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International Scientific Review for Contemporary Archival Theory and Practice
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The figure of Atlant taken from:
ATLAS NOUVEAU, Contenant toutes les parties du monde, Ou sont exactement Remarquées les Empires, Monarchies, Royaumes, Etats, Republiques etc. Par Guillame dI'Isle, a Amsterdam, Chez Jean Covens & Corneille Morties, 1733.

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THOUGHTS OF INTRODUCTION OF EDITOR-IN-CHIEF

It will soon be 30 years since Atlanti had first seen the light of the world. Atlanti were published by the Archival Center for Professional and Technical Issues (founded in 1985) as part of the Provincial Archives in Maribor. The issue of the first number of Atlanti was postponed from 1990 to the year 1991 due to the independence of the Republic of Slovenia and the initial problems that arose in preparations of publishing the first number. I looked at the first number of Atlanti with great interest, since in 1991, as the editor-in-chief of the journal, I claimed that solving professional and technical problems in the archives are some of the most comprehensive areas of archival theory and practice, no matter where the archives operate. The first efforts of the Atlanti publication were to draw attention to the issues of adaptation of existing buildings for the purposes of the archives. Several authors addressed these questions in their contributions. Those were Dr. Ugo Cova from State Archives in Trieste, Italy, Dr. Peter Pavel Klasinc from Provincial Archives Maribor, Slovenia, Dr. Marco Carassi and Dr. Izabella Massabo Ricci from the State Archive in Turin, Italy, Dr. Gerald Gaenser from the Styrian Regional Archives in Graz, Austria, Dr. Long Yuchuen from China, Dr. Edward Fracki from Archives in Warsaw, Poland, Dr. Josef Marsal from Archives in Prague, Czech Republic, and Daniele Neirinck from Directorate of French Archives, France.

The introduction of the first number of Atlanti was written by the Chairperson of the Assembly of Correspondents (today members) Prof. Dr. Simonida Marjanovič. In her article 'Why Atlanti?' she substantiated the need of such publication and thanked the International Council of Archives, Dr. Michael Duchein, Chairman of the Committee for Buildings and Equipment, and the Director General of the International Council of Archives, Prof. Dr. Charles Kecskemeti.

Editorial Board of Atlanti No. 1 consisted of Dr. Gerald Gaenser, Dr. Ken Hall, Dr. Herman Rumschoettel, Miroslav Novak and Zdenka Rajh. The Center consisted of 13 correspondents (today members) from different countries: Roana de Andres, Spain, Gerald Gaenser, Austria, Dr. Ugo Cova, Italy, Ken Hall, United Kingdom, Edvard Fracki, Poland, Shen Lihua, China, Josef Marsal, Czechoslovakia, Irina Grigorievna Shepilova, Russia, Imre Ress, Hungary, Ventsislav Veltschev, Bulgaria, Hermann Rumschoettel, Germany, Daniel Neirinck, France and Dr. Peter Pavel Klasinc, Slovenia.

Fortunately, many correspondents were invited to the 12th International Congress of Archives in Montreal, Canada, 1992, and on this occasion we prepared a special edition of Atlanti No. 1, with additional presentation of archives in Slovenia. The follower of Archival Center had already prepared this issue in 1992 for Professional and Technical Issues, which was the International Institute of Archival Science at the Regional Archives of Maribor.

Today, I will try to answer the question from over 30 years ago – "Why Atlanti," posed by Dr. Simonide Marjanovič. © ATLANTI + as the International Scientific Review for Contemporary Archival Theory and Practice, are created in order to be able to be placed in a global database. This can be achieved only if we meet the strict criteria required in this process. Existing Atlanti (this year's was the 29th year) will continue to be published as a Journal of Contemporary Archival Theory and Practice in which archivists from all parts of the world, who will attend the annual International Conference "Archival Day," will also be published in their national languages, in the same way this has been done so far.

In © ATLANTI +, independent research scientific texts, mainly members of the International Institute of Archival Science, as well as other scientists from the field of archival science, will be published. They will be published three times a year, entirely in English, under the careful management of the Editor-in-Chief, of five co-managers and 25 members of the Editorial Board from different countries, with only two members from each country. International scientific journal for contemporary archival theory and practice © ATLANTI + will be published in classical and digital forms.

When 30 years ago I was preparing the first number of Atlanti, my honorable colleague Prof. Charles Kecskemeti kindly pointed out that we have to have registered authors for at least 5 years ahead to issue a magazine. I acknowledge his comment also today, when I decided on the latest issue of ATLANTI + in that many regular members of the institute and experts in archival science at the AMEU-ECM or related institutions from around the world promised me that they would be happy to contribute to this new magazine ATLANTI +.

So let me conclude with the well-known and often written Latin saying: "Archivistica amor noster, semper et in aeternum"; in conjunction with "Per aspera ad astra" I add, »vivat, crescat, floreat © ATLANTI +«.

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Peter Pavel Klasinc[1]

ARCHIVAL SCIENCE - TODAY

Abstract:

In this paper the author is convinced that today is the time when archival science can be defined in detail or even redefined. In professional archival literature we can find many definitions of archival science, which we can accept or take knowledge of without problems. If we analyze these definitions, we will, as a result, determine whether these definitions are still really appropriate for present time.

The new definition of archival science was primarily referred to by the results of the preparation of materials for the accreditation of study programs in archival science (Ist degree - Bachelor's degree), archival science and records management (2nd degree - master of archival science and documentology) and archival science (3rd degree-doctor of archival science) at Alma Mater Europaea - European Center Maribor.

The author in this paper is trying to redefine the basic definition of archival science. Therefore, the author makes the following statement: "Archival science is an independent, academic, multidisciplinary and interdisciplinary science".

Keywords: *archival science, definition, redefinition, relations, archival studies*

1 INTRODUCTION

What does »scientific« mean? It is considered that by the word "science" we can define all those activities which satisfy the following research criteria:

1. knowledge of the subject of research,
2. the causes of research and
3. methods of research. (Duranti, 2000: 242)

It is indisputable that in the effort to apply archival science as an academic science, the same criteria are taken into account that are used in the application of other sciences. The historical past of archival science may be based on one of the oldest documents dealing with archival theory and practice and is present in the "office management manual" (if so called) that was created in 1571. (Weidling, 2013: 270-271)

From the viewpoint of what constitutes archival science activities today, we can say that it "deals with archival and current records". (Posner, 1997: 17-62). Recently, archival science can be traced in the light of the existence and organization of e-commerce, in the creation of electronic documents. (Duranti, 1996: 46-67)

First it is right to present an indicative overview of definitions of archival science and there are many of them. We will start this task, which is more personal in character, with Dr. Wolfgang Leesch, whose research traces the methods, the breakdown and the importance of archival science. (Leesch, 1956: 13). He asserts that "everyone knows archives as guardians of important written sources, but they do not know anything about archival science". For this reason, in the context of this finding, the question arises whether archival science is a science at all, especially if we see that there is nothing or very little written down about archival science. (Klasinc, 2011)

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In this overview of the definitions of archival science we should briefly get acquainted with Dr. Willy Flachom's standpoint, who places archival science within the discipline of archival professional work, especially those elements that serve "protecting, preparing and transmitting historical sources." (Flach, 1953:42) This definition does not convince us of the sufficiency of justification based on archival professional work.

Increased interest in definitions of archival science brings us to Dr. Adolf Brennecker, who formally introduced the principles of the developmental principle of archival science in 1897 in the Prussian Secret State Archives. The result of the scientific justification of archival science by the Dutch archivists puts in front of us the fact of a "logically constructed system" and thus places archival science in the same position with other sciences.

In addition to this established definition of archival science, we should add the theory of Dutch archivists, who, among other things, determined that "the an archive is a whole that can not be arbitrarily shaped".

This position is and should be the basis for the professional work of each archivist, who "must not take out records and treat them individually". Archivists always and everywhere follow their affiliation. Such instructions can be found in the Glossary of Archival Terminology. (Pearce – Moses, 2005).

There has been an extensive list of professional literature published over the last forty years, which contains a number of definitions of archival science. These definitions depend on the activities of the authors of contributions. It is not our intention to disagree with these definitions, since we can be sure that many of them form certain foundations, programs, definitions, descriptions and other elements of presentations of archival science. Our task is to set the definition of archival science with plenty of professional tolerance and mutual professional cooperation. That way, a more favorable outcome regarding the definition of archival science will be achieved in many environments. The integration of archival science into archival theory and practice will be enhanced in the environment where archives operate. (Burke, 1981; Katelaar, 1997, 1999, 2000, 2008, 2014; Katelaar-Thomassen, 1999; Cook, 2013:116)

It is indisputable that archivists always and everywhere follow the affiliation of archival principles; therefore, archival science has no intention of investigating a particular document but rather explores it:

- the structure of the entire archive and the structure of the funds,
- the history of the archives and the history of funds,
- documents that are the basis of each fund,
- the dependence of archival science on archival theory and practice, and vice versa
- the methods and principles under which an archive or fund was formed,
- the origin, existence and operation of each archive or fund.

The fact is that archival science cannot comprise researches that focus solely on archival records; however, the content od archival records cannot be the matter of archival science either.

We must be invariably aware of the conceptual differences between acts, convolutes, documents and records from certain peculiarities, such as, for example, birth records, records of married and deceased, and other documents generated in office operations. These conceptual differences raise interest among historians and many other users of archival records. For archivists, these conceptual differences, by themselves, do not pose problems with regard to the editing of archival records.

During the era of producing large quantities of documents, written on various sources, the large amounts of information contained in the archival records indicate that archivists will not need to deal with auxiliary historical sciences in the future; sphragistics, paleography, diplomacy, geneology, heraldry, vectics, archeography, chronology, record management, and the like. However, we can say that all of the afore mentioned knowledge cannot be seriously scrutinised without the use of archival records and professional help from archivists. (Leesh, 1985:17)

2 ARCHIVAL SCIENCE

Archival science has been developing in conditions taking into account the development of general science, the development of technology, the formation of countries, the formation of national states, the functions of the state's operations, the functions of office operations, the formation of premises for the preservation and protection of archives, the care of materials, the collection of archival records, the processing of archival records, the access and use of archival records, definitions of archival records, publications and use, exhibitions and publications, presentations of archival records, inventories, legislation, the purpose of archival records, digitization of archival records (formerly microfilming) and training of professionals working with archival records. (Klasinc, 2018)

Consciously, recently we have been deciding on a new definition of archival science, especially after we began with the study of the second degree – Archival Science and Records Management - at Alma Mater Europaea, the European Center Maribor, and set up a new paradigm: "Archival science is an independent, academic, multidisciplinary and interdisciplinary science." We justify this by interpreting it as: independent - in terms of pedagogical, scholar and scientific research work; academic, because it is included in the study process at the university or faculty (Faculty of Archival Science.); multidisciplinary, due to various and general contents and information on archival records and data derived from archival records; interdisciplinary, because it contains in-depth views and approaches to uniform systems of a particular profession.

For the science, however, it is necessary to know the subject, causes, methods and limitations of research; in this case, all that it is necessary in the field of archival science. (Škoro Babić, 2017)

We can divide archival science into the following elements:

- scholarly research work
- and professional theory and practice.

Taking into account the results of research published in the book of dr. Jože Žontar, "The Archives of the 20th Century", and after a review of professional literature relating to archival theory and practice and to archival science as a whole, we will look through a few selected **definitions of archival science**, which were found on various websites pertaining to the works of various authors (google, wikipedia and some social networks).

These definitions have been developed in the past and in many areas today still actual. In any case, however, the definitions are closely related to the development of archival science (that is, archival science in general).

* Archival science is the science by which we mark some knowledge that deals with theoretical and practical solutions in the field of management of current and archival records.

* Archivalism is a new science that deals with appraisal, transferring archival records to archives, editing, description, long-term preservation, use and ensuring the credibility of archival records.

* Archival science covers the study of the knowledge needed for records and archival records management from its creation, for their arranging, evaluation, acceptance, description, long-term preservation, archiving and also subsequent use, regardless of whether the records are written in classical (paper) or electronic form.

* Archival science is a scientific discipline that must deal with all areas of archival theory and practice without compromise.

* Archival science is a science whose goal is not to research individual documents but to research the structure of all archival records (investigating its history, the origin and appearance of individual documents, the causes of the origin, and the causes and ways of appraisal - recognizing archival records among other current records).

* Archival science is a science that deals with archival theory and practice.

* Archival science is a science that deals with the establishing/formation of the fond.

* Archival science is a science that deals with archival and current records and documents.

* Archival science is a science that deals with the completed units, the files and ways of depositing of records.

* Archival science is a science that deals with the arrangement of current and archival records for the purpose of accessibility.

* Archival science is a science that addresses the legal issues of archives, the functioning of archives and standards.

* Archival science is a science that takes care of organizing work in archives.

* Archival science is a science that creates knowledge and methods that will justify the functioning and existence of archives.

* Archival science is a science that researches the existence, regulation, management, preservation, maintenance and the significance of archival records for the proving of some rights of the state or citizens, and to define a written cultural heritage.

* Archival science is a science that explores archival theory and practice, archival techniques, archival legislation, history of archives and the rest.

In the above definitions, the most commonly used word is: science. In the analysis of definitions we find descriptions of archival professional work, appraisal, acceptance, editing, listing, preservation and access. In some definitions we can notice the finding that the archival records are kept in electronic form. Often we can find a recommendation on the compromise treatment of all areas of archival theory and practice and on the research of archival records for the purposes of historical research in the broadest sense of the word. Often, archival science is associated with activities that deal with archival theory and practice, the formation of a fond, archival and current records and in particular with documents, files or ways of depositing files. Archival science is also attached to legal questions about the functioning of archives, archival laws and by-laws, regulations, and national and international standards. The international term for archival science is also the archivology. [2]

Example 1. From the web pages of the Faculty of Arts in Zagreb, Croatia (Internet 1):

"Archival science is a set of knowledge about the nature and features of archival records and archives activities. Archival science is a relatively young science, it has developed over the past hundred years and today we can say that it has shaped its theory, methodology and practice. Archival theory is a collection of archival ideas about what archival records

2 On the meaning of the word wrote Ass. Prof. Dr. Miroslav Novak in working material fort he acreditation of Master study of ARchival Science and Records Management. Maribor, 2012.

are; archival methodology is a collection of archival ideas about how to handle these records; archival practice is the application of theoretical and methodological ideas in certain situations"[3]

Example 2. Wikipedia (Slovene) (Internet 2)

»Archival science is an auxiliary science of history, which works in the field of archival material protection. With the help of archivists, we investigate archives as an institution, archival records and the theory of archiving«.

Example 3. Archival Science (Internet 3)

Archival Science promotes the development of archival science as an autonomous scientific discipline. The journal covers all aspects of archival science theory, methodology, and practice. Moreover, it investigates different ...

Example 4. Springer (Internet 4)

»Archival science, or archival studies, is the study and theory of building and curating archives, which are collections of recordings and data storage devices. To build and curate an archive, one must acquire and evaluate recorded materials, and be able to access them later. To this end, archival science seeks to improve ...«

* The selected examples do not conflict with the above-mentioned definitions of archival science.

3 BRIEF OVERVIEW OF THE HISTORY OF ARCHIVAL SCIENCE

The claim that archival science is young as a science is not entirely true (paintings in underground caves in Altamira and elsewhere). If we consider and interpret archival science in the broadest sense of the word, then we must take into account its historical development and closely associate it, at least in a certain period, with the emergence of individual national states. At the time of their establishment, these countries often took care of the creation and operation of their archives, employing people who worked and took care of archival records.

Looking back at the history of ancient Greece and its cities, we see that they had built special spaces called "arheion" inside their centers, where they kept archival records, regardless of the basis on which it was written (clay tiles, later papyrus etc.).

History leads us to the realization that in the time of the Roman Empire they even had state officials, known as "tabularius" (or archivists). It is known that the Roman Empire was operating in an organizational manner in which special premises for the preservation of archives were being set up in major centers outside Rome. This claim can be justified by the appearance of the word "tabularius", which is mostly interpreted with the activity of the archivist's profession, and with the fact that two monuments - tombstones located in Ptuj and Ljubljana - have been kept in today's territory of Slovenia, which preserved information on "Tabularius".

It is also known that Karl the Great in the city of Achen, i.e., the center of his new country, organized a special space for the archives and employed individuals for taking care of preserving archival records already in the 10th century.

