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The Soft Factors in Digital Transformation Strategies: A Study of Employees Digital Competencies and Support Measures

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Abstract. The aim of the study is to examine whether the digital competencies of employees and the way in which management introduces new digital technologies to employees influence the extent of selected strategic areas of digital transformation and the importance of different types of support. The data was collected in collaboration with Slovenian chambers of commerce using an online questionnaire. Study finds that the way in which new digital technologies are introduced has an impact on the customer experience, processes and digital solutions to support the business, as well as the digitalization of business models, products and services. In addition, the customer experience was also influenced by digital competencies. The ability to obtain funding for digital transformation was influenced by enterprise size and published local and international examples of best practice in the field of digitalization were influenced by the methods used to introduce new digital technologies.

Keywords: Digital Transformation, Digital Transformation Strategy, Digital Competencies, Support Measures For Digital Transformation.

1. Introduction

The contemporary business landscape is undergoing a profound and accelerating shift driven by the proliferation of digital technologies. This phenomenon, termed Digital Transformation (DT), has evolved from a peripheral IT concern into a central strategic imperative for enterprises across all industries and sizes [14], [30]. The strategic stakes of this transformation are exceptionally high [12]. Firms that successfully navigate this shift can unlock significant competitive advantages, including enhanced operational efficiency, deeper customer engagement, and the creation of novel revenue streams. Conversely, those that fail to adapt, risk obsolescence as new, digitally-native competitors disrupt established markets [30].

In response, a rich body of academic literature has emerged to understand this complex process. Initial research focused on defining the phenomenon and distinguishing it from earlier forms of IT-enabled change [31], [32]. Scholars have established that successful DT is far more than the mere implementation of new technology; it represents a fundamental

rethinking of how an organization uses technology, people, and processes to radically change its business performance and value proposition [17]. It is now widely accepted that organizational factors such as strategy, culture, and skills are critical enablers of this change [5], [15].

However, as the field matures, the focus of inquiry is shifting from what DT is, to how it is successfully executed [31]. While we know that internal organizational factors are important [17], [33], [3], a more granular understanding is needed of the specific mechanisms through which they influence the scope and nature of an enterprise's transformation journey. Several key questions remain at the forefront of this research agenda. First, how do fundamental enterprise characteristics, such as enterprise size, interact with more dynamic, capability-based factors like employee competencies and change management processes to shape an enterprise's strategic priorities [14], [19]? Does an enterprise's internal capacity determine whether it focuses more on transforming its operational core or on enhancing its customer-facing and cultural dimensions [33], [3]?

Second, enterprises do not transform within vacuum-like environment. They operate within a broader environmental context that includes a growing ecosystem of institutional support, such as government programs and Digital Innovation Hubs (DIHs), designed to mitigate the significant risks and costs associated with DT [24]. Yet, there is a need for greater empirical insight into how enterprises perceive and prioritize these external support mechanisms. Is financial assistance that de-risks investment perceived as more critical than knowledge-based support that closes the skills gap? And how do an enterprise's internal characteristics shape its reliance on this external ecosystem?

This study addresses these critical questions by providing an empirical investigation into the determinants, scope, and support mechanisms of digital transformation. Drawing on an exploratory survey-based study, this research analyzes data from 102 Slovenian enterprises, predominantly small and medium-sized enterprises (SMEs), which reflects the structural characteristics of European economies, where approximately 99% of businesses are SMEs [9]. In this study we explore the relationships between key organizational characteristics—namely enterprise size, the digital competencies of employees, and the methods used to introduce new technologies—and the extent of enterprises'DT strategies across a range of operational and people-centric domains. Furthermore, we examine how these organizational factors relate to the perceived importance of different types of financial and knowledge-based support.

The findings of this research offer several important contributions. By analyzing the interplay between static enterprise attributes and dynamic capabilities, this study provides a nuanced understanding of the true drivers of digital transformation. It offers empirical evidence on the distinct dimensions of DT strategy and identifies which organizational capabilities are most critical for each. Finally, it provides actionable insights for managers on how to prioritize their transformation efforts and for policymakers on how to design more effective support interventions.

The remainder of this paper is structured as follows. Section 2 develops a comprehensive theoretical framework, drawing on the Technology-Organization-Environment (TOE) model and the dynamic capabilities perspective to ground our research questions. Section 3 details the research methodology, including the sample, data collection, and analytical

techniques. Section 4 presents the core empirical results of our statistical analysis. Section 5 provides a detailed discussion of these findings, interpreting their significance and linking them back to the theoretical framework. Finally, Section 6 concludes the paper by summarizing its key contributions and outlining avenues for future research.

2. Theoretical Framework

DT has evolved from a peripheral IT concern into a central strategic imperative for enterprises across all industries and sizes [14], [30]. Literature has moved beyond simple definitions to offer a more nuanced understanding of this process. Verhoef et al. [30] usefully distinguish between three stages of digital change: digitization, the conversion of analog information to digital format; digitalization, the use of digital technologies to alter existing business processes; and digital transformation, a more fundamental, enterprise-wide change that leads to the development of new business models. This study focuses on the latter, more pervasive form of change, which represents holistic strategic reorientation rather than a series of discrete technological upgrades.

In this context, DT represents far more than the mere implementation of new technology; it is a fundamental rethinking of how an organization uses technology, people, and processes to radically change its business performance and value proposition [17]. Vial [31] offers a comprehensive process-oriented definition, framing DT as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies." This process compels organizations to re-evaluate not only their internal operations but also their value creation paths, customer relationships, and even their core business models, with a key outcome being enhanced product and service innovation [5].

