BETWEEN TECHNOPHILIA AND TECHNOPHOBIA – THE PROBLEM OF TECHNOLOGICAL FEAR

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Purpose: The aim of the article is to systematize knowledge about technological anxiety and to get to know the opinion of the management staff on the manifestations and potential effects of this phenomenon.

Design/methodology/approach: A critical literature analysis and qualitative research (FGI) was used as the research method.

Findings: Technological anxiety is a real problem in companies implementing solutions typical for industry 4.0. It mainly affects employees in the 55+ age group. It generates negative attitudes towards changes, in particular towards acquiring new competences necessary to work in the conditions of the digital economy. Em-ployees experiencing technological anxiety rationalize it by exaggerating the potential negative effects of technological changes. Technophobia has social and health consequences for the workers it affects. From the perspective of the company, it is a psycho-social barrier to the implementation of the concept of industry 4.0.

Research limitations/implications: Conceptualization of the problem of technological anxiety may contribute to the development of research methodology on this issue, and, as a result, to its in-depth empirical diagnosis in the form of quantitative research.

Practical implications: Understanding the problem of a technological drug can help improve the work comfort of employees who are affected by it.

Originality/value: The text contains original own research. It is an attempt to conceptualize the problem of technological anxiety. It can contribute to the development of methodology for in-depth research on this issue and recommendations for management practice.

Keywords: technological anxiety, technophobia, attitudes towards 4.0.

Category of the paper: research paper.

1. Introduction

The development of new technologies as a part of the industry 4.0 development is analyzed primarily in the context of potential benefits (Bader et al., 2018; Mayer-Schonberger et al., 2013). It is pointed out that technologies offer unprecedented possibilities for collecting,

processing, analyzing, storing and using data quickly and efficiently. The use of cloud services, the Internet of things and tools analytically based on artificial intelligence means building values and generating new solutions based on the integration of data obtained from IT and operational systems equipped with sensors (Bader, Rahimifard, 2018). Advanced data integration and analysis enable making decisions either in real time or autonomously. For manufacturing companies, this means ensuring greater data integration and faster flow between IT and organizational systems (Moczydłowska, 2023). It is thanks to these solutions that it is possible to implement cyber-physical systems, autonomation of processes based on artificial intelligence and production robots characterized by much greater mobility, flexibility and the ability to cooperate with humans than before. New opportunities arise in the development of services throughout the product life cycle, and the integration of data on its use favors its personalization. It is possible to achieve efficiency not only in mass production, but also in small series. Competitiveness based on low production costs is growing (Śledziewska, 2020). These phenomena cause growing technophilia, a special kind of uncritical enthusiasm accompanying the creation and implementation of new technologies. It is an attitude according to which they constitute an extension of biological and intellectual abilities of people (Osiceanu, 2015). The problem of potential threats related to the implementation of 4.0 concept, especially those of a psychological and axiological nature, is much less frequently discussed in the scientific literature (Achuonye et al., 2011; Jamka, 2020). Meanwhile, the resistance of employees to innovation, including technological innovation, is listed as one of the key barriers to the implementation of the industry 4.0 concept (Khasawneh, 2018; Młody, 2019). In some cases, this resistance is extreme because it results from technological anxiety. This type of fear is the opposite of technophilia. It is a state of extreme and irrational fears of technologies treated as a threat to the established set of norms and patterns of behavior (Di Giacomo et al., 2019).

The aim of the article is to systematize knowledge about technological anxiety and to get to know the opinions of the managerial staff of 4.0 enterprises on the symptoms and potential effects of this phenomenon. The goal was achieved using the methodology of critical literature analysis and qualitative research (FGI). Conceptualization of the problem of technological anxiety may contribute to the development of research methodology on this issue, and, as a result, to its in-depth empirical diagnosis in the form of quantitative research.

