ARTICLE REVIEW

FROM INFORMATION MANAGEMENT TO QUALITY: AN AUDIT PROCESS AND STANDARDIZATION FOR TAW COMPANY

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Introduction

The project that is presented took place within the curricular unit of The Final Project Seminar / Internship of the degree in Library and Information Science and Technologies (LIST) of ISCAP-P. Porto and was developed by a student finalist of this cycle of studies oriented by two faculty members and tutored by TAW staff. The project was developed at TAW, a micro-company focused on Information and Communication Technologies, seeking to associate best practices and technological solutions with all businesses. It is the Global Distributor of the platform called S2i, being specialized in its customization, project management and consulting in business processes (TAW, 2020).

The emergence and advancement of technologies, with emphasis on ICT (Information and Communication Technologies), Information Systems (IS), Quality Management Systems (QMS) and Information Science (IS), provide tools for organizations to be able to emerge in the market, and to manage, all the information and documentation that they generate and use, with the purpose of ensuring their quality through their standardization, organization according to normative processes.

The main objectives of the project are the promotion of Information Management (IM), processes, documents, projects and tasks in order to control and maintain all information documented, standardized and organized information, identifying and recording all events and documents considered relevant in the development of *software projects*. Thus, it is intended to contribute to the evaluation and certification process of TAW company and to prove, before future audits, compliance with the current regulations. The degree of freedom granted by TAW to the LIST internship student and project allowed a set of improvement proposals, namely the creation of Corrective Maintenance Forms and the preparation of the Quality Manual, carried out and completed.

Critical analysis of the problem

The identified problem, which originates the project, is the absence of IM procedures at TAW. Therefore, the main objectives are: the promotion of IM, processes, documents, projects and tasks in order to control and maintain all information documented, standardized and organized information, identifying and recording all events and documents considered relevant in the development of *software projects*.

All the work was based on literature review.

To solve the emerging need and problem of IM and documentation considered relevant for the development of software projects*,* and in order to achieve the objective of the project, it will be necessary to: a) execute a framework of the company and the S2i software to understand its functioning and deepen knowledge in this context; b) proceed to the process of selecting the most relevant information and functionalities and establish priorities; c) prepare Documentation Manuals and Use of Software with all the functionalities existing in each of the interfaces that constitute the Software of the Development area, in order to specify in detail each interface; d) group by modules the Documentation Manuals and software use and, in the system, organizing properly identified folders, promoting easy and fast access to all employees.

With regard to the problem of control and monitoring of projects and tasks, it will be necessary to: a) create Task Control Forms to record all tasks and events that will occur in the development of each project; b) participate in daily meetings with all project stakeholders, in order to control the evolution and updating of each and supervise the performance and work of

each team member; c) evaluate the time spent on each task; d) generate reports, using the database, that are important and accurate, dependent on the request of customers. Regarding standardization, it will be essential to fill out all forms and the improvement and creation of routes and classes in node.js to facilitate their location, update, and change, resulting in the time savings used to search for each interface since its source code will be represented in isolation. A Quality Manual was also proposed, which aims to present the company to stakeholders as well as its system and commitment to quality.

All proposed activities, with special emphasis on the creation of Documentation and SUM, task control and completion of forms consist of continuous activities that must be prepared and improved regularly to keep all the information and documentation updated and in coherence with the current situation of the company and the projects under development. Thus, it is essential to seek and implement improvements, as they contribute to and relate to characteristics that can define the quality of information and documentation. The project started on February 1st and expected to be fully completed on June 22nd of 2022.

Theoretical framework

The theoretical foundation focuses on the main themes of this project, namely IM information and document management, the most used and important archival standardization, information audit, quality management, relationship between archival standardization and quality management.

1. Information Management and Document Management

The theme under analysis makes it essential to identify and define some concepts, such as operational concepts that structure information and documents. The word information derives from the Latin *informatione* and refers to a communication process that aims to generate knowledge.This definition is in agreement with that defended by Capurro and Hjorland, who consider the word information in "two basic contexts […]: the act of shaping the mind and the act of communicating knowledge." (2007,p.155). In this sense, this concept is intrinsically related to communication. From the perspective of Information Science, it is defined as being "(...) a structured set of encoded mental and emotional representations (signs and symbols) and modeled with/by social interaction, capable of being recorded on any material support (paper, film, magnetic tape, CD, etc.) and, therefore, communicated asynchronously and multidirectionally." (Silva,2006,p.25).

