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DIMENSIONS OF DIGITAL ORGANIZATIONAL CULTURE – A FRAMEWORK PROPOSAL

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ABSTRACT: *DIGITAL TECHNOLOGIES ARE CONSTANTLY TRANSFORMING EVERYDAY LIFE AROUND THE WORLD, AND THE COVID-19 PANDEMIC PUSHED ORGANIZATIONS TO ACCELERATE THEIR DIGITIZATION EFFORTS, PERSUADING THEM TO ADAPT QUICKLY IN ORDER TO SURVIVE. DIGITAL TRANSFORMATION REQUIRES INVESTING IN RESOURCES, PROCESS CHANGES, AGILE STRUCTURES, AND ORGANIZATIONAL CHANGES. CULTURE IS ONE OF THE FUNDAMENTAL ELEMENTS TO SUPPORT AND SUSTAIN ANY CHANGE. THEREFORE, ORGANIZATIONS SHOULD ADAPT THEIR ORGANIZATIONAL CULTURE TO A DIGITAL CULTURE. HOWEVER, THE SCIENTIFIC LITERATURE ADDRESSES THE DIGITAL ORGANIZATIONAL CULTURE SUPERFICIALLY. THIS STUDY PROPOSES A FRAMEWORK THAT PRESENTS THE DIMENSIONS OF THE DIGITAL ORGANIZATIONAL CULTURE FREQUENTLY ADDRESSED IN THE LITERATURE. THIS GOAL ENTAILED CONDUCTING A SYSTEMATIC LITERATURE REVIEW, WHICH RESULTED IN THE IDENTIFICATION OF SEVEN DIMENSIONS OF DIGITAL CULTURE: INNOVATION, COLLABORATION, DATA-BASED DECISION-MAKING, LEADERSHIP, CUSTOMER FOCUS, ETHICS AND FINANCIAL FACTORS. THIS STUDY WILL CONTRIBUTE TO THE ACADEMIC COMMUNITY BY PRESENTING THE MAIN ASPECTS STUDIED ABOUT DIGITAL CULTURE, AND AN AGENDA TO GUIDE FUTURE RESEARCH.*

KEYWORDS: *DIGITAL TRANSFORMATION; ORGANIZATIONAL CULTURE; DIGITAL CULTURE; SYSTEMATIC LITERATURE REVIEW; FRAMEWORK.*

1. INTRODUCTION

COVID-19 accelerated digital transformation as organizations adapted to survive. A positive aspect was the realization that addressing culture facilitates change (AGGARWAL, 2020). Now, there's greater awareness and support for digital journeys, as experiences in 2020 demonstrated the effectiveness of digitalization (SZNAJER; FOLEY, 2020). Emerging technologies are revolutionizing daily life, making digitization a dominant theme (PREINDL et al., 2020). Industry 4.0, or the fourth industrial revolution, plays a crucial role in leveraging digital opportunities across production and service systems (USTUNDAG; CEVIKAN, 2017). Digital transformation involves several digital innovations that change or complement existing organizational structures and practices (Hinings et al., 2018).

Verhoef et al. (2021) assert that companies need assets, digital agility, a digital network, and big data analysis to transform digitally. They must develop agile, low-hierarchical structures and internalize IT and analytical skills. Gürkan and Ciftci (2020) emphasize that adapting organizational culture to a digital culture is essential for sustaining digital transformation, as culture maintains organizational values and reduces resistance.

Schuh and Frank (2020) argue that a mature corporate culture supports transformation into a digital and agile company. Hoe (2019) suggests that achieving a digital culture requires guiding employees at individual, team, and organizational levels. Porfírio et al. (2021) link expanding digital culture to changes in socialization, communication, and operations. However, many articles only briefly address culture, focusing on generalized values for successful digital transformation (HARTL; HESS, 2017). Teichert (2019) notes that culture is a dimension in 70% of professional digital maturity models but only 40% in academic ones.

