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Problems of Ensuring Digital Readiness of Enterprises in the Context of Digital Transformation

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Abstract: Digital transformation requires enterprises to adapt their technological systems and internal management practices. However, the development of digital infrastructure does not always correspond to the maturity of the organizational environment. This difference raises questions about how enterprise digital readiness should be assessed. The study aims to develop an analytical approach that considers both technological and organizational preparedness. A quantitative research approach is applied to examine the organizational factors associated with digital transformation. The proposed framework distinguishes two dimensions: readiness for digital development (G) and digital organizational culture maturity (C). The findings indicate that technological capabilities alone do not fully characterize enterprise digital readiness. Organizational conditions, including employee competencies and engagement, also need to be considered. The proposed G–C framework allows different combinations of technological and organizational preparedness to be examined. It provides a basis for identifying potential gaps and determining which areas require managerial attention.

The study contributes to the assessment of enterprise digital readiness by considering technological development and digital organizational culture as related but distinct characteristics. The proposed approach may be used to support organizational diagnostics and the selection of measures for digital transformation.

Keywords: digital readiness, digital transformation, organizational preparedness, digital organizational culture, digital development, enterprise transformation.

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1. Introduction

Digital transformation has become an important factor in enterprise development. The adoption of digital technologies changes production processes, management practices, and organizational interaction. These changes require enterprises to adapt their internal structures and develop the capacity to operate in a digital environment [1, 2]. The problem is particularly relevant to the energy sector. Energy enterprises operate complex production systems that require continuous monitoring, operational reliability, and compliance with safety requirements. The introduction of digital technologies affects not only technical processes but also the organization of work. Employees must acquire new competencies, while management systems must adapt to changing operational conditions [3].

The expansion of digital infrastructure does not necessarily indicate that an enterprise is prepared for digital transformation. Technological systems may be introduced before the organizational conditions for their effective use have been established. As a result, differences may emerge between technological capabilities and the preparedness of employees and management processes. Such differences need to be considered when assessing enterprise digital readiness [4].

The governance of digital technologies also requires attention. ISO/IEC 38500:2024 establishes principles for the governance of information technology in organizations. These principles emphasize the responsibilities associated with the effective and appropriate use of IT. They provide a relevant basis for considering management practices alongside technological development [5]. Existing approaches to digital readiness assessment may place different emphasis on technological resources and organizational conditions.

When these characteristics are examined separately, it becomes difficult to determine whether they develop consistently. The assessment may identify the availability of digital technologies without sufficiently explaining the organizational conditions affecting their use [2,4]. This study considers digital readiness through two related dimensions. Readiness for digital development (G) represents the technological dimension, while digital organizational culture maturity (C) represents the organizational dimension. Their relationship is important because technological development and organizational change may occur at different rates. A difference between these dimensions may indicate a need for additional technological investment or changes in organizational practices.

The research problem concerns the assessment of differences between technological and organizational preparedness in the process of digital transformation. The purpose of this study is to develop an analytical approach to enterprise digital readiness based on the relationship between readiness for digital development (G) and digital organizational culture maturity (C).

The proposed approach is intended to support the identification of potential readiness gaps and the selection of organizational development priorities. Its practical relevance lies in providing a basis for examining technological and organizational conditions within a common analytical framework.

2. Research Methodology

The study combines the analysis of digital infrastructure with a quantitative assessment of organizational factors associated with enterprise digital readiness. The research was conducted in three stages. First, the development of digital infrastructure in Uzbekistan's electricity sector was examined. Second, the relationships among digital competencies, employee engagement, and digital organizational culture were assessed. Third, the findings were considered within the proposed G–C analytical framework.

The theoretical basis of the study draws on research into organizational culture, digital transformation, and organizational capabilities. Organizational culture is considered in relation to employees' adaptation to organizational change [6]. Digital transformation is examined as a process involving changes in technological systems and management practices [7]. The organizational capacity to respond to these changes is considered using existing approaches to organizational capabilities [8,10].

