzerland, but among the Swiss-German network IDS, Germany and Austria. These countries were the first non-English speaking countries to adopt RDA and they adapted the rules to their own linguistic community. Their project and code of practice is known under the acronym RDA D-A-CH AWR. The until then used rules for descriptive cataloguing of German-speaking Switzerland, KIDS, which were based on AACR2, were replaced by RDA in 2016. In October 2016, the NB also changed their cataloguing standards to RDA (NB, 2018). In December 2018, RERO published a document outlining the transition from AACR2 to RDA in two steps (Réro, n.d.). From January until May 2019, cataloguers would be made aware of RDA and FRBR, and the new RDA fields would be added to MARC. By December 2019, RERO aims to have completed the transition process to RDA by having adopted the same cataloguing rules as the German-speaking countries (RDA D-A-CH AWR) but adapted to their own linguistic community.

One part of the data was gathered from the union catalogue of the NEBIS network. NEBIS is a member of IDS, and it is the largest network of academic and research institutions in Switzerland (Küssow and Märchy, 2017, p.17). Almost 150 libraries from across Switzerland

and across all four language communities (German, French, Italian and Romansh) collaborate in this network in order to make records of approximately 10.5 million resources online available and accessible (NEBIS, 2019b). Most of the libraries within the network are German-speaking, but over 15% of the libraries are non-German-speaking (Küssow and Märchy, 2017, p.16). The working language of NEBIS is German and French.

3.2.2 Bibnet.lu and a-z.lu

The union catalogue a-z.lu is operated by the Luxembourgish library network bibnet.lu and gives access to the resources of 87 Luxembourgish libraries (bibnet.lu, n.d.). They include public libraries, the National Library, research institutions, state cultural institutions, higher education and academic libraries, school libraries, and special libraries (Kieffer, 2012, p.27). The National Library of Luxembourg (BnL) is in charge of the network and "responsible for the implementation and maintenance of the IT infrastructure" (Kieffer, 2012, p.27). The BnL is the bibliographic agency of Luxembourg, and the decisions that it takes are valid for all library institutions within Luxembourg. Furthermore, the BnL also trains new cataloguers and offers advanced training for cataloguers.

The libraries and institutions that are part of the network catalogue in MARC using Aleph as their ILS. They use the French version of the Swiss-German cataloguing rules IDS for descriptive cataloguing (KIDS), which are based on AACR2 (BnL, 2017a). IDS was in charge of maintaining and regularly updating KIDS, while the Luxembourgish network adopted those. However, as mentioned previously, IDS adopted RDA in 2016, and no updates have since been made to KIDS. As a consequence, NEBIS and a-z.lu were considered to provide appropriate data for this project, as the Luxembourgish network still catalogues according to KIDS, not updated since 2015, while the Swiss-German network itself migrated to RDA almost three years ago. It was hoped that the comparative analysis would provide evidence of a different search experience in the two catalogues as well as significant differences regarding the information recorded in the MARC records.

The transition to RDA was, however, not overlooked by the Luxembourgish network. Plans existed to migrate to RDA. For instance, in April 2013, the same year when the LC officially adopted RDA, the BnL posted a job vacancy at their cataloguing and indexing department

(BnL, 2017b). Having a deep interest for new technologies such as Web 2.0 and RDA was one of their requirements. Furthermore, the position would involve among other tasks the management of an RDA implementation project. Six years later no official plans have yet been revealed regarding a transition to RDA (as at August 2019). The BnL is, however, a member of EURIG (European RDA Interest Group) (RSC, n.d.).

3.2.3 Multilingual context

Switzerland and Luxembourg are both multilingual countries. The Grand Duchy of Luxembourg recognises three languages: Luxembourgish, French and German. Luxembourgish is the national language, French is the language of legislation, while Luxembourgish, French and German are the languages of administration and judiciary (Le Gouvernement du Grand-Duché de Luxembourg, 2015). Switzerland has German, French, Italian and Romansh recognised as national languages, while German and French are spoken by a majority of the population (SWI, 2017). The cataloguing language of NEBIS is German, while French is the cataloguing language used by the Luxembourgish network. It is, however, the case for both networks that they record some information in the language of the resource (Aliverti and Müller, 2013, p.13). The English edition of Allison Levy's House of Secrets: The Many Lives of a Florentine Palazzo, for example, is catalogued in English and the title is not translated into the preferred language of the catalogue. The bibliographic and authority data is in English, even though English is not an officially recognised language neither in Luxembourg nor in Switzerland. This rule agrees with AACR2's rule 0.12 and RDA's rule 0.4.3.7, which reads that if the information is taken from the resource itself, it is encoded in the language as it appears on the resource. If the information is not taken from the resource itself, it should be encoded in the preferred language of the bibliographic agency. Subject access fields are, however, treated differently. Subject access entries and terms are encoded in one language only. The chosen language is French for Luxembourg and German for the German and French cataloguers of German-speaking Switzerland.

3.2.4 Criteria

There were a few criteria that had to be met in order to do the comparative analysis. First of all, it was essential to have access to the MARC records of the two chosen online catalogues. Both NEBIS and a-z.lu had their records openly and freely available. The NEBIS

network had an open data strategy that allows users to freely use their bibliographic data under the creative common licence CCO 1.0 Universal Public Domain Dedication (NEBIS, 2019b). In their metadata quality statement, they highlighted that every institution participating in the NEBIS network would ensure that the published data was accurate (NEBIS, 2019b). Nonetheless, they also stated that the criteria for high quality metadata might not always be met (NEBIS, 2019b). No information regarding a licence agreement was provided by the Luxembourgish network. In either case, the data was solely used within the framework of this dissertation, and it was not shared with third parties.

Forty-three items were randomly chosen from both OPACs. The MARC records and the labelled versions of each of these items were saved as screenshots on a personal computer. The same item had to be available in both catalogues. To make sure that the items were identical, they were required to have the same ISBN (International Standard Book Number), ISSN (International Standard Serial Number) or another standard identifier. Furthermore, the items had to be published after 2016, because from September to December 2016, RDA was implemented in and tested by the Swiss-German cataloguing community until it then got officially adopted in 2017. Choosing records that were catalogued before 2017 would increase the probability that the records were catalogued according to KIDS, and it would not make sense within the framework of this project to compare records from the NEBIS network and a-z.lu that were catalogued according to the same standard. Six of the seven chosen journals were, however, published prior to 2017. They were chosen, because the information in the respective NEBIS records were RDAised.

In the FRBR report it was mentioned that the model tried to cover a variety of materials (IFLA, 2009, p.7). As a consequence, a third criterion was defined for the data gathering of the present study. It was required that the chosen items covered at least five different topics and themes (for example fiction, non-fiction, juvenile fiction, autobiographical), and most importantly, that they covered at least five different types of materials (for instance printed books, electronic books, audiobooks and audio-visual materials). Articles were not included in the analysis, because the records were not available in the OPACs, but only with the online publishers, like ProQuest. The audio-visual materials had no identifier. In such a case, IFLA (2009, p.81) says that certain common characteristics of an entity serve as a

means of differentiation. For this reason, the available information in both OPACs was compared in order to decide if the records of the audio-visual materials in question described the same item. Furthermore, information included in some of the MARC records identified a resource as both electronic books and printed books. In these instances, the resources were integrated in the data analysis as one format only. The full list of the fortythree items that had been chosen can be found in Annexe 1.

It was challenging to find records that met all the above-mentioned criteria. 88.38% (38 out of 43) of the chosen resources were printed books (20.93%), e-books (16.28%), audio books (11.63%), audio-visual materials (23.26%) and journals (16.28%). Printed books, e-books and audio-visual materials were easier to find, as they were popular titles that were recently published (within the last two to three years). It was more difficult to find matching audio-visual materials, because of the missing identifier, while other information, such as the publisher, the place of publication or the language, were often not matching. Finding journals that were suitable for the analysis was difficult as well, because many journals were first published prior to RDA implementation in the Swiss-German environment, so that most of the records were not yet updated to RDA. Identical non-book materials such as games, and mixed materials such as language materials were hard to find. For this reason, only one record (2.33%) of each was part of the analysis. Cartographic materials (6.98%) were included in the analysis in order to have a more diversified sample of records to analyse. The cartographic materials were interesting as such, because in one OPAC they were considered as cartographic materials, while in the other they were considered as printed books.

3.3 Data preparation

The aim of comparative analyses is to identify and explain similarities and differences between entities on the basis of a theoretical framework. Before the AACR2 and RDAformatted records could be compared to the FRBR model, the records themselves became subject to analysis. The AACR2-based record of one resource and the RDA-based record of the same resource were compared, and the similarities and differences were recorded in spread sheets. This procedure allowed to detect which MARC fields were most commonly used by both cataloguing networks, which were used by one rather than by the other

network, which fields were infrequently used, which fields were frequently used, or which fields were used for cataloguing one type of resource but not used for cataloguing other types of resources. The aim was to detect any similarities and differences among records describing the same type of resource, but also beyond.