In fact, information has existed since the dawn of humanity and has always been present through language techniques, but it is today that information is seen as an essential phenomenon, becoming a "growing need for any sector of human activity (…) indispensable even if the search is not ordered or systematic, but results only from case-by-case and/or intuitive decisions." (Braga,2000,p.1). Thus, and with the evolution and growth of the market, there is a need to correctly manage all available information, knowing how to use it and learning new ways of looking at the information resource, since no organization works without correct and organized information.

IM is increasingly relevant for a good performance of any organization, being a direct reflection of its management. Large amounts of information are involved in the business world, which, potentially, enhances its loss and consequently the difficulty in quickly and successfully access what is considered most relevant and useful IM encompasses "(…) dealing with, managing, finding practical solutions from the genesis to the multiplier effect of the flow of information, and comprises a diverse set of activities, namely: production, treatment, registration and storage, communication and use of information." (Silva,2006,p.148), that is, IM integrates interconnected and linked activities, both in traditional and in computer information systems, with the aim of supporting the operations, control and functions of the organization and also "(…) identify and enhance an organization's information resources, teaching it to learn and adapt to changes." (Tarapanoff,2006,p.22). In addition, it "groups organizational efforts related to value, cost, quality, origin, security, ownership, distribution, reliability, adequacy and relevance of information in support of the mission and objectives of a company." (Oliveira,2014,p.37). It is a process of extreme importance, mainly because it is responsible for managing internal and external resources to the organization, supported by organizational policies that allow the interrelationship between the units and sectors of the organization, being, for this, necessary to mobilize different resources, more specifically, people, information technologies, information sources and services with the purpose of maximizing resources to share information in the best possible way, support the organization's global policy, support decision-making, support the evolution of the organizational structure and make knowledge of the surrounding environment more efficient and reliable.

Information is increasingly a source of wealth for organizations but, this information must be recorded and structured in documents so that it can be used whenever necessary, giving rise to the concept of document "(…) any document produced, received and kept as evidence and information by an organization. or person, in the fulfillment of its legal obligations or in the conduct of its activities." (APDSI,2014,p.14).

To retrieve and use information, it is necessary to implement document management. This term corresponds to the translation of the term records management being defined in the Portuguese Law No. 8.159 of 1991 as "(...) the set of procedures and technical operations related to their production, processing, use, evaluation and archiving in current and intermediate stages, aiming at its elimination or collection for permanent storage.", that is, it concerns the techniques and procedures used to organize the documents necessary for the proper functioning and management of organizations. In addition, it can be understood as the "administrative process that allows analyzing and controlling, throughout its life cycle, the recorded information that is produced, received, maintained or used in an organization, in line with its mission, objectives and operations." (Moreno,2008, as cited in Sena,2014,p.6).

For all the activities related to document management to be carried out in an efficient, consolidated, and organized way, it is necessary to develop support instruments, the so-called document management instruments, which refer to "documents or tools that are used in the course of an archival procedure or activity." (Pereira,2012,p.33), in which, according to the Portuguese Standard NP 4438:2, the main instruments used are the Classification Plan based on the organization's activities, the Archival Conservation Regulation and the security and access classification scheme (2005,p.15) giving main emphasis to the Classification Plan. However, the Portuguese General Directorate of the Book, Archives and Libraries, still stresses the importance of the Selection Table as a document management tool.

Related to this theme, from a technological perspective, the term IS – Information Systems – emerges, constitutes an "(…) operation unit that encompasses all the computer subsystems existing in the company for the most diverse purposes, and the functions that, in some way, are related to the treatment of information (...)." (Oliveira,2014,p.38). In this context, the importance of using digitalization arises, defined as the "(…) phenomenon of transforming analog data into digital language, which in turn can improve commercial relations between customers and companies, adding value to the entire economy and society as a whole." (Souza,2021,p.17). According to Santos and Miranda (2019), this process includes steps such as document reception, verification, preparation, capture, indexing, quality control/inspection/audit, reconstitution and return of the document and has advantages such as ease of access, reduction of unnecessary expenses, optimization of time, reduction of paper waste, increase of physical space and reduction of document loss.

