IDENTIFYING AND COMPARING INFORMATION CULTURES: A PERSPECTIVE FROM RESEARCH INSTITUTES AND ACADEMIC LIBRARIES

Dean Pereira de Melo
Doutorando em Ciência da Informação pela Universidade Federal de Minas Gerais, Brasil.
E-mail: deanmelo@petrobras.com.br

Benildes Coura Moreira dos Santos Maculan
Doutora em Ciência da Informação pela Universidade Federal de Minas Gerais, Brasil. Professora da Universidade Federal de Minas Gerais, Brasil.
E-mail: benildes@gmail.com

Patrícia Costa
Doutoranda em Ciência da Informação pela Universidade Federal do Rio de Janeiro/Instituto Brasileiro de Informação em Ciência e Tecnologia, Brasil. Bibliotecária da Universidade Federal do Rio de Janeiro, Brasil.
E-mail: iedapm@usp.br

Paul Cleverley
PhD. em *Information Science & Technology* pela *Robert Gordon University*, *United Kingdom*. Professor visitante da *Robert Gordon University, United Kingdom*.
E-mail: paulhughcleverley@gmail.com

Abstract
This article aims to identify the informational culture of two research institutes and an academic library, to assess the alignment of this culture with the organizational strategy. The method adopted follows the phases of a Survey research, where informational cultures are examined through a questionnaire. The respondents were all employees involved in operational routines at the three institutions. The Favorability Index is used to qualitatively measure the dominant informational culture, enabling comparison between the analyzed organizations. This is a multiple case study combined with qualitative analysis. The results indicate that the analyzed academic library is dominated by a relationship-based information culture. Research institute A has a results-oriented culture as its predominant culture, while research institute B is not dominated by a single culture, showing a tri-polar character of relationship, result, and risk. In conclusion, it can be said that the findings are unexpected. Given that innovation and risk are significant strategies and objectives of research institutes, the dominant informational culture is not aligned with such strategies. Furthermore, the tri-polar culture of institute B contradicts the literature stating that organizational information culture tends to be dominated by one or two cultures. This may suggest that the interaction between informational cultures may be more complex than previously thought, offering new possibilities for future research.

Keywords: *information culture; academic libraries; information management.*

IDENTIFICAÇÃO E COMPARAÇÃO DE CULTURAS INFORMACIONAIS: UMA PERSPECTIVA DE INSTITUTOS DE PESQUISA E BIBLIOTECAS ACADÊMICAS

Resumo
Este artigo tem como objetivo identificar a cultura informacional de dois institutos de pesquisa e uma biblioteca acadêmica, para verificar o alinhamento dessa cultura com a estratégia organizacional. A abordagem metodológica adotada segue as fases de uma pesquisa Survey, onde as culturas informacionais são examinadas por meio de um questionário. Os sujeitos respondentes foram todos, nas três instituições, funcionários que atuam nas rotinas operacionais. O Índice de Favorabilidade é utilizado para fazer a medição qualitativa da cultura informacional dominante o que possibilita a comparação entre as organizações analisadas. Trata-se de um estudo de casos múltiplos combinado com análise qualitativa. Os resultados indicam que a biblioteca acadêmica analisada é dominada pela cultura da informação baseada no relacionamento. O instituto de pesquisa A tem uma cultura orientada a resultados como sua cultura predominante, enquanto o instituto de pesquisa B não é dominado por uma única cultura, mostrando um caráter tripolar de relacionamento, resultado e risco. Como conclusão, pode-se dizer que os resultados encontrados são inesperados. Uma vez que inovação e risco são estratégias e objetivos marcantes dos institutos de pesquisa, a cultura informacional dominante não está alinhada com tais estratégias. Além disso, a cultura tripolar do instituto B contradiz a literatura que afirma que a cultura da informação organizacional tende a ser dominada por uma ou duas culturas. Isso pode evidenciar que a interação entre as culturas informacionais pode ser mais complexas do que se pensava, oferecendo novas possibilidades para futuras pesquisas.

Palavras-chave: cultura informacional; bibliotecas acadêmicas; gestão da informação.

1 INTRODUCTION

Information culture (IC) has been studied by scholars in organizational studies since the 1980s (Ginman, 1988). New research projects have applied empirical methods to both collecting data and characterizing the informational culture using quantitative or qualitative measurements. According to Kisilowska (2015), it is vital to cover different aspects of information culture ("aspects, varieties, and contexts of information") as a new perspective of information science. The iSchool movement also reiterates that information schools are changing their focus from agency perspective to contexts (Dillon, 2012) where IC approach can be useful.

This article applies the typology of IC developed by Choo (2013) to identify the dominant behavior of employees when manipulating information. According to the mentioned author, IC is defined "as the socially shared patterns of behaviors, norms and values that define the significance and use of information in an organization" (Choo, 2013, p. 775).

The relationship between IC and business performance has been investigated and the findings show that corporate performance is positively affected by IC (Ginman, 1988; Adenekan, 2019). However, this correlation should be detailed because it is essential to align the right IC with the enterprise strategy. In other words, there is no advantage if the dominant IC is rule-following, and the company seeks to be innovative.

An aspect in which the literature has been silent so far is the role of the statistical measurements to explain not only the dominant IC, but also to explore the degree of the dominant culture. In his seminal article, Choo (2013), it does not define a scale in the IC diagram consequently leading to a non-standardization which compromises the comparison among research studies.

The purpose of this paper is to report findings from an investigation on IC in two research institutes and academic libraries, exploring the relationship between IC and the strategy of the organizations. Moreover, a qualitative approach is applied to compare and understand the dimension of IC in each organization. Considering this context, the following research questions have been elaborated:

RQ1. What is the dominant information culture in the studied research institutes and academic libraries?

RQ2. Is there an alignment between the general strategy of the organizations and the IC?

To answer the questions proposed, firstly the seminal papers of IC and empirical studies that identified the dominant IC were reviewed. Secondly, the research methods addressing the design of the data acquisition instrument and the data analysis procedures were demonstrated. Then, the results were presented through the IC profile of each organization followed by discussions about its alignment with the general strategy and comparisons with the related literature. Finally, the article was concluded by evaluating the qualitative approach and how it is suitable for IC definition and comparison among organizations.

