



The evolution of technostress: the use of artificial intelligence technologies and levels of employees' technostress in a workplace

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► To cite this version:

Yara Ayyash. The evolution of technostress: the use of artificial intelligence technologies and levels of employees' technostress in a workplace. Business administration. 2022. dumas-03922879

HAL Id: dumas-03922879

<https://dumas.ccsd.cnrs.fr/dumas-03922879>

Submitted on 4 Jan 2023

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Research Dissertation

The Evolution of Technostress:

**The Use of Artificial Intelligence Technologies and levels of
employees' technostress in a workplace**

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Date: from 01/02/2022 to 12/06/2022

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**M2 – Advanced ReseArch in Management of
Information Systems
2021 - 2022**

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Abstract

Technostress, that is the stress experienced by individual when using Information and Communication Technologies, is a phenomena that has been widely studied in the field of Information System research. With the fourth industrial revolution and the corporate world being heavily dependent on Artificial intelligence technologies in their daily processes, employees have been experiencing concerns and work pressure causing them to feel highly stressed and affecting their performance. This paper aims to study the different elements of technostress (techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty) that employees face and how do external factors such as performance expectancy and technology acceptance levels influence their technostress levels to help organizations management develop the right strategies and trainings for their employees.

The methodology used in this paper was the quantitative approach using a questionnaire distributed among employees in different AI-driven companies. The data was collected from 60 participants and analysed using SPSS software. Results showed that technology acceptance and performance expectancy have different influence on different techno-stress elements and indicated a relationship between the independent variables as well. This opens the path for future research to investigate more deeply on these relationships and establish the right management style for different experienced stress.

Keywords: Technostress, Information and Communication Technologies, Artificial Intelligence, Technology Acceptance, Performance expectancy.

ACKNOWLEDGEMENT

This dissertation has taken many efforts. However, it would not have been possible without the help and the kind support of different individuals. I would like to extend my sincere thanks to all of them.

It has been a great honor and privilege to be accepted and chosen as a student in the ARAMIS program 2021-2022.

I am highly indebted to Professor Céline Péréa for her guidance and constant supervision as well as for providing the necessary information regarding my research dissertation and also for her support in completing it. Her constant guidance and willingness to share her vast knowledge made it easier to accomplish my research on time with the best results and will always help me in my future career and all endeavors.

Also, I would like to express my gratitude towards Professor Carine Dominguez and all the professors who taught us throughout the year and made me reach the place I am in today. I offer my sincere appreciation for the learning opportunities they provided and the continuous encouragement they give for their students to go beyond their limits and reach their best.

Finally, a special thanks to my parents and family who always inspire and support me unconditionally to dream big and achieve all my goals

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INTRODUCTION

In an era of rapidly changing environment, insane technological advancement, globalization and uncertainty all around the world, humans now have to cope and stay up to date with everything around them. This means following up on all the technology inventions, updates and growth; whether in their professional or personal lives.

No one can deny that technology is an essential need in our everyday lives. We are all so reliant on technology that we are unable to function without it. It is significant because it is employed in every aspect of life. When you consider your daily routine and tally all of the technological devices you use in a single day, you will understand how significant technology is when you're using a mobile phone, watch TV, buy a vehicle, and use a pc or any electrical device.

In reality, the reliance on technology grows by the day, whether in interaction, transportation, information search, or amusement. With the advancement of space technology, humans have also made it to the moon. Technology may help with the existing while simultaneously bringing the future faster. As a result, technology is unquestionably significant in our lives. While digital communication has made our lives easier, it has also improved the pace with which they move. Exchanges that used to take weeks via letter may now occur in minutes on the opposite side of the planet. This may prompt us to do more.

However, with all the improvements and advancements that technology has brought to our lives; it is not possible to deny or ignore the huge negative impact it exerts on us. Sometimes people find their selves forcefully dependent on a technology that they haven't used before or learned how to use it. This creates some sort of stress that affects their lives and acceptance of these technologies. Some argue that due to the use of Information and communication technologies (ICTs), Organizations have received significant advantages in terms of worker productivity and effectiveness (Brynjolfsson, 1996; Dos Santos, 2000; Kudyba, 2002). Although, there is an affirmative base on the increased productivity, there also may be unexpected repercussions of

these ICTs that are counterproductive. The introduction of ICTs has created a continual sense of urgency and expectations that individuals need or are compelled to work quicker (Hind, 1998).

The highly competitive globalization of work has resulted in lean companies with cultures that praise employees who work exceedingly hard, work longer hours, and are linked to the corporation via ICTs 24 hours a day, seven days a week (Kouzes, 2000). This generates a feeling of being overloaded with work, having to be always connected and sort of invaded by work and these technologies also in private life. Moreover, having to always update skills to cope with the advancements and learn how to use these technologies so that the employee won't be replaced with better skills. All these worries and concerns are what create the phenomena of "techno-stress" which is defined by Tarafdar (2007) as *"one of the fallouts of an individual's attempts and struggles to deal with constantly evolving ICTs and the changing cognitive and social requirements related to their use"*.

Techno-stress has become an emerging field of research especially with the introduction of Artificial Intelligence (AI) technologies that is causing a fundamental change in different industries. Why has artificial intelligence become the interest of all organizations and industries?

AI helps an organization to transcend many of the previous limits of human-intensive process development by increasing the process's scalability, widening its reach beyond conventional bounds, and boosting its capacity to learn and adjust upon this run. It also allows for the development of alternatives that are more customer oriented than human-based methods. Firms are digitizing a rising number of vital business operations as they transition to an increasingly AI-centric operations strategy, eliminating human effort and management from the implementation of many critical operational tasks (Verganti, 2020). Although the term "artificial intelligence" refers to systems that can solve problems on their own, the current level of AI systems involves human participation. According to experts, AI may never be completely realized, or at

least not within the next two to three decades (Müller, 2016). Therefore, the implementation of these technologies are dependent on the levels acceptance of employees. A successful introduction of new information technology systems is unlikely if they are not accepted (Davis F. D., 1989).

The next point to be addressed is what elements affect the acceptance of Artificial intelligence by employees?

Performance expectancy is one of the most important elements to focus on when studying people's levels of technology acceptance. The extent to which they believe that this technology will perform to their own benefits determines they would likely accept or reject this technology. It also depends on how they believe that this technology will help them to attain gains in their job performance (Ghalandari, 2012). Performance expectancy is experienced by every individual prior to using a technology which in its turn determines their behavioural intention and attitude towards it. This is determined by two elements, how their expectations of its usefulness are build and to what extent they believe its easy to use based on their expectations. These elements are part of the Technology Acceptance model that is widely used among researchers to study individuals' attitudes and behaviours towards emerging technologies. Based on the TAM model , the levels of employees' acceptance of Artificial intelligence in company's and their daily job performance will be studies in this paper by targeting their levels of technostress.

Companies urge to implement Artificial Intelligence technologies in their daily processes have caused employees to be in a state of uncertainty and complexity, and at some point it created a fear of losing their jobs. Research also suggests that even routine office tools like email can cause stress for employees (BBC.com, 2018). This conflict requires organizations' management to act upon finding solutions to their employees integrate these technologies in their daily tasks to help improve and prioritize company's goals and gains. However, its not easy to understand where their

employees are struggling and what is the exact reason causing them to deal with technostress.

The objective of this paper is to study how employees' performance expectancy of technologies affects their technology acceptance levels which in its turn determines how employees face technostress in its five different dimensions.

The proposed model and results are expected to serve future research as a guide on which levels and what management styles should organizations focus on when developing strategies and coping mechanism for their employees to face technostress and accept Artificial Intelligence as part of their daily work routine.

PART ONE: Literature Review

CHAPTER 1 : Technostress

I. Evolution of technostress

The concept of technostress was first discussed in 1984 by Craig Brod, American psychotherapist, in his book *The Human Cost of the Computer Revolution*. In his book he aimed at analysing dramatic impact of new technology on life at work, home and how it affected the emotional, social, mental health and explored the cultural hazards of our fascination with computer technology; in this context he saw technostress as a disease and defined it as *“a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner.”* (Brod, 1984, P. 16). He derived this definition on the fundamental principle of stress, having the internal condition of the organism (or strain) an external incident (or stressor); and an experience resulting from a continuing interaction of both a person and their environment (Mason, 1975).

Many other authors studied this phenomenon and tried to give it a global definition, Arnetz and Wiholm defined it as *“ State of mental and physiological arousal observed in certain employees who are heavily dependent on computers in their work”* (Arnetz & Wiholm, 1997, P. 36). Weil and Rosen disagreed with C. Brod on defining technostress as a disease, and as a result they agreed on giving it another definition as *“any negative impact on attitudes, thoughts, behaviors, or body psychology caused directly or indirectly by technology”* (Weil & Rosen, 1997, P. 5). Although these definitions have been popular among authors who studied this topic, Connolly and Bhattacharjee argued that these classifications lack any theoretical or empirical validity, and suggested that technostress be researched as a dynamic, unfolding process rather than as a presumed, static black box (Connolly & Bhattacharjee, 2011).

Caro & Sethi viewed technostress from a transactional perspective as a *“a perceived, dynamic adaptive state between the person and the environment, mediated by sociopsychological processes and influenced by the nature of the technological environment”* (Caro & Sethi, 1985, P. 292). Therefore, technostress can be resulted from one's fear, anxiety, tension and unease when interacting with new computers

and machines that causes emotional rejection and intense repulsion, thus preventing them from learning and using these technologies. It can be noticed that these primary definitions were quite broad and general and authors observed technostress as a negative reaction and do not apply to the nature of stress, which is neither positive or negative. Tarafdar, Ragu-Nathan and T. Ragu-Nathan stated Individual efforts and difficulties in coping with continuously increasing and changing ICTs and the evolving physical, social, and intellectual needs associated with their use is what produces technostress (Tarafdar et al, 2007).

Technostress can be assigned to different factors or characteristics; Ragu-Nathan et al attributed it to three different technological and work environment characteristics. These characteristics can be defined as:

- The increasing dependency on ICTs (Personal computers, workplace apps, manufacturing applications, collaboration applications, and connection tools are all examples of technologies.) and the continuous software updates.
- The lack of knowledge or the difference of knowledge level between what is need from employees to perform tasks related to ICTs and the actual level of knowledge among these employees and their managers.
- the changed work environment and culture caused by these technologies. (Ragu-Nathan, 2008).

In an attempt to understand and study the growth, development and the classification of the scientific literature of technostress, Salazar-Concha (2021) performed a bibliometric analysis to provide a scientific map of technostress. They studied a total of 246 publications during the period of 1981 and 2017. Their analysis showed a growth and increase in the number of citations and publication on technostress since 2007 where three main articles were published and had been the most cited since then. Two of these articles built and validated a scale measurement on technostress

creators called the “Technostress Questionnaire” that has been used by many authors in their publications, these two articles are:

- *“The impact of technical stress on stress and productivity of roles”* (Tarafdar M. T.-N.-N., 2007)

- *“The consequences of technostress for end users in organizations: Conceptual development and validation”* (Ragu-Nathan, 2008).

