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An examination of employee perceptions in digital transformation in terms of demographic variables

Dijital dönüşümde çalışan algısının demografik değişkenler açısından incelenmesi

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Abstract

This study examines the perceptions of employees regarding digital transformation in organizations where digital transformation processes are being implemented. This research aims to determine the level of digital transformation perception among employees working in the public and private sectors with diverse professional roles, and to investigate whether these perceptions differ according to demographic variables. A survey design, a quantitative research method, was used in the study; data were collected through online and printed questionnaires between April and August 2025. Analyses were performed on 256 valid participant responses. The perception of digital transformation was measured using the Digital Transformation Scale, which consists of five dimensions. The findings showed that employees' perceptions of digital transformation were generally at a moderate to high level. Significant differences were found in the scores for business processes, strategy and corporate culture, and total digital transformation perception according to ag egroup and length of experience variables. It was determined that the perception of digital transformation relatively decreased as age and experience increased. Furthermore, it was found that employees working in engineering and technology fields had higher perceptions regarding personnel knowledge and competence compared to education and other departments. The results show that digital transformation should be managed not only through technological investments, but also with a holistic approach that centers on employee perception.

Keywords: *digital transformation, employee perception, organizational change.*

Öz

Bu çalışmada, dijital dönüşüm süreçlerinin yürütüldüğü organizasyonlarda çalışanların dijital dönüşüme ilişkin algıları incelenmiştir. Araştırmanın amacı, kamu ve özel sektörde görev yapan ve farklı mesleki rollere sahip çalışanların dijital dönüşüm algı düzeylerini belirlemek ve bu algıların demografik değişkenlere göre farklılaşıp farklılaşmadığını ortaya koymaktır. Çalışmada nicel araştırma yöntemlerinden tarama deseni kullanılmış; veriler 2025 yılı Nisan–Ağustos döneminde çevrim içi ve basılı anketler aracılığıyla toplanmıştır. Analizler, 256 geçerli katılımcı yanıtı üzerinden gerçekleştirilmiştir. Dijital dönüşüm algısı, beş boyuttan oluşan Dijital Dönüşüm Ölçeği kullanılarak ölçülmüştür. Elde edilen bulgular, çalışanların dijital dönüşüm algılarının genel olarak orta ve yüksek düzeyde olduğunu göstermiştir. Yaş grubu ve görevde çalışma süresi değişkenlerine göre iş süreçleri, strateji ve kurumsal kültür ile toplam dijital dönüşüm algısı puanlarında anlamlı farklılıklar tespit edilmiştir. Yaş ve deneyim arttıkça dijital dönüşüme yönelik algının görece azaldığı belirlenmiştir. Ayrıca, personel bilgi ve yetkinliği boyutunda mühendislik ve teknoloji alanında görev yapan çalışanların algılarının eğitim ve diğer departmanlara kıyasla daha yüksek olduğu saptanmıştır. Sonuçlar, dijital dönüşümün yalnızca teknolojik yatırımlarla değil, çalışan algısını merkeze alan bütüncül bir yaklaşımla yönetilmesi gerektiğini göstermektedir.

Anahtar Kelimeler: *dijital dönüşüm, çalışan algısı, örgütsel değişim*

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Introduction

In the transition from an industrial to an information society, technology, information, and human capital have become central to economic and organizational systems. The rapid development of information and communication technologies (ICT) in this transformation process has reshaped the way organizations do business, their decision-making processes, and their competitive strategies (Castells, 2010). Particularly with the widespread adoption of digital technologies, organizations have been forced to restructure not only their operational processes but also their management approaches, organizational structures, and human resources practices on a digital basis.

Digital transformation is defined as the process of renewing or optimizing business processes, production models, and organizational structures through the systematic integration and adoption of digital technologies within organizations (Sümer, Bayrak, & Kiraz, 2025; Zhao et al., 2024). Digital transformation is not a sudden technological change or a one-off application; it is a holistic and dynamic transformation process that affects and shapes an organization's structure, processes, and culture. In this process, the integration of digital technologies restructures business models, decision-making mechanisms, roles, and ways of creating value (Vial, 2019; Verhoef et al., 2021). Therefore, it should not be considered a project with a defined start and end date, but rather an ongoing organizational transformation process that requires continuous learning, adaptation, and renewal.

Digital transformation perception is a cognitive evaluation process shaped by how individuals interpret technological change, their self-efficacy perceptions regarding this change, and the expected outcomes associated with it. In this context, the perception of digital transformation can be addressed within the framework of Social Cognitive Theory (Bandura, 1986). According to the theory, individuals' behaviors arise from the interaction of their personal competence perceptions, environmental conditions, and expected outcomes. Whether employees perceive digital transformation as an "opportunity" or a "threat" is closely related to their perceptions of digital competence, the level of organizational support, and their cognitive evaluations of the transformation process. In this respect, the perception of digital transformation is also related to the concepts of perceived benefit and perceived ease of use emphasized in the Technology Acceptance Model (Davis, 1989); however, digital transformation represents a more holistic change process that encompasses organizational structure, culture, and strategy beyond individual technology use. Digital transformation perception can also be explained within the framework of Cognitive Evaluation Theory (Lazarus & Folkman, 1984). According to this theory, individuals primarily evaluate the changes they encounter cognitively, classifying them as a threat, an opportunity, or a manageable challenge. In processes with high uncertainty, such as DT, how employees perceive the transformation is decisive for their stress levels, resistance behaviors, and adaptation to change. In this context, employees who perceive digital transformation as an opportunity rather than a threat facilitate the development of positive attitudes and behaviors towards the transformation.

Successful digital transformation processes are directly related to technology investments, the models used to manage the process within the organization, employee perceptions, and the organization's ability to adapt to its culture. Westerman, Bonnet, and McAfee (2014) consider digital transformation as a long-term change process in which technology, leadership, and the human factor are managed together and simultaneously; they emphasize that this process progresses in stages depending on the level of organizational maturity. Similarly, Kane et al. (2015) state that digital transformation is a non-linear process that is constantly reshaped through feedback mechanisms, and that this process is directly affected by employee perceptions, organizational flexibility, and managerial vision. In this respect, digital transformation is a multi-layered and continuous change process that includes both technical and social dimensions.

The digital competencies, adaptability skills, and perceptions of transformation of employees, who are a crucial resource for organizations, directly impact the success of digital transformation (Verhoef et al., 2021; Kraus et al., 2021). Employees' learning speed, capacity to update digital skills, and adaptability to organizational change are among the key determinants of a company's digital competitiveness. Employees are positioned not as passive implementers of the digital transformation process, but as strategic actors who shape and direct this transformation.