The strategic stakes of this transformation are exceptionally high. Firms that successfully navigate this shift can unlock significant competitive advantages, including enhanced operational efficiency, deeper customer engagement, and the creation of novel revenue streams. Conversely, those that fail to adapt risk obsolescence as new, digitally-native competitors disrupt established markets [30]. The central challenge for incumbent enterprises, therefore, is not if they should transform, but how they should transform to overcome challenges and exploit opportunities from DT. This requires a coherent strategy that aligns technological capabilities with organizational goals, a challenge that is particularly acute for enterprises of all sizes. This study seeks to explore the determinants, scope, and support mechanisms of digital transformation within the specific context of Slovenian enterprises, contributing to a deeper understanding of how enterprises can successfully navigate this complex journey.

To understand the multifaceted nature of DT, a holistic framework is required. The adapted Technology-Organization-Environment (TOE) framework, first articulated by Tornatzky and Fleischer [29] and later widely used in information systems research, provides a robust and widely accepted theoretical lens for this study. Its enduring relevance stems from its comprehensive approach, positing that three primary, interacting contexts influence an enterprise's decision to adopt and implement new technology:

- The Technological Context (T): As originally conceived, this context refers to the pool of technologies available to an enterprise, both those already in use and those available externally. It encompasses not just the technologies themselves but also the enterprise's perception of their characteristics—their potential benefits, their complexity, and their compatibility with existing systems and processes [29]. In the realm of DT, this context is exceptionally rich, including a vast array of digital tools (e.g., Cloud, Analytics, Cybersecurity, Industry 4.0) that can be combined in novel ways.

- The Organizational Context (O): This context encompasses the internal characteristics and resources of the enterprise. Tornatzky and Fleischer [29] highlighted several key factors, including the enterprise's size and scope, the complexity of its managerial structure, its internal communication processes, and the availability of slack resources. In modern DT research, this context has expanded to include the enterprise's human capital, its strategic orientation, its culture, and its overall readiness for change. It is the internal environment that shapes the enterprise's ability to recognize the need for change and its capacity to enact it.

- The Environmental Context (E): This context includes the broader arena in which the enterprise operates. It encompasses factors such as the industry's structure, the presence and actions of competitors, the regulatory landscape, and the enterprise's relationships with its network of suppliers, customers, and other institutions [29]. For DT, this context is particularly dynamic, encompassing not only competitive pressures but also the institutional support systems available, such as government grants or partnerships with entities like Digital Innovation Hubs (DIHs).

This study operationalizes the TOE framework by examining specific variables within each context. The organizational context is investigated through the independent variables of enterprise size, the existence of a formal DT strategy, the level of employee digital competencies, and the method of introducing new technology. The technological context is explored through the dependent variables which measure the extent to which an enterprise's strategy covers various DT domains, representing the scope and nature of the technological application. Finally, the environmental context is addressed by analyzing the perceived importance of various external support mechanisms. This framework allows for a structured investigation into how organizational factors influence enterprise's technological choices and its interaction with the external support environment, providing a holistic view of the transformation process.

While technology provides the tools for transformation, a strong consensus in the literature emphasizes that organizational factors are the primary drivers of success. As the influential work by Kane et al. [17] argues, "strategy, not technology, drives digital transformation." This perspective suggests that the most digitally mature organizations are not necessarily those with the most advanced technology, but those with clear, coherent strategies and the internal capabilities to execute them. This people-centric point of view is evident also in recent literature review [23] that systematically categorizes the "soft factors" that are critical for success of digital transformation projects. Their findings point out, that for digitalization projects to succeed, the "people dimension" requires explicit attention. Furthermore, their research identifies four core organizational enablers—Leadership, Culture, Support, and Learning—that are crucial for both the implementation and adoption phases

of DT. In this light, this study's variables, "digital competencies" and "IT introduction methods," can be seen as tangible indicators of these broader soft factors, particularly organizational learning and support.

The role of enterprise size in DT is a subject of ongoing debate in literature. A theoretical dichotomy is often drawn between Small and Medium-sized Enterprises (SMEs) and large enterprises, as they are perceived to face fundamentally different sets of challenges and opportunities.

Large enterprises typically possess greater financial resources and specialized skilled employees to invest in large-scale transformation projects. They can leverage their scale to absorb the high costs of new systems and dedicated R&D. However, they are also frequently encumbered by complex legacy systems, rigid organizational structures, and a bureaucratic culture that can slow down decision-making and create significant resistance to change [30]. This "liability of bigness" can stifle the very agility needed to respond to fast-moving digital disruptions.

In contrast, SMEs are often characterized by greater agility, organizational flexibility, and faster, more centralized decision-making, which could theoretically facilitate quicker adaptation to market shifts [4]. However, they face a significant "liability of smallness," with well-documented constraints in terms of capital, access to specialized human resources, and market information [10]. These limitations often manifest as critical barriers to DT, such as prohibitive investment costs and a lack of employees with the requisite digital skills [20].

However, this dichotomy is not absolute. Recent research suggests that while resource constraints are real, they do not predetermine failure. Müller, Buliga, and Voigt [21] argue that SMEs can be highly successful innovators in the Industry 4.0 context when they possess a "prepared mind"—a proactive strategic orientation that allows them to leverage their agility effectively. Similarly, Li, et al [19] demonstrate from a capability perspective that the digital transformation success of SME entrepreneurs is critically determined by the development and deployment of digital competencies and dynamic capabilities, not merely by the enterprise's size or resource endowment. This shifts the focus from a deterministic view based on size to a more nuanced perspective based on capability. By including small, mid-sized, and large enterprises, this study is uniquely positioned to test this theoretical tension empirically. It allows for an investigation into whether the strategic imperative to transform is felt equally across enterprises of all sizes and how size might influence the nature, scope, and support needs of their respective transformation journeys.

