

EUNIS 2019: Information Management @ Universities: a model proposal¹

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1. SUMMARY

This communication aims to present the main result of a research in the field of Information Management (IM), acknowledged as a cross-sectional and applied area in Information Science (IS).

It is based on a diagnosis made at Portuguese Public Universities, complemented by a more detailed study performed at the University of Porto (U.Porto) involving traditional information services (Archives, Libraries, Documentation Centres and Museums), an area that, in the last few decades, has sustained epistemological and theoretical changes which have impacted on training and investigative models, functional contents and professional profiles, as well as emerging services such as Informatics and the role of IM, that tend to dominate IM in the digital milieu.

The info-communicational flow is considered in its several stages and contexts and managed under the concept of information (human and social phenomenon). IM is defined as the study, conception, implementation and development of processes and services related to the info-communicational flow, serving to build implementation models for maximum efficiency and profitability.

The prospective vision is embodied in the proposal of an Active and Permanent Information System Management Model (MGSI-AP) for the university.

2. GENERAL FRAMEWORK

The issue of Information and Communications Technology (ICT) and its mediation in the info-communicational phenomenon, with the resulting problems associated to information and communication within an institutional and organizational context, raised reflections such as the one here presented. In this equating a lot is reflected of the multi-optional confrontation of challenges and opportunities that the Information Age (Castells, 2002-2003) has assigned to both individuals and groups, within their different roles, functions and activities and, particularly, within the field of Information Management (IM).

"Which Organic Entity is the University?" was the first research question in a study which focused on the Portuguese Public University within a period characterised as a crossroad, having attempted to put in perspective and sought to understand this entity within a dialectic relationship between the "existence" of the secular "Institution" and the "action" as "Organisation" in the Information and Knowledge Age (Pinto, 2015a:40-112; Pinto, 2016). A role that calls on to an active participation in the new "informational development way", which takes root in the centrality of information and of knowledge as main sources of productivity and competitiveness in the "new knowledge based economics", in the restructuring intervention and development of national economics, in the reinforcement of the interaction with the community, which can be translated into one word only, "change" to be promoted in its midst, leveraged on the outside.

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In Portugal, the University is heiress to seven centuries of history (Lisboa, 1290) which makes it unique within the institutional universe, namely among the institutions which integrate, at a general level, Public Administration (PA) and, at a more specific level, the scope of Higher Education (HE) and the Research & Development System (Pinto, 2015b). Founded in 1911, the University of Porto (U.Porto) is a benchmark institution for Higher Education and Scientific Research in Portugal and one of the top 200 European Universities according to the most relevant international ranking systems, comprising, currently, 14 faculties, one business school and over 50 research centres.

3. METHODOLOGICAL APPROACH

This research fits in with a sense of IM as cross-sectional and applied field of study within Information Science (IS), in permanent integration and crossing with Informational Production (InfP), Organization and Representation of Information (ORI) and Informational Behaviour (InfB), within the framework of the interdisciplinary of Communication and Information Sciences, and in the face of intersciences such as Information Systems and Cognitive Sciences, within the broader framework of Social Sciences (Ribeiro & Silva, 2016; Pombo, 2006).

We start from a diagnosis applied to all Portuguese public universities between 2010 and 2011, at a time when the problem of the impact of ICT and, specifically, the proliferation of digital repositories was taking on significant relevance. These have been developing since the late 1990s with the creation of digital libraries and archives in the traditional information services (libraries and archives), expanding, not necessarily with their support, to Faculties/Schools, Departments, Documentation Centres and Research & Development Units (R&DU).

Besides the consolidation of the university information system, namely at U.Porto (Ribeiro, David, Azevedo & Santos, 1997; Nunes, 2004), in the beginning of the 21st century a typological diversification is ascertained (Institutional Repository, e-Learning Repository, Data Repository, Knowledge Repository...) which has as common features:

1. "contain" metadata and digitalised and born-digital information which needs to be managed and made available;
2. tend to an "autonomous" management, be it into each other, or when it comes to the management of 'traditional' archives, collections and information services provided within the midst of the same institution;
3. constitute an integral part of the complex diversity of university infrastructures and digital services.

