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CAUSES AND EFFECTS OF TECHNOSTRESS IN THE WORKPLACE: A SYSTEMATIC LITERATURE REVIEW

ABSTRACT: Modern life circumstances have led to the fact that people spend more and more time connected to their computers. As digital technologies become present in societies, the psychological and physical effects of their use become evident in their users. The aim of the paper is to explain the creators and effects of technostress in the workplace. The paper presents an overview of the research results so far in the field of digitization of the workplace. The most significant factors of technostress that have been identified are: creators of technostress, use of technology, multitasking, uncertainty about new technologies and exposure to screens. Technostress has significant effects on work productivity, employee health, commitment to the organization and business decision-making. Literature sources include scientific papers published in various scientific databases. The limitation of this paper is the impossibility of accessing all articles dealing with the topic of technostress. The results can serve as a foundation for understanding the challenges that managers face in modern business conditions.

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INTRODUCTION

The subject of the research is technostress as a consequence of accelerated improvement of existing and implementation of new technological solutions at workplaces where workers are exposed to information and communication technologies. Modern workplaces are digital workplaces that are no longer tied to a specific place or time. While smart workplace technologies facilitate business processes and increase work productivity, digital technologies, on the other hand, cause technostress, that is, a specific form of stress perceived by the end users of information and communication technologies. Technostress is considered the dark side of digital transformation (Becker, 2021).

The aim of the paper is to explain the causes and effects of technostress in the workplace. The central research hypothesis is: The causes of technostress play an important role in the origin and development of technostress. In the methodological sense, secondary data will be collected, namely available scientific works that deal with the scientific field of technostress. The collected materials will be processed using scientific methods of analysis and synthesis. The work is structured in five parts. The second part provides an overview of previous research on the topic of technostress, the third part of the paper reveals the methodology used, the fourth part presents the basic determinants of technostress, and the fifth part is a conclusion with limitations and recommendations for further research.

LITERATURE REVIEW

As a consequence of the intensive use of digital technologies in solving work demands and digital transformation, various forms of discomfort among employees appear. The negative effects of using digital technologies are the subject of research in numerous works, and as a result of them, the term technostress was identified, as a documented human reaction to interaction with technology (Agboola, Olasanmi, 2016, according to Smeltzer, 1987).

The cause of many diseases is stress, unless it is in an adequate balance with rest and relaxation. Today, we are witnessing that continuous stress at the workplace can be the cause of so-called burnout, which is constantly increasing, and therefore, there is a need for stress prevention and management. Burnout is defined as an individual response to chronic stress at work that develops progressively and can eventually become chronic, leaving

various consequences on the individual (Edu - Valsania, Laguia, Moranio, 2022, according to Montero - Marin, 2016). With the expansion of digital technologies in the workplace, the occurrence of digital stress has increased. Digital stress was the subject of research in Venezuela in the field of higher education, and it was shown that the level of digital stress decreases with higher digital competences of teaching staff and vice versa (Anton - Sancho, Vergara Medina, Sanchez - Calvo, 2022). They defined digital stress as a form of stress that manifests itself through feelings of fear and insecurity. The field of digital stress at work is still under-researched, and there is a need to fill that research gap (Blaknenhagel Theilig, Koch, Witte, Zarnekow, 2019).

Bearing in mind all the advantages brought by the progress and rapid development of information and communication technologies for companies, numerous studies have been recorded that examined the impact of digital transformation on employee stress. However, there is a lack of empirical research examining the relationship between technostress and work efficiency. Digital transformation is the process of creating new business models using existing or new technologies to support changes in the organizational structure of the company, its resources or relations between internal and external stakeholders (Plekhanov, Franke, Netland, 2022, according to Brynjolfsson, Hitt, 2000; Frank et al. al., 2019; Loebbecke, Picot, 2015; Vial, 2019). In their work, Plekhanov, Franke and Netland (2022) observed the negative effects of the digital transformation process. Some of them are stress at the workplace, i.e. stress as a consequence of the digital transformation of the company.

Technostress is the subject of numerous researches, especially after the coronavirus pandemic which accelerated the need for transformation, as customers preferred digital technologies and transactions over the traditional way of buying and selling. The research conducted in Indonesia dealt with the impact of digital transformation on employee engagement and stress. Considering the numerous changes that have taken place in a very short time, and in terms of the use of new tools of information and communication technologies, this has shown the need for support for employees, because with the increase of uncertainty in the workplace, due to technological changes, a high level of stress appears. (Winasis, Wildan, Sutawidjaya, 2020).