The Bookshop					
MARC	a-z.lu	NEBIS			
Fields	(AACR2)	(RDA)	Comments / observations / peculiarities		
FMT	1	1	VM - Visual materials		
			Both as n-new, g-projected medium, m-monograph/item, 4-		
			core level; NEBIS: as a-UCS/Unicode (auto-filled), c-ISBD		
L D R	1	1	punctuation omitted; a-z.lu: as u-unknown		
001	1	0	Control Number database LUX01		
005	0	1	Date and Time of Latest Transaction		
007	1	1	id.; v-Videorecording d-Videodisc v-DVD		
			NEBIS: p-Distribution/production date, gw-Germany, v-		
			Videorecording, ger-German, d-Other; a-z.lu: s-single known		
008	1	1	date, gw-Germany, v-videorecording, eng-English		

Table 1 Transferring data to a spread sheet

The information provided by the MARC records of both networks were transferred to spread sheets. The chart was divided into four columns (Table 1). All the MARC fields that appeared in the a-z.lu record and the NEBIS record of a same resource were recorded in the first column. The second column was dedicated to a-z.lu (AACR2-formatted), while the third column recorded the data from the NEBIS network (RDA-formatted). Any comments, observations or peculiarities were recorded in the fourth column. Subsequently, the records were analysed line-by-line and the presence or absence of a MARC field was recorded in the chart with 1-present and 0-absent. The figure above (Table 1) is an excerpt of the analysis of *The Bookshop* (audio-visual material). It displays the format (FMT), Leader (LDR) and the Control Fields (00X). The FMT, for example, was used in both records, whereas 001 (Control Field) was used in the a-z.lu record, and the 005 (Date and Time of Latest Transaction) was used by NEBIS. MARC fields that did not appear in the records,

were not considered in the chart. In a next step, the data was colour-coded in order to make the similarities and differences visually apparent. If a MARC field appeared in both records, it was highlighted in green, if it only appeared in the a-z.lu record it was highlighted in blue, and in yellow if it only appeared in the NEBIS record.

Online Catalogue	a-z.lu	NEBIS		
	 Type of material 	 Type of material 		
	- Title // title	- Title		
Top section	- Collaborator	- Collaborators		
	- Date of publication	- Date of publication		
	- Availability	- Availability		

Table 2 Comparison of information provided in both catalogues

Once the data from the MARC records was prepared, the information provided by the bibliographic records in the online catalogues was compared to see how information was displayed, if there were any similarities or differences between the catalogues. Going back to the example of *The Bookshop*, if a user would search the catalogues for *The Bookshop*, they would see the following information (Table 2). a-z.lu told its users which type of material it was (DVD Video), it provided the original title in English and gave the German title as parallel title, the director as collaborator, the year of publication and if the item was available from a library. Comparing both catalogues, one noticed that NEBIS provided similar information. Preparing the data in such a way allowed to have a more abstract view on the data provided by the catalogues, and it facilitated making comparisons across resources. The complete analysis of the MARC records and the bibliographic records from the catalogues based on *The Bookshop* is provided in Annexe 2.

4. ANALYSIS

Although the MARC records analysed within the framework of this dissertation contained bibliographic and holdings data, only the bibliographic data was integrated in the analysis. Please note that the MARC fields are numbered throughout the analysis section, while definitions are only given for the most frequently used MARC fields. Further information, definitions and scope of each individual MARC field and subfield can be found on the website of the Library of Congress (2019).



4.1 The MARC records

4.1.1 Encoding level (000/17)

Fig.7 Encoding level

The Leader-field (000) is the first field in the bibliographic records, and it is a fixed-length field of 24 positions that are either auto-filled or manually filled in. The analysis suggested that among those manually filled in positions, the record status (05), the type of record (06), the bibliographic level (07), the encoding level (17) and the descriptive cataloguing form (18) were those 000 positions that were most frequently used in the records. Generally, recording value i in 000/18 suggested, for example, that one dealt with an RDA-

formatted record. Nonetheless, the preferred value recorded in the NEBIS records was c, indicating that the ISBD punctuation was omitted.

Particular attention was paid to the encoding level (Fig.7). Two NEBIS records were encoded at partial level and unknown level (2.33% respectively). One (2.33%) a-z.lu record was encoded at abbreviated level, four (9.30%) as not applicable, two (4.65%) as K, a value that could not be clearly identified, but probably stood for less-than-full level defined by OCLC, leaving three (6.98%) a-z.lu records whose encoding level was undefined, meaning that position 17 of the 000-field was left blank. As the graph above showed (Fig.7), value 4 was most frequently chosen by both NEBIS and a-z.lu, meaning that those resources were catalogued at core level. 41 (95.35%) NEBIS records and 33 (76.74%) a-z.lu records were encoded as such. Core level refers to the level of completeness of a bibliographic record defined by a cataloguing standard or agency. AACR2, for instance, defined three levels of bibliographic description, leaving it to the library to choose the level of detail appropriate to their users and the resource being catalogued (ALA, CLA and CILIP, 2005, 1.0D.). The chosen level of description had to be applied to all resources with the possibility to add or omit elements depending on the resource being catalogued and the conventions of the library. KIDS, for instance, defined a niveau normal IDS (core level IDS), which equalled AACR2's second level of description (IDS, 2011, 1.0D1.). RSC (RDA Steering Committee) defined a number of core elements that had to be included in an RDA record (RDA Toolkit, sections 0.6.2 to 0.6.7). In their code of practice RDA D-A-CH AWR, Germany, Austria and German-speaking Switzerland defined a certain number of core elements that were specific to the German-speaking community.

4.1.2 Copy-cataloguing

The encoding level guarantees to maintain a certain degree of consistency in a bibliographic record, that does not only simplify data interoperability and the exchange of data, but also favours international cooperation by copy-cataloguing from other cataloguing agencies, a practice that is not uncommon as cataloguing is rather an expensive task. For copy-cataloguing to be most effective, the bibliographic records need to meet certain criteria and be of a certain quality. If a cataloguing agency copies from another agency, attention should be paid to completeness and accuracy of the data that is subject to copy-

cataloguing, as well as to issues of punctuation, spelling mistakes or incomplete call numbers (Mason, 2019). In the copy-catalogued records in a-z.lu, for example, the ISBNs were used without the dashes, whereas the dashes were used in all records originally catalogued in a-z.lu. If users would run a search for the ISBN with the dashes, no results would be returned, and vice versa.



Fig.8 Copy-cataloguing

Both NEBIS and a-z.lu copy-catalogued (Fig.8). 18 (41.86%) NEBIS records were copycatalogued from other cataloguing agencies such as the DNB or the LC, and 25 (58.14%) records were originally catalogued by NEBIS. Six (13.95%) a-z.lu records were copycatalogued from other cataloguing agencies, 32 (74.42%) of the records were originally catalogued by one of the libraries of the Luxembourgish network, leaving 11.63% (5 records) as undefined. In all five a-z.lu records that were labelled 'undefined', the cataloguing source (040) was missing from the record. If the 040-field was intentionally omitted could not be traced.

The data suggested that RDA supported copy-cataloguing more than AACR2. While the gap between copy-catalogued and non-copy-catalogued NEBIS records was not that significant (16.28%, 7 records), the gap between the a-z.lu records was distinctive with a difference of 60.47% (26 records), not considering the undefined records. As mentioned in the literature review, although AACR2 was considered to be the first international cataloguing code, it was a success in the English-speaking countries rather than in the rest of the world. As cataloguing agencies across the world then used different standards defining different

metadata element sets, copy-cataloguing was less convenient, because it was as timeconsuming to make amendments to a copy-catalogued record as to catalogue from scratch. Furthermore, as mentioned above, AACR2 defined three different levels of description leaving it to the libraries to choose the level that was most appropriate to the purpose of their catalogues, which means that even though two cataloguing agencies catalogued according to AACR2, the level of detail might differ depending on the level they chose.

RDA, in contrast, is an international standard by design, translated into languages other than English, capable to be adapted to communities' local, linguistic and cultural variations (Ducheva and Pennington, 2019, p.388; Guerrini, 2015, p.3). RDA defines a core element set that needs to be included in a record, allowing cataloguing agencies to add core elements or additional elements to the element set, a practice that might render copycataloguing more attractive and facilitate international cooperation. Critics of RDA, in turn, perceive the metadata standard as less interoperable, as it leaves room for the cataloguer's judgment, a practice that could create real problems and inconsistencies in a catalogue. Nonetheless, as the statistics above illustrated (Fig.8), copy-cataloguing is a practice that might more likely be found in RDA.



4.1.3 Core elements

Fig.9 Comparing the use of MARC fields in both catalogues

Comparing the MARC records across both networks, a total of 72 different MARC fields were used for cataloguing the 43 resources. Among those 72 fields were those fields that were either exclusively used by both networks, only in a-z.lu records or only in NEBIS records (Fig.9). However, there were also those fields that were predominantly used either by both, by a-z.lu or by NEBIS, but not exclusively. For instance, 245 was exclusively used by both networks, meaning that it co-occurred in all the records of both networks. 300, in turn, predominantly co-occurred in the records of both networks, and apart from that, it also appeared in five NEBIS records only. 509, for instance, predominantly occurred in az.lu's records, while it once also co-occurred in the records of both networks. Furthermore, there were 20.83% of MARC fields that were alternately used by the networks, meaning that they either appeared just as often or with the same infrequency across the records. 504, for instance, co-occurred in two records of both networks, it appeared twice only in the a-z.lu records, and twice only in the NEBIS records. Based on the data provided by the networks' MARC records, it was deduced that NEBIS recorded more data in the bibliographic records than the Luxembourgish network. 27.77% (8.33% + 19.44%) of MARC fields co-occurred or mainly co-occurred in both networks, while 13.88% (6.94% + 6,94%) only or mainly occurred in the records of the Luxembourgish network, whereas 37.50% (23.61% + 13.89%) only or mainly occurred in the records of the Swiss-German network. On average, NEBIS used 23.62% (37.50% – 13.88%) more MARC fields than a-z.lu.

