THE EFFECT OF ORGANIZATION EMPLOYEES' PERSPECTIVE ON DIGITAL TRANSFORMATION ON THEIR TECHNOSTRESS LEVELS AND PERFORMANCE: A PUBLIC INSTITUTION EXAMPLE

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Abstract

The digital transformation (DT) process, which has been experienced intensely recently, can radically change all business processes, models and structures of organizations. Change and transformation, which are focused on efficiency and productivity, also trigger stress from time to time. Public institutions are also adopting DT processes. In this study, the relationship between technostress faced by organization employees in the DT process and employee performance is examined. The mixed method is used in the study. As a sample, 351 central career experts working in primary units of public institutions are selected, and the data are analysed using IBM SPSS 25 and MAXQDA 20 software. As a result of the study, it is seen that the perspective on DT affects employee performance and technostress in a positive way, and that employees' technostress levels negatively affect employee performance. Besides, according to the findings of the qualitative research method, the concepts of hardware and software, technological infrastructure, the attitude of senior management, resistance to transformation, education and ability to use technology, workload, complexity and uncertainty, speed, satisfaction, motivation, continuity, quality and work-life imbalance are listed as influential factors.

Implications for Central European audience: The findings reveal that by focusing on DT, technostress can be reduced, and thus employee performance can be increased. Employees can improve their DT skills, which will also positively affect their performance. It has also been stated that in 2021, Turkey would rank 16th in the European Union digital agenda e-government title and has digital government services similar to Central European countries. It shows that the positive and negative aspects of DT can be similar for employees.

Keywords: digital transformation; technostress; employee performance; mixed method

JEL Classification: M10, L20, D73

Introduction

Technological innovations have always had a crucial place in the lives of individuals, organizations and societies. Changes in information and communication technologies (ICT) have deeply affected individuals, communities and institutions and continue to do so. The digitization and DT concepts developed with the emergence of Industry 4.0 are seen in many areas of daily life. The business world is facing rapid and radical changes due to the increasing prevalence of digital technologies (Gregori & Holzmann, 2020). The evolution and transformation in ICT, which has emerged with the developing digitization age, is effective in many areas. Digital technologies are available in almost all businesses and everywhere, and their diffusion is transforming organizational structures, forms of communication, business models and industrial relations. In addition to the various advantages DT that provides for organizations, unexpected factors such as the COVID-19 pandemic have shown that transformation for sustainability is no longer a choice but a necessity. For sustainability, it is necessary to determine a digitization-based transformation roadmap in enterprises and to revise all business processes and relations with all stakeholders. In this transformation, which focuses on effectiveness and efficiency, it is necessary to determine the perspectives of DT for employees as internal stakeholders to be active in all business processes. The changes will have some consequences for the employees.

From an occupational health and safety perspective, it is crucial to determine whether certain aspects of digitization processes cause work stress and thus have the potential to impair mental health. In this process called the digital transformation (DT), individuals may have some worries and concerns, such as being unable to catch up with the changing and transforming technological developments and not being able to use them fully. This state of anxiety and fear towards ICT is called technostress (Ayyagari et al., 2011).

Organizations' use of digital technologies is closely related to their capacity for innovation and growth. In this context, digitizing public services has also become a basic necessity. A government improved through digitization will not only have an increased influence on businesses, but will also be able to intensify citizen participation and push economic growth (Alvarenga et al., 2020). Public institutions' organizational structures and management styles may differ compared to those of private organizations. The main objective of this study is to determine whether employees' perspective on the DT process experienced in public institutions affects technostress and employee performance.

1 Conceptual Framework

1.1 Digital transformation and changes in public institutions

Digital transformation (DT) is a concept that has emerged as the most essential technological trend changing both society and the business world. Many segments, from the business world to countries, are exposed to DT or enter this process voluntarily. DT first started to emerge in business processes with the use of software systems. It then transformed business processes and models with the help of several digital technologies, including the Internet. After this change and transformation, enterprises started to rush the Fourth Industrial Revolution or Industry 4.0. The digitization concept began to be referred to as "digital transformation" because it covers all business processes, models and structures (Klein, 2020).

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Digitization is the process of transforming analogue/physical forms into digital ones: it transforms industries, business models and processes and creates innovation (Alt et al., 2018). This includes the direct and indirect transformation that it has enabled in the general industries in recent decades (Niemand et al., 2021). Likewise, digital transformation appears to be a compelling process of change that individuals and entire organizations have to face and respond to. It is also understood as the Fourth Industrial Revolution, which is in the process of fundamentally changing familiar patterns of life (Vey et al., 2017).

Digital technologies is a general name given to technologies that are used extensively in many fields. They include smartphones, cloud computing, big data, artificial intelligence, robotic systems, the Internet of things, 3D printing, virtualization, cyber security, sensor technologies, advanced robotic systems and automation. On the other hand, the DT process represents a period in which organizations, universities, the public and employees try to change and transform, and consists of new business models and practices (Matt et al., 2015). In short, DT is a general name given to the process that covers a series of changes associated with the introduction and development of digital technologies in society. DT is related to the need to use new technologies to compete in the Internet age, where more services and products are offered online and offline (Mergel et al., 2019). On the other hand, DT is also defined as a way to rebuild business models that follow customers' needs by using new technologies (Berman, 2012; Nart, 2019). Change and transformation are experienced rapidly in many sectors, such as education, health, transportation, tourism and banking. DT has become a necessity for all modern enterprises. The power and dizzying speed of digitization entering and dominating our lives mean that many organizations have not yet adapted to it (Al-Ruithe et al., 2018). Besides business processes, organizational culture is also affected by this transformation. The public sector has also been affected by DT. It has started to transfer its activity and transactions to digital media. With this change and transformation, citizens have been able to access public services more easily and quickly.

