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The organization of archival information: a model for measuring the level of maturity of record management in the digital age

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Abstract: The organization of archival information in the digital age requires specific procedures; either because of the advent of digital archival records, or because the object of study has changed from sets of records to sets of organic information and archivology is witnessing new theoretical-methodological interlocutions with different disciplines that also have information as their object, such as Information Science. In the light of these developments, this research is based on the problem of analyzing how the management of digital archival documents can be measured at levels within document-producing organizations. To this end, this article presents a model for measuring maturity in the management of archival documents produced and kept in digital format. Objective: to propose a model for measuring the level of maturity in document management based on a study of existing models. Methodology: qualitative, documentary and bibliographical research. Results: by applying the new model for measuring the level of maturity in document management, it is possible to understand that the proposal is valid for measuring the level of maturity in document management in producing institutions. Conclusions: This research has shown that the record management maturity measurement model is valid and can be applied to any public institution in the digital information age to certify the quality of the custodian's archival record management.

Keywords: information organization; maturity model; level of maturity in record management; digital archival record

1 Introduction

It is known that bits represent the records that the user sees on the screen of the computer, application or tablet used and the high fragility of digital information requires differentiated measures for maintenance and preservation over time. The study by Santos

(2005) reveals that the term digital record refers to any record in a digital environment. Similar to analog records, digital archival records also need a support to record information. From this perspective, Camargo and Bellotto point out that support "[...] is the material on which information is recorded" (Camargo; Bellotto, 1996, p. 22, our translation). However, the virtual environment makes it difficult to define support. Santos (2005) observes that the real problem occurs with information available on the Internet to any user because it is not known where the physical storage area of this information is. "In this case, the bit would be the medium, because the information is recorded on it" (Santos, 2005, p. 36, our translation). "However, as the bit does not physically exist, there is no support" (Santos, 1997, our translation). In conclusion, Santos observes:

> Electronic records can be recorded on tangible and intangible media, with tangible media being more similar to traditional records? Theoretically, however, there will always be a server where the information available on the Internet will be stored, even if its location is difficult to identif (Santos, 2005, p. 36, our translation).

In this context, there are obstacles to managing and organizing digital archival records in the long term, given the possibility of adulterating and erasing the information contained in such unstable and changing realities over time.

This paradigm shift is underway both when studying archival theories and principles and when looking at the objects of study of archivology, whose development is now directly linked to contemporary technological developments. These developments present new questions related to archival theory and practice. As part of this paradigmatic shift, one of the main developments relates to the concept and way of managing archival records, as argued by authors such as Santos and Flores (2015). With the digital reality, the medium is constantly changing, although the information remains the same. Therefore, the concern turns to the production context of information recorded on dynamic media. It should also be noted that, with the digital reality, the way in which information is disseminated has also changed, since it can be made available to any user, simultaneously, anywhere in the world.

This article looks at the organization of digital archival records and proposes a new model for measuring the level of maturity in records management. Based on such a volatile environment, the research focuses on the assumptions necessary for records management in a systemic environment that allows the chain of custody of digital archival records to be maintained uninterrupted over time.

With this in mind, the aim of this paper is to present a model to measure the level of maturity in record management of organizations that produce archival records in the digital age. As well as measuring the level of maturity in record management, the proposed model can be used to support the improvement of record management in the producing organization, as it points to the models, systems and instruments used in record management in the digital environment. The maturity level model also contributes to the producing organization's record management by providing a planning tool that can be aligned with the institution's strategic objectives.

To this end, and based on a qualitative, documentary and bibliographic methodology, the research begins with a brief explanation of the organization of archival records and the assumptions, parameters and guidelines necessary for this organization in digital media. Next, the model for measuring the level of maturity in record management is presented, based on the study of levels based on systems, record management tools, archival policies, models, standards and metadata.

2 The organization of archival records: specificities of the digital age

The digital context requires specific procedures for record management. Acker's report investigates how:

> Technologists, archivists and information scientists confront issues of materiality and digital preservation with emerging formats and the information systems that create, delete and store digital traces created with mobile devices (Acker, 2019, p. 282, our translation).

This account proves the need for specific procedures required by the digital reality. Acker (2019) asks how to locate a digital archival record in the internet

communication infrastructure: on social networks and mobile devices, when an archival record is created and transmitted from a mobile device to another mobile device; when posting on a social network, when an archival record is transmitted from a mobile device to a fixed device and vice versa. How do we identify and maintain reliable and authentic archival records on these platforms? How to preserve and maintain the reliability of digital archival records on the Internet infrastructure? These and other questions are recurring problems in the digital age.

The search for solutions also requires the definition of basic concepts: archival record or archival information? The studies by Rousseau and Couture (1998) and Vital (2015) show that archival information is not linked to the medium. Diniz (2020) corroborates this understanding and writes that recorded organic information is also known as an archival record. From this perspective, can the term "archival record" and "archival information" be considered synonyms? Perhaps in a study whose subject matter could be investigated in more detail, this statement could be made, given that "Archival information is immaterial, so its management necessarily leads to the management of records containing strategic or non-strategic information content" (Lopes, 2009, p. 249, our translation), but it is not the purpose of this article to get involved in this debate.

