# Challenges of a Digitalising World in the Light of an International Survey

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## Abstract

In recent years, the use of high-level IT systems and the digitalisation of organisational processes has become increasingly important in business organisations. This means that digitalisation is one of the most frequently mentioned objectives in the development of organisations. This study aims to examine how well-prepared organisations are on the path towards these goals and how can organisational culture help. The quantitative international research involved 692 respondents in 34 countries across 6 continents. Responses were assessed using SPSS software. The results show that an organisational culture that is open to change and based on trust supports digital transformation processes, leadership attitudes, human responses and interactions. Regardless of geographical location and economic performance, organisations face similar challenges and there are no marked differences internationally in terms of preparedness for digital transformation. The characteristics of the learning organisation culture studied have the greatest impact on leadership behaviour and the least influence on the digital tools used.

## Keywords

# Retos de un Mundo en Vías de Digitalización a la Luz de una Encuesta Internacional

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## Resumen

En los últimos años, el uso de sistemas informáticos de alto nivel y la digitalización de los procesos organizativos han cobrado cada vez más importancia en las organizaciones empresariales. Esto significa que la digitalización es uno de los objetivos mencionados con más frecuencia en el desarrollo de las organizaciones. El objetivo de este estudio es examinar el grado de preparación de las organizaciones en el camino hacia estos objetivos y cómo puede ayudar la cultura organizativa. En la investigación cuantitativa internacional participaron 692 encuestados de 34 países de 6 continentes. Las respuestas se evaluaron con el programa informático SPSS. Los resultados muestran que una cultura organizativa abierta al cambio y basada en la confianza favorece los procesos de transformación digital, las actitudes de liderazgo, las respuestas humanas y las interacciones. Independientemente de la ubicación geográfica y de los resultados económicos, las organizaciones se enfrentan a retos similares y no existen diferencias marcadas a escala internacional en cuanto a la preparación para la transformación digital. Las características de la cultura de las organizaciones de aprendizaje estudiadas son las que más influyen en el comportamiento del liderazgo y las que menos en las herramientas digitales utilizadas.

## Palabras clave

Digitalización, herramientas digitales, interacciones humanas, organización que aprende, actitud de los directivos, cultura organizativa

I n addition to globalisation, the most striking feature of 21st-century companies is the rapid development of digitalisation. It is bringing with it the emergence of new business models, the restructuring of industries, and the transformation of production, consumption and transport systems (Fisher et al., 2018; Ahman & Murray, 2019; Abdallah et al., 2022). Leadership, employee relations, training - development and knowledge retention are unprecedented challenges that organisations need to address. They need to find new solutions that will enable them to maintain their position in the market (Szelągowski & Berniak-Wozni, 2022; Crişan & Marincean 2023). The importance of this transformational effect justifies the presentation of the results of this research (Abrahamson & Johansson, 2020; Maskun & Nor, 2018; Kusuma, 2018).  Although there have been many studies on the subject (Barbosa et al., 2015; Li et al., 2017; D'Angelo, 2020, Sun et al., 2021; Za et al., 2022), examining the readiness, behaviour, lack of or existing competences of human resources in different nations, the results of the studies are published in separate research papers (Lee et al., 2018; Mura & Svec, 2018; Frey & Osborn, 2013). There is no comprehensive international picture in the literature that would provide information on digital readiness regardless of geographical and cultural specificities. This research aims to fill this gap.

The study aims to provide a comprehensive international picture of the readiness of business organisations in the digitalising world, their openness to change, the use of management tools and the characteristics of human-human, human-machine relations from the perspective of the most receptive learning organisation culture. The study's distinct novelty lies in the fact that, detached from other factors that characterise economic development, geographical location and natural conditions, it highlights the fact that technical-technological progress has no limits. Wherever we look for its inevitable consequences, the overall picture is not as wide a development gap as we might otherwise assume and even the most advanced economies are not fully prepared for transformation.

The research questions are:

**Q1** - Do learning organizational characteristics influence the level of preparation for digital organizational functioning?

**Q2** - Which learning organisation characteristics have the greatest impact on the use of management tools and behavioural characteristics when preparing for digital solutions?

**Q3** - What are the links between the characteristics of the learning organisation culture the openness to digital transformation, and the emergence of human emotions (fear - trust and stress)?

In the next section, the literature review is presented, followed by the results of an international quantitative study. Respondents from 34 countries on 6 continents participated in the questionnaire survey. The answers were analysed using SPSS statistical software, using simple and complex statistical methods. The first paragraph starts exactly at the left margin – indentation none.

**Literature Review**

The term digitalisation refers to organisational processes that use information technology to innovate, design, and reduce time and cost in products, services, work processes and organisational solutions (Watanabe et al., 2017). There are many definitions of digitalisation, which show the diversity of the subject (Bronzetti et al., 2020; Hale, 2021; Srai & Lorentz, 2019; Ochs & Riemann, 2018).