Authors examine organizational culture dimensions in sustainability and digitalization (ISENSEE et al., 2020), Industry 4.0 (Schuh and Frank, 2020), big data analytics capability (UPADHYAY; Kumar, 2020), digital maturity models (Teichert, 2019), and cultural values for digital transformation (HARTL; HESS, 2017). This study aims to answer the research question: What dimensions are analyzed in the literature when addressing digital organizational culture?

To answer this, we propose a conceptual framework of digital culture constructs extracted from the literature. A systematic literature review (SLR) was conducted to identify dimensions of digital organizational culture. This work aims to contribute to academia by presenting a literature review of digital culture and main theories, addressing future trends and challenges. For companies, it provides factors to consider when implementing a digital

organizational culture to aid their digital transformation process.

The paper is organized as follows: Section 2 presents the theoretical background of digital organizational culture. Section 3 details the methodology used for the SLR and framework creation. Section 4 discusses the results, and Section 5 offers final considerations.

2. THEORICAL BACKGROUND

In order to understand the relationship between digital transformation and organizational culture, this section presents a synthesis of the fundamental literature addressing the main topics related to digital transformation, organizational culture and digital culture.

Digital transformation regards the process of developing digital capabilities and technologies that promote business models, operational processes and customer experiences that generate value (MORAKANYANE et al., 2017). IBM research indicates that a complete reformulation of the business model, with the customer's presence in the processes and digital support, can optimize all elements of the value chain in which the organization is inserted (BERMAN, 2012). In other words, digital transformation is a complex issue that involves many or all segments of an organization (HESS et al., 2016). It is a complex and multidimensional phenomenon that tends to holistically encompass all domains of the company (PORFÍRIO et al., 2021).

Digital transformation forces companies and sectors toward organizational changes and critical business adaptations if they want to survive and prosper, making it the main driver of the current change in the organizations' value creation processes (PORFÍRIO et al., 2021). At the company level, many traditional companies have been overtaken by fast-growing, innovative digital competitors and have suffered from it (VERHOEF et al., 2021), because digital transformation has recently become the means to gaining competitive advantages and business differentiation (FERREIRA et al., 2019).

The digital strategy is a synergistic sum of strategic IT and Information Systems (IS) initiatives, driven by the managers' decision to utilize these available infrastructures. In this regard, the joint role of technological infrastructure, human capital and organizational culture in the context of organizations must be considered (ORLANDI et al., 2021). Culture is the most important element for the continuity of core values, the participation of employees and lower resistance among employees (GÜRKAN; CIFTCI, 2020).

Organizational culture is viewed as the format or pattern of how the adaptation and learning processes occur in a given organization (SCHEIN, 1984; CAMERON; QUINN, 2011).

In other words, organizational culture is the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and which have worked well enough to be considered valid, and therefore to be taught to others new members as being the correct way to perceive, think and feel in relation to these problems (SCHEIN, 1984). Organizational culture has been overlooked in change efforts (CAMERON; QUINN, 2011). Culture influences organizational results, since individuals' beliefs, formed by their experiences, influence their actions, which produce results. To change the results of the organization, you must change its culture (CONNORS; SMITH, 2011).

When organizations adapt their culture to the new format to succeed during the digital transformation process, they create a digital culture (GÜRKAN; CIFTCI, 2020). There is a cultural dimension for organizations undergoing digitization and that, to have it, people must be guided to adopt a digital culture at the individual, team and organizational level (HOE, 2019). Martínez-Caro et al. (2020, p. 2) conceptualize the digital organizational culture as follows: “a set of shared assumptions and understanding about organisation functioning in a digital context.”

Therefore, the dimensions of a digital organizational culture must be understood. And, for this understanding to be effective, the next section presents the research method used to arrive at these dimensions.

3. RESEARCH METHOD

An SLR was carried out in order to achieve the objective of the article by proposing a framework with the dimensions of the digital organizational culture. For this purpose, the steps presented by Tranfield et al. (2003) were chosen, which involve the stages of planning, conducting, reporting and disseminating the review, consisting of phases (Table 1).

