

Characteristics in Digital Organizational Culture: A Literature Review

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Organizational culture is an important aspect that supports a successful digital transformation in companies. It is an essential component of Digital Transformation and requires a crucial development of competencies, characteristics, and attitudes to create acceptance and openness among employees and managers and enable organizations to adapt to the transformation. This paper deals with the main characteristics and implications of digital organizational culture. A systematic literature review was conducted for the methodology. The identified characteristics were integrated into the defined dimensions (digital communication, proactivity, entrepreneurial orientation, personal competencies, and digital skills and attitudes). The results show that, e.g., fault tolerance, innovation, digital skills, and an agile mindset are central to developing a digital organizational culture. Furthermore, some characteristics (participation, teamwork, agile mindset, digital skills, problem-solving, risk-taking) positively affect the digital organizational culture. New research questions are derived from the results, which still show a need for research in IS research.

Keywords: digital organizational culture, attitudes, value, digital transformation, characteristic, company

INTRODUCTION

Digital Transformation (DT) is a complex process of rapid technology-enabled change in organizations (Bharadwaj et al., 2013) that occurs through changes in digital technologies such as information, connectivity, data processing, and communication technologies (Al-Faihani & Al-Alawi, 2020). Digital Transformation is not just about digitizing products and services using digital technologies (Hess et al., 2016) but requires complete changes in processes to enable business improvements (Hartl & Hess, 2017). Companies in the DT process are concerned not only with digital products, customer interactions, or services but also with a culture that supports the transformation and the way a company operates (Hemerling et al., 2018; Shirokova et al., 2020). Therefore, organizations need to consider new, digitally relevant aspects of their culture and change their structures, values, and assumptions in the context of DT (Kane et al., 2017; Vial, 2019).

According to Schein (2019), organizational culture is a system of commonly shared patterns of thought, feeling, action, norms, values, and symbols that convey these within an organization. There are various definitions of organizational culture. Schein's (2019) definition covers many aspects and is therefore used

in this paper. The basic dimensions are artifacts, collective values, and assumptions (Schein, 2019). Waterman et al. (1980) developed a model that includes capabilities, strategy, structure, and people. Companies and organizations need to understand and improve their culture during Digital Transformation to ensure that it supports and does not hinder their transformation efforts (Weill et al., 2018; Wokurka et al., 2017; Yoo et al., 2010b). Many change initiatives stem from an organizational culture conducive to implementation. Organizational culture is an essential component that shapes the underlying characteristics of Digital Transformation (Hartl, 2017) and requires extensive internalization of values and a willingness to adhere to them (Chandler et al., 2017), so employee buy-in must be in place for organizations to adapt to change (Nesbit & Lam, 2014). Changing organizational structures is a practical part of cultural change in some companies, enabling new ways of seeing and working (Larjovouri et al., 2018) and is crucial for managing DT (Fitzgerald et al., 2018). The culture of organizations can be a significant and influential aspect influencing Digital Transformation (Kane et al., 2017; Vial, 2019). The human factor of Digital Transformation (agility, collaboration, communication) is essential for the positive development of organizational culture through effective Digital Transformation (Trushkina et al., 2020). Personal competencies and entrepreneurial orientation are characteristics that make a person's work successful (Tahvanainen & Luoma, 2018) and promote the readiness and motivation of employees in the company (Knorr, 2020). Flexibility and transparency promote adaptation to a changing business environment (Uludag et al., 2018). Changing the way of working in a large company with its habits and culture is difficult but necessary. On the one hand, there is the constantly changing environment and, on the other, the increasing importance and use of digital technologies. Companies must develop a digital organizational culture that adapts to the new format to manage this challenging process successfully.

According to Deshpande & Webster (1989), digital organizational culture is “the set of shared assumptions and common understanding of organizational practices in the digital context” followed in this study. Various characteristics, values, and attributes of digital organizational culture critical to digital culture have been studied in the literature (Duerr et al., 2018; Hartl, 2017; Hartl & Hess, 2017; Kiefer et al., 2021). In order to identify the values of organizational culture critical to the success of Digital Transformation, authors (Hartl, 2017) examine the fundamental values (e.g., collaboration, innovation, risk-taking) of digital organizational culture. However, these characteristics were not grouped as dimensions seen as a collection of reference information, or only individual components that constitute a digital organizational culture were addressed. In Isensee et al. (2020), it is shown that four dimensions (strategic orientation, internal capabilities, management, and attitudes) are the best studied to constitute a digital organizational culture. The concepts of (Knorr, 2020; Tahvanainen & Luoma, 2018) contain many characteristics that constitute a digital organizational culture. They have integrated these characteristics into the dimensions of entrepreneurial orientation, proactivity (Knorr, 2020), and personal competencies. Hartl & Hess (2017) described factors in her work but did not use a common taxonomy to describe the characteristics. The digital organizational culture is new and differs from the classical organizational culture. The concrete design of a digital change culture and its characteristics have not yet been clarified (Duerr et al., 2018).