Table 1 shows the main topics that were published on technostress in the studied period based on Salazar-Concha (2021) findings. As shown below in the first period 1982-2003 most publications were in the medicine and health domain, then after that period the scientific production shifted towards computer science, social science and business, management and accounting. Salazar also highlights on the Journals with the most notable number of research papers published on technostress with *Information Systems Journal* having the greatest impact factor.

Table 1 Top published scientific documents based on Salazar-Concha (2021)

Main topics published	1982-2003	Main topics published	2004-2011
Medicine	42%	Computer Sciences	32%
Social Sciences	17%	Social Sciences	21%
Computer Sciences	11%	Decision Sciences	8%
Engineering	8%	Engineering	8%
Business, Management and accounting	5%	Business, Management and accounting	5%
Psychology	5%	Mathematic	5%
Others	12%	Medicine	5%
		Psychology	5%
		Others	11%
Main topics published	2012-2014	Main topics published	2015-2017
Computer Sciences	37%	Computer Sciences	36%
Social Sciences	26%	Business, Management and accounting	10%
Arts and humanities	6%	Social Sciences	10%
Business, Management and accounting	6%	Medicine	8%
Engineering	6%	Psychology	7%
Psychology	4%	Arts and humanities	6%
Decision Sciences	7%	Decision Sciences	5%
Others		Engineering	5%
		Economics, Econometrics and finance	3%
		Others	10%

“Technostress is an emerging research field with little fragmentation. The results show that the research field is in evolution and has not yet reached a state of maturity” (Salazar-Concha, 2021, P. 12)

In an organizational context, it has been agreed among researchers that ICTs use in organizations have a wide range of direct and indirect effects on employees. They cause negative reactions in individuals and require them to adjust in various ways (Hudiburg, Pashaj, & and Wolfe, 1999). Technostress according to Tarafdar (2007) , is a problem of adaptation that an individual experiences when he or she is unable to cope with, or get used to, ICTs. As organizations are becoming more technologically dependent, and employees are forced to adapt and integrate with machines to perform their daily tasks rather than working on them manually; they experience stress at work on a daily basis as this requires them to be connected and on their phones and laptops even outside working hours. This has led to the rise in interest among researchers to study the organizational environment’s influence on employees job stress.

Hendrix (1995) identified and studied three factors that cause stress for employees and affect their productivity: Interior and exterior organizational factors, and individual characteristics; pointing out that the internal organizational factors have the highest direct influence on job’s temporal stress, including decreased efforts, involvement and managerial control and organizational environment.

Focusing on the organizational internal factors Wang, Shu, & Tu (2008) studied the effect of an organization’s centralization levels and their innovative environment on the level of employee’s technostress and argued that employees’ lack of participation in the decision-making processes of new technology introduction may also increase computer-related technostress and that an innovation oriented organizational culture often promotes frequent technological changes and internal environment changes, which are important antecedents to individual stress. From the understanding of different studies about the organizational role in increasing technostress, it can be

said that employees experience different levels and types of technostress based on the organizational culture and the internal environment. According to this, management and decision makers in organizations play an important role in taking measures and setting strategies and coping mechanisms to reduce or alleviate technostress among their workers and enhance the overall satisfaction and performance. Several researchers attempted to dig deeper and understand the different levels experienced by employees during and outside their working hours. Below, presented quotes from different interviewees in two recent studies done on technostress:

1. Zhao, Xi; Xia, Qihui; Wayne, Wei Huang (2020)

-“Time is limited. When I have to spend more time on learning complex technologies, I tend to treat it as an obstacle to my gains because my efforts putting on learning a new technology may not be valued by others if I can’t finish my work in time.”

-“Technologies are developing so fast that we do not know when my knowledge will be outdated. It can be tomorrow. I can’t fall asleep every time I think about losing my job. It’s quite a bad feeling that makes me get anxious easily.”

-“I can’t say no to my boss if he asks me to work on weekends. ... I would regard it as an opportunity for me to make a good impression on my boss that I’m working hard. In this case, I may adjust my time to do work at home. Meanwhile, I may also complain about it in private because my rest time is occupied and I feel unhappy about it.”

-“Technologies are developing so fast. It threatens me that many of our works may be replaced by Artificial Intelligence in the near future. This feeling forces me to keep improving myself in order not to be eliminated by the world and to prepare for my future.”

2. Thomas Fischer , Alexander Pehböck , and René Riedl (2019)

-“What I fear is that everything can be checked. What I do, what I say ... internal support can check everything. ... That leads to ... pressure.”

-“For example SAP, something like that is extremely complex. ... if you find the time to use it and get used to it... then you get able to handle such a system. Yet, that time is often missing.”

-“As soon as I am awake, I basically look into it all the time and react to them [i.e., e-mails]. Because there is an implicit demand and our customers get really angry when they write an email on Sunday and do not get a response”

These examples illustrate the experienced stress in different forms, each of them focuses on one aspect of technostress. This shows that different factors can contribute in developing technostress among employees. Therefore, previous research agreed on five dimensions of technostress that were first developed by Tarafdar et al (2007) and used up to this date by other researchers studying this phenomena.

II. Dimensions of Technostress

Dimensions of technostress can be referred to as “technostress creators” or “techno-stressors”, that are the factors causing technostress among employees in an organization. Studying and understanding technostress creators and which of these stressors has the highest and most direct effect on employees is of utmost importance for the organization’s management. This would help managers limit their effects on job satisfaction, role stress and their loyalty and commitment towards their work environment and organization; which, in its turn causes behavioural stress and anxiety that leads to lowering individual’s performance and productivity.

This is why research on technostress paid huge attention on identifying the causes related to technostress and came to an agreement on recognizing five main components of technostress:

- **Techno-overload:** refers to ICT’s potential to push employees to work much faster and for longer (Tarafdar M. T.-N.-N., 2007). It also describes the technical issues caused by stress-creating characteristics of multitasking and excessive information. Introducing new technologies or software applications can negatively affect employees’ productivity where they will be forced to be multi-tasking and putting more efforts in keeping up with these new introductions and to fasten their information processing duties. In many jobs that require creativity, innovation and thinking outside the box, techno-overload can restrict these aspects of the job where the multi-tasking causes them to process information in a hushed and poor manner leaving them with little time and effort for paying attention to creative task completion. Pullins (2001) explained

techno-overload through salespeople who will become more routinized and programmed as a result, instead of being cooperative and of real worth. In these circumstances, it is impossible for them to co-create and invent or generate innovative and new ideas for their consumers. Lewis (1996) characterized Information fatigue syndrome (IFS) as a special form of exhaustion and weariness that individuals deal with, caused by the use of ICT that stems from the today's information Age obligations and from having to cope with information overload. This can also result in weak decision making, trouble memorizing and recalling, and a poor attention period.

- Techno-invasion: a second component of technostress that Tarafdar (2007) refers to as the intrusive influence of ICTs that generates scenarios in which users might easily be contacted at any time, this causes the employees to feel the necessity of being continually "connected" even outside work hours and during their vacations. This affects also their personal lives and their relationships with their friends and families. This is due to having IS application, global networks, smartphones and mobile devices used for work purposes such as receiving calls, emails and other work interruptions at any time and any place. End users are left with the impression that they are never independent or away of technology, constantly under control or on demand and that their private life has been violated (Tarafdar M. T.-N., 2011). As a result, they feel that the barriers or the walls separating their work from their home and private life are demolished, leading to frustration with the software and applications that they are working with. With the Covid-19 Pandemic in the past two years and the new work from home policy that organizations relied on, employees witnessed an increase in stress due to the techno-invasion through different online applications including personal online social platforms (e.g. WhatsApp) became a way for managers to communicate with their employees to keep them working and connected.

- **Techno-complexity:** the third component is concerned with the feeling of incompetent that employees experience in terms of their skills and abilities to understand and cope with the complexity of the newly introduced ICTs. This leaves them with no option other than putting more time and effort studying and comprehending the different components of these technologies. According to Tarafdar (2007), most users do not truly comprehend the importance of utilizing these technologies as they find their diversity and their features very intimidating and overwhelming. The substantial adjustment and preparation needed for using ICTs causes dissatisfaction and poor performance towards these technologies as they need constant technical help. Especially with technologies advancement and innovation which adds the unpredictability and surprise element; employees are left with little routine tasks and a lot of effort and work becomes necessary to complete their tasks which makes their job more complicated (Alterman, 1993) and puts them under pressure. According to Fauscette (2014), technical complexity generates a variety of issues, including increased strain, high operating expenses, lower productivity among employees, and increased competitive disadvantage. They argued that, complexity is frequently an unavoidable cost of going digital. Tarafdar explain techno-complexity on salespeople saying that Because of technological complexity, they are expected to learn new skills on a regular basis in order to use IS, which they are frequently reluctant or unable to accomplish. As they fail to apply their previous solutions to new technologies, the amount to which they can do their technology-mediated activities innovatively falls.
- **Techno-insecurity:** refers to the premise that ICT's nature is to change regularly, and that this may threaten employee job security. Techno-insecurity according to Tarafdar (2007) describes a situation in which workers fear losing their careers due to a new ICT overtaking their job, or to other individuals who have a better grasp of the ICT. It may cause anxiety and low confidence for employees and thus preventing them from performing their tasks as expected

and required. Same as the other components of technostress, it leads in poor judgments of application support and computer expertise sufficiency, resulting in frustration with the utilized applications and software (Tarafdar M. T.-N., 2011). Furthermore, this continuous fear of losing their job generates non-collaborative professional actions such as hiding knowledge and new information from co-workers and creates competition among employees which affects negatively their team work and individual performances as well as a discouraging work environment.

- **Techno-uncertainty:** refers to situations in which ongoing modifications and upgrades in a ICT disturb users and cause uncertainty for them, as they are forced to continually learn and train themselves about the latest ICTs (Tarafdar M. T.-N.-N., 2007). This continuous need for always being updated and having renewed information and knowledge about these technologies creates a sort of dissatisfaction for the users (Nelson, 1990). As the existing knowledge and expertise becomes outdated and no longer valid for the new application, employees will have to continuously learn and stay updated leading to their stress and frustration (Weil & Rosen, 1997). It is argued that innovation is associated with uncertainty regardless of the result whether the change is for the better or not and this leads to job dissatisfaction and turnover intention as a result of the stress the employee experience (Mantler et al, 2005 ; Griffin and Rafferty, 2006). One aspect of innovation is unpredictability and whether the desired outcome or goal is achieved cannot be determined in advance or with the existing knowledge. Technological change and innovation is fraught with unpredictability and uncertainty despite being a key component of long-term economic growth; once an advanced technological competency is established, the questions alters and new uncertainties, particularly those of a strictly economic type, begin to emerge. (Rosenberg, 1998). Rosenberg explained this in commercial aviation field as it can be sought to be similar in context; he

argued that the prediction of the future advancements of jet engines, after being introduced, was a failure even to people at highest scientific levels.