Furthermore, we could add several other examples to the historcal overview. Perhaps we should draw attention to the Qumran manuscripts (Israel, the ruins of the former Khirbet

3 Original text: »Arhivistika je skup znanja o naravi i značajkama arhivskoga gradiva i djelatnosti arhiva. Arhivistika je razmjerno mlada znanost, razvila se posljednjih sto godina i danas možemo reći da je oblikovala svoju teoriju, metodologiju i praksu. Arhivska teorija je skup arhivističkih ideja o tome što je arhivsko gradivo; arhivska metodologija je skup arhivističkih ideja o tome kako postupati s tim gradivom; arhivska praksa je primjena teoretskih i metodoloških ideja u određenim situacijama„.

Qumran settlement) belonging to a very old period, or perhaps to the new ones – the so called historical "capsules" that were discovered in the tower of the National House in Maribor or those found in Grammar School in Kranj. (Kne, 2017)

With all of the arguments presented above, we have tired to prove briefly that archival science is not really a young science; it is true, however, that data or records were not preserved for all historical periods, which could prove or that could directly justify the existence of archival science in the broadest sense of the word outside of the desrcibed examples and perhaps some others.

Modern archival theory and practice can be set in the 16th century, and this is associated with the emergence and the formation of national states; we can argue that when national states were created, individual state institutions were formed as well, and the development of national archives is indisputably connected with them. (Smole, 1976:83-85)

We can easily be convinced that archival science has been actually defined as a science over a long period of time and has its own development, which is closely connected to and in a certain interdependence of:

a) Profesional technical development, the formation of archival spaces (architectural issues, archival location issues, internal layout of premises), the relevance of equipment for archival records, archival boxes (manufacture, material, use) and among others also climatic, safety and other conditions of professional technical protection;
b) Independent professional development (all questions of professional processing of records, especially editing, describing, classification, etc.).

It is not clear where archival science will be placed in the future, in terms of the development of information technologies and the principles of the functioning of the information society, with the separation of the creation of the document, information and archiving them. In the light of the findings from the historical presentation of the origins of archival science, we will discuss information technologies in the future as part of the development of archival theory and practice – so, also about archival science. Many areas and ways of data media, various documents created in digital form, including digitization of records, will be constantly changing according to the basic principles of archival theory and practice and archival science. However, the basic roots of this profession will not change, but will only be upgraded. (Hajtnik, 2010)

This development of archival science, which will not be finished in short notice, shows that in archival theory and practice we encounter many questions and expert issues, especially when we are talking about:

- the appraisal and selection of archival records from current records;
- collecting, storing and protecting archival records (as a proof of the operation of the state, state institutions, proof of the rights of the state or individual, sources for research);
- publicity and use of archival records;
- digitization of records;
- archival legislation (the first archival law in Slovenia in 1966);
- the application of archival records (appraisal and determination of archival records at record creators);
- trainings for those who work with records;
- study programs of the 1st, 2nd and 3rd degree of the archival science, and obtaining the title of a graduated archivist, a master of archival science and records management, and a doctor of archival science.

From the brief history of archival activity we learn primarily about the fact that archival science has actually been exercised over a long period of time. Following the development of the "Historia magistra vitae", the follow-up of this development can lead us to the future development of archival science. The implementation of scientific research projects arising from archival theory and practice is therefore very extensive. They will not run out of research in the future. Archival science will confirm the claim in the new definition that it is multidisciplinary to develop in parallel with the treatment of research topics related to archival records in classic formats stored in professional archival institutions around the world. At this moment, those records represent almost 100% of all archival records, but in the future this percentage will be reduced due to new information media and the development of public electronic archives, perhaps not as departments, but as independent institutions. Of course, we must draw attention to the fact that describing records from linear meters will be changed to the description of records in the databases (archival records in electronic form). In the future, the archives will carry out their basic mission, which is the appraisal, acquiring, professionally processing, preserving, maintaining, use of archival records as the written cultural heritage of the nation, of the state and of other areas where archives are created and archives operate as professional institutions. However, we do not give up the vision that the electronic archives will actually implement all of the above, and this will be focused on an activity that will allow public archival stakeholders and public in general to access the electronic archives..(Larin, 2017; Popovici, 2017; Rybakou, 2017)

4 CONCLUSION

It is indisputable that there are still many open questions regarding the views on archival science today. In any case, an in-depth analysis of the efforts of individuals, which have been pointed out in recent years in the desire to define archival science as an independent, academic, multidisciplinary and interdisciplinary science, would be needed. Many sought to find ways of joint co-existence with information sciences, social sciences, humanities, librarianship, historiography and the like. This fragmentation is reflected in some of the solutions related to the operation of archival services, which can be combined with librarianship, museum, information sciences and the like, which is shown to be poor. We cannot claim that archival science is directly compatible with other sciences, but it is necessary to emerge always and everywhere from the roots of the development of archival science as a science, bearing in mind the Latin saying: "Per aspera ad astra"; we must be aware that these roots go a long way back to the past.

It is always unpleasantly surprising that we cannot decide in any way whether archival science is placed in the field of humanities or social sciences. Archival science must be installed in both areas. Due to the integrity and multidisciplinarity, which is reflected in the archival records, archival science is actually ranked in the field of social sciences.

Applying the new definition that "Archival science is an independent, academic, multidisciplinary and interdisciplinary science" is not only the desire of individuals who want to translate such interpretations, but above of all those who are aware that many of the scientific and scholarly researches depend on the preservation and accessibility of archival records study, whether we talk about history, historical auxiliary sciences, historical geography, art history, history of literature, research on international relations and politics in general and the like.

In particular, we must link archival science to the complexity of archival records in some institutions, which also collect archival records. These are mainly libraries, museums, galleries, information centers and the like, which is commonly referred to as the preservation of archival records in non-archival institutions. In these institutions archive records can be stored because of their basic activity.

There are also special archives that carry out elements of archival science and archival theories and practices in special fields covered, for example, archives of architecture, librarianship, museums, economics, medicine, construction, mechanical engineering, law and many fields of creativity.

Without archives and archival records, and taking into account information about archival fonds and information on archival records and data derived from archival records, multidisciplinary or interdisciplinary research will simply not be possible!

The fact is that archival science is a targeted science, and in a form of scientific and research activity deals with issues of creation, processing, protection and use of archival records and the like.

Archival science leads to a scientifically arranged archives, archival fonds and archival collections, and according to the actual arrangement reflects the original order (provenance) at all levels, as well as the working methods of the creators.

This order will enable scientists, researchers, users of archives to have direct access to resources - data that are fundamental to their research.

The national states and some other creators of archival records as cultural heritage, the memory of the nations, establish state and other archives, which are prescribed by law, provide buildings, equipment, wages for employees and financial resources for individual actions, while forgetting the necessity of training archival professionals, who will only be able to deal adequately with all the issues they face in their work if appropriately educated. We must be aware that there are significant differences between the environments where the archival institutions operate.

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Maryna Paliienko[1]

THE ROLE AND IMPORTANCE OF ARCHIVES IN THE TRANSFORMATION OF MODERN UKRAINIAN SOCIETY

Abstract

The article is devoted to the analysis of the role that archives played in the process of state and national building in Ukraine at the end of 20th – at the beginning of the 21st centuries. There is an accent on the importance of free access and openness of archives of totalitarian regimes' repressive institutions. In this respect particular attention is paid to the analysis of the Law of Ukraine "On Access to the Archives of Repressive Bodies of the Communist Totalitarian Regime of 1917–1991" (2015). The transformation of society set new challenges for the Ukrainian archival community. The role of archivists evolved from the custodians of the records to mediators between their institutions and society. The author is dealing with the question of modern technology in archiving. The author is proving the statement that archivist is an extremely important, noble and always relevant profession, designed to keep and update the documentary evidence of the past in the modern world for the sake of the future, for historical development continuity, genetic links of generations.

Key words: *archives, society, democratic transformation, memory, Ukraine, state and national building, access to information.*

1 INTRODUCTION

Traditionally archives have been and still remain very important from historical and cultural point of view. They are integral components of public administration and governance providing accountability of the authorities and protection of human rights. During the 20th century we were witnesses of the great evolution and changes of the images of archives and the role of archivists around the world and in every country.

For centuries archivists have been considered as invisible keepers of official documents, later – as silent servants of historians. Subsequently they were called "ghosts" of remembrance. All these definitions were stereotypes which reflected the perception of archivists by society. But during the recent decades the role of archivists in society has changed dramatically. They began communicate with institutions and citizens more actively, presenting the values of archival documents and supporting social projects. As Terry Cook stressed, "archivists shape the future of our documentary heritage", they are deciding "what is remembered and what is forgotten, who in society is visible and who remains invisible, who has a voice and who does not" (*Cook, p. 171*).

Post-modern historiography treats archives as "lieu de mémoire" / "houses of memory" (*Nora, p. 7*) as well as a metaphoric "time-machine" (*Ketelaar, p. 233*). A concept of archives as a precious gift for the future generations was proposed by Canadian archivist Arthur Dougfty. In particular, he noted that "all of national assets archives are the most precious. They are the gift from one generation to another, and the extent of our care of them marks the extent of our civilization" (*Cook, p. 171*). More archival "images" were analyzed earlier in my article "The Image of Archive in the Modern Scientific Discourse: Multiplicity of Interpretations", published in the journal "Archives of Ukraine" in 2016 (*Палієнко, p. 143*)

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2 ARCHIVES IN NATIONAL AND STATE BUILDING PROCESSES IN UKRAINE

If we consider the history of Ukraine, it should be noted that archives have come a long way from the "d'arsenal de l'autorité" with very limited access under the Soviet totalitarian regime, through the process of massive declassification of archival documents and their opening to public use in late 1980s – at the beginning of 1990s. Crucial political, social and historical changes that have taken place in Ukraine over the last decades influenced the evolution of perception of archives and their role in society. It should be emphasized that the influence of archives on the development of modern democratic society in Ukraine is extremely meaningful. They have become important not only as "le laboratoire d'histoire", but also as crucial sources for transformational changes in people's mentality, their consciousness. The declassification of archival documents initiated the process of returning Ukrainians their own history, their national memory and historical roots.

The crucial moment in the modern history of Ukraine was a proclamation of the Ukrainian independence in 1991. It was closely connected with the process of democratization of society and liberalization of memory policy as well as access to archives. During the end of the 1980s and the beginning of the 1990s thousands of archival files were declassified and became available not only for a scientific research but also for the wider use. New democratic organization of the Ukrainian nation guarantees the right to information.

In the 1990s a system of state archival institutions of Ukraine was created. Today it represents by the State Archival Service of Ukraine, which implements state policy in the field of archives, 9 central state archives, 12 branch archives 24 regional state archives, other local archives and archival divisions. The legal basis for the activities of the archives is the Law of Ukraine "*On the National Archival Fond and Archival Institutions*" (2001) as well as other Ukrainian and international legal acts devoted to archives.

Among the basic principles of the development of archival affairs in a democratic society should be highlighted the rule of law, national security, transparency and openness of power, protection of the citizens' rights and interests, devotion to the ideals of freedom and democracy, education and professionalism. The transformation of society set new challenges for the Ukrainian archival community. The role of archivists evolved from the custodians of the records to mediators between public institutions, archives and society.

Ukrainian archives are doing a great work of promoting documentary heritage, organizing on-line exhibitions of documents and implementing numerous presentation projects. Among the main online projects it should be mentioned "ArchiVazlyva sprava" ("Archives Important Affair") – a project of the Central State Archives-Museum of Literature and Arts of Ukraine, "Turning History Pages" – a project of the Central State Archives of Supreme Bodies of Power and Government of Ukraine, "Archives Alive" – a project of the Central State Historical Archives of Ukraine in Kyiv.

Among the interesting archival exhibition projects of recent years it should be mentioned "De-communization: archival chronicles", "100 years of the Ukrainian Revolution. Revival of the State", "Ukrainian Diplomacy 1917–1924: The Birth of National Traditions". In general, the number of exhibitions prepared by the archival institutions of Ukraine is impressive. In particular, 1865 expositions were opened in 2018 (106 exhibitions were prepared by central archives, 359 – by regional archives, and all of the rest – by small local archives and archival subdivisions) (*Публічний звіт Голови Укрдержархіву Баранової Т.І., p. 22*).

In recent years, the number of users who work with documents in the reading rooms of archives has increased significantly. So in 2017, the reading rooms of Ukrainian archives were visited by 26,811 people (and among them there were 1669 foreign researchers). The main topics of research and reader queries included property rights, genealogy research, history and activities of enterprises and institutions, church temples and religious denominations, the history of the Second World War, Nazi occupation, national liberation movement of the 20th century, and victims of a totalitarian regime and repressions.

Today, the work of Ukrainian archival institutions is based on the principles of transparency and openness, which involves the availability of information about their work. At the State Archives Service of Ukraine there are public and scientific-expert councils, which include well-known scholars, journalists, and public figures. They take an active part in public discussions, round tables, press conferences, scientific seminars, opening of exhibitions of archival documents. During recent years, archivists have begun to work more actively with the media, taking part in the preparation of interesting TV and radio stories, programs, historical documentaries, etc.

Declassification of documents of the former state security services of the Soviet totalitarian regime (NKVD-KGB) had a great impact on the political transition process. Meanwhile this process began in the 1990s, it gained the real consequences only after the Orange Revolution and especially in the aftermath of the Revolution of Dignity.

On April 9, 2015 the Verkhovna Rada of Ukraine adopted a law "*On Access to Archives of Repressive Bodies of Communist Totalitarian Regime of 1917–1991*" (№ 316-VIII). The adoption of this law was due to understanding that archives guarantee the preservation of human memory as well as they are an integral and indispensable part of the historical heritage of the Ukrainian people. It was also taken into account, *the Recommendation of the Committee of Ministers of the Council of Europe to Member States on the European Policy of Access to Archives No R (2000) 13*, concerning fundamental right of everyone to receive objective information about the history of the country which is one of the basic principles of a democratic state.

The initiator of the adoption and implementation of de-communization legislation in Ukraine was the Institute of National Remembrance. An important precondition for the adoption of this law was preventing the repetition of crimes committed by totalitarian regimes in any forms; any discrimination based on national, social, class, ethnic, racial or other grounds in the future. The main reason was restoration of historical and social justice, elimination threats to independence, sovereignty, territorial integrity and national security of Ukraine.

In the law there were formulated the main principles of state policy on providing access to archival information of repressive bodies. Among them, the following should be pointed out: 1) the state guarantees the right of everyone to access to the archival information of the repressive bodies; 2) free access to archival information of repressive bodies; 3) conditions for the proper storage, gain and use of archival information of repressive bodies as well as digitization of their information (*Law of Ukraine "On Access to Archives of Repressive Agencies of Communist Totalitarian Regime of 1917–1991"*).

In accordance with this law, Ukrainian state archives provide maximum simplification of the procedure for obtaining information. It is prohibited to classify archival information of repressive bodies as well as attribute it to confidential information, except as provided in this Law.

It is very important that archival information of repressive bodies on their staff or non-staff employees shall be open and access to such information cannot be restricted for any reason. From the other hand, a person, who is a victim of repressive agencies, has the right to restrict access to archival information about himself, but having noted, which information is limited (type of information, pages, paragraphs, etc.) and the period for which limitations are set up. It should be noted that mentioned persons have the right to restrict access to archival information of repressive bodies about themselves for a period not exceeding 25 years.

Everyone has the right of access to archival information of repressive bodies which are provided by their administrators by all available means. A person's self-supporting production of a copy of archival information of repressive bodies is free of charge. It is forbidden to demand direct or indirect payment for making copies of such information.