Furthermore, a classification or summary of the characteristics has not yet been investigated. Individual values and general cultural characteristics have occasionally been suggested to enable a successful Digital Transformation, but a comprehensive analysis of which cultural characteristics are crucial for Digital Transformation success has not yet been done. Therefore, we examine the characteristics and effects of an organizational culture conducive to Digital Transformation. Resulting from this is the following research question:

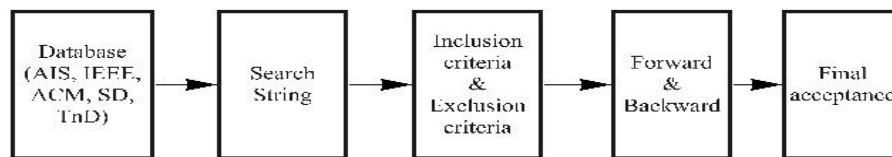
What are the characteristics and effects of digital organizational culture to drive Digital Transformation in companies?

A literature review was conducted to identify the attributes according to Webster & Watson (2002), and the specified features were grouped into dimensions based on the organizational level.

METHOD

We conducted the literature review described below to identify the characteristics and impacts of digital organizational culture. The literature search is based on a systematic approach (Webster & Watson, 2002; Kitchenham et al., 2009), in which relevant articles are examined based on clearly defined research questions, criteria, or phenomena. In the first step, the publications were searched using the specified search terms. In a second step, the citations of the identified articles were checked (backward search). We also conducted a forward search to identify publications citing these articles (Vom Brocke et al., 2015). In the literature search, we focused on the important journals and selected conference proceedings (Webster & Watson, 2002). A web-based search of digital libraries (Kitchenham et al., 2009; Zhang & Babar, 2010) was used to search for digital organizational culture-based studies published in academic databases. The selection of databases was based on a suggested list of the important databases for software and technology engineering (Zhang & Babar, 2010). The search was based on a full-text search. Five major databases (AIS, IEEE Xplore (IEEE), ACM Digital Library (ACM), Science Direct (SD), and Taylor and Francis Online (TnD)) focusing on information systems and computer science were searched from 2015-to 2022 to find the current results. The proposed databases contain reliable publications in many research areas, from highly technical journals to more socio-technical areas such as IS journals and Proceedings of the Association for Information Systems (AIS) Electronic Library. The following keywords were used to search the AIS, ACM, ScienceDirect, Taylor, and Francis: (“digital organizational culture” OR “organizational culture”) AND (“traits” OR “attitude” OR “value” OR “dimension” OR “characteristic”) AND (“digitalisation” OR “digitalization”) AND (“digital transformation”) AND (“Compan*”). This search string was used for the general search. There were a total of 2947 publications. After limiting abstract, title, and keywords, there were 87 papers.

**FIGURE 1
RESEARCH APPROACH**



A publication was selected as a source for the analysis if the proposed inclusion criteria were met; a publication was removed from the reference list if it met the predefined exclusion criteria. The inclusion criteria are as follows: (1) journal or conference, (2) explicit mention of values, characteristics, and attitudes in abstract, and (3) title or keywords collaboration between groups with digital organizational culture. In addition, the exclusion criteria are as follows: (1) Non-English, (2) non-explicit mention of traits, attitudes, or values of digital organizational culture, (3) paper incomplete, no scientific methodology is available. According to the inclusion criteria and exclusion criteria, there were 25. Through a forward and backward search (Webster & Watson, 2002), 11 more articles were added. A total of 36 papers were analyzed.

A concept matrix search (Webster & Watson, 2002) was used to analyze a framework for the characteristics of digital organizational culture. Each selected publication’s content was summarized, and the identified and redundant characteristics were combined with the associated verb. In order to summarise the identified values, characteristics, and attitudes in a context, four dimensions are entrepreneurial action orientation (Knorr, 2020), proactivity (Knorr, 2020), personal competencies (Tahvanainen & Luoma, 2018), digital skills and attitudes (Waterman et al., 1980; Hildebrandt & Beimborn, 2021), and digital communication were formed. The values describe the internalized goals, ideals, norms, standards, and moral principles (Raabe et al., 2021). The traits describe the elements central to the nature of digital organizational culture (Hartl, 2017). The attitudes are mental states of readiness structured by experience and guide individuals’ responses to all relationships with particular situations and objects (Hildebrandt &