2. Technological anxiety – literature review

Fear is one of the primary emotions that a person struggles with. From the beginning of time, people were afraid of something or someone. Initially, it was nature, animals or - generally speaking - the unknown or incomprehensible. Currently, it is technology that takes over the role of the "Other", while binding all gative projections to this notion (Szpunar, 2018). Anxiety is

usually defined as an unpleasant, intensely felt state of malaise, produced by a feeling of close and unspecified threat, in contact with which a person feels powerless. It is a relatively common phenomenon, as it is estimated that various anxiety disorders affect approximately 20% of the population (Paxling et al., 2013).

O.Y. Khasawneh (2018a, 2018c) defines technophobia as fear and/or anxiety resulting from a reaction to a new stimulus taking the form of a technology that modifies and/or changes an individual's normal or previous routine while performing certain tasks. Technophobia manifests itself primarily on the emotional level, but its consequences take the form of specific behaviors (Martínez-Córcoles et al., 2017). The symptoms of technological anxiety include expe-riencing irrational anxiety towards objects such as computers, drones or autonomous cars, but also towards phenome-na related to work automation, information flow in cyber-space, data processing (including personal data) by techno-logically advanced solutions (Nimrod, 2018). A special type of technophobia is the fear of misunderstanding a device based on a given technology, the consequence of which is usually lack of attempt to learn how to use this device. The fear in question is more than a lack of trust in new technologies (Ejdys, 2018) or digital minimalism (Newport, 2020). This is an existential and axiological phenomenon (Xi et al., 2021; Tańczuk, 2018). It is related to cultural measures and images. New technologies confront people with questions about the nature of technological entities born in science laboratories, "living machines", the Internet of things, artificial intelligence and its limits (Di Giacomo et al., 2019; Khasawneh, 2018c). They inevitably change people as well, therefore technophobia must be analyzed in a much broader context: of the position of technology towards the human subject and nature. It can be treated as a specific side effect of existential questions about human nature, identity and boundaries, as well as the species future and the possibility of interaction, coexistence and creation of community with new technological entities. As R. Tańczuk (2018) writes, one of the essential elements of the fear of technology is the fear of losing humanity, the threat from machines that look more and more like us, and therefore the inability to distinguish between what is human and what is inhuman. Machines that are intelligent, make decisions, self-reproduce, can communicate, including expressing emotions, as well as learn and even behave creatively, requires asking questions about the limits of human subjectivity. Technological anxiety is based on the conclusion that technology can completely escape people's control, take over our everyday life, have a destructive influence on it, and as a consequence, strive to annihilate humans and a human-centered civilization (Ajlouni, Rawadieh, 2022).

The key variables which influence experiencing technological anxiety are: personality predispositions (especially paranoid thinking tendencies) and age. Older people, compared to young people, known as digital natives, have significantly less experience in using advanced technologies (Liao, 2022; Wildenbos et al., 2018). Therefore, they also show a lower level of competence related to their understanding and operation. Older workers are often referred to as digitally excluded (both scientific and journalistic language includes other concepts reflecting

the analyzed problem, e.g. digital barrier, digital division, information disproportion, disconnection, information wealth versus information poverty) (Scheerder et al., 2017; Iwańczuk et al., 2017). In the first analyzes of this phenomenon, digital exclusion was treated as unequal access to the Internet, which was associated with a very simple division into people connected and not connected to the network. E-exclusion referred to the differences between those who have regular access to digital and information technologies and are able to use them effectively, and those who do not have such access (Czerski, 2020). Currently, the source of digital exclusion is rarely the lack of access to the network. Today, this phenomenon is treated as multidimensional, including access to information and communication technologies, the possibility of using digital technologies and the perception of the benefits of using digital artifacts. Psychological barriers are being emphasized more and more (Greer et al., 2019). In older people, new technologies cause uncertainty, stress and, consequently, reluctance to use these solutions. Already in the 1980s, within the Technology Acceptance Model, it was noticed that the behavior of an individual is directly determined by his or her intention and the belief that technology is easy to use. Both factors have a direct impact on the assessment of the usefulness of the technology and the user's attitude towards using it. Techno-logical anxiety in the elderly triggers an attitude: I don't need it, I don't want to learn it. The so-called an anti-digital attitude may result in incomplete participation in social life. Low frequency of using technology largely affects the reduced autonomy and weaker self-esteem of one's own technological competences, which in turn leads to a feeling of social maladjustment, regression of the general development of cognitive, social and professional competences (Jamka, 2020).