Based on a perspective of action-research, within the qualitative quadripolar method framework (Pinto 2015a:549-586), a diagnosis was made, to study and contribute towards a theoretical modelation, applied to IM, centred in the management of the university's organisational information system. This was done by asking the following question:

How do the Portuguese Public Universities taken on and operationalised IM at a time of profound change and intensive and extensive use of ICT in the intra and inter-organisational context?

4. THE INTERVENTION MODEL

In the path taken issues were approached and an attempt was made to contribute with answers concerning the whole info-communicational procedurality, within any context (Silva & Ribeiro, 2009:35), considering an **investigative dimension** (diagnosis and IM research design model validation) and an **applied dimension** (diagnosis and intervention model).

At the basis is a systemic perspective with three elements - the Institutional and Organizational, the Info-communicational and the Technological - providing a mapping which allowed the identification, within the research sample, of identity traits present in agents, formal and informal relationships and networks, as well as procedures and services of IM, whose formulation is liable to a more generalized application.

The research main contribution was a proposal of an IM model directed to the **Active and Permanent - Information System (SI-AP)** of the University, the informational result of the activities developed in the pursuit and achievement of its mission and goals.

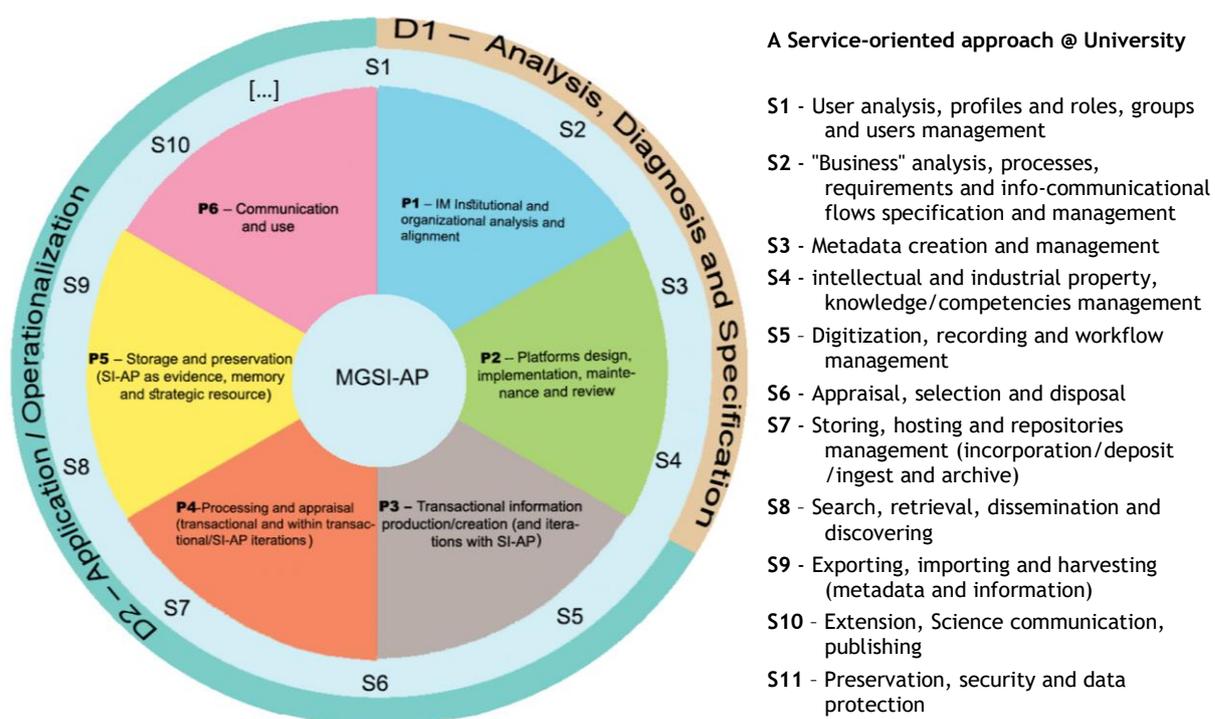
It is an intervention descriptive model which operationalises IM - the **Active and Permanent Information System Management Model** (MGSI-AP) - within the U.Porto (MGSI-AP.UP) (Figure 1). This is configured as flexible and dynamic and aims for a balance of the institutional whole within a frame of (moderately) flexible relations (Weick,1976) which are established between individuals, groups, constituent units and the University and between these and the outside, thus articulating flows and technology, as well as organisational structure and networks, supported by communities of practice which reflect and optimize scientific, technical and administrative areas through IM.