Beimborn, 2021). In their work, Isensee et al. (2020) define the dimension of internal capabilities as a factor of digital organizational culture. In Tahvanainen & Luoma (2018), the dimension is also conceived as personal competencies that reflect personal skills. The dimension of digital communication was developed to group the multitude of communication characteristics such as collaboration and team participation. Based on the definitions of the respective dimensions (Waterman et al., 1980), the identified characteristics were added to the dimensions. Some characteristics such as cross-functional (Mocker & van Heck, 2015; Weritz et al., 2020), physical and virtual (Duerr et al., 2018; Hemerling et al., 2018), and internal collaboration (Abhari et al., 2021; Hartl & Hess, 2017; Kiefer et al., 2021) and knowledge sharing (Abhari et al., 2021; Hartl & Hess, 2017; Kiefer et al., 2021) were combined as one character and added to the digital communication dimension.

In addition, an analysis was conducted to determine which characteristics affect digital organizational culture. The assignment to the classifications was done by analyzing the factor description. A text analysis (Mayring, 2016) was carried out and evaluated for the impacts, and these were classified between positive (P), negative (N), and no statement (NS).

RESULTS

Of the selected papers, most papers were published in 2018 with 28% and 2022 with 22%. The lowest number of papers was published in 2015 with 6 % and 2016 with 0 %.

The characteristics of digital organizational culture examined in the selected studies are shown in Table 2. The top five most cited features are innovation, digital skills, agile mindset, fault tolerance, culture, and learning to fail, customer-centricity, integration, and market orientation

**TABLE 1
TOP FIVE TREATED DOMAINS**

The top 5 most mentioned characteristics	Number of mention
Innovation	19
Digital skills	18
Agile mindset	15
Fault tolerance and culture, and learning to fail	14
Customer centricity and integration, and market orientation	14

Characteristics identified through the systematic literature search were summarized and added to the corresponding dimensions. The dimensions can be divided into four categories (entrepreneurial orientation, proactivity, personal competencies, digital competencies, and attitudes). These are described in detail. In addition, the number of mentions in the respective references was summed up and presented. The tables provide an overview and listing of the relevant characteristics of digital organizational culture. The identified characteristics were analyzed for impact on the digital organizational culture, and the one with essential was included in the table. Through text analysis, the positive (P), negative (N), and no statement (NS) effects of the factors were entered in the tables.

Digital Communication

Digital classification communication describes all types of communication that take place with the help of digital media. For this reason, all identified types of communication were added to this classification (Tahvanainen & Luoma, 2018). The human factor is essential for the positive development of organizational culture through effective Digital Transformation (Trushkina et al., 2020). In order to develop ideas, employee participation (Abhari et al., 2017; Hartl, 2017; Hartl & Hess, 2017; Zeng & Glaister, 2018) and closer collaboration (Mocker & van Heck, 2015; Weritz et al., 2020; Duerr et al., 2018), within the organization are necessary (Hartl & Hess, 2017). In particular, features of organizational culture, such as

communication (Aasi & Rusu, 2017; Abhari et al., 2017; Edelmann et al., 2021; Hartl & Hess, 2017), have an impact on performance (Aasi & Rusu, 2017). Teamwork (Aasie & Rusu, 2017; Al-Faihani & Al-Alawi, 2020; Duerr et al., 2018) and participation (Abhari et al., 2021; Hartl, 2017; Hartl & Hess, 2017; Kiefer et al., 2021) are part of digital organizational culture. Another factor of digital organizational culture is the establishment of interfaces with partners and competitors (Duerr et al., 2018), as well as corporate social responsibility (Duerr et al., 2018; Hartl & Hess, 2017; Kiefer et al., 2021).