2 EVOLUTION OF INFORMATION CULTURE OVER THE TIME

Although the concept of IC was mentioned in the early 1980s, a robust approach to the topic was only carried out in 1988 and the approach would not become popular until the 1990s. The pioneering paper published by Ginman (1988) connected the ideas of IC and business performance. Over time, the concept of IC has evolved, and it is possible to say that the current paradigm of IC in organisations is supported by seven foundational conceptions: 1) There are factors that determine IC in organisations; 2) Typification of IC; 3) Conceptual model for assessing IC; 4) Relationship between informational culture and information use; 5) Relationship between informational culture and information management in organisations; 6) Four IC typologies and 7) Three level pyramid model of IC (Chart 1).

Chart 1 – Foundational concepts related to the evolution of IC

Foundational conceptions	Description	Author
There are factors that determine IC in organisations	"The adaptation of a company's business culture, its problems as determined by the life cycle, its approach to the market and its IC emerge as the result of internal interaction (…) This state of harmony is not easily disturbed.	Ginman (1988)
Conceptual model for assessing IC	Encapsulate the essential elements of an IC along with assessment criteria. Recognize the main components of IC to be assessed: communication flows; cross-departmental partnership; information value; information system management; information management; internal environment and professionalization.	Curry and Moore (2003)
Relationship between IC and information use	The authors found that IC is determined by a large number of variables. Also, it can be a function of the maturity of development of an organization. IC significantly affects	Choo *et al*. (2008)

	information use outcomes.	
Relationship between IC and information management in organisations	The findings show that different values and attitudes to information are influencing factors of the IC in the organizations studied. Knowledge and understanding of the features of IC will assist with addressing the challenges of organizational information management.	Oliver (2008)
Four IC typologies	Four IC types are proposed: result-oriented culture, rule-following culture, relationship-based culture and risk-taking culture. One or two IC typology would prevail.	Choo (2013)
Three level pyramid model of IC	IC behavior can be analyzed and discussed in terms of preferences, considerations and infrastructure (level 1); skills, knowledge and expertise (level 2) and governance trust (level 3).	Oliver and Foscarini (2014)

Source: by the authors (2024)

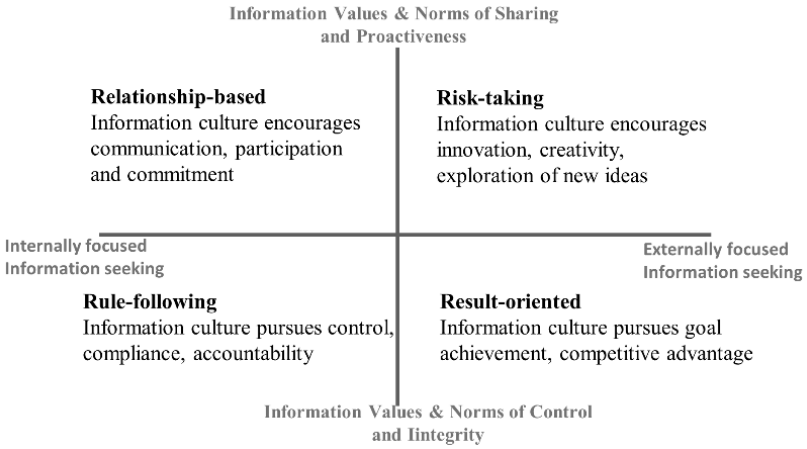
The Chart 1 represents the incremental evolution that occurred in research on IC from a chronological perspective, focusing on the organizational context. The authors cited were selected based on the study by Moraes and Barbosa (2015), who compiled empirical research and proposed models of IC. The criterion used for selection was the identification of foundational concepts proposed for IC studies that became cited in subsequent studies. This advancement should be highlighted for providing accurate investigations of IC through frameworks, procedures, representations, and assessments in different types of organisations.

In the 1990s some important contributions and developments were made, such as the initial idea of IC attributes like values and information norms (Grimshaw, 1995). In addition, types of IC were identified by Davenport and Prusak (1997), namely closed or open cultures, those focused on internal or external issues, and those oriented towards formal channels of information or media.

In the 2000s there appeared more papers applying the idea of IC in particular industries. Widén-Wulff (2000), for example, studied pharmaceutical firms, Curry and Moore (2003) the healthcare sector, and Choo *et al*. (2008) a law firm, an engineering company and a public health agency. This empirical research dramatically improved the theoretical basis of IC. These studies were responsible for the development of conceptual models used to assess IC, made concrete the concept of components of IC, and demonstrated that IC affects information use outcomes.

Even with all the theoretical developments, there was still no way of representing a typology of IC until Choo (2013) proposed one, based on a typology developed to identify dominant cultural styles in an organizational culture. Two basic dimensions were proposed, labeled “Information values and norms” (vertical axis in Figure 1) and “Information behavior” (horizontal axis).

Figure 1 – Dimensions of IC. Vertical axis related to norms and values, and horizontal axis related to behavior



Source: Choo (2013)

Consequently, four quadrants are created that represent IC types: result-oriented, rule-following, relationship-based, and risk-taking. Each culture type has specific attributes under the following dimensions: primary goal of information management, information values and norms, information behaviors in terms of information needs, information seeking, and information use. Furthermore, Choo's hypothesis is that, for many firms, one or two culture types would prevail (Choo, 2013). The framework developed by Cameron and Quinn (2006) was utilised by Choo (2013) to propose the typology illustrated in Figure 1. The relationship between organisational culture and informational culture remains an important research theme in information science (Vassi; Valentim, 2023).