Digital solutions are transforming customer and partner relationships and can also play an important role in reducing costs (Marinč, 2013; Gomber et al., 2018; da Silva, 2015). The methods of value-creation are transformed, structural arrangements are changed, and new business models are developed (Trischler & Li-Ying, 2023; Rachinger et al., 2019; Davenport & Westerman, 2018; Kane et al., 2016). As with any other organisational change, even if digitisation requires specific solutions, the right organisational culture needs to be in place to ensure that the new technology is embedded in organisational operations (Matt, 2015; Wang et al., 2017; Lobonţ et al., 2022; Raimo et al., 2022). This culture can be described by the characteristics of a learning organisation, which includes all the operational elements necessary to embrace change and successfully operate in the new situation that has emerged.

**The Role of Leadership in Change Management**

The evolution of digitalisation is leading to a transformation and growth of relationships in organisations. The increased number of connections reinforces the uncertainty of the competitive environment. The responsibility for adaptation lies with the leader of the organisation, who is responsible for integrating effective innovation into the company during digitalisation (Parvianien et al., 2017; Gilli et al., 2023). Leadership must lead by example in adapting to new technologies and products. Its most important task, besides developing its competencies, is to develop an appropriate corporate culture (Alekhina et al., 2020). Frequent problems are that employees doubt their abilities, lack self-confidence and lack professional knowledge. This is coupled with the incredibly rapid development of technology and the ever-increasing number of digital solutions, which also pose challenges and often create serious stressful situations (Tams et al., 2022). The cultural characteristics created as a result of this change need to be shaped to support the organisation's digitalisation efforts (Weber et al., 2022).

**The Importance of the Learning Organisation**

'The ability to learn faster than your competitors may be the only sustainable competitive advantage' (Arie De Geus, Head of Strategy, Royal Dutch Shell, cited (Gadoci, 2017)). This idea establishes all the conclusions that underpin the construction and operation of knowledge management systems and the justification for a learning organisation culture (Ivanova et al., 2020). The functioning of learning organisations and their characteristics have been collected by several authors (Senge, 2006; Garvin et al., 2008; D'Amato et al., 2017; Örtenblad & Koris, 2014; Farrukh & Waheed, 2015; Rusok et al, 2021), the most frequently cited requirements are

System Thinking, Personal Mastery, Mental Models, Shared Vision, Team Learning (Senge, 2006).

**Competencies Required**

The successful integration of emerging digital tools will facilitate the operational functioning of organisations (Girrbach, 2018). This requires competent staff and managers (Ditzendy, 2017; Za et al., 2022). Dzwigol et al. (2020) grouped the competencies expected of managers into four categories. 'Experience and time on the job', 'education, cognitive and creative potential', 'effective goal setting and development', 'communicative, leadership and managerial functions'. The competencies required are specifically designed to assess the suitability for digital transformation in the context of Industry 4.0. Among the requirements, our research investigated the communication, support, decision-making and other tools used by managers towards their employees.

It is not only the management that needs to be competent but also the skills of the staff. Hecklau et al. (2016) have summarised the most important competence requirements in the context of Industry 4.0 - digitalisation in a comparative study. In our research, we focused on the most frequently occurring technical and technological solutions, focusing on the technological competence requirements. This includes solutions such as IoT (Gatoullat et al., 2018; Khansa, et al., 2018), the integration and use of artificial intelligence in processes (Rutten et al., 2018), cloud-based solutions, (Baltatescu, 2014; Destefano et al., 2019), automation in various areas, (Barbosa et al., 2015), digital data (Plante et al., 2021) and decision making based on it (Noran & Bernus, 2018; Putranto et al., 2021; Wang et al., 2017).

## Research Method and Methodology

**Data and Research Model**

The international quantitative research was conducted in English using an anonymous questionnaire survey in the Autumn 2022. Contact details of respondents were collected in the following ways: publicly accessible organisational websites, social media pages of publicly accessible organisations, publicly published job vacancies and postings on portals, and online study groups of students at colleges and universities. Communication with organisations and their employees was via email and social media. Data collection was prioritised for countries and their online platforms with a high proportion of English speakers. In collecting the sample, we did not aim to be selective between economic sectors, as we wanted to get a broad picture. Thus, a wide range of sectors is represented in the sample. The responses received are not a representative sample but provide a general picture. During the survey period, we received 2,435 responses, from which we identified the following organisations that characterise the culture of the learning organisation. 692 fully and correctly completed questionnaires were received and evaluated.