Among those 8.33% of MARC fields that solely co-occurred in the records of both networks and those 19.44% of MARC fields that predominantly co-occurred in the records of both networks were those fields that were defined as core elements by RDA and KIDS. 000, 008, 245 and 260/264 occurred without exception in all the records. 260 and 264 were considered as the same field, because they were targeted at recording similar information. The main difference between both fields was that NEBIS tended to put the year of publication in square brackets. With the exception of the journal records, 1XX and 7XX were used in all the records. The physical description fixed field 007 was used by both networks to describe audio and audio-visual materials. When 007 occurred in a record, it was generally used in conjunction with 300, 336, 337 and 338. An identifier was used in almost all of the records. The ISBN was recorded in 020 for printed, audio and electronic books,

while the ISSN value was entered in 022. Other standard identifiers, such as identifiers for audio-visual materials, were recorded in 024. 028 occurred in some of NEBIS' audio-visual records to record a publisher or distributor number. The cataloguing source was identified in 040, a field that co-occurred in all the records, except for those five a-z.lu records whose 040-field was omitted. The 300-field occurred in all the records except for the journal records. The format-field (FMT) occurred in all NEBIS records and all the records that were originally catalogued by a-z.lu. 250 and 490 were used in NEBIS and a-z.lu records whenever an edition statement or series statement was identified. 041 was mainly used for translations with the language of the resource being catalogued in 041\$a and the original language in 041\$h. 041 was used in conjunction with the language value encoded in 008/35-37.

The values encoded in the MARC fields were, however, not always identical with one network being more specific than the other or interpreting data in different ways. Both networks generally agreed on the same FMT, except for the cartographic materials. a-z.lu defined those resources as books (BK), while NEBIS considered them to be maps (MP). In 008, data variation mainly happened with regards to the values entered for the type of date (008/06) and the place of publication, production or execution (008/15-17). For example, one network said that the place of publication was xxu (United States), whereas the other network was more specific by saying that the place of publication was nyu (New York State). a-z.lu and NEBIS mainly disagreed on 008/15-17 in the records of the audio-visual materials, because as no identifier was recorded for hardly any of the DVDs, it was not safe to say that the records of exactly the same manifestation were subject to the analysis. Therefore, it was possible that the manifestation catalogued by NEBIS was published in Switzerland, while a-z.lu's manifestation bearing the same title and containing similar content was published in Germany. The place of publication in 260\$c and 264\$c respectively were, hence, also subject to variation, as these fields were used in conjunction with 008/15-17.

In the title statement (245), variation between the records mainly happened in subfield b and c. The use of subfield b depended on how the cataloguers interpreted the title. For the eBook *Babel*, for instance, a-z.lu put the title in 245\$a and the remainder of the title in 245\$b, whereas NEBIS put all title information in 245\$a. 245\$c greatly differed in the

records of the audio-visual materials depending on who the cataloguers judged responsible for a work. NEBIS tended to encode the director in 245\$c, while a-z.lu generally added subsequent statements of responsibility, such as screenwriter or cinematographer. In the audiobook, audio-visual and some of the eBook records, a-z.lu added subfield h to 245 recording the medium. As NEBIS did not make use of 245\$h but recorded similar information in the content, media and carrier type fields (336, 337, 338), it was suggested that these fields might act as a substitute of 245\$h in RDA.

Joudrey, Taylor and Miller (2015, p.135) confirmed that the three RDA fields 336, 337 and 338 replaced the general material designation field (GMD) 245\$h that was common in AACR2 and ISBD. The role of 245\$h was to tell users that they were dealing with a resource other than a physical book (Joudrey, Taylor and Miller, 2015, p.135). The problem with 245\$h was, however, that it was not clear if it described the carrier, media or content type of a resource. RDA's 336, 337 and 338 fields, in turn, adopted 245\$h's functions by describing the manifestation that is being catalogued with more granularity in relation to the content users deal with (336), the special equipment that is required to use the resource (337) as well as the format of storage (338) (Library of Congress, 2019). Values encoded in those fields are taken from a list of controlled vocabulary. Nonetheless, the influence of these fields on the catalogues was not apparent at all times; at least not for the non-printed book materials. In the a-z.lu catalogue and the NEBIS catalogue, audio and audio-visual resources were identified as audio and video. The electronic books, however, were identified in both catalogues as books and not specifically as electronic resources. The sign indicating that these resources were non-printed book materials and needed special equipment to be used was given by the 'online access' button in the top section of the catalogue, and the format information in the main labelled record.

a-z.lu is an AACR2-formatted catalogue and as such one would not expect content, media and carrier type fields to appear in its MARC records. Six of the seven eBook records in az.lu, however, were copy-catalogued from TEFOD (not identified) or MiAaPQ (Ebook Central). A peculiarity of these records was that they were originally catalogued in RDA and adopted as such in the a-z.lu catalogue, meaning that RDA specific fields like 000/18 (i), 040\$e rda, 336, 337 and 338 were maintained. RDA-formatted records then existed in an

AACR2-formatted catalogue. When analysing and comparing the RDA-formatted records and their labelled versions with AACR2-formatted records in the same online catalogue az.lu, no differences between the records were noticed, except that the RDA-formatted records were generally more detailed than the records originally catalogued by the Luxembourgish network. A perceivable difference between the records resulting from the use of field 245\$h or from the use of 336, 337 and 338 could, however, not be identified. As a consequence, the question was raised regarding the purpose of these fields, why 245\$h was replaced by three new fields when they had no immediate impact on the catalogue.

Among those 13.88% of MARC fields that were either used in a-z.lu records only or that predominantly occurred in the records of the Luxembourgish network were 001, 072, 509 and 511. 001 contained a system-generated control number. According to IDS (2011, p.14), it was not a standard field in KIDS. The analysis of the records, however, suggested that 001 must be a mandatory field in the Luxembourgish application of the standard, as the field occurred in all original a-z.lu catalogued records generating a control number for the database LUX01. Similar to 001, 072 occurred in all original a-z.lu catalogued records as well, but not with the same consistency as in a-z.lu. 511 was used consistently in all a-z.lu's audio-visual records, recording information about the interpreters and performers of a movie. 511 was used in some of NEBIS' audio-visual records as well, but again, not with the same consistency.

005, 040\$e, 336, 337, 338 and 6XX were among the 37.5% of the MARC fields that were mainly used by NEBIS. Date and time of the latest transaction (005) is system-generated, and it is a field that was solely used in every single NEBIS record that was subject to this analysis. 040\$e was used in all NEBIS records to specify that the description convention was RDA. Along with 000/18, 336, 337 and 338, the presence of 040\$e was a possible clue that the bibliographic record was catalogued in RDA. KIDS (2011, p.48), for instance, specified that 040\$e should only be used in those instances where the description convention was different from AACR or ALA. One could thus assume that 040\$e became a mandatory field in RDA. Even though the subject access fields (6XX) were used by both networks, they occurred more frequently in NEBIS. Another particularity about the 6XX-fields was that

some of the NEBIS subject access fields allowed multilingual access to a resource. The multilingual subject access terms were recorded in the MARC records in 691E1 in German, French and English, while only one was displayed in the online catalogue, generally in the language of the browser. As a consequence, users searching the catalogue for 'libraries cultural administration' would find the DVD *Ex libris: the New York Public Library* among their search results the same as users searching for its French equivalent 'bibliothèques administration de la culture' or for its German equivalent 'bibliotheken kultusverwaltung'. Even though a-z.lu is a multilingual catalogue as well, this multilingual access to subject was not detected in any of their records.

In some instances, both networks recorded the same information, but used different MARC fields. When the resource was a translation, NEBIS recorded the original title in 240, while the original title was recorded in 509 in the a-z.lu record. 240 and 509 were used for resources other than audio-visual materials. The uniform title for audio-visual materials was recorded in 130\$a by NEBIS and in 245\$d in the a-z.lu record. 245\$d no longer exists in RDA, while 130 was a field not used in KIDS. In both networks, language information was always recorded in 008/35-37 and 041 in the case of a translation. In the case of the audio-visual materials, both networks used a third field to record information regarding the original language of a resource and the languages available for dubbing and subtitles. NEBIS recorded this data in 546, a field that does not exist in KIDS, therefore, a-z.lu used the general note field 500 to record this data.