The technological component was examined using data on the expansion of electronic electricity metering infrastructure in Uzbekistan between 2019 and 2024. Changes in the number of electronic metering devices were analyzed to characterize the development of infrastructure supporting automated data collection and electricity consumption monitoring. The organizational component was assessed through three variables: digital competencies, employee engagement, and digital organizational culture. Digital competencies reflect employees' ability to use digital technologies in their professional activities. Employee engagement characterizes their participation in organizational processes and digital transformation initiatives. Digital organizational culture reflects the organizational conditions associated with the adoption and practical application of digital technologies. The empirical assessment was based on data collected from employees of energy-sector enterprises in Uzbekistan. The collected responses were used to construct the variables included in the statistical analysis. Correlation analysis was applied to identify the strength and direction of relationships among the variables. Multiple regression was used to estimate the associations of digital competencies and employee engagement with digital organizational culture, which was specified as the dependent variable. Structural modeling was subsequently applied to assess direct and indirect relationships, including the mediating role of employee engagement. At the final stage, the findings were interpreted within the proposed G–C analytical framework. Readiness for digital development (G) represents technological preparedness, while digital organizational culture maturity (C) represents organizational preparedness. The comparison of these dimensions provides a basis for identifying potential digital-readiness gaps and corresponding managerial priorities. [9,10]

3. Analysis and Results

The development of digital infrastructure in Uzbekistan's electricity sector was examined through the expansion of the Automated System for Control and Metering of Electricity (ASCME). The system supports remote collection of electricity consumption data and monitoring of distribution networks [11]. The dynamics of electronic metering devices from 2019 to 2024 are presented in Table 1.

Table 1. Dynamics of the Expansion of Electronic Electricity Metering Infrastructure in Uzbekistan

Year	Electronic metering devices, million units	Change compared with 2019, times
2019	>1.5	—
2020	5.445	3.6
2021	7.40	4.9
2022	7.60	5.1
2023	8.041	5.4
2024	8.189	5.5

The number of electronic metering devices increased from more than 1.5 million in 2019 to 8.189 million in 2024. The largest increase occurred during the initial implementation stage: by 2020, the number had reached 5.445 million. Growth continued in the following years, although at a slower pace [12,13]. These figures characterize the expansion of digital infrastructure rather than the organizational readiness of individual enterprises. The organizational dimension was examined through digital competencies, employee engagement, and digital organizational culture. The correlations among these variables are reported in Table 2.

Table 2. Correlation between the Main Organizational Indicators of Digital Readiness

Indicators	Digital competencies	Employee engagement	Digital organizational culture
Digital competencies	1.000	0.827**	0.734**
Employee engagement	0.827**	1.000	0.869**
Digital organizational culture	0.734**	0.869**	1.000

Note: ** $p < 0.01$.

All three correlations were positive and statistically significant. The strongest association was observed between employee engagement and digital organizational culture ($r = 0.869$; $p < 0.01$). Digital competencies were correlated with employee engagement ($r = 0.827$; $p < 0.01$) and digital organizational culture ($r = 0.734$; $p < 0.01$).

Multiple regression analysis was then performed with digital organizational culture as the dependent variable and digital competencies and employee engagement as predictors. The estimated equation was:

$$C = 0.531 + 0.049X_1 + 0.829X_2$$

where C denotes digital organizational culture,

X_1 denotes digital competencies,

X_2 denotes employee engagement.

Table 3. Results of Multiple Regression Analysis

Variable	B	β	p-value
Constant	0.531	—	—
Digital competencies	0.049	0.048	0.003
Employee engagement	0.829	0.829	<0.001

The model explained 75.5% of the variation in digital organizational culture ($R^2 = 0.755$).

Employee engagement had the larger standardized coefficient ($\beta=0.829$; $p < 0.001$). The coefficient for digital competencies was smaller but statistically significant ($\beta=0.048$; $p=0.003$). These findings motivated an additional examination of the indirect relationship through employee engagement [14,15]. A structural model was estimated to examine the relationships among the three organizational variables and the mediating role of employee engagement. The model estimates are presented in Table 4.

Table 4. Main Results of the Structural Model

Relationship / indicator	Coefficient	Significance / R ²
Digital competencies → Employee engagement	$\beta = 0.847$	$p < 0.001$
Employee engagement → Digital organizational culture	$\beta = 0.830$	$p < 0.001$
Digital competencies → Digital organizational culture	$\beta = 0.040$	$p = 0.100$
Indirect effect: DK → VE → OC	$\beta = 0.703$	$p < 0.001$
Employee engagement	—	$R^2 = 0.717$
Digital organizational culture	—	$R^2 = 0.747$

The relationship between digital competencies and employee engagement was positive and statistically significant ($\beta = 0.847$; $p < 0.001$), as was the relationship between employee engagement and digital organizational culture ($\beta = 0.830$; $p < 0.001$). The direct path from digital competencies to digital organizational culture was not statistically significant ($\beta = 0.040$; $p = 0.100$), whereas the indirect effect through employee engagement was significant ($\beta = 0.703$; $p < 0.001$). The model explained 71.7% of the variance in employee engagement and 74.7% of the variance in digital organizational culture.

