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The Governance of Data, Information and Knowledge, in the Digital age

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ABSTRACT: In the contemporary organizational context, the sharing and transfer of knowledge play a significant role and, therefore, it is important to overcome internal and external barriers for them to be processed. What can be facilitated by the implementation of The Governance of Data, Information and Knowledge (GovDIC), an emerging interdisciplinary approach that crosses the fields of Information Sciences, Business Sciences and Human Resources Sciences. The Governance do the problem is that, in addition to being a new construct and still little studied, conceptual divergences are fed by the amplitude the possible dimensions of analysis. In this context, the objective of this study arises in identifying the conceptualization of the construct Governance of Data, Information and Knowledge proposed in the scientific literature to support its better understanding and perspective of future investigations. A theoretical research was conducted through a systematic literature review, followed by an analysis of the most relevant publications on the subject. The discussion on the relevant GovDIC construct is considered in the context of contemporary organizations, however, it signals the importance of future empirical and theoretical studies,, to foster discussions, on the subject today.

KEYWORDS: Corporative Governance; Data Governance, Information Governance, Knowledge Governance, ICT Governance. Data, Information and Knowledge Governance in the Digital Age

I. THEME AND SEARCH PROBLEM

"Governance" is a well-known term in the business world. It has focused mainly on the role of management in representing and defending the interests of shareholders. The fundamental role of governance is to monitor and control the behavior of managers, who are hired to preside over the day-to-day functioning of organizations. Perhaps the best- known use is at the corporate level: "corporate governance", such as the set of processes, customs, policies, laws that affect the way the corporation/company is run, managed, or controlled. Corporate governance also includes the relationships between the stakeholders involved and the objectives for the company. The main stakeholders are shareholders, employees, suppliers, customers, banks and other creditors, regulators, and the community. In the world of ICT's, the term "ICT governance" is well defined and is known, Weill and Ross, (2004). It is a discipline of the subset of corporate governance focused on information and communication technologies, their performance and risk management. The growing interest in ICT governance is partly due to compliance (quality) initiatives as well as the recognition that ICT is a resource of increasing importance in products, services and in the implementation and optimization of processes. It consists of "organizational structures and processes that ensure that ICT's support the strategy of organizations and their objectives, Governance Institute, (2003). ICT governance is therefore an instrument of the alignment of ICT's with the business, according to Hirschheim and Sabherwal, (2001).

Therefore, the proper use of information (and not only its production) is of vital importance and therefore adequately a candidate for governance. We believe (it is our premise) that organizations that have an implemented process of information governance are more effective in identifying sources, collecting, processing, and using information and increasingly creating value for other sources of information. Information governance involves defining the global and immediate or transactional environment, identifying new opportunities, rules and decision-making power for the evaluation, creation, collection, analysis, distribution, storage, use and control of information, which answers the question:

"What is the information that managers need for support in decision making, how they make use of it and who is responsible for it?"

Research into current practice reveals that in many organizations, if not all, a comprehensive information governance policy, Economist Intelligence Unit, (2008), especially for external and free information, and often the policies and processes they have, are not effective.

II. INTRODUCTION

Data, information, and knowledge are valuable organizational assets and therefore must be managed to maximize their value. Governance and management are complementary functions; in the public sector, governance is a response of the State to the external environment, based on the various interactions between public and private actors that influence or are influenced by the activities of public institutions, taking into account the
social, political and legal arrangements that structure relations between government institutions and their public.
Governance defines mechanisms to ensure good management, with an emphasis on strait participation, transparency, integrity, and accountability (2006). One of the mechanisms of governance is the implementation of policies, which are formal instruments where the principles to be adopted are defined, as well as the guidelines, responsibilities and how the organizational structure will conduct and monitor Ladley governance, (2012); Stumpf, (2016).
From a scientific perspective, public research, development and innovation (R&I) institutions have strived to find new ways to manage the data, information and knowledge generated in their internal activities, in research networks, in interinstitutional relations and in interactions with society in general. This effort aims to ensure the proper management and preservation of these assets, especially research data, to achieve sustainability and competitiveness in the modern scientific and technological system.
Data, information, and knowledge management has become a major challenge for these institutions, as the global information environment moves towards new phenomena, paradigms, and movements, such as Big Data, e-Science, Open Government and Open Science.
Big Data is defined as the set of "informational assets of great volume, variety and speed, which require innovative formats of adequate cost and benefit for data processing, enabling knowledge and decision-making" (Gartner, 2015). In addition to volume, variety and speed, the phenomenon is also dedicated to the veracity and value of the data, Mcafee; Brynjolfsson, (2012); Kitchin, (2013).
About value, research institutions generate large volume of data, which are underutilized, little explored or even lost. E-Science – data-intensive science – is the new paradigm of science that is based on the exploration of large amounts of data that are generated throughout research projects and activities, collaborative research and the use of shared resources for data exploration, Appel, (2014); Borgman, (2007); Gray, (2009). In e- Science, efficient and effective management of search data throughout the life clickis one of the key points for accessing, using, and sharing this data.
Open Science encourages science and technology institutions to make available to society the scientific data resulting from publicly funded research projects. The concept of Open Science is still under construction, according to Albagli (2015, p. 14). The movement reflects "new ways of thinking and exercising scientific, with direct repercussions on the commitments, norms and institutional frameworks that directly interfere in scientific practice and in its relations with society".
This movement benefits the increase in the efficiency and effectiveness of the research system, as it reduces duplication and creation costs, through the transfer and reuse of data, accelerating the process of further investigations from the same data and multiplying opportunities for national and global participation in the research process. Open Science is therefore a new way of generating knowledge to address global challenges and promote citizens' participation in science.
Open Government is a new vision of public administration that has as principles transparency, accountability and accountability, citizen participation, technology, and innovation. One of the main benefits of open government is transparency and social control, based on the provision of public data, to monitor and benefit from the opportunities of the digital economy and strengthen the new global scientific paradigm.

a. Goals

This article aims to reflect on the process of construction of the Data, Information and Knowledge Governance Policy, based on the aggregation of existing literature. The first steps were taken in defining such policies and processes from a compliance perspective, Donaldson, and Walker, (2004), in a more exploratory way. To this end, first reflect on the inadequacy of ICT governance,, in dealing with the decisive role of information, in organizations.
And the value of information is used, and aspects of governance are discussed to optimize the use of information. We continue with a discussion on the aspects of governance and the various mechanisms that have been explored so far. We conclude with clues for further investigations of data governance, information, and knowledge. This research is, by definition, a full and unconditional attempt to combine rigor (academically speaking) and relevance (from the point of view of practice). The governance of Data, Information and Knowledge is "strictly relevant" in both theory and practice.

b. Focus and Approach Methodology

As for its nature, the research is qualitative since it does not claim to quantify events or privilege the statistical study. Its focus is on obtaining descriptive data, i.e., the incidence of topics of interest in two fields, the

Information Sciences, and the Business Sciences. Consequently, with regard to the extremities, the research is exploratory in nature and descriptive in nature, to the extent that the technique used is categorized, consensually, as a study of direct documentation, which provides for the consultation of sources related to the study in different media, printed or electronic.

The complexity and turbulence of the information and knowledge society have led to consideration of interdisciplinarity and transdisciplinary as essential processes for the development and innovation of science and technology. The implementation of these concepts in some areas faces challenges that go not only through the polysemy of these concepts itself, but also by the hardened views departing from the disciplinary formation and tradition itself, still dominant.

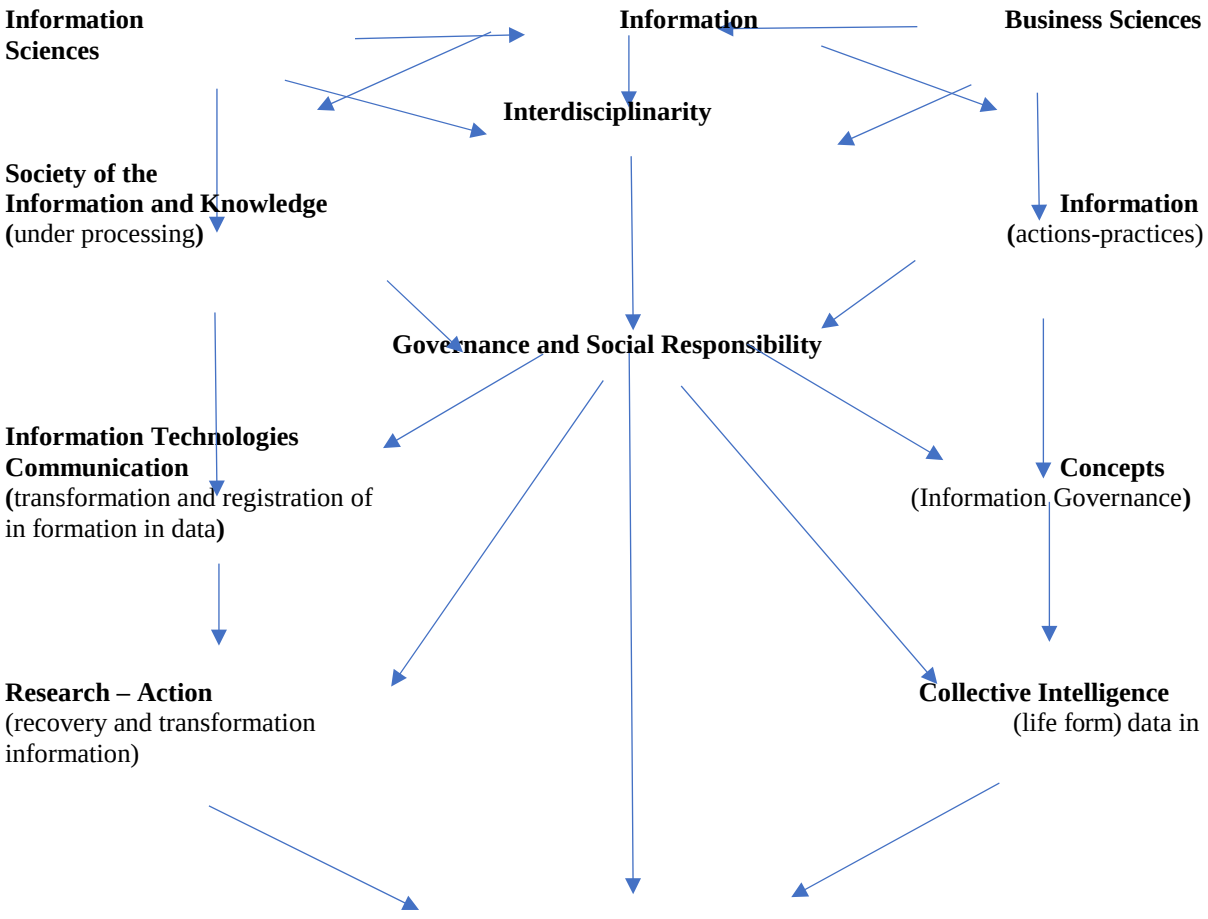
The research method is likely to cause two or more sciences to interact with each other. This interaction can go from simple communication of ideas to the mutual integration of concepts, epistemology, terminology, methodology, procedures, data, and research organization.

This is an exploratory study that seeks to clarify and organize the concepts presented in the literature of Information Sciences and Business Sciences. It is not a proposal of new terms and concepts, but an organization that allows identifying a common denominator,, among the different concepts already indicated in the literature, so that it allows its grouping by identity, application / use and pertinence / aggregation of value in the context, in which the terms are inserted. Data collection is characterized by bibliographical research on terms and concepts.

It is necessary to understand, through a theoretical review of the concepts, through the historical reference documents; of a psychosocial analysis of the concepts of Data Governance, Information and Knowledge applied to Information Sciences and Business Sciences;the normative framework in which they fall; the Internet as a platform for the exercise of political action and the problems associated with it; digital data, citizen surveillance; social engineering of Power; online social networks and spaces of trust and conflict.

It is a descriptive and analytical approach seeking to know and analyze existing cultural and/or scientific contributions on this subject, from the review of existing literature. The research was structured based on the systemic approach to understanding the problems of Data, Information and Knowledge Governance in this Complex and Turbulent Society. Governa We represent this conceptual network, as follows:

Figure 1 - Data, Information and Knowledge Governance Model Scientific Field



Source: own elaboration

It presents the model of approach to intervention in information e a actions,, in the academic space,, with the purpose of production and information sharing, and knowledge, among the participants, besides and promote the development of skills of search, recovery, organization, appropriation, production and dissemination of information relevant to scientific researchers, managers and other interest groups, in society.

Fundamental Concepts

c. Data, Information and Knowledge

Information is not the same as data, although the two words are often confused, so it is understood that the subtle distinction between these concepts is essential. The data do not convey sense or meaning of the facts, images, or sounds, since they lack relational elements essential to the establishment of a complete meaning, lacking an internal relational structure for a cognitive purpose.

This structure is one of the attributes of the information. Data is transformed into information when its creator adds meaning to it Davenport and Prusak, (1998). Wiliam

G. Zikmund (2000, p.19) defines knowledge as "the mixture of information, experience and understanding that provide a structure that can be applied in the evaluation of new information or new situations". Information "feeds" knowledge. Knowledge can thus be defined as a person's ability to relate complex information structures to a new context.

New contexts imply change, action, and dynamism. Knowledge cannot be shared, although the technique and components of information can be shared. When a person internalizes information to the point that he can use it, we call it knowledge Zikmund, (2000). This is a fluid mix of experiences, values, contextual information, and expert judgment, structured that provide a framework for evaluating and incorporating new experiences and information. Organizations are found not only in documents and reports, but also in organization routines, processes, practices and standards.