The typology proposed by Choo (2013), has been analyzed empirically in different contexts mainly in innovative contexts such as universities (Vick *et al*., 2015; Zamoryonova, 2015; Lian *et al*., 2016; Virkus and Salman, 2021). Vick *et al*., 2015 investigated 12 innovation project teams. Among them four presented risk-taking as the first or second dominant culture. Five teams presented relationship-based, all of them as the first dominant culture. In terms of rule-following, 5 teams presented this IC typology. Finally, only one team showed result-oriented as dominant IC. It is worth noting that even in technological context, where agile method is widely applied, it is not common to find risk-taking and result-oriented IC. Another study involved students, teachers and staff in the context of University (Zamoryonova, 2015). According to the author:

> The priority is one type of information culture – Rule-following – usually takes 62% defining the university as a stable, hierarchical system based on defined regulatory responsibilities, positions, rules. 45% identified culture Result-oriented – result-oriented, because the university is the company that wants to be competitive in the market. 37% Culture Relationship-based – Based on the relationship means below average degree of cooperation and collaboration that creates somewhat unbalanced university work. Risk-taking – Risk acceptance is almost not represented at only 13%, showing the complexity of the implementation of new, innovative and low levels of adaptability to unstable market conditions (Zamoryonova, 2015, p.357).

Virkus and Salman (2021) also investigated higher education institutes in Estonia. It identified two dominant ICs: relationship-based and risk-taking. In this case, the participants

were a director, programme managers, project managers, heads of study areas (managerial positions) professors, researchers, and lecturers (academic roles). Recently, two Chinese companies were also studied in terms of IC (Lian *et al.*, 2021) representing the private sector. According to the author, the first company listed in China's top 500 enterprises presented result-oriented culture. On the other hand, the second company presented rule-following as the dominant IC. Although there are no previous studies addressing IC in academic libraries, literature regarding knowledge management and the nature of academic libraries (Koloniari and Fassoulis, 2017; Gayton, 2008) will shed light on results discussion.

3 METODOLOGY

Two research institutes and an academic library were invited to be part of this research. Due to reasons of confidentiality the name of the institutions cannot be disclosed being called RI-A, RI-Ba and Academic Library. RI-A is part of a multinational oil and gas company while RI-B, is an independent institution which focuses on sustainable management of land, crop and natural resources, headquartered in Aberdeen, UK. The academic library is in Brazil, Rio de Janeiro State. It is important to highlight what is considered an academic or university libraries. According to Cunha and Cavalcante (2008) these libraries are:

> maintained by an institution of higher education that meets the information needs of the faculty, students and administrative staff, supporting teaching activities and activities of research and extension. It can be a single library, or several libraries organised as a system or network (Cunha; Cavalcante, 2008, p. 53).

From the definition above it can be inferred that university libraries are entities that have the ability to articulate a network of information exchange, not only for the academic community, but also for the entire external community. Considering these characteristics, this study is considered a multiple case study combined with qualitative analysis.

The investigation was conducted by questionnaire survey distributed by email. In the case of RI-A, the questionnaire was sent to 232 employees with 32 respondents (13,7%). In RI-B the questionnaire was sent to 82 employees and 35 responses were received (42,6%). In the academic library, 30 employees were invited to respond and 19 completed the answers (63%). The sample population was determined comprehensively. It means that a specific group was selected to be part of the study to achieve representativeness of the companies involved.

3.1 Data acquisition

As mentioned before, an online questionnaire was used to collect data from the participants. Wilson (2013, p. 29) defines questionnaire as: "written, online, or verbal tool for collecting data from individuals or groups that can be analyzed using qualitative and quantitative techniques".

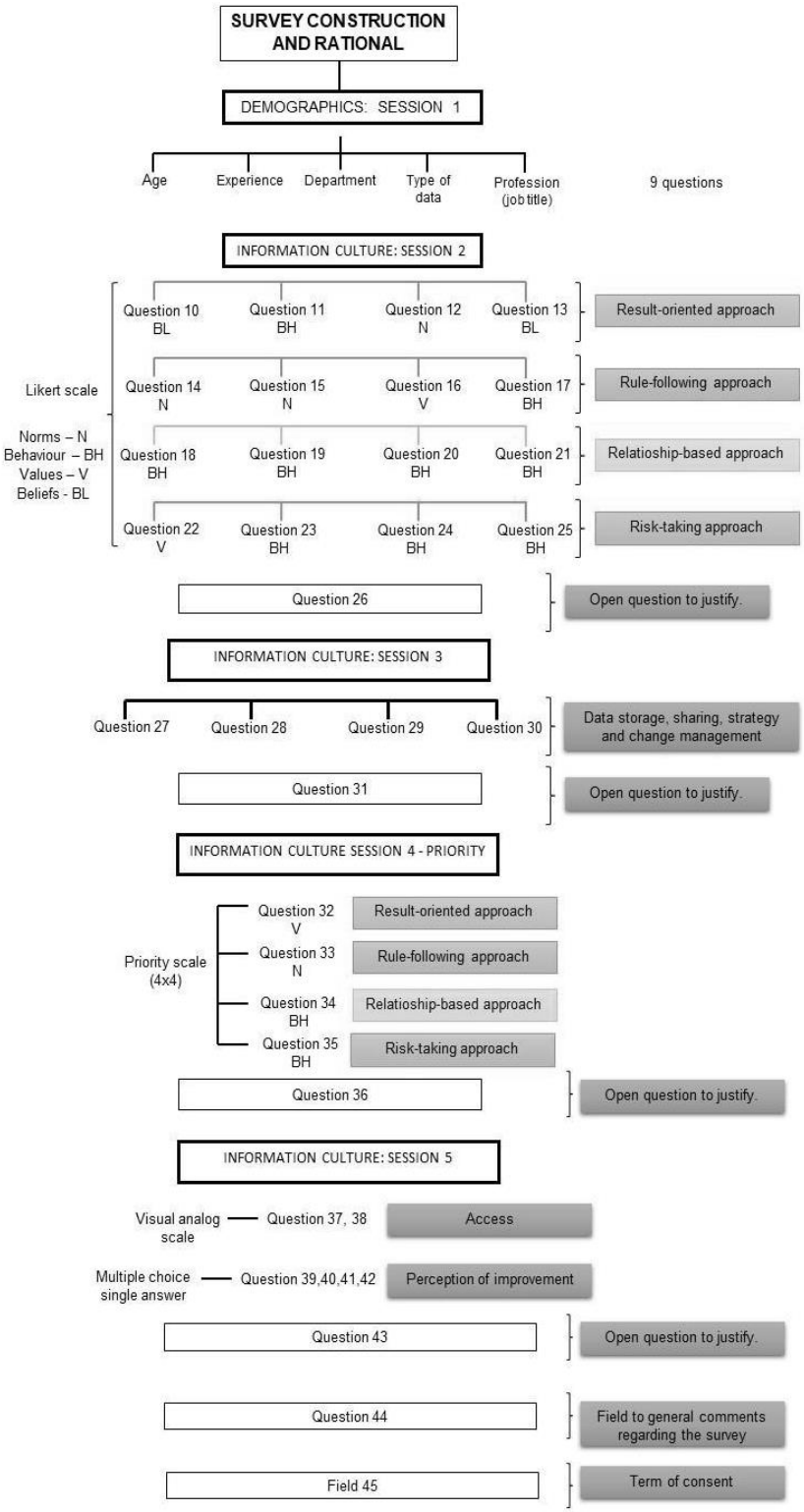
There are many pitfalls that researchers should be aware of when using this method. A practical procedure was followed to ensure the correct construction and use of the survey (Wilson, 2013).