While studies on DT have gained momentum in recent years (Armenia et al., 2021; Hinings et al., 2018), this process generally occurs in the form of recording the relevant procedures and documents in a digital environment with the help of computers (Armenia et al., 2021). In particular, the increase in computerization and the spread of the Internet increases the demand for digitization because digitization is an essential tool that transforms physical reality into virtual reality and facilitates access to information by eliminating physical distances.

DT is a process that is greatly affected by external factors, such as the use of new technologies by the stakeholders of public administrations (Mergel et al., 2019). The services of public institutions first emerged as interacting with citizens through social media and then continued with the delivery of public services to citizens in a digital environment through e-government or other applications (Scupola & Mergel, 2022). These processes make public services more accessible.

The use of digital technologies in public administration makes it possible to create appropriate conditions for citizens to access all necessary information and receive essential services quickly (Gül, 2018). It is an effective management tool that helps improve the efficiency and quality of the information provided and the provisioning process (Yener et al., 2020).

In recent years, increased digitization and DT pressure have affected public institutions and their management very closely. As a result, a rapid digitization attack has started. The Digital

Transformation Office was established within the Presidency in 2018 as a reform to adapt to developing technologies and enable the public to achieve this transformation. DT efforts in the public sector, in general, gained momentum. In this context, “works on e-government, cyber security, national technologies, big data and artificial intelligence” have been tried within the scope of public administration.

The rapidly developing DT in the public sector has an efficient, practical, sustainable, fast and agile approach that considers stakeholders. Also, improving relations between public administrations and their stakeholders will result in increased citizen satisfaction and, most crucially, a change in bureaucratic and organizational culture (Mergel et al., 2019). EU digital transformation is followed (i.e., adopted, pursued) by Turkey (PDTO, 2020).

Although many public administration services have made significant progress, the full potential of the concept has not been exploited due to the inability of full digital adaptation. While many governments are generally aware of the need to strengthen the ICT capacities of civil servants, they have not made detailed assessment of this issue (Porrúa et al., 2021). It leads to the inability to understand and benefit from digitization in public organizations.

To realize, understand and use the changes and transformations in the digital field in the public sector, a trained human capital is required. Therefore, public authorities train their employees in DT through in-service training or outsourcing. Specific competencies are needed to use this progressive and ever-changing technology.

1.2 Technostress

Technostress is defined as the stress experienced by employees while using ICT. Although there are studies on the positive effects of ICT, the concept also has some negative aspects. This situation is generally referred to as technostress (Tarafdar et al., 2019).

Technostress studies focus on many factors that measure the potentially harmful effects of technology use. In general, using mobile devices and the Internet causes employees to connect to work from anywhere and do business continuously. It causes a constant attachment situation in employees. This situation is also called “technostress” (Borle et al., 2021a).

Brod, who suggested that computer technology can cause user stress, is one of the pioneering scientists who introduced the concept of "technostress" to the literature (Dragano & Lunau, 2020). The concept of technostress was defined by Brod (1984, p. 4) as “a modern adaptation disease resulting from the inability to keep up with new computer technologies in a healthy way”. In another definition, it is expressed as “a mental and physiological arousal that occurs when they feel that they do not have the necessary skills to cope with technology, observed in some employees who are highly dependent on computers in their jobs” (Arnetz & Wiholm, 1997, p. 36). Ragu-Nathan et al. (2008) defined the concept as the stress experienced by individuals in organizations about the use of ICT and the fear of not being able to cope with the ever-changing and transforming technology. Weil and Rosen (1997) defined technostress as any adverse effect on attitudes, thoughts, behaviours or body physiology caused directly or indirectly by using technology. Salanova et al. (2013) considered technostress to be a negative psychological state. This evaluation emerges in the context of two concepts: techno-addiction and techno-strain. Techno-addiction studies are based on compulsive ICT use and workaholism associated with an excessive time

commitment. An uncontrollable compulsion pressure is paired with anxiety when ICT is not used. Techno-strain, on the other hand, includes four interrelated constructs (anxiety, fatigue, scepticism and inadequacy) that emerge in a chain reaction relationship.

Technostress is an adaptation problem that an individual experiences when he or she cannot cope with or get used to ICT. In an organizational context, technostress results from individuals' attempts and struggles to cope with ever-growing ICTs and the changing physical, social and cognitive needs associated with their use. Technostress leads to various results, such as dissatisfaction, fatigue, anxiety and overwork, negatively affecting individual productivity (Nelson & Kletke, 1990).

While the causes of technostress vary depending on many factors, in general, technostress factors associated with human-machine interaction are technical problems, poor usability, low situational awareness and new skills being required. Technical problems such as malfunctions are seen as the primary source of stress when employees are not competent to handle these problems on their own, thus slowing down the workflow and causing additional time pressure (Stadin et al., 2016). Otherwise, reasons such as age, gender difference, pressure from senior managers and organizational culture can be counted in this context (Maier et al., 2015).

The concept of technostress is formed from five sub-factors, used in the literature. They are “techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty” (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). Alam (2016), on the other hand, expressed the technostress level as three sub-dimensions (techno-workload excess, techno-complexity, techno-uncertainty). Respectively, techno-workload excess is defined as “situations where ICTs force users to work faster and longer”. Techno-complexity is “the state of being out of routine and the complexity associated with ICTs that make users feel inadequate in terms of skills and force them to spend time and effort to learn and understand various aspects of ICT”. Techno-uncertainty is expressed as “contexts where ongoing changes and upgrades in an ICT make users nervous and create uncertainty for them, and they need to learn and educate themselves about new ICTs” (Alam, 2016; Kim & Lee, 2021; Tarafdar et al., 2007).