Employee perception plays a critical role in the adoption and sustainability of the digital transformation process. Studies show that when employees perceive digital transformation as an "opportunity," innovative behaviors, job performance, and organizational commitment increase; conversely, when the transformation is perceived as a "threat," it strengthens resistance to technology, burnout, and job security concerns (Li et al., 2022). In digital transformation, a socio-technical process, the necessity of managing technology and the human factor simultaneously and in a balanced manner theoretically supports the central role of employee perception (Pasmore et al., 2019).

In digital transformation, employee skills are not limited to technical competencies; they encompass multidimensional competency areas such as digital literacy, data-driven thinking, agile working, problem-solving, and continuous learning. The OECD (2025) and World Economic Forum (2025) reports emphasize that in the digital age, the core capital of the workforce is "digital skill sets," which constitute the driving force behind organizational transformation.

Given the dynamic and continuous nature of digital transformation, systematically researching employee perceptions is a strategic necessity for the sustainability of this transformation. To improve employee perception levels and increase the success of digital transformation, it is first necessary to determine the current perception of the organization. This study investigates the perceptions of employees regarding digital transformation in organizations where digital transformation processes are being implemented. The study examines employees' perceptions of digital transformation in the public and private sectors, across different professional roles. The main objective of this diversity is to demonstrate that digital transformation is not limited to a specific sector or a single professional group; instead, employee perceptions can vary depending on organizational structure, business processes, technology intensity, and job descriptions. Thus, the aim is to evaluate the perception of digital transformation within a more holistic framework, independent of sectoral and professional contexts. The research results are expected to contribute to the development of digital transformation strategies. Although digital transformation has been widely studied in the literature, studies that address employee perception using a multidimensional measurement tool and within the framework of different demographic characteristics are limited. This study aims to fill this gap.

This study aims to examine how the perception of digital transformation differs according to the demographic characteristics of employees. The research question is as follows: Do employees' perceptions of digital transformation differ significantly according to their demographic characteristics in terms of the sub-dimensions and total score of digital transformation perception?

Digital Transformation Perception

Digital transformation is one of the topics that has been frequently researched in recent years. Gürcan et al. (2023), who examined scientific research on digital transformation between 2013 and 2023, found that 45.76% of the studies in the literature focused on digital transformation applications in industry and public institutions, 26.08% on processes, 22.48% on technology, and 5.63% on human factors. Employees, a crucial component of digital transformation (Blanca et al., 2022; Cetindamar et al., 2024; Kokshagina & Schneider, 2023), directly influence the success of digital transformation (Polakova-Kersten et al., 2023; Schneider & Sting, 2020). Digital technologies can be used in

the workplace thanks to the knowledge and skills of employees (Colbert et al., 2016). Therefore, businesses should listen to their employees and strive to develop positive perceptions and attitudes towards digital transformation.

Digital transformation can be perceived differently by employees. While some employees believe that digital transformation contributes to personal development (Nishii et al., 2008), others resist this change due to reasons such as uncertainty, technostress, or the possibility of job loss (Çini, Erdirençelebi, and Akman, 2023; Makowska-Tlomak et al., 2023; Tarafdar et al., 2023). Digital transformation, which emphasizes the change of all organizational components, including technology, structure, business model, and processes, represents a significant shift in organizational structure. Digital transformation encompasses systematic and continuous change (Hanelt et al., 2020). Employees with a positive attitude towards change are more likely to respond positively to digital transformation. Wanberg and Banas (2000) state that a positive attitude towards change facilitates adaptation to new job demands.

The perception of digital transformation is influenced by various components, including organizational structure and culture, business processes, personnel competence, internal communication, and the willingness of both the organization and its employees. Business processes refer to the set of value-creating and interconnected activities that a business follows in transforming inputs into outputs; business models, on the other hand, represent a holistic structure that explains how the business creates, delivers, and converts this value into economic value (Davenport, 1993; Osterwalder & Pigneur, 2010). With digitalization, business processes are being restructured to incorporate elements such as automation, data-driven decision-making, and real-time integration. In parallel, business processes and models are also transforming within this scope (Teece, 2018; Verhoef et al., 2021). Employees need to use digital technologies and tools in their daily work routines, which is transforming workplaces (Kokshagina & Schneider, 2023). The effectiveness of business processes is directly related to employees' digital tool skills, their understanding of processes, their problem-solving capacity, and their adaptability to innovation (OECD, 2025; Kraus et al., 2021). Therefore, employees are not passive implementers of business processes; they have an active role in reshaping processes and business models.

Employee perception offers valuable insights into an organization's strategy. While corporate strategies are orientations determined by top management, their success is directly related to how employees perceive them, the extent to which they internalize them, and how they are reflected in daily work practices (Kaplan & Norton, 2001). When employees perceive the strategy as clear, consistent, and achievable, their motivation towards strategic goals increases; when they perceive it as unclear or threatening, resistance, decreased performance, and strategic disconnect may occur. In this respect, employee perception plays a decisive role in ensuring that the corporate strategy becomes more than just a declared plan, but an organizational action. Corporate culture plays a supportive or limiting role in the implementation of strategic decisions. While strategy defines the organization's long-term goals and the roadmap to achieve these goals, corporate culture refers to the values, norms, and behavioral patterns that determine how this strategy will be perceived and implemented (Schein, 2010). In digital transformation, the success of strategic orientations such as innovation or sustainability depends on Employee perceptions, which are directly related to their understanding of a cultural environment that supports these orientations (Denison & Mishra, 1995; Kane et al., 2015). Employees with an innovative, learning-oriented, and participatory culture tend to view strategic changes as "opportunities."

In contrast, in hierarchical, control-oriented, and error-prone cultures, strategic transformations are more likely to be perceived as "threats." Especially in strategic processes involving high uncertainty and change, such as digital transformation, managing employee perception emerges as a critical requirement for the sustainability of strategic goals,

ensuring cultural alignment, and reducing organizational resistance (Verhoef et al., 2021; Pasmore et al., 2019). Therefore, employee perceptions should be considered not only an output of organizational strategy and culture but also a dynamic input that reshapes these two structures.

The level of knowledge and skills possessed by personnel shapes both the cognitive and affective dimensions of their perception of digital transformation. As individual competencies such as digital literacy, data usage skills, technological problem-solving competence, and continuous learning capacity increase, employees are more likely to perceive digital transformation as an "opportunity" rather than a "threat" (OECD, 2025). Employees with a high perception of competence adopt new digital applications more easily and develop open and innovative behaviors towards change. Employees with a high level of competence view the digital transformation process as an opportunity for career development, increased productivity, and job enrichment (Li et al., 2022; Verhoef et al., 2021). A perception of insufficient knowledge and skills in the digital transformation process can foster negative perceptions among employees, including uncertainty, job security concerns, resistance to technology, and burnout. Employees with low digital competence perceive digital transformation as a threat and a loss of control, negatively impacting the success of the digital transformation. Polakova-Kersten et al. (2023) stated that employees who perceive digital transformation as a threat lead to suboptimal digital transformation. Personnel knowledge and competence directly affect not only the technical success of digital transformation but also the direction of employee perception, the social acceptance of the transformation, and its sustainability. In this respect, personnel knowledge and competence are positioned as both a precursor and a transformer of employee perception of digital transformation.