**The Sample**

Responses were received from 34 countries and 6 continents. Most responses came from the United Kingdom (44) and the United States of America (34), (English-speaking regions). Europe was the most represented continent with 439 respondents, followed by Asia (148), and then North America (50). The smallest proportion of respondents came from Australia (23), South America (22) and Africa (10). Other countries participating in the research (Europe): United Kingdom, Hungary, Slovakia, Belgium, Germany, Netherlands, Austria, Czech Republic, France, Norway, Portugal, Sweden, Russia, Greece, Ireland, Armenia, Spain, Andorra, Serbia. (North America): United States, Canada. (Asia): China, India, Israel, Bangladesh, Taiwan (Republic of China), Iran, Malaysia, Pakistan, and Singapore. (Australia), (South America): Colombia, Ecuador. (Africa): Angola.

The questionnaire was administered online via the Lime survey platform. The anonymous questionnaire consisted of closed questions that took approximately 15–20 min to complete Questionnaires that were started but left unfinished or incorrectly completed were not processed. The questionnaire used closed questions, mostly on a Likert - scale, with 4 response options (thus blunting neutral opinions). For some questions, the response option 'Don't know' was added. The structure of the questionnaire is shown in Table 1 below.

**Table 1**
*The structure of the questionnaire*

| Questionnaire structure | |
| --- | --- |
| Impact of digitisation (5 questions) | How organisations experience digitalisation and what they think about its impact. |
| Digital tools used (9 questions) | Leadership impact on digital transformation, employee experience, knowledge, and tool use. |
| Human-human and human-machine interaction, fear and trust (3 questions) | Fear, confidence, competence development, training. |
| Supporting role of management (1 question – 9 sub-questions) | Managerial and leadership tools, motivation. |
| Organisational culture (1 questions – 9 sub-questions) | Organisational attitudes towards change, decision making. |
| Demographic and organisational data (7 questions) | Demographic and organisational data. |

*Source*. Own construction

Results were evaluated using SPSS software, using simple and complex statistical methods. The research model is shown in Figure 1 below.

**Figure 1**

*Research model*
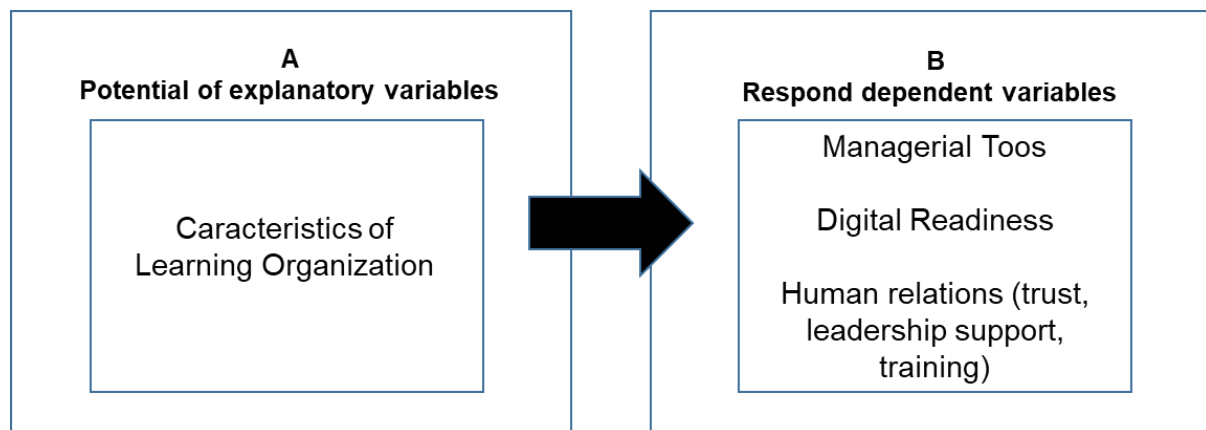


*Source*. Own construction

The arrow in the research model indicates our research question, i.e. whether the answers to question A significantly influence the answers to question B, and if so, how strongly they are related.

## Data Analysis Method

Descriptive statistics and relationship analyses are used as research methods. The level at which the questions are measured determines the indicator that can be used to quantify any relationship between them.

In statistics, the scale at which a variable is measured is a classification that allows the nature of the information contained in the numbers (and hence the variable) assigned to the task to be described. According to Stevens' theory of scale (1946), different mathematical operations can be performed on variables, depending on the level of measurement of the variable. He proposed four types of scales for psychological measurement: nominal scale (categorical and discrete), ordinal scale, interval scale, and ratio scale. In our research, the level of variables used in the questionnaire is measured on nominal and ordinal scales.

There is only a qualitative difference between the values of the nominal measurement level variables. This is the simplest and least informative level of measurement. Among the mean values, only the mode, i.e. the most frequent value, can be determined. For the ordinal measurement level variable, the order of scale values describes the real relationships between units. The most commonly used methods for these measurement level variables are: percentiles, medians, rank correlation

The research model in Figure 1 contains nominal and ordinal scale variables. Rank correlation relationships between them can be explored using Kendall's Tau ($\tau$). $\tau$ can take values in the interval [-1, 1].