It is worth noting that similar laws on archives have been adopted in several post-communist Eastern European countries and are recommended by European institutions. Adoption of de-communisation laws in Ukraine reflects general tendency of the Ukrainian policy-makers towards the recognition of European democratic values and distraction from Russia's integration projects (*Law and Memory. Towards Legal Governance of History, p.313*)

Consequently, the de-communization processes in Ukraine created favourable conditions for work in the archives for Ukrainian and foreign researchers. One of them, director of the Freedom of Information Act Project for the National Security Archive at George Washington University Nate Jones, stressed that "anyone conducting research on the Soviet Union, nuclear history, or the Cold War should visit Ukraine as soon as possible" (*Jones, 2017*). He also pointed out that now the Ukrainian archives are open (including to foreigners) and filled with historically important, previously secret documents. Describing his work at the Central State Archives of the Supreme Bodies of Power and Government of Ukraine, he underlined that researchers can access the archives without an appointment simply by showing a passport. But the most valuable gem for him was the Archives of the Security Services of Ukraine (former the KGB Archives). According to him, the Ukrainian KGB archives are "demonstrating a path of openness that the archives of other formerly communist countries would be wise to follow". Investigating these documents, researchers have a unique opportunity for an inside view of how the Soviet organs of state operated. N. Jones's conclusion sounds really inspired for researchers: "There are countless gems now available to researchers in the Ukrainian archives and waiting to be discovered. While the Ukrainian geopolitical situation remains fraught, its historical archives have never been more accessible. Another window into the history of the Soviet Union has been opened". (*Jones, 2017*)

According to experts' conclusion based on the analytical report "European legislative practices on decommunization issues: implications for Ukraine", modern Ukraine is one of the post-Soviet countries with the easiest access to KGB archives. It is interesting to know that this conclusion was based on analysis the practices of the Czech Republic, Slovakia, Hungary, the Baltic countries, Albania, Bulgaria, Moldova, Georgia and Romania (*Blood-stained Papers: Decommunization and Opening KGB Archives in Ukraine, 2017*). There are minimum requirements for accessing to the KGB archives in Ukraine. It is enough to provide all available information about a person to facilitate searching, and a passport of researcher (user of information). No access fee required as well as making copies with researcher's own technical devices is free of charge.

The importance of this law lies in using of archival records for rehabilitation people who were the victims of totalitarian regime. But its value is not limited to this. It is also a valuable instrument in the process of formation the new social relationships, reconciliation, and creation a consensus between different groups of people and state.

Ukrainian archivists made significant contribution to the collection and preservation of documentary evidence of the Orange Revolution (2004–2005) and Revolution of Dignity (2014). But nowadays we have great problems with the documents in occupied territories. Ukrainian archival authorities don't have an access to the vast collections of official documents and other documentary fonds that remains in the occupied territories (in Donetsk and Luhansk regions). This creates great problems for the functioning of state institutions and lives of individuals.

3 NEW OPPORTUNITIES VIA NEW TECHNOLOGIES

New technologies in archiving open new possibilities for democratization of archival usage and free dissemination of information. Nowadays the establishment of databases for archival documents, preparation of on-line documentary exhibitions as well as support of public relations is among the main activities of archivists. In general,"digital documents and electronic records have destabilized the concept of records and challenged the ability of archives to capture, represent, and preserve digital records" (*Hedstrom, p. 22*).

For the purpose of proper storage of electronic documents of the National Archival Fond, the Central State Electronic Archives of Ukraine was founded in Kyiv in 2007. Archives' main tasks include: keeping electronic records and information resources, ensuring their integrity, creating conditions for their use.

One of the strategic directions of organizing access to archival information is the digitization of documents and providing access to them via the Internet. The target audience of the official web-portal "Archives of Ukraine" is Ukrainian citizens as well as users from more than 125 countries of the world. The Ukrainian archival web portal most frequently visited by the users from USA, Russia, Poland, Germany, Canada, the Great Britain, the Netherlands, Israel, Belarus. The level of information openness of public archives websites increases each year. In particular, the availability of information for users with visual and hearing impairments is ensured.

A significant number of the Ukrainian state archives have their own pages in social networks (mainly Facebook) which they use for interactive communication with users, representatives of the public, mass media. Meanwhile, modernization of sites remains relevant, especially with regard to the development of on-line services (e-services). Due to the active communication and presentation of documentary databases in the Internet, Ukrainian archives are becoming more open, they begin to implement the concept "archives without borders".

But unfortunately due to instability of economic development and military actions in the east of Ukraine, our archival affairs have insufficient funding for realization of a number of the important technological reforms.

4 CONCLUSION

Nowadays the role of archivists in society is multifaceted and extremely important. They not only preserve the documentary, historical and cultural heritage, but take an active part in state-building processes, promote the consolidation and development of civil society, the values of public accountability, open government, and social justice. Archives help to produce a new collective memory, to provide a proper framework for the emergence of a new political system.

On the whole, the social responsibility of archivists is growing, because they have to satisfy the right to know, the right to access to information as well as to protect state security and personal rights of citizens.

But in the new political and socio-cultural environment archivists need greater financial support and recognition of their work by society. In this connection, changes in the profession itself are extremely important. We need to be confident professionals, with deep theoretical knowledge and practical skills. Consequently, the urgent requirements of the present are to promote profession, to elaborate new educational programs, and to develop international links between archivists and educators. Only under such conditions archivists will be able to respond to modern challenges of informational era, providing the needs and values of democratic society.

Traditionally archives have been and still remain very important from historical and cultural point of view. They are integral components of public administration and governance providing accountability of the authorities and protection of human rights. During the recent decades the role of archivists in society has changed dramatically. They began communicate with institutions and citizens more actively, presenting the values of archival documents and supporting social projects.

Crucial political, social and historical changes that have taken place in Ukraine over the last decades influenced the evolution of perception of archives and their role in society. It should be emphasized that the influence of archives on the development of modern democratic society in Ukraine is extremely meaningful. They have become important not only as "le laboratoire d'histoire", but also as crucial sources for transformational changes in people's mentality, their consciousness. The declassification of archival documents initiated the process of returning Ukrainians their own history, their national memory and historical roots.

Among the basic principles of the development of archival affairs in a modern Ukrainian society should be highlighted the rule of law, national security, transparency and openness of power, protection of the citizens' rights and interests, devotion to the ideals freedom and democracy, education and professionalism. Ukrainian archives are doing a great work of promoting documentary heritage, organizing on-line exhibitions of documents and implementing numerous presentation projects.

Declassification of documents of the former state security services of the Soviet totalitarian regime had a great impact on the political transition process. The Law of Ukraine "On Access to Archives of Repressive Bodies of Communist Totalitarian Regime of 1917–1991", that was adopted by Verkhovna Rada of Ukraine in 2015, formulated the main principles of state policy on providing access to archival information of repressive bodies. The de-communization processes in Ukraine created favourable conditions for work in the Ukrainian archives for native citizens and foreigners.

New technologies in archiving open new possibilities for democratization of archival usage and free dissemination of information. Nowadays the establishment of databases for archival documents, preparation of on-line documentary exhibitions as well as support of public relations is among the main activities of archivists. But unfortunately due to instability of economic development and military actions in the east of Ukraine, our archival affairs have insufficient funding for realization of a number of the important technological reforms.

Consequently, in the new political and socio-cultural environment archivists need greater financial support and recognition of their work by society. In this connection, changes in the profession itself are extremely important. We need to be confident professionals, with deep theoretical knowledge and practical skills. The urgent requirements of the present are to promote profession, to elaborate new educational programs, and to develop inter-

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Miroslav Novak[1]

METHODS OF LINEAR AND HIERARCHICAL SEQUENCES IN ARCHIVES

Abstract

There are more and more data collected and captured in the archival repositories and in the archival information systems and organized in different ways. Therefore, legitimate archival professional dilemmas and related discussions arise about ensuring their integrity. To solve this problem it is necessary to check the suitability of existing methods or develop and establish new methods of managing data in the archives.

The paper presents two archival methods for managing the archival data consistency and integrity on the base of linear and hierarchical sequences and the method of cardinality of sets of sequences. In archival professional procedures all three methods are already used in various forms. In some areas, their use is systematic, in other sporadic. They are often carried out by inertia and with the limited archival practical experience. The main intention of that paper is to present and theoretically ground these methods with intention of better and systematical implementation in everyday archival professional procedures.

Keywords: *methods, linear sequences, hierarchical sequences, cardinality, data in archives, archival material*

1 INTRODUCTION

In the framework of archival theory and practice, archival professionals have developed several ways and procedures for data management over time. Their solutions base primarily on the practical experience of manually manageable quantities of preserved archival material or related records about them.

A prerequisite for managing data in archives is formalized and established procedures. We can systemize these into the following basic processes of managing archival material:

- evaluation of creators and archival appraisal,
- arranging and describing archival records,
- performing examinations and the inventory of the entire archives, archival warehouses and archival records,
- implementation of procedures for relocation of archives,
- implementation of internal and external loan procedures,
- implementation of restaurant and conservation procedures including the replacement of technical equipment,
- carrying out procedures related to the dismantling and publishing of archival records,
- the implementation of procedures for the use of archival records for scientific, research and other purposes (ZVDAGA, Art. 53).

If the basic principles of the afore processes did not change significantly over time, then in practice we van conclude that the relations between the data generated in these processes and their creators and managers did not change significantly. Only few decades ago people (archivists) collected and processed data by themselves. Today many various devices generate and process data within archival professional processes.

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Individuals and machines manage data by implementing different methods and modes of processing. Some of these have been deliberately developed on the basis of the legitimacy of archival records and their contexts, while others appear "ad hoc" and are used to a limited extend regarding time and space. In this context, we should mention the methods of data and content classification (Šauperl, 2007), methods of producing reproductions (Novak, 2018a), scientific research methods in archival science (Semlič Rajh, Šauperl, Šabotič, 2013), etc.

2 PRESENTATION OF THE RESEARCH PROBLEM

The information contained in the procedures of archival professional work must be "accurate" and "credible". It is important to distinguish the "accuracy of the data"[2] from their "precision"[3]. Although both requirements are largely defined by the ratio between the amount of archival records and the available human resources in time and space, the accuracy and precision of data in practice are determined in a methodologically different manner. The accuracy of the data is determined based on the relationship between their incidence and the expected results. Precision is determined with the degree of detail of the definition of the entity under consideration. Different comparative methods in combination with abstraction, reduction, selection, etc. are used to determine the degree of accuracy and precision. (Novak, 2011).

From the point of view of archival practice, however, the use of the comparative method often depends on data previously obtained through various other formalized or non-formalized methods. In archival theory and practice, the method of determining the number of elements of a particular set or the power of the set or the cardinality of the set (Weisstein). Complementary to this, the procedures for the production of different lists and reviews of the entities of archival expert reviews are carried out. On this basis, different metadata are generated, which need to be compared with the long-term consistency of the entities of the sequence in question. That is why it is important to know the kind of data captured and the way of capture, as well as how they are preserved in time and space so that they can be compared with the results of analyzes in another time and space (Semlič Rajh, Šauperl, 2011). However, if we add to this the other activities and procedures implemented in the archival institution, especially in the field of managing the archival institution, human resources, professional and other procedures in the archives, time management and technological infrastructure in the archives, then we can understand the complexity of the whole data management in archives and related methods of capturing, checking, storing, evaluating and deleting data. Several methods and their practical implementations have been developed to carry out these tasks and to achieve goals in the field of data management in archives. Therefore, we will therefore limit ourselves to only three methods:

- the method of cardinality of a set of the sequence elements,
- the method of ensuring the consistency of linear sequence and
- the method of ensuring the consistency of hierarchical sequences in archives.

2 In this context, the accuracy is something that, when measuring something, shows as much as it really is. is completely consistent with the real situation (FRAN).

3 Precision includes everything, also details or with the greatest possible perfection it shows the true state of affairs. (FRAN)

3 THE METHOD OF ENSURING THE CONSISTENCY OF LINEAR SEQUENCE IN ARCHIVES

The method consistency of linear sequences in archives we can define as the one that determines the accuracy of the elements of the sets of the linear sequence in accordance with the known parameters of these sequences.

A linear sequence in archives means that the entities of archival professional processes or states are placed in a row, so we know exactly where the entity is in this sequence. Sequences can be generated in the same or different time and space and in various combinations of both values.

Ensuring the consistency means respecting the same principles, flows or manifestations of entities in a particular order.

Each linear sequence is defined by the following entities:

- **the set or objects of a sequence** (physical[4] and logical[5] entities, content[6], elements[7], data[8], etc.),
- **starting point, begining or grabbing of linear sequence** (numeric, alpha or alpha-numeric value),
- **the direction o**f the sequence (rising, decreasing),
- a sequence **step** (the rate of increase in a sequence that can be defined by value as a value of 1 or greater than 1),
- sequence **consistenc**y (sequencing rules including the principles for the division of entities into a specific sequence) and
- the **power** or **cardinality** of the plurality of sequence elements. This determines the number of elements that the crowd contains.[9]

Linear sequences can be represented in different ways. Let's just mention:

- physically (for example, 10 archive boxes on one shelf),
- logically (for example, 100 records on description units at the level of the fond),
- in a textual, descriptive form,
- in graphic form,
- on the basis of known spatial data or time points, etc.

4 Examples of physical sequence entities include technical equipment: archival boxes, bindings, cords, etc.

5 Logical sequence entities appear at the level of the archival description within one level, for example, sequence of sub-series within one series.

6 In archival theory and practice the contents appear as integral parts of the wider completed whole. For example: chapter in the book, physically deferred archives on the basis of the original arrangement, etc.

7 In this context, let us just mention the elements of the inventory in the census forms, the sequence of columns in the tables or other presentations of archival material, etc.,

8 In this context, we should mention only a set of data that is classified according to a particular criterion or written in accordance with the known rule of formation of wider information units, e.g. when creating the address of the description unit.

9 Example of set X, that begins with 1, in first step we can put down as X = {1, 2, 3, 4, 5}. In this case the power of the set or the cardinality of the set F equal 5, which can be put down as m(F) = 5. (Množice. Retrieved 8. 2. 2019: http://www2.arnes.si/~mpavle1/mp/mnozice.html)

Figure1: A linear sequence model in graphic form with a starting point 1, a clearly defined sequence direction, a corresponding consistency, and known sequence steps, which in this case is a value of 1

The method of ensuring the consistency of a linear sequence we can realize through a process that we can define in six steps:

- 1st step: **Defining the sequence objects.** At this stage it is necessary to establish or define the legality of the objects of the sequence to correspond to the condition that the properties of a set of objects that form a sequence must be similar in at least one characteristic.
- 2nd step: **Defining the starting point or a begining point (SpS).** At this stage, it is necessary to establish the start of the linear sequence and consequently the end of this sequence.
- 3rd step: **Definition of the direction of the sequence.** At this stage, it is necessary to determine or ensure the direction of the linear sequence (vector) and define possible deviations in the form of parallel linear or pseudo-hierarchical sequences.
- 4th step: **Definition of the sequence step (Ss).** At this stage it is necessary to determine or ensure the sequence step value. This we usually define by an integer. Very often, the step is defined as Ss = 1. Because of the particularity of the individual procedures, this rule also deviates , since Ss = n + 1, where n≥0 or n≤0 can also be, so the value of this step should be specified in each sequence.
- 5th step: **Defining the sequence consistency.** At this stage it is necessary to determine the degree of deviation of the results of the first 4 phases and to determine the status of a "consistent" or "inconsistent" sequence. At the same time, check compliance with any specific requirements of the sequence or additional criteria, principles of the division of the sequence objects.
- 6th step: **Determining the power or cardinality (card) of a plurality of sequence (S) elements.** In this phase, we determine or define the actual power of the set card(S) of the linear sequence. The power of the set of sequence elements is defined by the number of elements the set contains.

If the method of ensuring the consistency of linear sequences is implemented on objects of archival professional activities, which in themselves can not be empty values, natural numbers need to be used for their labeling. In this context, let us mention some examples of the implementation of this method:

- in managing the sequences of technical units in archival warehouses,
- when disposing of library material to shelves on the basis of the current number,
- in the management of records on archives that are produced on the same level of enumeration,
- when naming files in accordance with ISO standard (ISO / TR 13028), etc.

Theoretically, the method is used wherever:

- it is necessary to arrange the set of elements into the expected linear sequence,
- it is necessary to determine the integrity of a particular linear sequence,
- it is necessary to establish the legality of the existing linear sequence and the occurrence of deviations of this sequence,
- it is necessary to transpose the elements of one linear sequence into elements of the second linear sequence.

An example of using the management of linear sequence data based on one-to-one transponder transposition is illustrated in the process of digitizing a large-format book, 150 pages. The pages in the book have a sequence (S) established. This is derived from the content and is usually defined by pagination. The order of the page can be defined by the page number, page order sequence and same point sequence. This can be written as follows:

S={1,2,3,4,5,6...150} with SS 1 and SpS in point 1, where card(S)=150.

In the process of digitization, for practical reasons, we first perform digitization, for example, odd and then even sides. After the digitization of the odd pages, the digitized odd pages (Dop) obtain the sequence:

Dop={1,2,3,4,5,6,...75} with Ss 1, SpS in point 1, where card(Dop)=75.