Motivation, another element influencing the perception of digital transformation, is one of the fundamental psychological factors that determine how employees perceive the digital transformation process, the extent to which they participate in it, and their level of adoption of the transformation. The level of motivation can cause digital transformation to be perceived as either a "necessary burden" or a "personal and organizational development opportunity." It is reported that highly motivated employees perceive digital transformation positively, in terms of increased productivity, job enrichment, and career development, whereas low-motivated employees tend to evaluate the process more in terms of stress, burnout, and resistance to technology (Li et al., 2022).

The accessibility and openness of corporate communication and information channels influence employees' perception of digital transformation. Since digital transformation involves high uncertainty, role changes, and restructuring of business processes, how employees interpret this process is primarily shaped by the content, transparency, and continuity of the information provided to them (Gioia & Chittipeddi, 1991; Lewis, 2019). Regular and multi-channel information dissemination to employees about the purpose, scope, potential benefits, and how their individual roles will change increases the legitimacy of the transformation and strengthens perceived fairness (Meyer & Stensaker, 2006). In organizations with strong corporate communication, employees have higher levels of acceptance and lower levels of resistance to digital technologies (Kane et al., 2015; Verhoef et al., 2021). When employees perceive themselves as actors who are sufficiently informed about the process, involved, and whose opinions are considered, their level of psychological ownership and trust in digital transformation increases. This situation strengthens the social acceptance of the transformation (Lewis, 2019; Pasmore et al., 2019). In an environment with a high level of communication feedback, managers can better understand the individual needs of employees and ensure the organic integration of the organization and its employees by communicating organizational goals to them. An effective communication mechanism helps employees grasp the overall situation and provides reassurance, ena-

bling them to cope with the discomfort and challenges related to Digital Transformation (DTP). Employees can obtain information that helps improve their performance, reduce uncertainty, explore the expectations of new tasks, and develop a sense of responsibility. In situations where communication and information are limited, inadequate communication channels and poor feedback can prevent employees from understanding the organizational DTP's path and requirements, limiting their ability to gain valuable information in response to the DTP. Effective communication and information help employees monitor their current situation, encourage them to correct themselves, and better adapt to new DTP requirements (Fu, 2023). Therefore, corporate communication is not just a tool for transferring information during the digital transformation process; it is considered a strategic function that shapes employee perception, manages resistance, and supports the sustainability of the transformation.

Determining employees' perceptions of digital transformation and enhancing their level of perception are critically important for achieving an effective and successful digital transformation. Organizations should undertake initiatives aimed at improving employees' perceptions across all components that constitute digital transformation.

Methodology

In this study, employees' perceptions of digital transformation were determined using survey research, a quantitative research method. Survey research is a descriptive research method widely used in social sciences to determine the characteristics of populations (Can, 2017).

Since the research aims to determine whether the perception of digital transformation differs according to the demographic characteristics of employees, a research question-based structure was adopted instead of a hypothesis-testing approach. The literature indicates that in studies focusing on group comparisons and not aiming for causal inference, research questions can be used in place of hypotheses (Büyüköztürk et al., 2016; Creswell & Creswell, 2018; Punch, 2014).

Population and Sample

The research population consists of employees working in public and private sector organizations in Türkiye that are directly or indirectly involved in digital transformation processes. Convenience sampling, a non-probability sampling method, was used to collect data due to its practicality in terms of time and cost. The main limitations of this method are the low representativeness of the sample and the possibility that the selected participants may exhibit sampling bias with respect to certain characteristics (Büyüköztürk et al., 2016). To mitigate the adverse effects of this limitation, data were collected from public and private sector employees working in different institutions and sectors. Participants voluntarily participated in the research through online (Google Forms) and printed survey forms. The data collection process was completed between April and August 2025. Two hundred seventy-five participants were reached, and 256 valid participant responses were analyzed. The research was reviewed by the Gazi University Ethics Committee at its meeting on January 14, 2025, and numbered 01, and ethical approval was obtained.

Data Collection Tool

The employee perception of digital transformation was investigated using the Digital Transformation Scale (DTS), developed by Gök et al. (2024). The DTS consists of five factors and 28 items. The scale comprises the dimensions of "business processes", "strategy and corporate culture", "personnel knowledge and competence", "motivation", and "communication and information". A total score can be obtained from the scale, or separate scores can be calculated for each sub-dimension. There are no items that can be reverse-scored. The scale has a 5-point Likert-type structure and is answered with "strongly disagree", "disagree", "neutral", "agree", and "strongly agree". The business

processes dimension of the DTS refers to the redesign and improvement of operational flows within the organization using digital technologies. The strategy and corporate culture dimension represents the level of adoption of digitalization by the organization, whether it views digital transformation as a strategic priority, and its capacity to achieve the necessary cultural change in the organizational structure accordingly. The personnel knowledge and competence dimension focuses on the technical knowledge and skills necessary for employees to adapt to digital transformation and effectively use digital tools and software. This dimension reflects employees' digital literacy level, problem-solving abilities, and capacity to integrate information technologies into business processes. The motivation dimension assesses the extent to which employees are willing, enthusiastic, and participatory in digital transformation processes. Willingness to participate in digital transformation projects, attitudes towards innovative practices, expectations for personal development, and positive feelings towards the change process constitute the key elements of this dimension.

The communication and information dimension refers to the effectiveness of the organization's information-sharing mechanisms in relation to the digital transformation process. Regularly announcing developments related to digital projects, ensuring the openness of corporate communication channels, and providing employees with adequate information about the process, as well as ease of access to information, fall within the scope of this dimension.

Table 1. Possible Scores and Score Levels from the Scale

Factors	Item	Score		Score level		
		Min.	Max.	Low	Medium	High
BP	10	10	50	10-23.3	23.3-36.6	36.6-50
SCC	7	7	35	7-16.3	16.3-25.7	25.7-35
PKC	4	4	20	4-9.3	9.3-14.6	14.6-20
M	4	4	20	4-9.3	9.3-14.6	14.6-20
CI	3	3	15	3-7	7 -11	11-15
DTS (Total)	28	28	140	28-65.3	65.3-102.6	102.6-140

Data Analysis

The first stage of data analysis involved preprocessing the data. Outliers were identified and excluded from the analysis based on the dataset. The Mahalanobis distance method was used for outlier analysis. Missing values, where an answer was missing in an item, were filled with the item's mean, and participants with more than one missing data point were excluded from the analysis. The skewness and kurtosis values of the dataset were evaluated within the ±2 limit (George & Mallery, 2010).