The MGSI-AP considers the complexity of the multidimensionality of vectors being analysed, i.e., the systemic components and groups of variables, as well as IM's dimensions (2), processes (6) and services (11).

Its implementation, naturally, runs through technology and by the assurance of the system(s)' interoperability, responding the technological evolution with an ever growing level of efficiency and effectiveness, be it through a management system *in situ*, i.e., in the production system, be it an *in app* system, i.e., accumulating the role of support both current activities and information management.

Without questioning the role of information services organically constituted, the model presents a basis for a systemic look and an integrated approach of the institutional / organizational SI-AP and related management model.

Figure 1 - MGSI-AP.UP Model (IM Dimensions; Processes and Services) (Pinto, 2015a)



The main vectors of MGSI-AP.UP are here outlined and a particular focus is given to the informational component, namely in what it concerns IM procedures and services.

4.1. A brief overview

The MGSI-AP seeks to make feasible the production, processing, preservation and continuous access to the unitary SI-AP in which an Institution / Organization is materialized and persists. Why? Because the SI-AP reflects the action and constitutes an asset, evidence and memory of any kind of entity, be it an institution, a non-profit association, a company, a family or a person and that, in order to stay on, needs to be managed.

This IM model integrates two levels, the macro, with a bidimensional intervention approach, and the micro, with the procedures and services of IM. The **macro level** embraces the diagnosis, the analysis and the specification, as well as the action / execution of the intervention in IM. At the **micro level**, there are the identified six **IM procedures**, two related with diagnosis and three with action/execution, which support, in a non-necessarily sequential/cyclical, the info-communicational flow. Based on the study, eleven **IM services** are associated to these procedures, depending its activation/ execution on the different functional areas (among which are the traditional information services and IT services) and new transversal / informal communities of practice.

Assuming the theoretical model SI-AP (Pinto & Silva, 2005), namely its characteristics and operative concepts applied to the University (Pinto, 2015a: 605-610), were identified the following guiding **principles of action**: the principle of institutional complexity; the principle of identity and flexibility, autonomy and unity; the principle of systemic integrity and the principle of collaborative and networked work.

The IM systemic framework is considered under these principles, it being possible to equate the perspective by the **info-communicational phenomenon** and the perspective by the **social or sociotechnical system**, a position that distances itself from the Australian view that seeks to understand *recordkeeping* as a social system (Mckemish & Upward, 2001)². Also, the construction of individual and collective memory is not taken for granted, but there's an attempt to understand and support the institutional structure / action that builds and develops the institution's identity *self* and its constituent units and, with that monitoring and support, provides for the preservation of its memory. These are Internal dictates to the institution and not to the collective memory that guide the approach to be made.

At the base of the model is the binomial **Systemic Theory / SI-AP Model**; a holistic view of the structuring of the institutional/organizational Information System; the focus on the dynamic **info-communicational flow**; and an operationalization supported by **components** and **sets of analysis variables**, among which the joint foundational variables - organicity, functionality and memory - is highlighted; an **orientation to services** that effect the IM processes and their development along the **info-communicational flow** for the structuring, development and management of the SI-AP.

The MGSI-AP has two linked and interacting DIMENSIONS within the organizational context: the **human and social** (reflected in the SI-AP) and the **technological** (reflected in the Technological Information System). With this research and in line with the analysis of the relationship between the IM and the Knowledge Management (Pinto, 2015:399-462), it is considered in the human and social dimension what we call **People Management** (and the People [and Competency] Management System, PMS).

This being a model developed in IS, it corresponds to a new paradigm that systemically approaches the info-communicational phenomenon, references IM as a cross-sectional and applied area of study in IS (PINTO, 2015a: 526-549), in interaction and permanent intersection with the three areas of study InfP, ORI and InfB, distinguishing IM and *IM processes*, valuing equally in these processes the production and use of information, human and social processes materialized in the info-communicational flow, positioning the Preservation of information (digital and non-digital) as a variable of IM and ensuring its implementation along with IM processes.