TABLE 2
ESSENTIAL CHARACTERISTICS OF DIGITAL COMMUNICATION

Digital Communication	Number of mentions	Sources
Collaboration: Ability to cooperate, share and manage digital mobility through digital technology	15	(Abhari et al., 2021; Capgemini, 2017; Duerr et al., 2018; Hartl & Hess, 2017; Hemerling et al., 2018; Igartua et al., 2018; Kiefer et al., 2021; Luo et al., 2018; Mocker & van Heck, 2015; Quinton et al., 2018; Submitter et al., 2020; Troilo et al., 2017; Vey et al., 2017; Weritz et al., 2020; Zeng & Glaister, 2018)
Communication: Ability to communicate constructively, effectively, and consciously	13	(Aasi & Rusu, 2017; Abhari et al., 2021; Edelmann et al., 2021; Gamache et al., 2019; Hartl, 2017; Hartl & Hess, 2017; Hie, 2019; Jäntti & Hyvarinen, 2018; Raabe et al., 2021; Storm & Borgman, 2020; Submitter et al., 2020; Trushkina et al., 2020; Tuukkanen et al., 2022)
Corporate social responsibility: Ability to self-regulate and take responsibility for actions towards clients, stakeholders, and the world at large	8	(Billington & Ellersgaard, 2017; Duerr et al., 2018, (Hartl, 2017; Hartl & Hess, 2017; Kiefer et al., 2021; Quinton et al., 2018; Sousa & Wilks, 2018)
Cooperation: Ability to work cross-functionally and with external partners	4	(Gamache et al., 2019; Hartl, 2017; Submitter et al., 2020; Tuukkanen et al., 2022)
Establishing interfaces with partners and competitors: Attitude to use digital communication optimally in interaction with other cultures	1	(Duerr et al., 2018)
Participation: Ability to support open and non-hierarchical discussion in the organization, the democratization of decision-making processes	11	(Abhari et al., 2021; Billington & Ellersgaard, 2017; Hartl, 2017; Hartl & Hess, 2017; Igartua et al., 2018; Kiefer et al., 2021; Luo et al., 2018; Sousa & Wilks, 2018; Tuukkanen et al., 2022; Vey, 2017; Zeng & Glaister, 2018)

In addition to some mentions, a table lists the effects of factors on the digital organizational culture. Establishing interfaces with partners and competitors does not affect the digital organizational culture. All other factors affect a digital organizational culture. Participation is shown in many articles as the most important characteristic that affects the digital organizational culture.

TABLE 3
IMPACT OF THE FACTORS ON DIGITAL COMMUNICATION

Digital Communication	Positive (P), negative (N), or no statement (NS) Impact
Collaboration	(Trushkina et al., 2020) (NS), (Edelmann et al., 2021) (N), (Hartl & Hess, 2017) (NS), (Kiefer et al., 2021) (NS), (Mocker & van Heck, 2015) (NS), (Abhari et al., 2021) (P), (Zeng & Glaister, 2018) (NS)
Communication	(Abhari et al., 2021) (NS), (Edelmann et al., 2021) (N), (Hartl, 2017) (NS), (Hie, 2019) (NS), (Trushkina et al., 2020) (NS), (Hartl & Hess, 2017) (NS), (Raabe et al., 2021) (NS), (Storm & Borgman, 2020) (NS)
Corporate social responsibility	(Hartl, 2017; Hartl & Hess, 2017) (NS, NS), (Kiefer et al., 2021) (NS)
Cooperation	(Hartl, 2017) (NS), (Trushkina et al., 2020) (NS), (Mocker & van Heck, 2015) (NS), (Abhari et al., 2021) (NS)
Participation	(Trushkina et al., 2020) (NS), (Abhari et al., 2021) (P), (Hartl, 2017; Hartl & Hess, 2017), (NS, NS), (Kiefer et al., 2021) (P), (Zeng & Glaister, 2018) (NS)
Teamwork	(Aasi & Rusu, 2017) (NS), (Al-Faihani & Al-Alawi, 2020) (P), (Hartl & Hess, 2017) (P)

Digital Skills and Attitudes

The classification of digital skills and attitudes deals with positive attitudes towards new digital technologies (Knorr, 2020) and ICT systems (Hildebrandt & Beimborn, 2021). Therefore, the identified digital skills and attitudes were integrated into this dimension. One of the essential characteristics of creating a thriving digital organizational culture in the company is the need for digital skills (Aasi & Rusu, 2017; Duerr et al., 2018; Kiefer et al., 2021) and an agile mindset (Hartl & Hess, 2017; Kiefer et al., 2021; Sousa & Wilks, 2018). The essential factors are employees' and managers' self-organization (Submitter et al., 2020). The so-called 'error culture' (Haffke et al., 2017; Hartl, 2017) motivates employees to take risks (Jonathan et al., 2020; Tuukkanen et al., 2022) to take risks and try new things, even if this might have negative consequences.

TABLE 4
ESSENTIAL CHARACTERISTICS OF DIGITAL SKILLS AND ATTITUDES

Digital Skills and Attitudes	Number of mentions	Sources
Agile mindset: Attitude to react creatively and opportunity-oriented to market changes and to bring them about innovatively and proactively	17	(Billington & Ellersgaard, 2017; Capgemini, 2017; Duerr et al., 2018; Hartl, 2017; Hartl & Hess, 2017; Kiefer et al., 2021; Larjovuori et al., 2017; Luo et al., 2018; Raabe et al., 2021; Sousa & Wilks, 2018; Troilo et al., 2017; Trushkina et al., 2020; Tuukkanen et al., 2022; Vey, 2017; Zeng & Glaister, 2018)
Autonomy: Ability to be independent, not needing to show consideration for others, and free from control to make their own decisions	1	(Abhari et al., 2021)