The reality of the digital universe described by Acker (2019) makes it clear that the immateriality of archival information manifests itself more forcefully in the digital age, since the medium on which information is recorded is volatile and changes with each new version of a record. In other words, archival information recorded on a medium generates an archival record, as long as it is produced in accordance with the functions and activities of the producing organization, within the organizational context of that organization and with the metadata necessary for its publication. Changing the medium generates a new record, although the information remains the same, but with the addition of new metadata.

Given this reality, the immateriality of archival information and the definitions set out above, within the scope of this research, it is considered that a digital archival record is archival information recorded on an unstable and always dynamic medium, produced with the metadata necessary to guarantee the organizational context of the producing

institution and which maintains an organic relationship between them in the organizational environment to which it belongs.

Within this archival context, Lehmkuhl, Vianna and Silva (2019), when studying the relationship between organic information and archival information, note that both terms are used synonymously. "The words identified for archival information, minus nature, relationship, interrelationship, words linked to the organic character, are all others, also present in the ranking of organic information" (Lehmkuhl; Vianna; Silva, 2019, p. 91, our translation); characteristics that equate the terms archival information and organic information. Similarly, Andrade (2019) describes archival information as the result of the combination of Information and Communication Technology (ICT) and various other factors, since "[...] archival information is the result of the combination of various factors such as the inclusion of ICT and the use by its users, the latter emerging from the contemporary nature of the archive" (Andrade, 2019, p. 52, our translation).

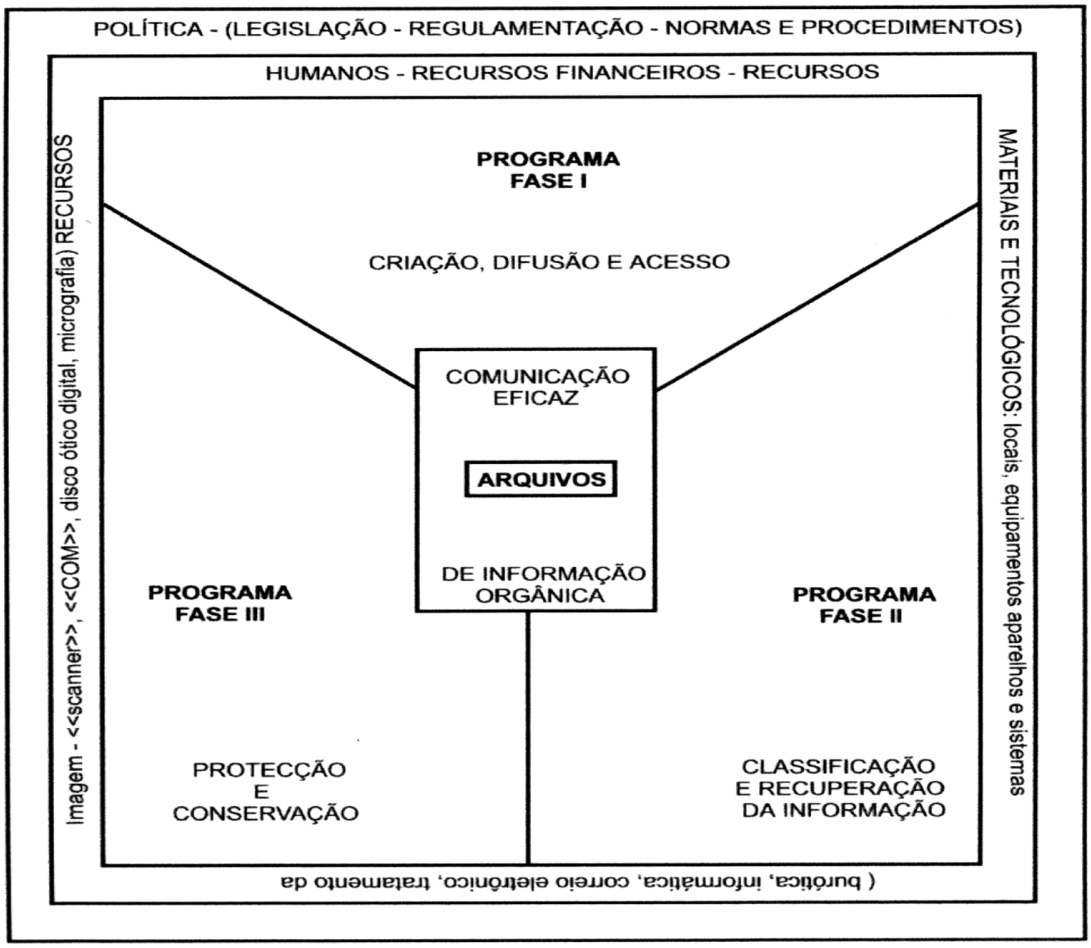
Whether in an analog or digital environment, the object to be classified and managed in archives does not change. Sousa (2007) states that "[...] there is a consensus among authors that we can only talk about archives when man began to produce written records of his actions, feelings and knowledge" (Sousa, 2007, p. 95, our translation). These records need a support and, once recorded, this information, as long as it is produced as a result of functions and activities and in accordance with the context of the producing organization, is characterized as an archival document.