Recognizing that questionnaires have limitations, the procedure mentioned was followed step by step. Each question had a clear connection with the proposed study. This was achieved through the steps suggested in the planning phase of the methodology. The first nine questions, called demographics, were used to obtain information about the participants (Dillman, 2000) and enable data analysis by different groups. Each question from 10 to 45,

except those asking for consent, was related to some IC typology or characteristic, such as norms, values, behaviors, or beliefs.

Consistency of the questionnaire was achieved through a mix of techniques. The questions were inspired by others' surveys (Choo *et al.*, 1998; Curry; Moore, 2003) and guidelines (Oliver, 2017), some of them were rephrased to be more direct and less susceptible to bias, and to improve the experience for the respondents by offering different ways of answering. Pilot tests and feedback were vital in helping to make some of the concepts clearer. Each question was developed to capture specific dimensions of the IC: norms, behavior, beliefs, and values (Figure 2). The IC profile was generated based on qualitative analysis of the questions 10 to 25. Other questions, including those open, were used to confirm the predominant IC observed by means of the IC profile.

Figure 2 – Rationale behind the survey questionnaire



Source: by the authors (2024)

3.2 Data analysis

The data analysis plan was based on five steps: framing the problem and asking questions; acquiring and preparing the data; exploring the data; modeling and evaluating the data; and communicating the results and/or deployment (Ganguly, 2017).

A link to the questionnaire was distributed to professionals working in the exploration area through the representatives of these companies. For the research institutes the questionnaire was built using RedCap developed by Vanderbilt University. For academic libraries, Google Forms was applied replicating the same questions. All responses were anonymous.

The data were prepared for interpretation by considering the following aspects (Wilson, 2013):

1) coding and treating answers like “Not applicable (N/A)” and “Refuse to answer”;
2) coding and dealing with missing data;
3) coding unusual answers;
4) coding open-ended data.

The representation and typologies identified by Choo (2013) were used, called spider diagrams. Thus, an IC profile was created for each institution involved. The first step was to turn the scales (Likert scales) into numbers. Questions 10 to 25 were used to generate the IC profiles directly. Questions 10 to 25, representing degree of agreement, were coded with 1 for strongly disagree, 2 for disagree, 3 for neither agree nor disagree, 4 for agree and 5 strongly agree. Questions from 26 to 35 were vital to support the interpretation of the IC identified. Figure 3 shows an example of the quantification strategy. The favorability index is calculated considering the answers 4 and 5, agree and strongly agree, respectively (Silva *et al.*, 2008). Therefore, 60% of favorability means that 60% of the respondents have an agreement of 4 or 5 for a given sentence. The arithmetic mean was used only to represent the IC typology as just one value by using the spider diagram considering the favorability of each group of four questions (Table 3).

The authors are proposing a contribution in terms of methodology through the favorability index applied to the Likert scale for measuring IC. The likert scale, as an ordinal scale, is limited to use descriptive statistics (Barry, 2017). Therefore, once adopting this scale to collect data the best way to demonstrate it is by using a composition of frequencies. It seems to be a good option for comparing IC among studies that used likert scales (Favero *et al*., 2009).

Figure 3 – Data codification strategy of the core questions used to define IC

Number	Sentences to be evaluated	Example of answer	Answer coded	Information typology related
10	My performance is evaluated based on the data I generate for stakeholders or the achievement of research objectives.	Disagree	2	Result-oriented
11	I seek to interact with the users of the data I generate in order to have feedback on how helpful they were.	Neither agree nor disagree	3	Result-oriented
12	The norm is to manage information with a focus on supporting decisions.	Neither agree nor disagree	3	Result-oriented
13	I understand the relationship between the data that I generate and the success of the Institute.	Neither agree nor disagree	3	Result-oriented
14	The data I generate is used to control internal processes of the department.	Agree	4	Rule-following
15	I generate data that is used to standardize processes and ensure compliance.	Agree	4	Rule-following
16	Internal standards are important sources of information for me.	Agree	4	Rule-following
17	I avoid performing tasks that are not in the previously established workflows, during data processing.	Strongly agree	5	Rule-following
18	Storing the data in a way that facilitates access to any stakeholder within the Institute is part of my routine.	Agree	4	Relationship-based
19	I look for data to enrich my project in external sources, such as articles and public databases.	Disagree	2	Relationship-based
20	I exchange information with people who work in my department, even though they are working on activities and themes different from mine.	Strongly agree	5	Relationship-based
21	I strive to get new data when those that I already had prove insufficient or when someone tells me about the existence of others that may be interesting to my project.	Strongly agree	5	Relationship-based
22	Information is managed to facilitate and promote innovation, creativity and exploration of new ideas.	Agree	4	Risk-taking
23	I look for data and exchange information with other departments (e.g. others science groups) even if it involves risks.	Neither agree nor disagree	3	Risk-taking
24	I test new ways to analyse data and generate new products (e.g. maps, new data visualisation) even if it involves risk.	Neither agree nor disagree	3	Risk-taking
25	I have contact with experts in technologies related to data analysis.	Strongly disagree	1	Risk-taking
26	Open question			
27	There are clear criteria on where and how to store the data I generate.	N/A	N/A	Supporting question to assess rule-following organizational behavior
28	Less formal mechanisms for sharing data	N/A	N/A	Supporting question to assess relationship-based organizational behavior
29	My work processes are changing to ensure greater data integration.	N/A	N/A	Supporting question to assess risk-taking organizational behavior
30	There is a clear strategy on how to manage the data to ensure efficiency in the decision-making process.	N/A	N/A	Supporting question to assess result-oriented organizational behavior
31	Open question			
32	Reliability of the data created.	N/A	N/A	Supporting question to assess result-oriented behavior
33	Ensure compliance of the data created.	N/A	N/A	Supporting question to assess rule-following behavior
34	Make the data available to other teams.	N/A	N/A	Supporting question to assess relationship-based behavior
35	Look for new ways to integrate and analyze large volumes of data.	N/A	N/A	Supporting question to assess risk-taking behavior