This is followed by digitization of even-numbered pages. Digitalization even pages (Dep) obtained sequence:

Dep={1,2,3,4,5,6,....75} with Ss 1, SpS in point 1, where card(Dep)=75.

Both sequences digitalizatov odd and even pages have exactly the same features and none of them shall not be liable to the original sequence of pages in a digitized book. Therefore, it is necessary to change, transpose, the legality of both sequences of digitizers.

The order of the digitizers of the odd pages should be transposed so that it becomes:

Dop={1,3,5,7,...149} with Ss 2, SpS in point 1, where card(Dop)=75.

The same is true for digitalizate even-numbered pages. They receive the following legality of the sequence:

Dep={2,4,6,8,..150 with Ss 2, SpS in point 2, where je card(Dep)=75.

After the digitalization of the even and odd pages, we combine the digitized files of the odd and even pages in one folder and sort them ascending, then we get the sequence:

Dop+Dep={1,2,3,4,5,6,7,8,...150}withSs1,SpSinpoint1,wherejecard(Dop+Dep)=150.

This corresponds to the condition of the page sequence of the original archival material, which can be defined as a bijective mapping of the set S → the set Dop + ep, since the condition is satisfied:

(S={1,2,3,4,5,6...n} with Ss 1, SpS in point 1) = (D ep+op={1,2,3,4,5,6...n} with Ss 1, SpS in point 1)

If we define the strength of the two sequences, then we can write down:

card(S) = card (Dop+Dep) or |S| = |Dop+Dep|=150

Using the above method, we can conclude that the digitization of the book was carried out correctly, in the object management segment throughout the entire process of converting one form of archival records into another.

Another example of the implementation of this method can be seen through the processes of transforming the signature list signature (Sg), e.g. at the level of the aggregation. It is known that at the record creator, the original linear sequence of cases with the production numbers Sg = {1,2,3,4,5,6,7,8,9, ... n} is created with step (Ss) 1 in the starting point of sequence (SpS) 1. After removing records of non-archival value in the process of transferrinf archival records to archives, the sequence of identification numbers or the case labels (SF) changes to Sg = {2,3,6,8..n} with Ss ≤1 and the SpS of sequence ≤1.

After removing records with no archival value, there is an unordered sequence of archival records. The markings or identification numbers of files of archival value (Sa) form a sequence with the following legality Sa = {1,5, 7,9, ... n} with Ss ≤1 and the SpS in ≤1. This sequence is no longer the same as the original linear sequence, so it needs to be transposed into a new sequence (Sn). The new sequence must have all the characteristics of

the linear sequence Sn = {1, 2,3,4,5,6,7,8,9 ... n} with Ss 1, the SpS of sequence 1. It is expressed in the identification number of the description units of archival records as an injective maping[10] the sets Sa → Sn. Forming the identification number is actually a complex archival professional task based on the consideration of basic archival professional principles, since it is necessary to uniquely define the positions of description units within certain sequences, which is not always followed in practice (Novak, 2012). If the afore knowledge is generalized, it can be stated that by a method of ensuring consistency of linear sequences, and related determination of the power of the plurality of the linear sequence, the basic tool for managing data and their structures in the archives is obtained.

The method can be implemented in many basic archival professional processes and subprocesses in solving individual archival professional problems. Depending on the implementation method, it can be systematically supported with simple system tools that allow sorting or not.

4 THE METHOD OF ENSURING THE CONSISTENCY OF HIERARCHICAL SEQUENCES IN ARCHIVES

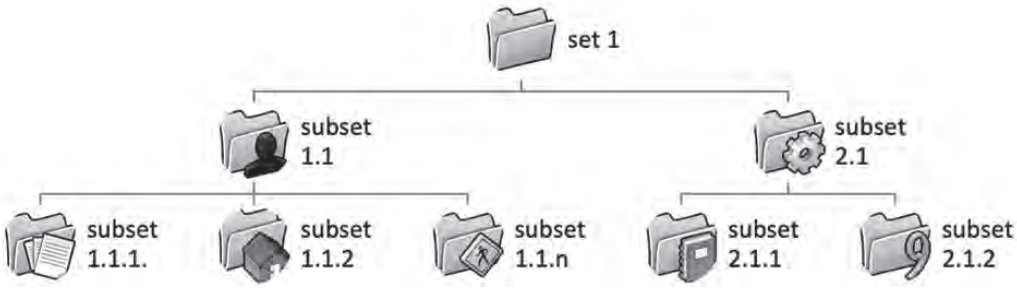
A hierarchical sequence in archives means that the entities of archival professional processes or states are placed in a structure in this way to know the exact position of the entity in the structure. The consistency of a hierarchical sequence, by analogy to linear sequences, means ensuring compliance with the same principles of events or manifestations of entities in a particular order of the structure. Hierarchical sequences are generated in time and space and are subject to the same rules as for linear sequences

Since a hierarchical sequence in some sense with a structure is the upgraded set of linear sequences, we can define this with the following entities:

- **sequence objects** (physical and logical entities, content elements, data, etc.)
- **starting point, begining or grabbing of** (numerical, alpha or alpha-numeric value) of a hierarchically organized set, including a plurality of complementary clasps of subsets od elements od a hierarchical sequence,
- **directions** of the sequence in the horizontal and vertical dimension (ascending - descending, wider - narrower) or as a precursor - successor (larger - smaller, etc),
- **consistency** of sequence (design rules of sequences including the principles of separation of entities in a particular location sequences), and
- a **two-dimensional sequence step** (defines the rate of increase or decrease in the sequence. The step is defined as the value 1 by the hierarchy and as the rate of increase or decrease in the sequence within the subset of the linear sequence by 1, in certain cases also for a value of more than 1 or less than 1, depending on the points and direction of the sequence).

10 An injective function or injection or one-to-one function is a function that preserves distinctness: it never maps distinct elements of its domain to the same element of its codomain. (More about in: Injective function. . Retrieved 8. 2. 2019: https://en.wikipedia.org/wiki/Injective_function.)

Figure 2: A model of a hierarchical sequence in graphic form with a starting point in a set 1 defined by the top-down hierarchy direction and the linear sequence within the subsets of the corresponding consistency and the known steps within the sequence of the subset.



Hierarchical sequences can be the same as linearly presented in different ways. Let's just point out:

- in physical form (for example, 10 folders in one archive box),
- in logical form (for example, 1 record at the level of the fond, 10 records at the level of the series, 100 at the level of the aggregation),
- in a textual, descriptive form,
- in graphic form,
- based on previously known spatial data or time points, etc.

The method of ensuring the consistency of a hierarchical sequence is realized through a process that can be defined in six stages:

- 1st phase: **Defining the sequence objects.** In this phase it is necessary to determine whether the objects of the set of hierarchical sequences correspond to the conditions under which the properties of a set of objects that form the sequence structure are similar in at least one characteristic.
- 2nd phase: **Defining the starting point or a beginning point (SpS).** In this phase, it is necessary to determine the starting of the hierarchical sequence of the discussed set of objects of the hierarchical sequence, and the starting point of each of its subsets of the objects.
- 3rd phase: **Defining the direction of the sequence.** At this stage, it is necessary to determine the direction and type of the hierarchical structure of the sequence and the direction of the linear sequences within the subsets of the considered set, including possible deviations.
- 4th phase: **Defining the sequence step (Ss).** This is usually defined as the value of 1 in both the hierarchy and the horizontal within the sequence. Mostly: $Ss = n + 1$, where $n \geq 0$ or $n \leq 0$.
- 5th phase: **Defining the sequence consistency.** At this stage it is necessary to determine the degree of deviation of the results of the first 4 phases. At the same time, check compliance with any specific requirements of the sequence or additional criteria, principles of object division in structure.
- 6th phase: **Defining the strength of the structure or cardinality (card).** At this stage, we determine the actual power of the set and its subsets in a hierarchical structure.

The method of ensuring the consistency of hierarchical sequences in archival theory and practice is, as a rule, implemented on objects that in themselves can not be empty values, therefore they must be denoted in practice by natural numbers.

The method can be used to manage sequences of multi-stage records describing. Also to manage the system of marking technical units – archival maps in relation to archival boxes, to establish all types of relationships between objects in the form of decision trees at the level, for example, of organization of digital and physical storage locations, establishment of relations between descriptors, description and technical units, etc. Theoretically, the method is used wherever:

- arrange the necessary set of elements in the expected hierarchical order,
- to determine the integrity of a particular hierarchical sequence,
- to establish the legality of the existing hierarchical sequence and the occurrence of deviations in the sequence in question,
- transpose the necessary elements of one hierarchical sequence into elements of the second hierarchical sequence.

A typical example of the problem of arranging elements in an expected hierarchical sequence is the management of the sequence of levels of description (Ld) of archival records. In accordance with the ISADg standard, there are 6 levels of inventory defined: fond (F), sub-fond (sF), series (S), sub-series (sS), file (F) and documents (D). They are in the following hierarchical relationship:

$D \subset Zd \subset pS \subset S \subset pF \subset F$

In the archival information systems, the structure of the levels is defined, for example. with numbers of levels 1 to 6 in this way to represent the value of 1 = F, 2 = pF, 3 = S, 4 = pS, 5 = Zd and 6 = D. In this way, we get a bijection mapping of the levels of descriptions into natural numbers.

Additionally, the following conditions or the following insertion rules are added:

1. Rule A: $D1...n \in F$;
2. Rule B: $D1...n \vee F1...n \in sS$
3. Rule C: $F1...n \vee sS1...n \in S$
4. Rule D: $F1...n \vee sS1...n \vee S1...n \in sF$
5. Rule E: $Fd1...n \vee sS1...n \vee S1...n \in sF1...n \in F$

Although relatively weak structure cardLd = 6, due to the established relationships and rules insertion, can be properly managed only by means of the algorithm used within the archival information system

Direct sorting of the linearized form of this hierarchical structure by title does not give the expected result.

Level structure by standard	Activity	The result of the classification of the levels of description
fond **sub-fond** **series** **sub-series** **aggregation** **documents**	sorting values	**documents** **fond** **sub-fond** **sub-series** **series** **aggregation**

A solution to this problem is possible, for example, by adding prefixes with the center of gravity from 1 to 6 in the name of the element, in a way that is disproportionate to the describing level. If we perform this bijective mapping, we get the following results:

fond = [1] fond

sub-fond = [2] sub-fond

series = [3] series

sub-series = [4] sub-series

aggregation = [5] aggregation

document = [6] document

Thus, when sorting the mapped linearized values of the levels of description, the corresponding sequences would be obtained without the intervention of a specific algorithm.

Fairly unsophisticated example shows the actual complexity of managing hierarchical relationships, especially on the problems of management of such sequences, especially if the rules and logic of their operation restricted to specific system solutions. On the basis of this, we can conclude that, in order to ensure the autarktility of such sequences, the data structure and presentation must be made in such a way that it does not depend on the source system. The appropriately designed identification number or tag of individual elements represent in this case a prerequisite for the consistent management of such sequences and their structures.

Another example of using data management with a hierarchical sequence is the labeling of archival boxes of specific archival fond of, for example, 10 technical units and 100 units of the technical equipment of description units (folders or maps) within archival boxes.

Archival boxes (Ab) are defined within the archival fond as a set of linear sequence entities.

Ab={1,2,3,4,5,6,7,8,9,10} with Ss 1, SpS in point 1

The equipment of description units (Edu) can, however, be theoretically sorted in two ways: as a set of elements of a linear sequence or as a set of elements of a hierarchical sequence.

If the set of linear sequences of the technical equipment of the description units is treated within the framework of the archival fond, then this can be recorded as:

Edu={1,2,3,4,5,6,7,8,9...100} with Ss 1 and SpS in point 1

In this case, we abstract the existence of a superior set of technical equipment - that is, archival boxes, and the defined sequence is not in accordance with the requirement that each subset starts with a point sequence 1.

Therefore, it is more correct for the sequence of technical equipment to be considered on the basis of the legality of the hierarchical sequences, according to which in each subset the point sequence is defined by 1. The starting point is that each element of the Edu is also a technical unit element[11], and that the power of each subset Edu1 ... Edu10 is always 10. The first condition can write down:

Edu ϵ AŠ

If the set of elements correspond to this condition, then we obtain the following hierarchical order of the technical equipment of description units within archival boxes:

Edu1{1,2,3,...10} ϵAb1+Edu2{1,2,3,...10}ϵAb2+Edu3{1,2,3,...10}ϵAb3+...
Edu10{1,2,3,...10} ϵAb10

This raises the question of how to calculate the power of a set of hierarchical sequences in archival theory and practice. If we proceed from the starting point so that each set of elements of hierarchical structures can be defined in a linearized form, then we can calculate the cardinality of the whole set of elements or the power of individual subsets or their combinations.

11 In archival practice this means that books (K), for example, which are deposited independently on the shelf, are not an element of archival boxes, which is written in the form K ¢ AŠ

The strength (cardinality) of a set of archive boxes is:

card(Ab1...Ab10) = 10 or |Ab1...Ab10| = 10

The strength of the set of the technical equipment of the description units is:

card(Edu1...Edu10) = 100 or |Edu1...Edu10| =100

The power of the set of descriptions of the technical equipment is:

card(Ab) + card(Edu)=110 or |Ab| + |Edu|=110

By introducing the method of consistency of hierarchical sequences and determining the power of the set of these elements, with methodologically thought-shaped data structures, we gain in archival practice a powerful tool for data management and their structures. This can be implemented in many archival professional processes, including in the phases of testing the planned solutions of individual archival professional problems. Depending on the implementation, the method can be supported by information system or not.

5 THE METHOD OF CARDINALITY OF A SET OF THE SEQUENCE ELEMENTS

The method of determining the cardinality of a set of elements is based on a comparison of at least two measured power sets of the same elements on the basis of biictivity and injectivity or using cardinal numbers. It can be calculated for the sequence of items that are located in the same time period and in the same place or not. If the difference between the powers of the comparing sequences is zero, then the sets are considered to be consistent, and therefore the entity of the treatment is consistent in this part.

As a typical example of the implementation of the cardinal method, we use an example of 10 archival boxes (Ab) of a fond based on the identification of the cardinal numbers of this set. The cardinality of the multitude of boxes was established at the time of the acquisition (T1) of the archival fond, after processing at a location (L1). When it is established that the arranged archival boxes follow the legality of the linear sequence with step 1 and the point sequence in point 1, this is written:

Ab={1,2,3,4,5,6,7,8,9,10} with Ss 1, SpS in point 1, in T1, L1

In the next step, the power of the sequence is calculated, which is

card(Ab1...Ab10) in T1,L1 = |Ab| in T1,L1 = 10

When the archival records are deposited on archival shelves, the consistency of the sequence at a different time and another environment is revisited based on a biative mapping.

Ab1={1,2,3,4,5,6,7,8,9,10} with Ss 1, SPS in point 1, in T2, L2

The power of the sequence is recalculated:

card(Ab1...10) in T2,L2 = |Ab in T2,L2| = 10

The difference in the power of the linear sequence of archival boxes at the time of the records transmission to archives (T1, L1) and the power of the sequence of archival boxes, after being deposited on the archival shelves, is 0:

[card(Ab1...10) in T1,L1] – [card(Ab1...10) in T2, L2] = 0

This means that the sequence in question is consistent in time and space. If we want to formalize the power of the considered sequence, this is done in the inventory of archival records in accordance with the ISADg2 standard, for example, at the level of the fond description in the element 3.1.5 Scope and medium of the description unit.

In the case of an inventory (at other times = T3) in the archival warehouse it is necessary to re-check the consistency of the sequence of these archival boxes with known linear sequence legality based on the bijective mapping. If we recalculate the power of the sequence, we find:

() in T3, L2 = 10

Then, the power of the sequence from T3 time is deducted from the power of the T2 sequence that is written in the archival description:

[card(Ab1...10) in T3,L2] – [card(Ab1...10) in T2,L2] = 0

The result of this operation is 0, which means that there were no changes in both sequences. By doing this, the consistency of this sequence is verified and confirmed over time. At the same time, we have also set up a model for its implementation to permanently determine the power of this sequence in time and space.