Although technostress has a negative meaning, it has recently been suggested that technostress can lead to positive results in the workplace, increase productivity and encourage innovation because digital technologies – when adequately designed – can reduce technostress and create positive effects on employees (Tarafdar et al., 2019).

1.3 Employee performance

Employee performance, a sub-part of organizational performance, has recently become a more frequently studied topic in academic studies. The concept is exciting to companies due to the new managerial processes that emerged after digitization. It is especially vital because it is among the ways to increase organizational effectiveness, productivity and organizational commitment.

Performance is an essential concept for businesses and has a multi-component structure. Performance is defined as "behaviour that achieves results" (Armstrong & Taylor, 2014) or whether an employee is good at his/her job (Alromaihi et al., 2017). Employee performance, on the other hand, is expressed as the quality and quantity of the extent to which an employee

achieves goals and objectives, along with the responsibility undertaken by the employee (Campbell et al., 1996; Hermina & Yosepha, 2019; Jena, 2015; Kesen & Kaya, 2016). Employee performance is defined as all the efforts required by the employees in an enterprise within the framework of the salary they will receive (Rousseau & Parks, 1993). Moreover, employee performance is the successful completion of tasks by a selected person or persons and is measured by a supervisor or organization based on predefined acceptable standards (Jena, 2015). Performance is related to the quantity of output, quality of output, timeliness of output, attendance, efficiency of work, and effectiveness of the work completed. Borman and Motowidlo (1997, p. 99) defined employee performance as "the activity of fulfilling the missions assigned to them and realizing the fulfilment of the organization's vision while rewarding the organization and the individual proportionally".

Understanding job performance is essential for every employee, as organizational decisions are based on individual performance, leading to organizational success. At this point, performance should be measured to be meaningful and based on the principle of "you cannot manage what you cannot measure" (Avcı, 2019, p. 215). In this context, employee performance is what employees do or do not do (Yang et al., 2016).

The issue that enterprises give priority to is employee performance, that is, individual performance, because the sum of the individual performance reflects the performance of the enterprise. This increases the efficiency and profitability of the business. If an employee performs well, this positively contributes to the enterprise. Especially if a team of employees has good feelings, solid ties and positive motivation, their performance will increase and contribute to the enterprise (Çalış Duman & Akdemir, 2016).

Today, technology has become an integral part of every organization, contributing to individual and organizational performance. However, working with rapidly changing and developing technology can increase or decrease employee performance (Jena, 2015). This situation may differ according to the technology used, organizational culture and other internal or external variables.

1.4 Literature on digital transformation, technostress and employee performance

DT and technostress, among the topics covered in this study, are new concepts, limiting the studies in this field. Below are the reachable national and international publications on the relationship between DT, technostress and employee performance.

Turkey: Yener (2018), in his research on office workers who used computers intensively in Sinop Province and its districts, looked into the effect of technostress on work performance and revealed that the presence of technostress would reduce employee performance through emotional exhaustion due to reasons such as increased workload and constant exposure to technology. Çiçeklioğlu and Eren (2020) found a significant relationship between technostress and employee productivity in their study. In this context, individuals who cannot adapt to advanced technology experience technostress, reducing their productivity.

World: Tarafdar et al. (2007), in their study on 223 ICT users, investigated the effects of technostress on employee performance values such as role stress and individual productivity. It was concluded that technostress adversely affects productivity, there is a positive relationship between technostress and role stress, and the adverse effects of technostress

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can be partially prevented by strategies that reduce role conflict and role overload. Shu et al. (2011) show that (a) employees with high computer self-efficacy have lower computer-related technostress levels, (b) employees with high technology addiction have higher computer-related technostress, and (c) employees working in different environments have higher computer-related technostress. Suharti and Susanto (2014), in their study of 138 people working in the production department of a multinational company, concluded that technostress has a substantial and significant effect on employee performance. Tarafdar et al. (2014), based on data obtained from 237 people, revealed a negative relationship between technostress creators and performance. At the same time, traditional approaches to using technology cause technostress, and technology self-efficacy and the presence of information systems reduce technostress. Mergel et al. (2019), based on expert opinions to define DT, show that citizens' perceptions of public services have changed due to DT approaches that have developed outside the public sector. However, the public side does not have a clear projection of DT. As a result, the authors developed a conceptual framework with the causes, processes and expected results of DT in the public sector by providing an empirical-based definition of DT obtained from expert interviews. Alvarenga et al. (2020) analysed the evolution of digital government literature to explain aspects of DT in the public sector and how it relates to knowledge management. They concluded that digital government and information management studies are extremely few. However, according to the study, information management is vital for the success of digital government. Trenerry et al. (2021), in their study on the readiness of workplaces for DT, examined the relationship between technostress and DT at the individual level. They concluded that DT creates technostress due to problems such as blurred work-life balance and access to work 24/7.