Mental rejection of new technologies has a number of different consequences, e.g. it may be a deterioration of health due to resignation from using technologies supporting diagnostic and therapeutic services in a virtual way (medical teleconsultations, telemedicine) (Hou et al., 2017; McCabe et al., 2017). In the context of the topic discussed in this article, the potential effects of technophobia in the work environment are particularly important. The implementation of solutions typical for the 4.0 economy is tantamount to the spread of new technologies on an unprecedented scale. As a consequence, a special kind of pressure arises on employees to accept new technological solutions and to be able to use them in a short time. At the same time, many users cannot keep up with the understanding the essence of operation and the use of very modern and innovative machines and devices, therefore technophobia may cause a decrease in the effectiveness of the work performed and negatively affect the organizational climate (Khasawneh, 2018a, 2018b, 2023). The fear of "being unnecessary" (the phenomenon of technological unemployment) arises, on the other hand, employees feel a strong sense of mismatching competences with the needs of employers and the fear "if I am able to learn what I need to know" (Bader, Rahimifard, 2018). These phenomena and processes are also overlapped by the dematerialisation of work and employees, resulting in changes in the organizational structures of enterprises (e.g. e-enterprises, network organizations) and changes in the forms of work (remote work, teleworking), which intensifies

the feeling of social alienation. Even recruitment processes, which are increasingly dominated by machine learning algorithms, create a fear that the application documents submitted by the candidate will be rejected due to the lack of keywords or other pieces of information expected by the system (Jamka, 2020; Moczydłowska, 2023).
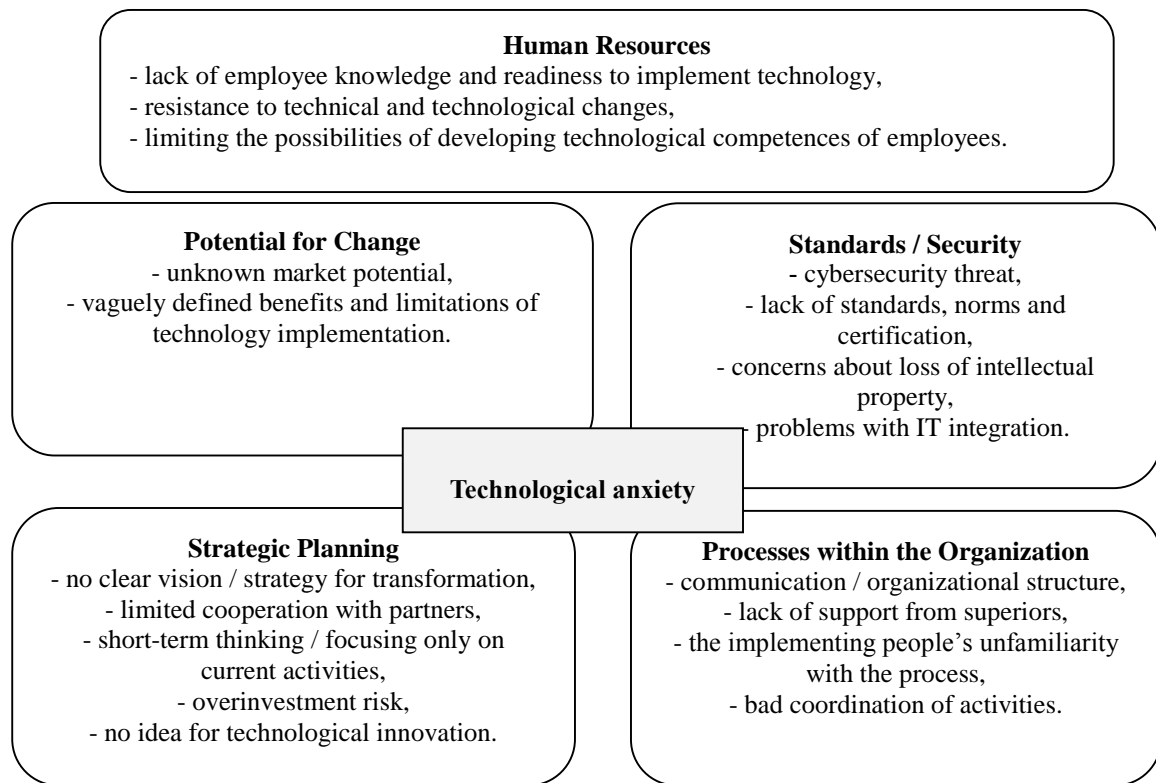
Human Resources
- lack of employee knowledge and readiness to implement technology,
- resistance to technical and technological changes,
- limiting the possibilities of developing technological competences of employees.