Based on this understanding, the documents resulting from these actions form the organization's archival fund and, consequently, the archives which "[...] are made up of information linked to work processes. Any archive is made up of information generated and structured by functionally interrelated work processes" (Thomassen, 2006, p. 6, our translation). Information is recorded on supports that are translated into documents and these, the documents, have the capacity to "[...] record and preserve the actions and deeds of their creators" (Sousa, 2007, p. 107, our translation).

In the case of the organization of archival information, Rousseau and Coulture (1998) do not distinguish between general information management methods or archival information; they only distinguish between organic information and non-organic information, but both are part of a management program that must always take into

account the mission and vision of the organization that produces archival records. The authors divide this program into three phases: I - Creation, Dissemination and Access; II - Information Classification and Retrieval; and III - Protection and Preservation, as shown in Figure 1.

Figure 1 - Archival science and integrated information management



Source: Rousseau and Couture (1998).

The guidelines pointed out by the Canadians must be accompanied by the official establishment of an information management policy; or, in this case, the organization of digital archival documents. In this regard, the studies of the National Council of Archives (Conarq, 2020) corroborate the Canadians and also advocate the development and implementation of a Computerized Record Management System (SIGAD) as a fundamental point for the organization of documents in digital media, "[...] bodies and entities must define an archival document management policy that aims to produce,

maintain and preserve reliable, authentic, accessible and understandable documents, in order to support their functions and activities" (Conarq, 2020, p. 22, our translation). Kelvin Smith also notes the importance of record management policy at an organizational level:

> Organisations shoud have in place a records managements policy statement that is endorsed by top management and made known to all staf. It is the manifestation of the authority´s commitment to record management and a mandate for all related actions. It shoud be a clear and concise statement able to read and easily understod by everyone in the organisation (Smith, 2007, p. 11).

Under these circumstances, the establishment of standards for the organization of records, which must take place from the moment they are produced, "[...] allows us to make the most of the information that is available and essential to informed decision-making, and is one of the challenges that administrators must accept" (Rousseau; Couture, 1998, p. 118, our translation). This measure is necessary because "The frightening increase in the volume of information produced from records of administrative age raises more difficulties for its classification, retrieval and preservation" (Rousseau; Couture, 1998, p. 118, our translation). In addition, the conclusions of the studies by Rousseau and Couture (1998) show that the organization of current archives protects information.

Following this collection of studies on the subject of organizing or managing information, based on the research by Rousseau and Couture (1998), Silva (2006) and Vaz (2019), it is possible to infer that they are synonymous with the same process, which is organizing information or archival records.

From this perspective, the literature in the field indicates that the management and organization of archival records requires, above all, the official establishment of an "[...] archival document policy that aims to produce, maintain and preserve reliable, authentic, accessible and understandable records in order to support its functions and activities" (Conarq, 2015, p. 25, our translation). "This policy is initiated with an official declaration of intent that specifies, in summary form, how management will be carried out in the body or entity" (Conarq, 2020, p. 25, our translation). To this end:

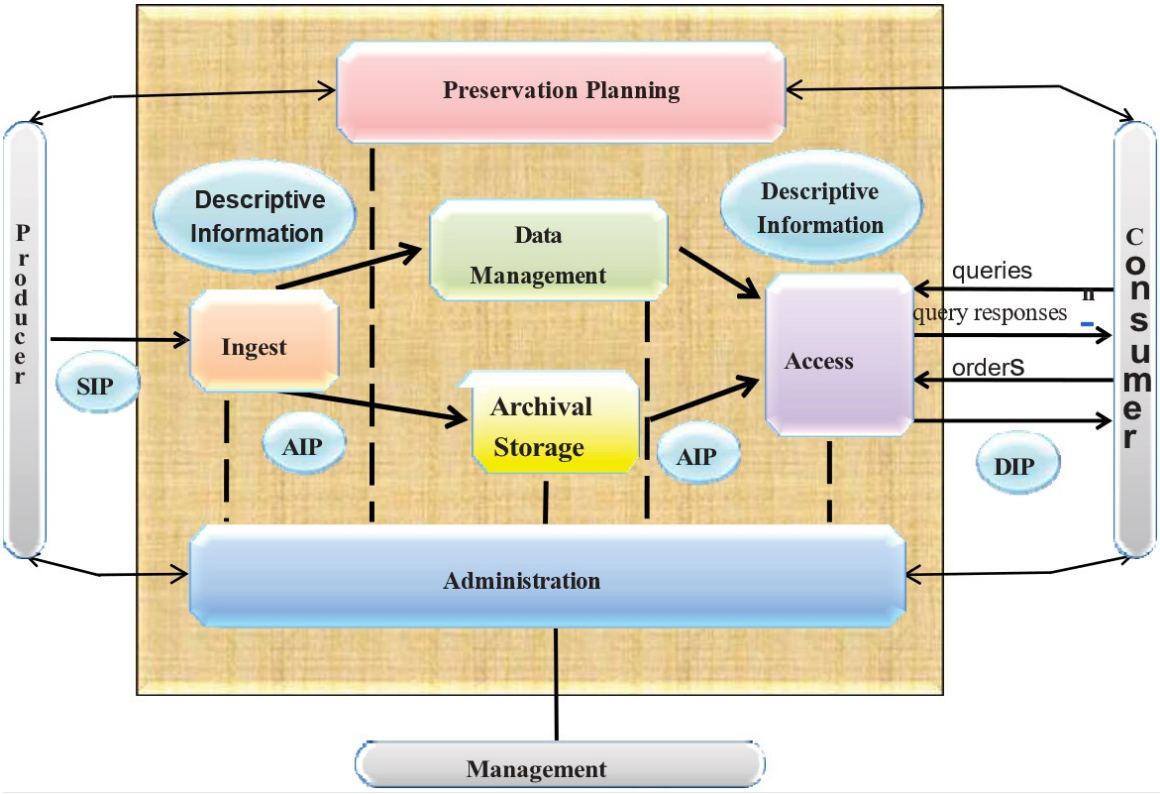
The archival record management policy should be formulated based on an analysis of the institutional profile, its legal-administrative context, organizational structure, mission, competencies, functionsand activities, so that the records produced are the most