As we're witnessing a rapidly changing environment and continuous technological advancements, the introduction of Industry 4.0 has placed an enormous pressure on the corporate world in adopting the newest updated technologies implying higher levels of stress among workers. Thus, researchers have put a great deal of effort to theorize stress in the workplace and understand the fundamentals of this phenomena. Therefore, in the next section, different organizational theories will be presented and discussed to elaborate on the theoretical adoption of technostress.

III. Organizational theories on Technostress

Numerous researchers, including those at the Tavistock Institute in London, proposed that a combination between two sub-systems was needed to overcome workers' difficulties and attain the desired benefits from management while studying the resistance of the work force to innovation and, in particular, the introduction of technological systems for work automation. Bostrom (1977) argued that The Socio-Technical System approach sees the organization as a work process comprised of two interconnected subsystems: the technical system and the social system. The two subsystems were described as follows:

- The technical system is focused on the procedures, activities, and technologies required to change input into outputs for example raw materials into products.
- The social system is involved with people's connections as well as their characteristics such as perspectives, abilities, and values.

It is importance to understand The Socio-Technical System theory and the link between the techno and the social sub systems because, according to Emery (1959), Employee behaviour and job design are so interconnected that understanding technological processes necessitates understanding social processes. Moreover, STS can be used a proactive tool to detect technostress related issues and solutions

beforehand to increase work efficiency and lead to a better decision making process.
(Davis M. C., 2013)

Tarafdar (2007) utilized Socio-technology theory to describe how the installation of ICTs impacts the role of employees in the business to measure the influence of Information and Communication Technologies on role stress and productivity. They proposed and validated their hypotheses based on this idea.

For better understanding and gaining a clear overview of how employees perceive technostress in the organizational world, Fischer (2015) developed a theoretical framework based on cybernetics as they believed that Cybernetics as an explicit theoretical approach, provides further insights on Technostress. They built their framework upon two models that have been applied in stress research: "*Cybernetic Theory of Stress, Coping and, Well-Being in Organizations*" and "*Cybernetic Framework for Studying Occupational Stress*" by Edward , and Cummings and Cooper respectively. Cummings and Cooper (1979) based their framework on the concept that living systems tend to maintain a type of steady state, with each variable having a certain level of stability. Any factor that disrupts this steady state, jeopardizing a variable's level of stability, is described as stress, and necessitates an adjustment procedure ((Cummings & Cooper, 1979) ; Cummings & Cooper, 1998). According to Edward's model, Stress is caused by a contradiction between an individual's belief or perception of their current situation and their desired state. (Edwards, 1992). He also claimed that the actual state influences the perceptions of individuals. So, the proposed framework was built upon five categories that can be operating as triggers or antecedents of technostress experiences among employees. These categories are the individual and job characteristics, technological, organizational and social environment. In terms of technostress, the technological environment has the major impact and importance of all the categories; its characteristics are direct stressors that can lead to biological stress and cause health issues (Ayyagari, 2011; Riedl, 2012). This theoretical framework could be a basis for research on how individuals in

organizations rate and perceive tasks related to ICTs in their values and desires which could help in drawing insights from the emerging strains inside the technostress research field. Moreover, Cybernetics is commonly used for explaining and figuring out human behaviour in stress theories where stress is considered to arise from individual's attempts to adapt through collecting and processing information and using feedback for establishing coping mechanisms and this could be a successful approach for studying technostress.

The organizational perspective in studying technostress and its influence has been limited in the Information Systems field; most of the research found is based on experimental and observatory studies rather than focusing on theoretical or conceptual background. One aspect to study the causes of technostress on individuals is to understand their social and psychological behaviour towards the new technologies. Two of the most used and adopted theories in this context are the Theory of Reasoned Actions and the Theory of Planned behaviour.

The Theory of Reasoned Actions was first developed by Martin Fishbein and Icek Ajzen in 1980; they proposed that the willingness of performing is what drives or decides a person's behaviour and this intention is a product of one's attitude regarding this behaviour and its surrounding norms. This means that the intention of a person to accomplish or attain a behaviour increases and becomes stronger when the attitude and subjective norms are more beneficial and desirable. Based on the Theory of Reasoned Actions, Ajzen (1991) explains the Theory of Planned behaviour by adding the perceived behavioural control to the first theory. With these three factors, this theory claims that a favourable attitude, a strong subjective norms with a high perceived behavioural control increases one's intention which in its turn results in performing a behaviour.

These two theories were used in IS research to understand people's adoption and utilization mechanisms of new ICTs. In addition, Karahanna (1999) highlighted on the importance of distinguishing between user's acceptance of technologies and user's

continuance in using these accepted technologies. Technology Acceptance Model developed by Davis (1989) is widely used in technology acceptance research that aims to understand why are ICTs adopted and used by people. This theory claimed that user's motivation to use a system is influenced by external factors that are comprised of the real system's attributes. These are the Perceived Usefulness, Perceived Ease of Use and Attitude towards using the system. These theories form the theoretical foundation in research on technostress that aims to study individuals' behaviour towards ICTs and their acceptance and usage of these technologies and as a result understand the root causes of stress in a work place and in their private lives. Moreover, (Tarafdar M. T.-N., 2010 ; Ragu-Nathan, 2008; Ayyagari, 2011) argued that users and their environment determine their perception of technostress. This means technological characteristics, users characteristics and difference in their personalities and the organizational environment reflect their perceptiveness and level of technostress. This is based on the Transactional Model of Stress and Coping by Lazarus (1966) which focuses on the fact that stress is dependent on each individual and it differs from one to another and that it is an interplay between them and their environment where an individual analyses potential negative impacts through initial assessment, and then picks coping behaviours through secondary evaluation.

Another organizational theory of Stress that was adopted in technostress research is Person-Environment Fit Model by Caplan (1983) which defines stress as a misalignment and inability of matching a person's characteristics and their environment. The Job Strain Model by Karasek (1979) focuses on the impact of environmental factors, particularly work structure, on the individual. It contends that high job requirements combined with limited job choice freedom result in job stress.

The Task Technology Fit theory proposed by Goodhue (1995) and Goodhue & Thompson (1995) as a theoretically defined evaluation construct that examines certain features of technology and sought to explore how the usage of technology influences performance. It is a theoretical framework for understanding the interaction of three

variables; technological functionality, task objectives and needs, and individual capacities. According to Goodhue D. L. (1995) a greater match between technology, task needs, and individual skills would lead to improved performance, i.e., more efficient task completion. Although utilizing technology can add to technostress, having an ideal match between technological functionality, activities, and individual skills can help to reduce it (Ayyagari R. G., 2011). Technology that empowers employees and fosters employee self-motivation and well-being will increase job satisfaction and work productivity and performance (Cascio, 2016). Therefore, it is essential to note and emphasize the significance of this theory in the organizational setting as it provides an opportunity for managers and organizations to put an effort in optimizing the alignment between technology used by employees and the tasks they're using this technology to accomplish to be able to control and minimize the levels of technostress and thus prevent it from being an impediment to productivity and improved performance.

CHAPTER 2: Influences of Technostress on employees in work place

Since the first scientific-technical revolution in 1940, dependency on technology has been increasing as men's interaction with machinery has been rapidly evolving and as a result their struggle to adapt to the situation and to establish a coping mechanism hasn't been an easy journey, in fact it has been progressing and expanding with time as there has been four different technological revolutions and each time new complex and advanced machines and computers are being introduced. As discussed earlier, research has paid a great deal of attention to studying technostress associated with the four industrial revolutions and the technological advancements over the years and recently we are beginning to understand how some features of ICTs, such as continual connectedness and accessibility, which are connected to technostress and its bad repercussions, may also push individuals to use them for beneficial outcomes such as more job flexibility. Therefore, technostress can have both negative effects as well as positive effects, this is also supported by the transactional theory of stress (Ngai, 2014). People can have different reactions to changes, whether being internal or

external, small or big change. Therefore, in this section two concepts generated from technostress will be discussed representing the influence or impact of technostress on employees. These two separate stress-related events are described by the concepts of "Eustress" and "Distress." (Selye, 1974). For better guiding future research on technostress, Tarafdar M. C. (2019) presented a framework describing how IS can be designed to either enhance techno-eustress or mitigate techno-distress.

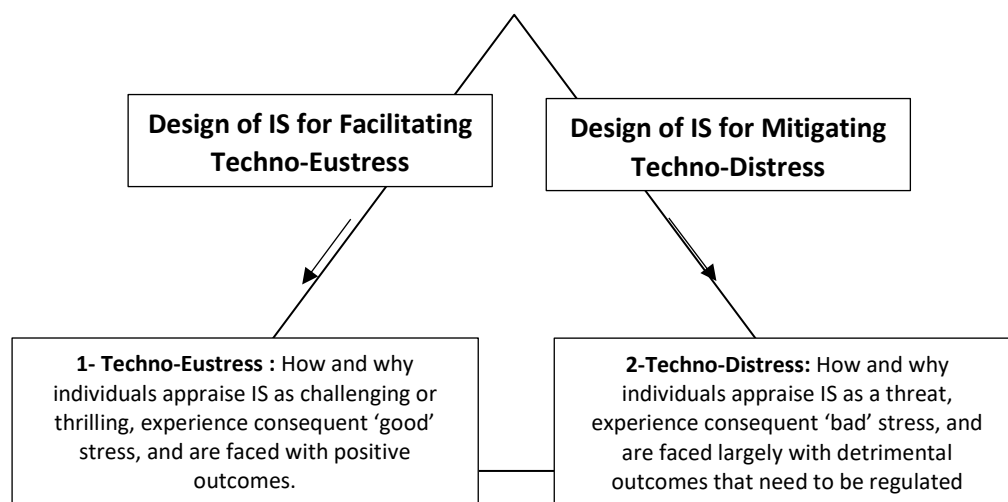


Figure 1 the technostress trifecta, Tarafdar (2019)