For the Portuguese Association for the Promotion and Development of the Information Society (APDSI), document management presents as main objectives: the management of the entire life cycle of documents, covering all activities related to all moments of their management; the guarantee of efficiency and quality and their recovery as quickly as possible, ensuring that the recovery of documents is carried out in the most immediate and intuitive way and also the certification that the evaluation and selection of the documentation are carried out correctly and in a relevant way. to preserve the memory of the organization and all documentation with long-term administrative value (2014,p.13). So, document management should be considered a priority for organizations, as their management and decision-making are largely based on the quality and transparency of existing information accessible to all.

2. Archival Normalization

"At national and international level, there are standards that cover areas such as Information and Documentation: Management of archival documents, which are divided into direct principles, recommendations and general guidelines to be followed." (Montenegro,2017,p.16), that is, the good management of information and documents is guided by a set of norms - the archival norms - that aim to guarantee the ability to properly use information and documents, rationalizing investments necessary, without prejudice to the quality requirements, essential in the archive.

The ISO 30300 series of standards, a management system for archival documents, "(…) supposes the alignment of document techniques and processes with the methodology of management systems." (Ruesta,2012,p.6) and appears with the aim of integrating with other document management systems, allowing their interoperability, auditing, and certification. They can be implemented in any type of organization, since they all produce documentation in the development of their activities and have a very close relationship with other standards for the management of document records, particularly with those that were drafted by the ISO

Technical Subcommittee, called Archive/Records Management, whose coordination group is responsible for ensuring the consistency of all published standards.

From these, other standards have been developed that address different aspects of control and document management processes, highlighting: **ISO 15489**- *Information and Documentation - Records management*, transposed in 2005 to the quality system Portuguese (NP 4438:2005); **ISO 16175** - Information and documentation-Principles and functional requirements for records in electronic office environments.

The use of these standards enables to "monetize processes such as storage, recovery and re-use [and] prepares the organization for any litigation or investigation by providing tools for carrying out such due diligence." (Duque,2021,p.42), facilitating the audit, evaluation, and crediting process.

3. Information Audit and Quality Management

With the growth of information and documentation and the recognition of the importance of its management and organization, there is a need to deepen the functions of their control and monitoring regarding the valorization, quality, development and proper functioning of any organization.

In this sense, the importance of audits arises as they correspond to the systematic, independent and documented process to obtain audit evidence (set of policies, procedures or requirements used as a reference against which audit evidence is compared) and respective objective assessment, with a view to determining the extent to which the audit criteria (a set of audit criteria requirements used as a benchmark against which objective evidence is compared) are satisfied (ISO 19011,2018,p.11). That is, it is the independent and documented process to obtain evidence and its evaluation, and to determine if the procedures, requirements or policies used are satisfied in the management of the organization, with the objective of evaluating its efficiency and effectiveness, and must, therefore, be performed by a technically prepared person – the auditor.

There are several areas to which an audit can be applied but we highlight in the words of Carneiro (2004,p.57) "information – the audit will focus on the organization of information systems, security and information flows".

In the context of the project, the importance of information auditing was highlighted because "regardless of the size of a given organization, its nature or its activity, the production of information is an integral part of its activity and allows for good management and continuity of your business." (Duque,2021,p.17) and how an audit is the "incorporation of information about a particular object, with the aim of making a deep review of the functioning or behavior of the object under analysis." (Ponjuán Dante,2008,p.6), then, "(...) obtaining information, its validity, its organization, systematization and analysis are phases or steps that occur throughout the audit process." (Ibidem,p.7), becoming indispensable tools for the good management of information and documents in organizations.

We look at information audit as a "systematic review of the use of information, resources and flows, with verification and reference to existing people and documents, in order to establish the extent to which they contribute to the achievement of organizational objectives." (Duque,2021, p.28), focusing on analyzing the information cycle and identifying user needs, assessing how effectively they are met, with the aim of making IS more effective and efficient. In other words, it is the process of "(…) discovering, monitoring and evaluating an organization's information resources to program, maintain and improve an organization's information management." (Dante,2008,p.9), being something essential to determine the value, the environment, the quality, the function and the usefulness of the existing information resources and to use them strategically, to identify errors and duplications and to facilitate the mapping of the flows of information.

The information audit goes through a set of seven phases and, according to Orna (2002, as cited in Pestana,2014,p.51), it evaluates the information that the organization has, the resources it has to make the information accessible, the way the organization uses the information to promote its ends, the people involved in using the information, the technical means that are used to work with information, and the criteria used in the organization to determine the cost and value of the information.