A formal DT strategy is the cornerstone of a successful transformation, providing a roadmap that aligns technology investments with business objectives [14]. However, a strategy is only as good as the organization's ability to execute it. This is where the concept of dynamic capabilities becomes essential. Coined by Teece, Pisano, and Shuen [28], dynamic capabilities are defined as “the enterprise’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (p. 516). This framework is particularly relevant to DT, as it focuses on how enterprises manage change in turbulent conditions.

To understand how these capabilities operate, recent research has focused on their micro-foundations, the underlying individual and group-level factors that enable enterprise-level change. A critical contribution in this area comes from Helfat and Peteraf [13], who argue that the managerial cognitive capabilities of individual leaders fundamentally underpin enterprise-level dynamic capabilities. They define this as the capacity of a manager to perform the mental activities—such as perception, attention, reasoning, and problem-solving—that comprise cognition. This cognitive perspective provides a powerful theoretical lens for interpreting the variables in this study. The Teece [27] framework of sensing, seizing, and transforming can be understood through the cognitive abilities of the enterprise's managers and employees:

- Sensing: The ability to identify and shape new opportunities and threats. Helfat and Peteraf [13] link this to the cognitive capabilities of perception and attention—the ability to recognize emerging patterns and focus on relevant stimuli in a noisy environment.
- Seizing: The ability to mobilize resources to capture value. This is linked to cognitive capabilities of problem-solving and reasoning—the ability to design new business models and make sound investment decisions under uncertainty.
- Transforming: The ability to continuously renew the organization. This is linked to cognitive capabilities of language, communication, and social cognition, which are essential for persuading others, overcoming resistance, and orchestrating change.

In the context of this research, the variable “digital competencies of employees” can be understood as an empirical proxy for these underlying cognitive capabilities. A workforce rated as having ‘advanced knowledge and skills that they are constantly upgrading’ is not merely technically proficient; it reflects an organizational-level aggregation of the cognitive capacity to sense new technological opportunities, reason through their implications, and solve the complex problems associated with their implementation.

Building on this, recent research has sought to operationalize these concepts into a measurable, multidimensional construct. Cao, Duan, and Edwards [5] introduce the concept of a "digital transforming capability," which they define as an integration of three key pillars: digital strategy, digital skills, and digital technology use. This capability, they argue, is the direct mechanism through which enterprises achieve DT and drive outcomes like product innovation. Furthermore, they demonstrate that this capability is significantly influenced by organizational culture. Specifically, they find that an adhocracy culture (valuing innovation and agility) has the strongest positive influence, followed by clan, market, and hierarchy cultures. This provides a powerful theoretical link, suggesting that the organizational context, particularly its cultural norms, is a critical antecedent to the development of the very capabilities needed to execute a digital transformation.

Therefore, this study conceptualizes "digital competencies" and their "introduction methods" as measurable manifestations of an enterprise's underlying dynamic and transforming capabilities, which are shaped by the enterprise's organizational culture.

Digital transformation is not a monolithic event but a complex phenomenon that unfolds across various organizational domains. Recent critical reviews of the field argue that DT should be understood as a "network of interrelated processes" rather than a single, linear

progression [34]. This perspective challenges researchers to move beyond simplistic models and examine the interplay between different transformation activities.

Literature provides several frameworks for deconstructing this network. Westerman, Bonnet, and McAfee [33] identify three core pillars of transformation: transforming customer experience, operational processes, and business models. Furthermore, they refined their framework to incorporate employee experience and digital platforms [3]. This aligns with other models that distinguish between different dimensions of transformation (e.g., [25]. Drawing on this, the present study investigates two broad categories of transformation activities:

- Operational and Technological Transformation: This dimension concerns the technical core of the business. It includes initiatives such as formalizing a data management strategy, optimizing processes and digital solutions to support business, enhancing cybersecurity, and implementing Industry 4.0 technologies. These efforts are primarily aimed at improving internal efficiency, resilience, and operational excellence.
- Customer and People-Centric Transformation: This dimension focuses on the enterprise's external interface and its human capital. It encompasses strategies related to enhancing customer experience, developing digital-skilled employees and digital workplaces, and cultivating a digital culture. These initiatives are focused on creating superior market value, fostering an adaptive workforce, and building an organizational culture that can sustain innovation.

By conceptualizing DT as a network of processes across these domains, this study investigates whether the organizational determinants discussed above have a differential impact on these "hard" versus "soft" areas of transformation, providing a more nuanced understanding of the DT process and answering the call for more holistic research [34].

For many enterprises, particularly SMEs, the barriers to digital transformation can be prohibitive. The literature consistently identifies two primary categories of obstacles: financial constraints (the high cost of investment in new technology and expertise) and a knowledge gap (a lack of in-house skills and access to reliable information) [10], [20]. The external environment, specifically the institutional support ecosystem, is therefore critical for helping enterprises overcome these challenges.