This objective required developing a formal protocol to guide research based on the model available in the State of the Art through Systematic Review (StArt) software. StArt is a computational tool that provides support and facilitates systematic reviews (FABBRI et al., 2016).

The studies were identified and extracted from five databases: (a) Web of Science, (b) Scopus, (c) IEEE Xplore, (d) Science Direct e (e) PubMed up to December 2023. The search string used was defined using terms and synonyms in English that refer to organizational culture, digital culture, digital transformation, digitization and Industry 4.0, in order to analyze

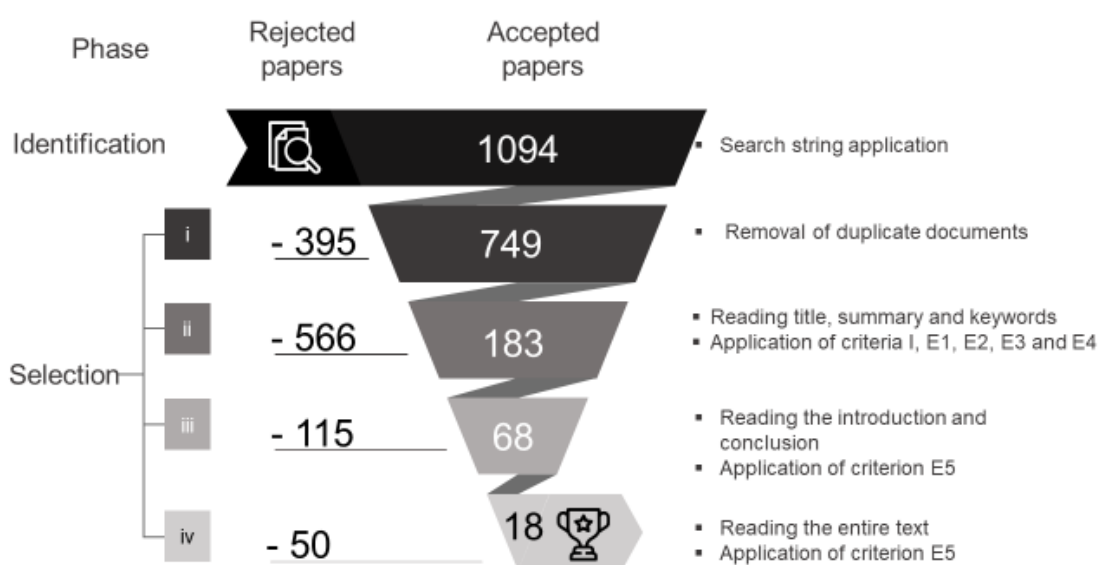
which dimensions of digital organizational culture have been addressed in the scientific literature. With the application of the search string in the databases, 1094 documents were identified for analysis, which were evaluated in the selection phase using the inclusion and exclusion criteria presented in Table 1.

TABLE 1 - Article selection criteria.

Inclusion (I) and exclusion (E) criteria
I: Original articles published until December 2023 that discuss the dimensions of digital organizational culture
E1: Article in a language other than English
E2: Full article unavailable online or inaccessible through the 313 Scientific Databases made available by USP (AGUIA, n.d.)
E3: eBook, Editorial, Keynote, opinion, tutorial, workshop, summary report, poster or unpublished articles
E4: Article does not discuss dimensions of digital organizational culture
E5: Article does not collaborate with the development of a framework with the dimensions of the digital organizational culture

Source: The authors.

FIGURE 1 - Number of articles accepted and rejected during the methodological steps.



Source: The authors.

In the extraction phase, the complete re-reading of the 18 selected articles is considered

in order to extract the dimensions of the digital organizational culture that could contribute to the construction of a theoretical framework that answers the research question. Based on this extraction, it was possible to identify the authors who addressed dimensions of digital organizational culture, the themes addressed in their studies and what these dimensions are, which are synthesized in the next phase. The results of the systematic literature review are used to propose a theoretical framework containing the dimensions of the digital organizational culture and to make recommendations for future studies and possible contributions to academia and organizations.