Europe: Zeike et al. (2019), in their study conducted in Germany, looked at the relationship between digitization pressure and psychological well-being. They concluded that the pressure of digitization did not affect psychological well-being. Mache and Harth (2020) stated in their work on Germany that intensive digital work creates new demands on both institutions and employees. Fischer and Riedl (2020) stated that a changing organizational climate with digitization has both positive and negative aspects. They also stated that stress factors might decrease or increase depending on the institution's situation. Institutions may have different reflections on the performance of employees. In Italy, La Torre et al. (2020) found that the intense and widespread use of digitization creates technostress in parallel. Their results seem to match the results of the present study. Wrede et al. (2021) conducted a study in Germany to measure the stress on employees caused by extra demands that come with digitization in government institutions. According to the study, digitization creates stress for 10.0% of employees. The Digital Economy and Society Index (DESI) 2021 report shows the delivery of digital public services. In this report, Estonia, Finland, Malta and the Netherlands are listed as the top-performing countries using digital tools in government business and transactions; the worst-performing countries are Romania, Greece, Bulgaria and Slovakia. In addition, it is stated in the report that by 2030 all services are aimed to be completely online (European Commission, 2022). When the 2021 European Union digital agenda e-government data are analysed, it is seen that Turkey would rank 16th among the European Union member countries with 73.3 points (DESI, 2021). For this reason, it is possible to say that Turkey has achieved equal development with the Central European countries in terms of digitization of state services. In this development and change, it is predicted that the positive and negative aspects of digitization will show similarities for

employees. Since 2001, the e-government development level of member countries has been calculated by the UN every two years. As a result of this calculation, some indicators such as the efficiency, productivity and transparency of the public sector are revealed. In the latest report prepared in 2020, Turkey ranks 53rd among the 193 countries (PDTO, 2020).

No study could be found in the domestic or foreign literature dealing with DT, technostress and employee performance. Therefore, it is thought that this study will contribute to the literature.

2 Methodology

2.1 Objective, model and hypotheses

In this study, the effects of the DT perspectives of central career experts working in central units of Turkish Ministries on their technostress levels and performance were investigated using a mixed method. It is estimated that there is a relationship between these three variables. The study aims to determine the perspectives of the central career experts employed at the Ministry on the DT process and to reveal the effects on their technostress levels and employee performance. Moreover, it was investigated whether there is a relationship between employees' technostress and work performance. Meanwhile, a more in-depth analysis was carried out by determining which sub-factors were effective between these three variables. Based on this primary objective, the research model and hypotheses were formed. The research hypotheses and model are as follows:

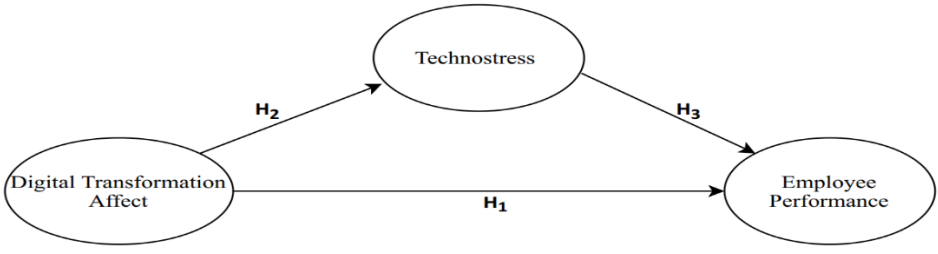
H1: The perspective of central career specialist employees on DT affects employee performance.

H2: The perspective of central career specialist employees on DT affects their technostress levels.

H3: Technostress levels of central career specialist employees affect employee performance.

The research model created from the objective and hypotheses is shown in Figure 1.

Figure 1 | Research model



Source: authors

2.2 Data collection tools and statistical methods

The mixed analysis method, which includes both quantitative and qualitative research methods, was used in this study. The relationship between DT, technostress and employee performance was determined using quantitative research methods. Through the qualitative

research method, it was determined which sub-factors were influential among these three factors. Thus, we tried to reveal how the DT in public institutions affects employee performance through technostress. All data of the study were collected between January and May 2022. Various statistical analyses were made within the scope of the study. Firstly, IBM SPSS 25 software was chosen for the quantitative method and MAXQDA 20 software for the qualitative method. Besides, all data were collected in accordance with the Ethics Committee Decision of Necmettin Erbakan University dated 11 March 2022 and numbered 2022/104.

The survey method, one of the primary data collection methods, was preferred for the quantitative research. Research data were collected online by sending a link to the participants via Google Forms. In the first part of the questionnaire used in this research, there are seven demographic questions and three scales with a total of thirty-two statements, using a five-point Likert scale. In short, the questionnaire consists of four parts. In the second part, the DT scale was taken from the study (twelve expressions) of Yıldırım (2020), who adapted it from Kumar (2016) and used the scale in his research. The scale consists of three sub-dimensions: DT in human resources, DT in talent management and DT in performance management. In the third part, to measure the technostress levels of employees, a fourteen-item scale which was developed by Tarafdar et al. (2007), simplified by Alam (2016) and used by Türen et al. (2015), was used. The scale consists of three sub-dimensions: techno overload, techno complexity and techno uncertainty. The employee performance scale, which was used by Kılınç and Paksoy (2017), was used in the fourth section (six expressions).

Content analysis, one of the analysis types most used in qualitative research (White & Marsh, 2006), was preferred as the analysis method for the qualitative part of the study. The semi-structured interview method was chosen for the data collection (Bryman & Bell, 2011). Depending on the meeting schedule determined by the participants, the interviews were conducted online via Zoom. Detailed notes were taken for each interview, and all interviews were recorded on the online platform. Each interview lasted approximately 30-40 minutes. Interview questions were prepared by using previous research scales from the related literature. Additional questions were asked during the interview so that the participants could better understand the purpose and scope of the research. The main questions to the participants in this process are as follows.

"Which factors do you think are influential in your organization regarding DT? Explain with an example."

"Which factors cause technological stress (technostress) in your organization regarding DT? Explain with an example."

"Which factors affect employee performance regarding DT in your organization? Explain with an example."