Generally speaking, new solutions based on the development of information and communication technologies result in positive effects for both the company and its employees. However, the process of digital transformation can be the cause of the development of digital transformation stress (Digital Transformation Stress - DTS). The aforementioned form of stress manifests itself in situations where work demands caused by the rapid implementation of information and communication technologies are elevated, with limited resources available to employees (Makowska - Tlomak, Bedynska, Skorupska, Paluch, 2022).

In the Republic of Croatia, Ćuk, Grabovac and Glebov (2022) conducted research related to the intensity of technology use. In particular, they point out that the introduction of smartphones, laptops, applications and other platforms into the business world has led to employees feeling compelled to respond to e-mails and receive calls of a business nature outside of working hours, resulting in family conflicts and an imbalance between private and personal life. and business life.

Multitasking is the simultaneous execution of several tasks and is one of the creators of technostress (Hefner, Vorderer, 2016; according to Salvucci, Taatgen, 2011).

Research has shown that the creators of technostress positively correlate with uncertainty about new technologies. Technological uncertainty encourages deviant employee behavior that manifests itself through reduced engagement in performing work tasks (Chiu, Tan, Shih - Chieh Hsu, Cheng, 2023). In 2023, Yao and Wang conducted research among Chinese students on the impact of exposure to screens on the occurrence of technostress. The results showed that the use of smartphones and information overload affect the occurrence of technostress and reduce the quality of students' sleep.

Picazo Rodriguez, Verdu – Jover, Estrada – Cruz, Gomez – Gras (2023) examined the relationship between digital transformation and labor productivity. The results of their research showed that there is a positive significant relationship between the previously mentioned two constructs, and the research units were workers from the administrative sector. Tarafdar, Tu, Ragu - Nathan, T. S., Ragu - Nathan, B. S. (2011) found that technostressors reduce work productivity.

Lei and Ngai (2014) conducted research on the impact of technostress on work performance and found that technostress negatively affects work efficiency. Research conducted among academic staff in Great Britain showed that technostress is present and reduces work efficiency (Bourlakis, Nisar, Prabhakar, 2023).

Employee health is a very important construct when examining the effects of technostress. Namely, Pfaffinger, Reif and Spiess (2020) determined that technostress affects the health of employees. When researching the impact of technostress on employee health, among workers from the manufacturing sector in China, the mediator variable job exhaustion was used, and it was shown that technostress, in addition to the mediating effect of employee exhaustion, also determines their health (Wang, Ding, Kong, 2023).

Organizational commitment was often observed in the context of technostress. The impact of technostress on commitment to the organization was examined by Taneja and Singh (2018) among employees in the information and communication technology sector. The results showed that

technostress reduces employees' commitment to the organization in which they work. The same results were obtained by Lei and Ngai (2014).

Yildirim and Eldber Börü (2023) included the moderator variable job insecurity when observing the relationship between technostress and business decision-making, and showed that technostress through uncertainty in employment status determines the decision-making process of employees.

RESEARCH METHODOLOGY

As a part of this paper, a secondary research of available scientific papers dealing with the topic of technostress was carried out. Over 130 papers were collected with a search using the keywords: techno stress or digital stress. Out of 130 papers, 46 were selected according to their relevance to the research subject. Literature sources include scientific works published in various scientific databases such as: EBSCO, Google Scholar, SCIndexs, Emerald, Jstor, Taylor and Francis and Wiley, and the analysis method was used during the literature study and the synthesis method in order to systematically provide an overview of the causes and consequences of technostress.

DETERMINANTS OF TECHNOSTRESS

By analyzing the available literature, the key creators, that is, the causes of technostress, as well as its consequences, were systematized. In their work, Tarafdar, Tu and Ragu – Nathan (2014) aimed to show the negative consequences of technostress to the extent that employees believe that the applications they use at work can be used to improve their business performance. The authors sought to identify mechanisms that can mitigate these effects. Specifically, they tried to develop and validate a model that analyzes the effects of factors that create technostress on employee satisfaction and the performance of work tasks using information and communication technologies.

