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The "Techno-stress" Phenomenon and Its Consequences in the Modern Organization

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Abstract

Due to the rapid development of NICT, our private and professional lives have fundamentally changed. By using mobile computing devices and computer networks, people have the ability to access information in real time, share information with colleagues, anytime, and anywhere. Thus, the use of NICT and technology dependence have led to the development of work-related stress called "techno-stress". This paper explores the phenomenon called "techno-stress" and analyzes the factors that cause stress by using NICT, the positive and negative aspects related to workplace stress, the NICT effects on end users, and possible measures to prevent it. The need for this study stems from the fact that technology will continue to advance, organizations will continually introduce new technologies to keep pace with market competition and employees cannot avoid increasing their daily interactions with NICT. It is therefore recommended that the management of the modern organization and NICT professionals provide a better environment and adequate training programs.

Keywords: *management of NICTs, techno-stress.*

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1. Introduction

The information system is at the center of rapid global change, which is why managers cannot ignore computer systems because they play a critical role in modern organizations. Thus, the application of concepts, techniques, policies and strategies for the implementation of information technologies in modern organizations has become a topic of fundamental importance and, indeed, a prerequisite for local and global competitiveness. Recent studies show that modern organizations are experiencing rapid technology changes by introducing new IT applications in recent years that have made changes in the nature of employee work. With innovations in new technology features and their ability to deliver various services and transactions, more and more organizations are making investments to gain the benefits of these new IT technologies. It is true that all organizations are completely dependent on new IT applications, especially in the processing and dissemination of large amounts of information. It is impossible to process information without the technology.

The widespread use of modern information and communication technologies (NICT) in professional and private life takes place as a result of rapid technological advances and the popularization of various devices and applications, which implies rapid changes in user profiles. Thus, the problem of possible negative consequences of exposure to information systems, materialized in the phenomenon called "techno-stress", which describes the technology-related stress reactions, has been raised.

Therefore, due to the accelerated technological development, both our professional life and our private life have been fundamentally changed [9]. Through the adoption of NICT, organizations have undergone changes in several aspects, including organizational structure and behavior, business processes and means of changing employee interaction and between individuals and the organization [13]. This has led to significant benefits for reducing operational costs, saving labor, process efficiency and increasing labor productivity [4].

2. Theoretical Background

At present, work has become increasingly competitive, which has increased working pressure for employees. This rapid pace of change has led to changes in working time (both at the office and outside the working hours), making work harder for employees. Changing traditional work processes into a dynamic job places employees more stressed. Moreover, the

introduction of new technologies at work to increase productivity through effective communication through email, telephone, videoconference, etc. has generated more stress for employees. International bodies such as the International Labor Organization and the World Health Organization are concerned about the consequences of workplace stress on employees' health. Techno-stress at the workplace can reduce employees' productivity and reduce their morale. Therefore, it is very important that, in addition to identifying workplace stress issues, we also propose solutions to reduce the stress generated by the use of NICT because an effective stress management technique can help overcome physical and psychological problems and increase productivity of the organization.

3. Argument of the paper

The current work environment continues to change with advances in the field of information and communication technologies. So the concerns about how to manage these changes have increased. Thus, the understanding of the stress generated by the use of NICT and its effects on employees becomes extremely important in organizational behavioral studies. Therefore, the present paper aims to study the techno-stress phenomenon and its potential negative consequences on the performance of the modern organization. Regardless of the type and nature of an organization, its performance and effectiveness depend to a large extent on employee satisfaction at work. In other words, employee satisfaction influences the performance of the modern organization.

The second objective of this research is to identify a mechanism that can potentially mitigate the negative consequences of techno-stress.

4. Arguments to support the thesis

In general, NICT uses appear to create stress for employees (Figure 1). This phenomenon is known as "techno-stress". Such stress is felt by staff who do not meet the demands of NICT use within organizations [18].

Figure 1. **The main stressors felt by employees in organizations**

Source: Mémoire d'expertise comptable "La gestion du stress en cabinet d'expertise-comptable : proposition d'un diagnostic et d'outils de prévention" Claudine Locheron – Session novembre 2009

First of all, since employees are always connected by email, telephone and Internet, they may feel they lose control of their own time and space [3]. Such situations could create stress for employees.