2.3 Population and sample

For both the quantitative and qualitative research part of the study, the research population consisted of central career experts working in the central units of the Ministries in Turkey. In this context, 353 people were reached as a sample for the quantitative research. Two participants did not provide data, so they were not included in the analysis. In general, data from 351 respondents were analysed. For the qualitative research, 12 central career experts were selected within the scope of purposeful sampling among the participants

included in the quantitative research. In qualitative research, multi-purpose samples are chosen primarily in general (Grix, 2010). Within the scope of the interview, the participants were asked to express which factors affect employee performance, considering their experiences in the DT process in public institutions. When it was observed that the answers did not differ and the similarity ratio increased considerably, it was decided that twelve participants would be sufficient. In the research, the names of the participants' institutions were not shared in order not to violate personal rights within the scope of the Personal Data Protection Law applied in Turkey.

3 Results

3.1 General information about participants

Table 1 shows the participants' gender, age, marital status, education, working time at the unit and all work experience while considering the quantitative and qualitative research distinction.

Table 1 | General information about participants

Variable	Quantitative research		Qualitative research	
Gender	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
Male	235	67.0	11	92.0
Female	116	33.0	1	8.0
Age	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
21-25	13	3.7	-	-
26-30	109	31.1	5	42.0
31-35	94	26.8	7	58.0
36-40	59	16.8	-	-
41-45	38	10.8	-	-
46-50	24	6.8	-	-
51-55	10	2.8	-	-
56 and older	4	1.1	-	-
Marital status	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
Married	225	64.1	9	75.0
Single	126	35.9	3	25.0
Educational status	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
Undergraduate	198	56.4	9	75.0
Postgraduate	138	39.3	2	17.0
Doctorate	15	4.3	1	8.0
Duration of work at unit	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
1-5 years	177	50.4	3	25.0

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6-10 years	111	31.6	8	67.0
11-15 years	35	10.0	1	8.0
16 years and longer	28	8.0	-	-
Overall work experience	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
1-5 years	109	31.1	-	-
6-10 years	116	33.0	-	-
11-15 years	61	17.4	-	-
16 years and longer	65	18.5	-	-
Working unit	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
Total	**351**	**100.0**	**12**	**100.0**

Source: authors

Table 1 shows a total of 351 central career specialists participating in the study for quantitative research. The highest number is of male participants (67.0%) between the ages of 26-30 (31.1%), married (64.1%) and with an undergraduate education level (56.4%). Additionally, the maximum working time of the participants at the unit is 1-5 years (50.4%), and the total work experience is 6-10 years (33.0%). For the qualitative research, the number of participants is twelve. The highest number is of male participants (92.0%), aged 31-35 (58.0%), married (75.0%) with an undergraduate education level (75.0%) and professional experience of 6-10 years (67.0%).

3.2 Reliability test and explanatory factor analysis findings

Table 2 shows the reliability coefficient (Cronbach's alpha), KMO (Kaiser-Meyer-Olkin) and Barlett values of all scales used in the study, exploratory factor analysis results and total explained variance values. While searching for the suitability of the data for factor analysis, attention was paid to ensuring that the KMO value was more significant than 0.70 and that the Barlett test met the condition of $p < 0.005$. In the exploratory factor analysis, attention was paid to ensuring that the eigenvalue of each variable was more significant than 1. It explained at least 2/3 of the total variance, and the factor loads were more significant than 0.50. The reliability coefficient (Cronbach's alpha) of all scales used in the study ranged from 0.910 to 0.801. These values show the reliability of the scales (Zikmund et al., 2013). According to the explanatory factor analysis results, the factor values of the digital transformation perspective scale were between 0.864 and 0.569. The factor values of the technostress scale ranged from 0.867 to 0.654, and the factor values of the employee performance scale ranged from 0.834 to 0.704. Factor loads should be more than 0.50 (Bryman & Bell, 2011). Therefore, these items were excluded from the scale because the TS14 and EP1 factor loads were less than 0.50.

Table 2 | Reliability test and explanatory factor analysis findings

Scales	Sub-dimensions	Variable	EFA	
PERSPECTIVE ON DT	HR DT eigenvalue: 6.115	DT4	0.800	Cronbach's α = 0.910 KMO = 0.913 Barlett sph. test = 2192.225 Total variance = 69.109% Factor loads ≥ 0.50
		DT3	0.764	
		DT1	0.750	
		DT2	0.741	
	Talent management DT eigenvalue: 1.115	DT7	0.703	
		DT5	0.663	
		DT6	0.653	
		DT8	0.569	
	Performance management DT eigenvalue: 1.037	DT11	0.864	
		DT9	0.720	
		DT10	0.718	
		DT12	0.702	
TECHNOSTRESS	Techno overload eigenvalue: 5.115	TS4	0.823	Cronbach's α = 0.860 KMO = 0.868 Barlett sph. test = 2638.495 Total variance = 69.94% Factor loads ≥ 0.50
		TS1	0.819	
		TS3	0.793	
		TS2	0.790	
		TS5	0.654	
	Techno complexity eigenvalue: 2.747	TS8	0.850	
		TS9	0.834	
		TS7	0.833	
		TS6	0.776	
	Techno uncertainty eigenvalue: 1.763	TS13	0.867	
		TS11	0.853	
		TS12	0.838	
		TS10	0.748	
EMPLOYEE PERFORMANCE	One dimensional eigenvalue: 2.103	EP4	0.834	Cronbach's α = 0.801 KMO = 0.834 Barlett sph. test =555.044 Total variance = 68.304% Factor loads ≥ 0.50
		EP5	0.798	
		EP3	0.742	
		EP2	0.711	
		EP6	0.704	

Source: authors

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There are some differences in the reliability and validity of the qualitative research compared to the quantitative method. In the qualitative research part of the study, some concepts are at the forefront of its validity and reliability. These are credibility, transferability, consistency and confirmability (Erlandson et al., 1993; Yıldırım & Şimşek, 2011). In the qualitative research part, the validity of the concepts of credibility is achieved by providing diversity with long and in-depth interviews. Also, transferability is assured by detailed descriptions and purposeful sampling, consistency by examining the consistency of the data, and confirmability by confirming that the data were provided within the scope of the study. It shows that the study meets the requirements as its qualitative nature is feasible (Creswell & Poth, 2017).