I. Techno-Eustress

Based on the definition given by Tarafdar, Cooper, & Stich (2017) Eustress is stress that results in a challenge or an opportunity, it describes how people see ICTs as hard or exciting, and how this causes them to experience "good" stress, which pushes them to participate in coping behaviours that contribute to stronger and positive results. It symbolizes ambition, aspiration and hunger for achievement (Selye, 1974). Techno-eustress is the phenomena that encapsulates the good stress that people experience when they use information technology. Individuals see IS features as difficulties that they are driven to handle because they believe that doing so will lead to improvement, activate coping behaviours to master the obstacles in a good way, and achieve generally affirming and successful results. All of this results in the individual experiencing "eustress" or "positive" technostress. This concept of eustress as "good stress" is based on the Yerkes-Dodson Law, which

asserts that *"increasing stress is beneficial to performance until some optimum level is reached"* (Le Fevre, 2003). This means that being more productive, efficient and performing effectively can be simulated by stress and people can achieve better results than when not being stress. Previous studies findings indicate that eustress has been viewed as both a process and a product, meaning that eustress can have an impact on the process in terms of both the behaviour to the stressor and the quality of the final outcome or product (O'Sullivan, 2011). One of the earliest attempts to study the existence of eustress was a study done by Gmelch in 1983, who examined a baseball game and players performance in order to explore a connection between stress and effective performance (Gmelch, 1983). He discovered that at a particular degree of stress, players performance was at it peak. In this scenario, stress improved the athletes' performance skills. The techno-eustress process results in beneficial outcomes that have a positive and reinforcing influence on the individual. They might include, for example, higher performance, efficiency, and innovation in job duties as a result of the application of ICTs (Tarafdar, Cooper, & Stich, 2017). Previous research suggests that sharing IT knowledge and expertise generates an atmosphere of general understanding and common set of standards among employees which in its turn allow managers to understand how to spread eustress in their employees (Ragu-Nathan, 2008 ; Hargrove, 2013). Moreover, the subject of Organizational Behaviour has frequently investigated both the beneficial and bad consequences of workplace stress. High-powered executives were interviewed about the impact of working stress in a research done by Benson and Allen in 1980. The findings indicated that people were more successful in the corporate context while under stress, but that too much stress should be avoided (Benson, 1980). This demonstrated the possibility of existing both eustress and distress in the workplace. This approach leads managers to aim to keep a constant level of stress for their staff rather than attempting to eliminate all stress (Le Fevre et al. 2003). Nevertheless, given that

managers understand that increased stress is harmful, the objective is usually not to boost stress but to try to regulate it at an optimal level.

II. Techno Distress

Techno-distress embodies “how and why individuals appraise IS as a threat, experience consequent ‘bad’ stress, and are faced largely with detrimental outcomes” (Tarafdar et al. 2019, p. 21). Empirical study on technostress often portrays it as causing a number of negative effects, both for individuals and businesses. For example, techno stressors have been connected to a variety of outcomes, including poor innovation (Tarafdar et al. 2011), low work engagement satisfaction, low organizational commitment, and low commitment and loyalty (Ragu-Nathan et al. 2008). Individuals perceive IS features as frightening and posing challenges beyond their ability to handle. Distress has been conceptualized and measured through constructs such as unease, sadness, depression, negative attitudes, and lack of self-esteem (McVicar, 2003). It can result from fundamental conflicts between people and technology, which must operate in parallel in functioning work units (Kolbeinsson, 2017). As a result, work environment factors such as information synchronization, job intensity, and working hours can all have an impact on employee discomfort causing them distress (Sellberg, 2014). It is important also to understand the different characteristics of people and organizations that affect how they perceive technostress as these characteristics may raise the possibility of IS features being viewed as threat techno stressors. For example, people with low self efficacy are more prone to see increased job demands as a threat which potentially undermine an individual's confidence in coping with IS qualities like flexibility and speed of change, as well as enhance the impression of threat attached to them (Compeau, 1995). As for organizational characteristics, a traffic monitoring culture entails IS-enabled tracking of employees, which might develop in them worries of job instability, violation of privacy and confidentiality, and invasion of personal boundaries (Zuboff, 2015). Also, Organizational requirements of responsiveness for work outside of work

hours may compel employees to reply rapidly to communication such as e-mail, SMS, or networking apps (Barber, 2015). Individuals in such companies may regard dependability and presentism as dangerous circumstances that drive them to be accessible for work at all times. Therefore, Tarafdar, Cooper, & Stich (2017) studied the outcome of technostress based on the notion that the degree to which individuals have control over their own IS usage allows them to select when and how they use IS, making them feel less intimidated and overwhelmed by its qualities.

CHAPTER 3: Artificial Intelligence and Technostress

I. What is Artificial Intelligence?

Artificial intelligence (AI) started out as a fantasy, its past is littered with illusions, potential, and demonstrations. Imaginary mechanical helpers have been a part of everyday life since a very long time. However, it has only been in the last half-century that the AI community have been able to develop experimental devices that test ideas about the principles of cognition and intelligent behaviour, therefore demonstrating processes that were previously merely theoretical possibilities (Buchanan, 2006). In Science fiction the possibility of autonomous intelligent robotics had been exploited to develop the notion of intelligent nonhumans while also causing us to reflect on our own human qualities. The research and engineering of creating imaginative systems, mostly computer programs, is known as artificial intelligence.

To give it a definition Kok et al (2009) described it as a discipline of computer science that is mainly devoted to the development of intelligent computers that function in the same way that people do. This entails the creation of machines or computers capable of engaging in human-like mental processes such as learning, understanding, adjusting, self-correction, and so on, as well as behaving rationally. Artificial intelligence is now used in different domains and fields; forensic Science (Jadhav, 2020), such as gunshot detection, huge digital data analysis, building statistical evidences, cybercrimes and digital evidences detection and fingerprint

comparison and identification in a more precise and faster rate than humans. It is also used in criminal investigation such as a pattern, human and hand writing recognition. It is obvious that Artificial Intelligence powered tools, computers, or applications may assist specialists or researchers in reducing the amount of time required for various activities at various phases of an inspection and research.

Artificial Intelligence in the Industry 4.0 is mainly applied through dig data, machine learning and IoT (internet of things). The benefits of artificial intelligence include longevity, reliability, and cost-effectiveness while also including unpredictable and rapid speed in critical thinking, solving problems or reaching a solution. Artificial intelligence appeared to be implemented in a variety of disciplines; its applications are some of the top up-and-coming technologies that appeared to be in desperate demand on the market (Kherdekar, 2022), it can enhance organizational performance, productivity, efficiency and customer satisfaction. According to Wang, Wei, Lu, Alsaadi, Hayat and Zhang (2019) , AI may also be used for Enterprise resource planning (ERP) by assisting managers in making consumer decisions, recommending innovative product development and process management, and modifying human allocation of resources based on changes in consumer demands. This is supported by Singh (2017), who stated that managers can be assisted with their products' positioning and development through AI algorithms that provide them with deep information and insights with speeding up customers' feedback analysis process.

AI and big data analytics have been widely used in supply chain and operational management. For example, in healthcare, many web apps have increased efficiency in clinical procedures such as surgery scheduling and image analysis with the goal of diagnosis and illness prediction (Panch, 2018). The digitalization and automation of manufacturing activities, fuelled by big data and machine learning, has resulted in ground-breaking production facilities such as self-learning factories. Also, there's the use of artificial intelligence in retail businesses.

E-purchasing provides online retailers with a wealth of information about consumer browsing trends and purchase habits, which helps in creating future offers and product while efficiently managing their inventory (Dogru, 2020).

Having mentioned the importance of AI in different disciplines and the benefits brought it with, there is now a clear idea of why companies from different sectors are very eager to implement AI in their daily processes and to impose it on their employees for using them. The next section will be devoted to comprehend the influence of this imposition on employees well-being

II. Artificial Intelligence influence on employees' technostress.

Today's businesses are in great need of remaining competitive and viable with the trends, which has led them to become heavily reliant on applying technologies interventions and having them implemented in their organizational processes. This, as previously discussed and based on the literature review, has led to multiple beneficiary outcomes. However, as a result, employees are always under the pressure of having to adapt to these technologies which leaves them with an overwhelming feeling and effort of the necessity to cope with all of this constant and extensive use of technology in all operations (Ragu-Nathan, 2008; Tarafdar M. T.-N., 2011). Although AI has been proven to increase organizations processes and thus result in increased profits and efficient overall performance, the technostress it generates among employees can cause a real complication and act as an obstacle to what companies seek to achieve when adopting these technologies. In an attempt to study the Impact of artificial intelligence on employees working in industry 4.0 led organizations, Malik (2021) stated that employees find it difficult to comprehend AI-related applications as they believe that these applications are technically advanced and too complicated and sometimes new apps may not produce the desired/intended results. AI 4.0 necessitates employees upgrading their skills using the latest technologies; they must learn about new systems and develop their own use cases and thus may attempt to spend much longer shifts

with the new AI program in order to comprehend the difficulties. This causes information overload and technostress, which leads to decreased job satisfaction.

Because automation and the implementation of AI has led in omnipresent technostress in companies, there is a significance need to create and implement organizational strategies to counteract this growing threat and capitalize on its advantageous attributes. While advanced technology interventions grow to challenge organizational human capabilities, it is crucial to have a thorough knowledge of both the bad and beneficial effects, such as technostress. Not only will it fill conceptual gaps, but will also meet real management demands, assisting them in developing precautionary measures. One aspect to look at when studying how AI's influence on employees technostress is to understand how employees expect these technologies to perform by understanding the benefits and gains associated with them and how they accept and perceive the usefulness of these technologies.

A. Technology Acceptance Model:

Based on the Technology Acceptance Model (TAM), Users' intentions and acceptance of computer technology are influenced by perceived usefulness and ease of use (F. D. Davis, 1989). Previous research has demonstrated that developing a favourable association between user trust and emotional stability throughout AI system operation facilitates the implementation of new innovative products.

-Perceived usefulness, refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320);

-Perceived ease of use, refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).

According to TAM, if a technology or innovation improves a person's performance while not significantly increasing the work expected to accomplish a function, it is

regarded as helpful and easy to use, and the person is more likely to implement the technology. Taking Amazon's Echo (Known as Alexa) as an example, in the smart speaker market Amazon sold 31M units compared to Google Home that sold 14M. When compared to Google Home, Amazon has a market edge because to its leading role in the smart speaker sector, and consumers love the ease of use of Amazon Echo, which links more than 12,000 products from 2000 manufacturers (Business Wire, 2018). Studying the components of this model serves as a basis for understanding the psychological response and attitudes of technology users. According to Alhashmi, Salloum and Mhamdi (2019) the perceived usefulness and perceived ease of use influence the attitude towards using technologies, their behavioural intention and their actual use of the technology. Several studies used the TAM to study the acceptance of various technologies such as wearable devices (smart watches and fitness track), Business intelligence Systems, smart indoor technologies (Yang, 2016) ; (Wang C. , 2016) ; (Kim, 2015)). Hence the technology acceptance is a main factor that plays a huge role in AI technologies implementation that organizations and management departments should study and take into consideration when introducing them and understanding their employees' reactions towards accepting them or not. Accordingly, the following hypotheses, describing relationships among variables were developed:

H1a: Perceived usefulness decreases employees' techno-overload
H1b: Perceived usefulness decreases employees' techno-invasion
H1c: Perceived usefulness decreases employees' techno-complexity
H1d: Perceived usefulness decreases employees' techno-insecurity
H1e: Perceived usefulness decreases employees' techno-uncertainty

H2a: Perceived ease of use decreases employees' techno-overload
H2b: Perceived ease of use decreases employees' techno-invasion
H2c: Perceived ease of use decreases employees' techno-complexity

H2d: Perceived ease of use decreases employees' techno-insecurity

H2e: Perceived ease of use decreases employees' techno-uncertainty

B. Performance Expectancy

The degree to which a person feels that adopting the system would aid his or her gains in work performance is known as performance expectation (Venkatesh et al., 2003). This concept is seen to be the best determinant for the intention in the individual TAM. According to Sujin et al, (2009) peoples' intentions to use technologies primarily depended on performance expectancy. These expectations influence peoples' work efficiency and, as a result, their desire to utilize technology while working. Therefore, when studying the degree of technology acceptance that employees reflect while using the latest technologies in their workplace, their performance expectancy must be considered and taken into account to understand their intentions and behaviour towards these technologies. As the performance technology measures both the overall value to the user and the perceived benefits of the technology in comparison to other prior technologies (Rogers, 1983); the following hypotheses, which describes the relationship between variables, was proposed:

H3a: Performance Expectancy positively influences the Perceived usefulness of Artificial intelligence technologies.