In the analysis of scores obtained from the scale, independent samples t-test and one-way ANOVA were used when parametric assumptions were met; otherwise, non-parametric tests such as Mann–Whitney U and Kruskal–Wallis H tests were used, and post hoc tests were used for variables where a significant difference was found in the Kruskal–Wallis H test results to compare group scores. In groups where a significant difference was found, the effect size was investigated, and the impact of the findings on the application was evaluated.

Effect size was determined using eta-square and Cohen's d coefficients. The effect size was interpreted according to the classification proposed by Cohen (1988): d = 0.20 (small), d = 0.50 (medium), and d = 0.80 (significant effect). Table 1 presents information on the dimensions that constitute the perception of digital transformation, along with the scores obtained for the entire scale.

Table 1 presents the minimum and maximum score ranges for the dimensions and the entire scale that constitute the perception of digital transformation, ranging from 3 to 50. These scores are classified into three groups – low, medium, and high – to determine the score level for all dimensions and the entire scale.

Findings

This section presents demographic findings regarding the participants, as well as information on

scale dimensions and overall scale scores, according to the independent variables.

Data Preprocessing and Demographic Findings

In data preprocessing, necessary adjustments were made for missing data and outliers. Eight observations with missing data in only one item in the dataset were completed with the sample mean for that item. There were no observations with missing data in more than one item. Outlier analysis was determined using the Mahalanobis distance method, and responses with this feature were removed from the dataset. Nineteen observations with Mahalanobis distances greater than the critical value ($\chi^2(28) = 58.30$; $p < 0.001$) were removed from the dataset, which consisted of 28 items constituting the scale, and analyses were performed using the data from 256 participants.

characteristics of the participants are presented in Table 2.

According to Table 2, 44.1% of the participants are female, and 55.1% are male. Regarding marital status, 34.4% are single, and 65.5% are married. 23.4% of the sample consists of young employees aged 21–30, while the highest representation rate is in the 31–40 age range at 35.2%. This is followed by the 41–50 age range at 34%, and employees aged 50 and over make up 6.6%. The education level of the participants is predominantly undergraduate (46.5%). The rate of master's degree holders is 27%, those with secondary education or equivalent constitute 4.3%, and associate degree holders are 5.5%. Those with a non-thesis master's degree are represented at 6.6%, and holders of doctoral degrees at 9.8%.

When examining the fields of study of the participants, mathematics and science constitute the highest group at 62.5%. Social sciences follow with 31.6%, while other fields account for 5.5%.

Table 2. Participant Demographic Characteristics

Demographic variable	Groups	n	%	Demographic variable	Groups	n	%
Gender	Female	113	44.1	Legth of experience	1-10	148	57.8
	Male	141	55.1		11-20	75	29.3
	Missing data	2	0.8		21-30	18	7.0
	Total	256	100		31-40	11	4.3
Age	21-30	60	23.4		Missing data	4	1.6
	31-40	90	35.2		Total	256	100
	41-50	87	34.0	Education degree	Secondary education	11	4.3
	51+	17	6.6		Associate	14	5.5
	Missing data	2	0.8		Bachelor's	119	46.5
	Total	256	100		Non-thesis master's	17	6.6
Marital status	Single	88	34.4		Master's	69	27.0
	Married	165	64.5		Doctoral-(PhD)	25	9.8
	Missing data	3	1.2		Missing data	1	0.4
	Total	256	100		Total	256	100
Educational Background	Math. and natural sci.	160	62.5	Department	Engineering and tech.	104	40.6
	Social sci.	81	31.6		Management and adm.	66	25.8
	Other	14	5.5		Finance and accounting	19	7.4
	Missing data	1	0.4		Education	38	14.8
	Total	256	100		Other	29	11.3
					Total	256	100

The normality of the dataset was evaluated using skewness and kurtosis values. The skewness value ranged from -1.456 to -1.112; kurtosis ranged from -0.807 to 1.071. The dataset has a normal distribution.

The DTS developed by Gök et al. (2024) is a scale exhibiting a five-dimensional structure. The EFA results from the previous study showed KMO = 0.961, Bartlett's $\chi^2(990) = 12562.459$ ($p<0.001$). The total variance explained is 76.11%. Descriptive

The researcher categorized the units where participants worked within the institutions where the study was conducted. Accordingly, 40.6% of employees work in engineering and technology-related units. The proportion of those working in management and administrative units is 25.8%, those in education units is 14.8%, and those in finance and accounting units is 7.4%. The proportion of those working in other units is 11.3%. Examining the distribution of years of service, it is seen that

57.8% of participants have 0-10 years of work experience. This is followed by 29.3% with 11-20 years of experience. Those with 21-30 years of experience represent 7.0%, and those with 31 years or more of seniority represent 4.3%.

Digital Transformation Perception According to Gender Variable

Table 3. Scores by Gender

Factors	Gender	n	Mean	Std. deviation	Perception level	F	Levene's test (p)	t-test		
								t	df	p
BP	Female	113	37.40	10.057	High	0.391	0.532	0.087	252	0.931
	Male	141	37.29	9.651	High					
SCC	Female	113	26.99	7.295	High	0.696	0.405	-0.096		0.923
	Male	141	27.08	7.037	High					
PKC	Female	113	13.11	4.080	Medium	0.338	0.562	-1.164		0.246
	Male	141	13.71	4.124	Medium					
M	Female	113	14.35	4.219	Medium	1.297	0.256	-0.720		0.472
	Male	141	14.72	3.930	High					
CI	Female	113	9.64	3.252	Medium	0.115	0.735	-1.802		0.073
	Male	141	10.37	3.186	Medium					
DTS (Total)	Female	113	101.49	26.503	Medium	0.471	0.493	-0.518		0.605
	Male	141	103.17	25.083	High					

T-test results show no statistically significant difference between female and male participants in terms of BP (t=0.087), SCC (t=−0.096), PKC (t=−1.164), M (t=−0.720), CI (t=−1.802), and total DTS score (t=−0.518) (p>0.05).

Whether there is a significant difference in DTS sub-dimensions and total scores according to the gender variable was examined using an independent samples t-test and is presented in Table 3.

Table 3 shows that perception levels for all dimensions comprising the digital transformation and the scale as a whole are moderate or high across all gender groups. Levene test results indicate that variances are homogeneous across all dimensions (p>0.05).

Digital Transformation Perception According to Age Group Variable

Descriptive statistics of perception scores according to age variable and homogeneity of variances were investigated with Table 4.

Participant perception levels for the entire scale and its dimensions were observed to be moderate to high, varying by age group (Table 4).