4. RESULTS AND DISCUSSIONS

In this section, the descriptive results obtained through the SLR are presented and discussed, extracting the synthesis of the studies, as well as proposing a framework of the dimensions of the digital organizational culture.

4.1 Descriptive results

The combination of quantitative results found in this SLR provides an overview of existing studies on digital organizational culture. Based on these results it was found that scientific publications on this subject have increased and several study areas have addressed the dimensions of organizational culture regarding digital transformation.

Based on the analysis of the 68 documents chosen in phase iii of selection, the study results showed that the main articles that analyze dimensions of digital organizational culture have been published since 2010, but after 2015 there has been a significant increase in scientific publications on the subject. The first selected article, published by Hongsong (2010), analyzes the internal and external motivations for cultural change in favor of organizational innovation. In 2011, Cyrus and Nejad (2011) studied how the characteristics of national culture can affect the successful implementation of Enterprise Resource Planning (ERP) in an organization. No study published between the years 2012 and 2014 was selected.

Between 2015 and 2023 several studies addressed the theme of organizational culture in various aspects of digital transformation, analyzing its effect on the implementation of technologies and digital work methods (CASAS et al., 2015; NEWMAN et al., 2016; DAVISON; OU, 2017; ALOS-SIMO et al., 2017), on the implementation and analysis of Big Data capability (e.g., THIRATHON et al., 2017; NGUYEN, 2018; DUBEY et al., 2019; BEHL, 2020), its context in Industry 4.0 (eg, MOHELKA; SOKOLOVA, 2018; NAFCHI;

MOHELSKA, 2019; SCHUH; FRANK, 2020), among others.

For the proposal of a theoretical framework that answers the research question, 18 articles were extracted from the 68 articles selected. The extraction criterion used was the presentation of dimensions of organizational culture within the scope of digital transformation, that is, the seven articles selected pointed to different cultural dimensions that assist implementing technologies, which consists of digital maturity models that measure the improvement of big data analytics capability, etc. The dimensions presented by each study were listed, totaling 176 dimensions of the digital organizational culture.

4.2 Content analysis of main papers in SRL.

The content of the 18 selected articles was analyzed to understand each dimension and highlight the main points of each study. Upadhyay and Kumar (2020) emphasize that organizations should focus on organizational culture and aligning business processes to achieve positive results with big data analytics, rather than just on big data analytics capability (BDAC). They investigated the role of organizational culture in performance using dynamic capabilities and sociomaterialism theories, identifying six components of organizational culture plus data-driven decisions. Their results show that organizational culture mediates between BDAC and internal analytical knowledge to improve company performance.

Lin and Kunnathur (2019) found that a development culture affects the relationship between technology orientation and big data capability. Companies with high technology orientation may not seek external resources, but those with a high development culture do. They developed a concept of dynamic capability related to big data, exploring factors like market orientation, entrepreneurship, technology, and development culture as a moderator.

Hartl and Hess (2017) state that businesses must transform to leverage new digital technologies, which are often hindered by organizational cultures resistant to change. They identified twelve cultural values crucial for digital transformation. Similarly, Isensee et al. (2020) explored the interdependencies between organizational culture, environmental sustainability, and digitalization in SMEs, identifying key cultural dimensions for digital and sustainable development.

Teichert (2019) evaluated digital maturity models, highlighting the underrepresentation of transformational capabilities and stressing the importance of managerial aspects in digital transformation. 55% of these models include "culture" as a dimension, with higher representation in professional models than academic ones.

Sansabas-Villalpando et al. (2019) discuss the challenges of implementing Industry 4.0, emphasizing the need to strengthen the organizational culture of innovation. They propose a method to classify factors critical to Industry 4.0 objectives. Schuh and Frank (2020) argue that a mature corporate culture is essential for successful digital transformation.

