

## Technostress: A Concept Analysis

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## **Technostress: A Concept Analysis**

### **Abstract**

Information and communication technology (ICT) has become an integral part of modern society, transforming the way people work, communicate, and live. However, the pervasive use of technology has also given rise to a new phenomenon known as "technostress", which refers to the negative effects and stressors that arise from the use of technology in various domains of life, including the workplace. Despite the growing recognition of technostress as a significant issue, the literature on this topic remains fragmented and lacks comprehensive evaluations. Therefore, this article aims to provide a thorough and comprehensive literature review of technostress in the workplace.

Using keywords such as "techno-stress", "technostress", and "Technology Related Stress", we conducted a systematic review of four major electronic databases, including Google Scholar, Scopus, Web of Science (WOS), and Cairn. The review revealed that technostress is a multidimensional construct that encompasses various cognitive, emotional, behavioral, and physiological responses to technology use in the workplace.

The review also discusses theoretical models of technostress, and highlighted the physiological side of technostress, including its impact on physical health. In addition to the negative effects, the review also discussed inhibitors or coping mechanisms that individuals and organizations may employ to mitigate technostress. The findings of this literature review provide insights for researchers, practitioners, and policymakers to further investigate and address the challenges posed by technostress in the workplace.

**Keywords:** technostress definition, technostress theoretical models, physiological face of technostress, technostress assessment, technostress inhibitors.

**JEL Classification:** I1

**Paper type:** Theoretical Research

## 1- Introduction

Over the past few decades, technological advancements have ushered in a new era, fundamentally transforming our lives and shaping the trajectory of human progress. The integration of technology has become so deeply ingrained in our daily routines that imagining a world without it seems unfathomable. With the advent of digital technology to the evolution of the Internet, these innovations have not only made life easier but have also revolutionized countless aspects of our society.

The rise of the digital age, propelled by the World Wide Web, has had a profound impact on businesses, leading to the seamless integration of the digital world into their operations. Workspaces have undergone a remarkable metamorphosis, evolving into hyper-connected environments where the flow of information and data generated by electronic tools transcends the physical limitations of traditional workplaces. This technological revolution has certainly opened up new possibilities and transformed the way we work, communicate, access to healthcare, and pursue leisure activities.

However, amidst this rapid evolution of technology, it is crucial to acknowledge that it is not without its risks. The concept of technosocial risks has emerged as a vital area of inquiry, referring to the negative effects that arise from the use of emerging technologies in our society. These risks encompass a wide array of concerns, including privacy breaches, cyber threats, information overload, social isolation, job displacement, and ethical dilemmas, among others.

Researchers and experts from diverse disciplines, such as psychology (Testa et al., 2017), medicine (Stein et al., 2007), education (Robotham& Julian, 2006) etc..., have delved deeply into the exploration of technosocial risks. Their work seeks to understand the challenges we face in navigating these risks and strives to unravel the complex and long-term implications of technological advancements on our social fabric, ethical frameworks, and political landscape. Through extensive studies and research, these scholars have shed light on the multifaceted dimensions of technosocial risks and their impacts on individuals, organizations, and society as a whole. Their findings provide valuable insights into the social, ethical, and political implications of emerging technologies.

This paper aims to explore the concept of technosocial risks comprehensively. It will delve into the rich and nuanced perspectives offered by researchers and experts from various disciplines, highlighting the key challenges and implications associated with these risks.

Three electronic databases were used to conduct a comprehensive literature review. The one and only key was "Technostress." three electronic databases were searched Google Scholar, Scopus, and Web of Science (WOS).To be as reasonable as feasible, the keyword "technostress" has been used to include all of the publications that have widely discussed this topic.A multi-step process was used to determine the studies that were eligible (title reading, abstract and full-text assessment).

In the subsequent sections, we will delve into the knowledge regarding workplace technostress, including its definitions, theoretical models, various dimensions, physiological side, and inhibitors.

## 2-Literature Review

### 2-1- Stress: Definitions and History

Understanding the notion of stress and its different conceptualizations allows for a better understanding of the concept of technostress and is a preliminary step that every researcher must take into account, since the theoretical models evaluating technostress in the workplace are based on those evaluating stress at work.

According to Falzon and Sauvagnac (2004), the term stress now has a negative connotation that initially did not have. The authors recall that the term stress was established by Hans Selye (1974) as part of the general adaptation syndrome theory. The general adaptation syndrome is a process that increases vigilance, aggressiveness and regulates attention to cope with stressors (Falzon&Sauvagnac, 2004). Among the stressors (Mason, 1975) we can mention interpersonal problems, workload, noise and trauma (Suzuki & Ito, 2013).