Knowledge has its origin and is applied in the minds of connoisseurs Davenport and Prusak, (1998), William Zikmund, (2000). Knowledge is information as valid and accepted, integrating data, acts, information and sometimes hypotheses. Knowledge needs someone to filter, combine and interpret information. Information can be considered as a "substance" that can be acquired, stored, and owned by a person or group and transmitted from person to person or from group to group.

Information has a certain stability and it may be better viewed as existing at the level of society Davenport and Prusak, (1998). Although we can store it using various physical supports, the information itself is not physical, but rather abstract and neither purely mental. Knowledge is stored in people's memory, but information is out there in the world. Whatever it is, there is somewhere between the physical world around people and the mental of human thought.

Knowledge = Internalized information + ability to use it in new situations.

Knowledge is found fundamentally and intrinsically within people. These are more complex and unpredictable at the individual level than an entire society, so it is not surprising that knowledge is much more difficult to obtain than information. Knowledge exists mainly within people; it is an integral part of human complexity and unpredictability.

Knowledge has a fundamental duality: it is something storable (at least sometimes we intend to do it) and something that flows (something that communicates from person to person). It is possibly the duality of knowledge (something that flows and storage process) that makes its treatment and management difficult. According to Dahlberg (2006), knowledge is organized into units of knowledge (concepts) according to its characteristics (objects / subjects / subjects). The organization of knowledge is related to a process of conceptual analysis of a domain of knowledge and from there, it is structured / architectedgenerating a representation of knowledge about that domain that will be used for the organization of information about that domain of knowledge.

Matrix - 1 Data, Knowledge, and Information.

Given	Information	Knowledge
Simple observations on the state of the world: • easily structured. • easily obtained by machines. • often quantified. • easily transferable	Data with relevance and purpose: • requires unit of analysis. • requires consensus on meaning. • necessarily requires human mediation.	Valuable information from the human mind. Includes reflection, synthesis, context. • difficult to structure. • difficult to capture on machines. • often tacit. • difficult to transfer.

Source: Davenport, 1998.

Data, information and knowledge should be seen and analyzed from the continuing perspective of values and fundamentally marked by the growing human contribution – processing, management, action, result, learning and feedback, that is, human empowerment for actions that generate the desired results at the organizational level

Matrix - 2 - Data, Information, Knowledge, Actions / Results

	Data Processing	**Information Management**	**Knowledge Management**	**Stocks/Results**
Activities	• Data capture • Data definition • Data Storage • Data Modeling.	• Information Needs • Acquisition of information • Information Organization • Distribution of Information	• Knowledge Creation • Sharing of Knowledge • Use of Knowledge	• Strategies, alliances and initiatives • Products and Services • Processes • Systems • Structures • Values
Values	• Precision • Efficiency	• Access • Relevance	• Enables action • Value generation	• Innovation • Learning
	"Once we have the data, we can analyze it"	"Bringing the right information to the right person"	"If only we knew what we know"	The ability to learn is the only sustainable advantage"

Source: Adapted from Choo, (2002, p.258).

d. ***Information and Communication Technologies (ICT's)*** Information and Communication Technologies (also known by the acronym TIC's), are an area of knowledge that uses computing to produce, transmit, store, access and use various data. Because Information, and Communication Technologies can cover and be used in various contexts, their definition can be quite complex and broad. However, it is used **to process the data,** helping the user to achieve a certain goal. **Information and Communication Technologies can** be divided according to the following areas**::**

- Programming.
- Database.
- Technical support.
- Data security.
- Tests.

A professional can work in the any **areas of Information and Communication Technologies.** Among them, programming, database, technical support, data security and quality tests.

Security Analysts work primarily **to maintain and improve the data security of a company / institution**, whether public or private, creating "barriers" that safeguard the security of equipment and data. In addition to working with operating systems and company/organization servers, it avoids intrusion attempts. In the event of an invasion of the data, these professionals are also responsible for combating threats and developing more efficient ways so that it does not occur again.

Technical support is guaranteed by professionals who **work** in the maintenance ***of hardware*** (physical equipment), working in the repair of computers, problems with access to operating systems and / or applications (**software),**among other issues that appear in the daily life of a company /organization. To work in this area, it is necessary to understand the technical part of the architecture of computers.

The professionals of the programming area can work in several fields because this is one of the most comprehensive areas of information and communication technologies and, which is more subdivided into other areas. This is because **there are several programming** languages, and professionals can focus on only one. There is, for example, programming for database, for *web*, mobile and even games. Usually an ICT professional who chooses an area of programming, seeks to specialize even more in this programming language.

Quality professionals work in the verification and analysis of *software and applications* before they even reach the market or the end customer of a company / organization. The professional who works with quality tests does the verification of the **usability of an** application or software ***to*** know if its operation is, as promised or with what the company
/ organization expects and do.

Network Administrators are the professionals who are responsible for managing all communication networks that exist within a company/organization, be it their computers or other equipment, such as printers and the like. It is one of the areas of ICT's that requires *technical knowledge of hardware and software (base)*, since these professionals deal daily with the infrastructure of the company / organization, the installation and maintenance of the technological systems of the local network. Therefore, generally the professional in this area has a lot of experience in ICT's in general, understanding a little programming, technical support and database to perform its function effectively.

e. Governance

In 2001, Anna Grandori published an article titled "Neither hierarchy nor identity: Knowledge-governance mechanisms and the theory of the firm" in the Journal of Management and Governance. In this article, the author rescues the term that coined and deepens her studies on principles and mechanisms of intra, and inter-organizations knowledge by presenting different cases related to knowledge transfer. On the principles, Grandori (2001) cites that, governance (Gov) must be continuous, in addition to seeking to balance and combine the organization's systems.

As for the mechanisms, the author believes that the mechanisms of Gov can be evaluated based on two criteria: the first focused on the cognitive possibility of sustaining certain exchanges of knowledge, and the second, consists of the costs attributed to the mechanisms, especially in cases where more than one is applicable. That is, skills and structures for the sharing and transfer of knowledge, as well as the costs for this to occur.

f. Data Governance

Data governance is a management method used by companies, based on the digital information (data) captured. Software and technological solutions are responsible for capturing data and allow managers to obtain relevant information about the performance of organizations and the direction of their product and /or service to the correct niche market.

However, to deal efficiently with the information generated, it is necessary to have a data governance that aims at structuring, organization, and use. The management model involves company policies, production processes, human resources and, of course, the use of technologies. Data governance describes:

- Who acts with data?
- At what point?
- Using what methods?
- Under what circumstances?

In addition to enabling a better decision-making process, investor information protection, more efficient processes, cost reduction and transparency, data governance can be implemented from agile methodologies.

The implementation of data governance assists the organization in managing insights, promotes less resource utilization, enabling greater productivity of ITC's teams, and strengthening the security of intellectual property. Data reaches organizations from a variety of sources: internet, mobile devices, internal network, transaction systems, operating software, smart meters, inbound and outbound processes, points of contact with stakeholders, among numerous other forms. For all this to be protected, organized, and used in the best possible way by everyone, it is necessary to make a well planned and executed management.

Data management is a discipline that aims to manage and watch over organizations' data, treating it as a valuable resource, so that information can be transformed into business value. For this, data management uses processes, professionals, methodologies, and tools.

Today, in the context of digital transformation, intelligent information management becomes even more important. As organizations are increasingly driven by digital processes, the amount of data grows exponentially. It has never been easier to capture market information, but on the other hand, it has never been more crucial to protect it. Today, data security is a priority..

In addition, companies that fail to organize their large amounts of information end up spending unnecessarily on storage. They also tend to bear extra expenses with compliance and human resources — the time spent searching for information, managing processes, and fulfilling tasks increases dramatically. However, more than all of this, data management is a foundation of Digital Transformation. As we know, it goes far beyond technology: it is directly linked to organizational culture and operations.

Therefore, this discipline is shown to be the key to the success of this change. What an organization does with its most important information will determine its ability to achieve the results of innovation, productivity, and growth.

g. Information Governance

Todefine information governance as a logical alternative, with emphasis on the use of information and not only on its production (systems). Information governance is not a new term, but the proposal for definition in this

article is different from the approach in the existing literature. Information governance was introduced scientifically by Donaldson and Walker, (2004) as a framework to support the work in the National Health Service on the security and confidentiality of information, at various levels, in electronic information services. A report was published by the Economist Intelligence Unit (EIU, 2008) on the use of information governance in companies. Information governance in these approaches generally includes record management, privacy regulation, information security, data and ownership flows, and information lifecycle management.

The explorations so far point to the possible trap of relying on age principles by introducing a hierarchical control framework, without exploring the possibilities of alternative governance approaches. Let us explore a broader view of information governance as a basis for future investigations. Like the previous points, we divided our approach into one part "information" and another "governance".

The information has unique characteristics, which make it difficult to evaluate. But regardless of its content (financial, commercial information, etc.), the generic principles of understanding the value of information can be defined.

Information is a production of an unusual good in many respects, distribution, cost, and consumption. Information is a product, an instrument, or an entry in the production of other goods, decisions, and information, Rafaeli, (2003). It is expensive to be produced and inexpensive to be reproduced, Shapiro and Varian, (1999).

The value of information is subjective, since it can be more useful to satisfy the desires of one person than another, or of great use to one person and from little to another. Huizing, (2007) describes in his article that the main difference between ICT and information is the human aspect. Giving means of information is a human element and, by definition, subjective, since objectivism cannot deal with the human feeling of decisions. Information governance should be considered with the inclusion of the human element to understand and use information of value to the business.

Information has many definitions and by itself has no value, it is necessary to give meaning to information so that it has value for a person. Any "actor" when receiving new information, will give meaning to this information (the information feeds the knowledge). At the same time, the information that the "consumer" or the "receiver" finds is always produced by some "actor" (the producer) in some format, which implies that the production of information cannot be seen without any subjectivism. Information governance should include human interaction with the underlying data and systems.

Finally, information should always be seen within its context. According to Pijpers, information can only be evaluated with awareness of the context in which it is being interpreted. Context is an element of the information environment, which incorporates all the factors that affect the way an organization deals with information, Davenport and Prusak, (1997). Like the information environment, Huizing and Bouman (2002) describe the information space in transactions, which "represents all possible exchanges of information - economists say in operations - available to any actor at any time.

If an organization intends to influence these exchanges, if possible in all, in some way governance must be introduced and, therefore, an "actor" who governs the keeping of those principles. Therefore, introducing the concepts of "actor and governing", the actor of the third parties involved, as a representative of an organization is a determining factor of the information space in transactions, being able to influence the interaction between the producer and the receiver of information.

In short, information governance be a way for an organization to deal with the use of information among agents involved in the transaction information space. Based on these considerations, we propose the following definition for information governance: the totality of interactions between agents who achieve their objectives using the information they have in common, with the establishment of a normative basis for all activities. Information governance: it is the totality of theoretical conceptions and the principles that govern related information. With this definition, we follow the approach proposed by Kooiman (2007), dividing our definition in governance and information governance, highlighting the various designs and principles applicable to the information manager.

h. Knowledge Governance (GovC)

The state of the art over the term, Borghi (2006), even though it does not have many publications on the term or not being one of the most cited in the Scopus database, brings a definition of governance that is worth sharing. For the author, governance is a set of transformations interrelated with the intensification and dissemination of participatory practices for the optimization of exchange processes between the various actors..

Peltokorpi and Tsuyuki (2006) describe the importance of corporate governance taking over the coordination of the mechanisms that influence knowledge processes, because their non-integration can hinder the sharing of knowledge leading the organization not to achieve the desired strategic objectives. Fleeing the instance of knowledge management, which seems to be the analysis of these authors, Peltokorpi, and Tsuyuki, (2006), this concept is applied to the GovC based on Mayer (2006), which describes that governance mechanisms are responsible for decisions that affect the creation and protection of organizational knowledge.

One of the main references on GovC is the researcher Nicolai Foss (2007; 2011), and his collaborators, who

analyze the term by the view of the economy. One of his most cited publications (139) is the publication "The emerging knowledge governance approach: Challenges and characteristics". For Foss (2010) Knowledge Governance is the result of the interaction of the implementation of corporate governance mechanisms and the management of knowledge processes for the optimization of the economic results of the organization. In an economic approach, the author has been examining the interrelations of corporate governance mechanisms and the organization's capabilities in dealing with knowledge-based transactions, such as no, sharing, maintaining, and creating this phenomenon..

Grandori (2007) adds to the concept that this can be understood, as a collaborative organizational system oriented to the aggregation of distinctive values to the products, services and brands of the company /organization, creating organizational structures that enable the management of intangible assets generated in intra- and inter-organizational interrelations, consisting of people, processes and technologies. The article "The governance of knowledge in project-based organizations" prepared by authors Pemsel and Müller (2012) studies GovC practices more deeply, recording the investigation of patterns of these practices in project-based organizations (PBOs).

The results of companies and organizations are that GovC practices in PBO's are impacted by structural and situational factors and that the mechanisms of "informal governance" are as useful as formal mechanisms when it comes to knowledge creation processes. The authors believe that these formal mechanisms seem to be complex for executives, which results in the formation of barriers to productive governance practices. During the analysis of the publication of Garde et. Al. (2007) the question arose, whether the author was referring to knowledge management or its governance,, since it relates knowledge governance to a set of processes that enable the creation, development, organization, sharing, dissemination, use and continuous maintenance of archetypes. A definition close to what is meant by knowledge management.