Causes of technostress

According to several studies (Tarafdar et al., 2007; Ragu-Nathan et al., 2008; Singh et al., 2022), five creators of technostress can be defined, namely: techno-invasion, techno-overload, techno-uncertainty, techno-complexity and techno-uncertainty. Techno-invasion occurs when an employee feels that work demands prevail outside working hours (Singh et al., 2022). Techno-

overload occurs when an employee faces extreme use of technology (Singh et al., 2022). Techno-overload is expected to have a negative effect on work-life balance (Dingemans, 2020). Techno-insecurity describes the insecurity that individuals experience due to their lack of knowledge about new technology, they might feel insecure as a result of feeling that others know more than they do (Singh et al., 2022). Techno-complexity describes an individual's perception of using new technology and the difficulty of how to use it (Singh et al., 2022). According to Harunawamwe and Ward (2022), the complexity of technology used during work increases the feeling of incompetence among employees, which they state has a negative effect on the organization. This is because employees start to feel frustrated and their productivity decreases (Harunawamwe, Ward, 2022). Techno-uncertainty occurs when employees are not familiar with new technology and how to use it (Singh et al., 2022).

The use of technologies was the subject of research by a group of authors from South Korea in 2013. Namely, it includes using the Internet, playing games, using smartphones and other digital technologies. Thus, a scale was developed to measure the excessive use of smartphones, the so-called SAS scale (eng. Smartphone Addiction Scale), which consists of 6 factors and 33 statements, and is measured by a five-point Likert-type scale. Indicators for measuring this construct are: failure to perform planned tasks due to the use of smartphones, inability to concentrate, feeling dizzy, back pain, feeling tired and calm, self-confidence, overcoming stress through the use of mobile devices, feeling fun while using smartphones, using social networks right after waking up, constantly checking smartphone content and battery drain rates (Kwon, Kim, Cho, Yang, 2013). Technostress appears as a consequence of the use of technologies in the workplace, namely various forms of generic applications, mobile and communication technologies, collaborative technologies and others, as well as technologies that users use for private purposes (Maier, 2014).

Multitasking represents the frequency of using the Internet simultaneously with other media content or using the Internet during other non-media activities such as meals or conversations with others (Hefner, Vorderer, 2016). Multitasking is measured on a five-point Likert-type scale, and the indicators for measuring multitasking are: the frequency of simultaneous playing of games, watching television, playing games on a mobile device, writing SMS messages, making calls, searching the Internet and social networks (Trombetta, 2019).

The uncertainty of new technologies refers to the fear of termination of the employment contract. Namely, there is some uncertainty regarding the automation of some skills that could lead to a reduction in the number of employees in organizations (Fischer, Reuter, Riedl, 2021; according to Sahin, Coklar, 2009, Frey, Osborne, 2017). Uncertainty about new technologies is

measured by questioning attitudes about: the feeling that the workplace is threatened through the introduction of new information and communication tools, fear of replacing personnel due to increased standardization of work processes, pessimism regarding long-term employment security, fear that employees will be replaced by machines, fear of the consequences of digitization (Fischer, Reuter, Riedl, 2021) and the degree of employee fear of the impossibility of mastering and understanding the use of new information and communication tools (Tarafdar et al., 2007).

Screen exposure is the time spent on digital devices such as smartphones, monitors, laptops, tablets, televisions or other digital devices. Exposure to screens will be measured by questionnaires about the time employees spend using some of the digital media (Sharma, Anand, Ahuja, Thakur, Mondal, Singh, Kohli, Venkateshan, 2020).

Effects of technostress

The consequences of technostress have also been recorded at the workplace, and are manifested through reduced productivity. Although the negative aspects of technostress are known, what is less understood and represents a research gap is how individuals can cope with technostress to mitigate its negative consequences. In this regard, a qualitative study was conducted in Great Britain that examined 30 executives in the information technology sector and how they deal with the consequences of technostress. Seven forms of behavior that individuals engage in as a response to technostress have been identified here. The second is a survey of 846 American employees who use information technology in their workplace. Here, the effects between the causes of technostress and the productivity of employees working in the information and communication technology sector were measured, where the goal was to explain how employees and organizations can cope with technostress (Tarafdar, Pikkalainen, Salo, Makkonen, 2020). Given that technostress is viewed in relation to work efficiency, it is necessary to define this construct as well. Namely, efficiency represents the rational use of financial, material and human resources and information with the aim of achieving the maximum result (Omar, 2023; according to Kharkhash, 2015).