Pfaff et al. (2023) explore how digital transformation impacts organizational culture, noting increased collectivism and reduced power distance. Leal-Rodríguez et al. (2023) highlight the importance of a people-oriented cultural archetype for digital transformation success, while Peixoto et al. (2022) and Kocak et al. (2022) emphasize organizational learning and the development of skills and attitudes for digital adaptation.

Treacy et al. (2022) examine the impact of the Covid-19 pandemic on organizational culture and digital innovation, identifying twelve key cultural variables. Abanumay and Mezghani (2022) investigate how organizational culture facilitates the strategic alignment of big data projects.

Pietruszka-Ortyl et al. (2021) explore the role of organizational culture in knowledge transfer within the energy sector, proposing a framework for cultural practices. Tuukkanen et al. (2021) identify nine organizational values important to digital transformation in small IT companies.

Kiefer et al. (2021) delineate nine attributes of organizational culture that promote digital innovations, such as digital awareness, agility, and internal knowledge sharing. Parihar and Sinha (2020) identify cultural traits influencing digitization in manufacturing industries, while Busco et al. (2023) rank factors affecting digital culture development in large Chilean organizations.

Based on this analysis, we proposed a framework for the dimensions of organizational culture.

4.3 Framework proposal

The 176 elements extracted from the articles were analyzed individually and their definitions were compared semantically to generate groups, which are called dimensions of digital culture. Finally, seven distinct groups were formed, that is, the seven main dimensions: leadership, innovation, decision making, customer focus, financial, and ethical management factors or intellectual property management. All the original elements were considered for grouping them in dimensions, even those mentioned only once. Elements related to “Innovation” are the most cited by the authors, followed by factors related to “Collaboration”.

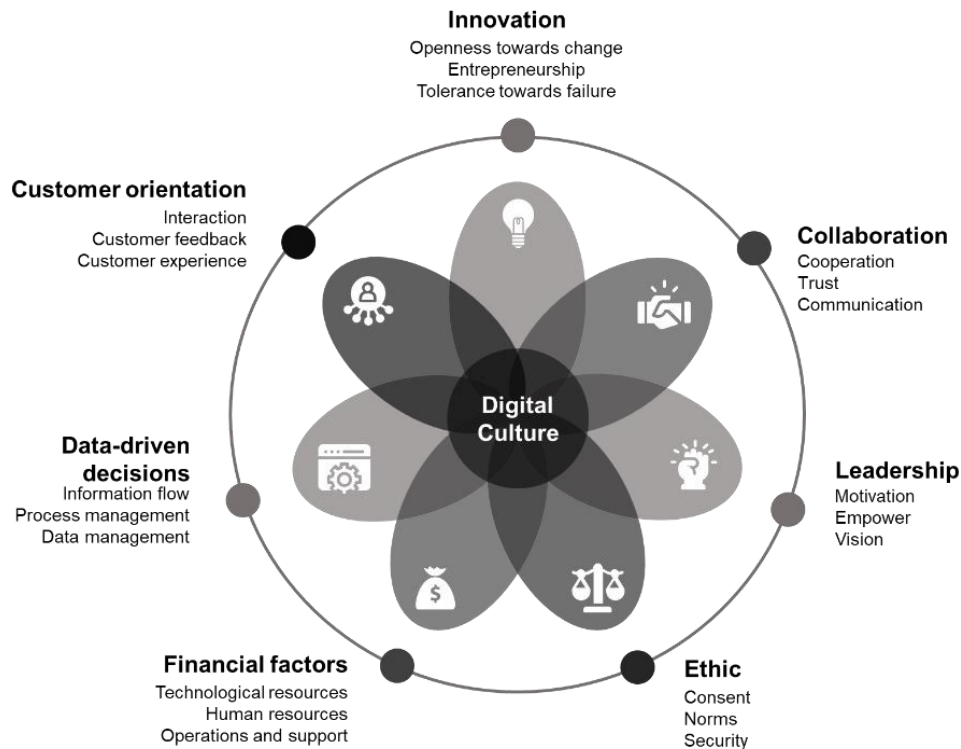
Thirdly, there is the dimension “Decision-making based on data”, “Leadership”, and “Customer focus”. “Ethics/intellectual property management”, and “Financial factors” are the least mentioned. Figure 2 presents a proposed framework where the digital organizational culture is composed of seven dimensions, which are described in Table 3 together with the elements related to each of them, which were proposed based on the original dimensions of the digital culture presented by the authors, in addition to the weight of each dimension due to the number of original elements provided by the authors.