III. THEORETICAL-METHODOLOGICAL FRAMEWORK FOR RESEARCH

a. Sources of Information

For rulers, it is important to know the sources of information, a political world internal and external, which involve the world policy in which the country is insured, because these sources vary in formats nature, and content, not the process of using these sources, in the strategic political decision-making. Choo (1994, 2006) classifies sources of information into four categories: external, personal, and impersonal, personal, and impersonal interns. The author of the company/organization that information is an intrinsic component of almost everything a government does.

The primary sources express the direct interference of the author; secondary sources facilitate the use of knowledge from primary sources, since there is a differentiated treatment for them, according to their function; tertiary sources allow primary and secondary sources to be found. Ribeiro (20013, p. 44), groups the sources of information into: external personal sources - governance colleagues, experts, other rulers or ex. , consultants, partners, international fairs, congresses or lectures (face-to-face or telephone interaction); personal and internal sources – public servants, co-workers, hierarchical superiors, partners (face-to-face or telephone interaction); electronic personal sources: e- mail (personalist), forums, web discussion groups, Messenger, Skype and the like; external impersonal sources - documents produced outside the country, such as magazines, newspapers, books, technical reports, regulations, government publications, radio or television broadcasts; internal impersonal sources - documents produced within thestate, such as reports, studies, memoranda, paper files and work notes; and electronic impersonal sources - electronic documents in general, intranet, electronic databases of the state, online government websites, various Internet sites, news portals.

b. Open Access to Information

The new information and communication technologies allow researchers in the Information Sciences an environment conducive to the development of new forms of scientific communication and the provision of materials that include institutional documents. In Costa's concept (2008, pp. 219-220), "the term open access to scientific literature was consensually defined, such as access to literature that is digital, online, free of cost and free from unnecessary copyright restrictions and use licenses. Open Access must remove both price barriers and permission to use, i.e. respect the authorship of intellectual production, information must be shared, broadly and unrestricted.

According to Alves (2009, p. 12), "these technological advances, like the digital library, and institutional, offer a range of opportunities for the dissemination of information, especially scientific information, produced in institutions, universities and higher schools", in the provision of knowledge to society. This scenario was based, within the scope of the Budapest Declaration, Budapest Open Access Initiative, (2002), Weitzel, (2018, p. 106).

c. Creation of Organizational Knowledge

Nonaka (2005, p. 1) says that knowledge has been a new factor of production, joining the classic factors: land, labor, and capital. More than that, different researchers have proposed knowledge as the main source of wealth

today of increasing importance of intangible assets. For Nonaka and Von Krogh (2009, p. 636), the articles of Winter (1987) and Kogut and Zander (1992) initiated a line of investigations into strategic management often called "vision of the company / knowledge-based organization" (knowledge-based view of the firm).

Grant (2006, p. 203) explains that this line of research that includes the analysis of the resources and capabilities of institutions/companies, epistemology, and organizational learning – is not a theory of the company/organization in any formal sense. According to Tigre (2005, p. 187): The analysis of the evolution of the ories of the company / organization and its relationship with organizational paradigms,, shows that there is no single and coherent theoretical body, because theories are conditioned by different methodological-theoretical affiliations, focus on different aspects (production or transaction) and are based on diverse institutional, historical and sectoral contexts.

The vision of the company / organization based on knowledge is actually an emerging set of ideas about the existence and role of the company / organization, which seeks to emphasize the role of knowledge, seeking to identify strategies to manage intangible assets, based on series of assumptions and observations about the nature of knowledge and its participation in production. It is worth noting that the various translations for Portuguese enshrined by the use the expression "vision of the company / organization based on knowledge", which perhaps diminishes the impact of thinking about a vision based, not only based on knowledge or even prevent are ordering of the terms, which could resulting something, such as a "vision based on the knowledge of the company
/organization".

Parallel to the works of the "vision of the company / organization based on knowledge "and VBR (Barney, 2007), Teece, Pisano and Shuen (1997) developed the theory of Dynamic Capacities, which highlights the importance of dynamic processes. In this theory the competitive advantages based on processes of coordination and combination of assets knowledge. The Theory of The Creation of Organizational Knowledge, especially the SECI model, gains another dimension, when viewed, not as an explanation for the world, but as a supporting element, a lantern, to delve deeper into other broader theories.

Nonaka and Von Krogh (2009, p. 636)consider that: The Theory of Organizational Knowledge Creation aims not only to explain the nature of the assets of knowledge and strategies, but also to complement the vision of the company /organization, based on knowledge and the theory of dynamic capabilities, by explaining the dynamic processes of organizational knowledge creation, Nonaka, (1987, 1991, 1994); Nonaka et al., (2006).

The importance that the Theory of The Creation of Organizational Knowledge can have to better understand the dynamic skills and achieve a vision of the company / organization based on knowledge, is very clear in the image of the lantern, applicable to all the theory that functions as a lantern that illuminates aspects and dimensions of life and phenomena that before do not see. But like all the lantern pointed into the darkness (here, our ignorance), it illuminates some aspects and leaves others out, Migueles, (2003, p. 50).

d. Data Science

The term resource can be considered as any element used to achieve a particular purpose. Thus, for example, it is possible to talk about economic resources, human resources, technological resources, intellectual resources, renewable resources, etc. From this perspective, the whole resource is an element or set of elements that serves to achieve a goal. Given the breadth of the definition, it is obvious that this term issued in various areas of knowledge and circumstances. However, there are some areas where their use has well-defined limits, due to the importance that this resource means.

One type of resource with attendance and of great importance in the economy is the so- called natural resource. This expression refers to all the element extracted from nature that serves for the production of goods and services. Natural resources may have a limited obtaining in some cases, already in others, unlimited. In fact, on certain occasions there are resources that, because of natural processes, are constantly renewed: this is the case of natural resources. For the latter case, some energy sources such as energy, wind, solar, water, etc. may be mentioned.

In the area of psychology, the term resource refers to a person's ability to deal with the difficulties of the environment. They can consist of work skills, attitudes, ability to relate to others, etc. In this sense, resources have the function of keeping the person healthy from the, psychic point of view. In fact, when people are overwhelmed by external circumstances, when problems are impossible to solve with the internal tools they have, it is quite possible to fall into depression or some stressful situation.

And finally, it is worth highlighting the economic resources. They are the ones who guarantee the development of a company / organization, family, or person. On some occasions, these resources may become scarce and it is appropriate to assess the possibility of having access to external funding. The relationship between the economic resources produced and those consumed, shows to a large extent the health panorama and the proper functioning of the agents in question, from the economic point of view.

Economic resources are those material or immaterial means that offer the possibility of satisfying some needs of the production process or the economic activity of a company / organization. Therefore, economic resources are

essential to carry out financial, commercial, or industrial operations.

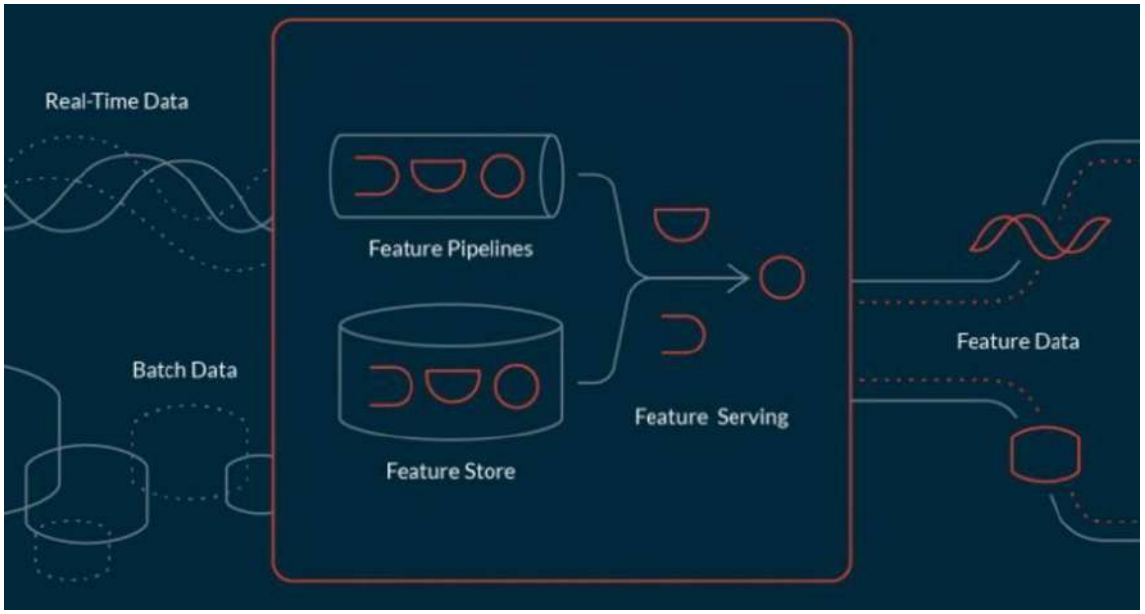
To have access to an economic resource it is necessary that there is an investment in advance. In the process of being profitable, it must be recovered through the use or exploitation of the activity itself. Let's examine this general idea through a concrete example: the field is an economic resource that allows the development of agriculture, but this resource may be unfeasible from an economic point of view, if the field is situated in a geographical area that requires a large amount of money in its exploitation. Economic resources allow individuals to meet their material needs and face life naturally..

The process of creating features is called resource engineering (or attribute engineering), which is complicated but critical component for any process of apprenticing to machines/equipment's Better features mean better models, resulting in better business results.

Generating a new resource requires a huge amount of work and creating the pipeline to build the resource, it is just one aspect. To reach this stage, it probably takes a long process of trial and error, with a wide variety of resources, until you reach a point where you are satisfied with the new unique feature. Then you need to calculate and store it as part of an operational pipeline, which differs, depending on whether the resource is online or offline.

Figure #2 - Feature Store data

Source: Microsoft Industry Blogs



In addition, the entire data science project begins with the search for the right data. The problem is that most of the time, there is no single, centralized place to search; the data is hosted everywhere. Therefore, first, data storage provides a single pane of glass to share all available data. When a Data Scientist starts a new project, you can access this catalog and easily find the data you're looking for. But data storage, data not only a data layer, is also data transformation service that allows users to manipulate the raw data and store it, ready to be used by any model of apprentice the machine (computer) . There are two types of data: online and offline

Offline data – some data is calculated as part of a batch job. For example, average monthly spend. They are mainly used by offline processes. Given its nature, creating this type of data can take time. Typically, offline data is calculated through structures such as Spark or simply running SQL queries in given database, and then using a batch inference process.

Online data – it is a bit more complicated data because it needs to be calculated very quickly and is usually displayed in milliseconds. For example, calculate a score for detection of a fraud in, real time. In this case, the pipeline is constructed by calculating the mean and standard deviation, real-time sliding window. These calculations are much more challenging, requiring fast computing as well as fast access to data. **The data can be stored in memory or na database,** of very fast key values. The process itself can be performed on multiple cloud services or a platform.

Here is an example of an online dados and offline pipeline using Data Storage (Feature Store). It was designed by Uber, as part of its Michelangelo platform:

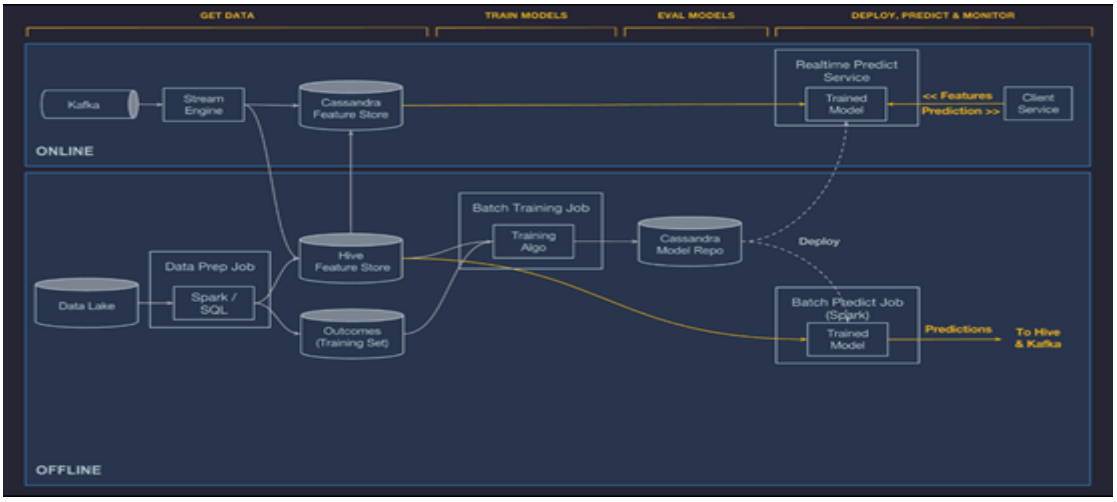


Figure no. 3 – Platform of Michelangelo do Projeto Uber

Source: Microsoft Industry Blogs

Ideally, data scientists should focus on what they have studied to do and what is best: building models. However, they often spend most of their time in data engineering configurations. Some features are expensive to compute and require aggregation, while others are quite straightforward. But that is not something that should worry data scientists or stop them fom leveraging the best features for their model. Therefore, the concept of data storage is to abstract all engineering layers and provide easy access to read and write them..

As mentioned earlier, online, and offline data has different characteristics. Behind the scenes, offline data is built primarily on structures such as Spark or SQL, where actual data is stored in a database or as files. While online data may require access to data using APIs for streaming engines such as Kafka, Kinesis, or databases of key values in memory, such as Redis or Cassandra.