In the framework developed by Selye (1974), stressors are the environmental demands and stress is the internal process reflected in physiological reactions (Lazarus & Folkman, 1984). Stress can be categorized by its severity, time dilation (acute, recurrent, or chronic), and the individual's level of control over the stressful stimulus (Salomon & Karlsdóttir, 2013).

Despite chaotic disagreement over its definition, Falzon, Sauvagnac, and Mason (1975) point out that Selye emphasized the term stress from a biological perspective when its use was becoming widespread and persistent in the fields of medicine and biology. Nogareda (1992) mentions that the organism is normally in a state of minimal stress, which can be increased according to context's demands. The physiological response of the organism to the stressful stimulus generates the activation of the pituitary-adrenal axis (hypothalamus) and the vegetative nervous system (homeostasis insurer). Thus, chronic stress is associated with physiological changes, such as neuroendocrine, immune deregulation, and worsening disease profiles (cardiovascular risks such as hypertension, coronary heart disease, and arrhythmias) (Benedict, 2013a).

The level of the balance depends on individual factors, situations and the individuals' experiences (Nogareda, 1992). Two concepts are important to mention: firstly, the concept of reactivity to stress, such as the capacity or tendency to respond to the stressor; this reactivity underlies individual characteristics, so each person reacts differently to the same stressor (Schlotz, 2013). Secondly, stress response give rise to physical or mental changes such as frustration, depression, anxiety, and stomach pain (Suzuki & Ito, 2013).

Currently, the DSM-V<sup>1</sup> defines stress as "a pattern of specific and nonspecific responses by a person to events and stimuli that upset his or her balance and exceed his or her ability to cope". It is important to note that this definition is very similar to Selye's (1974) definition of stress as a nonspecific response of the body to any stimulus (Mason, 1975 p. 10).

In addition, Stramler's (1992) Human Factors Dictionary defines stress as the collective mental and physical conditions that occur when an individual experiences one or more biomechanical, physiological or psychological stressors above comfortable levels. However, confusion may arise with the definition of strain, which is defined as the biomechanical, physiological and/or psychological effects of one or more stressors on an individual (Stramler, 1992). To resolve this potential confusion, we can rely on Cooper et al. (2001) who considers strain as negative stress or distress.

The transactional perspective as developed above involves the concepts of cognitive apprehension and coping. The first is an evaluation process that determines why the environment or rather the stimulus is stressful and the second is the response to the stressful stimulus. Coping is also a process, as it involves managing the emotions generated by the stressful stimulus and making cognitive and behavioral efforts to manage the demands of the stimulus valued as stressful (Lazarus & Folkman, 1984).

Focusing on psychological stress does not mean ignoring the other components of stress. According to Benedict (2013b), psychological stress can impact biological processes and have behavioral effects, alleging the occurrence of harmful behaviors (e.g., smoking or self-medicating to cope with the stressful stimulus). Thus, we understand that stress is a fundamental and generalized response in the body (i.e., physiological, psychological and

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<sup>1</sup> *Diagnostic and Statistical Manual of Mental Disorders, 2015.*

behavioral) this response will be determined by individual factors. Considering stress as a process involving different aspects of the individual is therefore an important issue for its assessment.

## **2-2- Theoretical Models of Stress:**

In the professional context, there are different theories that allow us to understand the genesis of stress. The first one is Karasek model (1979) which assumes that the mental tension (distress) and dissatisfaction of the operator do not come from the work environment, but are the result of the interaction between the demands of the work (workload, conflicts, presence of stress factors) and the decision latitude of the operator (freedom of decision or control).

According to Karasek (1979), tension occurs when demands are high and the level of control is low. For Falzon and Sauvagnac (2004), the model proposed by Karasek is the one that has received positive evaluations from the international public. However, some critics assert that this model underestimates individual factors and that decision latitude fails to distinguish dimensions such as personal development and environmental capture. Others think that Karasek's model is narrow and static, as it only considers a set of predictor variables that are not relevant for all jobs (Bakker & Demerouti, 2007).

In the same perspective, Demerouti et al. (2001) propose the job demands-resources model. This model also follows an interactionist perspective and applies not only to the understanding of work stress, but also to other variables such as burnout and worker commitment. In this framework, demands are those physical, social, or organizational aspects that require physical or mental effort, such as workload, time pressure, or the physical work environment. These aspects have a physiological and psychological impact on the individual. Resources are protective factors of health, and are therefore the functional aspects to the achievement of work objectives, reducing the cost of work demands and stimulating the development of the worker. These resources include feedback, participation, job security, supervisor support, among others.