appropriate, complete and necessary. "In addition, it must be articulated with the other information policies existing in the body or entity, such as systems and information security policies" (Conarq, 2020, p. 25, our translation).

Archival legislation defines "[...] record management policy as the definition of guidelines for the management of archival records, covering everything from production to final destination, whether preservation through permanent storage or disposal after evaluation" (CNJ, 2020, our translation).

Within this framework, records management in the digital environment requires specific procedures. Flores, Rocco and Santos (2016) note that these procedures include models, norms, requirements, standards and metadata in a systemic digital preservation environment maintained by the custodian. In this context, the Open Archival Information System (OAIS) reference model; translated by Conarq (2015) into Sistema Aberto de Arquivamento de Informações (SAAI) is an international reference standard for maintaining the archival digital chain of custody, as Santos and Flores (2018) point out.

Figure 2 - Functional entities of the SAAI model



Source: The Consultative Committee for Space Data Systems (2020).

Santos and Flores (2018) argue that this is a principle applicable to digital records, considering their specificities and complexities; ensuring that they have not had their digital archival custody broken, always keeping them confined in digital environments with approved archival requirements, from their production or representation, transmission and archiving, to their permanent custody, access or elimination; recording all their changes systemically in an audit trail; thus guaranteeing authenticity, reliability, integrity and fixity over time, in a systemic digital preservation approach, as illustrated in figure 2.

According to Conarq (2015), the SAAI Model can be defined as a reference standard that describes the functions of a reliable digital repository and the metadata necessary for preserving and accessing the digital materials managed by said repository, which, together with its metadata, constitutes a functional model and an information model. Also according to Conarq (2015), the SAAI model comprises the Submission Information Package (SIP) or the Information Submission Package; the Archival Information Package (AIP) or the information archiving package to be preserved in the repository; and the Dissemination Information Package (DIP) or the information dissemination package for access.

In this context defined by Conarq (2015), the model represented aims to provide guidelines for an archive system dedicated to preserving and maintaining long-term access to digital information, in a system that guarantees the authenticity and integrity of the digital object. These requirements for digital preservation are fundamental to the functioning of the Reliable Digital Archival Repository (RDC-Arq), the platform responsible for managing records in the third age; in other words, they ensure the permanent safekeeping of digital records. Conarq (2015) stresses that a RDC-Arq that follows the OAIS standard is made up of people and systems with responsibility for preserving information and making it available. The model addresses fundamental issues relating to the long-term preservation of digital materials, regardless of the area of application (archive, library, museum, among others).

Under these basic foundations, the organization that produces archival records will succeed in establishing good levels of record management in the digital age. But how

should the organization go about measuring this level of maturity in record management? This question is discussed in the next section.

3 The level of maturity in record management

Much has been said and written about record management, information management and their derivatives. From the perspective of these publications, what is record management? How can we measure the level of maturity of these managements? And what is a record management maturity model? According to ISO 15489-1, 2018, "[...] record management is the field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records" (ISO 15489-1, 2018[1], cause 10, *apud* Shepherd; Yeo, 2003, p. 1).

On the subject of maturity, Paulk *et. al*. maintain that "The maturity of an organizational entity is defined as a specific process for determining, managing, measuring and explicitly confronting its evolution" (Paulk *et. al*., 1993[2] *apud* Machado; Itaborahy; Alvares, 2021, p. 407-408). On this level:

> Maturity models are based on the assumption of predictable patterns of organizational evolution and change about how an organization's resources evolve step by step in an anticipated, desired or logical way, invoking theories of organizational change and development to conceptualize the path to maturity (Machado; Itaborahy; Alvares, 2021, p. 409, our translation).

Machado, Itaborahy and Alvares (2021) argue that the concept of maturity itself refers to the state of being complete, perfect and finished. Under this understanding, an organization's record management maturity is the advanced and optimized stage at which the institution finds itself in this area.