Secondly, employees sometimes seem to be overwhelmed by overloading information from different sources as part of their work [17]. Thus, they are forced to work more and more quickly to meet the demands of the workplace. Thirdly, the introduction of new technologies or systems often brings down the number of employees, who feel threatened to be

replaced by complex NICTs [2]. All of the above situations could reduce employee trust and overall satisfaction with the use of NICT. Then, they can begin to feel insecure and develop an aversion to using the new system.

The current organizational development trend requires an increase in the degree of dependence of NICT users [18]. Employees could continually increase their daily interactions with NICT, which could generate both positive stress (eustress) and distress at work (Figure 2).

Figure 2. **Techno-stress at work**

Source: Mémoire d'expertise comptable "La gestion du stress en cabinet d'expertise-comptable : proposition d'un diagnostic et d'outils de prévention" Claudine Locheron – Session novembre 2009

According to the literature, technnostres can lead to lower satisfaction with technology, poor performance, disruptive behavior, low commitment, and the intention to leave the job [12]. It is very important to understand the phenomenon technostres, to identify its possible negative effects at the individual level, according to which we can establish a set of tools and solutions as measures to prevent stress at the workplace (Table 1).

Table 1. Measures to reduce stress generated by NICT use

NICT STRESSORS	INSTRUMENTS AND SOLUTIONS
Accelerating the innovation cycle of NICT	<ul style="list-style-type: none"> - Training: ensuring the level of competence of the users - Communicating in the phases of change: Understanding sensitivity, limiting resistance to change
Expected response time	<ul style="list-style-type: none"> - Managing priorities: organizing a work program - Communicating the expected response time - the right to disconnect: the drafting of an internal

	regulation governing the use of messaging
Isolation, social support	- Creating an interactive environment through meetings and periodic meetings
Risks associated with reduced control of issued documents	- Raise employees' awareness of the risks of the documents they issue - Defining standards and delimiting the scope of responsibility: Validation takes priority over response time - Organization of submission of files in a uniform way in the company
Receiving and sending emails	- Reception management: customer classification - Complying with certain principles when sending emails: indicating the subject, limiting the number of recipients
Increase interruptions	- Managing phone calls and emails by grouping - Deactivating alert e-mail
Zapping/ Multitasking	- Reduce multitasking by taking care of a project at a time - Avoid opening multiple windows on your computer screen
Error interpreting messages	- Do not try to interpret a correspondence, staying factual - Read the mail again after letting you spend some time
Reliability of NICTs	- Back up, consult a double step - Update anti-virus, firewall - Periodically monitor the performance of your IT equipment as needed

Source: Mémoire d'expertise comptable "La gestion du stress en cabinet d'expertise-comptable : proposition d'un diagnostic et d'outils de prévention" Claudine Locheron – Session novembre 2009

Furthermore, it is important to investigate how to mitigate the negative effects of the technostress in order to improve organizational results.

According to Trist [21], organizational productivity is based on both the technical and social spheres of the organization. Thus, social, psychological factors, such as satisfaction and attitude towards the workplace, are of particular importance, which is why the organization should focus not only on the development of the technical system but also on the emotional status of its employees in order to achieve high performance.

5. Arguments to argue the thesis

Techno-stress, as a relatively new phenomenon of modern life, is quite different from the traditionally defined stress. Firstly, NICTs are deeply integrated into the work and culture environment. Flexible work schedules, virtual team and telecoms are becoming more and more common and effective [3]. However, NICTs:

- have made significant changes in conventional work patterns and have made time and distance somewhat insignificant for the workplace [13]. This has enhanced the possibility of remote surveillance, multitasking and social isolation [13].

- have led to a proper review of work processes within most organizations (employees need to spend time and work to keep up with the new technology that can impact productivity).

- have brought large amounts of information (individuals are surrounded by information regardless of whether they are actively seeking it or not). At work, information is the key to organizational success, and employees need to handle a large amount of information from different sources as part of their daily activities. Previous research has shown that overloading with information can lead to stress, job complacency and health problems [5].

Overloading describes situations where employees are forced to work more and faster or to change their working habits due to NICT [19]. Employees are assaulted by information, feeling frustrated, which reduces their productivity [5]. These conditions are also known as "smog data" [3].

Techno-invasion creates a blurring of the boundary between work and personal, because employees feel they are "permanently connected" [19], which forces them to increase their number of hours of work (Figure 3).