Table 3 | Regression analysis results regarding effect of perspective on DT sub-dimensions on employee performance

	B	Std. error	Beta	t	p
Constant	2.420	0.231		10.493	0.000
HR DT	0.226	0.072	0.220	3.138	0.000
Talent management DT	0.370	0.055	0.377	4.312	0.001
Performance DT	0.076	0.072	0.079	1.060	**0.290**

$R^2 = 0.301$ F = 17.562 p = 0.000

*__Dependent__ variable: employee performance

*__Independent__ variables: HR DT, talent management DT, performance DT

Source: authors

As seen in Table 3, the model is significant (F = 17.562, p = 0.000). The ratio of independent variables to explain the variance of the dependent variable is 30.1%. Of the independent variables in the model, HR DT (β = 0.226, p < 0.01) and talent management DT (β = 0.370, p < 0.01) have a significant positive effect on employee performance. On the other hand, performance DT (β = 0.076, p = 0.290, does not affect employee performance significantly. Hypothesis H1: "The perspective of central career specialist employees on DT affects employee performance" is accepted.

Table 4 | Regression analysis results regarding effect of perspective on DT sub-dimensions on technostress

	B	Std. error	Beta	t	p
Constant	0.107	0.020		5.456	0.000
HR DT	0.298	0.005	0.427	5.293	0.000
Talent management DT	0.330	0.006	0.385	3.789	0.001
Performance DT	0.344	0.005	0.480	2.153	0.000

$R^2 = 0.393$ F = 8626.613 p = 0.000

*__Dependent__ variable: technostress

*__Independent__ variables: HR DT, talent management DT, performance DT

Source: authors

As seen in Table 4, the model is significant (F = 8626.613, p = 0.000). The ratio of independent variables to explain the variance of the dependent variable is 39.3%. Of the independent variables in the model, HR DT (β = 0.298, p < 0.01), talent management DT (β = 0.330, p < 0.01), and performance DT (β = 0.344, p < 0.01) positively affect technostress with a significant effect. In short, DT triggers technostress. Hypothesis H2: “The perspective of central career specialist employees on DT affects their technostress levels” is accepted.

Table 5 | Regression analysis results regarding effect of technostress sub-dimensions on employee performance

	B	Std. error	Beta	t	p
Constant	4.164	0.234		17.760	0.000
Techno overload	-0.423	0.073	-0.408	-5.767	0.000
Techno complexity	-0.389	0.051	-0.380	-4.962	0.001
Techno uncertainty	-0.376	0.062	-0.369	-4.523	0.000

R^2 = 0.292 F = 14.520 p = 0.000

*__Dependent__ variable: employee performance

*__Independent__ variables: techno overload, techno complexity, techno uncertainty

Source: authors

As seen in Table 5, the model is significant (F = 14.520, p = 0.000). The ratio of independent variables to explain the variance of the dependent variable is 29.2%. Among the independent variables in the model, techno overload (β = -0.423, p < 0.01), techno complexity (β = -0.389, p < 0.01) and techno uncertainty (β = -0.376, p < 0.01) significantly affect employee performance negatively. Hypothesis H3: “Technostress levels of central career specialist employees affect employee performance" is accepted.

3.3 Qualitative research findings

A code relationships matrix and a code co-occurrence model (overlapping codes) were used to analyse research data. Figure 2 shows the code relationships matrix of the study.

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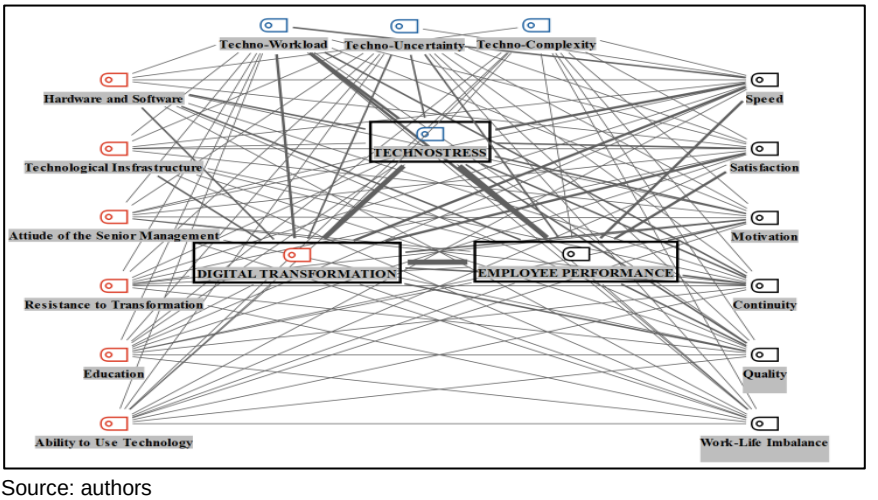
Figure 2 | Code relationships matrix