Creativity: Ability to develop different ideas and opportunities to create value, combine knowledge and resources to achieve valuable effects, research and experiment with innovative approaches	1	(Larjovuori et al., 2018)
Security awareness: Ability to protect personal data, devices, and privacy from threats	1	(Jonathan et al., 2020)
Digital mindset: Attitude of being open to new technologies and curiosity about change.	1	(Capgemini, 2017)
Digital skills: Ability to handle and use the digital tools	18	(Aasi & Rusu, 2017; Billington & Ellersgaard, 2017; Duerr et al., 2018; Gamache et al., 2019; Hartl, 2017; Jäntti & Hyvarinen, 2018; Kiefer et al., 2021; Luo et al., 2018; Quinton et al., 2018; Sousa & Wilks, 2018; Troilo et al., 2017; Trushkina et al., 2020; Vey, 2017; Weritz et al., 2018; Zeng & Glaister, 2018)
Empowerment: Ability to take on self-responsibility and self-determination in the organization	1	(Abhari et al., 2017)
Entrepreneurial mindset: Ability to think and act in an entrepreneurial way.	8	(Billington & Ellersgaard, 2017; Duerr et al., 2018), , Hartl, 2017; Hartl & Hess, 2017; Kiefer et al., 2021; Luo et al., 2018; Quinton et al., 2018; Sousa & Wilks, 2018)
Experimentation: Ability to check, prove or disprove a specific assumption or conjecture	4	(Chatfield et al., 2015; Haffke et al., 2017; Larjovuori et al., 2017; Storm & Borgman, 2020)
Fault tolerance, culture, and learning to fail: Attitude of seeing failures defeats as further development and acting on them.	14	(Abhari et al., 2017; Al-Faihani & Al-Alawi; 2020; Billington & Ellersgaard, 2017; Duerr et al., 2018; Gamache et al., 2019; Hartl, 2017; Hemerling et al., 2018; Larjovuori et al., 2017; Quinton et al., 2018; Trushkina et al., 2020; Tuukkanen et al., 2022; Vey, 2017; Zeng & Glaister, 2018)
Flexibility: Property to adapt to change and, above all, the anticipation of future innovation	3	(Capgemini, 2017; Shirokova et al., 2020; Shirokova et al., 2020; Weritz et al., 2018)
Making decisions quickly and collectively: Ability to take decisions whose outcome is not certain	5	Capgemini, 2017; Chatfield et al., 2015; Duerr et al., 2018; Edelmann et al., 2021; Hemerling et al., 2018; Submitter et al., 2020)
Overcoming resistance: Trait of dealing with stressful situations, bouncing back quickly after crises	1	(Hie, 2019)

Risk-taking: Ability to deal with ambiguity and make calculated decisions in the face of uncertainty	11	(Abhari et al., 2021; Duerr et al., 2018; Gamache et al., 2019; Hartl & Hess, 2017; Hemerling et al., 2018; (Jonathan et al., 2020; Kiefer et al., 2021; Larjovuori et al., 2017; Sousa & Wilks, 2018; Trushkina et al., 2020; Tuukkanen et al., 2022; Vey, 2017; Zeng & Glaister, 2018)
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The literature analysis found that the factors creativity, security awareness, digital mindset, and empowerment do not affect creating a digital organizational culture. Agile mindset, risk-taking and fault tolerance, and culture and learning fail to show the most impact on digital organizational culture. Here we do not yet know whether autonomy and overcoming resistance have a positive or negative impact.

TABLE 5
IMPACT OF THE FACTORS ON DIGITAL SKILLS AND ATTITUDES

Digital Skills and Attitudes	Positive (P), negative (N), or no statement (NS) Impact
Agile mindset	(Hartl, 2017; Hartl & Hess, 2017) (NS, NS), (Kiefer et al., 2021) (P), (Raabe et al., 2021) (NS), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (P)
Autonomy	(Abhari et al., 2021) (NS)
Digital skills	(Aasi & Rusu, 2017) (NS), (Hartl, 2017) (NS), (Kiefer et al., 2021) (P), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (P)
Entrepreneurial mindset	(Hartl, 2017; Hartl & Hess, 2017) (NS, NS), (Kiefer et al., 2021) (NS)
Experimentation	(Chatfield et al., 2015) (P), (Haffke et al., 2017) (NS), (Storm & Borgman, 2020) (NS)
Fault tolerance and culture, and learning to fail	(Abhari et al., 2021) (P), Duerr et al., 2018 (P), (Hartl, 2017) (NS), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (NS)
Flexibility	(Shirokova et al., 2020) (NS)
Making decisions quickly and collectively	(Chatfield et al., 2015) (N), (Edelmann et al., 2021) (N)
Overcoming resistance	(Hie, 2019) (NS)
Problem-solving	(Chatfield et al., 2015) (P)
Risk-taking	(Abhari et al., 2021) (P), (Duerr et al., 2018) (P), (Hartl & Hess, 2017) (NS), (Kiefer et al., 2021) (NS), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (NS)