The relationship analysis is interpreted on a 5% significance level using SPSS software. If the p-value for the test is $< 0.05$, then there is a significant relationship between the two variables. In the case of significant relationships, the absolute value of the indicator indicates the strength of the relationship (Sajtos & Mitev, 2007): below 0.2 we speak of a weak

relationship, from 0.7 a strong relationship, and between these two numbers a moderate relationship.

Since the $\tau$ indicator can take both positive and negative values, the sign of the rank correlation coefficient, which indicates the direction of the relationship, can also be interpreted here. A negative (positive) $\tau$ means that the higher the rank of one variable, the more likely it is that the other variable will have a lower (higher) rank.


## Research Results

In this section, some basic statistics of the answers to the (main) questions of the questionnaire are presented, followed by the results of the relationship analysis.

**Demographic Analysis**

Participant demographics are summarised in Table 2 below.

**Table 2**

*Characteristics of the sample*

| Age/generation distribution % | Job Title |
|---|---|
| Z – 26.80 | staff – 58.7 % |
| Y – 35.54 | senior manager/CEO/owner |
| X – 26.25 | middle manager/head of department/regional manager |
| Baby Boomer – 11.4 | direct manager/supervisor |
| **Date of foundation (year - %)** | **Main activity (number of respondents)** |
| 2000-2020 – 45.6 | Education and training - 117 |
| 1999-1980 – 29.8 | Marketing and sales - 82 |
| 1979-1960 – 5.2 | Hospitality and tourism - 78 |
| 1959-1940 – 9.6 | Others: business management and administration, information technology, social services, finance, science, technology and engineering, medicine, government and administration, agriculture and raw materials production, manufacturing, transport and logistics, arts, audio/video, communications, law and public safety, architecture |

*Source.* Own construction

The impact of digitalisation: digitalisation is shifting the balance of power on the labour supply side: 92% - agree, 53% - the impact is at least significant, 10.6% - the changes are radical.

Digital toolbox and the application of Industry 4.0: 65.7% of respondents have recognised the benefits of the tools and solutions listed in the questionnaire, 63.2% have already implemented some solution, 36.8% have not yet made any investments in this area, 6.9% have fully implemented digital solutions, 28.9% have at least minimal knowledge or previous experience of ICT.

30.3% of respondents provide training for their staff (in addition to mandatory professional training) 8.5% provide training using digital tools, and 22.9% do not organise any staff training.

The most threatening areas due to digitalisation are data security (data as digital documents) and cyber security (protection against attacks on infrastructure). The third biggest threat is the lack of digital skills in the workforce.

Man-human, man-machine interface, trust and fear: The organisations surveyed agreed that both management and staff are open to the introduction of new technology. They feel they can trust new technologies and that it will make their work easier. Management can help to overcome fears and dispel mistrust through competence development training. 40.3% of the organisations surveyed have either implemented or are in the process of implementing mandatory online competence development training, and 48.9% have either implemented or are in the process of implementing voluntary online training.

The supportive role of management is mainly through explaining the benefits of new technologies to staff and setting an example in their use. The involvement of professionals is the least common, occurring at most in large companies.

Organisational culture and learning organisation: The following questions were designed to find out the characteristics of organisational culture and to identify the existence of learning organisations.

To verify our assumptions and answer the research questions, we conducted correlation tests after the basic statistical evaluation. In doing so, we assessed the relationship between the learning organisation characteristics and our hypotheses (managerial tool use, digital readiness and human relations).

*Hypotheses*

**H1**: When the characteristics of the learning organization culture are valid, management supports the digital readiness of the organization through soft skills and leading by example (there is a linear significant relationship between the characteristics tested)

**H2**: When the characteristics of a learning culture are present, the organisation and the staff are open to digitalisation technology and the management continuously trains its staff to use it to an ever higher level.

**H3**: When the characteristics of a learning organisation culture are present, employees prefer to take advantage of the opportunities offered by digitalisation technology.

**Descriptive Statistics**

For each question, we present the number of valid answers, and the mode (Mo), i.e. the most frequent, typical answer. Where possible (for questions with a high level of measurement), we present the minimum (Min), maximum (Max), range (R), mean and quartiles (Q1, Q2=Me, Q3) of the responses, where the middle quartile is the median (Me). Since no question can be measured at the highest (ratio) scale, other descriptive statistics (e.g. mean, standard deviation) are not meaningful. The data for the study areas are summarised in Tables 3, 4, 5, 6.