Digital Innovation Hubs (DIHs) such as DIH Slovenia, which were supported by European Commission, have emerged as key institutional actors designed to address these specific barriers [24]. The services offered by such hubs and other support programs can be theoretically categorized based on the barriers they aim to solve:

- Financial Support Mechanisms: These are designed to alleviate capital constraints. They include the possibility of obtaining grants, co-financing for projects, and access to dedicated returnable funds. These mechanisms de-risk investment and enable projects that might otherwise be unaffordable.
- Knowledge-Based Support Mechanisms: These are designed to close the information and skills gap. They include access to a directory of credible experts, published examples of good practices, events and workshops on digitalization, and voucher-based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia)

registered experts. These services facilitate knowledge transfer, skills development, and ecosystem networking.

This theoretical division provides a clear framework for investigating the perceived importance of different support types, allowing this study to provide crucial empirical feedback to policymakers and support institutions on how to best design and prioritize their interventions to effectively foster digital transformation.

The literature provides a robust understanding of DT as a strategic imperative, best analyzed through the TOE framework. It highlights that success is driven by organizational factors, particularly dynamic capabilities rooted in managerial cognition and culture, and that this transformation unfolds across a network of operational and customer-facing processes. However, as the field matures, there is a growing need for greater specificity and empirical validation of these complex relationships.

This study is positioned to contribute to this developing conversation in several ways. While the link between capabilities and DT is established, there is an opportunity to empirically test how specific competencies and change management practices influence prioritization across different transformation domains. Although the role of support ecosystems is understood, there is a need for empirical evidence on which types of support are most valued by enterprises on their transformation journey, and how these needs relate to enterprise-specific characteristics like size. By empirically investigating these relationships in the Slovenian context, this research will provide a nuanced and integrated view of the digital transformation process, directly responding to recent calls for more holistic and process-oriented research in the field.

3. Methodology

Data from Slovenian enterprises were collected in collaboration with Chamber of Commerce and Digital Innovation Hub Slovenia (DIHS) using an online questionnaire using 1ka.arnes.si on-line survey platform. The effective sample size is 102. This study adopts an organizational capability perspective by focusing on structural, managerial, and competency-related factors, rather than on financial performance or revenue outcomes. Therefore we did not require from respondents to report revenue and balance sheet total [9] and have consequently use only number of employees as simplified criteria for enterprise size.

Collected were data on the enterprise size, measured only by the employee headcount (coded as 1 – small enterprise (less than 50 employees), 2 – mid-size enterprise (50 to 249 employees), 3 – large enterprise (250+ employees)), digital transformation strategy (0 – no, 1 – yes), rating of digital competencies of employees (1 - lack of sufficient digital competencies, 2 - basic knowledge and skills, 3 - advanced knowledge and skills that they are constantly upgrading), introduction of new digital technologies to employees by management (1 - employees are informed about the new features after the introduction, 2 - employees are informed about the introduction process, 3 - employees are involved in the planning and introduction of the new features), rating of the coverage extent of digital transformation strategy areas, namely Customer experience, Data Management Strategy, Processes and Digital Solutions to Support Business, Digitalization of Business

Models, Products and Services, Development of Digital Human Resources and Digital Workplaces, Development of Digital Culture, Cybersecurity, and Industry 4.0 (a 1-6 Likert scale, where 1 meant not at all, and 6 meant to the largest extent), and the importance of different types of support, namely possibility of obtaining grants for digital transformation, possibility of obtaining co-financing for digital transformation projects, possibility of obtaining dedicated returnable funds for digital transformation, directory of credible information about experts in the field of digitalization, published examples of domestic and international good practices in the field of digitalization, events on the topic of "How to approach digitalization", voucher based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia) registered experts (0 – no, 1 – yes).

Bivariate testing was used due to the sample size. Chi-2 test was used to test the relationship between the enterprise size and having a digital transformation strategy. Pearson's correlation coefficients were used to assess the relationships between the enterprise size, digital competencies of employees, and ways of introduction of new digital technologies to employees by management on one side, and the extent of selected digital transformation strategy areas and the importance of different types of support on the other side. Since only Pearson's correlation coefficients is used, "Pearson" is omitted in the rest of the article. Principal component analysis with Varimax rotation was used to create components from the digital transformation strategy areas and from the importance of different types of support. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were conducted prior to the actual principal component analysis. To contrast solution in rotated component matrix, we have set cutoff value of 0.40 in order to have single variable representing each principal component [7]. All statistical analyses were conducted in IBM SPSS.

4. Results

In the sample at hand, approximately a fifth of enterprises had a digital transformation strategy. Table 1 provides a crosstab for the enterprise size and having a digital transformation strategy.

Table 1. Relationship between the Company Size and Digital Transformation Strategy

	No DT Strategy	DT Strategy	Total
Small Companies	67	17	84
Mid-sized Companies	9	2	11
Large Companies	4	3	7
Total	80	22	102

To investigate whether the adoption of a digital transformation strategy is associated with enterprise size, a Chi-squared test of independence was conducted. The null hypothesis (H_0) stated that there is no relationship between an enterprise's size (small, mid-sized, large) and its likelihood of having a formal digital transformation strategy. The analysis of the observed frequencies in Table 1 against the expected frequencies under the null

hypothesis yielded a non-significant result ($\chi^2(2) = 2.038$, p = 0.361). As the p-value is greater than 0.05, we fail to reject the null hypothesis. This indicates that there is no statistically significant evidence in our sample to suggest an association between enterprise size and the presence of a digital transformation strategy.

These 22 enterprises were additionally asked which areas do their digital transformation strategy cover and to what extent (a 1-6 Likert scale, where 6 meant high). Table 2 provides descriptive statistics for the extent of digital transformation strategy areas for the enterprises that have a digital transformation strategy.