Table 4. Scores by Age

Factors	Age group	n	Mean	Std. deviation	Perception level	Levene's test (p)
BP	21-30	60	40.05	8.037	High	0.002
	31-40	90	37.78	8.250	High	
	41-50	87	35.34	11.335	Medium	
	51+	17	35.00	12.575	Medium	
SCC	21-30	60	29.05	5.466	High	0.009
	31-40	90	27.16	6.291	High	
	41-50	87	25.72	8.251	High	
	51+	17	25.82	9.160	High	
PKC	21-30	60	14.18	3.851	Medium	0.757
	31-40	90	13.84	3.851	Medium	
	41-50	87	12.54	4.422	Medium	
	51+	17	12.94	4.054	Medium	
M	21-30	60	15.38	3.494	High	0.034
	31-40	90	14.78	3.591	High	
	41-50	87	13.84	4.529	Medium	
	51+	17	14.12	5.231	Medium	
CI	21-30	60	10.27	3.047	Medium	0.328
	31-40	90	10.31	3.100	Medium	
	41-50	87	9.62	3.515	Medium	
	51+	17	9.82	3.005	Medium	
DTS (Total)	21-30	60	108.93	19.488	High	0.009
	31-40	90	103.87	22.550	High	
	41-50	87	97.07	29.995	Medium	
	51+	17	97.71	31.806	Medium	

According to the Levene test results, which determined the homogeneity of variances, the variances were not homogeneous for the BP, SCC, M, and DTS total scores ($p<0.05$); however, the variances were homogeneous for the PKC and CI dimensions ($p>0.05$). One-way analysis of variance (ANOVA) was performed on groups where homogeneity of variances was achieved, and post-hoc tests were performed on groups where homogeneity of variances was not achieved.

The effect sizes are moderate for these groups. The effect of the age variable on the relevant dimensions is statistically significant, as well as moderately significant in terms of practical/application.

Regarding the age group variable, significant differences were found only between the 21–30 and 41–50 age groups in BP, SCC, and total DTS scores; no significant difference was found in the M, PKC, and CI dimensions according to age.

Table 5. One-Way ANOVA Test and Effect Size by Age Group

Factors	Groups	Sum of squares	df	F	p	η^2
PKC	Between groups	122.408	3	3.187	0.63	0.028
	Within groups	4139.356	250			
	Total	4261.764	253			
CI	Between groups	25.772	3	0.823	0.482	0.009
	Within groups	2609.976	250			
	Total	2635.748	253			

Table 5 shows that there was no statistically significant difference between age groups in the PKC and CI dimensions ($p>0.05$). The results of the analysis of variance for PKC are $F(3,250)=3.187$ ($p<0.05$, $\eta^2=0.028$); and for CI, $F(3,250)=0.823$ ($p<0.05$, $\eta^2=0.009$). The effect sizes indicate that the effect of the age variable on both dimensions is small and negligible.

In groups where homogeneity of variances could not be ensured, group score comparisons were analyzed using post-hoc tests. Groups showing significant differences are presented in Table 6.

Table 6. Post Hoc Tests and Effect Size by Age Group

Factors	Age groups (I–J)	Mean difference (I–J)	Std. error	p	95% Confidence interval		Cohen's d
					Lower bound	Upper bound	
BP	21–30 vs 41–50	4.705	1.598	0.020	0.55	8.86	0.47
SCC	21–30 vs 41–50	3.326	1.132	0.020	0.38	6.27	0.46
DTS (Total)	21–30 vs 41–50	11.864	4.083	0.022	1.25	22.48	0.45

According to Table 6, significant differences were found only between the 21–30 and 41–50 age groups in BP, SCC, and total DTS scores ($p<0.05$). The 21-30 age group has a higher perception.

Digital Transformation Perception According to Marital Status

The scale dimensions and overall analyses according to the marital status variable are presented in Table 7.

According to marital status, the BP and SCC factors, which constitute the dimensions of the DTS, have high perception scores; the PKC, M, and CI factors have moderate scores. For the entire scale, single individuals have high perception scores, while married individuals have moderate scores. All variances show a homogeneous distribution (Levene $p>0.05$).

According to the independent samples t-test results, there was no statistically significant difference between single and married participants in terms of BP ($t=1.280$), SCC ($t=1.097$), PKC ($t=0.455$), M ($t=0.066$), CI ($t=-0.275$), and the total score of the Digital Transformation Scale ($t=0.842$).

Table 7. Scores by Marital Status

Factors	Status	n	Mean	Std. deviation	Perception level	F	Levene's test (p)	t-test		
								t	df	p
BP	Single	88	38.34	10.206	High	0.004	0.950	1.280	251	0.202
	Maried	165	36.68	9.579	High					
SCC	Single	88	27.67	7.254	High	0.025	0.874	1.097		0.274
	Maried	165	26.64	7.081	High					
PKC	Single	88	13.57	4.185	Medium	0.090	0.765	0.455		0.650
	Maried	165	13.32	4.075	Medium					
M	Single	88	14.56	4.291	Medium	1.608	0.206	0.066		0.947
	Maried	165	14.52	3.935	Medium					
CI	Single	88	9.94	3.253	Medium	0.028	0.868	-0.275		0.784
	Maried	165	10.06	3.225	Medium					
DTS (Total)	Single	88	104.08	26.205	High	0.040	0.842	0.842		0.401
	Maried	165	101.22	25.420	Medium					

Digital Transformation Perception According to Educational Background

Descriptive statistics of perception scores according to the educational background variable and the homogeneity of variances were investigated with Table 8.

A one-way ANOVA test was performed for the dimensions where variances were homogeneously distributed, and the results are presented in Table 9.

Table 8. Scores by Educational Background

Factors	Educational background	n	Mean	SD	Perception level	Levene's test (p)
BP	Mathematics and natural sciences	160	37.48	9.223	High	0.029
	Social sciences	81	37.64	10.081	High	
	Other	14	33.64	13.954	Medium	
SCC	Mathematics and natural sciences	160	27.05	6.731	High	0.061
	Social sciences	81	27.63	7.342	High	
	Other	14	23.29	9.450	Medium	
PKC	Mathematics and natural sciences	160	13.47	3.965	Medium	0.562
	Social sciences	81	13.46	4.304	Medium	
	Other	14	12.86	4.704	Medium	
M	Mathematics and natural sciences	160	14.47	3.851	High	0.183
	Social sciences	81	14.98	4.243	High	
	Other	14	13.21	5.010	Medium	
CI	Mathematics and natural sciences	160	10.06	3.203	Medium	0.873
	Social sciences	81	10.20	3.223	Medium	
	Other	14	8.86	3.461	Medium	
DTS (Total)	Mathematics and natural sciences	160	102.53	24.040	Medium	0.028
	Social sciences	81	103.90	26.705	High	
	Other	14	91.86	35.468	Medium	

Table 8 shows that perception scores are at the moderate and high levels. Homogeneity of variances was ensured for the SCC, PKC, M, and CI factors ($p>0.05$); however, it was not ensured for BP and the entire DTS scale ($p<0.05$).

In the analysis of variance based on educational background, there was no significant difference between group scores for the SCC, PKC, M, and CI dimensions ($p>0.05$).