Entrepreneurial Orientation and Personal Competencies

Entrepreneurial orientation describes the use of opportunities that other organizations cannot seize. It refers to the processes, practices, and decision-making styles of organizations that are entrepreneurial (Knorr, 2020). In personal competencies, characteristics contribute to a person's ability to do their job successfully (Tahvanainen & Luoma, 2018). Companies with a digital organizational culture are characterized by autonomous working conditions, allowing them to work independently. For this reason, the organization should be innovative (Aasi & Rusu, 2017; Abhari et al., 2021; Gamache et al., 2019; Gurbaxani & Dunkle, 2019; Haffke et al., 2017; Hartl, 2017; Hartl & Hess, 2017) to accept, implement and be open to new ideas and changes (Abhari et al., 2021; Jonathan et al., 2020; Kiefer et al., 2021; Martinez-Caro et al., 2020). For this reason, organizations that address a digital organizational culture need more

structure for the individual work process and mainly organizational (Duerr et al., 2018; Kiefer et al., 2021; Zeng & Glaister, 2018), dual structures, and strategic orientation (Isensee et al., 2020). These characteristics are supported by a willingness to learn, continuous learning (Abhari et al., 2021; Hartl & Hess, 2017; Kiefer et al., 2021; Zeng & Glaister, 2018), and customer-centricity and integration and market orientation (Aasi & Rusu, 2017; Abhari et al., 2021; Tuukkanen et al., 2022) supplemented to promote Digital Transformation and create a digital culture.

TABLE 6
ESSENTIAL CHARACTERISTICS OF ENTREPRENEURIAL ORIENTATION AND PERSONAL COMPETENCIES

Entrepreneurial orientation and Personal competencies	Number of mentions	Sources
Customer centricity and integration and market orientation: Ability to inform and support customers through the use of digital tools	14	(Aasi & Rusu, 2017; Abhari et al., 2021; Capgemini, 2017; Duerr et al., 2018; Hartl, 2017; Hartl & Hess, 2017; (Kiefer et al., 2021; Quinton et al., 2018; Submitter et al., 2020; Troilo et al., 2017; Trushkina et al., 2020; Tuukkanen et al., 2022; Vey, 2017; Weritz et al., 2018; Zeng & Glaister, 2018)
Ecosystem orientation: Ability to integrate ecological issues into business strategy and reduce harmful impacts of business activities	5	(Kiefer et al., 2021; Quinton et al., 2018; Sousa & Wilks, 2018; Zeng & Glaister, 2018)
Innovation: Ability to identify opportunities to improve performance by changing methods, processes, products, and services	22	(Aasi & Rusu, 2017; Abhari et al., 2021; Al-Faihani & Al-Alawi, 2021; Duerr et al., 2018; Hartl & Hess, 2017; Kiefer et al., 2021; Larjovuori et al., 2017; Quinton et al., 2018; Raabe et al., 2021; Submitter et al., 2020; Troilo et al., 2017; Trushkina et al., 2020; Vey, 2017; Weritz et al., 2018; Zeng & Glaister, 2018)
Openness to change: Ability to accept new ideas and its willingness to implement and embrace change	13	(Abhari et al., 2021; Gamache et al., 2019; Hartl & Hess, 2017; Jonathan et al., 2020; Kiefer et al., 2021; Luo et al., 2018; Sousa & Wilks, 2018; Storm & Borgman, 2020; Troilo et al., 2017; Trushkina et al., 2020; Vey, 2017)
Organizational and dual structures: Ability to divide, organize and coordinate the structure with organizational activities.	9	(Billington & Ellersgaard, 2017; Duerr et al., 2018; Kiefer et al., 2021; Luo et al., 2018; Sousa & Wilks, 2018; Troilo et al., 2017; Vey, 2017; Zeng & Glaister, 2018)
Responsiveness: Ability to complete assigned tasks of a system or functional unit within a given time.	1	(Abhari et al., 2021)

Strategic orientation: Ability to leverage the operational environment within the business to improve performance and achieve a competitive advantage	1	(Isensee et al., 2020)
Willingness to learn, continuous learning and development: Attitude to continuously develop knowledge, skills, and abilities through tasks and experiences in dealing with others	10	(Abhari et al., 2021; Billington & Ellersgaard, 2017; Hartl & Hess, 2017; Kiefer et al., 2021; Luo et al., 2018; Sousa & Wilks, 2018; Troilo et al., 2017; Vey, 2017; Weritz et al., 2018; Zeng & Glaister, 2018)

Customer centricity and integration and market orientation, ecosystem orientation, innovation, openness to change, organizational and dual structures, responsiveness, willingness to learn, continuous learning, and development are the characteristics mentioned in the literature that affect the digital organization. These characteristics show both positive and negative impacts on Digital Transformation. The characteristic strategic orientation does not affect a digital culture.