Another theoretical model is the theory of adaptation of the person to his or her environment. This theory was originally proposed by French, Rodgers and Cobb in 1974 (Caplan, 1987) and can be an explicative framework for work-related stress, as well as the development of the sickness. According to Edwards and Cooper (1990), the person-environment fit approach characterizes stress as a mismatch between the characteristics of the individual (e.g., skills, values, needs) and the environment (e.g., demands, rewards, supplies). The person-environment fit approach proposes an alternative intervention based on the analysis of what constitutes the worker and the company or structure.

Similarly, segmentation can be proposed, i.e., the specific fit of the person to the group can be studied as well as the fit of the person with the leadership style of his or her supervisor or the elements that make up the organization (values, goals). The work of Chuang et al. (2016) is an example of this through their multidimensional person-environment fit scale.

All three models of occupational stress focus on the characteristics of the work environment (conditions and parameters), resources, the internal state of the individual, and individual apprehension of stressors. In this synthesis, we have mentioned some theoretical models, since the operationalization of occupational technostress is based on the frameworks mentioned above. In the rest of this theoretical framework, we will discuss the concept of occupational technostress.

## **2-3- Concept Analysis of Technostress:**

Technostress is a concept that emerged from the Anglo-Saxon literature and its study has increased over the decades. One of the first reflections on the concept was made in the journal *Nature* in 1985 in an article entitled "Another Japanese discovery." Anderson (1985) then

defined technostress as the stress and concomitant psychosomatic disorder produced by the introduction of high technology into the work environment. In this context, the term high technology referred to office technology. Anderson deduced that this type of technology caused stress by working at machine-dictated rhythms, by the strain of staring at a monitor, and by the loss of self-esteem of individuals unable to master these new technologies, and feeling a fear of being replaced by them.

However, the invention of the term technostress is attributed to Brod (1984) who defined it as a modern disease caused by the inability to cope with new computer technologies in a healthy way. According to the author, this illness can manifest itself in the struggle to accept computer technology and over-identification with computer technology. This can lead to headaches or resistance to learning to use the computer.

In the late 1980s and early 1990s, three publications addressing the development of the concept emerged. The first is the contribution of Caro and Sethi (1985), the second is the validation of the computer problem scale by Hudiburg (1989) and the third is the study by Kupersmith (1992) on a sample of librarians.

By 1985, the need for a clear definition of the role of technology in the workplace was already a central topic of discussion in both North America and Europe. Caro and Sethi (1985) published their studies in this context, likening the role of technology to Prometheus to be chained. In other words, while technology can bring benefits to organizations, it can also bring negative effects. For this reason, it must be controlled or regulated.

In this framework, technostress is an experience of the worker that depends on his or her individual characteristics, coping mechanisms or adaptive capacities. According to the authors, this definition refers to two sub-concepts: techno-eustress, defined as beneficial stress, having a positive effect on the individual's functioning and his contribution to organizational effectiveness, and techno-distress, a type of stress that has a negative impact on the individual's functions and consequently hinders overall organizational effectiveness. Caro and Sethi propose a line of thought on the factors to be taken into account before introducing a new technology into the organization. Among these factors, four types of feasibility are distinguished: operational, technical, economic and social.

Years later, the terms techno-eustress and techno-distress would be taken up by Tarafdar et al. (2019). They define the first term as the phenomenon that represents the positive stress that individuals face in using information systems and where they evaluate system features as challenges. Individuals are motivated by these challenges because they will lead them to improve their skills. The authors characterize techno-distress as a phenomenon embodying the negative stress, which individuals face in their use of the system. They evaluate the characteristics of technology as threatening and presenting pressure beyond their ability to cope and perceive significant negative consequences when they do not address it.

The Computer Problem Scale proposed by Hudiburg (1989) was an important advance in the development of the concept, as it is one of the first measures of technostress. Specifically, as an assessment of computer-related stress arising from human-computer interaction, it also indicates that it is a specific type of stress not related to computer anxiety or attitudes toward computers (Balance & Rogers, 1991). The instrument consists of a list of 65 potentially irritating case items associated with computer use. This scale produces two scores, one reflecting the severity of computer problems encountered and the other reporting a selected number of problems.