4.1.4 Particularities

The differences between the journal records were distinctive (Fig.10). 11% of the MARC fields co-occurred in the journal records of both networks, while 11% were only used by az.lu, leaving 45% of the MARC fields that were solely used by NEBIS. Those 33% of MARC fields marked as 'Other', were those fields that were alternately and infrequently used across all journal records. These statistics resulted from the fact that NEBIS provided much more information about a journal resource than a-z.lu. a-z.lu mainly provided basic information such as title, publisher, language, ISSN and subject indexes, omitting any title of responsibility. It was also observed that some MARC fields were used rather infrequently. The current publication frequency (310), for instance, was used in three out

of seven a-z.lu records, while it occurred in six out of seven NEBIS records. Abbreviated journal titles were given in some records in field 210, while NEBIS also recorded some abbreviated titles in 524. Information regarding the international edition of The New York Times was considered by NEBIS as an edition statement, therefore, encoded in 250. a-z.lu recorded it in 245\$p.



Fig.10 Occurrence of MARC fields in journal records

Information that coincided throughout the journal records referred to FMT, 008/11-14, 245\$a and 260/264. In the FMT-field, both networks encoded SE for serials even though this terminology was obsolete and replaced by continuing resources (CR) from 2002 onwards (Library of Congress, 2019). Other information encoded in 008 did not coincide. In 008/21 (type of CR), one network, for instance, classified one resource as a newspaper, while the other network considered it to be a periodical, or one considered a resource to be a periodical, while the other encoded it as a monographic series. The note fields (5XX) were solely used in NEBIS records, whereas the linking entry fields (76X-78X) only occurred in the journal records and were mainly used by the Swiss-German network.

None of the numbers and code fields 01X-09X were addressed in the core elements sections of RDA D-A-CH AWR or KIDS, except for the identifier (02X). KIDS mentioned the note fields (5XX) in their core element set, leaving it, however, to the cataloguer to decide what 5XX-field(s) should appear in the record, while RDA did not specifically mention any

5XX-field as being part of their core element set. As a consequence, the greatest variation within and across the records happened on the level of the 01X-09X and 5XX-fields.

Besides 02X, 040, 041 and 072, other numbers and code fields appeared infrequently in the records: 010, 015, 016, 017, 019, 034, 035, 043, 044, 050, 052, 082, 083, 084, 085 and 09X. It was difficult to detect a pattern in the use of these fields, if they depended, for instance, on the cataloguing agency or if they occurred in copy-catalogued records only. 019 was particular as it was an unassigned field by the LC but existed in KIDS as a field for internal footnotes and was still used in the Swiss application of RDA (IDS, 2011, p.38). As 019 was a specific IDS field, it occurred in those records that were originally catalogued by NEBIS and a-z.lu. 010 and 050, for example, mainly appeared in records copy-catalogued from US-American cataloguing agencies such as the LC or the Washington County Cooperative Library Service (OQX). Fields 015, 016, 017 and 044 were mainly used in NEBIS records that were copy-catalogued from the DNB. Fields 082 to 085 were used by both networks inconsistently, which means that one cannot say that the Dewey Decimal Classification (DDC) number (082) was used in all printed book records, but never in the audio-visual records. A precise statement like that could not be made for any of these fields. Generally, but carefully speaking, many of the 01X-09X-fields were most likely to appear in copycatalogued records than in records originally catalogued by the networks, while they generally appeared with a higher degree of frequency in the NEBIS records.

Similar to the 01X-09X-fields, the 5XX-fields were used inconsistently across the records. The general note field 500 or the summary and abstract field 520 were used contradictorily among the records. By analysing the 500-fields in comparison across both catalogues, one noticed that hardly ever the same information was recorded. In some instances, 500 was used by one network to say, for example, that it was the unabridged version of a work, while the other network recorded this information in 250. One of the printed book resources had stated on its title page that it was the 26th instalment of the series. a-z.lu interpreted this information as the remainder of the title, therefore, they recorded this piece of information in 245\$b, while NEBIS considered it to be rather general information to be recorded in 500. The bonus content of the audio-visual materials was alternately recorded by both networks either in 500 or in 520.

The analysis showed that there was no uniform way of understanding MARC fields. Even though there was information provided by the standards and on the internet that was targeted at helping cataloguers to understand the meaning of the individual MARC fields, in the end it was the cataloguers' subjective interpretation of this information that made them record data in one field rather than the other. The role of the standards is to guide cataloguers through the cataloguing process, to give guidance and instructions, but they are not binding. Therefore, it is crucial for cataloguers to be consistent in their cataloguing practice, because as Hider (2018, p.129) said, catalogues can only be effective when they are constructed in a consistent way. As the literature review showed, in the 19th century, Panizzi was already aware of the importance of being consistent in cataloguing, and consistency became a theme in the standards and frameworks developed ever since.

4.2 Bibliographic display in the catalogues

In addition to choose Aleph as their ILS, the Swiss-German and the Luxembourgish library networks both chose Primo by Ex Libris as the discovery solution for their resources, which explained why their user interfaces (UI) were constructed in a similar way with a top section, the send-to action section, the main labelled record, a link section and the availability and location information section (Fig.11). NEBIS chose a different sequential arrangement for these sections than a-z.lu, but the content was similar. Among those sections that were identified as being most relevant for users was first the top section displaying summary information about a resource. This information also appeared in the search result list in both catalogues. Second, the main labelled record provided users with more detailed information about a resource, while the availability and location information section told users where to find the item and if it was available.



Fig.11 UI a-z.lu (n.d.)

The top section of the record provided information regarding the type of material, title, parallel title, remainder of title, creator, collaborator(s), the year of publication, the availability status, and in some cases, an image of the front cover of the resource was added. If multiple versions were available, links to the open access or online versions were added to the availability button, and if NEBIS recorded a series statement in the MARC record, a former, abbreviated or related title, these were displayed in the top section as well. In both catalogues, the title and remainder of the title were mapped to 245\$a and 245\$b of the respective MARC records, while the year of publication was taken from a-z.lu's 260\$c-field and NEBIS' 264\$c-field. The name of the person(s) responsible for a work, in turn, were taken from different MARC fields. In the top section of a catalogue record, all those persons appeared whose names were recorded by NEBIS in 1XX and 7XX, whereas this information was taken from a-z.lu's 245\$c-field.



Fig.12 Top section of a NEBIS (2019a) record

A particularity of the NEBIS' catalogue records was that they sometimes added a statement in inverted commas in the top section that looked like a quote but was actually a cumulation of random bits of information taken from a variety of MARC fields mixed with punctuation marks and special characters (Fig.12). In some cases, this information was partly taken from 245\$a, 245\$b, 245\$c or 264\$b, and in one of the records it was the beginning of the table of contents, but this information was not even recorded in the respective MARC record. The question emerged regarding the users and what they were supposed to do with information that was confusing and did not make sense; second, where this information came from and how it was put together; and third, if cataloguers' did not have the authority to change it.

The information displayed in the main body of the record depended on the data the networks recorded in their MARC records. As it was found that NEBIS produced more detailed records by using more MARC fields, the labelled records in the catalogue were equally detailed. Differences between both catalogues were perceived on the level of the title statement. a-z.lu provided a title and a complete title. The title referred to 245\$a, 245\$d and 245\$b in the MARC record and the complete title was all information recorded in the title statement (245\$a, 245\$d, 245\$b and 245\$c). The choice of displaying information like this resulted in a repetition of the title, the parallel title and the remainder of the title (Fig.11). NEBIS, in turn, provided a title and additional title information. Under the title (245\$b), whereas all information recorded in 245\$c was displayed under the additional title information heading in the catalogue. As a consequence, no information was repeated, which resulted in a better readability of the record.

In the AACR2-formatted catalogue, more information was subject to repetition. In the audio and audio-visual records, performers and other participants in the creation of a work were recorded in 7XX, but also in 508 or 511 introduced by a brief description of their functions, such as 'Read by:'. As the data recorded in those fields was displayed in the catalogue, the names of those persons were not only repeated, but they also appeared under the same heading 'Collaborators' (Fig.13). Furthermore, 1XX, 7XX, 508 and 511 became authorised access points (AAPs) in the AACR2-formatted catalogue. In 508, all entities were separated by semicolons, resulting in separate entries for each individual person in the catalogue record, which means that they could individually be searched for. Entities recorded in 511, in turn, were all separated by commas. As a consequence, they were clustered in the catalogue, which means that by clicking on them, the catalogue would be searched for works in which exactly all these persons participated in. As it was unlikely that exactly the same persons collaborated in more works, running such a search was rather ineffective.



Fig.13 Display of 508 and 511 in a-z.lu (n.d.)

In the RDA-formatted catalogue, for instance, only the 1XX and 7XX-fields served as AAPs. They were also merged under the same heading. The analysis of the catalogues suggested that NEBIS tended to merge more information under the same heading. In the journal records, both networks catalogued data in 362 and 310. a-z.lu displayed 310 in the catalogue under the heading 'Frequency' and 362 under 'Published'. NEBIS, in turn, merged both fields in the catalogue under the heading 'Coverage'. In the catalogue, NEBIS also clustered the 5XX MARC fields under the heading 'Description'. In its audio-visual records, for example, 500, 508, 511, 538 and 546 were all recorded under that title. a-z.lu, in

contrast, mainly displayed each of the 5XX-fields under their own heading, and only merged repeated fields under the same heading.