TABLE 7
IMPACT OF THE FACTORS ON ENTREPRENEURIAL ORIENTATION AND PERSONAL COMPETENCIES

Entrepreneurial orientation and Personal competencies	Positive (P), negative (N), or no statement (NS) Impact
Customer centricity and integration, and market orientation	(Abhari et al., 2021) (P), (Hartl, 2017; Hartl & Hess, 2017) (NS, NS), (Kiefer et al., 2021) (NS), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (NS)
Ecosystem orientation	(Kiefer et al., 2021) (NS), (Zeng & Glaister, 2018) (NS)
Innovation	(Abhari et al., 2021) (P, P), (Hartl, 2017; Hartl & Hess, 2017) (NS, NS), (Kiefer et al., 2021) (P), (Raabe et al., 2021) (NS), (Trushkina et al., 2020) (NS), (Zeng & Glaister, 2018) (P)
Openness to change	(Abhari et al., 2021) (P), (Hartl & Hess, 2017) (NS), (Kiefer et al., 2021) (P), (Storm & Borgman, 2020) (NS), (Trushkina et al., 2020) (NS)
Organizational and dual structures	(Kiefer et al., 2021) (P), (Zeng & Glaister, 2018) (P)
Responsiveness	(Abhari et al., 2021) (P)
Willingness to learn, continuous learning, and development	(Abhari et al., 2021) (P), (Hartl & Hess, 2017) (NS), (Kiefer et al., 2021) (P), (Zeng & Glaister, 2018) (P)

Proactivity

The classification of proactivity describes the ability to take responsibility, act on one's responsibility, and be goal- and future-oriented (Knorr, 2020). To establish a digital organizational culture in the company, it is essential to build mutual trust (Abhari et al., 2021) (Hartl & Hess, 2017; Jonathan et al., 2020) and transparency (Duerr et al., 2018; Edelmann et al., 2021; Hemerling et al., 2018). Motivation (Jäntti & Hyvarinen, 2018) encourages employees and develops their skills and engagement (Al-Faihani & Al-Alawi, 2020; Jäntti & Hyvarinen, 2018) play an essential role in a digital organizational culture. They support change, and a culture of openness (Jäntti & Hyvarinen, 2018) helps drive Digital Transformation. Engaging senior management (Isensee et al., 2020; Jonathan et al., 2020), especially equalizing power (Duerr et al., 2018), will also promote the development of digital organizational culture.

TABLE 8
ESSENTIAL CHARACTERISTICS OF PROACTIVITY

Proactivity	Number of mentions	Sources
Involvement of staff: Ability to promote teamwork, colleagues helping and coordinating with each other	2	(Al-Faihani & Al-Alawi, 2020; Jäntti & Hyvarinen, 2018)
Equality of power: Ability to give equal consideration to the opinions of each individual	1	(Duerr et al., 2018)
Motivation and promotion of employees: Ability to encourage and motivate employees through responsibility and autonomy and to convey recognition and appreciation	1	(Jäntti & Hyvarinen, 2018)
Support for change initiatives: Ability to initiate processes, accept challenges, act and work independently to achieve goals, make decisions and carry out planned tasks.	1	(Al-Faihani & Al-Alawi, 2020)
Trust: Ability to build mutual trust between organizations.	5	(Abhari et al., 2021; Hartl & Hess, 2017; Hemerling et al., 2018; (Jonathan et al., 2020; Tuukkanen et al., 2022)
Transparency: Ability to communicate openly and honestly with each other and the outside world, understanding that good information can enable effective action.	4	(Duerr et al., 2018; Edelmann et al., 2021; Hemerling et al., 2018; Shirokova et al., 2020)

Equality of power, motivation, and promotion of employees and supporting a culture of openness affect the organization's digital culture. The characteristic of trust only comes up in two contributions that concern digital organizational culture. According to the content analysis, it was found that involvement of staff, support for change initiatives, and trust positively affect Digital Transformation.