**Table 3**

*Characteristics of learning organization*

| Learning Organisation | Valid persons | Min | Max | R | Mean | Mo | 25 Q1 | 50 Q2=Me | 75 Q3 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Percentiles | | |
| The organisation proactively anticipates change. | 692 | 1 | 4 | 3 | 2.470 | 2 | 2 | 2 | 3 |
| The organisation is innovative in its thinking, looking for new solutions, not limited by routine. | 692 | 1 | 4 | 3 | 2.598 | 3 | 2 | 3 | 3 |
| The organisation also focuses on long-term impacts when making decisions. | 692 | 1 | 4 | 3 | 2.914 | 3 | 2 | 3 | 4 |
| In the operation and development of the organisation, attention is paid to the impact of changes on other departments. | 692 | 1 | 4 | 3 | 2.624 | 3 | 2 | 3 | 3 |
| The aim is to jointly develop the learning and development potential of the members of the organisation, through group learning. | 692 | 1 | 4 | 3 | 2.299 | 2 | 2 | 2 | 3 |
| The organisation needs to integrate individual, and employee visions into the organisational vision. | 692 | 1 | 4 | 3 | 2.599 | 3 | 2 | 3 | 3 |
| Employees are aware of how their work contributes to the achievement of organisational goals. | 692 | 1 | 4 | 3 | 2.621 | 3 | 2 | 3 | 3 |
| Workers can work towards their vision, which means they are free to express themselves. | 692 | 1 | 4 | 3 | 2.399 | 2 | 2 | 2 | 3 |

*Source.* Own construction

**Table 4**

*Digital toolbox*

| Digital tools | Valid persons | Min | Max | R | Mean | Mo | 25 Q1 | 50 Q2=Me | 75 Q3 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Percentiles | | |
| Digital tracking of raw materials, products | 692 | 1 | 4 | 3 | 2.353 | 2 | 2 | 2 | 3 |
| Automated material handling | 692 | 1 | 4 | 3 | 1.599 | 1 | 1 | 1 | 2 |
| Supply chain integration and transparency | 692 | 1 | 4 | 3 | 1.991 | 2 | 1 | 2 | 3 |
| Toolkit Industry 4.0 compatibility (digital data) | 692 | 1 | 4 | 3 | 1.939 | 2 | 1 | 2 | 3 |

| Digital tools | Valid persons | Min | Max | R | Mean | Mo | Percentiles | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25 Q1 | 50 Q2=Me | 75 Q3 |
| Using cloud-based solutions | 692 | 1 | 4 | 3 | 2.156 | 2 | 1 | 2 | 3 |
| Production automation | 692 | 1 | 4 | 3 | 1.871 | 1 | 1 | 2 | 2 |
| Using augmented reality solutions | 692 | 1 | 4 | 3 | 1.499 | 1 | 1 | 1 | 2 |
| M2M - Machine-to-machine communication | 692 | 1 | 4 | 3 | 1.769 | 1 | 1 | 2 | 2 |
| Application of artificial intelligence | 692 | 1 | 4 | 3 | 1.501 | 1 | 1 | 1 | 2 |
| Automated troubleshooting and forecasting (e.g. maintenance scheduling) | 692 | 1 | 4 | 3 | 1.802 | 1 | 1 | 2 | 2 |
| Real-time inventory management (automated entries) | 692 | 1 | 4 | 3 | 2.101 | 2 | 1 | 2 | 3 |

*Source*. Own construction

**Table 5**

*Human – machine interfaces*

| Human – machine interface | Valid persons | Min | Max | R | Mean | Mo | Percentiles | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25 Q1 | 50 Q2=Me | 75 Q3 |
| Workers have confidence in modern technology. | 692 | 1 | 4 | 3 | 2.452 | 2 | 2 | 3 | 3 |
| Workers are confident that new technology will make their jobs easier. | 692 | 1 | 4 | 3 | 2.558 | 3 | 2 | 3 | 3 |
| Workers are open to new technological solutions. | 692 | 1 | 4 | 3 | 2.327 | 2 | 2 | 2 | 3 |
| The organisation's management is open to new technological solutions. | 692 | 1 | 4 | 3 | 3.125 | 3 | 3 | 3 | 4 |
| Management uses modern technology to monitor the performance of workers. | 692 | 1 | 4 | 3 | 2.311 | 2 | 2 | 2 | 3 |
| Management accepts that workers make mistakes when introducing new technology. | 692 | 1 | 4 | 3 | 2.599 | 2 | 2 | 3 | 3 |
| Workers fear that the organisation will use new technology to control them. | 692 | 1 | 4 | 3 | 2.485 | 2 | 2 | 2 | 3 |
| Workers fear for their jobs because of new technology. | 692 | 1 | 4 | 3 | 2.210 | 2 | 1 | 2 | 3 |
| | 692 | 1 | 4 | 3 | 2.101 | 2 | 1 | 2 | 3 |