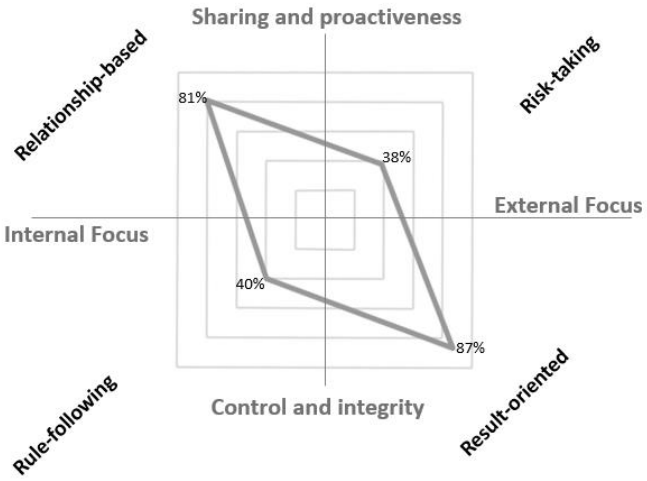
Source: by the authors (2024)

4 RESULTS

By means of the study carried out we confirmed the existence of two dominant culture profiles, as hypothesized by Choo (2013). The interpretation of the data collected indicates that the research institute A (RI-A) is dominated by a result-oriented and relationship-based culture based on favorability index (Figure 4). Analyzing open questions of the questionnaire

and support questions, the RI-A team emphasized the importance of reliability and accuracy in order to achieve the expected performance. Also, it is clear the connection between information management and decision-making process. Regarding information sharing, comments like: “we are improving our knowledge sharing” and “There is greater attention to the need to share information and make data available” illustrate the second dominant IC.

Figure 4 – IC profile of RI-A



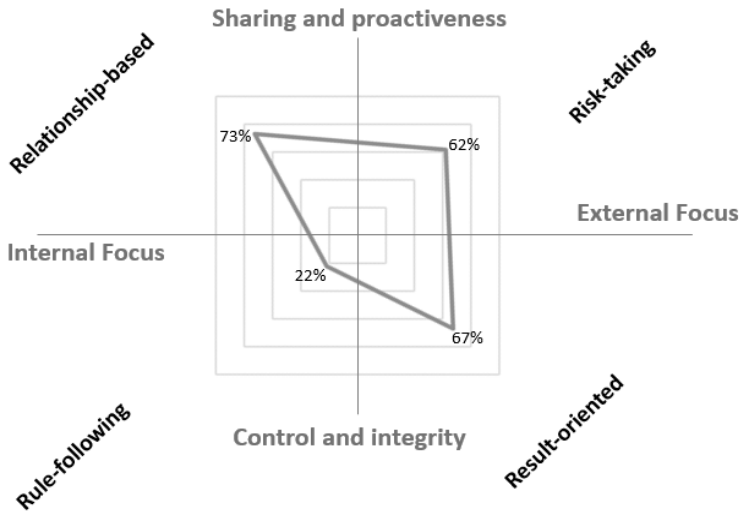
Source: by the authors (2024)

This research institute is part of an oil and gas company which exerts some degree of influence on the way researchers manage information. The pressure for efficiency of results and low cost of operations in the oil and gas sector has been widely discussed in the literature (Garcia *et al*., 2014; Jianjun *et al*., 2016).

Therefore, such pressure is demonstrated in a way that the information is managed primarily to assess achievements, improve the performance of the assets, and succeed in the competitive market. On the other hand, one could argue why a culture more prominently risk-based was not found in a research institute where it is expected to foster innovation, intellectual property and development of new products (Vick *et al*., 2015).

Considering that the strategy of research centers is very close to innovation and risk, this finding is crucial because there is a gap between the behavior of employees regarding information and the expected achievements. The research institute B (RI-B) is an interesting case of an organization not clearly dominated by one or two information culture (Figure 5) but by three. It opens a different possibility from that assertion that most organizational units have 1 or 2 dominant cultures (Choo, 2013).

Figure 5 – IC profile of RI-B



Source: by the authors (2024)