The language information of translated resources provided in a-z.lu was ambiguous, because both the translated and the original languages were given without specifying which language was the original language of the resource and which one was the language of translation. The way information was displayed suggested that the resource would be bi- or multilingual. The language information in a-z.lu probably originated from the MARC fields 041\$a and 041\$h, whereas NEBIS must have mapped it either from 008/35-37 or 041\$a, because only the language that the resource was in, was given.

4.3 FRBR mapping

The label attributed to the 1XX and 7XX entities in the RDA-formatted catalogue drew particular attention as the standard's underlying FRBR influence emerged. While these entities were displayed as 'Author' (1XX) and 'Contributor(s)' (7XX) in the AACR2-formatted catalogue creating a hierarchy between the entity responsible for the intellectual creation of a work and an entity participating in the realisation or production of a work, the term 'Creator' was used in the RDA-formatted record to refer to all entities (1XX and 7XX) responsible for a work, expression or manifestation. Even though creator was technically not a term used in FRBR as the model's preferred terminology was PFC (Group 2 entities), they had in common that neither word choice made a hierarchical distinction between the creator of a work, an entity responsible for the realisation. They were equalised although they performed different functions and had different responsibilities.

Displaying the PFC entities under the same heading in the catalogue was considered to be difficult, because it was either assumed that users were not interested in the particular functions these PFCs exercised; that they were able to understand what PFC was responsible for what WEM entity based on the information provided; or, that they knew where to find further information about the PFCs' respective roles. For instance, a user of a public library might want to learn from a catalogue record what person was the creator and who was the translator. If none of the persons' names sounded familiar and no other

information about their functions was provided in the catalogue record, users would have to do research by themselves. The purpose of the catalogue, however, is to provide all information users need to find, identify, select and obtain a document. Therefore, having detailed information recorded in the catalogues might help users to distinguish between PFCs and their related functions.

Besides their appearance under the 'Creator' heading, the PFCs were also displayed in the RDA-formatted catalogue under the 'Additional Title Information' heading. The 'Additional Title Information' statement was generally headed by a main entry field followed by subsequent statements of responsibility that were most of the time introduced by a relator term briefly explaining their function (Fig.14). In the catalogue records of translations, audio and audio-visual materials, other PFC entities such as performers or other participants often appeared under the 'Description' heading as well. By establishing relationships between those individual fields, users of the catalogue were then able to connect a name with a function. The name Thierry Janssen under the 'Creator' heading in the extract below (Fig.14) was meaningless, unless one connected it with the information recorded under the 'Description' heading.



Fig.14 Audiobook record in NEBIS (2019a)

The NEBIS and the a-z.lu catalogues both linked to the MARC records, which means that users could use them as information source as well, provided that they knew how to read them. NEBIS' MARC records provided indeed more detailed information about the PFC entities than the labelled records in the catalogue. Along with the name (1XX\$a) and the

associated dates (1XX\$d), NEBIS recorded a relator term (1XX\$e), a relationship (1XX\$4) and a real-world object URI (1XX\$1). These relationship designators non-existent in KIDS, explained the role and function of the PFC in the creation, realisation or production of a work, expression or manifestation. As these relator terms and relationships were recorded in NEBIS' MARC records, the question arose why they did not appear in the catalogue except for the information regarding any related dates (1XX\$d), since these relator terms would help users identify PFCs. This is in line with Cotterman's (2017) statement that "much work [cataloguers] do is hidden but is also essential for access". Nonetheless, important information that helps users identify a WEM or a PFC should be available to see.

These relationships between the Group 1 and Group 2 entities were one of many relationships identified in the bibliographic records. Even though cataloguing starts on the manifestation level, the attributes recorded with an entity relate to other attributes of other entities of the same group or even beyond groups and records (IFLA, 2009, p.55). Le seigneur des anneaux was the French translation (expression) of The lord of the rings (work) embodied in six CD MP3 (manifestation) with the six CDs being subject to cataloguing (Fig.14). Comparing the records of both catalogues, it became apparent that these relationships did not only exist in the RDA-formatted catalogue, but these relationships between the PFC entities such as illustrated above (Fig.14), existed in the AACR2-formatted catalogue as well. The catalogue record of the journal GEO Epoche: das Magazin für Geschichte, for instance, provided holdings information for users, and a link in the link section pointing to subordinate publications of the magazine. By following that link, users were able to retrieve a list of results displaying all issues published within this series that were owned by libraries of the Luxembourgish network. Users were then able to access the records of each individual issue in order to find a library that owned a copy. The catalogue record of the same journal in NEBIS provided holding information as well, but they did not link to the individual issues of the magazine, nor did they provide detailed description of the issues that were available.

FRBR aimed to reduce the number of search results by clustering results on the work, expression and manifestation level, and consequently, to improve data representation by reducing data duplication within the catalogue. The complex relationships between the

entities and groups should render this possible. As shown below (Fig.15), the NEBIS catalogue found an audio version of *Stille Wasser* and multiple versions of a work bearing the same title. They were expressions and manifestations of the same work, but the difference was that one was an audio version, while the clustered versions were all printed book versions. The RDA-formatted catalogue was, hence, able to identify multiple versions of a work, but clustered them based on the type of material. An audiobook was not the same work, therefore, they did not appear together in the catalogue. Zhang and Salaba (2009a, p.64) highlighted that new expressions were created whenever changes to content were made, while any changes made to carrier resulted in new manifestations. The 2017 printed book version of *Stille Wasser* and the 2018 printed book version were two different manifestations of the same work but considered as related resources as they belonged to the same type of material. The AACR2-formatted catalogue, in turn, was not able to make this kind of relationship between resources.



Fig.15 Search results in NEBIS (2019a)

The figure above (Fig.15) also revealed that the RDA-formatted catalogue had difficulties dealing with FRBR's terminology. The multiple versions were presented in the catalogue as being two versions of the same item. Choosing the term item is technically incorrect, because items are copies that are owned by a library, they exemplify manifestations, and have been assigned a call number in order to locate them on a shelf. Instead of informing users that there were two versions of an item, the users should be told that there were two related resources. The unfortunate word choice in the RDA-formatted catalogue demonstrated that FRBR terminology was not yet established or well understood. This observation was in accordance with the results of some recent studies addressed in the

literature review. O'Neill and Žumer (2018) and Strader's (2017) studies showed that FRBR still lacks a comprehensive terminology. As long as no uniform understanding of this terminology was achieved, problems such as those illustrated above cannot be resolved.

In the centre of FRBR's E-R model are the users and the tasks they perform when searching the library catalogue. As mentioned above, the NEBIS and the a-z.lu catalogue were both constructed in a similar way, and the search process was not that different either. In both catalogues, users could perform a simple or an advanced search to retrieve a list of search results that could be narrowed down by facets. These facets included the resource type, the library, language, author or creator, creation date and subject. NEBIS added more facets such as availability, genre, journal title and collection. In NEBIS' advanced search, users had the possibility to search for language, creation date and resource type, while az.lu offered to search by publication date only. Both catalogues allowed users to refine their search by adding facets, even though facet searching was more restricted in a.z.lu. However, both catalogues supported their users in finding materials that matched their search query. It was observed that in most of the cases, the number of search results was much higher in a-z.lu than in NEBIS. There might be various reasons for this such as the ability of the RDA-formatted catalogue to cluster related resources, or the scope of the catalogue. As mentioned in the methodology section, a-z.lu is a union catalogue operated by a network that includes many different types of libraries and institutions, whereas NEBIS is a union catalogue operated by academic and research institutions. Therefore, the content of both catalogues might vary.

Both catalogues served FRBR's user tasks identify and select. These tasks could be fulfilled based on the information recorded in the catalogue records, as it helped users find out if the resource described in the record matched the document users searched for or to distinguish between catalogue records that bore the same title. To make these distinctions and to retrieve better search results, the information in the records had to be accurate and relevant, and tailored to the target audience of the catalogue. This might become difficult in union catalogues where different types of institutions collaborate to serve a different target audience. Therefore, cataloguing standards and the defined core elements are important in order to maintain consistency in the catalogue.

As the analysis above showed, NEBIS and a-z.lu recorded similar information in their records, even though they sometimes used different MARC fields to do so. Despite the information recorded in the catalogues, neither a-z.lu nor NEBIS supported browsing. The catalogues' focus was on searching for a document, finding documents that matched the users' search queries, help users identify a document by the means of the information provided in the catalogue record, select the document that matched their search criteria, and access the chosen document. It was implied that the users knew what they were looking for, which corresponded with the criticism of FRBR. Critics perceived the model as a way of searching the catalogue but not suitable for browsing. None of the catalogues suggested readings, keywords or tags by which users could browse the catalogues. Instead, users had to initiate a search and from there, they could refine their search by different facets, or follow links provided in the catalogues.