Nowadays "quality is an absolute necessity for organizations. It always has been and continues to be more and more as competition increases, the complexity of the world increases and change accelerates." (Costa & Silva, 2021,p.19). In this context, quality management and control emerge as an "important tool because it recognizes people's needs and sets standards to meet those needs, aims to maintain standards that meet needs and also aims to (continuously) improve standards." (Campos, 1999, as cited in Ferreira et al., 2016, p. 50).

Thus, quality becomes an element of great importance for the organization that intends to survive in the current competitive market (Ferreira et al., 2016 p.51).

In general, the term quality management refers to the set of techniques developed by organizations in order to properly train, motivate and compensate employees and also define, administer, establish and manage criteria and indicators to meet customer expectations, thus focusing on three basic principles: "focus on the customer and other stakeholders, involvement of all workers in achieving organizational goals, organizational action structured by processes and adoption of a scientific practice in knowledge management." (António et al., 2019,p.158). In addition to these principles, the ISO 9001 standard also adds leadership, relationship management, improvement and evidence-based decision making (2015, p. 8). Management is based on four activities that constitute the Deming cycle or PDCA cycle (Plan, Do, Check and Act) to "(…) ensure that its processes are endowed with with adequate and properly managed resources and that opportunities for improvement are determined and implemented." Pinto, 2017, p.7). This process of continuous improvement is applied in Quality Management Systems (QMS) that allow "to lead an organization to analyze the requirements (or needs) of the customer, define the processes that contribute to obtaining a product and keep these processes under control." (Leitão, 2010,p.108).

Thus, in the context of standardizing and "guiding the implementation of quality management systems in organizations, regardless of their sector, type or size (…)" (Pinto,2017, p.3), ISO published a series (ISO 9000) four standards for quality management. Throughout the project, the main standard used as a reference in all activities was the ISO 9001:2015 standard, as it provides organizations with a generalized model with the requirements for a QMS and is the standard most requested by organizations that intend to develop a process of quality certification that is the case in question, obtaining recognition derived from compliance with the requirements of the standard with an international impact.

4. The relationship between archival standardization and quality management

According to Silva, standardization essentially involves the rationalization of documentary circuits, administrative processes and procedures and, more recently, standardization and forms (2008, p. 9), being one of the most important forms, the Corrective Maintenance Form, which consists of the "correction of errors detected in the normal functioning of the system and that result from an evident failure in its implementation [being] this type of support, as a rule, provided by the elements that were part of the implementation team ." (Palhoto, 2016, p. 200) and also the Task Control Form, which is a way of "ensuring a correct perception of the current state of an iteration [being] essential that each team member manages the tasks for which is responsible." (Ibid., p. 126) and it should be done at the end of the working day and as soon as the task is completed with the objective of ensuring that the entire team is aware of the project, the tasks actually completed and carried out, the time spent in each task and the person responsible for each one. These forms are grouped in manuals, the so-called Form Manuals. This rationalization of forms favors the quality of documentary production and information that circulates in the company and that must be archived (Leitão,2010).

The same happens with the control of the procedure, where "(…) all the steps to be carried out in each phase of the processes, responses, decisions and transactions are defined and, consequently, recording, for each action, the expected execution dates and those actually fulfilled." (Leitão, 2010,p.11). Document control means that the organization knows all the documents that are part of the system, their status and makes it possible to ensure that customers have all the documentation they need at their disposal in the version more correct and updated (Antunes, 2011). It is also essential to control records, "documents that prove the performance of activities being produced by the performers of each activity. It is also the performers of each activity who are responsible for organizing them." (Antunes, 2011,p.89) according to archival regulations, making it essential for organizations to establish "(…) a documented procedure to define the controls necessary for the identification, storage, protection, retrieval, retention and destination of records." (Idem). So, "(…) the implementation of a quality management system requires an integrated articulation with the archival or document management system." (Leitão, 2010,p.114). The QMS will be more effective when it is articulated with the archive or information and documentation management policy, since it is based on documentation requirements, which requires a process approach.