Lasrado, Vatrapu and Andersen (2015) list five relevant components for describing maturity models listed by maturity level: dimensions, subcategories, paths to maturity and evaluation questions. In the authors' view, the relevant components for a maturity model are:

a) **maturity levels** - maturity levels, maturity stages and maturity scores. These are states of maturity of the resources being assessed;

b) **dimensions** - dimensions, reference variables, process areas, capabilities and critical success factors;
c) **subcategories** - at this point, Lasrado, Vatrapu and Andersen (2015) present only the characteristics of the concept. In other words, they are second-level variables on which the dimensions depend;
d) **paths to maturity** - for the authors, this is the linear, one-dimensional path from the lowest to the highest maturity; in other words, something better, more advanced and higher;
e) **evaluation questions** - at this point, the authors only present characteristics of the concept. These questions are directly related to the subcategories with the score or level of maturity visualized.

Lasrado, Vatrapu and Andersen (2015), however, present criticisms of maturity models, such as the absence of a conceptual foundation and the lack of empirical validation in the selection of dimensions or variables.

In light of these considerations and according to the studies by Machado, Itaborahy and Alvares (2021), among the existing maturity models, the Capability Maturity Model Integration (CMMI) dominates maturity studies and influences new models in various domains, especially with regard to the relationship between maturity levels: initial, repeatable, defined, managed and optimized.

It should be noted, however, that the studies presented by these authors refer to maturity in information management in general and not specifically in relation to digital archival records.

Machado, Itaborahy and Alvares (2021) point out that "Models have been developed that can assess the maturity of information governance or management without a specific domain" (Machado, Itaborahy; Alvares, 2021, p. 417, our translation) and cite five appropriate models for assessing information management without a specific domain, such as the Enteprise Content Management Maturity Model (ECM3), which highlights the need to go beyond general issues and focus on the detailed concepts of the levels of management of archival records in a digital environment.

From this perspective, maturity models were sought that have characteristics more specifically geared to archival documents in digital environments. In this search, at the VII Seminar, The Role of Record and Archive Management in the Modernization of the State, in 2022, the Archive Record Management System (SIGA), using various measurement models, carried out a survey of Federal Public Administration (APF) bodies to find out what the level of maturity in record management is in their institutions. The research consisted of a survey of the situation of the archives, the workstations and the record and archive management maturity index of the FPA bodies.

Based on these surveys, the research established a maturity model based on TQM, "[...] a tool that guides an organization to evaluate existing processes and implement best practices" (Costa, 2022, our translation). TQM refers to total quality management or Total Quality Management (TQM), which, in the words of Fonseca and Frota, is "[...] a management model based on continuous improvement aimed at enhancing objectives, effectiveness and direction through systematic organizational planning" (Fonseca; Frota, 2015, p. 44, our translation). This model developed by SIGA is inspired by:

> Records and Archives Management Programme –, (United Nations Educational, Scientificand Cultural Organization – UNESCO);
>
> Capability Maturity Model® Integration" – CMMI (Software Engineering Institute – SEI);
>
> Modelo de Gestión de Documentos y Administración de Arquivos – MGD (Red de Transparencia y Accesso a La Información – RTA);
>
> The Principles Maturity Model – The Principles (Archival Record Management Agency – ARMA);
>
> The Recordkeeping Maturity Assessment Tool – The Assessment Tool (Queensland StateArchives);
>
> Modelo de Gestión Documental y Administración de Archivos – MGDA (Achivo General de La Nación –Colômbia);
>
> Perfil Integrado de Governança Organizacional e Gestão Públicas – iGG (Tribunal de Contas da União – TCU) (Costa, 2022, p. 8, our translation).

These models are classified into levels. Most have a scale from level one to three, others from level one to four and some have a scale from level one to five. The various

models used are similar in some respects, but they also have specific features inherent to each one.

In the RAMP studies by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the maturity model presented indicates that the institution's record management should have four levels: the minimum, in which the record-producing organization must have record retention and disposal programs and define procedures for collecting those records of permanent value from the archival institution; the extended minimum comprising the first level and there must still be one or more intermediate filing centers; the intermediate comprising the first two levels and in which the institution must adopt basic programs for the preparation and management of records, forms and correspondence, and the implementation of filing systems; and the maximum level which includes all the previous activities and in which there must be management of administrative guidelines, telecommunications and the use of automation resources.

The Unesco model, due to the semantic content presented at each level, focuses on analog records. It can be seen that the model uses the expressions "collect from the archival institution" and "intermediate filing center" and mentions the terms "file", "intermediate filing", "forms" and "correspondence", in a clear allusion to analog records. Jardim, in 1987, mentions this model which, at the time, only referred to automation resources in general, as it does not introduce any element that allows us to infer greater specificities of records in digital media, especially given the date of publication of the article.

Still on the subject of the Unesco model, it should be noted that it is based on James Rhoads' (1983) work entitled *La funcion de La gestión de documentos y Archivos en los sistemas nacionales de información: un estudio Del Ramp*. The longevity of the publication only proves the focus on analog records, since the subject of digital archival records was not very popular at the beginning of the 1980s, as shown by Rondinelli's research (2007). In the ARMA studies, the levels are:

> Level 1 (Inadequate): document concerns are not addressed at all, are covered minimally or sporadically;

> Level 2 (Developing): there is growing recognition that proper record handling has an impact on the organization and that the organization can benefit from a more defined record management program;
>
> Level 3 (Essential): characterized by defined policies and procedures and the implementation of processes specifically aimed at improving record management;
>
> Level 4 (Proactive): describes a proactive document management program throughout the organization, with mechanisms for continuous improvement;
>
> Level 5 (Transformational): an organization that has integrated record management into its infrastructure and business processes in such a way that compliance with the organization's policies and legal/regulatory responsibilities is routine; (Costa, 2022, p. 11-12, our translation).