TABLE 2 – Description and elements of the dimensions of digital organizational culture.

Dimension	Description	Related elements
Innovation	Includes behaviors that facilitate risk acceptance, disruptive thinking, exploring new ideas and learning.	Openness towards change Entrepreneurship Tolerance towards failure
Collaboration	It refers to collaboration, people's willingness to share digital skills and knowledge and engage the organization's digital initiatives.	Cooperation Trust Communication
Data-based decision making	Refers to the use of digital technologies for decentralized decision-making within the organization.	Information flow Process management Data management
Leadership	Refers to the influence on the actions of individuals and groups through interaction to achieve digital goals.	Motivation Empower Vision
Customer focus	Includes guidance for organizing all activities to meet customer needs.	Interaction Customer feedback Customer experience
Ethics	It refers to the organization's concern with the data that travels through its digital channels, either internal, from customers, suppliers.	Consent Norms Security
Financial factors	It refers to the availability of resources for the transfer, development, acquisition of digital assets.	Technological resources Human resources Operations and support

Source: The authors.

FIGURE 2 - Framework of the dimensions of digital organizational culture.



Source: The authors.

5. FINAL REMARKS

The objective of this study was to provide a framework from the dimensions, which are analyzed in the literature when addressing digital organizational culture. This required performing These dimensions were analyzed and compared semantically, generating seven main dimensions: collaboration, leadership, innovation, data-based decision making, customer focus, financial factors and ethics, which make up the proposed framework.

5.1 Theoretical contribution

The theoretical study brings an understanding of what is being considered for digital organizational culture over time, in addition to research gaps.

In this regard, a contribution of this study is that it can be used as a potential justification for researchers who are planning new investigations in this area. Therefore, this study can help academics identify future research paths for organizational culture in the digital transformation, as well as provide ideas for future research using practical and statistical approaches to assess digital organizational culture.

5.2 Managerial implications

The more companies can adapt to the ongoing digital transformations, the greater the capability of these companies to innovate and identify sustainable competitive advantages ahead of the competition (FERREIRA et al., 2019). Thus, this study presents companies the factors that must be considered when seeking to implement a digital organizational culture to assist in their digital transformation process.

5.3 Limitations and research opportunities

In light of the results presented in the previous sections, a research agenda on the dimensions of the digital organizational culture is proposed. Since this study presents a theoretical research, there is a need for practical validation. The research should offer a practical approach for validating the components of digital culture. Therefore, a future direction to overcome this limitation is to develop and apply a questionnaire that provides a view of the cultural factors in the organizations that were born digital or that have gone through the process of digital transformation. Researchers can rely on the proposed structure to develop a research instrument.

In addition, a statistical validation of this questionnaire can validate the existence of the seven dimensions of the framework.

Another limitation of this study is the failure to address the interrelationships of the proposed dimensions. Seven dimensions of digital organizational culture were identified and described, however the relationship between one and the other is not investigated or discussed. Therefore, a theoretical investigation and a statistical validation of the interrelationships between the proposed cultural dimensions are reasonable.

Furthermore, this study does not discuss the impact that each dimension has on organizational performance in terms of business performance, operational performance, innovation performance, for example. Therefore, a study that identifies the weight of each proposed dimension in the organization's performance is recommended.

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