Table 9. One-Way ANOVA Test and Effect Size by Educational Background

Factors	Educational background	Sum of squares	df	F	p	η^2
SCC	Between groups	225.462	2	2.241	0.108	0.017
	Within groups	12677.346	252			
	Total	12902.808	254			
PKC	Between groups	4.892	2	0.144	0.866	0.001
	Within groups	4269.657	252			
	Total	4274.549	254			
M	Between groups	40.656	2	1.242	0.291	0.010
	Within groups	4124.152	252			
	Total	4164.808	254			
CI	Between groups	21.679	2	1.043	0.354	0.008
	Within groups	2617.929	252			
	Total	2639.608	254			

Table 10. Scores by Length of Experience

Factors	Groups	n	Mean	SD	Perception level	Levene's test (p)
BP	1-10	148	38.89	8.806	High	0.028
	11-20	75	34.59	10.951	Medium	
	21-30	18	36.17	9.180	Medium	
	31-40	11	36.09	13.027	Medium	
SCC	1-10	148	28.22	6.269	High	0.007
	11-20	75	24.96	8.083	Medium	
	21-30	18	26.17	6.888	High	
	31-40	11	26.00	9.539	High	
PKC	1-10	148	13.84	3.905	Medium	0.121
	11-20	75	12.93	4.527	Medium	
	21-30	18	12.44	3.276	Medium	
	31-40	11	13.73	4.338	Medium	
M	1-10	148	15.04	3.621	High	0.009
	11-20	75	13.93	4.630	Medium	
	21-30	18	13.94	3.702	Medium	
	31-40	11	13.64	5.537	Medium	
CI	1-10	148	10.42	3.053	Medium	0.052
	11-20	75	9.51	3.644	Medium	
	21-30	18	9.61	2.660	Medium	
	31-40	11	9.73	2.796	Medium	
DTS (Total)	1-10	148	106.40	22.654	High	0.014
	11-20	75	95.92	29.582	Medium	
	21-30	18	98.33	23.,497	Medium	
	31-40	11	99.18	33.352	Medium	

The effect size values were η^2 = 0.017, η^2 = 0.001, η^2 = 0.010, and η^2 = 0.008, respectively, indicating that the effect of the field of education variable on these dimensions is minimal/negligible. Post-hoc tests were performed to compare group scores in groups where the homogeneity of variances was not ensured.

No statistically significant difference was found in the BP dimension and the total score of the DTS according to the field of graduation variable.

According to Table 10, all scores are at the moderate and high levels. Homogeneity of variances was ensured for PKC and CI (p>0.05); however, it was not ensured for BP, SCC, M, and DTS (p<0.05). A one-way ANOVA test was performed for PKC and CI and is presented in Table 11.

Post hoc tests were performed for BP, SCC, M, and DTS scores, where the variances were not homogeneously distributed, and the groups showing differences are presented in Table 12.

Table 11. One-Way ANOVA Test and Effect Size by Length of Experience

Factors	Groups	Sum of squares	df	F	p	η^2
PKC	Between groups	61.278	3	1.227	0.301	0.015
	Within groups	4129.401	248			
	Total	4190.679	251			
CI	Between groups	46.874	3	1.519	0.210	0.018
	Within groups	2551.233	248			
	Total	2598.107	251			

Digital Transformation Perception According to Length of Experience

Descriptive statistics of perception scores according to the leght of experience variable and the homogeneity of variances were investigated with Table 10.

Statistically significant differences were found in BP, SCC, and total DTS scores between the 1–10 year and 11–20 year length of experience groups (p<0.05).

Table 12. Post Hoc Tests and Effect Size by Length of Experience

Factors	**Groups (I–J)**	**Mean difference (I–J)**	**Std. error**	**p**	**95% Confidence Int.**		**Cohen's d**
					Lower bound	Upper bound	
BP	1–10 vs 11–20	4.298	1.457	0.020	0.50	8.09	0.45
SCC	1–10 vs 11–20	3.256	1.066	0.015	0.48	6.03	0.47
DTS (Total)	1–10 vs 11–20	10.479	3.890	0.040	0.34	20.62	0.42

Table 13. Scores by Education Degree

Factors	Educational degree	n	Mean	SD	Perception level	Levene's test (p)
BP	Secondary education	11	42.55	8.263	High	0.026
	Associate degree	14	34.21	9.978	Medium	
	Bachelor's degree	119	36.08	10.744	Medium	
	Non-thesis master's degree	17	35.00	12.253	Medium	
	Master's degree	69	38.83	8,200	High	
	Doctoral degree (PhD)	25	40.12	5.607	High	
SCC	Secondary education	11	30.27	5.798	High	0.064
	Associate degree	14	24.57	7.165	Medium	
	Bachelor's degree	119	25.93	7.704	Medium	
	Non-thesis master's degree	17	24.88	8.817	Medium	
	Master's degree	69	28.43	6.134	High	
	Doctoral degree (PhD)	25	29.76	3.811	High	
PKC	Secondary education	11	13.64	4.081	Medium	0.462
	Associate degree	14	12.93	4.514	Medium	
	Bachelor's degree	119	13.36	4.370	Medium	
	Non-thesis master's degree	17	12.65	4.358	Medium	
	Master's degree	69	13.52	3.673	Medium	
	Doctoral degree (PhD)	25	14.24	3.745	Medium	
M	Secondary education	11	15.64	3.557	High	0.127
	Associate degree	14	13.29	4.286	Medium	
	Bachelor's degree	119	14.08	4.381	Medium	
	Non-thesis master's degree	17	13.76	4.880	Medium	
	Master's degree	69	15.36	3.519	High	
	Doctoral degree (PhD)	25	15.44	2.694	High	
CI	Secondary education	11	10.09	2.809	Medium	0.334
	Associate degree	14	10.36	3.104	Medium	
	Bachelor's degree	119	9.71	3.479	Medium	
	Non-thesis master's degree	17	9.94	3.473	Medium	
	Master's degree	69	10.36	2.905	Medium	
	Doctoral degree (PhD)	25	10.56	2.973	Medium	
DTS (Total)	Secondary education	11	112.18	21.437	High	0.065
	Associate degree	14	95.36	27.864	Medium	
	Bachelor's degree	119	99.16	28.272	Medium	
	Non-thesis master's degree	17	96.24	31.993	Medium	
	Master's degree	69	106.51	21.078	High	
	Doctoral degree (PhD)	25	110.12	14.647	High	

The effect sizes of these differences were investigated using Cohen's d coefficient, and the results indicate a moderate effect. No significant difference was found in the M score in either group.

Digital Transformation Perception According to Education Degree

Descriptive statistics of perception scores according to the education degree variable and the homogeneity of variances were investigated using Table 13.