The ARMA model does not mention or refer to digital archival records at any of its levels. The concepts are general and there is no mention, for example, of SIGAD, business systems, the SAAI Model or any other similar model, or any other characteristics that refer to digital records. The ARMA model always refers to record management, but without any references that might infer, for example, the archival digital chain of custody. Another maturity model cited by SIGA is The Assessment Tool, which also classifies it into five levels:

> Level 1 (Not developed): the body does not understand and has difficulty managing documents. Procedures are inconsistent and there is no planning;
>
> Level 2 (Developing): the organization is working to improve consistency in record management processes and results with a focus on compliance;
>
> Level 3 (Acceptable): the organization meets the requirements of the record management policy and has developed and is implementing a plan for record management;
>
> Level 4 (Managed): record management functions smoothly and is aligned throughout the body, being integrated into all aspects of its activities;
>
> Level 5 (Integrated): the agency has incorporated record management into the organization at all levels, and it supports the achievement of institutional strategic objectives (Costa, 2022, p. 13-14, our translation).

As far as The Assessment Tool model is concerned, there is also a generalist approach to record management and the model does not show primary concern for digital archival records, even at level five. At this last level, The Assessment Tool points out that the body has incorporated document management into the organization at all levels, but it is not explicit or implicit what these levels are. The Model in question reports a

hierarchy of levels, from level one to five. In all the subdivisions of the Model, there are records that the body meets the requirements of the record management policy and has developed and is implementing a plan for record management; or that record management is running smoothly; or, finally, that the body has incorporated record management into the organization at all levels.

It should be noted, however, that the description of the levels of The Assessment Tool model does not demonstrate characteristics that are consistent with the chain of custody for digital archival records described by Flores, Rocco and Santos (2016); nor does it include the requirements, models, norms, standards and metadata demanded by Conarq's SAAI Model (2015). This general aspect makes it impossible to adopt The Assessment Tool model to measure maturity levels in the digital environment.

The Capability Maturity Model® Integration (CMMI) model is classified:

> Level 1 (initial): there is no standardization of procedures, processes are inconsistent, disorganized, with poor and unpredictable results;
>
> Level 2 (managed): processes are characterized by project, the approach is problem-based and actions are often reactive;
>
> Level 3 (defined): processes are defined and proactive, with a tendency to improve;
>
> Level 4 (quantitatively managed): processes are statistically managed, and it is possible to monitor and control variations and predict the achievement of results;
>
> Level 5 (optimized): execution of best practices, focus on continuous process improvement, development of automation (Costa, 2022, p. 15-16, our translation).

It should be noted that the CMMI model is the second to allude, albeit indirectly, to the digital environment. At level five (optimized), the model refers to the implementation of best practices, a focus on continuous process improvement and the development of automation. However, questions arise: what are these automation processes? Is there a classification plan and record temporality table in these processes? Are records eliminated? Is there a SIGAD and RDC-Arq in the institution? Are the norms, models, standards and requirements of any reference model followed? These are unanswerable questions, because the word "automation" can refer to all of these or just

some of these tools. Furthermore, as can be seen in the specialized literature, the management of digital archival records requires information management policies, norms, standards and models that go far beyond automation processes.

The SIGA survey also analyzes the MGDA and IGG record management maturity models and their respective levels, and in both the approach is generalist and there is no direct or indirect reference to digital archival records.

In the MGDA model, of the five levels (initial, basic, intermediate and advanced one and two), three mention the technological aspect. The last three levels emphasize that the implementation of the product must consider, among other things, technological needs. Again, the questions arise: what are these technological needs? What do they include? Is there a digital preservation policy guided by the systemic approach maintained by the custodian? Is there any elimination of temporary and occasional custody records? Again, these are unanswered questions, because simply reading and possibly applying the model in question does not reveal the information required by the digital environment.

Finally, an analysis of the levels of the IGG Model (initial, unimpressive, beginning, intermediate and improved) shows that the metric for measuring the level of maturity in record management in this Model is vague, as the IGG only uses percentages. For example, to reach the improved level, the record-producing organization needs to reach 100%. But 100% in what? What tools does a producing organization need to achieve 100% in record management according to the IGG Model? It's difficult to infer the answer from reading the Model.

The lack of clarity is noticeable, especially when considering digital archival records. It appears from the reading that it is not possible to measure the level of maturity in the management of digital archival records using the IGG Model metric. Even if it were possible, it would be a complex activity to use this model in a digital environment.

After presenting the models in question, it was noted that SIGA uses a metric for evaluating and gauging the levels of maturity in record management in the APF, but that it does not meet the needs of this research, because it does not clearly contemplate digital archival records. The content of the text portrays a reality in executive branch bodies that is always reminiscent of analogue records and is also complex to understand and apply in bureaucratic and hierarchical institutions. In addition to this problem, it can also be seen

that the models used by SIGA are sometimes generalist and sometimes focused on analog records.