Working with a data store abstracts this layer, so that when a Data Scientist is looking for a data instead of writing engineering code, he can use a simple API to retrieve the data he needs.

One of the main challenges in dados implementing the machine star (computer) in production arises from the fact that the data being used to be a model in the software development environment (programs) is not the same as the data in the production service layer. Therefore, enabling a consistent set of features (computer and software) across that-these and service layer enables a smoother deployment process, ensuring that the model really reflects the way things work in production.

In addition to the actual data, the data store maintains additional **meta** data for each resource. For example, a metric that shows the impact of the resource on the model it is associated with. This information can help Data Scientists tremendously select resources for a new model, allowing them to focus on those who have achieved a better impact on similar existing models.

The reality today is that almost all businesses are based on Machine Learning, so the number of projects and resources is growing exponentially. This reduces our ability to have a good comprehensive overview of the resources available, since there are so many. Instead of developing in silos, data storage allows you to share our resources with our **colleagues'** Meta data. It is becoming a common problem in large organizations that different teams end up developing similar solutions simply because they are not aware of each other's tasks. Data storage e fills that gap and allows everyone to share their work and avoid duplication.

To meet guidelines and regulations, especially in cases where the Artificial Intelligence (AI) models IA generated serve sectors such as health, financial services, and security, it is important to track the lineage of algorithms under development. Achieving this requires visibility into the end-to-end data flow to better, understand how the model is generating its results. Because data is being generated, as part of the process, it is necessary to track the flow of the data generation process. Data storage, the lineage of data and a resource can be maintained. This provides the necessary tracking information, such as the data generated ram and provides the vision and reports needed for regulatory compliance.

MLOps is an extension of DevOps where the idea is to apply the principles of DevOps in machine learning pipelines. The development of a machine (computer) apprentice ship pipeline is different from software development (programs), mainly because of the appearance of the é different of the development software data. Model quality is not based solely on code quality. It is also based on the quality of the data and the features that are used to run the model. According to Airbnb, about 60%-80% of data scientists' time is spent on creating, training, and testing.

Data storage scans data scientists to reuse resources rather than rebuilding them repeatedly for different models, saving valuable time and effort. Data storage automates data this process and resources can be triggered by code changes that are sent to Git or by the arrival of new data. This automated resource engineering is an important part of the MLOps concept.

Some of the largest information and communication technology companies that deal extensively with AI have created their own Feature Stores (Uber, Twitter, Google, Netflix, Facebook, Airbnb, etc.). This is a good indication for the rest of the industryof how important it is to use data storage as part of an efficient Machine Learning pipeline. Given the growing number of AI projects and the complexities associated with putting these projects into production, the industry needs a way to standardize and automate the core of resource engineering. Therefore, it is fair to assume that data storage is positioned to be gem a basic component of any machine (computer and software) apprentice) pipeline..

e. Information's Science

Origin

It is difficult to specify the emergence of a new science even if it is a recent scientific discipline such as information sciences. However, Foskett (l969) and Ingwersen (l992) mark the date of l958 as one of the milestones in the formalization of the new discipline when the Institute of Information Scientists (IIS) *was founded in the United Kingdom.* Meadows (l990) describes the origin of the new discipline from specialized libraries (in industries and other organizations). According to Meadows (l990) the discipline underwent a sharp development after World War II due to the emergence of the Mathematical Theory of Information described by Shanon and Weaver in the late 1940s. This theory was adopted by many other areas because it explains the problems of transmitting messages through mechanical communication channels. The industrialization of the commercial press promoted the bibliographic explosion, a phenomenon no less important than the advent of the Gutenberg press around 1450, the effects of which became more evident after World War II.

His contribution to the development of information sciences was small but important for the history of the area, as it attracted attention to two needs. The first to clearly define the character of the information with which professionals in the area cared and, the second, to define the conceptual structure to be applied in the organization of that type of information. According to Dias, (2002), there is consensus among the authors of the area that The Information Sciences appears in the middle of the twentieth *century.*", e Claude Shannon e Warren Weaver in 1949, in the book "*The mathematical theory of communication* Also according to the authors, it is in the 1960s that the first concepts and definitions are elaborated and the debate begins on the origin and theoretical foundations of the new area of knowledge" (Pinheiro & Loureiro, 1995, p. 42). The authors point out several facts that occurred in the 1960s that signified the real milestones of the formation of a new disciplinary field:

- The conference held at *the Georgia Institute of Technology* in 1962,
- The *Weinberg Report* in 1963,
- Mikhailov's Computer Work in 1966
- The study by Rees and Saracevic in 1967 and,
- Borko's definition, *in Information Science: what is it?,* in 1968.

Borko (l968) defined Information Sciences as a discipline that investigates the properties and behavior of information, the forces that govern its flow and the means of processing to optimize its accessibility and use. It relates to the body of knowledge related to the production, collection, organization, storage, retrieval, interpretation, transmission, transformation and use of information. This includes the investigation of the representation of information in natural and artificial systems (...). It has a pure science component that investigates the essence of the subject without considering its application and another component of applied science that develops services and products (...). For Goffman (1970), the goal of Information Sciences is to establish a unified scientific approach to study the various phenomena that involve the notion of information, whether such phenomena are found in biological processes in human existence or in machines created by humans. Consequently, the subject matter should be related to the establishment of a set of fundamental principles governing the behavior of the entire communication process and its associated information systems.

Griffith (1980) proposed a similar definition that establishes The Information Sciences as a discipline that seeks the creation and structuring of a body of scientific, technological, and systemic knowledge related to the transfer of information.

Saracevic (l991) studied the evolution of Information Sciences and defined it as "a field dedicated to scientific issues and professional practice focused on the problems of effective communication of knowledge and knowledge records between human beings,

in the social, institutional or individual context of the use and needs of information. In addressing these issues, the advantages of modern information and communication technologies (ICT's)" are considered of particular interest.

The Information Sciences was born after the Second World War, to solve a major problem, which was also the great concern of both documentation and information retrieval, which is to gather, organize and make accessible the cultural, scientific and technological knowledge produced worldwide. The Information Sciences is a recent science and was born from the exact sciences, that is, seeking to achieve an exact knowledge from the inspiration of mathematical and quantitative models. Bronowski, (1977, p. 47), based on objectivity, sought to formulate universal laws of the "behavior" of information. Strongly influenced by empirical sciences, it was intended to establish universal laws that represented the informational phenomenon and hence the need to resort to mathematical (information theory), physical (entropy) or biological (epidemiological theory) models.

In the seventies, a character comes into play who redirects the focus of information sciences: "man (decision-makers) and as such the human and social sciences also start to contribute with their methods and practices, to the composition of this emerging science", Cardoso, (1996: 73-74). Initially closely linked to computing and automatic information retrieval, according to González de Gomez, (2000, p. 6), from the 1970s onwards, he effectively enrolled in the social sciences as a "symptom of the ongoing changes that would affect the production and direction of knowledge in the West", González de Gomez, (2000,p. 2). It is, from that decade on, that we can refer to the "social foundations of information". However, some relevant questions are being raised to us right now, what is the branch of science that Information Sciences is closest to? What theories, concepts and methods feed The Information Sciences?

The first studies in information sciences as social science were to study social reality from a statistical perspective, that is, quantitative. Berger & Luckmann (1985) presented reality as something that is socially constructed and not as an existence in itself and pave the way for the understanding of information not as a given, something that would have *meaning and an importance per itself*, but as a process. That is, something that will be perceived and understood in various ways by people, which according to Borko's definition (1968) about behavior and information flows, is something that is outside people and with the definition of Buckland (1991) that sees information as "thing" outside people.

The subjectivity of information becomes fundamental for the understanding of the different planes of reality and the distinction between the different forms of knowledge and the mechanisms of its configuration and legitimation. People need to be included in studies on information and in their daily interactions, forms of expression and language, rites, and social processes. Several studies can be presented as an example of the incorporation of these concepts in the context of information science studies, such as the *do sensemaking approach* inaugurated by Dervin, Atwood & Palmour, MacMullin & Taylor's studies on people's values, cognitive nature studies inspired by Maturana's theory & Varela of the hermeneutic approach of Information Sciences, the studies of Capurro (2003) on information networks based on the theoretical framework of Bourdieu (1983.

p. 46-81), as well as bibliometric studies and scientific communication and the contributions of Foucault's Archaeology of knowledge and sociology of science (Latour, Knorr-Cetina, among others).

The Information Sciences is a discipline that has an overly broad field of practices but does not yet have a theoretical field defined as is the case of other areas of knowledge such as Linguistics, Anthropology, and others. It has not yet reached a theoretical construction that integrates all its concepts and practices. Therefore, it operates based on fragmented theoretical constructions, for example, the Representation of Information would be a construct, among others etc. The most important characteristic of information sciences is its interdisciplinary nature in which the magnitude of the problems faced (ecological, ethnic, and demographic) is demanding innovative solutions. The Information Sciences have been consolidating from "borrowed" elements among others, by mathematics, physics, biology, psychology, sociology, anthropology, semiology and the theory of communication and other sciences that contributed to its foundation and applicability, Cardoso, (1996, p. 74). *"Information science is not to be looked at as a classical discipline, but as a prototype of the new kind of science", Wersig, (1993, p. 235)..*

Information Sciences evolves into new stages of dialogue and insertion in the social sciences. The reflection on the evolution of information sciences, its relations with the social sciences and as a model of science, is fundamental for research to continue and to incorporate all the knowledge accumulated in this process. Since scientific research is one of the main ways for the formulation of theories of an area, what is perceived is that research in Information Sciences, has been consolidating and opening new horizons of discussions. Great contribution has been made by professors and researchers at various international universities.

Some important steps have been taken to theoretically strengthen the area of Information Sciences and that research in Information Sciences is expanding and has a Scientific Community that over the years has been consolidating internationally. There are many different challenges that present themselves today, forth Information Sciences. As applied science, it needs to respond to the search for information from society and, as an object of research, to the needs of fundamental conceptual esofthes of the area. The realization and sociability of research are the safest ways to create and share new paradigms. Thus, it becomes increasingly important to seek the theoretical, philosophical, and social foundation in the Field of Information Sciences and above all to

further strengthen its scientific community.

Interdisciplinarity

There are at least four distinct currents of thoughts that reflect on interdisciplinarity in information's sciences, Fernandes and Cendón, (2009). The first places that the Information Sciences, not having defined theoretical framework, captures concepts from other sciences to be theoretically based, and the interdisciplinary characteristic is born from the unique amalgam established within the Information Sciences. The second to the company / organization that the object of research of information sciences, **information**, is common to all areas of knowledge, so the Information Sciences is interdisciplinary by nature, being present in the epistemological core of science, as a whole. For the third, there is only interdisciplinarity when conceptual discoveries and practices modify both disciplines involved, at times when concepts and methodologies, shared by both disciplines, merge, and change each other. Finally, the fourth current of thought the company / organization that the interdisciplinarity of information sciences, the way it is proposed and discussed does not exist, since there is no mutual influence of the knowledge of both disciplines, occurring a mere juxtaposition of concepts. Borko (1968), lists the following interdisciplinary areas: Mathematics, Logic, Linguistics, Psychology, Computer Technology, Operations Research, Graphic Arts, Communication, Librarians and Administration. Merta (1968), Cherni and Gilyarevsky (1969) and Mikahilov and al (1969) highlight the following fields of knowledge, in which there is an interdisciplinary dialogue with The Information Sciences, with explanations related to each contribution, among which the methodological: Mathematics and Mathematical Logic; Linguistics and semiotics; Communication, Cognitive Science, Psychology, Librarian, economics, Cybernetics and Mathematical Theory of Communication; Reprography and Theory of Automatic Knowledge; Systems Engineering and Computer Science.

Harmon (1971) synthesizes Kitwanga's thinking, from which he identifies the strongest interdisciplinary relationship of the field with behavioral sciences, and all those that have "... a marked common trend for model construction" and concludes that Information Sciences is an "objective, subjective and practical research area". Wersig and Nevelling (1975), in the search for the "place" of the Information Sciences, the reasons for its emergence and what social needs it meets, considering different orientations: for the phenomenon, for the media, for technologies and for purposes.

According to Japiassou (1976), interdisciplinarity can be understood as the "dialogue between areas of knowledge. For Foskett (1980), the field "... it arises from a cross- fertilization of ideas that include the old art of librarian economics, the new area of computing, the arts of the new media, and those sciences such as Psychology and Linguistics, which in its modern form has to do directly with all the problems of communication – the transfer of information".

Japiassu and Marcondes (1991), define interdisciplinarity as: "method of research and teaching that can cause two or more disciplines to interact with each other; this interaction can go from simple communication of ideas to the mutual integration of concepts, epistemology, terminology, methodology, procedures, data and research organization.

Fazenda (1995) explains that the interdisciplinary movement emerged significantly in Europe in the 1960s, a period in which a new university and school status was claimed that broke with education in parts, which was completely alienated from everyday issues. The evolution of the movement towards interdisciplinarity was divided didactically by the author into three periods, including the 1970s, 1980s and 1990s, also presenting information on the context of the development of interdisciplinarity, mainly in education:

- **1st period** - 1970: characterized by the search for a philosophical explanation of interdisciplinarity; with the participation of institutions such as UNESCO in 1961 and the Organization for Economic Cooperation and Development (OECD) in 1972.
- **2nd period** − 1980: period of search for a sociological guideline; attempts to explain a method for interdisciplinarity.
- **3rd period** – 1990: phase of search for an anthropological project, towards the construction of a theory of interdisciplinarity.