The health of employees, that is, their well-being is a subjective concept and refers to the individual evaluation of the quality of life and emotional state (Hang, Hussain, Amin and Abdullah, 2022; according to Diener, 2000, de Jong, 2014). It also represents a state that characterizes an individual's health, sense of comfort and prosperity (Hang, Hussain, Amin, & Abdullah, 2022; according to Seligman, 2011). Hang, Hussain, Amin and

Abdullah, (2022) examined the impact of technostress on employee health and found that technostress determines worker health. The influence of employee health on work efficiency (Yuan, Yi, Miao, Zheng, 2018), and they came to the conclusion that the health condition of employees in the construction sector determines work efficiency. A five-point Likert-type scale is used to measure employee health, and the indicators for measuring employee health are: awareness of self-protection (Yuan, Yi, Miao, Zheng, 2018; according to Cohen, Smith, Anger, 1979), daily working hours (Yuan, Yi, Miao, Zheng, 2018; according to Alamursula, Vahtera, Kouvonen, Väänänen, Linna, Pentti, Kivimäki, 2006), time to rest (Yuan, Yi, Miao, Zheng, 2018; according to Yi, Wang, 2017), frequency of physical control health (Yuan, Yi, Miao, Zheng, 2018; according to Jayakrishnan, Thomas, Rao, George, 2013), sleep duration (Yuan, Yi, Miao, Zheng, 2018; according to Hsu, Sun, Chuang, Juang, Chang, 2008) length of service (Yuan, Yi, Miao, Zheng, 2018; according to Mok, Dong, Chang, 2013) and frequency of anxiety and upset mood (Yuan, Yi, Miao, Zheng, 2018; according to Patrick, 2013; Loewenstein, Weber, Hsee, Welch, 2001).

Business decision-making is a process in which an individual, a group of people or a company makes conclusions about future movements, taking into account goals, constraints and available resources (Schoemaker, Russo, 2014). Saturation of information and communication tools in the workplace can lead to feelings of anxiety, technostress and job dissatisfaction, which results in reduced ability to make business decisions (Sarabadani, Compeau, Carter, 2020). This construct is measured by a scale called "Decision-Making Questionnaire" (DMQ) and consists of ten dimensions: uncertainty, time, information and goals, decision consequences, motivation, self-regulation, cognition, emotions, social pressure and work pressure. Each of the mentioned dimensions is measured by individual indicators, the most important of which are: overcoming ambiguity, organization of activities depending on available time, gathering information needed for decision-making, predicting the consequences of a decision, awareness of the importance of decision-making, identification of factors that influence decision-making, overcoming fear, avoiding conflicts, complying with work rules (Sanz de Acedo Lizarraga, Sanz de Acedo Baquedano, Oliver, Closas, 2009). The variable business decision-making has its own lower order constructs and they are: Rational business decision-making, intuitive, dependent, avoidant and instant business decision-making, and the indicators for measuring individual constructs are: manager's logical approach to decision-making, experiential business decision-making, waiting for the support of others, before making a business decision, postponing decision making and impulsive and quick decision making (Yildirim, Elber Börü, 2023).

Labor productivity is defined as a measure of employee competence assessment and evaluation of his work results (Walton, 2019; according to Shin, Eksioglu, 2015). The effects of technostress on work productivity were investigated by Walton in 2019. The results showed that technostress does not significantly determine work productivity, but that reduced technological efficiency of employees leads to reduced productivity, a higher degree of absenteeism and burnout. The impact of stress on the business performance of companies was examined in Malaysia, also in the banking sector, and it was shown that the phenomenon of stress affects the business performance of banks (Ismail, Saudin, Ismail, Abu Samah, Abu Bakar, Aminudin, 2015). Work productivity is measured with a five-point Likert-type scale. The scale consists of 4 statements, and the indicators for measuring this construct are: technological solutions help to improve the quality of work, technology contributes to productivity, technology contributes to doing more work tasks than usual, technology helps to do the job better (Walton, 2019; according to Tarafdar, Roy, 2014).