Potential for Change
- unknown market potential,
- vaguely defined benefits and limitations of technology implementation.

Standards / Security
- cybersecurity threat,
- lack of standards, norms and certification,
- concerns about loss of intellectual property,
- problems with IT integration.

Technological anxiety

Strategic Planning
- no clear vision / strategy for transformation,
- limited cooperation with partners,
- short-term thinking / focusing only on current activities,
- overinvestment risk,
- no idea for technological innovation.

Processes within the Organization
- communication / organizational structure,
- lack of support from superiors,
- the implementing people's unfamiliarity with the process,
- bad coordination of activities.

Figure 1. Potential sources of technological anxiety in the enterprise.

In line with the popular trend of anthropomorphic approach to organization, technological fear is described not only in the context of the experience of individuals, but also of entire enterprises. For example, M. Młody (2019) identifying technological anxiety as an organizational pathology, attempted to classify its key dimensions. These are: strategic planning, processes within the organization, the potential for change, standards and safety, and human resources (see Figure 1).

The potential sources of technological anxiety in the companies presented in Figure 1 focus on internal determinants. It should be emphasized that significant external barriers may appear in the process of development and implementation of new technologies, e.g. regulations, investment incentives or the lack of them, tax solutions. Therefore, a significant challenge for the theory and practice of management will be the development of fear measurement tools, and then the determination of the boundaries between the natural enterprise fear of new technologies, and the fear with pathological features.

3. Methodology of own research

The subject of the research presented in this publication is the opinions of managerial staff (department/division directors) from the industrial enterprise sector on the intensity and manifestations of technological anxiety among employees. According to the FGI methodology, the research was conducted on a sample of 12 people. The following research problem was formulated: how do the managerial staff assess the scale, causes and effects of technological anxiety in the context of implementing technical and technological solutions specific to industry 4.0. In order to achieve the aim of the research, qualitative research was used. It is defined as empirical research, the primary purpose of which is to describe and analyze the causes, course, conditions, as well as the results of the occurrence or functioning of a given object, process or phenomenon in specific conditions and contexts. Qualitative research can be used to understand the phenomena better and deepen the current state of knowledge, although it is much more difficult to standardize the data obtained in this way. They are well suited to capturing the specificity of phenomena and taking into account the impact of unmeasurable or difficult to measure variables on management processes taking place in dynamic organizations (Bansal, Corley, 2011).

For the purposes of this article, interviews were conducted with the managerial staff representing the enterprise sector, in line with the principle that each manager should be an employee of a different enterprise. The condition for inclusion in the studied sample was work experience in a managerial position not shorter than 5 years. A proportional share of women and men was used, reflecting the proportions of representatives of particular genders in the professional group of managers in Poland. 4 out of 12 interviewees are women. The respondents represented medium-sized (3) and large (9) enterprises. The elimination of micro- and small enterprises resulted from the fact that most of these economic entities do not use technological solutions typical for industry 4.0 too much. The respondents' statements were recorded and then transcribed and analyzed using NVivo software (Bringer et al., 2004).