5. DISCUSSION AND CONCLUSION

The aim of this research project was to compare AACR2 and RDA-formatted records to the FRBR model in order to analyse to what extent FRBR has influenced the library catalogues, and if the model benefits users as it should. The expectations at the beginning of the project were that the RDA-formatted records would significantly differ from the AACR2-formatted records because of RDA's underlying FRBR structure. These expectations were not met. The comparative analysis revealed that the records were not that different after all. Most of NEBIS and a-z.lu's records were catalogued at core level (95.35% and 76.74% respectively), with the MARC fields 000, 008, 1XX and/or 7XX, 245 and 260/264 appearing without exception in all the records of both networks, while fields 300, 5XX and 6XX appeared with vast majority. Both catalogues then acknowledged that these fields contained important information that supported users during their searches, such as the title of a work, the creator, the contributor or the year of publication, while they also recognised that other fields like the physical description or note fields benefited the users in their searches. The AACR2 and the RDA-formatted catalogues acknowledged both the importance of having those fields present in bibliographic records for the purpose of finding, identifying, selecting and eventually obtaining materials. Furthermore, all information in the records served as APs in the catalogues, which means that it was likely that relevant search results would be returned in both catalogues.

Making relevance assessments and judgments of the results returned would be subject to a new study, but it was noticed during the data gathering that the number of search results returned in NEBIS were generally lower than those returned in a-z.lu. A reason for this might be that the RDA-formatted catalogue was able to identify and cluster related resources. FRBR's E-R model is based on the idea that the entities and attributes that make up the bibliographic universe are related to one another by complex relationships. In this regard, a FRBR-based catalogue should be able to identify related resources. Even though the word choice did not match FRBR's terminology, the Swiss-German catalogue was able to make these relationships between expressions and manifestations of the same work, provided that they belonged to the same type of material. Besides identifying related resources, the RDA-formatted catalogue was also able to identify and cluster related information under the same heading in its catalogue records. The system recognised that

all 5XX-fields, for example, were note fields describing a resource, therefore, it gathered that information under the heading 'Description' in the catalogue. The choice of displaying information like this contributed to a better readability of the record, as related information was gathered together, and the record was not overloaded by too many headings. Readability was rather an issue in the AACR2-formatted catalogue, as information was more likely to be repeated there.

FRBR's influence on RDA became apparent in the way RDA structured its chapters. Former cataloguing standards, such as AACR2, divided their chapters and sections based on the type of material. Cataloguers then had to identify the type of material first, before they could get guidance on how to catalogue the resource. RDA, in turn, divided its chapters according to FRBR's WEMI entities, and acknowledged that it was not the type of material that was important in describing a resource (Sprochi, 2016, p.131). Despite RDA's, and hence, FRBR's innovative way of approaching cataloguing, this innovation was missing from the RDA-formatted catalogue. It was observed that the RDA-formatted catalogue in contrast to the AACR2-formatted catalogue offered a variety of functions, but they were not yet fully developed. NEBIS, for instance, enabled multilingual access to subject, but not all subject access terms were available for multilingual searches, which means that users had to try by the trial-and-error method to see if they could run searches in different languages in order to find materials they were looking for. The quote-like statement in the top section of a NEBIS catalogue record was probably to give users an idea of what the resource was about or what critics thought about it. However, as it did not convey meaningful information, its presence was unnecessary. The role of the new RDA fields 336, 337 and 338 did not become that apparent either. It was understood that they would describe resources with greater granularity, but to what extent they served users better than the former GMD field 245\$h remained unclear.

Evidence that MARC and FRBR can cooperate was presented during the EURIG meeting in May 2019 when Qulto presented their FRBRisation pilot project (Fülöp, 2019). Starting point for their project was to link copyrighted titles in their catalogue in order to legally provide these titles online. The titles were clustered in the Qulto catalogue on the work level, and further broken down into expressions and manifestations (Fülöp, 2019). When

search results were returned, the catalogue informed users how many manifestations, languages and types of material were matched to the literary work found in the catalogue. In the record itself, the entity could be further broken down into editions (manifestations) and translations (expressions) that all individually linked to their own records and call numbers. This representation of bibliographic data was possible because the work entity was catalogued, the same as the different manifestations and expressions. Complex relationships between those entities were established and they were all linked by the MARC record of the literary work. For instance, a person was linked to the preface, the literary recording and the novel, whereas the novel linked to the literary recording as well and to other entities while those entities yet again linked to other entities. In the end, a semantic network of complex relationships was created. This representation of bibliographic data probably matched FRBR's E-R model more than that represented by the RDA-formatted catalogue analysed above. Nonetheless, comparing the semantic network created by Qulto with FRBR's graphs, one noticed that FRBR's graphs were rather simplistic in comparison. The vagueness of FRBR's E-R model could be the reason why there are still problems in terms of understanding FRBR's terminology, and the reason why it creates many ambiguities and uncertainties among the cataloguing community.

More than 20 years have passed since FRBR was first published, and its potential is still not fully explored or exhausted. Many critics believe that as long as libraries continue using MARC as their metadata schema, nothing would change. MARC was developed in the mid 1960s in order to transform card catalogues into machine-readable format. Over half a century has passed since its development, and a lot has happened in terms of technological change, and MARC seems not to be able to respond to a LD and semantic web environment. The "flat records" (Sprochi, 2016, p.134) produced in MARC have difficulties to link data beyond the library environment, therefore, the rich information recorded in the bibliographic records is isolated from other information on the web and cannot be picked up by search engines (Sprochi, 2016, p.133). In order to change that, data first has to become "machine-actionable" (Sprochi, 2016, p.131), and second, a solution for MARC needs to be found. The problem in this equation is thus not FRBR, but rather MARC. MARC prevents FRBR to fully develop its potential, whereas FRBR's potential cannot be fully tested as long as it operates in a MARC environment. Wallis (2013, slide 19) said that "We

are moving from cataloguing to catalinking", linking the catalogue records with information within and beyond the library environment. The idea behind FRBR agrees with this view that the rich information contained in the catalogue records needs to be linked with other information in order to improve discoverability of data.

The LC, the DNB, the BL (British Library) and some other libraries are currently testing BIBFRAME (BF), a data model that could replace MARC in the future as it better responds to the LD environment and supports data sharing and data interoperability within and beyond the bibliographic universe of libraries, and simultaneously integrates RDA and FRBR in its structure (Coyle, 2015, p.274). As Panchyshyn, Lambert and McCutcheon (2019, p.129) observed, "the only constant in twenty-first century librarianship is change". The standards and theories constantly evolve and develop. In 2017, IFLA LRM was published and it is currently being implemented in the RDA Toolkit. The model is believed to better respond to the LD environment, while it can be mapped to BF as well (Taniguchi, 2018, p.427). Besides FRBR's four user tasks, IFLA LRM adds a fifth one 'explore', while it emphasises the importance of those relationships that were outlined in the other three models (Žumer, 2018). In her article, Žumer (2018) noted that this model consolidating the FRBR family into one would finally be "a complete model of the bibliographic universe" on that future codes could and should rest. Furthermore, FRBR LRM is considered as being "compatible with the Semantic Web" (Zumer, 2018). The question, however, remains to what extent it is compatible with the users.

Prior to the publication of FRBR in the late 1990s, no user studies were conducted that focused on the users and their needs, or that analysed if FRBR's four user tasks actually served them. Instead of relying on evidence-based knowledge and studies, it was rather assumed that users would perform those tasks when searching for materials, and that those four tasks defined by FRBR would suffice to satisfy their quest. The analysis of the AACR2 and RDA-based catalogues revealed that the way these four user tasks were structured implied that users would know what they were looking for, while neglecting those users that used the catalogues without exactly knowing what they were heading for. Human information behaviour (HIB) studies humans in relation to information, information seeking, information searching and information use (Wilson, 2000, p.49), while IIR studies

the interaction between user and system, what information is displayed, how information is searched and found, and how users make relevance decisions. With these two specialised fields in mind, user studies should be conducted in order to better understand what users need from a library catalogue in the digital age, the age of big data and the semantic web (Snow, 2017, p.451-452; Strader, 2017, p.348). In user-focused studies, the participants could, for example, initiate searches in the library catalogue. Based on their queries, the filters they apply, their criteria to either select a document or to keep on searching, and finally, based on their responses and comments in follow-up interviews, researchers would gain important knowledge regarding users, their needs and their search behaviour, while FRBR and the cataloguing standards would need to be revisited. User-centred studies are relevant, because user needs change with the new technologies emerging, but also because these studies help to move away from the one-size-fits-all principle to more personalised catalogues.

There was limited time and space available to realise this project, therefore, not everything could be said, discussed or analysed. It was hoped, though, that this project contributed at least some new ideas or perspectives on the topic of FRBR, RDA, AACR2 and cataloguing, that might encourage further studies. Apart from time and space, there were other limitations to this project. a-z.lu was a union catalogue shared by many different types of libraries and institutions, while NEBIS was a catalogue operated by the largest network of academic and research institutions in Switzerland. Therefore, the scope of both catalogues differed, as well as the type of literature and resources they made available. As a consequence, it was difficult to find resources that were made available in both catalogues. Furthermore, AACR2 and the RDA Toolkit were used as guidance and reference work in order to understand the MARC records and the application of individual elements. In turn, there was no knowledge of, or an insight provided into the in-house cataloguing rules of the different institutions participating in the networks. In the analysis, no difference was made between the copy-catalogued and the original catalogued records of a network. They were equally treated in the analysis. One could have separated them in order to analyse to what extent the copy-catalogued records would differ from the original catalogued records in order to see what elements were added or omitted. This was, however, not in the scope of this project. The intention of the literature review was to provide an insight into the

history of the cataloguing standards, to illustrate where they emerged from, why they were and still are so important, but also to illustrate the problems and the challenges they have caused ever since. The history of standardisation is very rich and unfortunately for this reason, not everything could be addressed or discussed in detail.