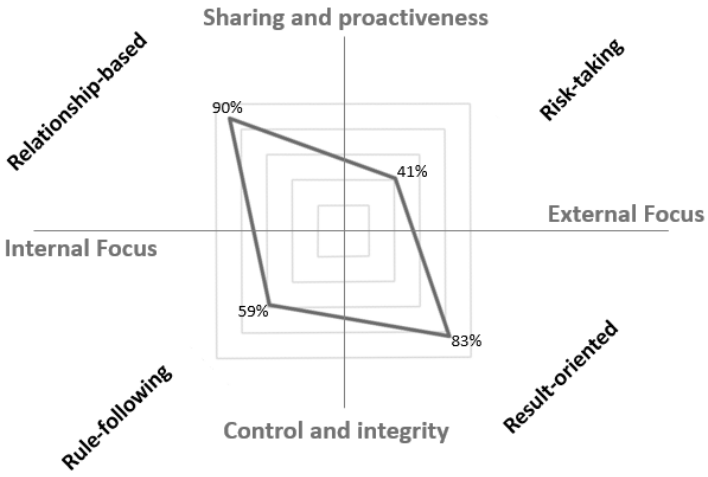
This research institute is independent, and the strategy depends on the board (leaders) of the organization, connected with the necessities of the society. Some level of freedom clearly impacts on the risk-based IC, where employees can try new methods of data processing, data analysis, for instance. However, the need for funding is reflected in the culture of results. In this ambience, even if for reasons different from those of an oil company, the employees of the research center need to generate results in the form of articles, participation in conferences, patents, and awards. These are tangible issues that shape the way they handle information. The following comment is well elucidated of the result-oriented as a second but influential culture: “To me, working in science, means that ensuring the data generated are reliable is the number one priority. If the data are not reliable or live up to compliance, new ways of integrating and analyzing data or making the data available to other teams make little sense”. Another comment goes toward the same norm: “Any data created has to be fit for purpose and reliable or anything you do with it is not going to work. If it isn't compliant to metadata or data standards, then reliability is called into question. Scientific research/ outputs could then be discounted”.

At this point, it is quite clear the importance of discussing the level of each typology. RI-B is more risk taking than RI-A. On the other hand, RI-A is more rule-following, probably due to regulatory pressure (Mansfield-Devine, 2017). Finally, the level of relationship-based culture in RI-A is more prominent than in RI-B even being result-oriented. It can be explained by the business model adopted by teams. While RI-A works like an “assembly line” with pieces of information flowing from hands to hands, in RI-B the groups work separately. The following comment makes it evident: “I suspect most projects are unique/niche with a team size of at most three (e.g. PhD student and supervisors), and while there is potential to share far more data between groups and projects, this is rarely a priority and is done ad hoc”. Therefore, the relationship-based culture reflects the behavior inside the teams (co-workers) but with few or no information sharing among teams.

Analyzing the IC profile of the academic library, the dominant IC is relationship-based followed by result-oriented culture (figure 6). This result is not far from the intuitive expectation as libraries are spaces of sharing, discovering and knowledge (Gayton, 2008). Therefore, the librarians who answered the questionnaire keep behaviors, norms, and values

to make data available to all interested and change information with different sectors inside the library.

Figure 6 – IC profile of academic library



Source: by the authors (2024)

Again, it is vital to discuss the level of the information typology. In the case of academic libraries, although the least dominant IC is risk-based (41%), it is more than RI-A (38%). Unfortunately, it is not possible to detail aspects of the IC because the respondents prefer to not make additional comments.

The analysis carried out so far demonstrates that there are differences between the institutions, but it is not possible to detect where the difference is. To shed light on this topic, it is crucial to investigate each value of the coded answers and detect the main differences. The comparison between RI-A and RI-B is presented in Table 2.

Table 2 – Difference of favorability between RI-A and RI-B considering IC of each question

N	Question Summary	IC dimensions	Favorability Index RI-A	Favorability Index RI-B	Difference
Q.10	Information and individual performance	BL	87%	63%	24%
Q.11	Interaction and feedback	BH	78%	74%	5%
Q.12	data and decision	N	97%	53%	44%
Q.13	Data and success	BL	88%	79%	9%
Q.14	Internal control	N	43%	15%	29%
Q.15	Compliance	N	25%	26%	-1%
Q.16	Following standards	V	63%	36%	26%
Q.17	Avoid doing things out of the workflow	BH	30%	9%	21%
Q.18	Store data to share	BH	52%	50%	2%
Q.19	Seeking data in papers and public DB	BH	77%	76%	0%
Q.20	Share data with co-workers	BH	94%	88%	6%
Q.21	Strive to get new data	BH	100%	79%	21%
Q.22	Information to innovation	V	47%	68%	-21%
Q.23	Broad data sharing and risks	BH	35%	61%	-25%
Q.24	Test new products	BH	26%	65%	-39%

Q.25	Contact with data analysts	BH	44%	56%	-12%

Source: by the authors (2024)

The deep difference between these two research institutes relies on information norm (N) where in RI-A data is vital to make decision (Q.12) and behavior (BH) when facing the risk of testing new products (Q.24). Risk is embedded in innovation and here the risk is related to project risk: cost, time and quality. Clearly, RI-B are saying that they assume the risk to test, to fail fast and evolve. On the other hand, RI-A is conservative converging with the more developed rule-following style. What contributes to making RI-A more result-oriented than RI-B is the norm (N) of using information to support decisions. It is established in RI-A, the employees of RI-B do not identify it as a norm.

Although the RI-B and the academic library have the same IC (relationship-based and result oriented), for sure there are norms, values, behavior, and beliefs that differentiate them. A remarkable contrast between these organizations relies on rule-following typology (table 3).

Table 3 – Difference between academic library and RI-B considering IC dimension of each question

N	Question Summary	IC dimensions	Favorability Academic L.	Favorability Index RI-B	Difference
Q.10	Information and individual performance	BL	84%	63%	21%
Q.11	Interaction and feedback	BH	89%	74%	15%
Q.12	data and decision	N	63%	53%	10%
Q.13	Data and success	BL	95%	79%	16%
Q.14	Internal control	N	79%	15%	64%
Q.15	Compliance	N	44%	26%	18%
Q.16	Following standards	V	74%	36%	38%
Q.17	Avoid doing things out of the workflow	BH	37%	9%	28%
Q.18	Store data to share	BH	79%	50%	29%
Q.19	Seeking data in papers and public DB	BH	79%	76%	3%
Q.20	Share data with co-workers	BH	100%	88%	12%
Q.21	Strive to get new data	BH	100%	79%	21%
Q.22	Information to innovation	V	58%	68%	-10%
Q.23	Broad data sharing and risks	BH	42%	61%	-19%
Q.24	Test new products	BH	42%	65%	-23%
Q.25	Contact with data analysts	BH	21%	56%	-35%

Source: by the authors (2024)

The use of data to control internal processes (Q.14) and following standards (Q16) both related to rule-following culture are the most important differences between them. All favorability indexes of academic libraries are higher than the RI-B indices except for favorability index associated with the culture of innovation (risk-taking). It is expected that academic libraries are more rule-following than a research institute. On the hand, research institute should be more risk-taking than academic libraries.