The method can also be used for complex data management activities, such as, for example, arranging a set of records on the description units with non-systemic tools, importing a linear set of descriptions of archival records into a database of the archival information system, etc. Each record has its own identification number (IDn), which from the point of view of the sequence provides the logic of the operation of this linear sequence, which can be written:

IDn = {1,2,3..n} with Ss 1, SpS in point 1 in T1, L1

At the same time, we can perform another operation, such as counting (CIDn) by using the system, or otherwise. In this case, we also obtain a linear sequence:

CIDn = {1,2,3..n} with Ss 1, SpS in point 1 in T1, L1

For each sequence, the power of the sequence is calculated and the countdown operation is performed on the values obtained:

[card(IDn1...n) T1,L1] – [card(CIDn1...n) T1,L1] = 0

If the result is 0, then we have shown that the number of records is consistent with the identification numbers used. However, the power difference between the two sequences is not always the same. The deviation can be in a positive or negative side. If the difference is positive, the increase in the elements of the crowd, e.g. to obtain archival records, to reorganize fonds and collections, or to modify the technical equipment used, or errors in creation of identification numbers or data capture, etc. However, if the gain is negative sequence, it can mean mislaying, in the extreme alienation or even destruction of archival records; however, changes may have occurred due to the implementation of other technical equipment or the reorganization of the archival records, as well as the errors in the design of descriptions or their labels. In any case, this is always an important alarm for archival professionals, because the sequence is inconsistent in time and space.

Another example of determining the cardinality of a set of sequence elements represents the archival records, which is not arranged and in the process of arranging we are giving them the identification number. In the process of arranging archival records, using the method of an injective mapping, we assign to the existing code numbers (eCn) the new teference numbers of the units of description (Rn).

eCn → Rn

The cardinality of the sets is determined on the basis of the cardinal number of the two sets (eCn) and (Rn).

The method is used in different time and space, for example in the case of various archival professional activities on objects that can determine the power of the sequence according to the state of power in a different time or space, or according to the two measured power of the masses of the same elements. Depending on the implementation method, the method can be systematically supported or not.

6 DISCUSSION

Presented methods for checking the consistency of a set of data structures and their elements are often used in archival theory and practice. Normally, this is part of the routine of individual archival professional procedures. They have been developed to provide basic data management needs in archival practice (Semlič Rajh, 2012) and are systematically implemented in some segments in the applicable legislation, standards, etc.

As an example to the legislation of the defined sequence, we should mention the creation of technical metadata, especially the technical unit designations. These primarily serve as information on the position in the linear sequence of the technical units of the entire archival fond. In archival information systems, these are often used as entry points for inquiries. Individual sequencer tags are typically created in the process of records arranging and formalized in the process of describing of archival records. Thus, for example, in Slovenia as a standard is used a numeric code for a technical unit (UVDAG, Articles 24 and 64), which is written on the archival plate in such a way that the data is also well visible in the context of limited visibility, for example in archival warehouses. At the same time, Article 23 of the UVDAG defines that the acceptance list should be included among other basic data also ... *the quantity of archival records, expressed by the number of technical units* - that is, with the power of a set of technical units of the entire collection of archival records respectively. In addition, the same article defines the elements of the takeover record, among which it also includes the designation of the technical unit. From the methodological point of view, the solution is a system of data management of technical units also for relatively complex sequences. At the same time, it allows for a good control over the consistency of the sequences of the technical units of one creator, especially if it has handed over all records within one transferring act.

In the area of management of archival records data, the Guide through Fonds and Collections is the basic utility for use. In it, for each fond, data on the quantity and extent of records are entered (Cvelfar, 2011). If these are expressed in technical units, then the guide through fonds and collections represents the source of the cardinality of this sequence. Takeover lists, archival lists, inventories can be defined in this case as the reference sources of cardinality of individual sequences.

Archival professionals often encounter problems with the management of archival records data, and in doing so implement both cardinal methods and the methods of ensuring the consistency of linear and hierarchical sequences. In this context, some problems have been detected in the archival practice already in the technical unit management, the following should be pointed out:

- the methods discussed are used only in those data management segments where the linear sequences are products of natural conditions and arise from the legality of the creation of physical archives in themselves;

- The methods discussed in existing archival practice can not always be consistently implemented because the sequence of technical units is not properly defined, or the technical units are not properly sorted in sequence;[12]
- Problems in the implementation of all three methods are also poorly performed rearrangement (injective mappings) or addition of values within sequences (bijective mappings), implementation of alpha and alphanumeric labels, in particular in the way that it obtains the legality of a nonlinear sequence[13] or pseudo-hierarchical-linear sequences[14].

Implementation of the methods discussed is often not carried out sufficiently precisely due to limited practical needs in the procedures of archival professional processing, especially the physical manifestations of the elements. However, it is to be expected that these methods will become very topical in order to ensure and control large masses of logically and physically rounded altogether at the level of data (Novak, 2018a) and metadata (Novak, 2018b) in archives. These requirements, however, do not arise only from theoretical considerations, but above all from the fact that many data structures are already accumulated in the archives and by archival professionals only partially can manage to handle them (Novak, 2018c). The process of accumulation of data structures is in a trend of strong increase, which is consistent with the production of archival records in a modern information society. The problem is even greater because, according to the dynamics of general development, we can expect an increase in archiva records, both in the physical and the exponential growth of the data captured in electronic form. However, we should add to this also the direction of development in the segment of describing archival records (Popovici, 2016). Very simplified archival information aids were first upgraded to standardized archival aids, and these are developed into contextual archival information aids. Thus those methods, tools and solutions, which will help archival professionals to control individual entities in the contexts of the management of linear and hierarchical sequences, are becoming necessary requirements. Especially since they will allow the overview of the integrity of preserved archives, regardless of whether these methods are implemented at the level of data from archival records or at the level of content or technical metadata.

7 CONCLUSION

Increasing amounts of data that are collected, organized, processed and are ready for use in a modern society are directly reflected also in archival theory and practice. Before some decades simplified data management methods were sufficient for everyday needs in the archives. Today it is different. Archivists cannot avoid different implementing of complex data management methods in everyday work. We can see, that in theory and practice, the process of chaining of methods or their results occurres. Among important basic archival professional methods we count the methods of ensuring consistency of linear and hierarchical sequences, and the method of cardinality of sequences.

12 This is the case if the last archive box of a linear sequence is not physically set to the last place in that sequence.
13 Typical deviation of technical unit management when one or more books as technical units appear in the linear sequence (n = n + 1) of standard archival boxes.
14 An example of this is the introduction of technical units with a poorly implemented labeling of technical units, usually in alphanumeric form.

The method of consistency of linear sequences in archives is that which determines the accuracy of the elements of the sets of the linear sequence in accordance with the known parameters of these sequences. In the case of dealing with hierarchical data structures, it is necessary to implement a method of consistency of hierarchical sequences. Although both methods have some common characteristics, they have also important differences, since their purposes, and above all the expected results are very different. As some kind of upgrade of the use of these methods represents the method of cardinality of elements of sequences in archives.

The method of ensuring the consistency of linear sequences and the associated determination of cardinality of elements of linear sequence is the starting point for the data management and for the data structures in the archives. We implement it in many basic archival professional processes and subprocesses in solving archival professional problems. In practice, the method itself can be supported in various ways, as with easy-to-use system tools that enable at least sorting elements of individual sequences.

Another important method for today's archivists is the method of ensuring the consistency of hierarchical sequences, including the determination of the power set of elements of the hierarchical sequence. It presents methodically well-formed data structures with a consistent data management tool and their structures. The method can be implemented in many archival professional processes, as in phases of testing the planned solutions of individual archival professional problems. It can be also systemically supported or not.

The method of cardinality of sets of sequences in the archives represents the possible management of those data structures that need to determine consistency over time and space, or in cases where the consistency of one sequence of elements is determined by two or more data structures over time and space.

All three methods can be successfully implemented in archival theory and practice on those sequences of data sets that have standardized and long-term sustainable data structures.

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DEVELOPMENT OF THE INTERNATIONAL RECORDS AND ARCHIVES MANAGEMENT STANDARDIZATION SYSTEM

Abstract

Standardization of different aspects of recordkeeping at the international level has quite a long history and has played an essential role in recordkeeping processes in almost all countries worldwide. A good example could be the international ISO standards for paper formats, principles of writing addresses, dates and time. However, it was not until the year 2000 that the international records and archives management standardization system began to take shape. The basis of this system was laid by the international standards ISO 15489-2001 and IEC 82045-2001, as well as by the MoReq specification. Before 2010 this system had been evolving progressively and the new international standards mainly supplemented the provisions of ISO 15489. Yet in 2011 the situation changed fundamentally, and the emphasis was placed on new priorities in this system, bringing the ISO 30300 series to the foreground. Nowadays we can witness the final stage of building an international records and archives management standardization system, but it is still difficult to say whether it will be as widely and consistently used in the world as the first international methodological standard ISO 15489-2001.

Keywords: *standardization, records and archives management, international standard, international standardization system.*

1 INTRODUCTION

Standardization of records management is one of the activities of the International Organization for Standardization (ISO) established in 1946. However, it was not until a little more than a quarter of a century ago that ISO got systematically involved in the standardization of certain aspects of recordkeeping (writing addresses, dates on documents, etc.) and archiving (e.g., requirements for the quality of archive shelving), although the practice of standardizing paper size (such as A1-A8) and its quality (for example, in terms of density and color) goes several decades back. Most of these standards are adopted in all countries of the world either by the method of literal translation (so-called "cover method"), or by developing national standards on the basis of ISO. Russia and Slovenia are no exception in this regard. In view of that we are not going to dwell on the historical aspect but will focus on the present times.

2 THE BEGINNING OF THE INTERNATIONAL STANDARDIZATION SYSTEM OF RECORDS AND ARCHIVES MANAGEMENT (2001-2010)

As a matter of fact, the standardization of records and archives management originated in 2001 from the publication of:

- The first standard of the International Organization for Standardization on Records Management (ISO 15489-1: 2001 - Information and documentation. Record management. General);

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- The first standard of the International Electrotechnical Commission for records management (IEC 82045-1: 2001 - Document management. Principles and methods);
- European Union specifications for electronic records management systems (Moreq, 2001, 2008, 2012).

Together, these three key documents laid the foundation for the international records and archives management standardization system. At the same time, each of them played their role in this process, finding its application in the practice of work of records managers.

The MoReq specification (in all its variants) is well known to Europeans, since it is applied in almost all European countries, so we will not focus on it. In the context of this theme we will focus on the international standards ISO 15489 and IEC 82045, which, as noted above, were issued simultaneously and independently of each other by two of the most important international organizations on standardization. Despite the fact that both standards deal with the general issue of records management, they approach this process from different points of view.

ISO 15489: 2001 demonstrates the classic managerial approach to working with documents and records and follows the processes of recordkeeping. However, ISO 15489:2001 does not spell out the metadata questions, but only mentions the need for their creation. Metadata are dealt with in a special standard ISO 23081: 2004 (2006), which presents the types and kinds of metadata created and used in records management. From the point of view of terminology, ISO 15489: 2001 introduced the concepts of records management, records management system, metadata, migration and conversion of records and some others, typical of information technology used in management. Yet it just formally differentiated between the concepts of record, document and documented information, without any connection with the information carrier, and practically did not reflect the specifics of the electronic document. The 2001 version of ISO 15489 was intended for mixed (paper and electronic) records management systems, which was relevant in that period.

IEC 82045: 2001 considers records management from the point of view of the process approach characteristic of product manufacture, i.e. from the moment of the emergence of the idea of manufacturing the product all along the process of its production and up to the moment of its manufacturing cessation. Moreover, the question of metadata formed in the process of creating and using documents accompanying the product manufacturing is clearly regulated within the framework of the same standard. At the same time, IEC 82045: 2001 assumes that the process of documents management is conducted mainly in electronic form, and introduces a number of terms specific to electronic record keeping: an aggregated document, a compound document, etc.

In the context of the concepts used by these standards, the names of the latter stand out. ISO 15489: 2001, which regulates the mixed document flow, is named as "records management", and IEC 82045: 2001, regulating mainly electronic document flow, as "document management". It should be noted that both of these standards have found their consumers, being really relevant and even groundbreaking for that period, and the only ones which systematically considered the issues of records management. However, the existence of two conceptually different international standards created uncertainty in the priority of their use. As a result, after 5 years of joint ISO and IEC coexistence, a coordinated decision was made to empower ISO to develop conceptual, methodological and terminological standards used in records management, and IEC - to develop technical standards related to records management. At the same time, joint development of standards related to technologies used in records management (e.g., digitization of documents, migration of documents, etc.) became a practice.

The ISO International standards on records management for the period 2001-2010, which can be characterized as progressive in its development, prompted an understanding of the importance and significance of records management and aroused interest in this area. Given the fact that these standards are already well studied and described, it seems sufficient just to list them:

- ISO 15489: 2001 - Information and documentation - Records management - Part 1: General; Part 2: Guidelines;
- ISO 23081-1: 2006 - Information and documentation - Records management processes - Metadata for records - Part 1: Principles;
- ISO 22310: 2006 - Information and documentation - Guidelines for standards drafters for stating records management requirements in standards.

The international standards of ISO devoted to the problem of long-term storage of electronic documents stand apart and need special attention. These standards were developed by ISO/TC 171 "Applied systems for creating and storing documents", as a rule, together with the International Electrotechnical Commission (IEC). Most of these documents are not standards in the literal sense of the word, but are technical reports created and used internationally as an example of solving a particular problem or for reinforcing some advanced, but not proven technology.

The international standard ISO/IEC 19005-1: 2005- Document management - Electronic document file format for long-term preservation Part 1: Use of PDF 1.4 (PDF / A-1) describes the principles and methods of using the PDF format for long-term document storage both in organizations and archives (including government structures).

ISO/TR 18492: 2005 - Document management application. Long term preservation of electronic document based information. The document contains a concept for developing strategies and practical ways of its implementation applicable to a wide range of electronically documented information (including records) of the public and private sectors to ensure their authenticity and availability over time. The standard contains practical recommendations for ensuring long-term safety of documented information (including legally valid electronic documents) and the possibility of access to them (and of their use) even in cases where their storage period exceeds the estimated period of the use of technologies (hardware and software) the latter having been used to create and maintain these electronic information resources.

The above standards and technical reports represent by no means a complete list of the documents of interest for our theme, but they are fundamental. The point that all these standards have in common is their subordination to ISO 15489: 2001 which was the basic standard, while all others lined up around it and complemented or developed its provisions.

3 THE EVOLUTION OF THE INTERNATIONAL STANDARDIZATION SYSTEM OF RECORDS AND ARCHIVES MANAGEMENT (2011-2018)

The period since the end of 2010 can be described as a new stage in ISO activities, which is characterized by an integrated approach to the standardization of records management processes through the development of a series of standards devoted to a certain theme, as well as to building the subordination of all standards not to one of them, but to a group of standards, namely, ISO version 30300.

The ISO standards 30300 series Information and documentation. Management system for records" are developed to assist organizations of all types of ownership and all organizational and legal types to create, use and modernize (improve the performance of) records management systems; and for the purpose of compatibility and application of common elements and methodology with some international ISO standards and their spread to other management systems (for example, the quality management system).