Although Vold's (1987) work is among the earliest studies to recognize the introduction's impact of technology on workers' attitudes, stress levels and mental workload, Kupersmith's (1992) contribution is noteworthy in that it compiles the different perceptions of librarians after the introduction of microcomputers into their workplaces. This constitutes one of the first empirical assessments of technostress as a concept, and its possible relationship with the



variables of information overload, role conflict, organizational factors and burnout. Finally, in his work, the author also sets out both individual and organizational actions and strategies to counteract the discomfort produced by technologies.

The factors of technostress have evolved and now come not only from the computer, but also from other types of technology. Weil and Rosen (1997) do not consider technostress as a disease (as Brod proposed) but define it as any negative impact on attitudes, thoughts, behaviors or body physiology caused directly or indirectly by technology.

Weil and Rosen identify three types of profiles: avid adopters, hesitant adopters, and resisters. The first group is made up of people who love being up to date with new technology and have a positive attitude towards it. The second group is made up of people who remain skeptical of technology, preferring to see the technology proven before they buy or use it. Finally, the resisters are defined as people who avoid contact with technology because they feel intimidated, threatened or embarrassed to use it. In other words, they manifest a series of negative attitudes toward technology.

Over the past decade, different definitions have emerged, enriching the conceptualization of technostress. Riedl (2013) conceptualizes it, from a biological point of view, as a phenomenon arising from direct human interaction with ICT<sup>2</sup>, as well as from perceptions, emotions, and reflections on the implementation of ICT in organizations and its ubiquity in society at large. On a more social and organizational level, we have the contributions of Salanova et al. (2013, See also Salanova & al, 2014) who defines technostress as a negative psychological state associated with the use or threat of use of ICT in the future. This experience is related to feelings of anxiety, mental fatigue, skepticism, and inefficiency. Similarly, the authors report that technostress is an umbrella effect that includes two different but related psychological experiences: technostress and techno-addiction. Technostress includes factors of anxiety, mental fatigue, skepticism and inefficiency in the use of ICT. Techno-addiction is defined as an experience of technostress due to an uncontrollable compulsion to use technology everywhere and at all times for long periods of time in an excessive manner, i.e. it refers to an abusive use. This concept is closely related to work addiction, however, it is relevant to ask whether it is indeed a techno-addiction or rather a techno-imposition, as the individual is not dependent on the technologies themselves, but rather on the work that imposes the use of these technologies.

Another conceptualization of technostress was proposed by Sellberg and Susi (2014) who defines it as a condition of constant high cognitive demand and physiological arousal. This condition is observable in individuals who, over time, have experienced a decline in their ability to understand and gain insight and control over workplace information and processes. Thus, technostress is a consequence of interaction with technology that lacks usability and/or inadequate organizational requirements and conditions for its use.

The concept of technostress is still under development. Terms; such as technological burnout syndrome or techno-social risks (Oliveri & Pélissier, 2019) are emerging. Technological exhaustion syndrome (TES) is defined as the visible consequence of technological pressure, as well as the increasing presence of technology among employees in the work situation. It manifests itself as both a physiological and psychological state generated by the omnipresence of technology in one's daily work life. According to the authors, people who suffer from technological burnout syndrome can no longer implement control, adaptation, bypass or resistance strategies in the face of the technological presence in their daily lives. The authors define techno-social risks as "all the physical and psychological disorders incurred by an

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<sup>2</sup> *Information and communications technologies*

employee when he or she works in a situation where information and communications technologies (ICT) play a central role in the performance of his or her duties” (Oliveri&Pélessier, 2019, p.91). According to the author, techno-social risks such as infobesity, the reception of irrelevant and low-quality content, etc., are informational in nature. The lack of mastery of computer tools, the social obligation of hyper-connection, the fear of cybercrime, among others, are technological. Mutual incomprehension between colleagues, various frustrations, cyber harassment, digital nuisance, the difficulty of managing the border between the private and professional spheres are of a relational nature. The states of permanent fatigue, the inability to keep up with the pace of information, the drop in performance at work, the development of addictions, etc.) are of the physical type, and finally, the feeling of control and oppression, deprivation of freedom, demotivation, inability to act, devaluation, professional exhaustion, etc.) are of the psychological type.

The study of technostress is becoming increasingly important among practitioners and researchers because of its impact on the individual and on his or her own perception of quality of life at work. In order to understand it, in the following section, we propose a review of the concept of physiological face of technostress.

#### **2-4-Technostress from a Physiological Perspective :**

Various studies show that technostress has a physiological component that cannot be underestimated. Arnetz and Wiholm (1997) point out that technostress has a real physiological component, due to the resulting wear and tear on the body which can increase a person's sensitivity to the effects of the environment on a physicochemical level.