| Human – machine interface | Valid persons | Min | Max | R | Mean | Mo | Percentiles | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25 Q1 | 50 Q2=Me | 75 Q3 |
| Workers are afraid of losing their jobs due to a lack of skills and qualifications related to technology. | | | | | | | | | |
| Workers are afraid of making mistakes when introducing new technology. | 692 | 1 | 4 | 3 | 2.320 | 2 | 2 | 2 | 3 |
| The organisation provides mandatory competence development training online. | 692 | 1 | 4 | 3 | 1.959 | 1 | 1 | 2 | 3 |
| The worker may apply for these courses on a voluntary basis. | 692 | 1 | 4 | 3 | 1.890 | 1 | 1 | 2 | 3 |
| The organisation provides training for employees before the introduction of new, modern technology. | 692 | 1 | 4 | 3 | 2.541 | 2 | 1 | 2 | 3 |
| There is a tailor-made training programme, including modern technologies. | 692 | 1 | 4 | 3 | 2.101 | 1 | 1 | 2 | 3 |
| Burnout syndrome is common among workers. | 692 | 1 | 4 | 3 | 2.099 | 2 | 2 | 2 | 3 |
| The management of the organisation pays attention to reducing the level of stress in the workplace. | 692 | 1 | 4 | 3 | 2.412 | 2 | 2 | 2 | 3 |
| The organisation is constantly improving the ergonomic conditions at work. | 692 | 1 | 4 | 3 | 2.459 | 2 | 2 | 2 | 3 |
| Workers rely too much on the use of digital tools, which can reduce their problem-solving skills. | 692 | 1 | 4 | 3 | 1.867 | 2 | 1 | 2 | 2 |
| Using the possibilities offered by technology, employees can be reached outside working hours if necessary. | 692 | 1 | 4 | 3 | 2.399 | 2 | 2 | 2 | 3 |

*Source*. Own construction

**Table 6**

*Management supporting*

| Management | Valid persons | Min | Max | R | Mean | Mo | Percentiles | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25 Q1 | 50 Q2=Me | 75 Q3 |
| Before introducing new technology, management will also consult the employees concerned. | 692 | 1 | 4 | 3 | 2.598 | 2 | 2 | 2 | 3 |
| Management is leading by example in the use of new technology. | 692 | 1 | 4 | 3 | 2.699 | 3 | 2 | 3 | 3 |

| Management | Valid persons | Min | Max | R | Mean | Mo | Percentiles | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25 Q1 | 50 Q2=Me | 75 Q3 |
| Management explains to employees how the new tool will make their work easier. | 692 | 1 | 4 | 3 | 2.798 | 3 | 2 | 3 | 3 |
| Management explains to employees that the new tool will ensure their personal development. | 692 | 1 | 4 | 3 | 2.601 | 3 | 2 | 3 | 3 |
| The introduction of the new tool will be supported by a specialist to whom employees can turn at any time with questions. | 692 | 1 | 4 | 3 | 2.699 | 3 | 2 | 3 | 3 |
| Management will sanction anyone who does not use the new tools. | 692 | 1 | 4 | 3 | 1.899 | 2 | 1 | 2 | 2 |
| For management, getting the job done is more important than keeping to working hours. | 692 | 1 | 4 | 3 | 2.505 | 3 | 2 | 3 | 3 |
| New ideas from employees are incorporated into the work process by management. | 692 | 1 | 4 | 3 | 2.787 | 3 | 2 | 3 | 3 |

*Source*. Own construction

**Relationship Analysis**

To confirm (or reject) the hypotheses, we looked at the answers to the questions that qualify the learning organisation. Is it true that the organisation is a learning organisation? Since the answers confirmed this, (see the analyses below) we examined whether these characteristics influence the range of digital tools used, the behaviour of managers and people's attitudes towards technology. If there is a significant relationship between them, how strong is it? That is, the more true the learning organisation characteristics are, the more true it is that more digital tools are used (even routinely). The more supportive leadership behaviour is during the digital switchover. The stronger the link between learning organisation characteristics and human behaviour, the greater the trust between technology, management and staff.

For the organisations classified according to their learning organisation characteristics (to confirm that they are indeed learning organisations), a factor analysis was carried out. The KMO and Bartlett's test provided the basis for this (KMO Bartlett's Test: ,918; Chi-square test: 3457,806, df: 45 sign.: .000 p<0.05). Using principal component analysis, we were able to group the 9 variables (questionnaire questions) into one factor, which explains 60%, so it makes sense to group them into one factor.

The reliability of the model shows that since the responses to each question on a scale of 1 to 4 ranged from 2.52 to 2.98 (with the majority of responses being in the third response option), the organisations we studied can be classified as having a high degree of learning organisation characteristics.

The following questions were used to identify the characteristics of the learning organisation:

**Q1**. The organisation is open to environmental change

**Q2**. The organisation proactively anticipates change.

**Q3**. The organisation is innovative in its thinking, looking for new solutions, not limited by routine.

**Q4**. The organisation also focuses on long-term impacts when making decisions.

**Q5**. In the operation and development of the organisation, attention is paid to the impact of changes on other departments.

**Q6**. The aim is to jointly develop the learning and development potential of the members of the organisation, through group learning.