■ Yes, regularly ■ Occasionally ■ No, never

Figure 3. The extent to which employees feel bound to be "connected" to NICT outside work hours, increasing their working hours

Source: « Bien-être au travail ou technostress ? » Une enquête du Service d'Etudes de la FGTB, BRUXELLES, LE 23 AVRIL 2013, <http://www.fgtb.be/documents/20702/177858/Bien-%C3%A4tre+au+travail+ou+technostress-FGTB23042013.pdf/c1db226c-5718-473d-b353-765c01513360>, accessed on 25.09.2017, at 11:35.

Therefore, employees feel that their personal life has been invaded and that they can never be disconnected from these technologies.

The technical complexity means that employees cannot cope with the complexity of new technologies [19]. Technologies are changing dramatically and are frequently introduced. Due to the competitive pressure, many companies need to update their systems frequently, which in turn requires changes in their working processes. At the same time, systems are becoming more and more complicated. And the training time for their use and implementation of the new systems could be extended to several months. This situation obliges employees to spend time and effort constantly to acquire NICT skills.

Technological insecurity is associated with the situation where employees are afraid they will be replaced by staff with advanced skills in using NICT, or they may lose their jobs due to automation resulting from their introduction. Studies have shown that NICT users may be passionate about the initial learning of new technologies, but constant training and updating can ultimately cause frustration, stress and dissatisfaction at work [22].

Tehno-uncertainty refers to uncertainty about technology, due to constant changes in hardware and software of NICT systems. Organizations move from one cycle to another, with very little time between NICT upgrades. This creates uncertainty for employees; that he must continue to learn the new technology. Furthermore, system updates require decisions on system configuration and customization, often a highly stressful process [13].

Therefore, a high (abnormal) level of occupational stress (Figure 4) can generate nervousness, tension, anxiety and depression, affecting the health of employees.

- Normal stress level in a modern professional environment
- Stress level corresponding to a tense situation
- Abnormal stress level in a professional environment

Figure 4. The level of stress in a modern professional environment

Source: Mémoire d'expertise comptable "La gestion du stress en cabinet d'expertise-comptable : proposition d'un diagnostic et d'outils de prévention" Claudine Locheron – Session novembre 2009

As these negative effects persist over time, they can cause heart disease, but also a combination of mental and behavioral instability. In other words, techno-stress affects people's health not only physically but also mentally (Figure 5).

Figure 5. How employees feel affected by NICT use at work

Source: « Bien-être au travail ou technostress ? » Une enquête du Service d'Etudes de la FGTB, BRUXELLES, LE 23 AVRIL 2013, <http://www.fgtb.be/documents/20702/177858/Bien-%C3%A4tre+au+travail+ou+technostress-FGTB23042013.pdf/c1db226c-5718-473d-b353-765c01513360>, accessed on 25.09.2017, at 11:35.

Early signs of techno-stress are pain in the hands, wrists, fingers, neck, shoulders or arms, headaches, difficulty sleeping, difficulty concentrating, irritability, and low morale (Figure 6).

Figure 6. Frequency felt by employees regarding the appearance of symptoms of techno-stress

Source: « Bien-être au travail ou technostress ? » Une enquête du Service d'Etudes de la FGTB, BRUXELLES, LE 23 AVRIL 2013, <http://www.fgtb.be/documents/20702/177858/Bien-%C3%A4tre+au+travail+ou+technostress-FGTB23042013.pdf/c1db226c-5718-473d-b353-765c01513360>, accessed on 25.09.2017, at 11:35.

In other words, technological use in the workplace has helped to increase the level of occupational stress of employees. Research shows that the worker's workload has increased due to the introduction of technological use in the workplace [11]. The most commonly used NICT tools in the workplace are computer (PC), laptop, GSM services, mobile phones (smartphones) and tablets (Figure 7).

Figure 7. NICT tools that are constantly used at work

Source: Mémoire d'expertise comptable "La gestion du stress en cabinet d'expertise-comptable : proposition d'un diagnostic et d'outils de prévention" Claudine Locheron – Session novembre 2009

Employee interaction with the PC creates more workplace stress than other tools (Figure 8), as employees experience feelings of agitation and stress-generating nervousness as a result of possible loss of information.

Figure 8. Stress-generating tools for employees during working hours

Source: « Bien-être au travail ou technostress ? » Une enquête du Service d'Etudes de la FGTB, BRUXELLES, LE 23 AVRIL 2013, <http://www.fgtb.be/documents/20702/177858/Bien-%C3%A4tre+au+travail+ou+technostress-FGTB23042013.pdf/c1db226c-5718-473d-b353-765c01513360>, accessed on 25.09.2017, at 11:35.