The focus is therefore on **Information**, human phenomenon (based on the person / individual / subject and their situation) and social phenomenon (group / community of practice / organization and their contexts and environment). This concept is associated with the emerging concept of **Competences** (cognitive, social, organizational and technical), also relevant to the understanding of the human and social base dynamics that can not be reduced to focus on structure, rules and procedures.

4.2. MGSI-AP Components

The model presents as COMPONENTS the systemic elements that integrate the *matrix of systemic analysis* that also guided the research carried out: **Institution/Organization**, **Information** and **Technology**. These are characterized by inseparability and permanent interaction.

² By conceiving the possibility of the inherent processes being institutionalized and starting from here to the need to gauge the functional requirements for the post-custodial "regimes" / models to be developed.

a) *Institutional / Organizational Systemic Component*

In light of the initial formulation of the SI-AP model, which together with the Organization highlighted the Actors and the Information System, placing IM at the *core* of the Organization (PINTO, 2015a: 604-606), **Technology** has been included in this formulation as a basilar component, in addition to those referred to.

The role of the component **Institution/Organization** is also reimposed, activating, at this level, determinant links with one of the sets of analysis VARIABLES, the subset of intrinsic informational variables (PINTO, 2015a: 617-618), namely the structuring by action, the dynamic integration and the pregnancy (three information properties), leading to the expansion and specification of this component depending on the analysis of the secular institution: the University.

The University configuration is identified as a moderately flexible system, reinterpreting in an integrated way the concepts of "Institution" and "Organization", the defense of "unity" and "autonomy", with the characteristics and dynamics already exposed in the principles that support the model and that convene the set of identity variables and that of social / human variables, leaving the management / processing variables (structure, people, processes, flows and technology) fundamental to the Information and Technology components.

This is, therefore, a systemic-informational and organizational modeling that, within the Institutional / Organizational component, is embodied / supported in the Informational and Technological components, which show the *social / human dimension* (the SI-AP and the PMS) and the technological *dimension* (the Information Technology Systems).

From this positioning comes the valorization of the central **SI-AP**, resulting from the info-communicational flow, of the People [and Competency Management] System, which embodies the skills, aptitudes and experience of the actors of the Organization / Institution (Social System) and, also of Information Technology Systems (ITS), indissociable mediator.

The MGSI-AP aims to respond to the urgency of the commitment of organizations and institutions to IM, recognizing the imperative of designing and implementing an [Active and Permanent] Information System Management focused on IM PROCESSES and carried out by the IM SERVICES, in a non-organic sense.

Applying this model to both Institutional System (InstS) and Organizational System (OS) and considering the research universe (the University), it is necessary to consider the InstS / OS relationship to better represent the two realities. It is therefore based on a conceptual analysis in which the **InstS** is characterized by its set of values, its long existence, is tendentially complex and dictates the "rules of the game" (the University) and the **OS** arises from the need to guarantee institutional existence, which passes, among other vectors, by a formal organizational structure (players) that tends to integrate autonomous constituent units (Organs and support services, Organic Units of Education and Research, Autonomous Services, etc.), with an evolutionary dynamic that results from the societal development and whose action and dynamics are embodied and reflected in the SI-AP that can only be understood, developed and managed in the institutional whole reflecting the alignment of the SO(s) with the InstS of which they are part.

This modeling is not intended to focus on the integrative function of IM as a subdiscipline of Management and a strategic alignment in the framework of the "*business / IT*" connection and the technological dependence of information / communication, as it aimed by MAES with an IM proposition model (MAES, 1999), but rather an intra-institutional and interorganizational alignment (internal and external) with a focus on the info-communicational flow. It should be noted that we are dealing with **multilevel organizational and informational relationships**, flexible and amenable to multifaceted representation.

Nevertheless, the idea, not of hierarchy, but of **network** and of the need to manage networks, whether organizational or informational, formal or informal, functional or scientific, is maintained and reinforced, thus corresponding to the complexity of the object of study and to confer intelligibility to the relations established between Components and Variables, which, in fact, constitute the identity core of the action and consequent management process to be established for each organic/constitutive unit in the institutional whole.

b) Informational Systemic Component

Information is the second and central component, aiming with the modeling of the MGSI-AP the systemic informational whole, reflecting criteria and needs identified by the Institution / Organization's view on itself and the inherent action and consequent construction and identity projection through a holistic and integrated vision of the SI-AP.