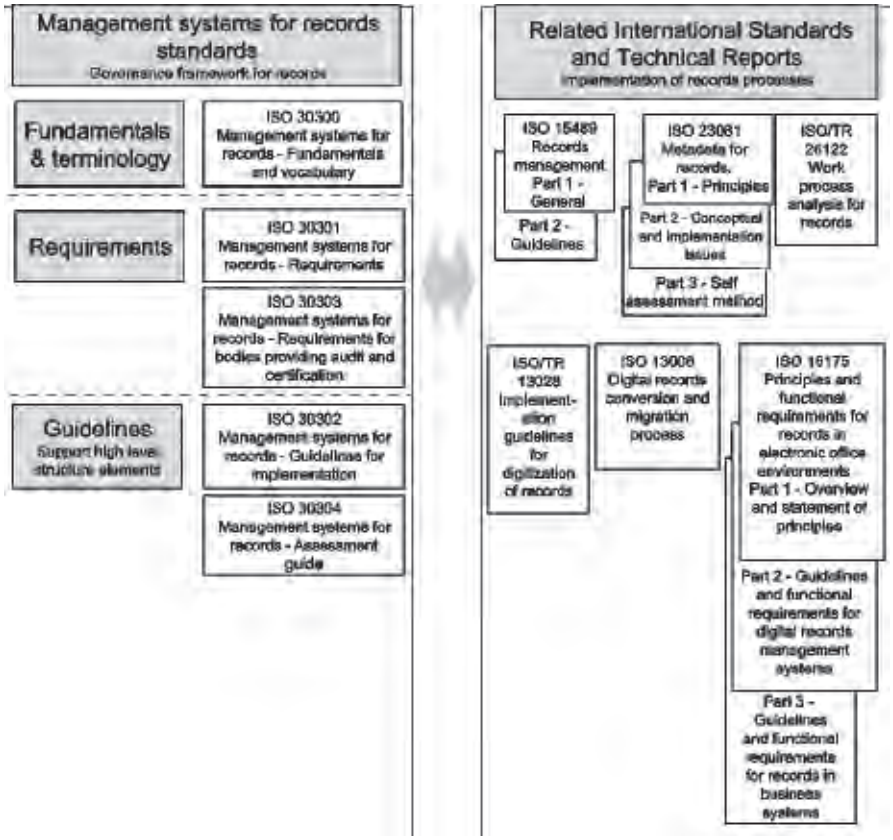
Within the framework of the international ISO standards 30300 series is planned to develop the following:

- ISO 30300: 2011 - Information and documentation. Management system for records. Fundamentals and Vocabulary. The standard is laying the groundwork which the records management systems and the terminology of this series of standards must conform to.
- ISO 30301: 2011 - Information and documentation. Management system for records. Requirements. The standard is shaping the basic requirements for records management systems.
- ISO 30302: 2015 - Information and documentation. Management system for records. Guidance for implementation. The standard is providing the practical guidance on the implementation and use of records management systems created on the basis of ISO 30301.
- ISO 30303 (draft) "Information and documentation. Management system for records. Requirements for bodies providing audit and certification" containing requirements for bodies carrying out audit and certification of records management systems developed on the basis of ISO 30301.
- ISO 30304 (draft) "Information and documentation. Management system for records. Assessment Guide" providing guidance on the assessment and self-assessment of records management systems developed on the basis of ISO 30301.

In 2011 the first two standards of this series were developed. ISO 30302 was adopted in 2015, but the others have not been approved by ISO so far, although the work on them is underway.

The publication of the first two ISO 30300 series standards in 2011 fundamentally changed the international records management standardization system. The scheme of this system was given in the first of them and looked as follows:

Figure1: Standards on MSR prepared by ISO/TC 46/SC 11 and related International Standards and Technical Reports (ISO 30300: 2011)



According to the scheme, it is the ISO 30300 standards that became fundamental, and ISO 15489 supplements them. In the right hand column we can see both well known ISO standards (15489, 23081) and the new ones (28122, 13008, 13028, and 16175). Let's have a closer look at some of them.

International Standard ISO 16175 "Information and documentation. Principles and functional requirements for records in electronic office environments" represents interrelated standards developed as its integral parts and having one common number:

- ISO 16175-1: 2010 - Information and documentation. Principles and functional requirements for records in electronic office environments. Part 1. Overview and statement of principles;
- ISO 16175- 2: 2011 - Information and documentation. Principles and functional requirements for records in electronic office environments. Part 2. Guidelines and functional requirements for records in electronic office environments;

- ISO 16175-3: 2010 - Information and documentation. Principles and functional requirements for records in electronic office environments. Part 3. Guidelines and functional requirements for records in business systems.

These standards virtually constitute a series devoted to one subject and addressing different aspects of the same problem, that of determining the functional requirements for electronic documents and their electronic environment.

These standards virtually constitute a series devoted to one subject and addressing different aspects of the same problem, that of determining the functional requirements for electronic documents and their electronic environment.

ISO 13008: 2012 - Information and documentation. Digital records conversion and migration process, contains recommendations for converting documents from one format to another and migrating documents from one hardware-software configuration to another. It includes requirements for records management and describes the organizational framework for the implementation of conversion and migration processes, as well as issues of technological planning, monitoring and implementation of measures to monitor these processes. The standard for each of these processes specifies the stages, components, specific methodologies and also addresses the issues of workflow management, versioning, testing and validation.

ISO/TR 18128: 2014 - Information and documentation. Risk assessment for records processes and systems, is designed to assist organizations in assessing risks related to documentary processes and documentary systems. The technical report contains a methodology of risk identification analysis and a risk assessment guide. The report also describes the methods for analyzing potential consequences of adverse events and a guide for documenting identified and assessed risks in order to mitigate their negative consequences.

ISO/TR 18800: 2012 - Information and documentation - Implementation guidelines for disposition of records, understands "disposition" as a series of processes that provide for the classification, disposal or transfer to storage and other controlled actions with records that can be performed when accessing/receiving or creating a record, changing the status of the record, in the case when the record no longer has administrative, legal, cultural or historical value, as well as for archival purposes.

Since 2011 there has been an increased focus on ISO storage processes and the preservation of documents through the publication of specialized standards that complement the provisions of ISO 30300 series. It was suggested that ISO 15489 should be cancelled, but due to a number of circumstances (first and foremost, the position of experts) it was modernized and adopted as ISO 15489-1: 2016 - Information and documentation. Records management. Concept and principles. Much has been already written about this standard, so we will not analyze it in this paper; however, it is interesting to note a change in its status in the system of international standardization of records management processes. From the fundamental standard regulating the issues of records management, it was transformed into a lower-level practice-oriented standard, complementing the provisions of ISO 30300 series standards addressed to an organization's top management. At the same time, the very system of the international standardization of records and archives management acquired a completely finished form. However, most international standards for the period 2001-2010 were outdated from the perspective of the development of modern IT, which required their conceptual revision (like ISO 15489) and / or updating (like ISO 23081 and others). This process is gaining momentum and will probably be continued by ISO in the near future. We are not only observers, but also participants in this process by working in ISO national committees, which allows us to treat the international standards on the basis of modern positions and raise the question of whether they should be adopted using the "cover method", as was

previously the case. Perhaps it is worth developing integrated national standards (using the full range of international ISO standards addressed to records and archives management) that will take into account the national specifics of working with documents and records in management and archives. There is no definite answer to this question yet, but it is no longer idle. It remains to be seen.

4 CONCLUSION

The development of international norms and standards in the area of records and archives management in the International Organization for Standardization is carried out by Technical Committee (TC) No. 46 "Information and Documentation" involving more than 34 national committees members of ISO – Federal (or State) Agency for Technical Regulation and Standardization.

ISO was the one of the first organization having standardized the processes of records management and which continues to work actively in this direction. It is important to note that the ISO records management standards complement one another. Each subsequent standard develops the provisions of the previous one. ISO standards are international in nature and recognized worldwide. In most developed countries of the world ISO records management standards are adopted by the cover method and are used directly without omissions and specifications, due to a high degree of their elaboration. Given the fact that every 3-5 years all ISO standards are revised (updated or canceled), we can be sure of their relevance.

Speaking about the international standardization of records management, it should be said that since 2001 the work in this area has been carried out systematically and consistently. At the same time, it is impossible to ignore the change in ISO's approach to this issue. Before the year 2000 ISO had been developing standards for individual documentation management issues, but since the publication in 2001 of ISO 15489 (a systemic fundamental standard for records management that comprehensively addresses this issue), the new ISO standards have been seen to be developing the provisions of ISO 15489 or standardizing new aspects of this problem, but within the framework of its ideology and with detailed references to its provisions. The situation began to change in 2010-2011 since the development of the ISO 30300 standards "Information and documentation. Document Management Systems" and acquired a new finished approach in 2012, aimed at building a system of international standards for records and archives management. However, as far back as in 2016, with the release of the updated ISO 15489 and the beginning of work on the revision of both the old ISO standards and ISO 30300, we can see a new surge of activity in the standardization of records and archives management by revising most of the highly-reputed and top-requested standards. From the point of view of the standardization process development in the area of records and archives management, this is an important and very timely step, but it is not possible to accurately predict so far whether the new standards and technical reports will be adopted literally in most developed countries of the world, as was the case of ISO 15489: 2001.

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Grigory N. Lanskoy[1]

AUDIOVISUAL ARCHIVES IN LIGHT OF SUSTAINABLE SOCIETY: CURRENT STATE AND OBJECTIVES OF DEVELOPMENT

Abstract:

The paper is devoted to analysis and evaluation of specific features of development of audiovisual archives in contemporary society. This scientific and practical problem is examined in spheres of definition of community of these documents, organization of their conservation in archival services specialized for different sorts of work with these documents and in services in which audiovisual documents are preserved as a part of general community of documents on paper, electronic and other different support. In theoretical part of paper the main attention is addressed to terminological interpretation of audiovisual archives and of some objects related to these archives in Russian and in European practice which has methodological and conceptual importance. Russian and European interpretations of key definitions related to audiovisual archives and documents are determined in paper as the object of comparison. In practical part of paper are analyzed aspects of work with audiovisual archives and documents devoted to their conservation and preservation in traditional and in electronic sphere, to tendencies of their description according to national and to international standards in interests of their conservation and in the same time of effective communication with them and to choice of the best form of their publication for showing in their informational potential. The problem of paper is to find and to show objectives of normalization on international level of norms of work with audiovisual archives and audiovisual documents. This task is necessary for creation of conditions of global access to audiovisual archives in Russia and in European countries, big part of which are of interest for all representatives of human society.

Key words: *audiovisual archives, documents, access to audiovisual records, communication, Russia, European Union.*

1 INTRODUCTION

Audiovisual archives and documents presented in them began to be formed in concentrated in archival services in their first part the second half of XIX century and in global community in the first half of XX century. Period of middle of XX century was marked by creation of conditions of communication of all categories of users with different sorts of audiovisual documents (photo, cinema, sound and then with video documents) in public services of state archives and with some limitations in archives of administrative institutions, creative enterprises and organizations independent from state system of management in sphere of archival work. Scientific and practical results of creation of system of services of audiovisual archives, of choice of best methods and practical approaches of managing these archives and of founding of conditions for public communication with these archives were firstly indicated during VII International congress of archives in 1972 in Moscow (1; Materials of VII International congress of archives, 1972) and specially presented in systematic form on XI International congress of archives in 1988 in Paris (2; Materials of XI International congress of archives, 23 - 26 august 1988, 1989).

During discussions on these congresses audiovisual archives in connection with specific features of their conservation, preservation and of communication with them were de-

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fined in distinction from archives of documents on paper as a "new archives". This definition was indicated firstly in European scientific and methodical literature and for example in manual for archivists published in France in 1993 (3; La pratique archivistique francaise, 1993). From the end of 1980 - beginning of 1990 years in international archival theory was diversified conception of existence and following development of different types of archives in electronic "cloud" sphere. These conception was presented in big part in studies of Canadian specialist L. Duranti firstly in theoretical terms of theory of documentary science (4; Duranti, 1988) and than in papers devoted to specific features of preservation of archival records and of access to them (5; Duranti, 2018).

In contemporary realities of social development according to human and to public needs it is principally important to indicate audiovisual archives as a part of "big data" which can be disposed and used in electronic sphere without necessary transition to traditional archival services. In Russia in distinction with European system of archival work these propositions are partly realized in practice of work of some cultural institutions (museums, libraries) but they are not used in theoretical, normative and methodical recommendations formed and adopted on state level.

2 METHODS

The study is based on using of comparative method. Its application gives possibility to see common tendencies and also differences between methods and practices of work with audiovisual archival funds and collections in Russia and in majority of European countries. Comparison of these tendencies and differences presented scientific interest because technologies of creation of documentary images and sound records were diversified in Russia, Northern America and in mostly developed countries of Western Europe practically in one time but than from period of middle of XX century the difference in level of production and diffusion of different types of audiovisual documents became evident. This difference can be explained by total control from part of state of activity of all enterprises, organizations and institutions which worked in sphere of production, conservation and diffusion of cinema, sound and majority of photographic documents in Soviet period. State control of all stages of archival work with audiovisual documents supposed dependence of technical and technological equipment of archival services from needs and possibilities of state institutions and services.

In the same time with comparative method in paper are used method of historical retrospection and logical method based on system approach. Method of historical retrospection is oriented to show traditions of legislative and methodical regulation of system of audiovisual archives in Russia and in majority of European countries. In Russia these traditions are connected with regulation of work of state archival services and with concentration in these services of all documents which have historical, cultural and social value. According to them private proprietors of audiovisual documents preserve and move their own archives under state control if these archives present value for state and for society. In majority of European countries existing norms and recommendations are oriented to different stages of work with audiovisual and other objects of documentary heritage without intention to concentrate all important archival funds and collections under control of state.

Logical method is oriented to show deep connection which exists in between all stages of work with audiovisual archives and documents in Russia and in European countries in conditions of sustainable society which can be characterized by high level of development of archival science and of its connection with practical work. The first aspect of this connection can be founded in sphere of communication with documents for needs of which

it is necessary to preserve images and sound records in the same time in traditional and in digital form. The second aspect means necessity of application of definition, conservation and of practice of using of audiovisual documents to conditions of electronic sphere of production and placing of these documents according to realities of development of contemporary society.

3 RESULTS

Among actual problems of study and analysis of current estate and directions of development of audiovisual archives in sustainable social systems of Russia and of European countries it is firstly necessary to indicate the problem of terminology. Its discussion can form theoretical and partly abstract impression but in reality this problem has fundamental importance. During long period of institutional centralization of system of audiovisual archives and of state management addressed to this system in Soviet and now in Russian state and in the same time of development of free market coexistence of audiovisual producers and owners of audiovisual archives in European countries belonging to "capitalist" system, has formed big difference in definition of these archives in Russia and in European countries which exists until our days. According to third article of Russian federal law on archival work audiovisual and all other archives must be identified only as the "institutions or structural departments of organizations which realize processes of conservation, collection, registration and of using archival documents" which must be presented on material mediums, "can be identified by document entries and must be definitively preserved according to importance of this support and of information for citizens, society and state" (6; Law of Russian Federation on archival work in Russian Federation, 2004).

This conceptually important definition has fundamental distinction from definition of audiovisual and of other archives which exists in European archival legislation. For example in article 211 of first chapter of second book of Code on heritage of France it is defined that archives present "community of documents understandable in form of records which have date, place of conservation, material form, technical base, created or received by every physical or juridical person and by other public or private structure in process of realization of their activity" (7: Code of heritage in France, 2011). This definition of archives separated from necessary accessory to archival services and institutions supposes possibility of communication with audiovisual documents and of their using in conditions formed by all categories of owners or producers of these documents. Also it gives possibility to organize conservation of films and of sound records without their equipment by document entries with condition of their existence on material support and with technical base.

Also in European legislative and normative practice has diversified such important definition as "record" which means every materially formed result of fixation of information on different mediums. Existence and using of this term which wasn`t adopted until our days in Russian practice of archival work give possibility to place all types of audiovisual documents in all spheres without obligatory copying to film base or to sound tape. For example records with audiovisual information can be preserved and used on electronic mediums with presentation of images and sounds, and then opened for public access electronic informational systems and preservation of originals on computer disks. This practice is also necessary for realization of actual conception of electronic records management which doesn`t suppose necessary transition of documents created in electronic form to other material mediums completely used before beginning of computer revolution.

In Russian practice of work with audiovisual documents conception of creation, registration and using of electronic audiovisual documents is presented only on level of scientific studies (8:Lanskoy, 2018). Existence of this type of audiovisual documents is not mentioned in normative acts adopted in 2007 for state and administrative archival services (9; Rules of organization of conservation, of collection, accounting and using of documents of Archival Fond of Russian Federation and of other archival documents in state and municipal archives, museums and libraries, in organizations of State academy of sciences maintained by order of Ministry of culture and of popular communications, 2007) and in 2015 for all organizations which produce archival documents (10; Rules of organization of conservation, of collection, accounting and using of documents of Archival Fond of Russian Federation and of other archival documents in institutions of state, of local governance and in organizations maintained by order of Ministry of culture and of popular communications, 2015). In addition to description of this normative base it is necessary to indicate that special scientific and recommendations with specialization in description of conditions of conservation, preservation and using of audiovisual documents in state archives and in archives of administrative departments were created and adopted in Russia in 1980, years before transition to adoption of computer equipment to archival work (11; Basic rules of work of state archives with cinema, photo and sound documents, 1980). In contemporary situation of study of audiovisual archives in Russia it is possible to indicate in quality of mainly discussed question possibility of conservation of authenticity of audiovisual information during its documenting in electronic form or on stage of its copying from original material support to digital form. In our opinion this question can be correctly discussed and decided only for paper documents, because it is necessary and in many situations impossible to indicate document entries directly on film base or on sound tape.