According to Table 13, participants have medium and high perception scores based on their education degree. According to the Levene test results, which investigate the homogeneity of variance, the assumption of homogeneity of variance is not met in the BP dimension ($p < 0.05$). Variances are homogeneously distributed for SCC, PKC, M, CI, and DTS ($p>0.05$). Groups were compared using a post-hoc test for the BP factor and one-way ANOVA for the other dimensions (SCC, PKC, M, CI, and DTS).

Table 14. One-Way ANOVA Test and Effect Size by Education Degree

Factors	Groups	Sum of squares	df	F	p	η^2
SCC	Between groups	744.454	5	3.049	0.011	0.058
	Within groups	12158.354	249			
	Total	12902.808	254			
PKC	Between groups	31.953	5	0.375	0.866	0.007
	Within groups	4242.596	249			
	Total	4274.549	254			
M	Between groups	137.925	5	1.706	0.134	0.033
	Within groups	4026.883	249			
	Total	4164.808	254			
CI	Between groups	28.156	5	0.537	0.748	0.011
	Within groups	2611.452	249			
	Total	2639.608	254			
DTS (Total)	Between groups	6296.340	5	1.951	0.087	0.038
	Within groups	160743.762	249			
	Total	167040.102	254			

Table 15. Scores by Department

Factors	Department	n	Mean	SD	Perception level	Levene's test (p)
BP	Engineering and technology	104	38.82	8.344	High	0.058
	Management and administrative	66	37.45	9.502	High	
	Finance and accounting	19	36.79	11.477	High	
	Education	38	34.55	12.067	Medium	
	Other	29	34.86	10.993	Medium	
SCC	Engineering and technology	104	28.14	6.078	High	0.016
	Management and administrative	66	27.12	6.954	High	
	Finance and accounting	19	26.84	7.960	High	
	Education	38	24.89	8.880	Medium	
	Other	29	25.07	8.115	Medium	
PKC	Engineering and technology	104	14.30	3.958	Medium	0.362
	Management and administrative	66	13.50	3.609	Medium	
	Finance and accounting	19	13.26	4.665	Medium	
	Education	38	12.05	4.287	Medium	
	Other	29	11.90	4.443	Medium	
M	Engineering and technology	104	15.04	3.657	High	0.094
	Management and administrative	66	14.80	3.600	High	
	Finance and accounting	19	14.84	4.913	High	
	Education	38	13.26	4.808	Medium	
	Other	29	13.62	4.499	Medium	
CI	Engineering and technology	104	10.68	3.135	Medium	0.024
	Management and administrative	66	10.24	2.701	Medium	
	Finance and accounting	19	9.68	3.637	Medium	
	Education	38	8.63	3.183	Medium	
	Other	29	9.31	3.790	Medium	
DTS (Total)	Engineering and technology	104	106.98	22.344	High	0.037
	Management and administrative	66	103.12	23.192	High	
	Finance and accounting	19	101.42	30.405	Medium	
	Education	38	93.39	30.846	Medium	
	Other	29	94.76	29.673	Medium	

No significant difference was observed between groups for BP. The results of the one-way ANOVA tests for SCC, PKC, M, CI, and DTS are presented in Table 14.

Table 16. One-Way ANOVA Test and Effect Size by Department

Factors	Groups	Sum of squares	df	F	p	η^2
BP	Between groups	704.044	4	1.827	0.124	0.028
	Within groups	24181.893	251			
	Total	24885.937	255			
PKC	Between groups	219.405	4	3.371	0.010	0.051
	Within groups	4084.528	251			
	Total	4303.934	255			
M	Between groups	118.602	4	1.825	0.124	0.028
	Within groups	4077.008	251			
	Total	4195.609	255			

According to the results of the one-way ANOVA test based on education degree, a statistically significant difference was found between the groups only in the SCC dimension ($F(5,249)= 3.049$, $p<0.05$). Differences between groups were investigated using the Tukey test, a post hoc test, for the SCC dimension. No significant difference was observed between groups based on education level for the SCC dimension. The effect size calculated for this dimension is moderate ($\eta^2 = 0.058$).

No statistically significant difference was found between groups based on education level in the PKC, M, CI dimensions, and the total DTS perception score ($p>0.05$). The effect values calculated for these dimensions are also relatively low.

As a result of the analyses, the education degree did not create a significant difference between groups for the dimensions and the overall perception of digital transformation.

Digital Transformation Perception According to Department

Descriptive statistics of perception scores according to the department variable and the homogeneity of variances were investigated using Table 15.

According to Table 15, all perception scores are at the moderate to high levels depending on the department worked in. According to the Levene test, the assumption of homogeneity of variances is not met for SCC, CI, and DTS ($p<0.05$). However, the variances are homogeneously distributed in

the BP, PKC, and M dimensions (p>0.05). Therefore, post hoc tests were used for SCC, CI, and DTS; and one-way ANOVA tests were used for BP, PKC, and M to investigate group scores. Table 16 presents the results of the one-way ANOVA.

No statistically significant difference was found between the groups in the BP dimension (F(4,251)=1.827, p>0.05) and the M dimension (F(4,251)=1.825, p<0.05) according to the department in which the participants worked. In the PKC dimension, a statistically significant difference was found between the departments (F(4,251) = 3.371, p < 0.05, η^2 = 0.051). According to the eta-squared value, this difference can be said to have a moderate effect. A Tukey post-hoc test was performed to determine which groups had a significant difference in the PKC dimension, and the results are presented in Table 17.

Table 17. Post Hoc Tests and Effect Size by Department

Factor	Groups (I–J)	Mean Difference (I–J)	Std. error	p	95% Confidence int.		Cohen's d
					Lower bound	Upper bound	
PKC	Engineering and Tech. vs Education	2.245	0.765	0.030	0.14	4.35	0.57
	Engineering and Tech. vs Other	2.402	0.847	0.039	0.07	4.73	0.60

According to the post-hoc test results for the department variable in Table 17, statistically significant differences were found only between participants working in the "Engineering and Technology" field and those working in the "Education" and "Other" fields in the PKC dimension, in favor of the "Engineering and Technology" group (p<0.05). No significant difference was found in comparisons between other departments. The effect size in the PKC dimension was found to be moderate (d = 0.57) for the categories "Engineering and Technology" and "Education". The effect size of the difference between the "Engineering and Technology" and "Other" departments was found to be moderate (d = 0.60).

Discussion and Conclusion

This study, which investigates employees' perceptions of digital transformation, was conducted with valid responses from 256 participants. Differences and score levels were examined for all five dimensions and scales that constitute digital transformation perception, based on demographic variables. The perceptions of employees regarding digital transformation were examined in relation to the following independent variables: gender, age group, marital status, educational background, length of experience, educational degree, and department.

When the research findings are evaluated overall, it was determined that employees' perceptions of digital transformation are at a moderate to high level, as indicated by the total score and sub-dimensions of the Digital Transformation Scale (DTS). This result indicates that digital transformation has evolved from being merely a technical necessity for organizations to a strategic process widely recognized and adopted by employees.