Project Results

The first phase consisted of creating Documentation and Software Usage Manuals (SUM), related to a company's project, with a step-by-step explanation of all the functionalities of each module and each constituent interface. For the creation of each of the manuals, the

word processor Microsoft Word was used with the objective of being a means of easy editing and updating, starting with the elaboration of a demonstrative cover image of the referring interface, through the image manipulation and editing program. Paint.NET and the Paint3D application, and then the step-by-step demonstration of all possible features with a short explanation, representative prints and routes. Furthermore, at the end of each manual, the DER (Entity Relationship Diagram) was displayed, prepared in Microsoft Visio, with the help of existing tables, as well as the corresponding UML (Unified Modeling Language), also prepared in Microsoft Visio to facilitate the reading and interpretation of the functionalities and actions possible to perform in each interface.

43 Documentation and SUM were created and organized by folders of the 3 existing modules, with each interface folder consisting of the respective complete manual, corresponding DER, and UML, saved independently to facilitate their editing whenever necessary.

Some errors were found so it was suggested to prepare a Corrective Maintenance Form to identify, record, organize and describe all errors, omissions, failures, or problems associated with its operation or deformation for future correction and resolution. The form was created in Microsoft Word processor with two large sections: Identification, with the record of who verifies and notes the problems or errors found, with the obligation to fill in the fields referring to the User, Responsible and Date of Last Modification; Evolution, where the found error is registered and located and a solution is proposed, being necessary to fill in the fields referring to Element, Module, Interface, Description, Solution and Status. At the end, a legend was presented to facilitate the identification of the elements, establishing a code for each of the elements considered relevant, in order to standardize the vocabulary and terms existing in the organization and in the project.

The next phase consisted of structuring and creating a uniform and common Task Control Form for all team members, in Microsoft Word, with the aim of controlling all the tasks performed in each of the projects and understanding how and by whom was performed, as well as the time spent on each of the tasks. The form was prepared according to a set of pre-defined requirements by the tutor that included mandatory parameters, namely: Identification data; Data of the task to be performed; Task evolution.

Data reports and requested information reports were also created through jsreport (report server that allows generating reports through JavaScript modeling mechanisms), essentially in pdf format. For this, the existing source code was used, only making changes to the data intended to be presented in the report and filling in the fields referring to each topic to be presented, according to the client's needs.

The next task focused on the software's programming, namely in the elaboration of routes and classes in node.js (JavaScript interpreter used in database applications) in SQL database (Structured Query Language, it is the standard language used to work with the databases). Using node.js, the data from the database was added to the programming so that an easy and cohesive connection could occur, and, on the final site, the tables of the MySQL database would appear interconnected. This entire process was carried out in the Visual Studio Code source code editor and consisted of an improvement of the existing code prepared by the tutor as a way to standardize the code and make it easier to read, always following the same scheme and giving rise to the routes, and also in the creation of independent classes for each one of the interfaces.

A Quality Manual was written using Microsoft Word and consisted of the specification for the company's quality management system. This document is no longer mandatory in the latest version of the ISO 9001:2015 standard, but it was considered relevant for the company's quality certification, because it allows its presentation to interested parties.

Conclusions

The development of projects during the LIST curricular internship aims to provide the student with tools that enhance theoretical knowledge at the level of professional practices, promoting the practical application and in a professional context of the knowledge obtained during the degree. It also made it possible to improve skills such as communication, perseverance, critical and team spirit and resilience, and essentially emphasize the importance of information and information and communication technologies in the organization and quality of information and documentation as they are means of facilitating the entire management. The work was based on the theory related to information management and document management, archival standards, information auditing, quality management, relationship between archival standards and quality management.

Companies that survive in the information economy are those that use and integrate technologies and information resources strategically to develop new products, find new markets and stand out in a positive and creative way. Thus, information is increasingly valued because it is in its content that the true knowledge that feeds society and the world in general can be found by allowing technological, scientific advancement and the sharing of ideas, giving more and more importance to its relevance and quality.

The focal point of the project was the organization and management of information and documentation, in order to standardize the work processes, archiving, classification, retrieval and approval of information in a structured and centralized way, avoiding waste of time and information leakage and highlighting its quality. In addition, the importance of controlling projects, records and documents was also highlighted, as no organization works without documents, whether in physical or electronic format, and if there is no strict and recorded control of all documentation, companies end up losing the domain and the notion of what is really happening within the business environment and, thus, going backwards and not keeping up with the existing competitiveness. Regarding the forms, it would be extremely important to keep records, updates, and improvements to present.

As future work, the implementation and use of robotic process automation is recommended, since it allows replacing human tasks considered monotonous, routine, and repetitive, assuming a role of assistance to this type of tasks.

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