According to Riedl (2013), this phenomenon has hardly been addressed from a physiological perspective and this is problematic, not only because data from physiology provide objective measures of stress, but also because they determine behaviors towards ICT to a notable degree.

The studies by Korunka et al. (1996) investigated the effects of introducing computer technologies (visual display unit) on workers' hormonal levels. Their results showed that the introduction of this technology increased catecholamine levels, which remained elevated even one year after the implementation of these technologies. This indicated that the introduction of new technologies at work was accompanied by increased physiological arousal of the employee.

Similarly, Riedl et al. (2013) studied technostress and cortisol, in particular whether system failure - considered one of the most serious stressors in human-machine interaction- increases cortisol production levels in users. This study is very important because system failure has not been studied in relation to salivary cortisol assessments under controlled laboratory conditions to date.

Thomé (2012), investigated ICT use and mental health in young adults, and conducted a series of studies on the physiological consequences of ICT use. It has been shown that high or moderate ICT use was associated with sleep disorders. For example, high use of e-mail and instant messaging was associated with sleep disorders and depressive symptoms. This research also shows that within the phenomenon of technostress, there are acute and chronic forms of technostress. It is important to recognize that the seemingly small frustration individuals experience every day due to technology have a negative and cumulative impact on their psychology and physical health (Weil & Rosen, 1997; Riedl, 2013).

Technostress has been studied since the 1980s and continues to be studied today. Over the years, a repertoire of theories and perspectives has been built, helping to understand the factors that cause technostress within the organizational environment, as well as its impacts on both the behavior and physiology of individuals.

In the following section, we'll discuss the dimensions of technostress.



## 2-5- Dimensions of Techno-stress in the Workplace:

Research on technostress over the last two decades has been oriented towards the study of the antecedents or predictors of technostress in the organizational environment. The concept of determinants or creators of technostress was introduced by Tarafdar et al. (2007) and expanded by Ragu Nathan et al. (2008). They identified the following technostress creators:

- techno-overload, defined as the increased workload, higher work speed, or change in work habits brought about by new technologies;
- techno-invasion (techno-invasion), defined as an invasion of personal life. Indeed, individuals spend less time with their families or on vacation in order to devote more time to learning new technologies;
- techno-complexity, or the inability to learn or manage the complexity of new technologies;
- techno-insecurity, understood as the job insecurity caused by the use of technology at work;
- techno-uncertainty, defined as the constant changes in computer hardware and software.

A second technostress assessment framework is proposed by Ayyagari et al. (2011). This framework has the theoretical basis of the Person-Environment Fit model. As mentioned earlier, the Person-Environment Fit model assumes that stress is the product of an inequity in the interaction of individual components (beliefs, skills, values, needs, etc.) with environmental components. This framework includes:

- technology characteristics such as usability, dynamics, and pervasiveness;
- stressors that emerge after mismatch such as work-at-home conflict, privacy invasion, work overload, role ambiguity, and job insecurity;
- strain (job burnout).

Following the work of Ayyagari et al. (2011), the Person-Environment Fit model has been used by other authors to assess technostress. A first example is the contribution of Brooks and Califf (2016) who use this model to investigate the relationship between techno stress caused by social network use and job performance of IT professionals. Their results indicate that technostress induced by this type of technology is negatively related to job performance, and this impact varies depending on the conditions of the job (feedback, task characteristics and varieties).

Another study conducted by Wang and Bo Li (2019), on technostress among higher education teachers in China found that job performance was affected by the degree to which ICT was relevant to conducting their work. At the same time, these authors provided a multidimensional questionnaire for assessing the technostress phenomenon.

Penado et al. (2020), adapted Wang and Bo Li's questionnaire to the Spanish context, and applied it to a sample of students. The results of this research showed excellent psychometric characteristics and a factorial structure indicating that technostress can be conceptualized in the Person-Environment Fit model, as a product of the imbalance between demands (abilities) and resources (needs).

A third alternative measure of technostress is the RED-TIC (Resources, Experiences, and Demands) model, proposed by Salanova and colleagues (2013, see also, Salanova & al., 2007). The model's theoretical foundation is based on Demerouti et al.'s (2001) work demands-resources framework.

Following this logic, Salanova et al. (2014) identify the existence of techno-demands (i.e. quantitative and qualitative work overload due to the use of technologies) and techno-resources (i.e. perception of self-efficacy or autonomy), and the interaction between the two variables that will produce the psychological experience of technostress, which will be manifested by fatigue, anxiety, feelings of inefficacy and skepticism. The presence of this phenomenon can lead to other undesirable consequences such as role conflict, low commitment, and job dissatisfaction.