There are two main approaches to studies on interdisciplinarity: the search for the unity of knowledge (objective of constructing a universalizing perspective from the gathering of knowledge around a given situation, especially scientific ***knowledge)***and the search for asolution to concrete problems (particular and specific practice to deal more with situations related to everyday existence, especially social problems, than those that are specific to science, with emphasis on the instrumental issue), Fourez, (1995), Batista, (2007).

According to Cardoso (1996, p. 74) the interdisciplinarity of Information Sciences is present as a component of current Society Science, in which the magnitude of the problems faced (ecological, ethnic, demographic) are demanding innovative and plural solutions. The Information Sciences are consolidated from the elements "borrowed" by mathematics, physics, biology, psychology, sociology, anthropology, semiology and the theory of communication and many other sciences that contributed to its foundation and applicability.

According to Gomes (2001) "Information Sciences is a contextual science, that is, it is a science applied to contexts and can be characterized as an interdisciplinary science". Interdisciplinarity is often confused with the mere incorporation of concepts, theories and methods of one discipline on the other, since it uses terms and concepts of a diversity of other sciences, in which it seeks its theoretical bases, such as computer science, business sciences, linguistics, communication, cognitive sciences, education.

Interdisciplinarity is not a simple appropriation of concepts, theories, and methods from one area of knowledge to another. It is only realized from the concrete dialogue between the different areas of knowledge. Effective interdisciplinarity is one that is updated in the field of theoretical abstractions, the establishment of methodologies, but also in the interventions that the different areas of knowledge promote in the social.

For Pinheiro (2004), it is the "mutual appropriation of methodologies, principles, theories, concepts, and constructs between two or more areas of knowledge (Pinheiro, 2004). Klein (2004) the company / organization that the concept of interdisciplinarity is linked to that of complexity. The convergence between these two ideas has significant consequences for understanding the nature of knowledge, the solution of scientific problems and the dialogue between the sciences and the humanities.

According to Klein (2004) the nature of complex systems offers a comprehensive rationality for interdisciplinary studies, unifies apparently divergent approaches, and serves as a criterion to direct the integration process. The goal of interdisciplinary research is the understanding of the part of the world modeled by a complex system. Interdisciplinarity is characterized by the exchange of knowledge, the transformation of the areas of knowledge and the sharing of objectives.

According to Klein (2004) the interdisciplinary approach originates from the need to understand complex objects, which a single area of knowledge would be unable to deal with the proper scope. Among these we can mention the phenomena of the explosion of information and cultural diversity, social and technological problems, or multifaceted concepts such as "body", "mind" and "life". It is perceived the development of a significant number of multi- or interdisciplinary areas of knowledge since the mid-20th century and among them are information sciences.

Interdisciplinary experiences have three basic characteristics, according to Domingues (2005):

- Approximation of different disciplinary fields for the solution of specific problems.
- Share the methodology.
- Generation of new disciplines after cooperation and merger between the fields.

From the many ideas around the term, many taxonomy possibilities have also emerged to better understand how interdisciplinarity occurs. Classifications of interdisciplinarity individually or collectively, several proposals have been and continue to be presented by scholars. Lenoir (2003) proposes two categories based on the type of action in which they occur, that is, scientific interdisciplinarity and school interdisciplinarity.

Regarding the scope of scientific interdisciplinarity, the OECD (Klein, 1990) presents two categories: endogenous interdisciplinarity and interdisciplinarity exogenous to the scientific community, that is, the methodology was adopted by will or internal requirement of the discipline or it is a requirement of an external character to science. Some authors have a more specific classification, dividing interdisciplinarity according to the way it is found in research.

According to Heinz Heckhausen (1972, 2006), interdisciplinarity can be categorized from the levels of interaction in which they occur. In increasing order, they would be heterogeneous interdisciplinarity; pseudo-interdisciplinarity; auxiliary interdisciplinarity; composite interdisciplinarity; complementary interdisciplinarity; and unifying interdisciplinarity.

For Boisot (1972), the level of interaction present in interdisciplinarity is divided into: structural interdisciplinarity; linear interdisciplinarity; and restrictive interdisciplinarity. Huerkamp et al. (1978) proposes the following classification: methodological interdisciplinarity; conceptual interdisciplinarity; interdisciplinarity of problems; and border interdisciplinarity, or interdisciplinarity of neighboring disciplines.

The existence and need for information for almost *all professions,* sciences, and *cultures,* is one of the proofs of the interdisciplinarity of the Information Sciences. In any circumstance, information acts as a driving force for the development of the various areas of human knowledge, nations, and peoples and as an element of unification of inter- and transdisciplinary relations.

On the interdisciplinary fields, the authors highlight part of Mathematics, Logic, Philosophy of Science, Transformational Grammar and Mathematical Theory of Communication and recognize that there is connection of Information Sciences with some traditional areas, including "Psychology (**Information Psychology**), Sociology (Sociology of **information**), Economics (**Information Economy**), Political Science(**Information Policy**) and technology (Information **Technology**)".

Transdisciplinary

It is pertinent to approach some ideas that announce it or converge it to interdisciplinary philosophy, long before the introduction of this concept, such as the notion of system, as well as those that succeed it, as transdisciplinary. Morin (1997), rethinks the concept of system, as an organized whole that "... produces or

favors the emergence of a certain number of new qualities that are not present in the separate parts", capable of connecting the parts to the whole.

Japiassu, (1976), illustrates the concepts of multidisciplinary, interdisciplinarity and transdisciplinary, based on Jantsch (1970,72 apud Japiassu), and describes them as systems "... with successive degrees of cooperation and increasing coordination of disciplines." Transdisciplinary is a concept of reciprocity between specialized investigations, but it situates these links within a total system, with no boundaries established between disciplines.

For Pombo, (2004), transdisciplinary is a way to promote the integration of knowledge, to ensure a higher level of interaction, that is, it is a fusion that overcomes disciplinary barriers allowing its transcendence.

The theoretical-methodological approach to transdisciplinary is under construction, being discussed and debated today. Some theories are causally related to the transdisciplinary approach, such as systems theory and information theory, as well as terms related to it, such as passage, transition, change, transformation, complexity, Nicolescu et al. (2000).

Transdisciplinary, as the prefix "trans" indicates, concerns what is at the same time between disciplines, across different disciplines and beyond the whole discipline. Its purpose is the understanding of the current world, and one of the imperatives for this is the unity of knowledge, Project Ciret-Unesco, (1997, p. 4).

Discipline

To understand interdisciplinarity, it is necessary to start from disciplinarily, since the specialties of knowledge are the "foundations on which everything is built", Clerk apud Klein, (1996). According to Japiassu (1976), disciplinarily is "... Specialized scientific exploration of a particular homogeneous field of study, that is, the systematic and organized set of knowledge that has its own characteristics in the plans of education, training, methods, and subjects: this exploration consists in the emergence of new knowledge that replaces the old ones". Disciplines have specific focuses and the real of each is always reduced to the angle of view of their specialists, which expands to the extent of interconnections with other disciplines.

For Morin (2002), the term discipline is related to academic-scientific knowledge that culminated in the emergence of various branches in the field of science, and which developed thanks to the progress of scientific research. In a broader view of Morin epistemology (2002) presents the discipline as a category that organizes scientific knowledge and divides and specializes in the work to respond to the diversity of domains that the sciences cover. A discipline naturally tends to autonomy by the delimitation of its borders, by the language it establishes, by the techniques it is led to elaborate or to use and, eventually, by the theories that are properto it, Morin, (2002, p. 37).

According to Gusdorf (2006), each discipline tries, "an approximation of human reality according to the dimension that is proper to it, with man as a common center", presenting different patterns of formality and organization. Some criteria identified by Heckhausen (2006) help to understand the nature of a discipline, characterizing it or differentiating it from others by aspects that are not always very definitive, as explained by the author himself. They are:

- **Study domain** - specific angle of your material domain. Vaguely defined notion that depends on the constitution of a given discipline.
- **Own methods** – to apprehend and transform phenomena. A discipline becomes autonomous when it has perfected its own methods, which must be adapted to the nature of the field of study, with correspondence between concrete application of methods and general laws at the theoretical level.
- **Instruments of** analysis - they are based on logical strategy, mathematical reasoning, and the construction of process models. They apply to several domains and are neutral criteria.
- **Applications** - guidance for the application and practical use in the field of professional activity.
- **Level of theoretical integration** – construction of the "reality" of its domains in theoretical terms, that is, its fundamental and unifying concepts must be comprehensive, enough to explain and predict the phenomena of its domain of study. Defines the maturity of the discipline and is the most important criterion for identifying a discipline.
- **Historical contingencies** – a moment through which discipline passes in its process of historical evolution, in which both the internal logic of the domain of study and external forces interfere.
- **Material domain** - set of objects they are dealing with. Many disciplines overlap in this area.

The disciplines are made up of groups of researchers who have common intellectual goals. For example, when talking about "physics" or "biology", it is not referring to the representation of knowledge of physics or biology of epistemic value, but to an organizational structure institutionalized with criteria, interests and objectives of researchers, within the scope of scientific policy.

As a practical example of a disciplinary research, the study of sound made in different disciplines: in physics - vibration and amplitude (acoustics); in physiology - production mechanisms (phonatory organs); in linguistics - significant and generation of meaning; in music - rhythm, melody, harmony and timbre.

Interactions between Scientific Disciplines

There is a general recognition, based on various studies and investigations, that the Information Sciences is more debtor than creditor in relation to the contributions of other disciplines. The Information Sciences incorporate a vast body of knowledge from various disciplines, transferring relatively little in return. And many published works establish interdisciplinary relations between the Information Sciences and various disciplines "without explicitness, deepening or theoretical foundation that justifies them", Pinheiro, (2008, p. 29).

Inter and transdisciplinary propose to offer alternatives to the ways of thinking and making of science, providing, in addition to analytical reductionist thinking, forms of scientific research that respond to the needs of understanding facts and phenomena in all their complexity

The levels of integration of the disciplines are classified under different perspectives and formats, starting from simple loans of theories and methodologies to displacement sands or dilution of boundaries between the scientific fields involved, without a very precise distinction of the limits between these levels, within a successive and growing "conceptual chain", as Pinheiro (2006, p.1) says.

Saracevic (1999) considers in the panorama of the development of information sciences its origin and social role, the nature of its object, information, its structure in terms of problems, evolutionary trends in information retrieval, and the relationship with other areas, issues and educational models.

According to Wersig and Nevelling (1975), under the name of Information Sciences (plural) is Systems Theory, Communication Theory, Philosophy, Science of Science, Mathematics, Linguistics, Law, and Information Sciences itself, as well as Librarian, Archaeology, Museology, Communication and Education. This set of disciplines appears linked to information theory, contains areas and theories that relate to the Information Sciences, namely Cybernetics, Semiotics, Computer Science Theory.

The areas are related by theories of a general nature, such as systems theory, applicable to different sciences. The interdisciplinary fields of Information Sciences consist of three levels or hierarchies, where this area appears linked to Philosophy and consists of subareas very similar to those recognized by Wersig and Nevelling (1975), such as Sociology of Information, Information Economics and Information Policy.

Complementarity between concepts

In the context of Epistemology, when studying interdisciplinarity, other related concepts emerge, including those that are founders, such as field and area of knowledge, or complementary concepts, including applications related to professional activities. The interaction between disciplines involves different tasks at numerous human levels and categories, so interdisciplinarity needs to be researched in the plurality of its constitution.

Japiassu (1976) briefly mentions applications, oriented to professions, and in Information Sciences this aspect gains importance for another quality of this area, sometimes called horizontality, or rather, the ability of information to go through all fields, in its condition of specialized information.

According to Pinheiro (1999) "... Applications (contexts, areas, sectors, organisms), that is, scientific, technological, industrial or artistic information, or application in fields of knowledge, such as in economics (economic information are mixed with interdisciplinarity itself – are distinct concepts, although they may present interdisciplinary contributions".

For Amaral (1990) "... field designates the total territory whose research is intended to operate, such as Medicine, Philosophy, Communication are fields. Area is a subdivision of the field, a cut artificially introduced for reasons of exploratory studies. Theories of Communication and Culture and Image Technologies are areas such as philosophy or surgery."

It complements its explanation of concepts, with the line of research, the company / organization that there will be a line each time, within an area (which is characterized by a certain informality, in the sense of the absence of a clear individualizing form), certain unifying themes form the cooperation between researchers. They come together to, working together on these themes, to deepen the area and develop the field." (Amaral, 1990).

f. Information Sciences and Business Sciences

In the last twenty years we have seen an important transformation in society, that is, we have moved from a society based on industry and transport, to another based on information and knowledge. A great challenge for managers is to understand what information consists of, how it is generated, interpreted and what decision (ões) allows us to make, in an era of communications at the globe level, since information is the link that unites us. By being able to transmit it in large quantities quickly from continent to continent, we transform the world into a global metropolis, so in the global economy, information and knowledge can be the greatest competitive advantage of organizations, *Thomas Davenport & Laurence Prusak, (1998,* p. 13).

Another challenge facing managers is the abundance of information in today's society, whose most obvious sign of the emergence of this type of society, is the combination of the production of large amounts of information, the intensive use of information and communication technologies and the ongoing learning process. The articulation of these three aspects suggests that from the information society it quickly became the knowledge society. The symbolic culture of this society implies new forms of learning, organisation and management and, consequently, information management. In the information and knowledge society there are several hierarchical

levels or progressive stages related to the learning process of this knowledge, so we can consider three stages: data, information, and knowledge.