**Q7**. The organisation needs to integrate individual, and employee visions into the organisational vision.

**Q8**. Employees are aware of how their work contributes to the achievement of organisational goals.

**Q9**. Workers can work towards their vision, which means they are free to express themselves.

### *The Supporting Role of Leadership*

The results show that there is a significant relationship between leadership behaviour, tools to support the use of new technologies and learning organisation culture. (The numbers in brackets represent the lowest and highest contact values.) The stronger the culture characteristics, the more true it is that management supports staff in learning new technologies (0.345 – 0.436), incorporating new ideas (0.339 – 0.436), reinforcing preparation by example (0.352 – 0.483), sometimes involving external experts (0.335 – 0.429), training (0.356 – 0.476). There is a moderately strong significant relationship between leadership by example (0.352 – 0.483) and communication (0.359 – 0.499), with very balanced scores across the sample. The relationship is very weak in cases where the manager links monitoring to possible sanctions (0.141 – 0.260) or places too much emphasis on the completion of tasks, even after working hours (0.160 – 0.225). The results confirm our first hypothesis.

### *Human-Machine Interface (Fear-Trust)*

The results show no or very weak relationships between the characteristics of learning organisation culture and the characteristics of human behaviour in the following cases. The number of characteristics of the learning organisation culture and the closeness of the relationship are shown in parentheses.

- Employees fear that the organization will control them with new technology (Q8. - - 0.071; Q6. – 0.072; Q4 – 0.076).

- Employees fear that their jobs will be controlled by the organization because of the new technology (Q6. – 0.108).
- Workers fear that they may lose their jobs due to a lack of skills and qualifications related to the technology (Q6. – 0.125; Q7. – 0.071).
- Workers are afraid of making mistakes when implementing new technology. (This lack of contact explicitly reinforces the effect of learning organisation characteristics.)
- Burnout syndrome is common among employees (in this case, the negative relationship also reinforces the learning organisation effect (Q8 - -0.082)).
- In addition to the moderately strong relationship between the other characteristics, two other cases show a rather weak relationship:
- Workers rely too much on the use of digital tools, which can reduce their problem-solving ability (Q4. – no connection; Q6. – 0.271)
- The use of technology makes the worker too dependent on the use of ICTs, which may lead them to overuse their digital skills (0.089 – 0.273).

The results shown here are consistent with the characteristics of leadership behaviour described above. It can be seen that, when the characteristics of a learning organisation culture are in place, staff will not be afraid of new technology, or managerial control or show signs of burnout.  Using technology they trust, they retain their problem-solving skills.

The learning organisation characteristics show the strongest relationship with the human behaviour characteristics for the items 'The management of the organisation is open to new technological solutions', (0.281 – 0.452) 'The organisation continuously improves the ergonomic conditions of work' (0.339 – 0.412) and 'The management of the organisation pays attention to reducing the level of stress at work' (0.313 – 0.375). Management's attention to people and building trust is stronger when learning organisation characteristics are present. The Q6 has a moderately strong impact on all the elements of leadership behaviour listed (0.199 – 0.431). The learning organisational characteristic Q9 has the least impact on leadership behaviour and employee trust (0.177 – 0.348). The relationship is moderately strong for most questions but near the lower limit. Q8 learning organisation characteristics have little influence on training programmes. The relationship with additional questions is significant but weak (0.142 – 0.241). Only one case (Q6) has a higher value, (0.336). In other words, workers' awareness is sufficiently developed and stable to make online and self-training programmes less necessary. Except when it is explicitly stated in the 'The aim is to develop the learning and development potential of the members of the organisation, group learning'.

The openness to change of staff and management is most influenced by the learning organisation characteristics of Q1 and Q4. Staff trust in technology is most strongly supported by the relationship between individual vision (Q7) and personal contribution (Q9). Feature Q6 shows the highest level of association with training programmes.  Management's tolerance for error is most strongly supported by the need for innovation and long-term decision characteristics.

The results support our hypothesis 2, which states that when the characteristics of a learning organisation culture are present, the organisation and the staff are open to digitalisation technology and the management provides training for their staff.

*Using the Digital Toolbox*

The correlation analysis shows that there is a significant correlation between learning organisation characteristics and the use of digital tools. However, its strength is weak or slightly above the lower limit of medium strength. For three learning organisation characteristics, we can speak of an effect with sufficient strength on the preference to use technological tools. The strongest relationship is shown by characteristic (Q6, 0.228 – 0.290), except for one instrument describing the presence of machine-to-machine communication (0.195). This is understandable since all learning organisation features focus on human shared values, cooperation, group learning and a shared vision, not on the inter-machine solutions. The following stronger relationships are found for Q2 (0.217 – 0.288) and Q3 (0.217 – 0.280). These effects are understandable, as the use of digitalisation technology is linked to innovation and proactive solutions. The least strong relationships were found with Q4 (0.132 – 0.223) and Q9 (0.125 – 0.223). It can be seen that in the case of shared learning, innovative thinking and openness to change, it is more likely that organisations prefer new solutions and are willing to be open to the challenges of applying them. However, it is also true that they do not always seem to need to harness the power of digital technology to maintain a successful learning organization — rather, personal human relationships, cooperation and trust prevail, with technology only supporting these relationships. Based on the results, it can be said that when the characteristics of a learning organisation culture are present, staff prefer to use the opportunities offered by digitalisation technology where it is needed. Even if the strength of the effect is not the same for all characteristics, and not all the technological solutions used are preferred to the same extent, we consider our hypothesis 3 to be accepted.