In conditions of development of informational society and of digital technologies it is also important to study in systematic case question of composition of interests of preservation and of public using of audiovisual archives. For decision of this question which has practical and in the same time human interest it is necessary to develop technologies of presentation in high quality of external features and of content of all kinds of audiovisual documents in informational systems opened for public access. For presentation of content it is useful to realize practice of normalization of description of audiovisual documents in Russia in comparison with majority of European countries on base of special norms adopted by International council of archives in the second half of the nineties (12; General International standard archival description, 1996: Encoded archival description, 1998). Creation of databases with unified descriptions of every audiovisual record with presentation of its digital copy or of copy from original of electronic audiovisual document can make sure access to photographic, cinema and sound documents of all historical periods and in the same time to preserve without regular usage original of the document.

4 DISCUSSION

The first discussing problem is connected with determining of legal juridical statute of electronic audiovisual documents. This community of informational resources can be classified as a separate community of documents which can exist and can be used in the same legislative conditions as the audiovisual documents created without using of computer technologies. Sometimes it is possible to meet opinion that electronic audiovisual documents can be defined in the same time as a digital documents but this viewpoint is not correct. These both groups of informational resources exist and can be objects of access in electronic sphere but in usual practice of work of archival services images and sound records presented in digital form can be defined practically in all situations as

copies of originals of documents created on traditional mediums. From other part electronic audiovisual documents are originally created in electronic form without using of traditional mediums such as audio tape or film. For verification of authenticity of films, photos and sound records in electronic form it is possible to use the same resources as for audiovisual documents in traditional form because producers of all these informational resources usually prepare for them accompanying documentation with necessary document entries - signatures, seals etc. In this connection it is possible to maintain that form of production and of conservation of audiovisual documents doesn`t take influence to their juridical statute.

The second problem for discussion is connected with identification of necessary material support for conservation and preservation of audiovisual documents. According to tradition of work of Russian archival services the original support of audiovisual document must be presented only on traditional film support for photographic and for cinema documents or on tape or gramophone disc for sound documents. World practice of production of all types of audiovisual documents evidently shows impossibility of transition of all these documents created in electronic form to traditional mediums. In this occasion it seems important to choose universal definition to all objects of conservation in audiovisual archives independently from electronic or traditional form of their production . In quality of this definition it is possible to use term "record" which can mean every audiovisual document produced either as photography or recorded sound.

The third problem is connected with choice of optimal form of publication of audiovisual documents and artistic audiovisual works from points of scientific and informational value of this publication. According to traditional approach for ensuring of scientific quality of such kind of publication it is necessary to accompany published images and sound records by different elements of description, introductions and indexes. These informational elements can be usually prepared in occasion of preparation of publication in printing form. In our viewpoint the quality of publication of audiovisual documents can be determined only by preservation of authentic image of document which gives guarantee of its effective using as historical source.

5 CONCLUSION

All stages of work with audiovisual archives in conditions of sustainable society must be realized in result of harmonic composition of traditional forms of practical activity which can ensure scientific quality of work and of new technologies which give possibility of global human access to valuable audiovisual documents independently of place of their conservation. Many examples of creation and of presentation of images and sound records in electronic form show that their quality of documenting reality is the same and some situation the best in comparison with the same types of informational resources created in traditional form. In the same time for ensuring of success in communication of users with all audiovisual documents presented in informational systems it is necessary to make detailed description of their content which must be unified by its structure according to norms adopted on international level. Only by following this condition it will be possible to realize the aim that human society can openly access all important objects of world audiovisual heritage.

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Stefano Allegrezza[1]

THE FUTURE OF OUR PERSONAL DIGITAL MEMORIES: IT'S TIME TO START THINKING ABOUT IT

Abstract

This paper deals with the issue of personal digital archives, reflecting on the consequences that digital technology will have on this kind of archives and trying to imagine what their future may be.

The author is researching the issue about records media. In the past in personal archives there were mainly analogue documents (mostly paper), in present time we can find documents recorded on storage media such as floppy disks, optical media, USB sticks, hard disks (some of which are already obsolete and difficult to read). An increasing part of those documents are stored on cloud services (like Dropbox or Gdrive) whose access is protected by authentication methods and usually nobody shares their credentials with other people. The author is researching the following questions: in ten or twenty years or more, will we still be able to access these archives? What future awaits them? Will personal archives still exist? In this paper he is trying to answer how to address these issues.

Key words: *archives, digital archives, personal archives, personal memories, personal digital archives*

1 INTRODUCTION

Until a few years ago when an archivist was asked to rearrange and draw up the inventory of an illustrious person's archive after his death, he was faced with a rather familiar situation. Usually he/she had to deal with documents created on well-known materials and with a very concrete consistency: most of the time it was paper of various kinds (paper for notes, paper for sketches, photographic paper, etc.) but in the past other materials were used (parchment, wooden or wax tablets, papyrus, etc.). The archivist could easily find the "documents" (of various kinds: writings, letters, notebooks, postcards, scattered notes, diaries, photographs, telegrams, etc.) left by the creator because it was enough to go to his/her home, to his/her office or in general to the places where he/she had carried out his activity and where the documents had been left.

But can we assume that this will be the situation that the archivist will find in the coming years? What will become of personal archives in five or ten years? Indeed, how have they already are?

In short: what will their future be? These are the questions we will try to answer with this paper.

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2 PERSONAL ARCHIVES AND DIGITAL REVOLUTION

In order to answer these questions, it is worth starting from some considerations about how many of the activities that for centuries we have carried out by using paper documents (or any other "analogue" medium) have changed in recent years.

For example, let us consider the traditional paper letters, those that in the past we wrote by hand (later with the typewriter and then with the computer: in the latter case we needed to print them), then we put the stamp and then we put it in the mailbox: in the last ten-twenty years they have been literally "superseded" by e-mails that we receive and send using computers or smartphones, and, therefore, there is no longer a need for printing.

Let us think of the postcards that until the end of the last century were the most used way to let our loved ones know in which magnificent holiday place we had spent our holidays: today they have been superseded by "selfies" taken in the most disparate tourist locations and immediately published on our preferred social media (for example: Facebook, Twitter) or on our preferred messaging system (for example: WhatsApp) (Marshall, 2017)

Let us consider the telegrams that in the past we used to quickly communicate news, such as the telegrams of condolences or congratulations: today they have been "replaced" by other tools that allow us to send messages in real time and give us almost instantly the guarantee of delivery to the recipient (for example text or voice messages sent by WhatsApp).

Again: the notebook on which in the past we took notes and notes today is increasingly replaced by one of the many "Apps" that allow us to take electronic notes directly on smartphones; the "old" paper agenda has been superseded by the various electronic diaries today available, starting from those on our smartphones to those accessible on the web (Google Calendar or Microsoft Office 365, just to mention some of the most used ones) and accessible through our computer devices (personal computers, notebooks, tablets or smartphones).

In the same way, the old paper "telephone book" in which, in the past, we used to write the surnames and names of our friends and relatives with their address and telephone number, has now been replaced by the phone book available on our electronic devices, that is, without any doubt, much more comfortable to consult and keep updated.

Again: the "old" diary that in the past gathered, almost a silent friend, our most intimate thoughts, today has been superseded by virtual diaries - the most famous case is that of Facebook - which, on the contrary, has become the way to make everyone aware of our personal life in a sort of exasperated individual protagonism. We could ask ourselves: if Anne Frank had lived in our age, what kind of diary would have left to posterity?

Even the notes we take during business meetings or lessons are written directly using a computer, tablet or even a smartphone and, therefore, are in a digital format.

In the multimedia world the situation is similar: from the beginning of the century analogue photographs have been superseded by digital ones, and now only a small fraction of digital shots are printed on paper, which, hundreds, if not thousands, we do: now the watchword is "sharing" and the photos are immediately published on one of the many social media that, like Facebook, Instagram and Flickr, have experienced enormous growth in recent years. In the same way, the audio and video recordings that "capture" the important moments of our existence are now exclusively in digital format.

Again: train, bus, and airplane tickets are also computer-generated and natively digital documents; however, while the "old" generations continue to print them on paper – it is due to the trust that almost instinctively they put on paper - the "new" generations no longer print and simply show to the controller the display of the smartphone on which the ticket (or the two-dimensional code necessary for its verification) is displayed. In the same way to orient ourselves in the cities or along the routes we no longer use maps or city maps – it was usual only fifteen years ago - but more and more often we use digital tools that, like the GPS navigator, allow us to navigate without too many difficulties and easily indicate the path to our favourite destination.

The examples could continue and are numerous: even the financial and economic management of an individual's life is almost entirely digital: current account movements are nothing more than registrations in a database of a bank and statements are sent by e-mail, as well as through the same medium or through digital channels, however, the electricity, gas and water supply bills come to us.

In the health's world, the digital revolution has come a long way: just to give an example, in the hospital digital radiographs have replaced the "old" plate radiographs and after carrying out a radiological examination the iconographic documentation is delivered to us in digital format on optical media (CD or DVD).

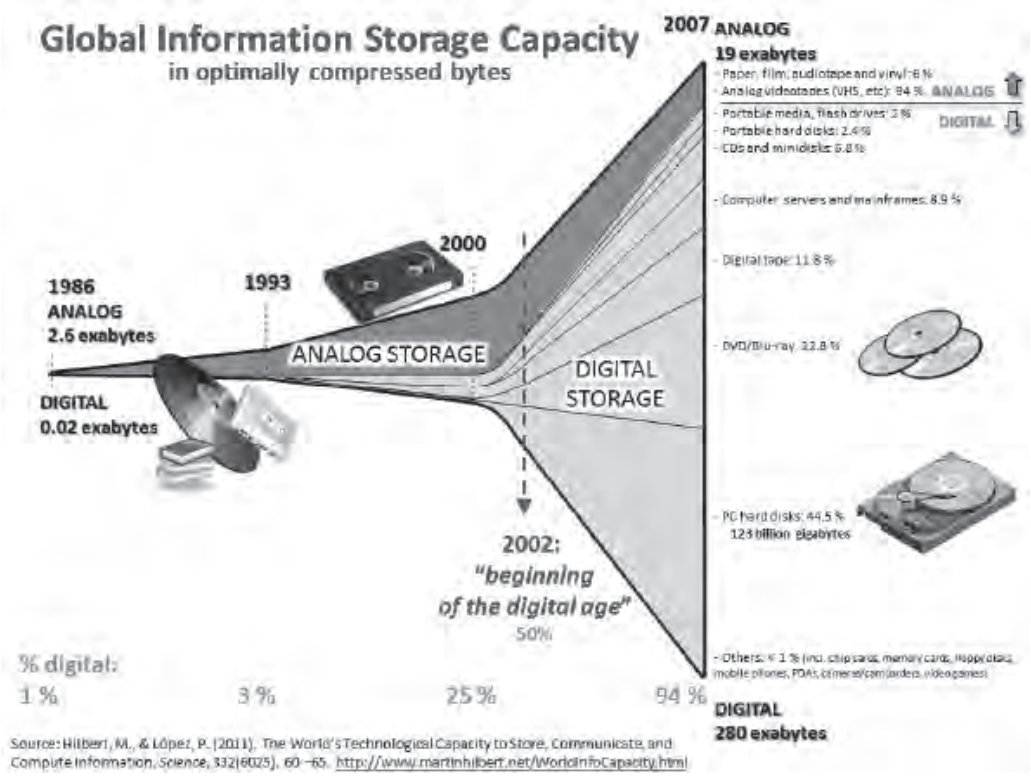
In the school world the situation is quite similar: at the end of the school year, students' parents no longer receive "paper" school reports because they are made available to them in electronic format on the document management system that the school has adopted (and which parents must have access to be able to consult the grades obtained by their children).

These are just some of the countless examples that could be done, but they are sufficient to understand the extent of the digital revolution we are experiencing and to which we are getting used to. And it is clear the evolutionary trend towards which even the personal archives are heading: it is very likely (if not almost certain) that in a not too far future these archives - and not only these - will become digital. If something does remain analogue, it will be the documents that, formed in digital (and, therefore, digital natives), will occasionally be printed for contingent reasons and are intended to be stored only temporarily.

A global revolution is in progress, comparable, according to some, to that resulting from the invention of printing. Furthermore, there are new types of "documents" that did not exist in the past (personal websites, blogs, profiles on Facebook, Twitter accounts, Instagram, Pinterest, etc.) but which can not fail to become part of a personal archive.

In short, personal archives are turning into digital archives, but to date the transition is not yet fully completed; so the situation that normally an archivist need to face is that of "hybrid" archives, in which part of the archive is still "analogue" and a part, more and more growing, is "digital". According to some scholars, the year in which the creation and archiving of "digital" documents has surpassed that of "analogue" documents is placed around the beginning of the new century. In particular, the study by Martin Hilbert and Priscilla Lopez entitled "The world's technological capacity to store, communicate, and compute information", published in 2011 but still current under many point of view, reveals that in 1986 only 1% of the data had been digitally archived, they reached 3% in 1993, 25% in 2000 and 94% in 2007 (see Figure 1) (Hilbert, 2011). They conventionally identified the beginning of the digital era in 2002, because in this year occurred the overtaking of the "digital" on the "analogue".

Figure 1. Global information Storgae Capacity from 1986 to 2007.



(source: Hilbert,M., and Lopez, P. (2011). The World's Technological Capacity to Store, Communicate and Compute Information. Science, 332(6025), 60-65)

3 THE PRESERVATION OF PERSONAL DIGITAL ARCHIVES

The examples we have just seen raise a question: what will remain of all this enormous quantity of digital documents we create today? The problem of preserving digital archives - and, in this case, personal digital archives - undoubtedly belongs to those that most haunt the archival community. Up to now, the preservation of these archives has been possible thanks to the adoption of preservation strategies and the use of the analogue materials mentioned above, which, despite their fragility and uncertainty, have allowed documents to come up to the present. Unfortunately, we can not say the same thing for digital documents, since they actually consist of sequences of bits that are far more difficult to preserve than their analogue counter-parts, and this because of at least three orders of difficulties:

1. first, digital documents need to be stored on "storage medium": it may be the hard drive of the user's computer or the storage system of the e-mail service provider in the case of e-mails; an optical disc (such as CDs or DVDs on which such documents are often stored); a flash memory (like the pendrives that we always carry with us); a magnetic tape (such as those used in the backups that service providers carry out on a regular basis); or a virtual space like the cloud where more and more often we put our important documents.

2. secondary, digital documents, since they consist of sequences of bits, must be coded according to a certain "electronic format" in order to be read and interpreted.
3. finally, while to be able to read, even after several years, a paper document we need only a good eyesight, in order to read a digital document a good eyesight is no more sufficient because we need an appropriate "technological platform" (typically a computer with a certain operating system and certain programs, or a tablet or a smartphone) as well.

Unfortunately, all these three components are very fragile factors and certainly make the preservation over time of digital documents not easy; in fact:

1. storage media are subject to the phenomenon of obsolescence, due both to their limited duration over time and to the fact that the market continuously propose new media, making obsolete and unreadable those that were used until a few years ago;
2. electronic formats are also subject to rapid obsolescence, due to their rapid evolution and to the fact that certain formats (for example, proprietary ones) strongly depend on the software with which they must be interpreted and which may no longer be available over time;
3. finally, even the technological platforms quickly become obsolete because of their very fast evolution and the fact that the market constantly offers more and more modern devices, making obsolete those that only yesterday were the latest novelty.

In short, these three problems (the obsolescence of storage media, the obsolescence of electronic formats and the obsolescence of technological platforms) make a digital document produced or received today probably not readable in ten or twenty years, obviously unless appropriate digital preservation strategies are adopted.

In short, these three problems (the obsolescence of storage media, the obsolescence of electronic formats and the obsolescence of technological platforms) make a digital document produced or received today probably not readable in ten or twenty years, obviously unless appropriate digital preservation strategies are adopted.

It is not the case, here, to go deep into the various preservation strategies (emulation, migration, hardware preservation, normalization, etc.) proposed by the international research groups who have been questioning these issues in an attempt to find a solution. However, it is important to note that ordinary people will hardly be able to use those strategies. In fact, who is able to adopt the so-called "refreshing" strategies: transferring digital documents from a storage medium that is becoming obsolete to a more current one to prevent the loss of digital documents stored on such medium? Who is able to carry out the so-called "migration": converting documents in an electronic format that is becoming obsolete towards a more modern one? Who has the skills to remedy the consequences that occur when the computer in which all documents were stored (emails received and sent, reports, drafts of speeches, photographs, etc.) suddenly stops working bringing into oblivion all the precious material it contains? Who adopts, as would be desirable, back-up strategies to prevent data loss that occurs in such cases?