Code system		TECHNOSTRESS			EMPLOYEE PERFORMANCE						TOTAL
		Techno-complexity	Techno-uncertainty	Techno-workload	Continuity	Satisfaction	Motivation	Quality	Speed	Work-life imbalance	
TECHNOSTRESS	Techno-complexity	0	2	5	10	23	17	25	30	5	117
	Techno-uncertainty	2	0	2	6	21	6	23	16	4	80
	Techno-workload	5	2	0	49	25	30	11	57	28	207
DIGITAL TRANSFORMATION	Hardware and software	0	18	37	23	16	15	9	31	12	161
	Technological infrastructure	1	0	36	13	10	8	2	26	11	107
	Attitude of senior management	8	0	34	15	18	19	7	20	10	131
	Education	4	28	1	3	19	6	24	10	4	99
	Resistance to transformation	25	0	4	4	13	10	10	13	4	83
	Ability to use technology	23	1	2	7	9	8	12	14	5	81
TOTAL		185	143	337	256	304	235	246	427	161	2294

Source: authors

Figure 3 | Code co-occurrence model (overlapping codes)



Source: authors

The code co-occurrence model (overlapping codes) shows the degree of intersection of the factors used in the study on the horizontal and vertical axes, according to the coding numbers. The colour scale, which darkens from white to red as the value increases, is also used in this matrix. The code co-occurrence model (overlapping codes) was used to represent the study in the context of the research model, which is also used in the quantitative research method. This model shows the relationship between the factors by using frequency and line width. As the frequency degree between the two factors increases, the line width also increases.

As can be seen in Figures 2 and 3, the most influential factors in DT are hardware and software, technological infrastructure, attitude of senior management, resistance to transformation, education and the ability to use technology. The most critical factors affecting technostress are workload, complexity and uncertainty. The most crucial factors affecting employee performance, evaluated in the context of DT and technostress, are speed, satisfaction, motivation, continuity, quality and work-life imbalance.

When the relationship between DT and technostress is examined, we find that hardware and software (37), technological infrastructure (36) and attitude of senior management (34) are in an intense relationship with workload. Also, education (28) is in a relationship with uncertainty. Resistance to transformation (25) and the ability to use technology (23) are in an intense relationship with complexity. When the relationship between technostress and employee performance is examined, it is seen that the relationship between complexity (30) and speed, quality and uncertainty (23), workload (57) and speed is more intense than other factors. When the relationship between DT and employee performance is examined, we see that the degree of relationship between hardware and software (31) and speed, technological infrastructure (26) and speed, senior management attitude (20) and speed, education (24) and quality, resistance to conversion (13) and satisfaction and speed, technology useability (14) and speed is intense. Within the research scope, the participants' answers were shared. However, since each participant's answer was very detailed and lengthy, only a limited number of answers that are thought to represent the results and crucial parts of each answer are included. Participants' answers are as follows.

DT

A participant's response to the factors of hardware and software, technological infrastructure, the attitude of senior management, resistance to transformation, education and ability to use technology that affects DT is included.

"The fibre Internet infrastructure provided in my institution is quite good. In this way, we can easily use the Internet in our projects or other works and carry out our work."

"Especially the hardware does not change often, sometimes it can be very old and this can slow down our work."

"In terms of the ability to use technology, the employees of our institution are generally at a good level. However, officers or managers over the age of 40 are having a hard time, which slows down the institution's DT."

"…internal correspondence is made both from the EDMS and with a wet signature. In fact, this situation increases the workload. As a general habit, the senior management definitely wants documents with wet signatures, in case something happens to the correspondence in the Internet or computer environment."

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"We generally have a learning situation in the form of the master apprentice. However, some of the training we received in specialization training can be useful for me in DT. I think that if more training is given, employees can adapt to technological applications more easily."

"…there can be a reaction against DT and that is definitely a process that undermines the transformation process. The institution may carry out DT projects or make implementation decisions as much as it wants, but this resistance is especially prevalent at a certain age and hinders the transformation."

Technostress

One of each participant's responses to the workload, complexity and uncertainty factors affecting technostress is shared below.

"…as we heard from former staff, there used to be folders and files on the desks. A lot of time was spent in these folders to reach a document. With technology, most of these files are in digital media, so they can be accessed quickly and easily, reducing the workload."

"…the software is constantly updated. This automatically repeats every ten days. The EDMS is constantly updated. An update comes every 5-6 months and you cannot use the EDMS at that time and an uncertain environment occurs."

"Younger colleagues are at peace with technology. However, when working with older managers, this situation is reversed."

Employee performance

An answer is given for each of the factors of speed, satisfaction, motivation, continuity, quality and work-life imbalance that affect employee performance.

"The fact that the hardware (PCs, printers, scanners) in our institution is widespread and fast contributes to faster completion of the work and increased quality."

"The technical problems I have with my job cause boredom and reduce my motivation to work. It also prevents me from being satisfied with the work I do."

"…the better the technological infrastructure is, the faster my speed increases and I become more efficient by doing more work in a short time. It increases the quality and continuity of my work."

"Everyone has a private life. Being called to an emergency meeting or asked for an urgent response to an e-mail while eating or walking outside inevitably upsets one's balance…"

Discussion and Conclusion

The concept of DT, which emerged with the development of information and communication technologies, affects every aspect of life. From how employees do business, to their performance, to the stress and crises they encounter, DT deeply affects many other areas. In this context, the stress experienced by employees, especially from the technological devices they use after DT, is called technostress and this affects the employees' performance in some ways (Borle et al., 2021b).

This study examined the relationship between employees' perspective on DT and their technostress levels and performance. Based on the results of the regression analysis,

hypothesis **H1:** “The perspective of central career specialist employees on DT affects employee performance" was accepted. The effect of DT sub-dimensions on employee performance is 30.1%. In the literature, it is seen that there are generally studies on organizational performance. A limited number of studies with similar results were found (Guzmán-Ortiz et al., 2020).