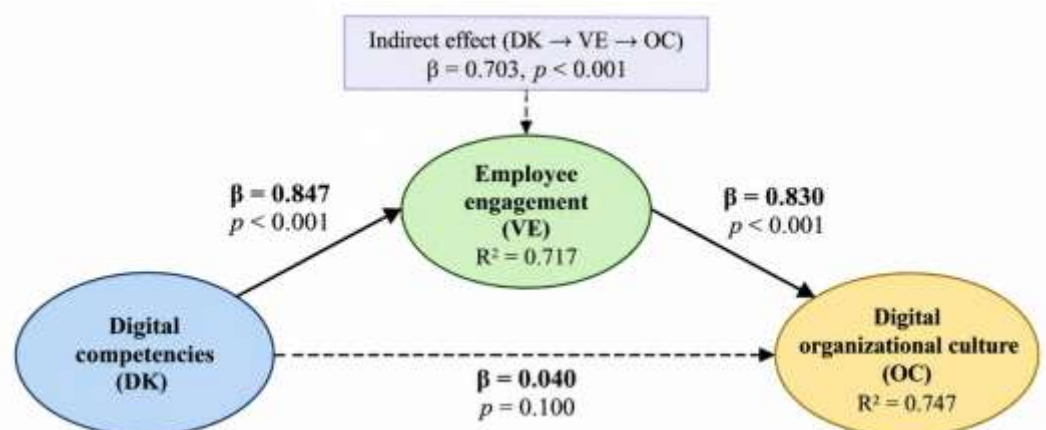


Figure 1. Structural Model of the Relationship between Digital Competencies, Employee Engagement and Digital Organizational Culture

Taken together, the structural estimates support a mediating role for employee engagement in the association between digital competencies and digital organizational culture. This interpretation is consistent with the regression results, while providing a more detailed account of the indirect relationship.

The technological and organizational dimensions were then considered within the proposed G–C framework. Readiness for digital development (G) describes technological preparedness, whereas digital organizational culture maturity (C) describes organizational preparedness. Their comparison is intended to distinguish different potential readiness gaps[15].

A relatively high G combined with a lower C points to organizational priorities, including employee participation, competencies, and internal communication. Conversely, a relatively high C combined with a lower G points to constraints in digital infrastructure and the integration of technological solutions. A balanced combination suggests greater consistency between the two dimensions.

The G–C framework offers an analytical interpretation of possible differences between technological and organizational preparedness. Classification of specific enterprises

would require comparable quantitative measurements of G and C; such enterprise-level scores are not presented in the current analysis.

4. Conclusion and Recommendations

The study confirms that digital readiness is determined by the relationship between technological development and organizational preparedness [16]. The development of digital infrastructure creates the necessary conditions for digital transformation, but its effective use also depends on the internal organizational environment. The analysis shows that digital competencies, employee engagement, and digital organizational culture form interconnected elements of organizational readiness. In this relationship, employee engagement supports the practical realization of digital competencies within organizational processes. These findings indicate that technological and organizational conditions should be considered jointly when assessing enterprise readiness for digital transformation.

The proposed approach considers readiness for digital development (G) and digital organizational culture maturity (C) as two related dimensions. Their comparison allows differences between technological capabilities and organizational preparedness to be identified. Such differences require different development priorities. A stronger technological position requires appropriate organizational support, including competencies, engagement, communication, and management practices. Limited technological readiness, in turn, requires further development of digital infrastructure and wider integration of digital solutions into enterprise processes. The alignment of G and C therefore provides a practical basis for selecting measures that correspond to the actual conditions of digital transformation [16].

The proposed approach can be further developed by expanding the range of technological and organizational indicators. Its application to enterprises with different levels of digital development would also provide a broader basis for comparative assessment. Further research may therefore focus on testing the G–C relationship across different enterprises and sectors and on refining the criteria used to identify digital-readiness gaps.

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