Table 2. Descriptive statistics for extent of digital transformation strategy areas

	Mean	Std. Deviation
Customer Experience	4.546	1.845
Data Management Strategy	4.909	1.151
Processes and Digital Solutions to Support Business	5.455	1.101
Digitalization of Business Models, Products and Services	5.455	1.101
Development of Digital Human Resources and Digital Workplaces	4.143	1.276
Development of Digital Culture	4.500	1.472
Cybersecurity	4.524	1.632
Industry 4.0	3.905	1.895

Averages are obviously in the upper half of the scale, ranging from 3.9 to 5.45, the highest being for processes and digital solutions to support business, and for digitalization of business models, products and services.

To test whether enterprise size, digital competencies of employees, and the methods of introducing new digital technologies to employees by management influence the extent of selected digital transformation strategy areas, correlation coefficients were calculated, and the results are provided in Table 3.

Table 3. Cross-correlations for extent of digital transformation strategy areas

	Company Size	Digital Competencies	Introduction of new Digital Technologies
Customer Experience	-0.013	0.608**	0.558*
Data Management Strategy	0.155	0.293	0.358
Processes and Digital Solutions to Support Business	0.081	0.264	0.449*
Digitalization of Business Models, Products and Services	-0.038	0.358	0.519*
Development of Digital Human Resources and Digital Workplaces	0.009	0.423†	0.365
Development of Digital Culture	0.089	0.374	0.247
Cybersecurity	0.231	0.141	0.181
Industry 4.0	-0.059	-0.114	-0.121

Note: † significant at 0.1, * significant at 0.05, ** significant at 0.01.

From the selected digital transformation strategy areas, customer experience was influenced the strongest by competencies and ways of introducing new digital technologies. Additionally, ways of introducing new digital technologies impact processes and digital solutions to support business, and digitalization of business models, products and services. All at the 0.05 significance level. Company size was not correlated significantly with any of the selected digital transformation strategy areas; all significances were above 0.1. To ensure the robustness of this finding, additional parametric and non-parametric correlations were computed using the raw number of employees (continuous variable) rather than categorical size groups; however, the results remained statistically insignificant.

Principal component analysis (PCA) provides an insight into how the areas group together. Kaiser-Meyer-Olkin test of sampling adequacy is 0.75, i.e. middling [16], and Bartlett's test of sphericity Chi-2 is 98.678 resulting into significance below 0.001, therefore, it makes acceptable to use principal component analysis.

The eigenvalue-one criterion is method for determining how many components to retain in a PCA. An eigenvalue less than one indicates that the component explains less variance that a variable would and hence shouldn't be retained [6]. PCA revealed two components that have eigenvalues greater than one and which explained 53.54% of variance for component 1 and 16.66% of the total variance for component 2 (Table 4). Components 1 and 2 explained 70.20% of total variance of digital transformation strategy areas. Obtained eigenvalues indicated that the study should proceed with two-component solution.

Table 4. Digital transformation strategy areas total variance explained*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative total %	Total	% of Variance	Cumulative total %	Total	% of Variance	Cumulative total %
1	4.283	53.544	53.544	4.283	53.544	53.544	3.170	39.622	39.622
2	1.333	16.663	70.207	1.333	16.663	70.207	2.447	30.585	70.207
3	0.970	12.124	82.331						
4	0.723	9.041	91.371						
5	0.247	3.088	94.460						
6	0.216	2.696	97.155						
7	0.147	1.838	98.993						
8	0.081	1.007	100.000						

*Extraction Method: Principal Component Analysis; eigenvalue-one criterion

Principal component analysis of digital transformation strategy areas was performed with Varimax rotation and resulted in two components solution. The rotated component matrix is provided in Table 5.

Table 5. Rotated Component Matrix for extent of digital transformation strategy areas*

	Component 1	Component 2
Customer Experience	-0.006	*0.917*
Data Management Strategy	*0.845*	0.346
Processes and Digital Solutions to Support Business	*0.902*	0.286
Digitalization of Business Models, Products and Services	*0.808*	0.360
Development of Digital Human Resources and Digital Workplaces	0.294	*0.872*
Development of Digital Culture	0.399	*0.713*
Cybersecurity	*0.723*	0.036
Industry 4.0	*0.470*	0.055

*Extraction Method: Principal Component Analysis – Varimax

Component 2 consists of softer factors, such as customer experience, development of digital human resources and digital workplaces, development of digital culture. And component 1 consists of harder factors, such as data management strategy, processes and digital solutions to support business, digitalization of business models, products and services, cybersecurity, Industry 4.0.

Table 6 provides descriptive statistics for the importance of different types of support measures that could help enterprises that have a digital transformation strategy.

Table 6. Descriptive statistics for the importance of support measures for digital transformation

	Mean	Std. Deviation
Possibility of obtaining grants for digital transformation	0.859	0.350
Possibility of obtaining co-financing for digital transformation projects	0.549	0.501
Possibility of obtaining dedicated returnable funds for digital transformation	0.183	0.390
Directory of credible information about experts in the field of digitalization	0.225	0.421
Published examples of good domestic and foreign practices in the field of digitalization	0.423	0.497
Events on the topic of "How to approach digitalization"	0.338	0.476
Voucher based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia) registered experts	0.338	0.476

Importance ranges from 0.18 to 0.86, the highest being possibility of obtaining grants for digital transformation, the lowest being possibility of obtaining dedicated returnable funds for digital transformation.