## Discussion

In recent years, there have been numerous publications in the field of Industry 4.0, the technological challenges of digitalisation (Girrbach, 2018; Hecklau et al., 2016; Barbosa et al., 2015; Li et al., 2017; D'Angelo, 2020; Sun et al., 2021). Most of these publications provide research results or literature reviews on a country, country comparison, industry or sector (Kusuma, 2018) and cultural conditions are the main reason for the shortcomings. The international research results show that although the requirements of digital transformation are inevitably close at hand, organisations, managers and employees are not fully prepared for these challenges (Li et al., 2017; Fischer et al. 2018). Around the world, there is a lack of community behaviour based on trust and continuous learning, leadership and staff competencies. Some technical solutions are used, and some software and AI solutions are used routinely, but in most cases, there are serious shortcomings (Fischer et al., 2018). We hypothesise that this organisational functioning will make the transition to digital transformation easier and more successful. The results show that there is a significant relationship between the investigated characteristics, mostly medium, sometimes weak correlation. It can be concluded that the results of the research presented in the literature (Salvi et al. 2021; Niehoff, 2022; Weber et al. 2022; Lobont et al. 2022) and the results of the situation

we have assessed mutually confirm our assumptions, so it is worth focusing on what is happening in digital transformation from both perspectives. The findings of this research are particularly interesting as the current survey has assessed impacts across continents.

Based on the sample examined, it can be said that regardless of industry, continent or country, it is true that to ensure that the transition to the latest technological solutions causes as little damage and resistance as possible for organisations and people, the cultural background must first be put in order. This also requires a rethinking of management behaviours and the toolkit used. However advanced and professionally justified the new digital techniques and technologies may be, if the culture and leadership skills are not up to the required standard. An interesting finding is that among the characteristics of the learning organisation, the preference for self-actualisation and efforts to achieve a personal vision are not strongly related to the use of digital technology, but they also have little influence on leadership behaviour and trust. This picture shows a predominance of individualism and self-interest, regardless of its wider impact. On the other hand, from the management side, a similar phenomenon is noteworthy: the characteristics of the learning organisation have little influence on management decisions, the use of management sanctions and expectations of out-of-hours work.

Therefore, as urgent as it is to incorporate the latest technology into organisational operations, cultural attunement cannot be neglected. Organizational and managerial openness, low-stress levels, group learning and development all underpin the legitimacy and necessity of a learning organization culture in an era of digital transformation.

## Conclusion

The research presented above aims to provide an overview (without emphasising countries and continents) of how managers around the world think and behave, how staff feel, and what their general preparedness and tool knowledge are. The results confirm previous research findings that have identified gaps in the coverage of specific countries or industries. However, a key difference is that while previous studies have examined the impact of managerial behaviour and digitalisation on the functioning of learning organisations, the present study has taken the opposite approach. Namely, it examined the impact of learning organization functioning on leadership and staff behaviour, tool use and competencies. The results indicate that, although the image of the learning organisation is alive in people's minds, its full realisation and real values are still incomplete. The preparation of the staff and the organisation is lacking and the results do not deliver the objectives set out in the strategy. It is not only the results that are lagging, but the trust of staff in the technique, in managers and each other (although it exists) is not stable. This uncertainty also has a serious impact on performance through culture. The explicit novelty of the research is given significance by the composition of the sample studied. It offers a cross-continental and cross-national perspective and a hitherto unexamined focus on the critical issues of digital transformation readiness.

**The Importance and Limitations of Research**

The explicit novelty of the research is given significance by the composition of the sample studied. It offers a cross-continental and cross-national perspective and a hitherto unexamined focus on the critical issues of digital transformation readiness.  It also explores a little-analysed context, namely the characteristics of readiness as a function of learning organisation culture, in the context of managerial tools, methods used and human behaviour.

The main problem in the research was sampling since a study of this scale can only be representative through well-organised networks. This network was not available. Another problem is that English is not widely spoken in many countries (especially in Asia, South America and Africa), so the sample from these countries is smaller than from other continents. Also a problem, as with all questionnaire research, is the willingness to respond. A larger sample would allow for more robust statements to be made. That said, the results reflect the gaps in organisational preparedness and the cultural solutions that support this preparedness, given the incredibly rapid pace of technological development and the inability to keep up.

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