Before concluding, it is worth saying that the records and resources that were chosen only served as a sample in order to compare AACR2 and RDA-formatted records to the FRBR model. The results are valid for the AACR2 and RDA-formatted records chosen for this project, while it is not impossible that the comparison of records taken from other catalogues might produce different results. Furthermore, this study was intended to be an objective analysis of catalogue records that were based on two different cataloguing standards, and to point out similarities and differences between these. It was not a comparative analysis of the networks in order to measure their efficiency.

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ANNEXE 1: List of selected items

						Types of
Titel	Responsibility	Publication Year	ISBN/ISSN	Language	Topic/Themes	Material
La jeune fille et la nuit	G. Musso	2018	978-2-7021-6363-4	French	Fiction	Books, printed
Flugangst 7a	S. Fitzek	2017	978-3-426-19921-3	German	Fiction	Books, printed
				German -		
Ein Sohn ist uns gegeben	D. Leon	2019	978-3-257-07060-6	Translation	Fiction	Books, printed
				German -		
Maschinen wie ich	I. McEwan	2019	978-3-257-07068-2	Translation	Fiction	Books, printed
Origin	D. Brown	2017	978-0-5930-7875-4	English	Fiction	Books, printed
Der Hundertjährige, der				German -		
zurückkam,	J. Jonasson	2018	978-3-570-10355-5	Translation	Fiction	Books, printed
Year One Chronicles of the						
One, Book 1	N. Roberts	2017	978-1-250-12298-8	English	Fiction	e-Books
Pip und Posy und der				German -		
Weihnachtsbaum	A. Scheffler	2018	978-3-551-51861-3	Translation	Juvenile Fiction	Books, printed
Becoming	M. Obama	2018	978-0-241-33414-0	English	Autobiographical	Books, printed
				German -		
So schmeckt Skandinavien	B. Aurell	2017	978-3-8310-3188-7	Translation	Non-Fiction	Books, printed

"The sweet						
and the bitter":	A. Amendt-Raduege	2018	978-1-63101-287-7	English	Non-Fiction	e-Books
			978-1-60635-305-9			Books, printed
Transforming Harry :	J. Alberti & P.A. Miller	2018	978-0-8143-4287-9	English	Non-Fiction	e-Books
			978-0-8143-4286-2			
			(pbk.)			Books, printed
			978-0-8143-44891-			
			0 (hbk.)			Books, printed
Literary allusion in Harry						
Potter	B. Groves	2017	978-1-351-97872-9	English	Non-Fiction	e-Books
			978-1-138-28466-1			
			(hbk.)			Books, printed
The House of Secrets:	A.M. Levy	2019	978-1-78672-571-4	English	Non-Fiction	e-Books
Babel	G. Dorren	2018	978-1-78283-250-8	English	Non-Fiction	e-Books
			978-1-78125-640-4			
			(hbk.)			Books, printed
Bibliotheken der Schweiz	A. Keller & S. Uhl	2018	978-3-11-055379-6	German	Non-Fiction	e-Books
Le parfum du bonheur est	V. Grimaldi and S.					
plus fort sous la pluie	Frison	2018	978-2-36762-582-9	French	Fiction	Audiobooks

Harry Potter et les				French -		
reliques de la mort	J.K. Rowling	2017	978-2-075-08505-2	Translation	Juvenile Fiction	Audiobooks
				French -		
Le seigneur des anneaux	J.R.R. Tolkien	2018	no identifier	Translation	Juvenile Fiction	Audiobooks
				German -		
Stille Wasser	D. Leon	2017	978-3-257-80380-8	Translation	Fiction	Audiobooks
Halali	I. Noll	2017	978-3-257-80383-9	German	Fiction	Audiobooks
				German –		Audio-visual
A star is born	B. Cooper	2019	no identifier	Dubbed	Musical	materials
				German –		Audio-visual
Mary Poppins Rückkehr	R. Marshall	2019	no identifier	Dubbed	Juvenile Fiction	materials
						Audio-visual
Vielmachglas	F. Ross	2018	no identifier	German	Fiction	materials
COCO: Lebendiger als das						Audio-visual
Leben	L. Unkrich	2018	no identifier	English	Juvenile Fiction	materials
EX LIBRIS: the New York						Audio-visual
Public Library	F. Wiseman	2018	no identifier	English	Documentary	materials
				German –		Audio-visual
Embrace	T. Brumfitt	2017	no identifier	Dubbed	Documentary	materials

				German –		Audio-visual
Die dunkelste Stunde	J. Wright	2018	no identifier	Dubbed	Biographical	materials
				German –		Audio-visual
Paddington 2	P. King	2017	no identifier	Dubbed	Juvenile Fiction	materials
Willkommen bei den						Audio-visual
Hartmanns	S. Verhoeven	2017	no identifier	German	Fiction	materials
				German –		Audio-visual
The bookshop	I. Coixet	2018	no identifier	Dubbed	Fiction	materials
The New York Times	NYT	2016 -	2474-7149	English	Daily news	Journals
GEO Epoche	GE	1999 -	1861-6097	German	History	Journals
Die Zeit	DZ	1946 -	0044-2070	German	Daily news	Journals
Science advances	ScA	2015 -	2375-2548	English	Science	Journals
IEEE Journal of biomedical						
and health informatics	IEEE	2013 -	2168-2194	English	Science	Journals
Journal of contemporary						
Central and Eastern						
Europe	JCCEE	2015 -	2573-9638	English	Science	Journals
Proceedings of the ASIS&T	ASIS&T	2017 -	0044-7870	English	LIS	Journals
				German -		
Codenames	V. Chvátil	2015	no identifier	Translation	Games	3D materials

					Language	
L'espagnol	Assimil	2017	978-2-7005-0665-5	French	material	Mixed materials
						Book /
Atlas der erfundenen	E. Brooke-Hitching &			German -		Cartographic
Orte:	LW. Wolff	2017	978-3-423-28141-6	Translation	Geography	materials
						Books, printed /
						Cartographic
Oxford Atlas of the world	OUP	2017	978-0-19-084362-5	English	Geography	materials
Grand Atlas 2018:						
Comprendre le monde en						Cartographic
200 cartes	F. Tétart & C. Marin	2017	978-2-7467-4613-1	French	Geography	materials

ANNEXE 2: Data preparation (example)

Original MARC records of The Bookshop

Leader	00000ngm 22000004u 4500	
001	001567329:LDX01	
007	vd v	
008	180607/82018 gw V eng	
040	##SaLUX BIMU	
*041	##SadengSagerSheng)	
072	#75aci\$2LUX	
***245	##\$à< <the>> bookshoਊ\$HFilm\$d/= <<der>> Buchladen der Florence Green\$c) / dir. by Isabel Coixet</der></the>	
Sc 7- × 260	##\$AAhrensfelde\$bCapelight Pictures\$c2018	
+300	##\$al DVD vidéo (ca 108 min.)\$bcouleur PAL	
*500	##\$aLangues: anglais, allemand ; sous-titres; allemand	
* 508	##\$aDir. of photogr. Jean Claude Larrien ; (ed) Bernat Aragones ; mis, Alfonso de Vilallonga ; prod. Joan Bas etc.	
¥ 511	##SaInterpr.: Emily Mortimer, Bill Nighy, Hunter Tremayne, Patricia Clarkson et al.	
	##\$aBonus : bandes-annonces ; making of ; clip	
538	##\$aZone 2	
- 653	##\$aFilms espagnols	
+ 653	##\$aFilms anglais	
+653	##\$aFilms allemands	
2 655	#6\$aFilms de fiction	AAR
691	KE\$8820-3	
* 700	##\$aCoixet, Isabel\$d1960-	
852	##\$bBIMU\$cME\$h83-3 Buc B\$pKM 1886510\$4Cité-Bibliothèque Luxembourg\$5Médiathèque	
852	##\$bDIFF\$cDIF1\$hDVF-DRAME-Booksho\$pKM 2079217\$4Bibl. municipale Differdance\$50pen access	
906	##\$hMP_DVD-Video	
LOCAL AUTH. 909	K#\$maut18fal	
949	##\$bBIMU\$cME\$j83-3 Buc B\$pKM 1886510\$q001567329\$r000010\$0Cité-Bibliothèque Luxembourg\$1Médiathèque\$3VIDE0\$405555hort	Loan\$6
SET. LOCAL HOL 949	##\$bDIFF\$cDIF1\$jDVF-DRAME-Booksho\$pKM 2079217\$q001567329\$r000020\$0Bib1. municipale Differdange\$10pen access\$3VIDE0\$40	5\$5Short LoanS6
AVA	##\$aLUX50\$bBIMU\$cMédiathèque\$d83-3 Buc B\$eunavailable\$tUnavailable\$f1\$g1\$hN\$i10\$jME	
LIB LUL AVAIL AVA	##\$aLUX50\$bDIFF\$cOpen access\$dDVF-DRAME-Booksho\$eavailable\$t <mark>Available</mark> \$f1\$q0\$hN\$i3\$jDIF1	
DRL DRL	##\$ahttp://catalog.bibnet.lu:80/F/?func=direct&doc_number=001567329&local_base=LUX01	
DIRECT LINE FMT	VM	
LDR	ngm 22 4u 4500	0.2 0
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Fig.16 MARC record in a-z.lu (n.d.)