To test whether enterprise size, digital competencies of employees, and ways of introduction of new digital technologies to employees by management influence the importance of different types of support, correlation coefficients were calculated, and they are provided in Table 7.

Table 7. Cross-correlations for the importance of support measures for digital transformation

	Company Size	Digital Competencies	Introduction of new Digital Technologies
Possibility of obtaining grants for digital transformation	-0.255*	0.058	-0.100
Possibility of obtaining co-financing for digital transformation projects	-0.149	0.146	0.044
Possibility of obtaining dedicated returnable funds for digital transformation	0.113	0.190	-0.167
Directory of credible information about experts in the field of digitalization	0.058	0.135	0.081
Published examples of domestic and international good practices in the field of digitalization	0.020	0.176	0.319**
Events on the topic of "How to approach digitalization"	-0.005	-0.017	0.107
Voucher based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia) registered experts	-0.113	0.061	0.107

Note: * significant at 0.05, ** significant at 0.01

With regards to support measures, Kaiser-Meyer-Olkin test of sampling adequacy is 0.66, i.e. mediocre [16], and Bartlett's test of sphericity Chi-2 is 84.592 resulting into significance below 0.001, therefore, it is acceptable to use PCA. PCA revealed two components that have eigenvalues greater than one and which explained 33.05% of variance for component 1 and 21.38% of the total variance for component 2. Components 1 and 2 explained 54.43% of total variance of importance for support of digital transformation (Table 8). Obtained eigenvalues indicated that the study should proceed with two-component solution.

Table 8. Support measures for digital transformation total variance explained*

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative total %	Total	% of Variance	Cumulative total %	Total	% of Variance	Cumulative total %
1	2.314	33.051	33.051	2.314	33.051	33.051	2.221	31.735	31.735
2	1.497	21.380	54.432	1.497	21.380	54.432	1.589	22.697	54.432
3	.955	13.643	68.075						
4	.770	11.001	79.076						
5	.573	8.188	87.263						
6	.520	7.426	94.689						
7	.372	5.311	100.000						

*Extraction Method: Principal Component Analysis; eigenvalue-one criterion

Principal component analysis of support of digital transformation factors was performed with Varimax rotation method and resulted in two components solution. The rotated component matrix is presented in Table 9.

Table 9. Rotated Component Matrix for the importance of support measures for digital transformation*

	Component 1	Component 2
Possibility of obtaining grants for digital transformation	-0.071	*0.715*
Possibility of obtaining co-financing for digital transformation projects	0.387	*0.686*
Possibility of obtaining dedicated returnable funds for digital transformation	0.023	*0.622*
Directory of credible information about experts in the field of digitalization	*0.498*	-0.387
Published examples of domestic and international good practices in the field of digitalization	*0.754*	0.080
Events on the topic of "How to approach digitalization"	*0.820*	-0.034
Voucher based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia) registered experts	*0.759*	0.249

*Extraction Method: Principal Component Analysis – Varimax

Component 2 consists of funding-related support measures, such as possibility of obtaining grants for digital transformation, the possibility of obtaining co-financing for digital transformation projects, and the possibility of obtaining dedicated returnable funds for digital transformation. And component 1 consists of knowledge-related support, such as a directory of credible information about experts in the field of digitalization, published examples of domestic and international good practices in the field of digitalization, events on the topic of "How to approach digitalization", and voucher based consulting in the field of digitalization by the Digital Innovation Hub (DIH Slovenia) registered experts.

5. Discussion

A central finding of this research study is the impact of digital competencies and introduction of new digital technologies on the extent of digital transformation. The strong, significant correlations between the digital competencies of employees and/or the ways of introduction of new digital technologies with nearly all measured DT strategy areas provide empirical support for the arguments of the dynamic capabilities framework, defined as an enterprise's ability to integrate, build, and reconfigure competences to address rapidly changing environments [28].

This study suggests that these two variables are more than just operational choices; they are manifestations of an enterprise's higher-order capabilities. Advanced digital competencies are not merely technical skills but represent the organization's capacity to sense new technological opportunities and seize them by understanding their strategic implications - the core of the sensing and seizing capabilities described by Teece [27]. This aligns with the microfoundational view of Helfat and Peteraf [13] that enterprise-level capabilities are rooted in the cognitive abilities of its managers and employees to perceive, reason, and problem-solve in complex environments.

Conversely, a lack of these capabilities can be framed as a form of Organizational Debt (OD), a phenomenon described as the accumulation of "suboptimal decisions, outdated procedures, misaligned structures and cultural barriers that limit an organization's ability to adapt and innovate quickly" [1]. Our findings empirically support this concept from a digital transformation perspective. When an organization fails to cultivate employee digital competencies or foster collaborative methods for introducing new technology, it is effectively incurring OD. This debt manifests in the softer DT areas we identified, such as a diminished customer experience, which [1] link to consequences like user frustration and reduced quality. Therefore, the soft factors we analyze are not merely enablers of success but are critical mechanisms for preventing the accumulation of organizational debt that mortgages the company's future agility and competitiveness.

Statistically significant correlations between digital transformation strategy areas, digital competencies and method for introduction of new digital technologies reported in Table 3, represent empirical evidence for the mechanisms of transformation competency at work. The data results suggest that a digital transformation strategy is correlated with cognitive capacity to envision the future (high employee competencies) and the organizational capacity to execute change collaboratively (participatory introduction methods). This aligns with the framework proposed by Blanka et al. [2], where an employee's ability to drive digital transformation is composed of two intertwined elements: generic digital

skills and, critically, intrapreneurial competencies. This frames the paper's contribution from simply identifying "important factors" to providing empirical validation for a specific, theoretically grounded model of human-centric digital transformation.