H3b: Performance Expectancy positively influences the Perceived ease of use of Artificial intelligence technologies.

H3c: Performance Expectancy decreases employees' techno-overload

H3d: Performance Expectancy decreases employees' techno-invasion

H3e: Performance Expectancy decreases employees' techno-complexity

H3f: Performance Expectancy decreases employees' techno-insecurity

H3g: Performance Expectancy decreases employees' techno-uncertainty

PART TWO: Research Problem

CHAPTER 4: Research Problem & Research Question

The evolution of technostress and the wide research on the topic in different disciplines ranging from psychology to medicine to social and computer sciences to MIS since the 1980's serves as a solid evidence on the importance and the seriousness of the presence of technostress in people's not only their professional lives but also reaching to their personal lives and relationships.

Many articles had discussed and tried to raise awareness on the consequences of technostress on people's physical and mental health showing different symptoms such as Increased heart rate, headaches, insomnia, depression, irritability and behavioural changes (Chiappetta, 2017); on role stress and role conflict leading to lower productivity (Tarafdar M. T.-N.-N., 2007). Thus, with the increased dependency on technology due to the fourth industrial revolution and the introduction of Artificial intelligence, employees became more exposed and experiencing different aspects and facets of technostress whether in the pre-implementation, during or post implementing phases of AI technologies in organizations.

Technostress has been given a wide range of definitions by different researchers with contradicting meanings, and studies done on its effects and influences from technological, psychological and even medical perspective. The majority of IS research is focused on determining what technology can achieve for you. However, given the importance of technostress and stress generally, businesses must be mindful of what technologies might do to you (Ayyagari R. G., 2011). Each organizational group might gain a better understanding of the major causes of technostress by concentrating on a technology or collection of technologies. Thus, Identifying the factors responsible would serve as a start towards planning appropriate management plans to address technostress.

To answer the question of what are the factors causing technostress, it is important to go back to previous IS research on technostress and understand how different authors studied this phenomena in the domain of Information systems. The literature review

provides deep understanding of the dimensions of technostress and how these dimensions affect the productivity and performance on the individual and organizational level.

Moreover, the introduction of Artificial intelligence and industry 4.0 increased the complexity and uncertainty brought with these technologies and as a result a relationship between AI technology and technostress has appeared and created a potential concern and threat in organizations. For this reason, IS research has put efforts in understanding this relationship and studying its effect in an attempt to provide effective solutions. Therefore, they focused on the technology acceptance in this domain as the TAM was precisely developed to understand the behaviour of users towards ICTs. It has been supported over the years and verified across several systems and the perceived usefulness and perceived ease of use have shown to be trustworthy and valid cognitive aspects (Burton-Jones & Hubona, 2006 ; King, 2006).

In recent years also, it has been used to understand the behaviour of employees towards AI technologies as they have become an important part of problem solving and decision making processes inside organizations. Previous research has put an effort to study the influence of technostress on technology acceptance and based on the findings of Gunson & Blasis (2002), there exists a negative influence on the implementation, exploitation, and preservation of computer systems. Which is also supported by Tarafdar (2007), Ayyagari (2007) and Sanderlin (2004) who proved an adverse relationship between technostress and user productivity; self-efficacy and satisfaction (Brillhart, 2004). Research also included studying levels of technostress prior, during and after the implementation, Erasmus (2014) studied the existence of technostress among employees who had prior experience and knowledge of the used technologies and the results showed the presence of levels of technostress. Given the most likely impact of technostress site on the advancement of technology adoption, it is clear from the findings that technostress has a strong influence on perceived ease of use and perceived usefulness.

Based on these findings from previous research and the path built from their future recommendation in this domain, Organizations must invest in managerial and technical strategies that would help in decreasing the levels faced by their employees when using AI and other forms of technologies, these strategies include trainings, upskilling etc. Change management is also an aspect that organizations must deploy and utilize when facing technostress (Erasmus, 2014). All these approaches are important to study and invest by utilizing them in the best ways possible to ensure a positive work environment that would help employees accepts new technologies and increase their productivity and performance.

From reviewing the literature review and fixating on the implications of future research, several gaps were identified.

These gaps include:

- Studying the reverse effect of technostress influence on Technology acceptance, by measuring how the perceived usefulness and perceived ease of use influence levels of technostress and how accepting the technology and believing its going to help employees accomplish more and help them in their daily tasks when not finding it complex and difficult to use and understand can enhance their intention to use it by removing the factor of technostress and fear from the scenario.
- Following the previous gap, research lacks the focus on studying each dimension of technostress independently with relation to technology acceptance. Each dimension has different items and is measured based on different elements therefore, technology acceptance and performance expectancy can have different levels of influence on each of these dimensions.

Having identified the above gaps, this study focuses on examining the influence of technology acceptance elements, that are the perceived usefulness and perceived ease of use, affected by their performance expectation, on the five dimensions on techno-stress; the techno-overload, techno-invasion, techno-complexity, techno-

insecurity and techno-uncertainty. This serves as a first step and provides a better understanding for organizations on how and when to develop the right strategies for their employees to relieve them from the technostress that would invade their workplace and negatively affect their productivity and job satisfaction and the overall performance.

Therefore, in the next sections of this study the following research question will be answered:

“How do employees’ performance expectancy and technology acceptance influence their technostress levels when using Artificial Intelligence technologies?”

PART THREE: Research Methodology

CHAPTER 5: Data collection & Survey:

The research methodology followed in this study is a quantitative methodology. A questionnaire comprised of four sections was distributed among people who worked in an Artificial Intelligence driven companies to analyse the relationship between employees' performance expectancy of artificial intelligence, their technology acceptance of these technologies and the levels of experienced technostress. Participants were reached out through a post published on a LinkedIn profile containing a link to the questionnaire and for their eligibility and to ensure that they understood the purpose of the study and were able to provide reliable answers, respondents were required to answer specific questions regarding the technologies used in their companies and the time spent using the most recent one. The data was collected in a period of 2 weeks and the responses received were from 60 different employees who worked in different companies and used different AI software technologies.

The structure of the survey was designed based on the proposed model and the four sections were built as follow:

- Section one: general questions related to the AI technologies used by the respondents in their workplace.
- Section two: questions related to the performance expectancy variable.
- Section three: questions related to the dimensions of technology acceptance; perceived usefulness and perceived ease of use
- Section four: questions related to the five dimensions of techno-stress; techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty.

CHAPTER 6: Research Model and Measurement Instruments:

I. Model:

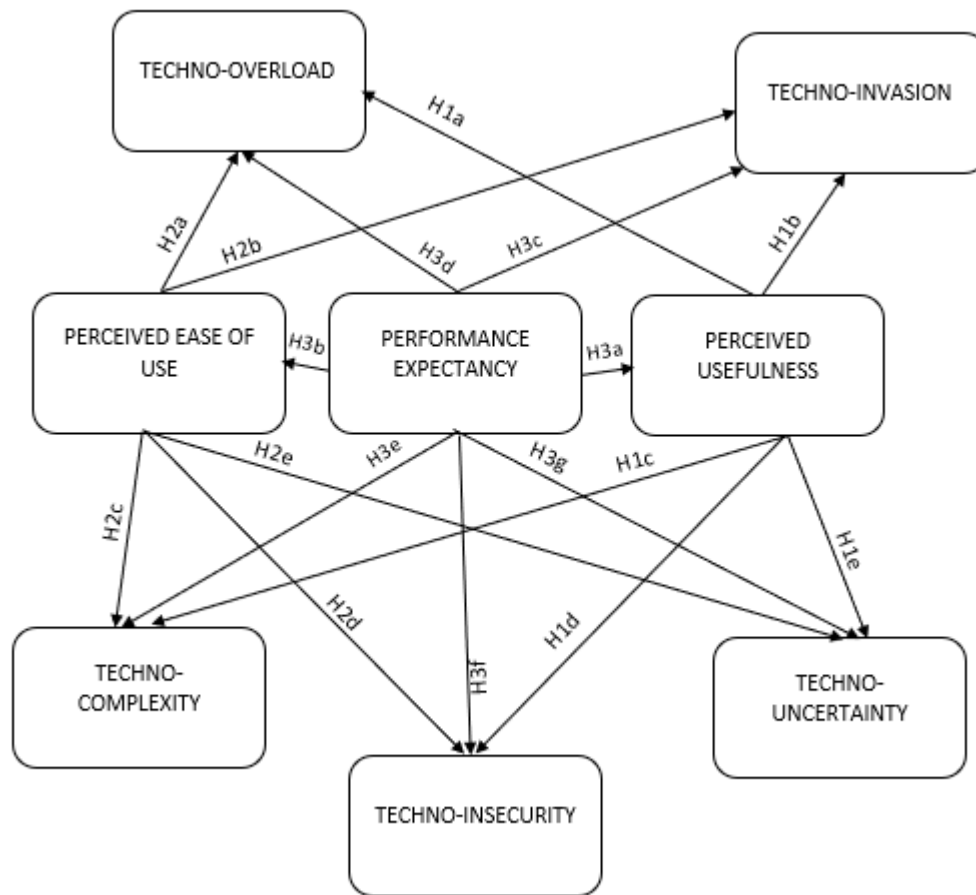


Figure 2 Research Model

II. Measurement Instruments:

Performance Expectancy items were measured using a scale instrument developed by Lu, Lu; Cai, Ruiying; Gursoy, Dogan (2019), Avoiding human errors, offering reliable and timely service, eliminating emotional exchanges, and communicating clarity and competency are all performance characteristics of utilizing artificial intelligence. Also, imagined situations are often used as a mood induction technique (e.g., Brown and Taylor, 1986). Thus this scale instrument was selected due to its relevance with this study.