Considering the findings from the literature, it is possible to verify that the combination of result-oriented and relationship-based as dominant cultures has been identified by Vick *et al*., 2015 in innovative contexts like research institutes (table 4).

Table 4 – IC found by others research papers

Author	Context	Groups	IC
Vick *et al*., 2015	Project teams of technological innovation in university	Computing	Relationship-based /result-oriented
		Microbiology	Relationship-based / risk-taking
		Agricultural engineering	Relationship-based / risk-taking
Zamoryonova, 2015	Universities of Poltava region	University staff, professors, and university students	Rule-following / result-oriented
Lian *et al*., 2021	Two Chinese companies	Company A	Result-oriented
		Company B	Rule-following
Virkus and Salman, 2021	Higher education institution	director, programme managers, project managers and heads of study areas; professors, researchers and lecturers	Relationship-based / risk-taking
Present article	Research institutes and academic libraries	Research institute A	Result-oriented and relationship-based
		Research institute B	Relationship-based and result-oriented
		Academic library	Relationship-based and result-oriented

Source: by the authors (2024)

As reported by other authors (table 4), finding risk-taking culture even in innovative organizations seems to be rare. It is also worth noting that relationship-based and result-oriented are identified in many groups even being in opposite fields which is not so obvious as identifying risk-taking/relationship-based because it is in alignment with sharing and proactiveness and rule-following/result-oriented in alignment with control and integrity.

5 CONCLUSIONS

The findings of this study, carried out in two research institutes and academic libraries, identified result-oriented and relationship-based as the two dominant information cultures for research institute A (RI-A) which is part of a multinational oil and gas company. The research institute B (RI-B), which is independent and headquartered in Aberdeen, and the academic library located in one of the most important Brazilian universities, have relationship-based and result-oriented as the dominant information culture. That is the answer for the first research question: RQ1. What is the dominant information culture in the studied research institutes and academic libraries?

Regarding the second research question, (RQ2. Is there an alignment between the general strategy of the organizations and the IC?), an unexpected result was found. If innovation and risk is a remarkable strategy and objective of research institutes, the dominant information culture is not in alignment with it. It is not new in the current literature that risk-based culture is rare even in innovative ambience. On the other hand, the least dominant culture in RI-B is rule-following which is opposed to risk-taking. Considering that academic

libraries are environment of knowledge-sharing culture (Koloniari and Fassoulis, 2017) and spaces of sharing, discovering and knowledge (Gayton, 2008), make sense to identify that groups of librarians have relationship-based as first dominant culture and result-oriented as the second.

The results discussed make clear that the favorability index is suitable for defining objectively the dominant cultures. The favorability index is suitable to be used with likert scale, can be used to represent the IC in spider diagram and also as composition of frequencies. The qualitative approach of comparing each question among institutes clearly show the difference among organization typology even having the same information culture. That is exactly what happened with RI-B and the academic library. Although having the same IC (relationship-based and result oriented), there is remarkable contrast between these organizations that rely on rule-following typology. Even inside the relationship-based typology, some behaviors between them are divergent. This detailed analysis enables us to detect norms, behaviors, beliefs, or values that characterize and differentiate each organization. It is exactly the case in the analysis proposed here where specific behaviors (testing new data products) and norm (use data to make decisions) mark the difference between RI-A and RI-B.

Finally, it is worth to mention that RI-B can be considered a tripolar organization. This is a unique case since the consulted bibliography and the Choo's seminal article (Choo, 2013) have revealed that most organizations are dominated by one or two informational cultures.

REFERENCES

ADENEKAN, Tolulope Elizabeth. Information culture, competitive advantage and operational excellence as correlate of job performance among British American Tobacco Company workers, Ibadan, Oyo State, Nigeria. **International Journal of Information, Business and Management**, v. 11, n. 3, p. 235-249, 2019. Disponível em: https://www.proquest.com/openview/df719007d1e0bff98a79726e577087b4/1?pq-origsite=gscholar&cbl=2032142 . Acesso em: 20 set. 2022.

BARRY, Dwight. Do not use averages with Likert scale data. Enterp. **Anal**, v. 24, 2017. Disponível em: https://bookdown.org/Rmadillo/likert/. Acesso em: 20 set. 2022.

CAMERON, K.S.; QUINN R.E. **Diagnosing and changing organizational culture**: Based on the competing values framework. Revised ed. San Francisco: John Wiley & Sons, 2006.

CHOO, C. W. Information culture and organisational effectiveness. **International Journal of Information Management**, 33, 2013, p. 775-779. Disponível em: https://www.sciencedirect.com/science/article/abs/pii/S0268401213000819. Acesso em: 20 set. 2022.

CHOO, C. W., BERGERON, P., DETLOR, B., HEATON, L. Information culture and information use: an exploratory study of three organisations. **Journal of The American Society for Information Science and Technology**, v. 59, n.5, 2008, p. 792-804. Disponível em: https://onlinelibrary.wiley.com/doi/abs/10.1002/asi.20797. Acesso em: 20 set. 2022.

CUNHA, Murilo Bastos da; CAVALCANTI, Cordélia Robalinho de Oliveira. **Dicionário de biblioteconomia e arquivologia**. Brasília: Briquet de Lemos, 2008.

CURRY, A.; MOORE, C. Assessing Information culture: na exploratory model. **International Journal of Information Management**, v. 23, 2003, p. 91-110. Disponível em:

https://www.sciencedirect.com/science/article/abs/pii/S0268401202001020. Acesso em: 20 set. 2022.

DAVENPORT, T. H.; PRUSAK, L. **Information ecology**: mastering the information and knowledge environment. Oxford: Oxford University Press, 1997.

DILLMAN, D. A. **Mail and internet surveys**: the tailored design method. 2nd. ed. New York: Wiley, 2000

DILLON, Andrew. What it means to be an iSchool. **Journal of education for library and information science**, p. 267-273, 2012. Disponível em: https://www.jstor.org/stable/43686920. Acesso em: 20 set. 2022.