Many people in organizations spend their day-to-day work gathering, analyzing and processing information; some industries have developed on the basis of the resource information to produce technologies (process technology – computer, product technology

– software and communication technology – communications equipment + software), that is, to store, process, transmit and easily access information. Managers cannot open the newspaper without reading the term information. Many books have the term information. Many people in organizations have as activity the term information. It will be said that it will be easy to say what it consists of. However, when we start thinking about the term information we have some difficulty in defining it. Part of the difficulty of managers in understanding information is that they are so used to dealing with it on a day-to-day life that they do not realize the complexities involved. Managers only realize the difficulties when they face a new language. The potential for misinterpretation is always present.

Given the importance of communication in organizations that are involved in decision making, whether manager or operational, need to find ways to reduce the possibility of error. To do this you need to understand how communication plays out – how information is transmitted from person to person, from computer to computer, and between the person and the computer. The need to understand information – what it is and how it flows – is not limited to large organizations. Whenever one person communicates with another, we have a flow of information, because communication is a means to provide information from one person to another.

The information that top managers need is two types: information to identify new business opportunities (internal about the skills and capabilities of the organization and external information about the global and immediate environment). It is not structured and merely consists of data, so to have meaning it needs to be structured, since not all information makes sense and is important. External information is one that is increasingly important for support in strategic decision-making but needs to be monitored and organized for the work of strategic managers.

g. Information Sciences and ICT's

The concept of technology is immediately understood by those who serve it and who constantly refer to it. There is unanimity on an implicit concept, but it is indispensable to explain, that is, technology is a complex set of knowledge, *means and know-how*, organized with view to production. This can be said about high density and measured integrated circuit production technologies, supported by a worldwide network of design and manufacturing centers connected to each other by satellites (Jean-Michel Ribaut and Bruno Martinet and Daniel Lebidois, 1991, p.13). Any technology covers three components:

- Knowledge – which does not constitute a technology.
- The means – which characterize technology, but which are not reduced to them; in non-specialized hands any technology represents a waste of investment.
- *Know-How* – without means is a specialization but cannot get any results and quickly falls into disuse due to lack of application.

Organizations to improve their competitive position do two ways, i.e. on the one hand, they observe and analyze the needs of customers to be met and this can lead to technological innovations or analyses the advantages of replacing one technology with another that allows them to *improve their performance.* Any technology always appeals to various scientific disciplines, such as laser *technology* brings together knowledge of optics, electronics, fluid mechanics and thermodynamics. Scientific research aims at acquiring or strengthening knowledge (provisional certainties), while the creation of technologies aims at production under industrial conditions. Technology only makes sense because of a guaranteed result: a technology only exists, when it is validated and when it allows production in precise conditions, that is, technology solves a problem.

Information and Communication Technologies can be defined as the set of knowledge, material means *(infrastructure) and know-how,* necessary for the production, marketing and/or use of goods and services related to the temporary or permanent storage of data, as well as the processing and communication thereof. The emergence and evolution of technologies represent a decisive impetus for the emergence of new forms and perspectives of addressing issues related to how to compete. The use of information and communication technologies has been expanding progressively, so *the English* expression " Information Systems " represents what in Portuguese can be translated as “Computer Systems” which do not represent a systemic, complete and organized form of the collection, selection, treatment, analysis and dissemination of information from organizations.

Information and communication technologies allow the storage, processing, accessibility, and transmission of data flows (information), so that process technology (hardware) and product (software) cannot be confused with the product (information). Understanding the difference between what information is for business management and information and communication technologies is vital for managers for the simple reason that information

helps managers make decisions, whatever the support technology. But managers also cannot forget that information and communication technologies, as a support, allow to obtain competitive advantages regardless of market share and the size of the business.

In the reflection on this topic, it is important to distinguish support for the collection, processing and transmission of data (technological infrastructures - hardware, software and communications) and the information resulting from the collection, selection, processing and analysis of information, i.e. the information embodied in the flow system (i.e. between the information resource, i.e. data and the product information).

The Post-Shannon Era in Communications Theory

Claude Shannon's research work (1916-2001) led to the definition of the theory of information and classical communication, whose first publication in 1948 was seen as one of the pillars of 20th century science, and Shannon was compared to Einstein and Darwin in terms of their intellectual impact on a significant number of problems and the applications of digital transmission and information encryption in investment theory. The theoretical concepts of information are now also very rapidly penetrating the field of genetic biology, the transmission of cellular signals and neuroscience. Shannon's theory was seen as a perfect theory, that is, complete, proper to all the appropriate definitions or interesting problems of communications – mathematically rigorous that it is, produces results that are "heavy" in several useful paths and provides a definition of what is possible in particular with respect to the signal capacity of sufficiently unequal communication channels.

Shannon's theory was on the "shelf" for thirty to forty years and was forgotten by the actual practical part of engineering (to be discussed elsewhere). But in the last ten to fifteen years the scientific method of engineering abruptly broke with the theory and even more surprisingly that has surpassed it in some fields of research. The impulse of the method for many of these fields has emerged in the field of engineering and wireless communications, where the unique feature of the wireless channel has created an interesting number of changes in classical information theory.

The readjustment with the practical problems of the engineering method was clarified, when Shannon's theory stopped on certain key assumptions, since not all were fully defined or explored (or perhaps more properly understood) in the original development of the field of research. While we can understand these assumptions, it also becomes possible to see beyond them and what we are seeing is the emergence of the various concepts of post-Shannon signal architecture in which Shannon's conventional theoretical work is being expanded or even replaced by the latest engineering methods (many examples can be discussed).

h. Data Governance

Currently, the use of Big Data in companies becomes essential for the establishment of their market strategies. Software and technological solutions are responsible for capturing data and allow managers to obtain relevant information about the company's performance and the direction of its product and/or service to the correct niche market.

However, to deal efficiently with the information generated, it is necessary to have a data governance that aims at structuring, organization, and strategic use.

The management model involves company policies, production processes, human resources and, of course, the use of technologies. Data governance describes:

- Who acts with what information?
- At what point?
- Using what methods?
- Under what circumstances?

In addition to enabling a better decision-making process, investor information protection, more efficient processes, cost reduction and transparency, data governance can be implemented from agile methodologies, as we will explain below!

Many institutions are looking for ways to take advantage of new technologies, such as AI and blockchain, to develop new services and better meet customer needs. Adopting these technologies often means a digital transformation and migration to the cloud of locally deployed IT solutions to gain processing and storage capacity and reduce administration. IT and compliance teams may worry that cloud data storage can reduce your control and insights, but that is far from true. Moving to the cloud often helps institutions better understand where their data is and how to manage it, which is essential as industry and government regulations on data management and protection are becoming increasingly stringent.

At Sibos 2018, in Sydney, Australia, Microsoft showed how comprehensive data governance technologies help institutions optimize and automate data governance processes. To learn more about our view of how better data management helps institutions meet rapidly evolving global compliance standards.

Data governance and the need to become digital

Data governance refers to practices and processes that help institutions manage and protect data. Having an effective approach to data governance has gained importance as institutions face significant data overload. Institutions do not just need to process more data; they need to understand the value of using data to drive

innovation and modernize their operations and services.

Without the technology to properly filter, store, and protect data, institutions are unable to differentiate between sensitive data assets that require higher levels of protection and those needed to accurately run customer reports. Unfortunately, most institutions today still use manual approaches to data governance, which are not able to keep pace with modern business. In fact, many institutions do not have procedures in place to ensure the creation of reports with relevant information, especially the lack of knowledge they have about their data. In addition, as institutions store huge amounts of unnecessary data, customers' personal and confidential data, as well as the intellectual property (IP) of the institution/company, are at greater risk of being improperly accessed.

As if data governance was not challenging enough, regulations are putting even more pressure on institutions to take control over their data. Penalties for data breaches are strict and institutions/companies need to be aware as many organizations do not comply with the European Union General Data Protection Regulation (GDPR) and face fines from their annual global revenue. To deal with such a challenging environment and improve the management of your data, institutions are analyzing cloud and digital technologies for answers. The cloud is also able to support the implementation of additional encryption and key management capabilities, which are of utmost importance in such a highly regulated industry.

Smart governance

To help maintain data integrity and confidentiality, Microsoft offers agile cloud technologies such as Client Lockbox for Azure and Compliance Manager. With Client Lockbox, institutions can maximize data security and privacy by controlling the approval loop if a Microsoft support engineer needs to request access to customer content to resolve an issue. This allows the organization to continue to maintain full visibility and control over the data and meet FedRAMP compliance requirements..

Microsoft and its partners are compliant leaders, and our data governance solutions provide what financial institutions need to be ahead of regulatory changes. To learn more about improving data governance and privacy, access the Microsoft Trust Center for Financial Services..

Corporate Governance

Corporate governance has structures that increase the strength of companies through risk mitigation, transparency generation, būt requires discipline and control.

In other words, corporate governance is a system by which organizations and other companies are directed, monitored, and encouraged, and involves the relationship between partners, boards of directors, board of directors, supervisory bodies, and control of other stakeholders.

The agile method, in turn, generates a change of mindset, in addition to allowing:

- Constant view of value deliveries
- Analysis of the importance of the team
- Transparency of management
- Transformation of the project management culture

Among the basic principles of governance are transparency, equity, accountability, and corporate responsibility.

i. ICT Governance

Governance is now a well-known term in the business world. It has focused mainly on the role of management in representing and defending the interests of shareholders. The fundamental role of governance is to monitor and control the behavior of managers, who are hired to preside over the day-to-day functioning of organizations. Perhaps the best known use is at the corporate level: "corporate governance", such as the set of processes, customs, policies, laws that affect how the corporation/company is run, managed or controlled. Corporate governance also includes the relationships between the stakeholders involved and the objectives for the company. The main stakeholders are shareholders, employees, suppliers, customers, banks and other creditors, regulators, and the community.

In the ICT world, the term "ICT governance" is well defined and is known, Weill and Ross, (2004). It is a discipline of the subset of corporate governance focused on information and communication technologies, their performance and risk management. The growing interest in ICT governance is partly due to compliance (quality) initiatives, as well as the recognition that ICT is a resource of increasing importance in products, services and in the implementation and optimization of processes. It consists of "organizational structures and processes that ensure that ICT's support the strategy of organizations and their objectives", IT Governance Institute, (2003). The governance of ICT's is therefore an instrument of the alignment of ICT's with the business, according to Hirschheim and Sabherwal, (2001).

This article takes a devisable approach to information, built based on the observation that:

- Information is what is lacking in the link between business and ICT.
- Information is a business resource, regardless of ICT's.
- The relevant information is increasingly sourced from external sources.

Therefore, the proper use of information (and not only its production) is of vital importance and therefore adequately a candidate for governance. We believe (it is our premise) that organizations that have an implemented process of information governance are more effective in identifying sources, collecting, processing, and using information and increasingly create value for other sources of information. Information governance involves defining the global and immediate or transactional environment, identifying new opportunities, rules and decision-making power for evaluation, creation, collection, analysis, distribution, storage, use and control of information, which answers the question "What is the information that managers need for support in decision making, how they make use of it and who is responsible for it?" Research into current practice reveals that in many organizations, if not all, a comprehensive information governance policy, Economist Intelligence Unit, (2008), especially for external and free information, and often the policies and processes they have, are not effective.

The first steps were taken in defining such policies and processes from a compliance perspective, Donaldson, and Walker, (2004), but the objective of this article is to define and discuss information governance in a more exploratory way. To this end, first reflect on the inadequacy of ICT governance in dealing with the decisive role of information in organizations. In point 5, the value of information is explored, and aspects of governance are discussed to optimize the use of information. We continue with a discussion on the aspects of governance and the various mechanisms that have been explored so far. We conclude with clues for further investigations of information governance. This research is, by definition, a full and unconditional attempt to combine rigor (academically speaking) and relevance (from the point of view of practice). Information governance is "strictly relevant" in both theory and practice.

The inadequacy of IT governance

Although ICT governance is now widely accepted, it is regarded by many authors as a powerful and necessary tool to improve the added value of ICT investments and risk management, while at the same time we argue that governance, both the bases and the application of ICT's, also suffer so far as serious limitations. Some of these limitations are inherent, which means that they arise logically from the concept of ICT governance. Other limitations are self-imposed, which means they are caused by the way, as in practice, organizations apply the concept of ICT governance. Both and their effects will be described below.

ICT's governance includes decision structures, alignment processes and communication tools. A definition in line with this is given by Van Grembergen (2004): "ICT governance is the organizational capacity exercised by managers, and ICT managers to control the formulation and implementation of ICT's strategy and thus ensure the alignment of ICT's with business". ICT governance is deprived of a clear and consensual definition and is based on very operational terms such as COBIT and ITIL, Simonsen and Johnson, (2006).

Despite its operational nature, ICT governance is still considered the main mechanism for linking investments in ICT and business value. However, the concept of aligning the business with ICT's itself has been difficult to master and even harmful and misleading. The concept of governance has been criticized on the side of studies of data systems (software), as being a mechanism developed to manage the uncontrollable, in this case incoherent. All activities of breaking borders, for example innovation, are discouraged or even discarded from governance. Proving itself in this way, it is essentially an instrument of repression. In addition, Carr (2003) has argued that it is no longer of strategic importance and, therefore, is no longer a concern of top managers. Nevertheless, in the business the governance of ICT's and their alignment with the business still score points in many investigations related to information managers and are imperative questions.