## **2-6- Technostress Inhibitors:**

The moderators of technostress, also known as the inhibitors, refer to the elements that can reduce its levels and impacts. Ragu-Nathan et al.(2008), gave a detailed description of the most significant moderators of work-related technostress in a well-conducted cross-sectional study, and they may be classified into three main categories:

1. Technical support provision defines the end-user support operations that mitigate the effects of technostress by resolving users' ICT-related issues;
2. Literacy facilitation: explains techniques that promote and support the dissemination of ICT-related information inside the company;
3. Involvement facilitation: This refers to informing people about the benefits of adopting new information and communications technologies (NICTs), as well as motivating them to use and experiment with NICTs (Ragu-Nathan & al. 2008).

Innovation support has been noted as a modulator of technostress in addition to these three inhibitors. It has been discovered that there is a very favorable correlation between effective training, acquiring new technology, and employee workload (Wang & Shu 2006). According to Tarafdar et al. (2011), user participation mechanisms that allow users to experiment, learn, and explore new concepts within the framework of ICT use, might reduce the impact of techno-stressors and boost satisfaction with ICT use. Consequently, this encourages a rise in productivity and creativity in ICT-related tasks (Tarafdar & al. 2011).

Additionally, Califf et al. (2015) showed that participation, literacy, and technical support are all positively correlated with techno-eustress and negatively correlated with techno-distress. Additionally, it has been discovered that work weariness is inversely correlated with organizational support (Kim & al. 2015). An extensive and high-quality cross-sectional study showed that several personality qualities, including agreeableness, extraversion, neuroticism, and openness to experience, are important moderators of the effects of technostress creators. In fact, it is said that having these certain personality qualities will lead to successful employment results (Srivastava & al. 2015).

Other moderators of work-related technostress have been discussed in the literature, including the innovation culture (Koo & Wati 2011), social media literacy, which help one deal with overload, invasion, and uncertainty (Bucher et al. 2013), a proactive personality of employees, which could reduce the effect of communication overload (Hung et al. 2015), technology self-efficacy of employees (Tarafdar et al. 2015a, b), and social and technical support from peers (Joo, 2016).

## **3- Materials and Methods:**

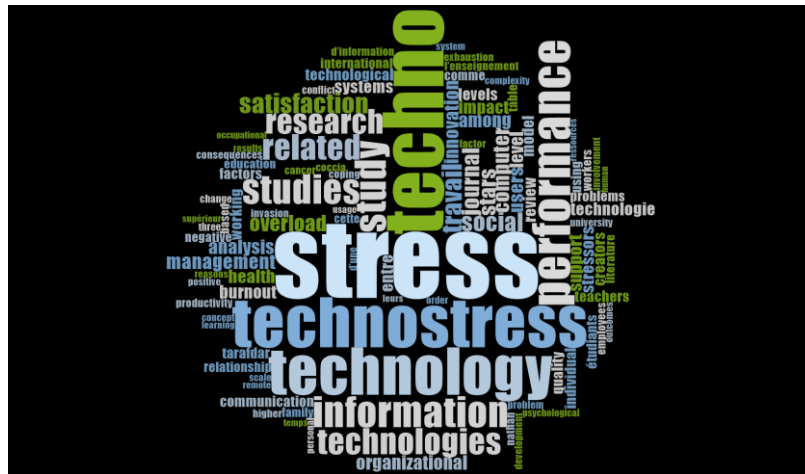
A literature review in the is a comprehensive and critical examination of existing scholarly works and research studies related to a specific topic within the field of social science. It involves identifying, analyzing, and synthesizing relevant literature to gain a deeper understanding of the current state of knowledge, theoretical frameworks, methodologies, and key findings in the field (Webster, J., & Watson, R. T. (2002).

This literature review was conducted following the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Liberati et al., 2009). Our systematic literature review aims to identify published articles that analyze technostress definitions, theoretical models, various dimensions, physiological side, and inhibitors.

In this literature review, we choose the pertinent technostress studies from Web of Science, Cairn, Jstor and Google Scholar. To find relevant literature on technostress at work, we employed keywords like Technostress, Techno-stress, and Technology Related Stress. Also, we limited our search to the period from 2007 to 2023 (since Tarafdar et al. released the

foundational publication providing the scale to quantify technostress creators in the information system domain in 2007).