Commitment to the organization represents the degree of commitment and attachment of the employee to the organization, and is reflected in his willingness to make an effort for the benefit of the organization and the desire to remain a member of it (Ahmad, Amin, Ismail, 2012; according to Mowday, Steers, Porter, 1979; O'Reilly, 1989; Meyer, Allen, 1991). Commitment to the organization is measured by a scale developed by Meyer and Allen called the Organizational Commitment Scale. It consists of three dimensions: Affective attachment, continuous attachment and normative attachment. Indicators for measuring affective commitment to the organization are: a feeling of happiness if you would be an employee of the organization until the end of your career, identification with the organization's problems, a feeling of not belonging to the organization, a feeling of emotional disconnection with the organization, personal importance of the organization, a feeling of not belonging to the organization; indicators for measuring continuance commitment: feeling of distress in case of leaving the organization, disruption of private life in case of leaving the organization, need to keep the job, consideration of leaving the organization, lack of alternatives in case of leaving the organization and personal sacrifice in case of leaving the organization; indicators of normative attachment are: lack of need to stay in the organization, improper decision to leave the organization, feeling of guilt, feeling of obligation to the organization, indebtedness to the organization (Allen, Meyer, 1990).

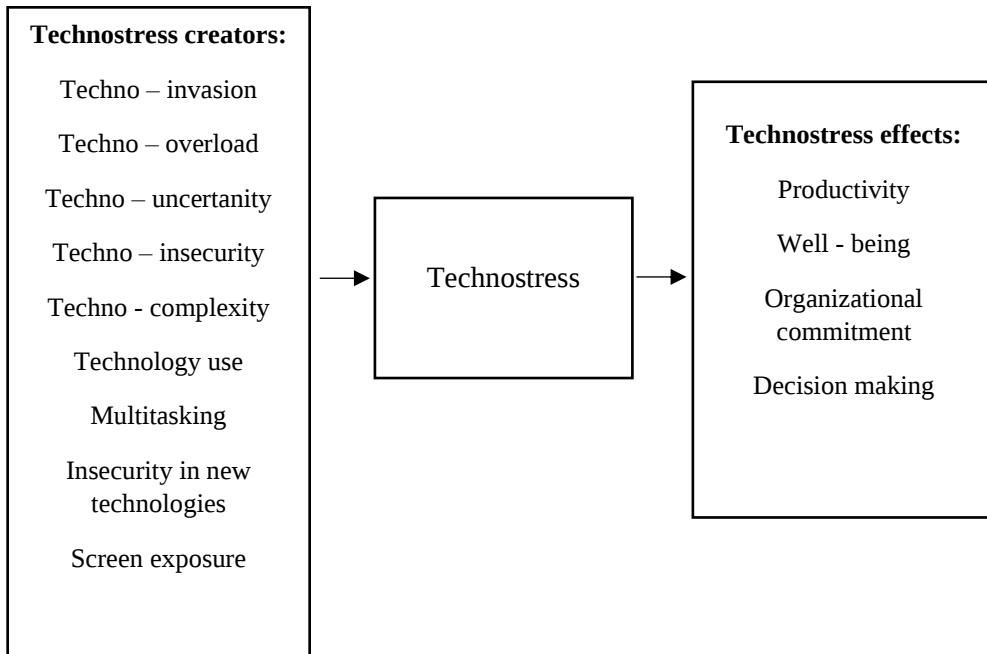
Recent research mentions the concept of digital detox, as a strategy in the fight against the negative effects of technostress. Digital detoxification strategies have been proposed as a solution to reduce the negative consequences of using smartphones, social networks and other advanced

technologies in the workplace. Digital detoxification is defined as avoiding the use of electronic devices, e.g. smartphones (Radtke, Apel, Schenkel, Keller, von Lindern, 2022). Given the uncertainties regarding the effectiveness of digital detox strategies, the authors analyzed and systematized previous research on this topic. A literature review was made that answered the question of the effectiveness of the above-mentioned strategies in the context of employee well-being. Their study showed that detox strategies proved to be effective in some cases, and had an effect on self-control and employee well-being, while in some other cases they had no positive effect.