Inherent limitations

The limitations inherent in ICT governance logically consist of two words "ICT's" and "governance". The first major limitation inherent in ICT governance is that they are not concerned with how information can be created, consumed, treated and exchanged in order to add value to the company, but only focus on the resources that must be implemented to achieve this goal, and the associated risks. In other words, ICT governance addresses how an organization should take care of its technological systems but does not address the mere purpose and right of existence of these systems. As a result, professionals trying to find the simple answers to information-related questions will find no consolation in ICT governance. Examples of such issues are:

- How can information governance be shaped to inform managers in a timely manner about the real value of performance indicators?
- How can communication with all supply chain actors be optimized to minimize stocks and delivery times?
- How can you get a better profile of customers, so that they can make personalized offers?
- How can we make the best use of the rapidly growing communities on the Internet to identify potential customers and share information?
- How can we ensure that the revenue stemmed by the sale of online content is quite complete and represented in the financial system?

The current concept of ICT governance will leave this, and many other information related to these questions unanswered – which is not very surprising as it was never designed for that purpose.

The second important limitation of ICT governance is that it is unreachable to "control" the business universe, including management, policies, accountability, authorization, communication, control, and auditing. ICT governance has the paradigm that investment in ICT and the consequent systems can and must be controlled to be successful. At the same time, ICT governance carefully avoids the other half of the business universe, which welcomes vital elements such as entrepreneurship, innovation, business development, creativity, improvisation, value creation and experience. Proponents of these concepts insist that ICT governance is a valuable tool to ensure that ICT investments are aligned with the organization's strategy (it remains to be proven), but in our opinion, this only illustrates its top-down in nature's "control." It should be seen that this assumption that investments in ICT should be directly derived from the business strategy (ICT alignment- oriented strategy) implies that the reverse (ICT's – guidance for strategy alignment) should not be possible.

The undesirable effects of these inherent limitations are that information managers who adopt ICT governance:

- They tend to focus on ICT's and lose sight of the information that is important to the business strategy.
- They tend to focus too much on control and spend less time on innovation and business development.

The information manager who reviews technology and control as the domain of ICT governance can quickly lose touch with the company and its vital needs. It cannot be included in the company's innovation projects. Worse, these projects will be hampered by the formal policies and procedures that have been implemented as part of an ICT governance structure, which corresponds to further drive it away from the business. Thus, the conscious implementation of ICT governance can widen the described gap between business and ICT rather than overcoming it.

Another, inherent limitation is that the concept of ICT governance was designed by auditors rather than ICT professionals or business professionals. In fact, the current ICT Governance Institute has published the well-known COBIT, which used to be a branch of the Association of Audit and Control Information Systems (ISACA). As a result, ICT governance has material auditing characteristics and contains a lot of audit "jargon" that can hinder their acceptance by business and ICT managers.

Other inherent limitations were mentioned in the introduction of this point, mainly the lack of clear definitions and the fact that they are mainly operationally based.

Self-limitations

The limitations of ICT governance come from the way it is currently applied in practice. It turns out that, even for narrow purposes, ICT governance can be difficult to implement. First, many ICT governance implementations focus on compliance, ignoring the part that deals with alignment and value aggregation. One possible reason for this is that many implementations of ICT governance are for compliance reasons ("because the quality auditor wants"). Secondly, in many cases, the implementation of ICT governance does not cross the boundaries of ICT's organization.

A substantial part of ICT governance cannot be applied by the ICT organization alone, but can only be applied in conjunction with, or even by, the company. But for the reasons mentioned and adding a lack of knowledge on the specific subject of ICT governance, the business is often found to leave ICT governance intact and goes unpunished. Third, the practice shows that ICT governance, even if it is restricted to the organization of ICT's, often undergoes incomplete or half implementations. Examples include policy documents of dubious operational effectiveness, information security projects that are delayed or aborted completely, service levels that are not yet monitored, and the lack of internal controls that are not found until an incident occurs.

There may be several reasons for this. It has been observed that the added value of ICT governance is not always clear to the organization and often leads to a formal (bureaucratic) process that is not always appreciated by ICT professionals. Fourth, governance, for some reason, is most often translated into strictly hierarchical approaches. Governance, however, includes a wide variety of solutions. One of these solutions is discussed at the point about the governance approach.

Por all types of self-imposed limitations, which are admittedly aggravated by the limitations inherent in the previous description, ict governance is not always effective for its original purpose. In fact, there are many examples of organizations that have invested substantially in ICT governance, but which are not as successful from the perspective of ICT's, flaws in ICT implementation projects, networks, and security incidents, are examples. At the same time, there are many examples of successful companies that do not excel in ICT governance. Apparently, ICT governance is neither sufficient nor necessary for success. Clearly, a new approach is needed.

j. Information Governance

To define information governance as a logical alternative, with emphasis on the use of information and not only on its production (systems). Information governance is not a new term, but the proposal for definition in this article is different from the approach in the existing literature. Information governance was introduced scientifically by Donaldson and Walker (2004) as a framework to support work in the National Health Service on the security and confidentiality of information at various levels in electronic information services. A report was published by the Economist Intelligence Unit (EIU, 2008) on the use of information governance in

companies. Information governance in these approaches generally includes record management, privacy regulation,information security, data and ownership flows, and information lifecycle management.

The explorations so far point to the possible trap of relying on age principles by introducing a hierarchical control framework, without exploring the possibilities of alternative governance approaches. We will explore a broader view of information governance as a basis for future investigations. Like the previous points, we divided our approach into one part "information" and another "governance".

The information has unique characteristics, which make it difficult to evaluate. But regardless of its content (financial, commercial information, etc.), the generic principles of understanding the value of information can be defined.

Information is a production of an unusual good in many respects, distribution, cost, and consumption. Information is a product, an instrument, or an entry in the production of other goods, decisions, and information, Rafaeli, (2003). It is expensive to be produced and inexpensive to be reproduced, Shapiro and Varian, (1999).

The value of information is subjective, since it can be more useful to satisfy the desires of one person than another, or of great use to one person and from little to another. Huizing, (2007) describes in his article that the main difference between ICT and information is the human aspect. Giving means of information is a human element and, by definition, subjective, since objectivism cannot deal with the human feeling of decisions. Information governance should be considered with the inclusion of the human element to understand and use information of value to the business.

Information has many definitions and by itself has no value, it is necessary to give meaning to information so that it has value for a person. Any "actor" when receiving new information, will give meaning to this information (the information feeds the knowledge). At the same time, the information that the "consumer" or the "receiver" finds is always produced by some "actor" (the producer) in some format, which implies that the production of information cannot be seen without any subjectivism. Information governance should include human interaction with the underlying data and systems.

Finally, information should always be seen within its context. According to Pijpers, information can only be evaluated with awareness of the context in which it is being interpreted. Context is an element of the information environment, which incorporates all the factors that affect the way an organization deals with information, Davenport and Prusak, (1997). Like the information environment, Huizing and Bouman (2002) describe the information space in transactions, which "represents all possible exchanges of information - economists say in operations - at the disposal of any "actor, at any time".

If an organization intends to influence these exchanges, if possible in all, in some way governance must be introduced and, therefore, an "actor" who governs the keeping of those principles. Therefore, introducing the concepts of "actor and governing", the actor of the third parties involved, as a representative of an organization is a determining factor of the information space in transactions, being able to influence the interaction between the producer and the receiver of information.

In short, information governance be a way for an organization to deal with the use of information among agents involved in the transaction information space. Based on these considerations, we propose the following definition for information governance: the totality of interactions between agents who achieve their objectives using the information they have in common, with the establishment of a normative basis for all activities. Information governance: it is the totality of theoretical conceptions and the principles that govern related information. With this definition, we follow the approach proposed by Kooiman (2007), dividing our definition in governance and information governance, highlighting the various designs and principles applicable to the information manager.

Value Creation and Information Governance

Information governance can be understood as the way to optimize the value of information for the "actors" involved. Does the definition raise the question for whom is the value optimized? What are the dependencies that allow the optimization of the value of information? Gaining a better understanding of the optimization of the value of information and its dependencies will be the basis for choosing the concept of information governance.

To answer the first question (for whom is the optimized value), we consider the "actors" involved, as discussed in the previous point: the producer, the receiver, and the "actor" of governance. Everyone may refer to one or more people (a single person, group, or group of individuals). The "actor" he manages be the "actor" who is governing the "interaction" between the producer and the receiver within the information transaction space. The three groups will value shared information and for this purpose, value optimization will depend on the value that is given by the three "actors" involved. This leads us to our first hypothesis about the value of information. In the continuation of this point we will put five hypotheses. They will be indicated here, but not proven. They will serve as the basis for further investigation, as described in the conclusion.

 Hypothesis 1: Will a "successful implementation" of an information governance approach lead to a better balance of the value of information for the three groups of "actors" involved?

We use the term "ideal" instead of the maximum because of two reasons: 1st - Maximization would imply that

the value of information can be measured. However, this is questionable since no objective measure can be applied (by definition). Possibly some form of classification can be introduced, which will be useful in the evaluation of information; 2 - Since some information is subjective by definition, information governance can establish an "optimal" point that is acceptable to all "actors" involved. Since they may have different perspectives, it is preferable to consider the "best" rather than the "maximum". To answer the second question, at the beginning of this point ("What are the dependencies to allow the optimization of the value of information"), we propose three hypotheses, each with emphasis on the role of one of the three "actors":

 Hypothesis 2: will the optimization of the value of the information for the "actors" involved depend on the reliability, relevance, and usefulness of the information for the receiver and how the information allows the receiver to make decisions?

For example, a financial report can give value to a financial manager, who is able to interpret it, for example, the "financial health" of a business unit, based on the figures presented. In this case, the report can be prepared by a controller, who is a highly trusted person by the financial manager, and who always provides a report with an extensive list of additional clarifications, in addition to the analysis on the "financial health" of the business unit and ends with an opinion on the actions to be taken by the financial manager. With this approach, the report is relevant to the financial manager due to the controller's approach. The financial manager can decide/act based on the information received. It relies on its controller and the data systems that have been used by the controller, which are the basis of trust, but probably also the controls that have been incorporated (through an audit of the data systems, and a series of system controls). The reliability of the information, in this example, is easy to verify, the relevance and optimization of the value of the information to the financial manager. If none of this applies, the financial manager will not make any decisions. The value of the information for the receiver and the producer would then be useless.

In addition to the reliability and relevance of the information, usability is a factor that can contribute to the optimization of the value of the information for the receiver, as it determines how the receiver makes decisions. The use of information involves the selection and treatment of the information, to answer a question, to solve a problem, to make decisions, to negotiate a position or to understand a situation. People relate the facts to play a role in the process of making use of information, such as the level of subjectivity and intersubjectivity between the producer and the receiver, but also culture, physical context, and mental models.

 Hypothesis 3: Will the optimization of the value of information for the "actors" involved depend on the context in which the information is shared? Can this be influenced by the "actor" who governs governance through information interactions (production and reception), which follows the principles of the economy, political, financial, and / or social mechanisms?

This hypothesis covers the most complex aspects but is the most interesting part of this research. Our definition of information governance aims to go beyond the regular limits of information governance, considering the possibility of influencing the evaluation of information, through governance, interaction, or information flows. This hypothesis is supported by Huizing and Bouman (2002), which describe the information space in transactions from the point of view of knowledge management. They developed "a dynamic framework for the management of the information transaction space in economic theory, which integrates the coordination, cost, and learning of perspectives on this topic". In addition, they evaluate four possible governance approaches to transaction space management Raban and Rafaeli, (2003) the company / organization in which: "a vision on the viability of the information society is constructed through the evaluation of the vitality of the exchange of information and the flows within it". In some cases, this may be a one-way issue, but the most frequent is that a flow of information goes from producer to consumer without having reached the same level of understanding, Griffith et al, (2003).

On the other hand, the governance of the interaction (s) will depend on the objective of the "actor" responsible for managing the interactions. He may want to strictly control the process and the result of the flow of information, independent of the receiver (the value), for example, a Financial Manager wants to control all the information of an annual report. In other cases, governance will be created to facilitate, creating a context where information flows can move freely (e.g. creating a *newsletter* to support workers in knowledge sharing), so that synergy between producers and information receivers can reach its ideal value. A third objective may be to organize flows to optimize the effectiveness for the information receiver.

On the other hand, information flows follow the rules of the economy, the mechanisms of politics, finance, or society. This is clarified through an example in the social mechanism, in some of the police departments in which they are evaluated annually through a series of performance indicators, giving an overview of their policing activities throughout the year. An example of such an indicator is the total number of speeding fines throughout the year. While the number of speeding fines can be measured objectively, it seems that most departments are able to meet the required standard for each year. Taking a closer look reveals a consequent spike in the number of speeding fines in December. Apparently, police departments put more effort into passing speeding fines at the end of the year to get the required standard.

Consequently, other activities may be neglected in that month. It is questionable whether the effectiveness of the police department is ideal because of this behavior. On top of that is the value of the useless performance indicator, because it does not give a good perspective of policing activities throughout the year. The value of information for all actors involved is not optimized. This shows that the flow of information relating to performance indicators leads to a desired behavior, a social mechanism. Taking this into account, applying effective information governance would probably lead to a data system where performance indicators are measured at random rather than an annual basis.

Similarly, the economic mechanisms of information flows play an important role, especially as information is expensive to produce, but too cheap to be reproduced, as people are conscious of sharing it without a reward. Can the company/organization in which "useful information" does not come for free. The creation and governance of an information flow will require the attention ofthese mechanisms.