Studies in the literature demonstrate that digital transformation occupies a central position in terms of organizations' competitiveness, process effectiveness, and corporate sustainability (Vial, 2019; Verhoef et al., 2021), supporting this finding.

The study found that perceptions of digital transformation differed significantly according to some demographic variables. Significant differences were observed, particularly in terms of age group and length of experience, across the dimensions of business processes (BP), strategy and corporate culture (SCC), and the total digital transformation perception score (DTS). According to the findings, employees aged 21–30 had statistically higher perceptions of digital transformation compared to those aged 41–50. In terms of practice and application, the impact of this difference is moderate (BP (η^2=0.47), SCC (η^2=0.46), DTS (η^2=0.45)). Similarly, employees with 1–10 years of work experience had higher perceptions in the exact dimensions (BP, SCC, and DTS) compared to those with 11–20 years of experience. The effect

level of this difference is moderate (BP (η^2=0.45), SCC (η^2=0.47), DTS (η^2=0.47)). These results show that perceptions of digital transformation relatively decrease with increasing age and experience, and while this relationship is statistically significant, it has a moderate effect size.

This finding aligns with discussions on generational differences and technological adaptability, frequently highlighted in the digital transformation literature. Younger and less experienced employees, having encountered digital technologies earlier and using digital tools as a natural part of their daily lives, tend to perceive digital transformation processes more positively (Kane et al., 2015; Westerman et al., 2014). Ng (2012) revealed that high levels of digital literacy among young employees positively influence their perception of digital transformation, making them more willing and flexible in integrating technology into their business processes. Conversely, older and more experienced employees, due to their established work habits and commitment to existing ways of working, may view digital transformation more cautiously (Hess et al., 2016; Trenerry et al., 2021). This situation demonstrates that digital transformation is not only a technological process but also a behavioral and cultural change process. Employees with long-term work experience tend to have a higher level of trust in existing systems and established ways of doing business; therefore, they may perceive digital transformation as a potential threat to acquired professional roles and habits (Oreg, 2006; Oreg et al., 2011).

The study also determined that the department in which an employee works is a significant demographic variable influencing their perception of digital transformation. Specifically, in the Personnel Knowledge and Competence (PKC) dimension, employees working in engineering and technology fields were found to have a higher perception of digital transformation compared to those working in education and other fields. This finding reveals that the human resources dimension of digital transformation is closely tied to the professional background and technical nature of the job. The moderate effect size of this differentiation (education η^2 = 0.57; other η^2 = 0.60) indicates that the difference is both statistically and practically significant. The absence of significant differences among other departments suggests that the perception of digital competence is not evenly distributed across departments in the institutions studied; it is particularly more pronounced among employees working in technical fields.

The literature emphasizes that individuals working in engineering and technology-based units interact more intensively with digital tools, software, and technological infrastructures; this strengthens their perceptions of digital knowledge, skills, and readiness (Bharadwaj et al., 2013; Kane et al., 2015). Employees working in technical units experience digital systems not only as users but also as tools for developing and improving processes; this results in higher perception levels in the PKC dimension. In contrast, it is stated that employees working in non-technical units perceive digital transformation more as a managerial decision or a supporting element. Therefore, their perception of competence remains at a relatively lower level (Vial, 2019). Enhancing the knowledge and competence of personnel is expected to influence employee perceptions during the digital transformation process positively. Technological literacy is the most sought-after digital skill by businesses (World Economic Forum, 2025).

When these findings are considered as a whole, it is seen that the perception of digital transformation does not exhibit a homogeneous structure within the organization; it differs depending on factors such as age, length of experience, and department. In particular, the fact that younger and less experienced employees have a higher perception in the dimensions of strategy, corporate culture, and business processes shows that digital transformation is strongly linked to the organization's vision and process design. In the dimension of personnel knowledge and competence, department-based differences come to the fore, indicating that digital competencies are not evenly distributed across the organization. In conclusion, this research reveals that digital transformation should

be managed not only through technological investments but also with a holistic approach that centers the human factor. Developing customized training, communication, and change management practices for different age, experience, and department groups when planning digital transformation strategies is critical for the effectiveness and sustainability of the transformation process.

In conclusion, this research complements the technological infrastructure and strategy-focused approaches frequently emphasized in the digital transformation literature with empirical findings that comparatively examine the perceptions of employees working in different organizations. The study reveals that the perception of digital transformation does not exhibit a homogeneous structure across the institutions examined; it differs significantly depending on demographic variables such as age, experience, and department. Within this framework, the findings demonstrate that digital transformation should be managed not only through technological investments but also with a holistic approach that centers the human factor. Considering age, experience, and department-based differences in perception when planning digital transformation strategies in organizations, as well as developing customized training, communication, and change management practices, is critically important for the effectiveness and sustainability of the transformation process.

While the findings of this study offer important implications regarding perceptions of digital transformation, they also have some limitations. The use of convenience sampling limits the generalizability of the findings to the entire employee population. Although the study included public and private sector employees from various industries, an examination of the participants' educational and professional backgrounds revealed that the sample predominantly consisted of graduates from mathematics and natural sciences (62.5%) and those working in engineering and technology departments (40.6%). This situation resulted in a relatively higher representation of professional groups with a high level of direct interaction with digital transformation. Therefore, generalizing these findings to include employee groups with less interaction with technology or the entire employee population should be carefully considered from a methodological perspective. While this limitation does not invalidate the study, it indicates that the findings primarily reflect the perceptions of employee groups with more intensive interaction with digital transformation. Repeating future research with samples that more evenly represent employees from different sectors will contribute to a more comprehensive understanding of how perceptions of digital transformation differ according to professional context. Data were collected within a single time period under a cross-sectional design. However, perceptions of digital transformation are dynamic, evolving over time and in conjunction with organizational practices. This limits the establishment of causal relationships and indicates that the findings reflect perceptions only for a specific period. Future research could investigate employee perceptions of digital transformation in broader sample sizes across different sectors, organizational types (public, private, NGOs), and cultural contexts.

Declarations

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***Ethical Approval*:** Ethical approval for this study was obtained from the Gazi University Ethics Committee (meeting date: January 14, 2025; decision number: 01).

Informed Consent: Informed consent was obtained from all participants prior to data collection.

Participation in the study was voluntary, and participants were informed about the purpose of the study and the use of the collected data.

Data Availability: The data supporting the findings of this study were obtained from questionnaire responses collected from employees working in public and private sector organizations in Türkiye. Due to ethical considerations and the confidentiality of participants, the raw data are not publicly available. Anonymized datasets may be made available by the author upon reasonable request.

AI Disclosure: The author declares that no artificial intelligence–based tools or applications were used in the conception, analysis, writing, or preparation of this manuscript. The study was conducted entirely by the author in accordance with academic research and publication ethics.

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