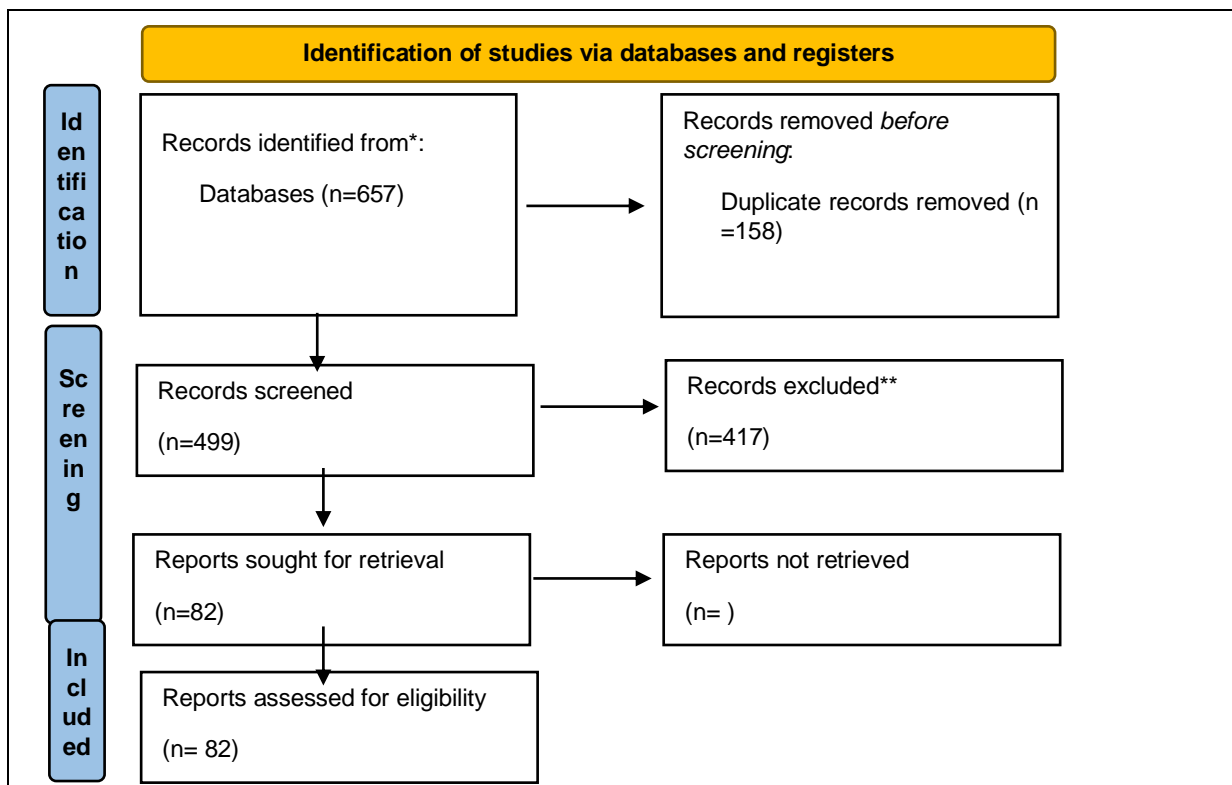
Figure1: Word frequency cloud



Source: Authors via Nvivo 10 software

We obtained 657 articles through keyword search, which constituted the initial set of studies for our research. The process of bibliographic research, including the detection and selection steps, is illustrated in Figure 2. The articles were chosen based on their relevance and their ability to align with the study's objective. Additionally, specific filters embedded within the databases were utilized to exclude scientific articles published prior to 2007, articles not written in English or French, irrelevant articles, and non-journal documents. After eliminating duplicate entries, the eligibility and relevance of the articles were assessed by reviewing their abstracts. Ultimately, we ended up with a final count of 82 articles.

Figure2: PRISMA 2020 flow diagram



Source: Authors via PRISMA 2020 flow diagram

#### **4- Discussion:**

Technostress is a syndrome that is gaining attention because of the widespread usage of ICTs in both work settings and personal lives. They are linked to a number of clinical conditions, including technostress. Because it is marked by distinct physical, psychological, cognitive, and behavioral symptoms this disorder seems to be treated differently than general stress, sadness, anxiety, or technology addiction (Chiappetta (2017); Ragu-Nathan&al. (2008)).

The purpose of this review of literature was to define the technostress syndrome, its theoretical models, and its different dimensions as well as its inhibitors. The findings demonstrate that the definition of technostress has evolved through time, and the most widely accepted definition is given by Ragu-Nathan et al. (2008), who said that technostress is “an IT user’s experience of stress when using technologies”. It consists of a psycho-physiologically active condition distinguished by elevated levels of stress-sensitive hormones in the blood. It is characterized by behavioral reactions in addition to cognitive symptoms such as fatigue and poor focus, irritation, and memory difficulties (Arnetz&Wiholm 1997). (Ayyagary& al. 2011).