The items used to measure this variable were as follow:

PE1 AI devices are more accurate than human beings

PE2 AI devices are more accurate with less human errors
PE3 AI devices provide more consistent service than human beings
PE4 Information provided by AI devices are more consistent

Figure 3 Items of Performance Expectancy

Chong (2013) proved that performance expectancy is the strongest determinant of behavioural intention to use technologies. It influences their acceptance of the technology by triggering their perceived usefulness and ease of use.

The items of the technology acceptance variables were adopted from the scale instrument developed by Davis F.D. (1989) and used as follow:

- **Perceived Usefulness**

USE1. This technology enables me to accomplish tasks more quickly
USE2. This technology enhances my effectiveness on related tasks
USE3. Using this technology makes it easier to perform my tasks
USE4. Overall, I find this technology useful in my job

Figure 4 Items of Perceived usefulness

- **Perceived ease of Use**

EASE1 Learning to operate this technology is easy for me
EASE2 I find it easy to get this technology to do what I want it to do
EASE3. Usage of this technology is clear and understandable
EASE4. I find it cumbersome to use this technology
EASE5. It is easy for me to remember how to perform tasks using this technology
EASE6 Overall, I find this technology easy to use

Figure 5 Items for Perceived ease of use

Technostress items were measured using Tarafdar (2007) scale instrument, which is the most used scale among researchers studying the technostress phenomena and was adopted in its five dimensions as follow:

Techno-overload

OVRL1 I am forced by this technology to work much faster
OVRL2 I am forced by this technology to do more work than I can handle
OVRL3 I am forced by this technology to work with very tight time schedules.
OVRL4 I am forced to change my work habits to adapt to new technologies
OVRL5 I have a higher workload because of increased technology complexity.

Figure 6 Items for Techno-overload

Techno-invasion

INV1 I spend less time with my family due to this technology.
INV2 I have to be in touch with my work even during my vacation due to this technology.
INV3 I feel my personal life is being invaded by this technology.

Figure 7 Items for Techno-invasion

Techno-Complexity

CMPX1 I do not know enough about this technology to handle my job satisfactorily.
CMPX2 I need a long time to understand and use new technologies.
CMPX3 I do not find enough time to study and upgrade my technology skills.
CMPX4 I often find it too complex for me to understand and use new technologies.

Figure 8 Items for Techno-Complexity

Techno-insecurity

INSC1 I feel constant threat to my job security due to new technologies.
INSC2 I have to constantly update my skills to avoid being replaced.
INSC3 I am threatened by co-workers with newer technology skills.
INSC4 I do not share my knowledge with my co-workers for fear of being replaced.
INSC5 I feel there is less sharing of knowledge among co-workers for fear of being replaced.

Figure 9 Items for Techno-insecurity

Techno-uncertainty

UNC R1 There are always new developments in the technologies we use in our organization.

UNC R2 There are constant changes in computer software in our organization.
--

UNC R3 There are constant changes in computer hardware in our organization.
--

UNC R4 There are frequent upgrades in computer networks in our organization.

Figure 10 Items for Techno-uncertainty

All items in the questionnaire were measured using a 5-point Likert Scale to test their level of agreement: (1)- Strongly disagree to (5)- Strongly agree.

PART FOUR: Data Analysis

Chapter 7: SPSS Tests

The Data analysis was performed on SPSS software by applying descriptive statistics to get to understand the survey and the answers of the respondents, Factorial analysis to check the reliability and the factors loading of the variables and finally to studying the correlation between the independent and dependent variables, a multiple regression was performed.

I. Descriptive Statistics

The following tables provide the descriptive analysis of the studied data set including the types of technologies used by different employees and the duration that these technologies have been used.

Table 2 summarizes all the technologies that respondents mentioned using them in the companies:

Table 2 Types and examples of Artificial intelligence technologies

Types of Artificial Intelligence Technology	Examples
Machine Learning	-Dynamic price optimization -Sage -Dataiku
Deep Learning	-voice recognition -image recognition
Natural Language Processing	Virtual agents
Predictive Modelling	-Sales Forecasting -Business forecasting -Decision Management
Robots	
Automation jobs	
Data Science	
Big Data	

Table 3 represents the frequency/Percentage of the most recent used technologies among the above mentioned ones:

Table 3 Table of Frequency of most recent Artificial intelligence technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Automation jobs	1	1,7	1,7	1,7
	Big Data	1	1,7	1,7	3,3
	Deep Learning	1	1,7	1,7	5,0
	Machine Learning	19	31,7	31,7	36,7

Natural Language Processing	11	18,3	18,3	55,0
Predictive Modelling	17	28,3	28,3	83,3
Robots	10	16,7	16,7	100,0
Total	60	100,0	100,0	

Latest acquired Artificial Intelligence Technology

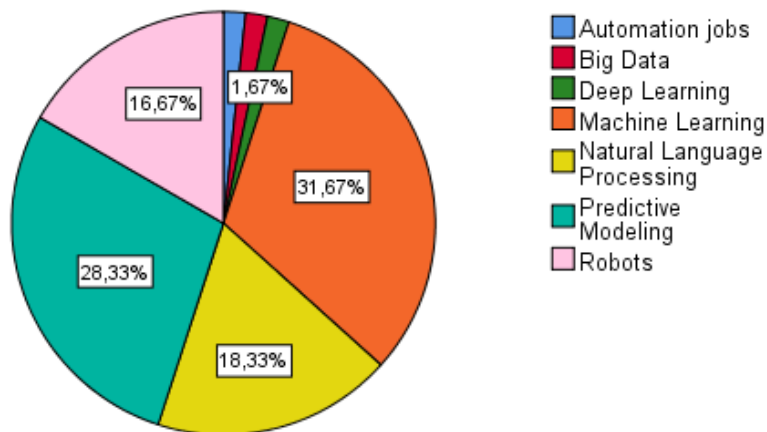


Figure 11 Pie chart for the distribution of the technologies used

As observed above, Table 3 and Figure 11 represent the distribution of the technologies that the respondents use. The results are distributed as follow: 31,67% used Machine learning representing 19 out of the 60 total respondents, some examples of this type are Dataiku software, Sage and Dynamic pricing optimization. Followed by 28,33% using Predictive Modelling (17 out of 60 respondents), examples such as Sales Forecasting, Business Forecasting and Decision Management were given. The third most used type is the Natural Language Processing representing 18,33% of the total answers including virtual agents (or as known chatbots) as an example. Robots with 1,67% and the remaining 5% represented by Big Data, deep learning (voice and image recognition) and Automation jobs.

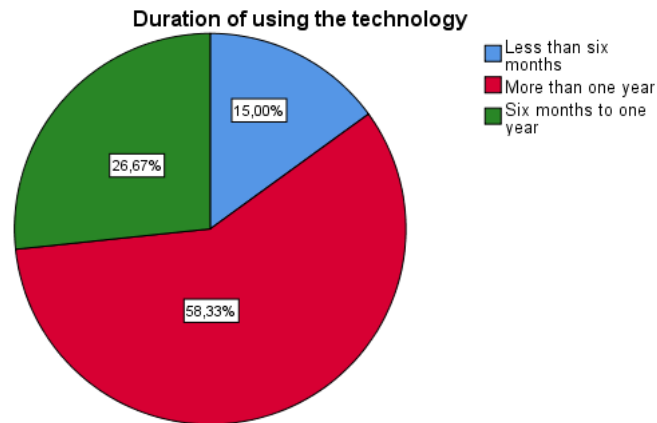


Figure 12 Pie chart for the duration of using the technology

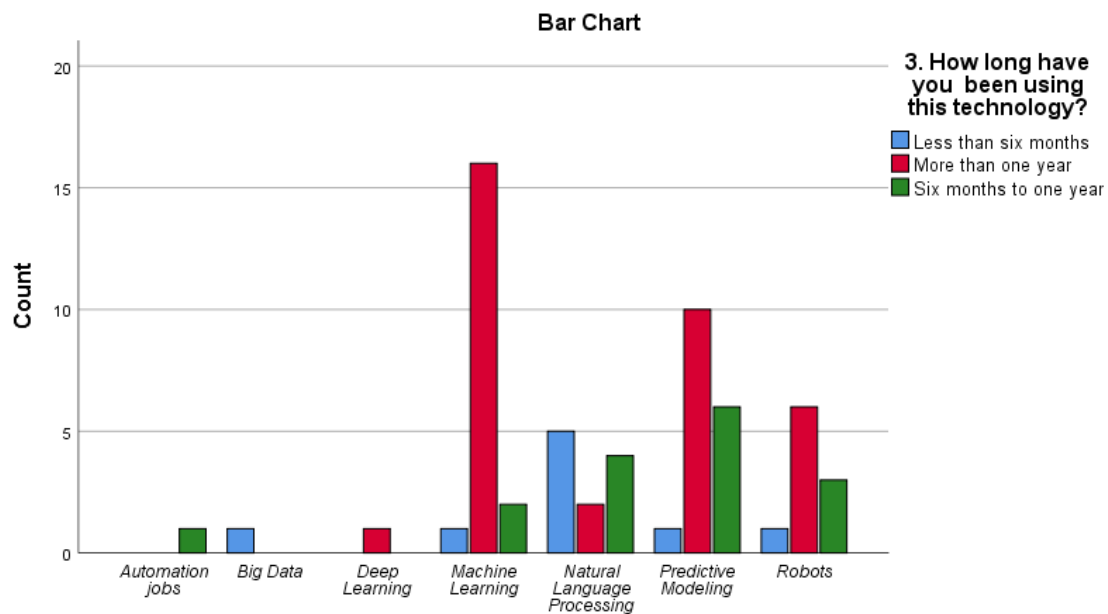


Figure 13 cross bar chart of the duration of each technology used

Table 4 Distribution of technologies based on the duration of their use

	Less than six months	More than one year	Six months to one year	Total
Automation jobs	0	0	1	1
Big Data	1	0	0	1
Deep Learning	0	1	0	1
Machine Learning	1	16	2	19
Natural Language Processing	5	2	4	11
Predictive Modeling	1	10	6	17
Robots	1	6	3	10
	9	35	16	60

-Figure 12 represents the duration of using the technology and as observed most of the respondents have used the technologies for more than a year representing 58,33% (35 respondents) , 26,67% (16 respondents) have used the technology for a duration of six months to one year and the remaining 15% (9 respondents) used it for less than six months.

-Figure 13 & Table 4 show the distribution of the technologies based on the duration of using them.

- 16 out of the 19 respondents who used Machine Learning have been using it for more than a year, 2 have been using it from six to twelve months and 1 using it for less than six months.
- 10 out of the 17 respondents who used Predictive Modelling have been using it for more than a year, 6 have been using it from six to twelve months and 1 using it for less than six months.
- 6 out of the 10 respondents who used Robots have been using it for more than a year, 3 have been using it from six to twelve months and 1 using it for less than six months.
- 5 out of the 11 respondents who used Natural Language Processing used it for less than six months, 2 for more than a year and 4 for six to twelve months.
- All the respondents who use Deep learning have been using it for more than a year.
- All the respondents who use Big Data have been using it for Less than six months.
- All the respondents who use Automation have been using it for six to twelve months.