4 THE CRITICAL ISSUES IN THE PRESERVATION OF PERSONAL DIGITAL ARCHIVES

The issue of archiving and preserving personal digital archives presents all the complex problems related to digital archives in general, but in addition presents some peculiar aspects that are very important to keep in mind:

- the tendency to accumulate huge and often uncontrollable amounts of documents, due on the one hand to the enormous storage capacity of the media today available, and on the other to the trust placed in the technological tools to make it possible to recover what is necessary simply by relying on the search functions (which, however sophisticated they may be, are not in any case able to return the accurate results that could be obtained with a correctly created archive);
- the lack of a logical sorting criterion during the stage of digital archive's creation, due on the one hand to the lack of archival knowledge (which are becoming increasingly important in the "new" digital world); on the other hand, to the lack of archival tools (for example: a filing planes for personal digital archives; a records management system for personal digital archives, etc.) (Hawkins, 2013) that can help ordinary people to create their archives according to archival principles; this is of fundamental importance, since the lack of an ordering criterion leads people to create messy archives that are very difficult to "rearrange" in a later stage;
- the tendency to distribute digital documents on multiple storage systems, on multiple platforms, on multiple services; ordinary people usually justify this by the fear of losing digital content (so they make multiple copies of the same documents on multiple media) but which inevitably generates disorder and confusion;
- the lack of the appraisal and disposal operations, activities that acquire an increasing importance compared to the huge quantity of personal digital documents that we produce and that risks becoming quickly unmanageable.
- the lack of the awareness on the problem of digital preservation and on the fact that personal digital archives are intrinsically more at risk than analogue counterparts and therefore need more attention and "curation".

As it is simple to argue, these highly critical elements strongly influence the chances of success of a preservation strategy applied to personal digital archives.

5 THE ISSUE OF PERSONAL DIGITAL HERITAGE

Alongside the critical elements outlined in the previous paragraph, we must bear in mind a further problem - linked to the broader research sector called "digital heritage" - that is perhaps the most critical issue.

To better understand things, let's imagine the situation – already described in the Introduction - in which an archivist has been asked to rearrange and draw up the inventory of the archive of an illustrious person who recently died. In order to access the analogue portion of his archive the archivist needs to go to the places where he has carried out his professional and personal life (his home, his office, etc.) and he can easily access all his documents; but in order to access the digital portion of his archive this is no longer sufficient. In fact, probably the archivist will be able to find the storage media used by him (such as floppy disks, CDs, DVDs, USB pen drives, hard disks, etc. - see Figure 2) at his home or in his office but when he will try to recover the digital documents stored on such media he will find that many of them are already obsolete and therefore difficult or impossible to read (Redwine, 2015).

But even if storage media was not obsolete, there is another and more difficult problem to solve: storage media are able to store the data recorded on them for a limited period of time depending on the type of technology used; even if the media is not obsolete, even waiting a few years could mean the loss of the content of such media.

Figure 2. An example of how the digital portion of a personal archive could show up: please note the presence of many obsolete storage media (floppy disk, DAT, DCC, Mini Disk, LS-120, etc.)

(source: https://www.theregister.co.uk/2013/07/18/data_storage_technology)

Moreover: storage media is often protected by access control systems: we need authentication information to access computers, tablets, smartphones and even to access documents stored on some storage media that use encryption mechanism to protect contents (such as external hard disks or USB sticks). If you do not have these authentication information it is impossible to access the digital archives stored on them.

It's not over here because there are still further problems to solve. Today more and more people no longer archive their digital documents on storage media but on "virtual places" such as Dropbox, Google Drive, Microsoft OneDrive, Amazon S3 and so on. For example, let's consider email archives: usually e-mail is no longer managed using a dedicated e-mail client but is more and more managed via remote services (such as webmail); therefore email archives are no longer stored on the creator's computer but they are stored on mail servers available on-line.

As a consequence, at the death of an illustrious person the archivist has a very big problem to solve: he must identify the "virtual places" where that person stored the portions of his digital archive. Most of the time, available information are fragmented and not sufficient; the archivist is faced with questions like: did the producer archive some documents on Dropbox? One Drive? G drive? Did he archive photos on Flickr? Instagram? Google Images?

Did he have profiles on the various social media (Facebook, Twitter, etc.)? Did he/she have had any website? Did he/she have had any blog? Did he/she have had any mail address? If yes, which ones? On which mail servers are his/her mailboxes? Unfortunately, it is not easy to provide an answer to these questions; often it is impossible.

But the difficulties do not end here. Even if it is possible to know where the portions of the illustrious person's archive are stored, the archivist will come across the difficulty (and often the impossibility) of accessing them. In fact, virtual places are normally protected by access control systems: we need authentication information (typically username and password) to access webmail, virtual spaces (G drive, Drop box, One Drive, etc.), accounts on social media, and so on. Without this information, which usually nobody shares with others and are therefore lost with the death of the creator, it is impossible for anyone to access the documents archived on the various online services. Even if it is possible to obtain such information (for example, because with lucid vision the creator has shared them to some of his relatives or friends) the situation does not allow any delay and the archivist must act as soon as possible. In fact, when the various online service providers realize that the service is no longer used by a given user, after a certain period of time they provide for the deactivation of the service and the cancellation of the related account. This can happen, depending on the policies adopted, in times varying from a few months to a few years at the most. Virtual places can still be available after a few days or a few weeks after the death of the creator, but probably they become inaccessible after a few months or a few years.

Let us consider the paradigmatic case of e-mail messages on the webmail system: access to the e-mail box is normally protected by authentication credentials, known only to those who created and use that particular e-mail box. But what happens to his death? Usually it is almost impossible for anyone else to recover access to the mailbox, since usually nobody is concerned with communicating these credentials to other parties: as a result, all these emails remain "trapped" in the mailbox and remain there until when, after a shorter or longer time, the account is disabled or deleted by the "inactivity" email service provider.

We must also consider the fact that many of the services that today are used by the majority of people tomorrow may no longer exist, for example because the company that offers them is in financial difficulty or because, trivially, the interests of users move to other platforms.

Therefore it is clear that in the world of personal digital archives the operations of rearranging, inventorying and valorisation must be undertaken immediately, thinking of the disappearance of the archive that can take place even after one or two years (sometimes even earlier). As can be understood, the approach must be diametrically opposed to that which one has towards analogical archives (where it is possible to carry out interventions even after years or decades after the death of the producer). With digital archives no extension is allowed.

In conclusion it is very difficult (indeed, most of the time impossible) to access the digital archive of a deceased person, be it the archive of his e-mails or that of his documents on G drive. The rules concerning the succession of digital assets are substantially non-existent and on more than one occasion the family members of a deceased have failed to access their accounts, hindered by the pedestrian application of the law on privacy. In this way, more and more often personal data, memories and testimonies of our lives remain stored exclusively in the form of bits and often remain forever hidden behind inscrutable passwords and sometimes protected by laws that have not yet contemplated the problem of digital heritage.

6 WHAT HOLDS THE FUTURE FOR PERSONAL DIGITAL ARCHIVES?

Faced with all these difficulties, can we be sure that we will we be able to preserve the personal digital archives that are being created today as we have been able to preserve the personal archives in the past? The answer is not the most comforting. The long-term preservation of digital archives in general is not simple nor, at the present, guaranteed. Sometimes it is even impossible; indeed, now we have the awareness that digital materials are not kept in a "passive" way (that is: without doing anything), just as, simply speaking, it happened for traditional paper materials, and that being able to preserve them and guarantee their legibility over time even for a few years only, it requires considerable effort and, more often than not, skills that are not available to everyone. For this reason we can reasonably believe that our era is running the risk of "losing" digital files in person, whether it is material produced in the personal field or in the workplace or professional.

In this regard, the reflections of Vint Cerf, deputy head of Google and one of the fathers of the Internet, are very significant. In 2015, he surprised everyone when in the annual meeting of the American Association for the Advancement of Science he declared that « If we don't find a solution, our 21st century will become an information black hole", a real "digital dark age". The advice that Cerf gave seems at first glance disconcerting: "If you have a picture that you really care about, print it".

7 CONCLUSIONS

As we have seen, digital archives face the danger, far from unrealistic, of being lost; indeed, it is very likely that most of the digital archives of people who have been formed in recent years have already been lost.

Unfortunately, the category of personal archives is much more at risk than that of public or enterprise archives that, for a variety of reasons (interests of study, legislative requirements, economic relevance, etc.) traditionally receive more attention from the archivists (Vettore, 2014).

If we consider that for centuries they have been a privileged source for a whole series of sectors (in historical research, demo-ethno-anthropological, sociological, artistic, geographic, literary, philological, just to name a few) we understand how the eventuality of loss of digital personal archives that are created in our time would have extremely negative consequences for multiple areas of research.

Nevertheless, the preservation of personal digital archives is slowly becoming part of the broader scientific debate on digital preservation, but there are still no authoritative studies and research projects on the subject, there is a lack of critical reflection on the many problematic aspects of the issue, serious proposals are lacking. Basically, it is a field of research still largely unexplored.

It is necessary to urgently address these issues, starting from a serious and systematic study of the issues of particular theoretical and technical complexity related to the training, management and conservation of digital files in person, putting in place awareness actions to increase the level of awareness on these issues; identifying methods, systems and strategies that are both simple and effective and that can be used not only by specialists in the sector (for example, archivists, computer scientists ...) but also by ordinary people.

Only by trying to understand how digital can influence the methods of settling documents and coming to suggest practical and operational solutions to ensure the preservation of the archives of people who are forming today, we can avoid that there are no traces of these archives walk towards that digital dark age, the digital middle age that someone has already begun to prefigure.

The digital revolution that involves every sector of our society is also transforming personal archives. Apart from some sporadic printing of documents, mostly carried out for contingent purposes, all our activities are now produce digital content: emails have replaced traditional paper letters; selfies have replaced postcards; digital photos have replaced the paper ones; blogs have replaced diaries; electronic agendas have replaced the paper ones; in addition there are "new" documents such as posts, tweets, websites and so on. Personal archives are turning into fully digital archives. Therefore if personal archives in the past consisted mostly of paper documents written on paper - a well known and with a very concrete consistency material - today they begin to consist of documents written on storage media such as floppy disks, optical media, USB sticks, hard disks (some of which are already obsolete and difficult to read); moreover, part of the documents are stored on online services (like Dropbox or Gdrive) whose access is protected by authentication mechanisms. So a question arises: in ten or twenty years or more, will we still be able to access these archives? What future awaits them?

The answer is not the most optimistic, because the preservation of digital archives over time is threatened by many problems, such as the obsolescence of storage media, electronic formats and digital devices necessary to read these documents. In fact, storage media are subject to the phenomenon of obsolescence, due to their limited duration over time and to the fact that the market is continuosly proposing new media, making illegible those that were used until a few years ago; electronic formats are also subject to rapid obsolescence, due to their rapid evolution and to the fact that certain formats (for example, proprietary ones) strongly depend on the software they must be interpreted with and that may no longer be available over time; finally, even devices quickly became obsolete due to the rapid evolution and the fact that the market constantly offers increasingly modern devices, making obsolete those that only yesterday were the latest news.

The issue of archiving and preservation of personal digital archives has all the complex issues related to digital archives in general, but in addition presents some peculiar aspects that offer interesting insights for studies and researches:

- the tendency to accumulate huge and often uncontrollable amounts of documents;
- the lack of a logical sorting criterion during the stage of digital archive's creation;
- the tendency to distribute digital documents on multiple storage systems, on multiple platforms, on multiple services;
- the lack of appraisal and disposal operations;
- the lack of awareness on the problem of digital preservation.

Faced with all these difficulties, can we be sure that we will be able to preserve personal digital archives that we are creating just as we have been able to preserve "traditional" personal archives of the past? The answer is not the most comforting. The long-term preservation of digital archives in general is neither simple nor guaranteed at the present. Sometimes it's even impossible; indeed, now we have the awareness that it is not possible to preserve digital materials in a "passive" way (without doing anything), just as, simplistically speaking, it happened for traditional paper materials, and that preserving them over time - even for a few years only - requires considerable effort and, more often than not, skills that are not available to everyone. For this reason we can reasonably believe that our era is running the risk of "losing" personal digital archives.

If we consider that for centuries they have been a privileged source for a whole series of scientific sectors (in historical research, demo-ethno-anthropological, sociological, artistic, geographic, literary, philological, just to name a few) we understand how the eventuality of loss of personal digital archives that are being created in our time would have extremely negative consequences for multiple areas of research.

The preservation of personal digital archives is slowly becoming part of the broader scientific debate on digital preservation, but there are still no authoritative studies and research projects on the subject, there is a lack of critical reflection on the many problematic aspects of the issue, serious proposals are lacking. Basically, it is a field of research still largely unexplored.

So it is urgent to address these issues, starting from a serious and systematic study of the issues of particular theoretical and technical complexity related to the creation, management and preservation of personal digital documents. Only in this way will we be able to secure a future for the personal digital archives that are created today.

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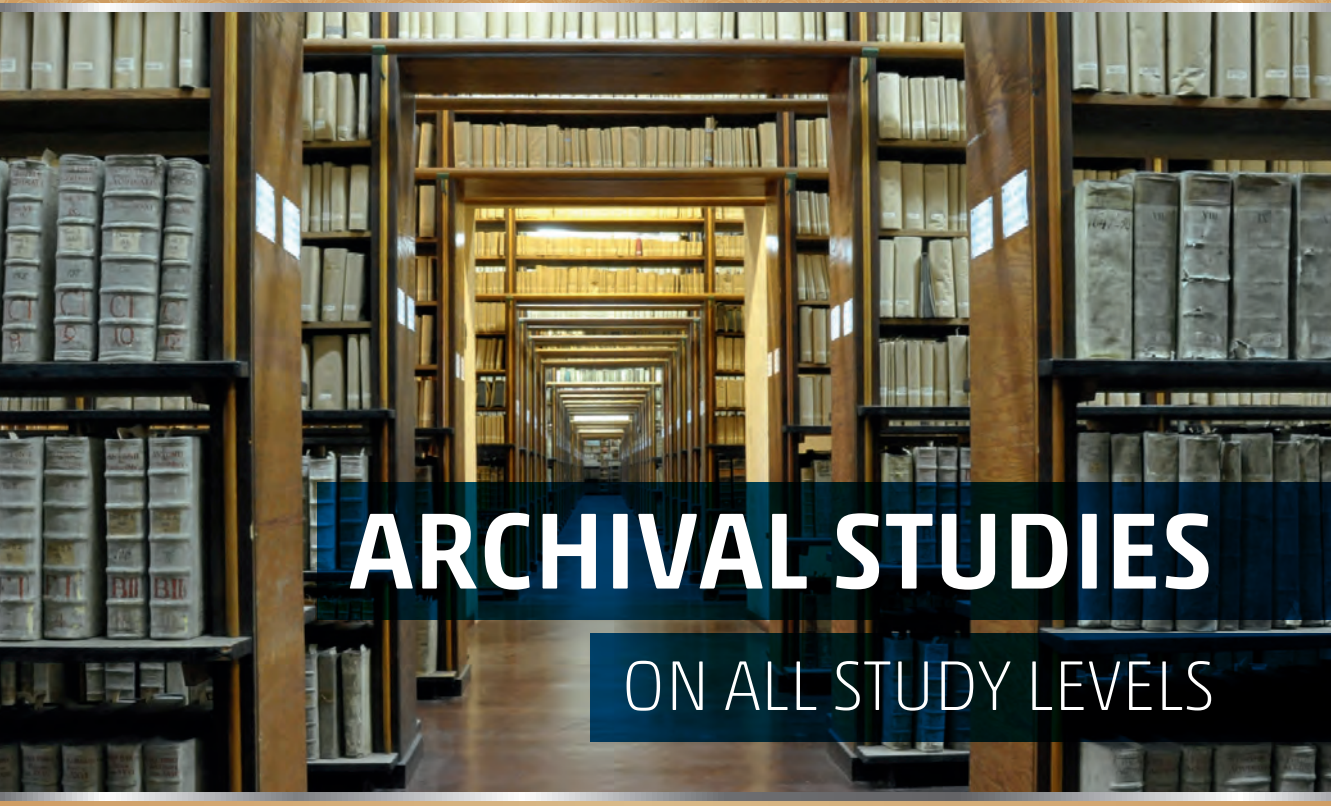

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