We have identified two primary contributions based on our comprehensive review of the literature. Firstly, it has been established that it reduces the job satisfaction, organizational commitment, and performance. It has been also shown to increase negative emotions like worry, anxiety, self-criticism, and a negative self-esteem, as well as the probability of developing a work-family conflict (Ragu-Nathan & al. 2008; Jena 2015b; Tarafdar& al. 2007, 2011). On the other hand, according to Ahmad and al (2014) and Al-Qallaf (2006), technostress has a favorable effect on both organizational commitment and work performance. Particularly in men, technostress raises the possibility of developing antisocial behavior (Kasuga& al. 2004). Wang and Shu (2006) found that role conflict, role overload, and emotional exhaustion may also be present. These factors have been linked to a deterioration in wellbeing and innovation (Tarafdar& al. 2015a, b). Burnout, sadness, and anxiety are all positively correlated with perceived stress (Reinecke& al. 2017). Technostress can also affect people's preferences for digital communication, making them prefer oral communication (Lee 2012).

Secondly, our findings indicate that technostress inhibitors primarily alleviate the strain through direct effects. In line with Ragu-Nathan et al.'s (2008) findings, we did not observe any evidence suggesting that inhibitors moderate the association between technostress creators and strain. This could potentially be attributed to the increased complexity and workload that mitigation mechanisms like involvement or literacy facilitation may impose on employees.

Our research suggests several avenues for future studies. Firstly, we believe that the body of evidence supporting more formal review methods, such as meta-analysis, has reached a sufficient level. Conducting a meta-analysis would enable us to make more robust statements regarding the magnitudes of the effects of technostress creators and inhibitors.

Secondly, as mentioned earlier, there is a need for further research to address the mixed effects observed. It would be valuable to expand the scope of the study by considering additional technostress creators and inhibitors, thereby enhancing the current understanding of this phenomenon. Exploring decomposed models of technostress creators and inhibitors could be one approach to achieve this. Identifying missing moderators that explain the variations in effect magnitudes is another potential direction for future investigation.

Alternatively, while technostress creators and inhibitors have been the primary focus of technostress research, it is worth acknowledging that other models and approaches have been developed (Maier et al., 2015; Tarafdar et al., 2017). Drawing on these models can enrich our theoretical understanding.

Lastly, we see an opportunity to integrate Ayyagari et al.'s (2011) conceptualization of strain into the transactional model. Excluding the construct that most closely captures the subjective experience of stress, as has been done in much of the research in this field, overlooks the affective mechanism through which stressors influence outcomes such as job satisfaction and performance.

## 5- Conclusion:

Although technology can enhance the value of work and contribute to its efficiency and performance, it can also fundamentally alter the essence of professional activity and deprive individuals of what gave it meaning: their practices and professional relationships, their autonomy, and their relationship with work. Therefore, the question of introducing and constantly updating information and communication technologies (ICT) in organizations fundamentally relates to the role and place of these devices in the activity, as well as how they are employed to prevent negative effects such as technostress.

This literature review is of paramount importance as it comprehensively examines various aspects of technostress, including the factors that contribute to its emergence, facilitate its development, or mitigate its impact. Additionally, it highlights the consequences of technostress-related issues and the methodologies used to assess them.

Technostress can affect individuals from diverse professional backgrounds who utilize information and communication technologies (ICT), resulting in a variety of symptoms and varying levels of severity. While extensive studies have been conducted on technostress among teachers, librarians, salespeople, businesspeople, and managers, it is crucial to recognize that many other professional categories are also vulnerable and warrant closer examination. The pervasive use of ICT now extends to emerging professions such as online content editors, programmers, advertising professionals, call center agents, journalists, and others (Rose et al., 1998; Frenna and Technostress, 2015; Perciavalle and Prunesti, 2016).

Clearly, further research is needed to enhance our understanding of the epidemiology, clinical manifestations, and underlying causes of technostress. It is essential to investigate the potential impact of changes in workers' attitudes and technological skills on the prevalence and intensity of technostress. Rigorous studies using longitudinal surveys are justified to overcome the limitations of current research.

Lastly, it is important to strengthen the study of non-work-related technostress, which may not have immediate implications for productivity but can have long-term psychological and behavioral effects on individuals and society as a whole.

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