The descriptive statistics shows that the population of the survey consists of employees working in different companies and using different technologies and types

of artificial intelligence and also have different experiences using them. Moreover, The diversity and variety of technologies included in the survey is to show that in this paper the studied variables are applied on different cases of employees using Artificial intelligence and that the study does not fixate on any specific type of Artificial intelligence nor based on the duration and experience of using them.

II. Reliability & Factorial Analysis:
Table 5 Reliability and Factor Loadings

Construct	Cronbach's Alpha	Items	Factor Loadings
Performance Expectancy	0.929	PE1 AI devices are more accurate than human beings	0.885
		PE2 AI devices are more accurate with less human errors	0.918
		PE3 AI devices provide more consistent service than human beings	0.927
		PE4 Information provided by AI devices are more consistent	0.910
Perceived Usefulness	0.899	USE1. This technology enables me to accomplish tasks more quickly	0.930
		USE2. This technology enhances my effectiveness on related tasks	0.902
		USE3. Using this technology makes it easier to perform my tasks	0.921
		USE4. Overall, I find this technology useful in my job	0.921
Perceived Ease of Use	0.938	EASE1 Learning to operate this technology is easy for me	0.891
		EASE2 I find it easy to get this technology to do what I want it to do	0.893
		EASE3. Usage of this technology is clear and understandable	0.916
		EASE4. I find it cumbersome to use this technology	0.585
		EASE5. It is easy for me to remember how to perform tasks using this technology	0.902
		EASE6 Overall, I find this technology easy to use	0.931
Techno - Overload	0.915	OVRL1 I am forced by this technology to work much faster	0.877
		OVRL2 I am forced by this technology to do more work than I can handle	0.902
		OVRL3 I am forced by this technology to work with very tight time schedules.	0.923
		OVRL4 I am forced to change my work habits to adapt to new technologies	0.908
		OVRL5 I have a higher workload because of increased technology complexity.	0.930
Techno - Invasion	0.946	INV1 I spend less time with my family due to this technology.	0.944
		INV2 I have to be in touch with my work even during my vacation due to this technology.	0.928
		INV3 I feel my personal life is being invaded by this technology.	0.906
Techno-Complexity	0.938	CMPX1 I do not know enough about this technology to handle my job satisfactorily.	0.912
		CMPX2 I need a long time to understand and use new technologies.	0.921
		CMPX3 I do not find enough time to study and upgrade my technology skills.	0.948

		CMPX4 I often find it too complex for me to understand and use new technologies.	0.918
Techno-Insecurity	0.943	INSC1 I feel constant threat to my job security due to new technologies.	0.9
		INSC2 I have to constantly update my skills to avoid being replaced.	0.907
		INSC3 I am threatened by co-workers with newer technology skills.	0.922
		INSC4 I do not share my knowledge with my co-workers for fear of being replaced.	0.855
		INSC5 I feel there is less sharing of knowledge among co-workers for fear of being replaced.	0.905
Techno-Uncertainty	0.826	UNCR1 There are always new developments in the technologies we use in our organization.	0.529
		UNCR2 There are constant changes in computer software in our organization.	0.827
		UNCR3 There are constant changes in computer hardware in our organization.	0.915
		UNCR4 There are frequent upgrades in computer networks in our organization.	0.927

As a first step of the analysis, all the scales used were measured using Cronbach's alpha reliability test. Table 5 above summarises the factorial analysis performed and as stated in the table the Cronbach's alpha for each scale lies between 0.826 the lowest for Techno-uncertainty and 0.946 the highest for Techno-Invasion. All these values demonstrate a high internal consistency between the items of each scale and thus concludes a high reliability of the scales for the study.

The next step performed is the factor loadings, which are the regression slopes for predicting the indicators from the factor (Brown, 2012) , that is to show the correlation of the items with the used construct in a study. In this study, the scale followed for the factor loadings is that which Tabachnick & Ullman (2007) and Comrey (1992) agreed on: below |0.32| : poor, around |0.45| : fair, around |0.55| : good, around |0.63| : very good, around |0.71| and above : excellent.

In the above Table 5, it is observed that all the items in the Performance Expectancy construct are associated with a factor loading (> 0.8) which indicates a very high correlation and thus all the items will remain included. For the Perceived usefulness,

all the items had factor loading > 0.9 showing an excellent relationship allowing us to keep all the items. As for the Perceived ease of use construct all the items are (> 0.8) except for EASE4 “I find it cumbersome to use this technology” with a factor loading of (0.585) which according to the followed scale indicates a good correlation, and since the internal reliability of this construct that is previously obtained equals to (0.938) proving a strong consistency among the item of the construct, then the six items will all be included in the next step of the analysis and be considered related with good correlation.

The rest of the constructs used in the study are Techno-Overload, Techno-Invasion, Techno-Complexity, Techno-Insecurity and Techno-Uncertainty; all of these constructs except for Techno-Uncertainty show factor loadings of their items (> 0.8) and most of them (> 0.9) with a Cronbach’s alpha (>0.9) for all of them, this shows that these four constructs with all of their items are reliable and valid for the study and thus will be included in the next step of the analysis. As for the last construct which is Techno-Uncertainty, all the items have factor loadings (>0.8) except for the first item UNCR1 “There are always new developments in the technologies we use in our organization” with a factor loading = 0.529, however the Cronbach’s alpha for this construct is 0.826 which proves a strong consistency and reliability among its items allowing to keep all the items within the construct.

III. Linear Regression

Table 6 Linear Regression

Dependent Variables	Independent Variables	Standardized Coefficients Beta	Sig (p-Value)
Techno-Overload	PE	-0.177	0.176
	PU	-0.246	0.058
	PEOU	-0.199	0.128
Techno-Invasion	PE	-0.186	0.155

	PU	-0.273	0.035
	PEOU	-0.322	0.012
Techno-Complexity	PE	-0.685	0.000
	PU	-0.741	0.000
	PEOU	-0.778	0.000
Techno-Insecurity	PE	-0.672	0.000
	PU	-0.712	0.000
	PEOU	-0.806	0.000
Techno-Uncertainty	PE	-0.062	0.639
	PU	-0.062	0.637
	PEOU	-0.069	0.598
PU	PE	0.771	0.000
PU	PEOU	0.774	0.000

*PU: Perceived Usefulness, PE: Performance Expectancy, PEOU: Perceived ease of use

The first linear regression performed on the first dependent variable Techno-stress and the three predictor variables (which are the independent variables) is to indicate whether there is a significant relationship between each of the three predictor variables and the dependent variable and to check the validity of the hypotheses studied. The test was performed at a confidence interval level of 95%, which means that for a relationship between two variables to be significant then the p-Value must be < 0.05 . As shown in the above table, each of the 3 predictor variables have a p-Value > 0.05 which means there is no significant relationship between Performance expectancy and techno-overload (p-Value=0.176), nor a relationship between Perceived usefulness and techno-overload (p-Value=0.058), nor a relationship between Perceived ease of use and techno-stress (p-Value=0.128).

As a result we fail to reject the three null hypotheses related to the levels of Techno-Overload and thus there Performance expectancy, Perceived ease of use and Perceived usefulness do not decrease nor affect the levels of Techno-overload.

The Second linear regression performed was between the three predictor variables, performance expectancy, perceived ease of use and perceived usefulness, and the dependent variable Techno-Invasion within a confidence interval level of 95%. The table above shows that there is no significant relationship between performance expectancy and techno where ($p\text{-Value}=0.176$) and so we fail to reject the null hypothesis and conclude that performance expectancy does not decrease levels of techno-invasion. Whereas, **the results show that there exists a significant relationship between perceived usefulness and techno-invasion with a ($p\text{-Value}=0.035$) and so we successfully reject the null hypothesis and accept H1b.** Moreover, the Coefficient Beta ($\beta = -0.273$) indicates that the relationship is a weak negative relationship such that the more perceived usefulness increases, the more the levels of techno-invasion decrease but in a weakly manner. **The last predictor variable is the Perceived ease of use showing a significant relationship with Techno-invasion at a ($p\text{-Value}=0.012$) and a Coefficient Beta ($\beta = -0.322$) and thus we reject the null hypothesis and conclude that there is a weak negative relationship between Perceived ease of use and techno-invasion by accepting H2b**, in particular the more is the Perceived ease of use of artificial intelligence technologies the more levels of techno-invasion tend to decrease but in a weakly manner as $0.25 < \beta < 0.5$ following the rule of thumb.

Based on this regression analysis we conclude that the most influential factor on techno-invasion is the Perceived ease of use however it remains a weak influence.

The third linear regression is performed on Techno-Complexity and the three predictor variables, performance expectancy, perceived ease of use and perceived usefulness. Results displayed show that there is a significant relationship between performance expectancy and techno-complexity, perceived usefulness and techno-complexity as well as a significant relationship between perceived ease of use and techno-complexity. **The three relationships are significant at a level ($p\text{-Value}=0.000$) and so, we successfully reject the 3 null hypotheses of Techno-Complexity assuming that**

there is no relationship between each of the three predictor variables and Techno-Complexity and accept H1c, H2c and H3e. Furthermore, the Coefficient beta values indicate a strong negative relationship between performance expectancy and Techno-complexity ($\beta = -0.685$), perceived usefulness and Techno-complexity ($\beta = -0.741$) and perceived ease of use and Techno-complexity ($\beta = -0.778$). This indicates that the more each of these variables increase, the more the levels of Techno-complexity decrease when using artificial intelligence technologies. Comparing the three Coefficient beta values, we conclude that perceived ease of use is the most influential factor when it comes to affecting the levels of techno-complexity as it is the closest to ($\beta = -1$).

The fourth linear regression shows a significant relationship between each of the three predictor variables, performance expectancy, perceived ease of use and perceived usefulness and Techno-insecurity at a level ($p\text{-Value}=0.000$). Thus we reject the null hypotheses and support the proposed ones H1d, H2d and H3f indicating an existing relationship between the 3 variables and techno-insecurity. The Coefficient beta values also support the existence of the three relationships, indicating a strong negative relationship for the 3 connections with ($\beta = -0.672$) for performance expectancy and techno-insecurity, ($\beta = -0.712$) for perceived usefulness and techno-insecurity and ($\beta = -0.806$) for ease of use and techno-insecurity.

Comparing the three relationships we conclude that perceived ease of use has the strongest relationship with techno-insecurity illustrating a very strong influence on levels of techno-insecurity.