TABLE 9
IMPACT OF THE FACTORS PROACTIVITY

Proactivity	Positive (P), negative (N), or no statement (NS) Impact
Involvement of staff	(Al-Faihani & Al-Alawi, 2020) (P)
Support for change initiatives	(Al-Faihani & Al-Alawi, 2020) (P)
Trust	(Abhari et al., 2021) (P), (Hartl & Hess, 2017) (NS)
Transparency	(Shirokova et al., 2020) (NS)

DISCUSSION

This paper identifies the characteristics relevant to a digital organizational culture that can contribute to IS knowledge at various points. Our study has compiled a comprehensive list of factors that form the digital organizational culture. Furthermore, the characteristics are divided into four dimensions to create a concise framework for digital organizational culture. In addition to the identified characteristics, the factors were defined using a standard taxonomy to ensure precise terminology. In particular, we focused on the

less researched influential factors. Affective factors include, for example, collaboration (Edelmann et al., 2021; Trushkina et al., 2020), communication (Abhari et al., 2021; Edelmann et al., 2021), digital skills (Aasi & Rusu, 2017; Hartl, 2017), innovation (Abhari et al., 2021; Al-Faihani & Al-Alawi, 2020) and trust (Abhari et al., 2021; Hartl & Hess, 2017). Affective competencies are taken into account because, in addition to cognitive competencies, they are more relevant for employees and managers who do not actively shape the Digital Transformation but who support its successful implementation.

Flexibility and transparency promote support for a changing business environment (Uludag et al., 2018), as changing the way of working in a large company with its habits and culture are difficult but essential. There is still a gap in the existing frameworks as not all characteristics of digital organizational culture are covered. The identified characteristics help develop a digital organizational model for staff and leaders to support the Digital Transformation. Compared to previous characteristics (Duerr et al., 2018; Hartl, 2017), our characteristics related to Digital Transformation supported the development of a new digital culture. Furthermore, customer-centricity, market orientation, and integrated customers are crucial to meeting the ever-changing market and customer requirements (Shirokova et al., 2020).

For this reason, it is necessary to integrate flexibility and rapid response characteristics into the digital organizational culture. Innovation, digital awareness and necessity of innovation, learning to fail, failure tolerance, communicative, openness, digital skills, and agile mindset (Gamache et al., 2019, Kiefer et al., 2021; Larjovuori et al., 2017; Jäntti & Hyvarinen, 2018; Sousa & Wilks, 2018) are the most frequently mentioned characteristics that constitute a digital organizational culture. For this reason, we have integrated these characteristics into the respective culture dimensions to determine to what extent they play a role in different industries in future studies.

Another contribution is the description of the factors using a taxonomy for creating the descriptions. Thus, the characteristics were classified and described as ability or attitude. The concept of digital organizational culture is not limited to values (Hartl & Hess, 2017) but also considers other factors such as digital attitudes or entrepreneurial action orientation. Our concept takes into account both the frequently studied values and characteristics as well as practical digital attitudes. Existing work argues that the human factor in Digital Transformation affects the positive development of organizational culture (Trushkina et al., 2020), but which of these factors is not mentioned. Through the literature, it was determined that digital attitudes are an essential dimension of digital organizational culture. The results show that the impact of the digital mindset has not been mentioned in the current work, which still needs to be investigated. In order to develop these attitudes in companies, managers should first be sensitized and trained. If managers have Digital Transformation attitudes, they can better motivate their employees to have the same attitude.

Additionally, these characteristics can be used and studied in different industries. Thus, it can be found out which characteristics are essential for the respective industries to build a digital organizational culture. The results of our review will also be used to develop further research questions that can be used to support IS research. For further research, the following research questions could be investigated:

- How could a digital organizational culture model be developed based on the identified characteristics?
- Which characteristics of digital organizational culture are fundamental for organizations?
- How could a survey instrument be developed based on the identified characteristics?

The questions can be used as foundations to fill the gaps in recent digital organizational culture studies, and researchers can modify these questions to fit their specific research problems better.

SUMMARY AND FUTURE WORK

This study investigated the essential aspects of a digital organizational culture relevant to the company's Digital Transformation. A systematic literature review was conducted to identify existing attitudes, competencies, and values. These characteristics were divided into four categories derived from established organizational culture models. This way, a broad overview of attitudes, competencies, and values was obtained to serve as a basis for future research. The results show that many of the characteristics are an essential basis for developing a digital organizational culture. The characteristics can be explored in the

future with a qualitative methodology for a specific sector or group of people to gain new insights and results. The evaluation of factor descriptions and the effect of the characteristics should be studied with a mixed-methods approach and applied to a specific industry.

Furthermore, it is essential to find out how to develop a model of digital organizational culture, evaluate it and define measures based on the identified characteristics. Furthermore, it would be helpful to define items for the individual factors to determine the status of employees and managers. In this way, it can be determined which areas can still be promoted. Another aspect would be creating a digital organizational culture assessment, where companies are divided into levels according to the assessment, and measures are created depending on the level.

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