A unitary vision without distinctions based on the type of information, the information service or professional profile responsible for its management, which will have as consequence and need the specification of IM processes that reflect this positioning and the design of a set of "services" that allows its effectiveness (see Figure 1).

The MGSI-AP intervention model maintains as a guide the existence, at the *macro level*, of the IM dimensions of **diagnosis / analysis / specification** and **action / operationalization**, and, at the *micro level*, **six processes** that support, not necessarily sequentially, the info-communicational flow and to which are associated **eleven services**.

The focus of the analysis and action is on the info-communicational flow represented through the Einstein-Minkowski light cone (PINTO, 2015a:548), an alternative formulation to the life-cycle representation proposals or "*continuum*" (American, Canadian, Australian ...) which, from **the act of information production/creation**, covers retrospectively and prospectively fundamental processes for the management of info-communicational flows and whose characteristics are summarized briefly as follows:

- **P1** - IM institutional and organizational analysis and alignment (strategic, tactical and operational):
Organic-functional analysis; specification of processes and flows; identification, analysis and evaluation of informational needs and behaviors (at different levels: individual, collective, functional, scientific, ...); and Institutional/Organizational alignment of IM (at the strategic, tactical and operational levels), involving the definition of the IM Model [Policy], the selection of strategies and the setting of goals.
- **P2** - Platforms design, implementation, maintenance and review:
Design, implementation, maintenance and review of informational, technological, processes, services, collaborative and other platforms; analysis, definition and management of profiles, groups and users; elaboration / adaptation of the Modules [sub Policies] and orientations of the IM processes (P3 to P6), namely in the scope of procedures standardization, information appraisal and selection, media transfer and information reproduction, metadata structure and management, information preservation & security, access, communication and dissemination, information quality and service performance.
- **P3** - Transactional information production/creation (and iterations with SI-AP):
Production, creation, reception, acquisition, import, transfer and collection of information, including digitization / media transfer, automatic capture and extraction of information and metadata, preservation & security management (standardization of digitization formats, *checksums* and *time stamps* generation, authentication, ...);
- **P4** - Information processing and appraisal (transactional and within transactional / SI-AP iterations):
Metadata creation and maintenance; organization and representation of information (classification, description, authority control, ...); information appraisal and selection; flows *tracking* and quality control; information preservation & security management (formats standardization, *backups*, audit records and trails, ...);
- **P5** - Storage and preservation (with integration and maintenance in the SI-AP, as evidence, memory and strategic source):
Information selection, retention and destruction; storage (activation of sub-processes of archiving, deposit, physical control, registration and installation, submission and ingest to digital repositories, hosting in specialized platforms ...), physical and logical management (in traditional or digital media); as well as preservation and security management of stored information and activation of planned strategies (environmental control, media refresh, migration, ...);
- **P6** - Communication and use of SI-AP:

Access, communication and use: information dissemination, search and retrieval, management of corporate and collaborative portals and search/discovery tools, *online* community and collaborative platforms management, traditional edition and *online* content management, *newsletters*, communication of scientific production (portals and aggregators management, open access directories, *rankings* managers and bibliometric indicators, ...) export, import and collection of metadata and information, etc.

A set of eleven **services** that underlie the idea of action on a flow (not a cycle) where, when and how it is needed, are developed on these processes. Its implementation includes information services, collaborative work and the use of *web* services that apply to the information of the entire SI-AP, regardless of which organic unit it "belongs" to, the service that manages it, or the facet that you want to focus.

These services work but are not limited to the transformation of the functionalities related with the management of digital collections and objects and guaranteed by *specific archives*, libraries, museums and repositories software applications, in a set of services *web* which may operate in the production system (an university information system as SIGARRA or other), on centralized or distributed platforms, some of which may be externally contracted for specific tasks at specific times (e.g. format migration tasks or integrity tests of *checksums* to be held annually). This option does not invalidate that there may be other software resources and services to interoperate with these *web services*.

Considering the previous diagnosis, these services demonstrate the integrated vision developed on the SI-AP of the university:

- **S1** - User analysis, profiles and roles, groups and users management.
- **S2** - "Business" analysis, processes, requirements and info-communicational flows³.
- **S3** - Metadata creation and management⁴.
- **S4** - Intellectual property⁵, industrial property and knowledge / competencies management.
- **S5** - Scanning, recording and workflow management.
- **S6** - Appraisal, selection and disposal (preservation; retention; destruction).
- **S7** - Storing, hosting and repositories (incorporation / deposit / ingest and archive)⁶.
- **S8** - Search, retrieval, dissemination and discovering.
- **S9** - Exporting, importing and harvesting (Information and metadata).
- **S10** - Extension, Science communication and publishing⁷.
- **S11** - Preservation, security and data protection⁸.