To complete the optimization of the value of the information that will define a hypothesis about the third "actor", the producer of the information. The producer may want to build the information in themselves, but may also be an aggregator, consolidator, or assimilator of information produced by others. It is not an enviable work; it usually results from the balance between the various information actors. Therefore, the fourth hypothesis focuses on the restrictions of the information producer.

 Hypothesis 4: will optimizing the value of information for all actors involved depend on the restrictions of the information producer?

The position of the producer is better understood when considering all possible restrictions:

i. Are there legal and regulatory rules that prescribe how information is displayed or restricted in the publication of certain information?

ii. The information contained in the information flow can be produced exclusively for this flow, but often the information is based on data for multiple purposes. Can this lead to restrictions on the availability and use of data?

iii. If the information is not directly available, the costs must be made to produce the necessary information. Costs can be are stiction, Huizing and Bouman, (2002).

iv. The position of the producer in the organization and in the relationship with the other "actors" and / or interested parties will be in determining the ease of obtaining the necessary information for the flow.

In most cases a flow of information does not have a single meaning, but two ways. In this case, hypotheses 2 and 4 are interchangeable. The last three hypotheses involve exchanging information and optimizing its value is a game between the three groups of "actors". The options for optimizing your value will have an impact on the design and organization of information processes and your underlying data. Focusing only on an "actor", for example, to optimize data systems on the producer side, can lead to sub-optimization. Information governance assumes that it is necessary to consider the three "actors".

Thus, information is closely related to the disciplines of communication. But our research focuses on information-related aspects, not communication-related aspects. We are focused on making sense, for example, of "financial information", but not on how the Financial Manager gives a press conference to explain the figures. Other related disciplines are "information behavior", "information governance", "knowledge management and learning in organizations".

Governance as an interaction

Governance is generally interpreted as a hierarchical structure of guidelines, policies, responsibilities, and procedures to ensure a certain level of control within an organization. But the definition of information governance does not necessarily mean restricting its use to a specific framework. Information governance can range from a set of policies, a way of working, or creating a space within a predefined agreement (such as an online community), or it may also apply to an Accounting map, rules within a country (such as IFRS, International Financial Reporting Standards).

As discussed earlier, the governance approach to the use of information is questioned. Other governance work can be more effective in regulating the use of information, provided that the exchange of information is not limited to the boundaries of an organization. In recent years Koeman's work has generally been accepted as an important contribution to the approach to governance, both in theory, Kooiman, (2007) and in practice, Kooiman, (2005). At this point we will discuss the approaches he has proposed and the relationships we anticipate for the use of information.

The basis for governance, according to Kooiman (2005 and 2007), is the concept of interaction. The "actors" within a given context interact, collaborate, and are involved in many relationships. The "actors" alone do not have the knowledge to solve complex, dynamic, and diverse social challenges. They need a governance approach to streamline interaction patterns. Kooiman defines three approaches to governance as a way of "governing."

The hierarchical approach can be considered as the "classic" approach. It was defined many years ago and is traditionally the basis for a way to manage an organization or a country. The hierarchical approach is based on management and control, Kooiman, (2007). The key element of management is "direction and control", i.e. it is

the way to ensure that the rules are followed. In modern times, this type of governance shifts from regulation to activation, but the basis is composed of a centralized approach directed, including a structuring framework, using structure and concepts.

It is a topic for the discussion of whether this framework is always effective for all forms of information governance, that is, the sharing of formal and informal information, which is not necessarily restricted to organizational boundaries. The leak of the information means that the implementing controls may not sufficiently guarantee the use and sharing of control information.

Because people act in view of the sharing and use of information, they are not based on the belief of information, but on the value they give to information. The predicted hierarchical control probably will not stop them from sharing information the way they prefer. At the top an information is difficult to produce, but easy to reproduce. Therefore, it is easy to share the information uncontrollably.

In his book Kooiman (2007) he defines two other approaches to governance, known as co-management and self-governance. The essential element of co- management is that the parties that interact have something "in common" to pursue together, that somehow autonomy and identity are at stake. A good example of co-management is network administration. This is a field of research in development, which began with Castells (1996), but with more recent developments on network management by Provan and Kenis (2008).

Co-governance includes the main forms of "horizontalization" that govern: "actors", communicate, collaborate, and cooperate without a central or dominant "actor" of government. When the "actors" involved and their relationships are known, these can be the basis for how to share information in an acceptable way. While the formal hierarchical relationship may exist, for example, in a customer- supplier situation, the way to share it can be based on more horizontal governance. Co-governance can lead to a greater willingness to share information or to ensure a high level of reliability of shared information, because a consensual set of rules has been defined and enclosed.

Ute-governance refers to the capacity of social entities to govern themselves autonomously. Communities created on the Internet self-govern form, where and during the process, but values and standards can be defined in the way information is shared. Kooiman talks about formal agreements, self-application of rules, and the semi-formalization of codes of conduct. Other examples can be found in mass psychology, Van Ginneken (2009). Self-government can be an effective approach to lessening the chance that information sharing will be abused and increase the chances that the use of information will be optimized in some sense.

Kooiman's approaches offer a wide range of possibilities on information governance, each with its own capabilities and flaws. This leads to new research questions about the approach that can contribute to a successful way of sharing information, for example, giving plenty of room to innovate with information, or to mitigate the risks of information abuse. We conclude this point with a hypothesis that relates the "actors" and the approach to governance that can be applied:

- **Hypothesis 5:** is there a direct relationship between the constellation of "actors" involved and the effectiveness of the information governance approach?

As discussed earlier, the optimization of the value of information is related to the three groups of "actors" involved. These "actors" do not necessarily belong to the same organization. For example, the producer and receiver may belong to different organizations and the "governing" actor can be part of any of them. In this case, the "optimal" governance approach can be a form of co-management, such as a network governance approach. Other examples and approaches can be applied as well.

k. Knowledge Governance (GovC)

According to Joskow and Schmalensee (1983 apud Hunt; Shuttleworth, 1997, p. 2), it would theoretically be possible to replace command and control relationships within a given company by contractual relationships between different companies, in order to perform the same functions as the original company. Here, the term "contractual relations" may mean any type of agreement entered to stipulate the terms under which transactions between these different companies would take place. However, these authors highlight the enormous difficulty, if not the impossibility, of specifying in a perfectly complete way all the terms necessary for such contracts, so that all possible situations were covered by them.

All of this could be so laborious and costly to negotiate, litigate and execute that it simply would not be worth it, being much more efficient to maintain activities within a single company, where a manager would take care of all activities. The technical term for the costs of negotiating, litigating, and executing the required procurement mechanisms is "transaction costs". According to Hunt and Shuttleworth (1997, p. 3), transaction costs are those associated with making contracts to replace command and control. In fact, the interesting reasoning above originated in a much earlier study.

Ronald H. Coase, winner of the 1991 Nobel Prize in Economics, published in 1937 an article that would become a classic. "The nature of the firm" raised fundamental questions about the concept of enterprise in economic theory. Coase (1937) proposed that the comparative costs of organizing transactions through markets or within companies would be the main determinants of their size and scope. Coase's article presented a "something primary" question, as Fiani referred to it (2002, p. 267). This question can be presented as follows: "why does a

company arise in an economy specializing in trade?"

Coase (1937) used transaction costs as the factor capable of explaining why markets are used in some cases and in other cases the hierarchy, with all its possibility of bureaucratic inefficiency, be chosen. Williamson (1975, 1985, 1996, 2002) laid the foundations of the so-called Transaction Cost Savings (ECA) in several texts. It affirmed the idea that the extent to which companies integrate different activities under direct ownership reflects the comparative costs of transactions between different governance mechanisms, especially "markets" and "hierarchies".

In line with this proposition, Fiani (2002, p. 267-268) says that the ECA deals organizations "with how companies and organizations conduct transactions and protect themselves from the risks arising from them" Also according to Williamson (1975, 1985), all transactions, whether between people, between companies or between people and companies – both buying and selling, command and subordination – involve costs. These transaction costs are increased by limited rationality and the opportunism of own interests inherent in human nature. The costs of a transaction also depend on the specificity of the assets, the degree of uncertainty and risk involved in the transaction, as well as the frequency with which they are carried out and their duration. The different actors involved in transactions sometimes make mistakes, sometimes cheat.

Thus, in the theoretical framework built by the ECA, the activities will be integrated under a single direct property where it is cheaper to avoid errors and fraud by bureaucratic methods of hierarchy. Managing activities by open markets, on the other hand, will be more appropriate when you can better control unreliable and opportunistic behavior by trading with independent contractors and competitors. According to Williamson (1985, 1996), therefore, vertical integration simply reflects the superior efficiency of hierarchies over markets in the organization of the various transactions involved in a distribution and supply chain. Horizontal integration – or diversification into parallel businesses – takes advantage of hierarchies in the case of synergy management and capital transfers between elements of a corporate portfolio. It is interesting to note that, according to Barney (2007,

p. 319), transaction cost savings give very different recommendations regarding the decisions of choice about the vertical integration strategies of those given by the Resource-Based Vision(VBR).).

In the latter, companies should perform only the activities for which they have distinctive skills and hire the other. Meanwhile, the ECA encourages companies to maintain internal activities for which they are vulnerable to error or bad faith. In Whittington's view (2006,

p. 99), in Williamson's reasoning it is distrust, not competence, that determines the limits of the company. If as an element of analysis of verticalization strategies in companies and large corporations, the ECA faces other theories that point to different decision-making methodologies, in the field of analysis of how institutions affect economic development, the ECA has proven to be a much more powerful tool.

A group of management researchers, whose largest exponent has been Nicolai Foss, has been collaborating for the vision of the knowledge-based company/organization, from a perspective of the ECA and the Austrian school in which Hayek is part of the basic idea that distributed knowledge is a strong restriction on the use of planned coordination, that is, a problem of the use of knowledge, which is not given to anyone in its entirety. Critical of the concept of routines and training, KGA theorists prefer the use of micro fundamentals in management research, pointing out the need for greater emphasis on avoiding regency opportunism and reducing transaction costs, highlighting how property rights concepts and agency theory can help better control the strategic management of knowledge assets.

The KGA criticizes the arguments currently widely disseminated by other lines of analysis, which highlight the importance of knowledge creation and the role of networks, which cross the borders of companies. Do not agree that networks become units of analysis more important than the legal limits of the company / organization (i.e. those that are defined in terms of possession of assets). They question the lack of proof for the argument that the economic organization would be undergoing an important transformation in the knowledge economy that we are living in. The KGA also criticizes the idea that, because of these changes, the relations of authority would be losing importance, as well as that the legal and property definitions based on the limits of companies would be becoming irrelevant. His starting point is that, inspired by Nelson and Winter's seminal work (1982) on the evolutionary economy, a vast literature has emerged, in which organizational routines, resources and skills are fundamental to explain the idiosyncrasies, the differences behavior of companies / organizations.

However, according to Foss (2007), most studies aimed at these phenomena do not go deeper into the possible explanations of heterogeneity at the company level. According to him, it is clearly important to understand how individuals and interactional processes allow and/or prevent the development of organizational skills and capabilities. At KGA, the companies are contractual entities focused on transactions, characterized by complementary assets, employment contracts, authority (concentrated decision rights), and the company/organization limits are defined in terms of asset ownership, and organizational knowledge is seen as collective tacit knowledge, and no evidence demonstrating its existence is recognized.

IV. FINAL CONSIDERATIONS

After conducting a systematic review of the literature, and the respective descriptive analyses of the selected publications, it was noticed that the emergent theme of Governance of Data, Information and Knowledge are emerging concepts in the field of Information Sciences, Business Sciences and Data Sciences. And there are different views on the term Governance, because it is a complex concept that can be explored by distinct visions, and that, because it is interdisciplinary crosses the fields of business management, information management, ICT management and human resources management, Foss, (2003; 2007); Foss E Klein, (2008).

As a conclusion to this research, it can be considered that Data Governance, Information and Knowledge (GovDIC), more than its concept, should be considered its main objectives, which are:

- Data Governance, (GovD):

i Turn information into data that can be stored by ICT's.

ii Management of data stored by ICT's.

iii Management, control, and security of data stored by ICT's.

- Information Governance, (GovI):

i How does information influence organizational truth and its meaning?

ii When can one change the informational meaning of the context?

iii What is the information relevant to the business?

iv How can the reciprocity of information between the organization and the ecosystem be allowed?

v How can passive information consumers become active communicators? vi How can organizations profit from the abundance of information?

vii What information is based on the strategy of companies/organizations?

- Knowledge Governance (GovC):

i Privilege organizational knowledge in a strategic way.

ii Ensure the survival and perennity of companies / organizations through the management of knowledge assets.

iii Control and monitor the processes of sharing, exchange and transfer of knowledge and technologies and.

iv Outline GovC strategies, policies, and practices.

With the implementation of The GovDIC, companies /organizations will be able to consolidate collaborative management paradigms in order to share, exchange and transfer knowledge from the intra-organizational levelto the inter-organizational level and in learning networks.

In this line of argument, Foss (2003, 2007) points out that in addition to generating knowledge processes, it is essential to choose a corporate governance structure that provides collaboration, sharing at multilevel. In addition, there is a need to define "mechanisms of governance and coordination [...], in order to influence favorably the processes of transfer, share and creation of knowledge", Foss, (2003, p.11).

Finally, it is concluded that GovDIC must be implemented in companies /organizations to promote the balance between dependence and power through a set of formal and relational mechanisms for the optimization of economic results. And, as there is not yet a model of data governance, information and knowledge to be followed, this study offers contributions to the elaboration of a model that recognizes knowledge, as a critical value for the success of companies / organizations, offering support to the principles and mechanisms to be respected.

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