FÁVERO, Luiz Paulo Lopes *et al*. **Análise de dados**: modelagem multivariada para tomada de decisões. Rio de Janeiro: Elsevier, 2009.

GANGULY, K. R. **Data analysis cookbook**. United Kingdom: Packt Publishing Ltd, 2017.

GARCIA, G., LESSARD, D., SINGH, A. Strategic partnering in oil and gas: A capabilities perspective. **Energy Strategy Reviews**, 3, 2014, pp. 21-29. Disponível em: https://www.sciencedirect.com/science/article/pii/S2211467X14000285. Acesso em: 20 set. 2022.

GAYTON, Jeffrey T. Academic libraries: "Social" or "communal?" The nature and future of academic libraries. **The journal of academic librarianship**, v. 34, n. 1, p. 60-66, 2008. Disponível em: https://www.sciencedirect.com/science/article/abs/pii/S0099133307002170. Acesso em: 20 set. 2022.

GINMAN, M. Information Culture and Business Performance, **Iatul Quarterly**. v. 2, n.2, p. 93-106, 1988. Disponível em: https://docs.lib.purdue.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1198&context=iatul. Acesso em: 20 set. 2022.

GRIMSHAW, A. **Information culture and business performance**. Hertfordshire: HERTIS Information and Research. 1995.

JIANJUN, C.; NAN, W.; HONGJUAN, T.; JUN, L.; Bo, X. 'Impact of sustained low oil prices on China's oil & gas industry system and coping strategies', **Natural Gas Industry**, B, 3, 2016, p. 181-186. Disponível em: https://www.sciencedirect.com/science/article/pii/S2352854016300511. Acesso em: 20 set. 2022.

KISILOWSKA-SZURMINSKA, Malgorzata. **Information culture as a new perspective for information science**, 2015. Disponível em: https://www.academia.edu/26407289/Information_culture_as_a_new_perspective_for_information_science . Acesso em: 20 set. 2022.

KOLONIARI, M.; FASSOULIS K. Knowledge management perceptions in academic libraries. **The jornal of academic librarianship**. v.43, p.135-142, 2017. Disponível em:

https://www.sciencedirect.com/science/article/abs/pii/S0099133316303330. Acesso em: 20 set. 2022.

LAURI, L.; HEIDMETS, M.; VIRKUS, S. The information culture of higher education institutions: the Estonian case. **Information Research**, v.21, n.3, paper 722, 2016. Disponível em: http://informationr.net/ir/21-3/paper722.html#.Yymm4ITMI2w. Acesso em: 20 set. 2022.

LIAN, Z., WANG, N.; OLIVER, G. Information culture and recordkeeping: a case of Chinese enterprises. **Journal of Documentation**. 2021. Disponível em: https://doi.org/10.1108/JD-09-2021-0189. Acesso em: 20 set. 2022.

MANSFIELD-DEVINE, S. Data governance: going beyond compliance. **Computer Fraud & Security**. v.6, p. 12-15, 2017. Disponível em: https://www.sciencedirect.com/science/article/abs/pii/S1361372317300520. Acesso em: 20 set. 2022.

MORAES, Leonardo Barbosa de; BARBOSA, Ricardo Rodrigues. Cultura informacional: uma proposta de modelo com foco organizacional. **Informação & Sociedade**, v.25, n.3, 2015.

OLIVER, G. 'Information Culture: exploration of differing values and attitudes to information in organisations', **Journal of Documentation**, v. 64, n. 3, p. 363-385, 2008. Disponível em: https://research.monash.edu/en/publications/information-culture-exploration-of-differing-values-and-attitudes. Acesso em: 20 set. 2022.

OLIVER, G.; FOSCARINI, F. **Records management and information culture**: tackling the people problem. Abingdon, Oxon: Facet Publishing, 2014.

SILVA, P.D.A. da; SANTOS, O.M. dos; PROCHNIK, V. Percepções quanto aos fatores críticos à implantação e uso do Balanced Scorecard: a experiência da Petrobras. In: CONGRESSO BRASILEIRO DE CONTABILIDADE. 2008.

VASSI, Vanderlei Ferreira; VALENTIM, Marta Lígia Pomin. Cultura organizacional na perspectiva da Ciência da Informação: uma revisão de literatura. **Perspectivas em Gestão & Conhecimento**, v.13, n.3, p. 178–198, 2023. Disponível em: https://www.periodicos.ufpb.br/ojs2/index.php/pgc/article/view/67854. Acesso em: 30 jan. 2024.

VICK, T. E.; NAGANO; M. S. and POPADIUK; S. Information culture and its influences in knowledege creation: evidence from university teams engaged in collaborative innovation projects. **International Journal of Information Management**, v.35, p. 292-298, 2015. Disponível em: https://www.sciencedirect.com/science/article/abs/pii/S0268401215000110. Acesso em: 20 set. 2022.

VIRKUS, S. SALMAN, A. Effective leadership behaviors and information culture in the higher education institution, Global Knowledge. **Memory and Communication**, v. 70, n. 4/5, p. 418-441, 2021. Disponível em: https://www.emerald.com/insight/content/doi/10.1108/GKMC-08-2020-0106/full/html. Acesso em: 20 set. 2022.

WIDÉN-WULFF, G. 'Business information culture: a qualitative study of the IC in the Finnish insurance industry'. **Information Research**, v.5, n.3, 2000. Disponível em: http://informationr.net/ir/5-3/paper77.html. Acesso em: 20 set. 2022.

WILSON, C. **Credible checklists and quality questionnaires**: a user-centered design method. Burlington, Massachusetts: Morgan Kaufman, 2013.

ZAMORYONOVA, Darya. Information culture in higher education: criteria and typology. **Journal of european economy**, v. 14, n. 4, p. 347-358, 2015. Disponível em: http://dspace.wunu.edu.ua/bitstream/316497/11217/1/Zamoryonova%2C%20D..pdf. Acesso em: 20 set. 2022.

Recebido em/Received: 15/03/2023 | Aprovado em/Approved: 21/04/2024