³ Specification and management.

⁴ Any sort of metadata (descriptive, administrative, structural, technical, preservation...) within information organization, representation and description management (classification, description - inventory/catalog - ...), control of authority management (producing / authoring entities management, authority control and subject indexing management, thesauri, taxonomies, ...), etc.

⁵ Copyright and related rights.

⁶ Digital and non-digital storage, repositories management, storage of electronic publications, online journals hosting, development of repositories profiles or, at a stage of greater integration, of facets to be built on the repository, which at U.Porto would include: 1) the current open and thematic repositories (restructured according to the scientific areas defined by the U.Porto or according to a global dissemination referential); 2) administrative, educational and research organic units repositories, intra U.Porto or inter-institutions; 3) the aggregator portal/discovery service U.Porto (single point of entry); and 4) the possibility of U.Porto acting as a hosting provider of repositories resulting, for example, from partnerships to be established with the Community and agents external to the university, similar to the deposit and acquisition of non-digital collections of individuals and external entities to the U.Porto; ...

⁷ Traditional edition, creation and management of an integrated hosting system for scientific journals and open publishing platforms (e.g. the already used Open Journal Systems (OJS) platform) ...

⁸ Integrated approach throughout the info-communicational flow in alignment with the institution / Organization strategies and the IM and ITS policies involving physical infrastructures, bitstream and contents, i.e., the

These services are part of the proposed model as they reflect the IM role in a dynamic that will be set by each institution/organization in the face of the requests of the different contexts and environment in which it performs.

Comparing with other IM modelling initiatives, for example the *life-cycle model* (WILSON, 2002; GOODMAN, 1994, ...), here is presented a different theoretical, conceptual and representational position based on a systemic vision, the concepts of information and information system, assuming an integral flow, stressing the information creation / production stage within an IM considered through an IS perspective and its relationship to applied disciplines such as Archivistics, Librarianship, Documentation, Museology and intersciences such as Information Systems / IT.

With regard to the *continuum* model (UPWARD, 1996; MCKEMMISH, UPWARD and REED, 2009), this was used as a metaphor to respond to the challenges of digital document management, supporting the Upward *continuum* model variant in space-time thinking, namely using the idea of movement through space and time to overcome the static character of the documents / artifacts, and the term *spacetime distancing* as synonymous of archive.

These characteristics are listed here to show that the reporting element of the *continuum* is **memory**. *Recordkeeping* (function) being assumed as a "*form of witnessing and memory making, a particular way of evidencing and memorializing individual and collective lives*", i.e., as a continuous activity centered on the operations that aim at the creation of *records of continuing value (archives)*, with this objective at the center of the model ⁹and designing a "prenatal" stage¹⁰ which now encompasses the *design* of the information systems, but which evidences the existence of three types of professionals: computer scientists, *record managers* and *archivists*, who must ensure the capture and creation of *records* and avoid the loss of information in the subsystems providing for the continuity of the existence of the *archives* throughout the *spacetime continuum*¹¹.

As analyzed, these are models that announce a management from the creation to the selection (to destroy or transfer to an archive), differentiating itself by the rejection of the "custodial" mentality and the assumption of an *Archival Science* in a postmodern sense, as well as the collaboration between two professional profiles, *records manager* and *archivist*, and between these and the *systems designer*.

In the MGSi-AP, the parallel that can be established between the *dimensions* of the *continuum* model finds its reflection in the *IM processes*, valuing in our proposal, at the level of *dimensions*, the **scientific-informational** position of permanent **understanding / action**, i.e., the dimensions of **diagnosis / analysis** and **action**. A positioning that is projected at both the *investigative* and the *applied* level and which results in a distinct approach of IM in the context of IS and not of *Archival Science*, just as the model covers all information production be it under the management of an archive service, library service, museum, computer center or producing services (administrative, educational, research, ...).