Digital detoxification was also the subject of research by Miksch and Schulz (2018). Namely, the goal of their work was to empirically investigate the practical side of detoxification and the appropriate motivations for implementing those actions. Their target group was a young group of people and their experience during the offline environment (Miksch, Schulz, 2018; according to Diem, 2017; Ofcom, 2016). Furthermore, the use of a smartphone during work represents a disruption in the execution of assigned work tasks, which leads to interruptions and additionally results in a loss of continuity in the work process (Miksch, Schulz, 2018; according to Montag, Walla, 2016), focus during working hours and leads to reduced productivity (Miksch, Schulz, 2018; according to Duke, Montag, 2017). According to Haug et al. (2015) when employees use a mobile device simultaneously while performing work tasks, it is more difficult for them to concentrate and complete assigned duties. According to Duke and Montag (2017), there is a negative relationship between the level of technological dependence and the number of actual productive working hours. In their study, the use of mobile devices during work reduces the perceived productivity of most employees. Furthermore, employees lost their perception of time while using mobile devices at work, which further problematizes the fact that employees lose control (Miksch, Schulz, 2018; according to Duke, Montag, 2017). So-called technostress (Tarafdar et al. 2007) at the workplace, which is described as stress caused by overloading information and computer technology, negatively affects individual productivity (Tarafdar et al. 2007). This is associated with stress and fear of missing important work-related information. What's more, the inability to disconnect can have a long-term negative impact on cognitive abilities, then processes like decision-making and creativity in the workplace (Miksch, Schulz, 2018; according to Scott, Valley, Simecka, 2017). As a result of technological progress, personal and professional constraints begin to merge with each other and it becomes increasingly difficult for employees to separate their private and work lives (Miksch, Schulz, 2018, according to Scott, Valley, Simecka, 2017; Shallcross, 2012). Continuous connection with work can result in stress, depression and anxiety in the workplace (Miksch, Schulz, 2018, according to Shallcross, 2012).

The most significant causes of technostress were identified as: techno creators, use of technology, multitasking, uncertainty about new technologies and exposure to screens. The effects of technostress are reflected in work productivity, health, commitment to the organization and business decision-making. Figure 1 shows the systematization of the identified causes and effects of technostress.

Figure 1. - Model of technostress: creators and consequences



Source: Author's creation

CONCLUSION

With the transformation of the global economy and the gradual shift to digitization, the modern financial industry is changing, especially banking. The research that was conducted analyzed the impact of perceived stress on the performance of managerial officers in the banking sector in conditions of digital business transformation (Chen, Cao, 2023). Work-related stress is a common reaction of an individual when he becomes overburdened with work tasks. Especially in the time of digital transformation, stress becomes an everyday thing that develops into a problem if steps are not taken to manage this phenomenon and solve it (Harshana, 2018). Based on all of the above, the central research hypothesis can be accepted.

The limitations of this work refer to the lack of empirical findings, which would enable new knowledge about the subject phenomenon. Managers must become aware that technostress has become a daily occurrence and that understanding employee fears is the key to successful human resource management. Recommendations for further research are reflected in the inclusion of constructs such as employee motivation and satisfaction as mediator variables of the research model. Identifying the creators and consequences of technostress will enable the knowledge of the extent to which technostress is present among employees, will provide the opportunity to develop strategies and policies to combat technostress in companies, explain areas in which improvements are possible, as well as recommendations that would enable technostress to be overcome in order to improve business company performance.

REZIME

UZROCI I EFEKTI TEHNOSTRESA NA RADNOM MESTU: SISTEMATIZOVANI PREGLED LITERATURE

Savremene životne okolnosti dovele su do toga da ljudi sve više vremena provode povezani za svojim računarima. S obzirom da digitalne tehnologije postaju prisutne u društvu, psihički i fizički efekti njene upotrebe postaju evidentni kod njenih korisnika. Cilj rada jeste objasniti kreatore i efekte tehnostresa na radnom mestu. Rad predstavlja pregled dosadašnjih rezultata istraživanja iz oblasti digitalizacije radnog mesta. Najznačajniji faktori tehnostresa koji su identifikovani su: kreatori tehnostresa, upotreba tehnologije, multitasking, nesigurnost od novih tehnologija i izloženost ekranima. Tehnostres ostavlja značajne efekte na radnu produktivnost, zdravlje zaposlenika, predanost organizaciji i poslovno odlučivanje. Izvori literature uključuju naučne radove objavljene u raznim naučnim bazama. Ograničenja rada ogledaju se u nemogućnosti pristupa svim radovima koji obrađuju tematiku tehnostresa. Rezultati mogu poslužiti kao temelj za razumevanje izazova sa kojim se menadžeri susreću u savremenim uslovima poslovanja.

Ključne reči: technostres, uzroci, efekti, produktivnost.

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