Similarly, the method of introducing technology—specifically, the involvement of employees in the planning and introduction process—is a clear indicator of an enterprise's transforming capability, the crucial third pillar in Teece's [27] framework that focuses on continuous organizational renewal. It reflects an organization's ability to manage change, foster a collaborative culture, and ensure that technological adoption is aligned with human processes. The findings can be further enriched by applying the integrated framework of soft factors proposed by Ngereja et al [23]. This framework shows that organizational enablers (like culture and support) translate into success through specific project-level actions and individual characteristics. Our finding that employee competencies (an individual characteristic) strongly correlate with "softer" DT areas like customer experience aligns with this model. It suggests that success in people-centric transformation requires not only skilled individuals but also project-level actions such as end-user involvement and organizational-level support, to foster a learning culture, which are among the critical soft factors identified.

In the context of the two components of digital transformation strategy areas from the principal component analysis results, it is possible to see a trend that softer areas (component 2) are positively correlated with higher digital competencies. In case of customer experience, significance is 0.004; for development of digital human resources and digital workplaces, significance is 0.063, and for development of digital culture, significance is 0.104. Harder component 1 includes Data Management Strategy, Processes and Digital Solutions, Cybersecurity, and Industry 4.0 corresponds to those identified by Sousa and Rocha [26], such as the Internet of Things (IoT), Robotization, and Artificial Intelligence, which directly enable process optimization and new data-driven operations. While harder areas from component 1 do not significantly correlate with digital competencies at the 0.05 level. These two components have a structure similar to the foundational pillars of business models, operational processes, and customer experience identified by Westerman et al. [33], our component 1 containing business models and a part of operational processes, and our component 2 containing customer experience and a part of operational processes.

With regards to the way new digital technology is introduced, it positively correlates to customer experience, processes and digital solutions to support business, and digitalization of business models, products and services, all significant at 0.05. These three areas are more at the operational level. While the remaining five areas, such as data management strategy, development of digital human resources and digital workplaces, development of digital culture, cybersecurity, and Industry 4.0 are more at the strategic level.

With regards to the two components of types of DT support from the principal component analysis, it is possible to see that financial related support on average (even when the possibility of obtaining dedicated returnable funds for digital transformation is ranked the lowest) is perceived as more important than knowledge-related support. This demonstrates a clear and pragmatic risk aversion. Enterprises prioritize support that directly mitigates the financial downside of transformation. This finding empirically confirms that the financial constraints identified as primary obstacles for SMEs by scholars like Ghobakhloo & Ching

[10] and Mittal et al. [20] are perceived by enterprises themselves as the most critical barrier to overcome. While knowledge-based support (consulting, events, best practices) is valued, it is perceived as secondary to the immediate need of financial support to initiate projects. This finding has significant implications for policymakers and support institutions like DIHs. It suggests that while knowledge-sharing initiatives are beneficial, the most impactful intervention, especially for encouraging SMEs to engage in DT, is the provision of direct, non-refundable financial support that lowers the initial barrier to investment. However, to ensure this investment leads to sustainable transformation, policymakers should adopt a two-tiered approach. Financial mechanisms (grants, co-financing) should serve as the primary catalyst to de-risk entry, while knowledge-based initiatives (expert directories, best-practice workshops) should be integrated as complementary capability builders. A practical application of this balance would be hybrid support models, where financial funding is paired with mandatory voucher-based consulting or training. This ensures that the necessary capital injection is matched by the development of internal competencies, thereby addressing the resource and skills gaps simultaneously.

From a managerial perspective, the findings underline that digital competencies should be treated as a core strategic asset. Results of our study suggest that investments in skills development directly enhance an organization's sensing and seizing capabilities. Managers should therefore prioritize continuous upskilling, reskilling, and learning mechanisms that develop not only technical digital skills but also employees' ability to fully understand and exploit opportunities of digital technologies in operational and strategic context. This aligns with findings of Neumann et al [22], which outline importance of learning culture practices that encourages experimentation and treats mistakes as growth opportunities rather than failures to fully exploit agile transformation of enterprises.

The results of our study also show that the ways in which new digital technologies are introduced in an enterprise, more precisely the degree of employee involvement in planning and implementation of digital technologies, act as a key indicator of an enterprise's transforming capability. Participatory introduction and implementation approaches should become integral managerial mechanisms for effective execution of digital transformation.

The distinction between softer and harder digital transformation strategy areas has important implications for managerial prioritization. Different approaches are needed to support overall enterprise-wide development of digital culture on one side and execute targeted technological investments and ensure specialized knowledge and expertise for harder (more technologically orientated knowledge) domains.

The results of our study indicated that financial and knowledge-based support are needed for successful digital transformation. Prior research has shown that SMEs continue to face considerable difficulties in keeping pace with ongoing digital transformation, particularly when compared to larger enterprises [35], [18].

These challenges are not only a recent phenomenon. Similar difficulties and limitations have been observed for several decades, dating back to the period when information technology first became a strategic organizational resource and a source of competitive advantage. Earlier research consistently reports that SMEs encountered substantial barriers to information technology adoption, including limited availability of digital skills and

expertise, as well as constraints related to managerial capacity and financial resources for ICT-related investments [8], [11].