These are different positionings for different models. This option also goes beyond the proposal, for example, of the 10 services of MoReq2010¹² which, although innovative in relation to previous versions, and useful (as other models and standards) is still very much in the domain of Document Management, being insufficient for an institution such as the University, in line with the analysis carried out to the

physical, logical, conceptual and essential dimensions of information units, whether digital or non-digital; EU GDPR implementation and control, ...

⁹ The key concept is that of *record / archival document* (conceptualized as recorded information resulting from transactions), involving *records of continuing value (archives)*.

¹⁰ It reminds us of the pre-archive phase, of French-speaking influence.

¹¹ In our view, the reduced character of the model is manifested in the starting concept (the *record / archival document*), the sequence "*record, archive and archives*" (transaction, memory of the entity, collective memory), the consequent enunciation of "recordkeeping processes" and "archiving processes", despite the assertion that they constitute a continuum, and the relations and dynamics of interactions that can not be confined to the refuge of interaction of an Archive with the Organization or between the evidence/proof and memory

¹² The System Service; the Users and Groups Service; the Profiles Service; the Classification Service; the Document Registration Service; the Meta-Information Service; the Selection and Disposal Service; the Retention Service; the Research Service; the Export Service.

information services that have structured themselves on it over the centuries and with the opportunities that the digital medium offers for its empowerment.

c) *Technological Systemic Component*

Technology is, then, the third **component of the model**. It is used in context and, therefore, causes and suffers impacts, being ICT inseparable from flows, actors and organizational behavior / culture, contributing to the structuring of the SI-AP and the People [and Competency Management] System, and casting here, on the level of the info-communicational phenomenon, the interaction of the human, social dimension with the technological dimension.

In addition to the *organizational* structure and the *informational* structure, it is therefore necessary to take into account the *technological* structure in its cross-sectional support function, also reflecting the **management levels** (strategic, tactical and operational / transactional) and the alignment with **processes and information flows**, both in digital and non-digital media.

Here is presented a simplified structure and distribution based on management levels and a *cross-sectional* level, which mirrors, but is not confined to, systems focused on this research:

- **N1** - Strategy Support:
 - Support for top management in terms of strategy, long-term trends, internal context and external contexts/environment, decision making and administrative support activities (including analytical activities / *Business Intelligence*);
- **N2** - Tactical Support:
 - Support to the intermediate / tactical management of the organization: support to planning, control and monitoring, decision making and administrative activities (Management, Quality and Performance data and applications);
- **N3** - Operational/Transactional Support:
 - Support to the operational management and development of basic and transactional activities in the organization.
 - *core functions*¹³:
 - Teaching (data, projects and *eLearning* applications)
 - Research (data, projects and *eLearning* applications)
 - Transfer of knowledge and Innovation (data, projects, contracts and applications of Science and Innovation Management)
 - Support/management functions:
 - Support areas: financial management; administrative management / services; human Resources; logistics (data and management applications) ...
- **N4** - Cross-sectional Support:
 - N4.1 - SI-AP (Organizational/Institutional Information System) Support
 - N4.2 - ITS (Information Technology Systems) Support
 - N4.3 - PMS (People [and Competency] Management Systems - Clusters / Practice Communities)
 - N4.4 - QPMS (Quality and Performance Management System) Support.

The option for a holistic view of the IM convene as essential, not only the traditional technological tools of *archive management*, *collections management*, *document management* and *content management*, but also emerging areas within Knowledge Management and that relate to PMS, namely the *competency management tools*¹⁴ and the "*knowledge maps*", *social networks* and *collaborative portals and systems (groupware)* that become vital for cross-cutting and information sharing which is

¹³ Considering University Mission.

¹⁴ Systems that, e.g., develop the so-called "knowledge maps" based on individuals' competencies, including profiles indicating the competences, capacities or areas of interest of each individual.

not confined to formal limits, whether organic, functional or otherwise, as well as the *tools to support innovation*, essential in the context of contemporary society.

With regard to IM specifically, the scope of action is not only distant from the "end of the line position" of the custodial paradigm (collect, organize and disseminate), but also from an unavoidable technological centralization, encompassing the entire info-communicational flow in a context that requires flexibility and speed, taking on a feature of multiplatform performance / aggregation, at the same level or between Institutional/Organizational system levels, with two scenarios that are likely to be imposed and which are already considered in MoReq2010: IM "in app" and IM "in place".