Taking a broader approach, Watanabe and Sousa (2021) researched the limitations of maturity models for information and record management. The methodological procedures used by the authors consisted of updating the systematic literature review on the subject and identified 36 information and record management maturity models.

The work by Watanabe and Sousa (2021) contains an extensive list of foreign authors who have proposed maturity models for information and record management and knowledge management. Consulting these references allows us to make important comments and deductions for the purposes of this article. Afshari and Khosravi (2009), for example, argue that in order to use a maturity model, five steps must be followed: I - prepare for the assessment; II - carry out the assessment; III - plan the improvements, IV - implement the improvements; and V - repeat the process periodically.

Reading the JISC Repository (2015) repository also allows us to infer an approach more focused on a set of more general recommendations, but without a focus on the digital environment. Similarly, Brown's Digital Preservation Maturity Model (2013) does not address the digital reality either, as the model is not concerned with the archival digital chain of custody, SIGADs or a systemic digital preservation environment maintained by the custodian.

The requirements required and absent in the models researched are essential, since, in the words of Tarhan, Turetken and Reijers (2016), the maturity model is the reference model with the description of its levels, as it provides a path of improvement for the organization. In light of this understanding, the various references consulted follow a general bias towards record management, information management, process management, information systems and other names. These inferences are sufficient to state that none of the models studied support the objectives proposed in this research.

In this respect, it should be added that the technological obsolescence of digital records, in the words of Shepherd and Yeo, represents new challenges for records managers:

> Eletronic records present the records manager with new challenges, not least in dependence their on computer, software, hardware and operating systems,

> and in measures that are needed to ensure their continuing accessibility in a word of rapid technological change (Shepherd; Yeo, 2003, p. 20).

In addition to Shepherd and Yeo's (2003) considerations, Roberge states that an institution's administrative document management should include a hybrid system:

> Hoy en dia, el sistema de gestión de los documentos administrativos de uma organización debe integrar la gestión de los documentos analógicos y de los documentos electrônicos, independientemente de que estos documentos tengan un valor administrativos, financeiro o legal (documentos de gestión de los actividades administrativas y de los assuntos de negocio, o um valor archvístico, histórico o patrimoninal (archivos permanentes) (Roberge, 2011, p. 17.13).

In this way, a simpler model is proposed, based on studies of the models presented by SIGA; on the considerations of Shepherd and Yeo (2003) and technological changes; on the considerations of Rousseau and Couture (1998) and Smith (2007) regarding record management policy; and on the studies of Roberge (2011) on hybrid record management systems and aimed primarily at the digital environment, which is the basis of this research. The construction of the new model will be based on the models presented by SIGA and the mentioned authors and aims to meet the requirements proposed by this research.
With this in mind, we suggest a model with a five-level scale to measure maturity in the management of digital and analog archival records in any public institution. The DDI Model stands for digital archival records: level zero; basic level; intermediate level; advanced level and integral level, as shown in Chart 1.

Chart 1- DDI Model

Scale of record management maturity levels	
1	- Level Zero: the record-producing organization does not understand and does not manage records, because the procedures are inconsistent; there is no planning and isolated actions in this area are ignored;
2	- At the Basic level, the record-producing organization must have systems for the production and storage of digital archival records and a Permanent Record Evaluation Committee (CPAD);

3	- Intermediate Level: comprises level 2 plus the use and application of a classification plan and record temporality table in all record production systems, with those of permanent value being transferred to an RDC-Arq;
4	- Advanced Level: comprises level 3 plus a record management and digital preservation policy officially established by legal act and units responsible for record management that are part of the organizational structure and located in the organization chart at least 2 levels from the top management of the producing entity; this level also includes the activities of identifying, classifying, evaluating, capturing, selecting, preserving and maintaining authentic records of any kind, species and/or category available on the web (internet and intranet), workstations and social networks;
5	- Integral Level: comprises level 4 plus units responsible for record management that are part of the organizational structure and located in the organization chart at least 1 level from the top management of the producing entity, SIGAD and RDC-Arq integrated into a dissemination and access platform in a systemic digital preservation environment capable of guaranteeing the archival digital chain of custody and maintained by the custodian entity. At this level, all the systems that produce records must be integrated into a systemic environment. Record management must also be integrated into the organization at all levels and must support the achievement of institutional strategic objectives.

Source: Prepared by the authors.

In addition to the possibility of being used in both analog and digital realities, the construction of the new model is also based on the Conarq guidelines (2015, 2020), when the Council lists, respectively, the requirements of the SAAI Model for the definition of a systemic digital preservation environment that guarantees the maintenance of the uninterrupted chain of custody of digital archival records; and of e-Arq Brazil for the official establishment of a records management policy as presuppositions for the implementation and development of a SIGAD.

Once the new model has been built, the level of maturity in the management of digital archival records can be measured by means of interviews and questionnaires in the records management and IT units of the institution being researched.

4 Methodology

This research is qualitative, explanatory and correlational in nature, as the use of a model capable of gauging an institution's level of maturity in record management contributes to the treatment of archival records in the production phase and in the formation of organized and logical archives. As an explanatory study, it investigated the procedures and

specificities required in the organization of information produced and accumulated in a digital environment.