			N	
	FMT	VM		100
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	005	20181124063347.0		20
	007			
	800	180825p20182017gw-III-1IIviger-d		2
	0243	1a 4042564183503		18
	040	a SzzulDS NEBIS ZHDK-MIZ (b ger je rda		eter
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	072 7	a E65127 /2 E65-20160917		6
	0821	ja 791 j2 15		8
	1300	ja <<1 ne>> booksnop		leit
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	264 1	a Anrensteide (b Capelight Pictures (c (2016)		9
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	337	a video lo v iz roamedia		2
	338	la Videodisk (b vo ja roacamer	ag of Musicuidae, Allonge de Vilallonge - Feeling Longhy Kingtrailer	82
	500	a Der Spieltim wurde 2017 in Farberin Grosspirtannien, Spanien und Deutschland produzien Bonds) ward	ng-bi, Musikvibeo. Alionso de Vilalionga - Peening conery, Kindulalien	<u>4</u>
	500	ja Basieri aut dem gleichnamigen Roman von Penelope Pitzgerak.	Barnat Arananán	ğ
	508	a Drehouch und Regie, Isabei Colxer, Musiki Allionso de Vilalionga ; kamera Jean-Claude Lameu ; Schmitt	Dernal Aragunea	2
	5110	a Darstellerinnen: Emily Montmer, Patricia Clarkson, bill Nigny		ang.
	538	a DvD, PAL, Region 2		gov
	546	a Sprache: Deutsch, Englisch , Oneriden, Deutsch		Au
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	7001	la Larrieu, Jean-Claude id 1943- 11 (DE-588)137530021 le Kameramann 14 cho	aut author	A T T
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	7001	la Clarkson, Patricia id 1959-11 (DE-588)141943998 je Schauspieler 14 act	Coo d'anna ha contract	CX S C
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	CAT	a N06-MOSC (b 20 (c 20180926 EBI01 (h 0810		
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	CAT	a BATCH-UPD b 20 c 20190312 I EBI01 h 1731		
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Fig.17 MARC record in NEBIS (2019a)

Original catalogue records of The Bookshop

Ø DVD	DVD-VIDÉO The bookshop = Der Buchladen der Florence Green dir. by Isabel Coixet 2018							
	> Empruntable / consultable	ie en diblioth	eque					
HAUT	Envoyerà							
ENVOYER À	ē		6	99	,	ß		
DÉTAILS	IMPRIMER	COURRIEL	LIEN PERMANENT	CITATION	EASYBIB	ENDNOTE	REFWORKS	EXPORT BIBTEX
LIENS	Détails							
OBTENIR EN BIBLIOTHÉQUE	Titre Titre complet Collaborateur(s)	The bookshop = Der Buchladen der Florence Green The bookshop = Der Buchladen der Florence Green Coixet, Isabel, 1960- > Dir. of photogr. Jean Claude Larrieu > ed. Bernat Aragones > mus. Alfonso de Vilallonga > prod. Joan Bas etc. >						
	Description Éditeur(s) Date de création Format Langue	Bonus : bai Ahrensfeld 2018 1 DVD vidé Anglais Allemand	ndes-annonces ; i e : Capelight Picti o (ca 108 min.) : c	making of ; cl ures ouleur PAL	lip			
	Note générale Sujets - Mots clés	Langues: a Films de fio Films espa Films angla Films allen	nglais, allemand tion > gnols > ais > pands >	; sous-titres:	allemand			

Fig.18 Labelled record in a-z.lu (n.d.)

VIDEO Der Buchladen der Florence Green Isabel Coixet, 1960-; Penelope Fitzgerald, 1916-2000; Alfonso Vilallonga, 1960-; Jean-Claude Larrieu, 1943-; Emily Mortimer, 1971-; Patrica Catrkson, 1959-; Bill Nighy, 1949-[2018] Letails

Details		
Titel	Der Buchladen der Florence Green	
Weitere	ein Film von Isabel Coixet	
Titelinformationen		
Ort, Verlag	Ahrensfelde : Capelight Pictures	
Erscheinungsdatum	n [2018]	
Format	1 DVD-Video (108 min)	
Sprache	Deutsch	
	Englisch	
Beschreibung	Der Spielfilm wurde 2017 in Farbe in Grossbritannien, Spanien und Deutschland produziert Bonus: Making-of, Musikvideo: Alfonso de Vilallonga - Feeling Lonely, Kinotrailer Basiert auf dem gleichnamigen Roman von Penelope Fitzgerald.	
	Drehbuch und Regie: Isabel Coixet ; Musik: Alfonso de Vilallonga ; Kamera: Jean-Claude Larrieu ; Schnitt: Bernat Aragonés	
	DarstellerInnen: Emily Mortimer, Patricia Clarkson, Bill Nighy	
	DVD, PAL, Kegion 2 Sarasha, Davitash, Faciliash , Ustartital, Davitash	
Tink citatian!	Sprache: Deutsch, Englisch ; Ontertitel: Deutsch	
Linheber	Ine bookshop	
onieber	Bandlana Fitzgerald 1016 2000 >	
	Alfonso Vilallonga 1960- N	
	lean-Claude Larrieu 1943- >	
	Emily Mortimer, 1971- >	
	Patricia Clarkson, 1959- >	
	Bill Nighy, 1949- >	
Schlagwörter	Buch >	
Ŭ	Intrige >	
	Literatur >	
	Macht >	
	Neid >	
	Realisierung >	
	Sortimentsbuchhandel >	
	Traum >	
	Verfilmung >	
	Witwe >	
	DVD-Video >	

Fig.19 Labelled record in NEBIS (2019a)

Abstract representation of the data provided by the records above

	The Bookshop						
MARC							
Fields	a-z.lu	NEBIS	Comments				
FMT	1	1	VM - Visual materials				
			Both as n-new, g-projected medium, m-monograph/item, 4-core level;				
L D R	1	1	NEBIS as a-UCS/Unicode (auto-filled) c-ISBD punctuation omitted;				
			a-z.lu as u-unknown				
001	1	0	Control Number database LUX01				
0 0 5	0	1	Date and Time of Latest Transaction				
007	1	1	id.*; v-Videorecording d-Videodisc v-DVD				
			NEBIS: p-Distribution/production date, gw-Germany, v-Videorecording, ger-German, d-Other;				
0 0 8	1	1	a-z.lu: s-single known date, gw-Germany, v-videorecording, eng-English				
024	0	1	Other Standard Identifier \rightarrow omitted in a-z.lu				
040	1	1	no copy-cataloguing				
041	1	1	id.				
072	1	1	Subject Category Code				
082	0	1	DDC				
130	0	1	Main Entry - Uniform Title				

* same information recorded

			a-z.lu: \$hMedium \$d// title → both fields non-existent in RDA
2 4 5	1	1	NEBIS: original title in 130, 245\$aGerman title $ ightarrow$ 130 not in use in AACR2 or KIDS
260/264	1	1	id., except 264\$c[YYYY] in NEBIS
300	1	1	a-z.lu adds colour code; Remember: NEBIS puts this information in 538
336	0	1	RDA
337	0	1	RDA
338	0	1	RDA
500	1		a-z.lu: language info;
		1	NEBIS: colour, extras (a-z.lu in 520), based on info; R in NEBIS
508	1	1	≠ information encoded here
511	1	1	≠ performers recorded here
520	1	0	Extras (NEBIS in 500)
538	1	1	Region; NEBIS: colour code
546	0	1	language note
6 X X	1	1	subject access; R in both records
700	1	1	Collaborators; R in NEBIS

Online Catalogue	a-z.lu	NEBIS
	- Type of material	- Type of material
Top section	- Title = // title	- Title

	- Collaborator (245\$c)	- Collaborators (700\$a\$d)
	- Date of publication	- Date of publication []
	- Availability	- Availability
	- Title = // title	- Title
	- Complete title information	- Additional title information \rightarrow director + rel. t.
	- Collaborator (1 coll.)	- Place of publication: publisher
	- Description (520)	- Date of publication [YYYY]
Main labelled record	- Place of publication: publisher	- Physical description (300)
	- Date of publication	- Languages (041\$a\$a\$h)
	- Physical description (300)	- Note Fields merged (500, 508, 511, 538, 546)
	 Languages (041\$a\$a\$h) 	- Uniform title (130)
	- General note (500 \rightarrow repetition of lang.)	- Collaborators (7 coll.)
	- Subject access (4)	- Subject access (11)
Hyperlinks	- Collaborators (700, 508, 511)	- Collaborators (700)
	- Subject access	- Subject access
	- Libraries that hold an item	- Libraries that hold an item
	- Availability	- Availability
Locations / Availability	- Location within the library	- Type of loan
	- Type of loan	- Call number
	- Call number	