The IM "*in app*" is identified as the traditional architecture supported by a specific centralized management system that captures metadata and information from other business systems in a repository and metadata/digital objects manager controlled by IM.

The IM "*in place*" is developed in the "native" technology system (of information production / accumulation) and presents itself as an alternative that "does without" centralized control. The information is maintained in the "production" applications, being left to IM to control and develop the IM processes and services on the identified information "*in situ*" such as to retain for a certain period of time or to preserve in the long term, progressively transforming the "production system" into a system that accumulates the function of "production and management of information".

The required "loosely coupled" approach is reinforced by the option of web services, given the great flexibility of use and the reduction of software dependencies that they provide and that has made them a product capable of operating independently, as well as being used by different applications which require the same functionality, and the IM services should be thought of as a "service-oriented architecture", without, however, falling into the error of subsuming IM in IT Service Management.

This positioning is vital to sustain the service-oriented approach and thus to respond to complex contexts that require flexibility and escape the implicit linearity of a life cycle.

We consider in this reasoning the organizational and informational systemic whole, pointing to the inclusion of the SI-AP, without functional or management service delimitations (administrative, IT, library, archive, museum, ...), and its hybrid nature (digital and non-digital), without delimitations based on the storage media, the informational typology or other.

In line with the MGSI-AP model, one can build a **multifaceted aggregator portal**, of a **distributed base** (by organic unit: teaching, research, autonomous service, etc.) and with a centralized aggregator interface (*information discovery services*) with three facets, expandable, namely: **open** (the commonly designated *Institutional Repository*); the **thematic / by scientific area**; the **institutional / organizational**, and the option for a centralized basis at the SI-AP level is also possible.

d) People and Competencies Management

Finally, with the MGSI-AP, and at the level of the human and social dimension, **People [and Competencies] Management** is essential, considering the individual, the very first information media storage (the human brain) and the informal information production contexts, creating facilitators and mechanisms of **information / knowledge** sharing, recording (within SI-AP) and consequent innovation processes, at the level of the technological dimension.

It considers the competences, capacities and experience (scientific or technical) enhanced by communication and interaction within **Communities of Practice** (with or without structuring of working groups, "*task force*" or more specific), in turn aggregated in *Clusters* (structured according to the Organization's Mission).

This relationship is fundamental for the construction of a specialized and tendentially informal "virtual" collaborative network / platform that goes beyond the formal structure, providing the valorization of these skills and experiences both at the operational level and at the strategic level, promoting the sharing, learning and the generation of contributions, especially for IM services (e.g., for the design and management of a shared metadata and authority control framework and tools).

This is a path that opens up to enhance the information that exists in the "human storage medium / memory" creating conditions for the activation of social and info-communication processes on collaborative technological platforms in a feedback *continuum*.

5. CONCLUSION

The efficiency and effectiveness requirements of organizational performance and informational production, access and use in digital milieu are the main lever of an affirmation process of the IM, which, however, is still far from consensual.

The modeling of the MGSI-AP applied to the University of Porto, or MGSI-AP.UP, with the transversality of the processes that characterizes it and the orientation to the services they require, followed, in general terms, the exposed modeling and has left pointers to the analysis developed upstream around the theoretical basis and implementation of an hybrid SI-AP (digital and non-digital), stressing the three systemic components of the model, as well as downstream with the vector equation related to the structure of services / organic sectors required for an effective application of the model.

The implementation of the MGSI-AP.UP would, in fact, be made unfeasible if it were confined to the rigid linear hierarchical configuration with well-defined outlines in which traditional information services and emerging services such as INFOSYS / IT / IM are inserted. It is not possible to see that more recent organizational models, such as Shared Services, could be an answer in itself, since they do not clearly recognize the IM function, which is diluted, for example, in the very common INFOSYS / IT shared service. It is not a matter of creating a structure parallel to the one mentioned, even though it presents a more distributed and integrative tendency but will tend to be confined to organizational / functional segments or specific levels of management.

This model convenes an institutional engagement in a IM Policy intersecting INFOSYS / IT Policy, in a trans and interdisciplinary basis, crossing traditional and emerging information services and pointing to its effective implementation and, if interesting, the future certification of an organizational/institutional information management system. An incursion we leave for future opportunities.

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