For managers, this implies that digital transformation initiatives are more likely to gain traction when financial uncertainty is explicitly addressed. However, it is widely known that financial resources alone are insufficient to sustain transformation. Managers should therefore combine financial investments with building up digital capabilities, especially digital culture, including supporting learning, experimentation, and knowledge-sharing practices to ensure that funded initiatives translate into lasting organizational capabilities.

Finally, our findings also emphasize the central role of managerial cognition and leadership in enabling human-centric digital transformation. Managers should actively shape shared understanding, strategic vision, and collective engagement with digital transformation, meaning building up digital culture in an enterprise-wide context. This requires managers to act not only as decision-makers but also as sense-givers who articulate why digital transformation matters and how employees as the most strategic asset in the enterprise valuably contribute to it.

6. Conclusion

This study embarked on an investigation into the determinants and nature of digital transformation (DT) within the Slovenian business landscape, a phenomenon of critical importance in the contemporary global economy. By grounding the research in the adapted Technology-Organization-Environment (TOE) framework and leveraging the theoretical lens of dynamic capabilities, this article has moved beyond a simple assessment of technology adoption to provide a nuanced, multi-dimensional view of the transformation process. The empirical findings offer a clear and compelling narrative: successful digital transformation is fundamentally a matter of organizational capability, not merely technological acquisition or enterprise size.

Our research confirms that the journey to digital maturity is driven by what an enterprise can do, rather than what it is. The initial Chi-2 analysis revealed that the strategic decision to pursue DT is not confined to large, resource-rich corporations; it is an imperative felt across enterprises of all sizes. This finding suggests that the environmental pressures of the digital age act as a great leveler, making transformation a near-universal strategic concern. However, the subsequent analysis demonstrated that enterprise's internal dynamic capabilities profoundly shape the scope and depth of this transformation. The strong, positive correlations between employee digital competencies and collaborative change management processes with the extent of DT initiatives underscore a main findings of this study: it is the investment in human capital and organizational processes - the microfoundations of sensing, seizing, and transforming which truly enables an enterprise to navigate the complexities of the digital transformation.

The principal component analysis provided a clear structure to this transformation journey, revealing two distinct but complementary fronts. The first, an operational and technical core, comprises the foundational investments in data, processes, and security necessary for efficiency and resilience. The second, a people and customer-centric front, encompasses the initiatives in culture, human resources, and customer experience that drive market

value and long-term adaptability. The finding that digital competencies are most strongly correlated with this second, "softer" dimension is particularly insightful. It suggests that while the operational core can be engineered, the value-creating front must be cultivated through a skilled, engaged, and empowered workforce.

Finally, this study sheds light on the pragmatic realities faced by enterprises undertaking this journey. The clear preference for direct financial support, such as grants, over knowledge-based assistance or refundable funds, highlights the critical role of de-risking the initial investment. For policymakers and support institutions like DIH Slovenia, this sends an unambiguous message: lowering the financial barrier to entry is the most potent catalyst for encouraging enterprises, especially SMEs, to embark on their digital transformation.

With these results, this study provides a significant contribution to both theory and practice. It provides robust empirical support for the application of dynamic capabilities theory to the DT phenomenon and challenges the deterministic role often ascribed to enterprise size. For managers, this study offers specific practical guidance beyond general investment in human capital. First, the strong correlation between introduction methods and transformation scope indicates that managers must abandon top-down implementation in favor of participatory approaches. Involving employees in the planning phase of new technology adoption acts as a practical mechanism for seizing opportunities and reducing resistance. Second, managers should prioritize the development of soft transformation areas - specifically customer experience and digital workplace culture - as these were found to be the primary drivers of employee digital competencies. Rather than viewing digital skills training as a separate activity, it should be integrated into the redesign of customer-facing processes, where the immediate value of the technology is most visible to the workforce. For policymakers, it offers clear guidance on how to structure support mechanisms for maximum impact.

Although this study provides valuable insights into how human factors - such as employee digital competencies and managerial approaches to supporting technology adoption - influence enterprise digital transformation, several limitations should be acknowledged. First, the study is based on cross-sectional data collected through an online survey, which captures organizational practices and perceptions at a single point in time. Given the dynamic characteristics of digital transformation, longitudinal research designs would be more suitable for examining causal relationships and changes over time.

Second, the sample is limited in size and comprises enterprises from a single country - Slovenia. In addition, the sampling was not random since the survey was promoted by Digital Innovation Hub of Slovenia and Chamber of Commerce. It is possible that respondents are those enterprises who are more aware or even advanced in the digital transformation journey. Therefore, the generalizability of results is limited and should be interpreted with awareness of these limitations.

Nevertheless, this context is highly relevant, as SMEs enterprises dominate not only the Slovenian economy but also in other European countries. To enhance transparency and interpretability, we have addressed these limitations by providing detailed descriptive statistics on enterprise demographics.

Additionally, the study categorized enterprise size solely based on the number of employees. Future research should aim to incorporate financial metrics, such as annual turnover and balance sheet totals, to fully align with the EU definition and capture potential nuances related to financial resources.

While this study provides a detailed snapshot of the Slovenian context, the path forward for research is clear. Longitudinal studies are needed to trace the causal pathways between capabilities and performance over time, and cross-country comparisons would enrich our understanding of how different institutional environments shape the DT journey. Ultimately, this research study affirms that digital transformation is a deeply human endeavor. Technology may provide tools, but it is the strategic vision, the cognitive capabilities, and the collaborative spirit of an organization's people that will determine its success in the digital age.

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