The vast majority of the study participants were students of Executive MBA studies at the Institute of Economic Sciences of the Polish Academy of Sciences in Warsaw and MBA Management at the Lazarski University. Conducting research among the participants of MBA programs gives the opportunity to access a relatively large sample of managers in a short time, but also limits its representativeness. It is made up of people with high qualifications only. Moreover, the share of managers aged 60+ who are less likely to undertake postgraduate studies is relatively low. Therefore, the conclusions drawn on the basis of the presented research require confirmation in quantitative research.
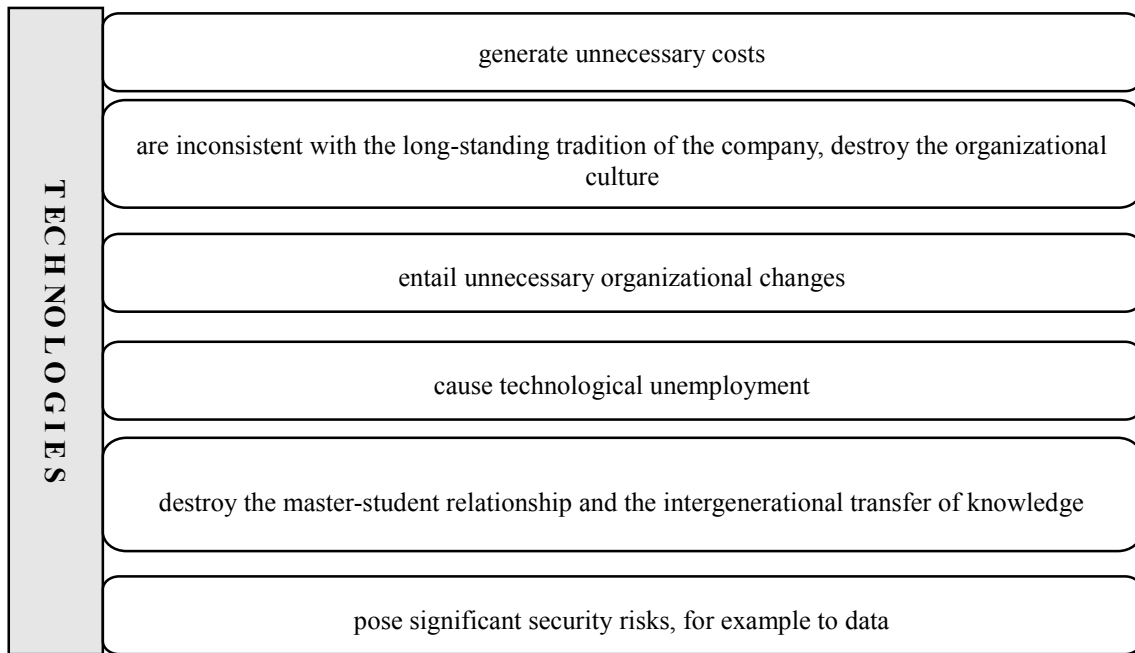
4. Results and discussion

In the opinion of the participants of the study, technological anxiety is a real phenomenon and in its non-clinical form affects approximately 10% of employees. In this group, the vast majority are people from the 55+ generation. According to managers, technological anxiety should be considered in a broader context, namely as one of the types of fear of change. According to the management, employees understand the need to implement technological solutions typical of industry 4.0 on a rational level, but on an emotional level they are concerned whether they are able to acquire the new skills related to it at a sufficient level. The analysis of the study participants' statements leads to the conclusion that technological anxiety manifests itself in the form of other negative emotional states: generalized reluctance to work, feeling of helplessness, shame, embarrassment, mental discomfort, a sense of threat to one's own professional position and position in the group (see Figure 2). This applies in particular to employees in the declining period of their career, who see that their long work experience and extensive professional experience do not directly translate into competences considered key in the conditions of technological transformation 4.0.

Figure 2. Mapping emotions associated with technological anxiety.