From the point of view of technical procedures, it is structured as documentary and bibliographical research, since the bibliographical part consists of a preliminary survey of material already published on the research objective, including, in particular, sources available in books, scientific articles, dissertations, theses and specialized websites. The areas of knowledge involve Archival Science, Librarianship and Information Science. In this context, the data collected was analyzed to arrive at the proposal defended in the research.

In developing this work, the research identified the existing models of record management maturity levels and proposed a new model capable of measuring record management maturity levels in public institutions. In this investigative process, in addition to consulting books to define some basic concepts, we decided to search for scientific articles, dissertations and theses in the Information Science Database (BRAPCI), the Brazilian Digital Library of Theses and Dissertations (BDTD) and the CAPES Periodical database.

After searching the platforms mentioned above and refining them, the next task was to analyze the material collected. In this analysis, it was observed that the publications found did not meet the requirements needed to measure the level of maturity in record management, as detailed in Section 3; which is why the new model detailed in this research was proposed.

5 Results and data analysis

According to the above, the proposed model can be used in any institution through interviews or the application of a questionnaire, with questions pertinent to the topic, in the record management and information technology (IT) units of the custodian entity. The choice of these specific units is justified by the fact that record management is familiar with archival principles and practices, although it also often has IT knowledge, and the IT area, by definition, has the technological knowledge involved in developing record management systems.

This methodology makes it possible to identify the reality and at what level the producing organization is in terms of record management. To this end, the methodological procedures used should make use of a scale (see Chart 1), with the first level being the most basic or non-existent and the last level being as close as possible to excellence in record management. Following these guidelines, the use of the proposed maturity model does not present any difficulties, given that the requirements for gauging the institution's level of maturity in record management are more quantitative than qualitative, as shown in Chart 1. Under this understanding, if the record-producing organization does not understand and does not manage records, because the procedures are inconsistent, there is no planning and actions in this area are isolated or ignored, there is no management to be measured.

On the other hand, if the record-producing organization has systems for the production and storage of digital archival records and a CPAD, the level of maturity in digital archival records management measured is basic; if it has the requirements of the basic level plus the use and application of a classification plan and a record temporality table in all information-producing systems, the organization is at the intermediate level in records management.

The other maturity levels are measured using the same methodology. In this way, it is possible to get to know the institutional reality of record management in a digital environment by applying the proposed model and, with the data collected, to propose interventions in the record management policy of the producer organization in order to improve the level of record management detected on the basis of the proposed maturity model.

6 Conclusion

The archivist's concern must be to make information available for decision-making within the producing organization. The construction of SIGAD, RDC-Arq and an access and dissemination platform must necessarily follow archival principles and this stage is just one more that must follow the methodologies of a record management program.

In the digital age, managing information linked to work processes aims to fulfill the mission and vision of each custodian, including the preservation of this information. Preservation guidelines, models and parameters must also be followed.

In light of these considerations, the organization and management of archival records in the digital age must follow the principles of contemporary Archival Science and these principles include the development and implementation of a systemic digital management and preservation environment that must be under the responsibility of the custodian and that is capable of maintaining the digital archival chain of custody over the long term. If it has these characteristics, the producing organization can reach the higher levels of the digital archival record management maturity model.

If the methodology is applied to the target institution, the proposed maturity model is capable of analyzing the level at which the record-producing organization is managing these information assets and, consequently, assessing whether it is capable of making the required information available, whether for decision-making or for social benefit.

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A organização da informação arquivística: um modelo de aferição do nível de maturidade em gestão de documentos na era digital

Resumo: A organização da informação arquivística na era digital exige procedimentos específicos; seja pelo advento dos documentos arquivísticos digitais, seja porque houve a alteração do objeto de estudo de conjuntos de documentos para o conjunto de informações orgânicas e a arquivologia assiste a novas interlocuções teórico-metodológicas com distintas disciplinas que também possuem como objeto a informação, como a Ciência da Informação. À luz dessas evoluções, a presente pesquisa parte da problemática de analisar de que forma a gestão de documentos arquivísticos digitais pode ser mensurada em níveis no interior dos organismos produtores de documentos. Para esse fim, o presente artigo apresenta um modelo de aferição de maturidade em gestão de documentos arquivísticos produzidos e mantidos em meio digital. Objetivo**:** propor um modelo de aferição do nível de maturidade em gestão de documentos a partir do estudo de modelos existentes. Metodologia**:** pesquisa qualitativa, documental e bibliográfica. Resultados**:** ao aplicar o novo modelo de aferição do nível de maturidade em gestão de documentos, torna-se possível entender que a proposta é válida para aferir o nível de maturidade em gestão de documentos nas instituições produtoras. Conclusões**:** esta pesquisa demonstrou que o modelo de aferição de maturidade em gestão de documentos é válido e pode ser aplicado em qualquer instituição pública na era da informação digital para atestar a qualidade da gestão de documentos arquivísticos do ente custodia dor.

Palavras-chave*:* organização da informação; modelo de maturidade; nível de maturidade em gestão de documentos; documentos arquivísticos digitais

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