Technological development has been rapid in the last decades, and maintaining the pace itself is a stress factor [14]. However, although both performance and communication have improved due to technology, it has also burdened employees with overloading information [10].

6. Dismantling the arguments against

Among the different types of work-related stress, techno-stress has a significant impact on the modern organization, whose activity is dependent on the use of NICT. Initially, technology has increased work precision and efficiency, but at the same time it has caused physical and mental stress. Even the type of stress caused by the use of different technologies at work differs according to the type of workplace. In order to diminish the negative aspects generated by techno-stress, coping mechanisms have been developed, including: stress management program, training program, awareness of techno-stress causes, acceptance of technology use and effective communication.

6.1. Stress management program

Tehno-stress caused by new technologies may be diminished or even eliminated through appropriate stress management programs for each type of work [15]. For example, inappropriate use of the keyboard and mouse may be a cause of stress in the workplace. A measure in this regard is to maintain a proper body position while working with these devices and to reduce stress in the muscles, bones and tendons (too much pressure during typing can cause stress, so there is not much to be taken on fingers while writing) [15]. Also, the way we use the phone adds to the cause of our daily disorder at work. Another finding is that stress caused by long hours of work can be reduced if small breaks are taken every 30 minutes [15]. Thus, the importance of stress management techniques should be taken seriously by organizations to avoid rising costs due to low productivity, high absenteeism and turnover, etc [7].

6.2. Training programs

Due to a lack of better understanding of the negative impact of techno-stress at work, individuals suffer at the organizational level. But with a better understanding, workload and lack of control at the workplace can be treated and even eradicated [8, 20]. Using the training program can be an effective way to minimize stress [8, 20]. It helps employees learn about the benefits of using email in the workplace and if a constructive email culture

can be introduced then it will reduce work-related stress. Instead of using only email for communication, you can alternatively use your phone. The effectiveness of the corporate and personal communication style can help reduce the use of email that causes additional stress in the workplace. [8, 20]. Therefore, several steps have been identified to combat techno-stress, including: employee co-operation, the creation of an opportunity for all on practical training and dissemination of information, simplification of technical details to reduce anxiety and prioritization. Thus, with the support of the organization's leadership, this whole process can reduce the stress generated by the use of new technologies at the workplace.

6.3. Acceptance of NICT use

Employees in the educational environment (especially teachers) also experience tremendous stress [8]. This is due to the lack of acceptance of NICT use, and this can be reduced if teachers start to accept the use of different technologies for their work [8]. Once teachers adopt NICT, half of their mental stress can be eliminated [8].

6.4. Awareness of the causes of techno-stress

Stress can be minimized if all staff members are aware of the causes and consequences of stress caused by their work.

6.5. Changing the working process and the coping mechanism

The whole work process can be done in such a way as to identify the causes of unnecessary stress, but at the same time ensure that job performance is also improved through NICT. Using the Critical Incident Analysis method, it is explained that there are different types of stressors and different stressors, which require different coping strategies.

7. Conclusions

Today, the accelerated development of NICT has fundamentally changed both our professional and private lives [9]. Organizations must therefore continuously renew their processes, driven by new technology or technology upgrading. In this way, technology could have a negative impact on employees and organizational efficiency; for example, employees may suffer a technology stress caused by their inability to meet the requirements of using NICT [6, 13]. The technology world will continue to advance, and organizations will constantly introduce new technologies to keep up with the

competition. Employees may need to increase their daily interactions with NICT, which can aggravate potential negative effects. Working time at work and excessive use of NICT have increased stress among employees in modern organizations. The high level of techno-stress among employees leads to lower productivity, turnover, absenteeism and behavioral deviations in the workplace. Therefore, it is important for organizations to address these issues seriously and develop coping strategies to help employees cope with stress. However, it is suggested that effective training programs and leadership support help employees cope with techno-stress. In conclusion, the current organizational development trend requires an increase in NICT users' dependency, which means that employees need to complete more activities in a shorter time. NICT can change our ways of working and, ultimately, our behavior in ways that we do not fully understand [13]. More and more researchers are exploring different aspects of user attitudes or behaviors towards NICT at work [1]. So, techno-stress is an inevitable aspect of using NICT in the modern organization.

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