Hypothesis **H2:** “The perspective of central career specialist employees on DT affects their technostress levels” was also accepted. The effect of DT sub-dimensions on technostress was 39.3%. There are similar studies in the literature (Dragano & Lunau, 2020; Lee, 2021; Marsh et al., 2022; Yazıcı & Kınay, 2021). The effect of technostress sub-dimensions on employee performance is 29.2%. Therefore, hypothesis **H3:** “Technostress levels of central career specialist employees affect employee performance" was accepted as well. There are similar studies in the literature (Hang et al., 2022; Kestane & Özbek, 2021; Suharti & Susanto, 2014; Tarafdar et al., 2007, 2014).

The results obtained as a result of the qualitative research method show parallelism with the results of the research hypotheses tested with the quantitative research methods. In other words, it is seen through the parameters of line widths among the factors that there is an intense relationship between DT, technostress and employee performance (see Figure 2). Malik et al. (2022) observed that technostress levels decreased due to the excellent functioning of DT processes. Besides, in the same study, it was revealed that as a result of the continuous spread of ICTs, employees’ workload increased, and the constant adaptation to new technologies and excessive dependence caused technostress in employees. Yıldırım (2020) highlights the concepts of “productivity, quality and increase in customer satisfaction, accuracy and speed in decision making” as the benefits of DT, similarly to the results of the present study. Saleem et al. (2021) found results contrary to the results in the literature, and it was revealed that technostress had a positive effect on employee performance rather than adverse effects, and both education and the creative self-efficacy of the individual significantly softened the relationship. In addition, as the main finding, employees continued to perform well despite the prevalence of technostress. Walton (2019) found low productivity results of from technostress, high employee absenteeism, and low self-efficacy that promote burnout. Also, he revealed that the level of technostress can be reduced by providing training. Finally, Saim et al. (2021) researched the relationship between technostress and work-life balance. They revealed that it is vital to protect employees’ work-life balance to reduce technostress, which increases employee performance and productivity.

Moreover, factors effective in this relationship were identified with qualitative research methods. According to the research findings, the influential factors in terms of DT, are hardware and software, technological infrastructure, attitude of senior management, resistance to transformation and ability to use education and technology. In terms of technostress, the factors are workload, complexity and uncertainty; and in terms of employee performance, they are speed, satisfaction, motivation, continuity, quality and work-life imbalance.

Another finding obtained using qualitative research methods was identification of how the sub-factors of DT, technostress and employee performance affect each other depending on the intensity of their relationship. Technological infrastructure and hardware and software sub-factors are in a very intense relationship with the workload sub-factor of the technostress factor. The workload sub-factor is very closely related to the speed sub-factor of employee

performance. Likewise, hardware and software are in a relationship with technological infrastructure sub-factors and speed, continuity, satisfaction and motivation sub-factors of employee performance (see Figures 1 and 2).

In this context, in line with the participants' comments, it can be said that the fact that the hardware, software and technological infrastructures of the institutions are of good quality given today's requirements increases the speed and reduces the workload and does not create technostress in the employees, thus increasing employees' continuity, as they have no problems with motivation and increasing job satisfaction. However, the attitude of the senior management is crucial in this process.

According to the research findings, the senior management attitude sub-factor is in an intense relationship with the workload, which is a technostress sub-factor. On the other hand, the workload sub-factor is strongly related to the speed sub-factor of employee performance, as mentioned before. Otherwise, it is seen that the senior management attitude sub-factor and the employee performance sub-factors are related to the speed, motivation, satisfaction, continuity and work-life imbalance sub-factors (see Figures 1 and 2). It was stated that DT increases the speed, and this reduces the workload. However, if the senior management uses the increased speed in the digitization process as a tool to get more work done, a contradictory result can be encountered. In other words, the workload may increase if the senior management is more demanding on the job, using digitization and increasing speed as an excuse. Also, these demands of the senior management, which exceed even the notions of overtime, can reduce the employees' motivation, satisfaction and continuity. It is also possible that this process may result in work-life imbalance for employees.

It is seen that there is an intense relationship between the education sub-factor of DT and the uncertainty sub-factor of technostress. There is a strong relationship between the uncertainty sub-factor and quality and satisfaction sub-factors of employee performance. Moreover, the education sub-factor is in an intense relationship with the quality and satisfaction sub-factors (see Figures 1 and 2). In this context, it can be stated that training given about DT in institutions reduces employees' anxiety. In turn, it will reduce stress about uncertainty, thus increasing the work quality and job satisfaction.

It was determined that the resistance to transformation and the ability to use technology sub-factors are in an intense relationship with the complexity sub-factor of technostress. It is seen that the complexity sub-factor is in a relationship with the speed, quality, satisfaction and motivation sub-factors of employee performance. Furthermore, the sub-factors of resistance to transformation and the ability to use technology are also related to speed, quality, satisfaction and motivation (see Figures 1 and 2). In this context, employees' resistance to DT and their limited ability to use technology can create mental complexity and resistance in people, which can negatively affect the employees' work speed, quality, satisfaction and motivation.

The DT in institutions, the technostress created by this transformation and the increase or decrease in employee performances by specific parameters are vital in terms of the quantitative and qualitative content of the work. This study investigated the effects and causes of this relationship. The research differs and contributes to the literature in terms of combining DT, technostress and employee performance factors in the research model, choosing experts working in public institutions as samples, and preferring the mixed method

as the research method. As in any research, this study has a certain sample limitation. Also, the participants' ability to make objective comments on the subjects in qualitative research methods is among the limitations of this study as it is for any qualitative research. New studies can be carried out if research scales are made within the framework of a different sample or if a different dependent variable such as work-life balance is preferred instead of employee performance.

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