Finally, the last linear regression performed on techno-uncertainty and the three predictor variables, performance expectancy, perceived ease of use and perceived usefulness shows that there is no significant relationship between techno-uncertainty and any of the three variables having ($p\text{-Value}=0.639$) for performance expectancy and techno-uncertainty, ($p\text{-Value}= 0.637$) for perceived usefulness and techno-uncertainty and ($p\text{-Value}=0.598$) for perceived ease of use and techno-uncertainty. Accordingly, we fail reject the null hypotheses indicating that there is no relationship between the

three variables and techno-uncertainty. This proves that neither perceived usefulness, nor performance expectancy and nor perceived ease of use are able to decrease levels of uncertainty when using Artificial intelligence technologies.

Two more analyses were performed using single linear regression with performance expectancy on each of perceived usefulness and perceived ease of use. **The results show that there is a significant, strong positive relationship between performance expectancy and perceived usefulness at a level of (p -Value=0.000) and Coefficient beta (β =0.771) as well as a strong significant relationship between performance expectancy and perceived ease of use at a level of (p -Value=0.000) and Coefficient beta (β =0.774) thus we accept H3a and H3b.**

The below table summarizes all the proposed hypotheses and whether the analysis of this study was able to support them or not:

Table 7 Summary of all the Hypotheses

Hypothesis	Supported
H1a: Perceived usefulness decreases employees' techno-overload	NO
H1b: Perceived usefulness decreases employees' techno-invasion	YES
H1c: Perceived usefulness decreases employees' techno-complexity	YES
H1d: Perceived usefulness decreases employees' techno-insecurity	YES
H1e: Perceived usefulness decreases employees' techno-uncertainty	NO
H2a: Perceived ease of use decreases employees' techno-overload	NO
H2b: Perceived ease of use decreases employees' techno-invasion	YES
H2c: Perceived ease of use decreases employees' techno-complexity	YES
H2d: Perceived ease of use decreases employees' techno-insecurity	YES
H2e: Perceived ease of use decreases employees' techno-uncertainty	NO
H3c: Performance Expectancy decreases employees' techno-overload	NO
H3d: Performance Expectancy decreases employees' techno-invasion	NO
H3e: Performance Expectancy decreases employees' techno-complexity	YES
H3f: Performance Expectancy decreases employees' techno-insecurity	YES
H3g: Performance Expectancy decreases employees' techno-uncertainty	NO
H3a: Performance Expectancy positively influences the Perceived usefulness of Artificial intelligence technologies.	YES
H3b: Performance Expectancy positively influences the Perceived ease of use of Artificial intelligence technologies.	YES

CONCLUSION

I. Discussion

Technostress is a significant side effect of the compulsory use of Artificial intelligence technologies in businesses, demonstrating the dual nature of their systems. Research about stress is being highly acknowledged as a viable foundation for understanding user behaviours concerning ICTs in the workplace (Ahuja, 2005).

Artificial intelligence technologies have had a significant impact on organizational strategies and processes. Businesses have strongly supported the benefits of Artificial intelligence technologies, such as speed, consistency, availability, and reliability, leading to huge advantages in storage of information, computing, and retrieving. Simultaneously, Artificial intelligence technologies frequently encourage employees to attempt to complete more in less time, which results in the loss of manual work and has an impact on relationships among peers. Artificial intelligence technologies alter our professions and, eventually, our behaviour in ways we do not fully comprehend.

This paper has aimed to understand how external factors and technology acceptance can alter and influence the levels of technostress from different aspects. Results has showed that even though employees can have certain expectations of the technology they're using and are aware of its benefits and usefulness and know how to use it easily they are still pressured and stressed from being required to work faster, longer and perform multiple tasks at the same time to keep up with these technologies.

Another result that was achieved in this paper is that performance expectancy does not help employees from feeling invaded by technologies, and having to always be connected and contacted by work even after work hours and during their vacations. This remains an issue and a cause of stress for employees and organizations should look into how to reduce these effects on their employees. However, even though the influence is minimal, when employees are more aware of the usefulness and how to use these technologies they feel less invaded and this makes sense in different ways that when they master using them or understand the importance of their existence,

they will get the work required done more quickly, save time and get back to their personal lives and vacations or will understand when to use them and when not .

When it comes to the complexity and insecurity that employees might experience when using artificial intelligence technologies, their expectations of its performance, usefulness and ease of use all help in lowering the levels of stress associated with these two dimensions in a strong influential way. This result helps businesses to focus on these three variables when developing strategies and trainings for their employees. Organizations should focus on giving the right information about the technology, its advantages, how it helps employees and the goals of the companies, and what to expect from the technology and its performance before implementing or deciding to implement it. Technical trainings on how to use the technology also will help them reduce levels of stress associated with complexity, it is also importance that organizations give their employees a sort of assurance that their jobs are not in danger or threatened due to the adoption of certain technologies and provide them with motivational and encouraging sessions on using and accepting these technologies to secure their jobs and improve their performance.

As for the techno-uncertainty, none of the proposed factors had any relationship or influence on it. Therefore, this dimension still exists highly among employees and the continuous developments and updates of the software and technologies are causing discomfort and stress for the employees with no apparent solution or identified reason to be targeted.

II. Limitations

- The time constraint was a huge limitation for the study, as it was conducted within four months only which limited the ability to go deeper into the Literature review, test a bigger model and perform more analysis for the research.
- Another limitation is the sample size of the participants for the study, due to the limited time that was given to conduct the study, only 60 respondents were

able be contacted for participating and the data was collected only within a period of 2 weeks. Also, due to the limited time it was difficult to search for companies who are using artificial intelligence in their processes and directly contact their employees. So the only way respondents were contacted was through a post published on LinkedIn.

- Third limitation, is the existence of only one construct for measuring technostress with the agreement of having all the five dimensions included. This limitation and due to the limited time available, it wasn't feasible to test new constructs for each variable in the study and thus the existing construct and the five dimensions were tested separately.
- As Artificial intelligence is considered a relatively new emerging topic in organizational context, it was difficult to find enough papers studying its relationship with technostress and because technostress is usually studied in a more general context as "the use of ICTs".

III. Future Recommendations

- The proposed model is one of the first models that use technostress as a dependent variable and study how it is being influenced by external factors. For future research this model can be used and studied on larger population to achieve more accurate and maybe discover new relationships and add more influential factors.
- The results showed a positive relationship and strong influence of performance expectancy on technology acceptance elements. So these elements, perceived usefulness and perceived ease of use, can be tested as mediating variables to study how they can alter and modify the relationships between performance expectancy and the different dimensions of technostress.

- As for the professionals in the MIS field and managers in the organizations, this paper provides a basis and a general map of what affects the levels of employees technostress. Therefore, they can use it to understand when and what to target when developing strategies to help their employees to cope with the advancement of technologies. For example, providing technical trainings for helping them understand how to use the technology and giving them leadership presentations on the importance and the vision they have with using this technology to help them understand its importance and to what extent its performance can increase the benefits and enable them to reach the goals more efficiently.
- The variables in this model showed that they do not influence the techno-overload and techno-uncertainty, thus future research must focus on the areas that can help mitigate the effects of these two factors on employees acceptance of the technologies to lower their stress levels.

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Appendix 1: Research Questionnaire

Artificial Intelligence Technology and Techno-Stress

This survey is done by a student as part of their Masters thesis in Advanced Research in Management of Information Systems program.

It focuses on an important phenomena in the MIS field called "technostress" which refers to the stress experienced by users when using new Information and Communication Technologies and how it can be reduced by studying their technology acceptance levels.

Please note that the target of this survey are employees who work in an Artificial Intelligence-driven company and use AI technologies as part of their daily work life.

Throughout the survey you will be provided with the definitions and meanings of different terms to help you better choose your answers. It takes up to 10 minutes to fill the survey and your participation will be highly appreciated.

1. What are the types of Artificial Intelligence (AI) technologies that your company uses? *

Your answer

2. Among the mentioned technologies, which is the latest acquired one? *

Your answer

Please refer to this specific technology in the next questions

3. How long have you been using this technology? *

- ☐ Less than six months
- ☐ Six months to one year
- ☐ More than one year

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SECTION TWO: Performance Expectancy

Performance expectancy of the AI devices refers to the perceived benefits that a user can gain from using AI devices

1. AI devices are more accurate than human beings *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

2. AI devices are more accurate with less human errors *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

3. AI devices provide more consistent service than human beings *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. Information provided by AI devices are more consistent *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

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SECTION THREE: Technology Acceptance

Part one: Perceived usefulness "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989)

1. This technology enables me to accomplish tasks more quickly *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

2. This technology enhances my effectiveness on related tasks *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

3. Using this technology makes it easier to perform my tasks *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. Overall, I find this technology useful as part of my job *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Part two: Perceived ease of use "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989)

1. Learning to operate this technology is easy for me *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

2. I find it easy to get this technology to do what I want it to do *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

3. Usage of this technology is clear and understandable *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. I find it cumbersome to use this technology *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

5. it is easy for me to remember how to perform tasks using this technology *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

6. Overall, I find this technology easy to use *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

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SECTION FOUR: TECHNO-STRESS

Part one: Techno-overload “Technology’s potential to push employees to work much faster and for longer” (Tarafdar, 2007)

1. I am forced by this technology to work much faster *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

2. I am forced by this technology to do more work than I can handle *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

3. I am forced by this technology to work with very tight time schedules. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. I am forced to change my work habits to adapt to this new technology *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

5. I have a higher workload because of increased technology complexity. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Part two: Techno-invasion “the invasive effect of technology in terms of creating situations where users can potentially be reached anytime, employees feel the need to be constantly “connected”” (Tarafdar, 2007)

6. I spend less time with my family due to this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

7. I have to be in touch with my work even during my vacation due to this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

8. I feel my personal life is being invaded by this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Part three: Techno-complexity “describes situations where the complexity associated with technology makes users feel inadequate as far as their skills are concerned and forces them to spend time and effort in learning and understanding various aspects of technology” (Tarafdar, 2007)

9. I do not know enough about this technology to handle my job satisfactorily *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

10. I need a long time to understand and use this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

11. I do not find enough time to study and upgrade my technology skills *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

12. I often find it too complex for me to understand and use this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Part Four: Techno-insecurity “situations where users feel threatened about losing their jobs as a result of a new technology replacing them, or to other people who have a better understanding of the technology” (Tarafdar, 2007)

13. I feel constant threat to my job security due to this technology. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

14. I have to constantly update my skills to avoid being replaced. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

15. I am threatened by co-workers with newer technology skills. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

16. I do not share my knowledge with my co-workers for fear of being replaced *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

17. I feel there is less sharing of knowledge among co-workers for fear of being replaced. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Part Five: Techno-uncertainty “refers to contexts where continuing changes and upgrades in a technology unsettle users and create uncertainty for them, in that they have to constantly learn and educate themselves about the new technologies.” (Tarafdar, 2007)

18. There are always new developments in the technologies we use in our organization *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

19. There are constant changes in computer software in our organization. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

20. There are constant changes in computer hardware in our organization *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

21. There are frequent upgrades in computer networks in our organization *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Thank you for your participation!

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