In the opinion of the survey participants, people in the 55+ age group affected by technological anxiety often treat new technologies as a source of undermining their position in the group, or even loss of professional authority. Knowledge and skills that were their advantage in the conditions of industry 3.0 are now losing importance. Implementation of solutions typical for intelligent factories causes that they stop understanding the processes in which they participate or which they are responsible for.

On the basis of the survey participants' statements, it was possible to distinguish elements that allow employees to rationalize technological anxiety, i.e. providing rational arguments justifying irrational emotional reactions (see Figure 3).

Figure 3. Technological anxiety rationalization.

In the opinion of the surveyed managers, the consequence of technological anxiety is primarily the low level of employee involvement in the process of implementing technical and technological changes and discouraging others from this process - those who have a positive attitude towards the digital transformation of the enterprise. Moreover, technological anxiety significantly influences attitudes towards learning (see Figure 4).
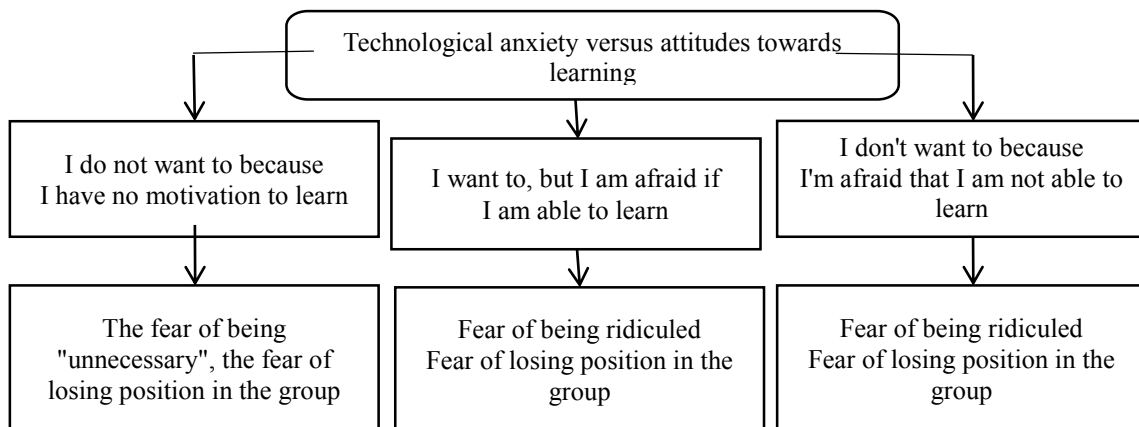

Figure 4. Technological anxiety versus attitudes towards learning.

The analysis of the respondents' statements allows for the conclusion that technological anxiety has a deeper psychological basis. New technologies cause deep concern because they require adaptive behaviors that some employees, especially in the 55+ age group, are not ready for. They are afraid whether they are able to acquire the competences necessary in the 4.0 enterprise or are not motivated to learn (for example due to the imminent retirement). It is easier for them to mentally reject changes than to deal with the fear of potential ridicule over the difficulty of acquiring new competences.

5. Summary and conclusion

Technological anxiety is a real problem in companies implementing technological solutions typical for industry 4.0. It mainly affects employees in the 55+ age group. It generates negative attitudes towards changes, and in particular to-wards the need to acquire new competences necessary for effective work in the conditions of digital economy. Employees experiencing technological anxiety rationalize it by looking for a justification for their emotions in the form of potential negative consequences of technological changes. Technological anxiety causes job dissatisfaction, a feeling of maladjustment and, consequently, social and health effects in the workers it affects. From the perspective of the company, it is a psycho-social barrier to the implementation of the concept of industry 4.0. The conclusions drawn from the research presented in this article have limitations. They are due to the qualitative nature of the research and the fact that the problem of technology anxiety was analyzed only from the perspective of managers. Therefore, it is advisable to continue research among different groups of employees and learn more about their attitudes toward new technologies typical of Industry 4.0 and the intensity, cause and manifestation of technology anxiety.

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