

Technoagism and Technical Behavior of Elderly Citizens: Results of Russian and Belarusian Research

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Abstract—The article is aimed at analyzing social effects of digitalization using the example of the elderly in a big city. Digitalization in this article is considered in two aspects: as introduction of digital technologies in everyday life (including in the context of the phenomenon “smart city”); and digital transformation of professional practices (constantly reproduced process of their digitization). In the context of its social effects, special attention is paid to phenomena such as technoagism (exclusion of older people from the digital sphere) and related technostress.

Keywords: digital transformation, elderly, “smart city,” digital competencies, discrimination and exclusion of the elderly in the labor sphere

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INTRODUCTION

Today, digital technologies are among the strategic priorities for the development of the innovative component of most states. However, their impact on society is twofold. Digitization intensifies the development of social and economic systems, but it changes the established order and principles of social life, which does not always have positive consequences, forming, among other things, the effect of its rejection by some population groups.

The issues of building an information society and the digitalization of social processes are receiving close attention in Russia and Belarus. The State Program of Scientific Research Society and Humanitarian Security of the Belarusian State for 2021–2025 involves the study of socioeconomic prospects and risks of the development of digitalization processes in Belarus in the context of building an IT-country, diagnostics of sociocultural conditions and factors of digitalization of the Belarusian society. One of the priority areas of scientific and technical policy is the creation of “smart cities,” with the help of which the problems of adaptation of the urban population to digitalization, its integration into the processes of digitization can be solved [7]. In Russia, one of the tasks of the Digital Economy National Project for 2018–2024 is the development of the concept of 50 “smart cities” (this includes the creation of a general scheme for the development of communication networks and urban infrastructure, a system of sectoral regulation of the use of cyber-physical systems, including the Internet of Things, etc.) [13].

Among the acute problems associated with digitization, researchers mention digital inequality, a situation when a group of people lacks or has limited access to modern information technologies as well as mastering digital competencies [3, 5, 9, 19–21]. Digital inequality is a complex multilevel concept that has many forms of manifestation, which include; technologically determined inequality (absence or underdevelopment of the corresponding information communication and technological infrastructure); inequality caused by socioeconomic factors (low income, limited access to digital literacy, lack of relevant skills and competencies); and demographic and cultural inequality, which complicates the process of mastering new technologies. Digital inequality often leads to the phenomenon of technoagism. This term is understood in the article as a phenomenon of a social order, which is a sociocultural pressure on the elderly as a result of the digitalization of the sphere of their professional activity [12]. We proceed from the assumption that the spread of digital technologies in the sphere of work leads to discrimination against employees of older age groups who do not have sufficient knowledge and skills to use information and communication technology products in their professional activities.

Elderly people, that is, people aged 60 years and over (according to the WHO classification, it is they that belong to the elderly people,¹ are especially vulnerable under the conditions when digitalization has

¹ <https://www.who.int/>.

already spread to all spheres of life. Since the majority of elderly people live in cities,² they can potentially use the existing advantages of the urban environment, which increasingly concentrate the achievements of the digital revolution, but they are often unable to do so for a number of reasons that will be discussed below.

Elderly people make up a significant part of society. According to World Bank statistics, Belarus together with Japan and Bulgaria are among the countries with the highest proportion of elderly people. In the Republic of Belarus at the beginning of 2019, more than a fifth of the population belonged to the elderly, and over the past 10 years the number of people in this group has increased by 18.2% [14]. In the Russian Federation, the situation is similar—the increase in the number of elderly citizens over the past 10 years amounted to 20.6% [17]. These figures confirm the importance of the problem of involving elderly citizens in digitization as an inevitable result of modern demographic trends.

The goal of the article is to analyze the peculiarities of the technical behavior of elderly citizens in the sphere of work and everyday life as well as ways to “mitigate” technoagism faced by the elderly. The objectives of the study are as follows: (1) outlining the existing problems of involving elderly citizens in digitalization based on the description of the social effects of digitalization of modern life; (2) identifying the manifestations of technoagism in the context of the digitalization of the sphere of work (using the example of the authors’ research carried out in St. Petersburg and Minsk); (3) considering the relationship between professional technoagism and technoagism in everyday life of the elderly; and (4) outlining possible algorithms for mitigating the consequences of technoagism for elderly citizens.

The empirical basis for solving the indicated tasks is of a qualitative and quantitative nature and includes the following: (1) the results of a telephone survey of St. Petersburg residents that is devoted to training and the use of digital technologies in work (the survey based on a stratified sample, $n = 1000$)³; (2) texts of in-depth interviews conducted in one of the successful Belarusian companies from the Park of High Technologies (2020, $n = 40$, only answers from informants over 50 years old were selected for the article, 11 people). The telephone survey was used to illustrate the degree of involvement of elderly people in new technologies in professional activities; texts of in-depth

interviews demonstrated their perception of this situation “from the inside” (how exactly this happens, what affects the involvement of elderly workers in digitization).

The solution to the problems posed in the article illustrates further prospects for research in the field in which there is a shortage of studies devoted to the analysis of the dynamics of the process of excluding elderly people from digitization (where does it begin, what stages it goes through, what factors affect it, etc.). Current research is focused mainly on the results of such exclusion. They show how it is possible to reduce the existing digital divide, that is, how to turn an elderly person into a personal computer user [13], to identify the reasons and needs of the older generation in mastering and using Internet technologies [6], and to outline the risks of inclusion of elderly users in the Internet space [1, 12]. The novelty of the approach proposed is that the introduction of digital technologies into professional activities and everyday life of citizens is considered not as a parallel trajectory, but as an interconnected process. We believe that there are a large number of intersections between them, technoagism in the workplace (including workers of pre-retirement age) leads to negative consequences in everyday life, when a person completes his work activity or finds himself in forced isolation (as during the pandemic Covid-19). On the other hand, the “digital lag” in everyday life narrows the boundaries of the involvement of people of pre-retirement age in the working environment, creating objective prerequisites for the spread of technoagism.

DIGITIZATION AND TECHNICAL BEHAVIOR OF ELDERLY CITIZENS

Modern ideas about the digital city (“Smart City 2.0”) are characterized by an active shift from the technological aspect (quantity, complexity, variety of technological solutions used) to the social, behavioral aspect (the degree of coverage of citizens with digital technologies and their impact on the quality of urban life). The main task of new technologies is to make the life of a modern city dweller easier, safer, and better. It is no coincidence that most of the digital solutions used in cities are predominantly concentrated in the service sector (the use of Internet messengers, Internet banking, mobile banking, ordering and purchasing goods via the Internet, interactive television, viewing online broadcasts, services of online registration and purchasing tickets via the Internet, electronic payment systems, etc.). The digital technologies of the smart city are contributing to a number of positive results. They can reduce mortality by 8–10%, increase responsiveness to emergencies by 20–35%, reduce average travel time to and from work by 15–20%, decrease morbidity by 8–15%, and reduce greenhouse gas emissions by 10–15% [16]. Therefore, the digitalization of the urban environment must be used to

² According to statistics for the beginning of 2019, 71.6% of elderly Belarusians live in cities [14]. In the Russian Federation, this indicator as of January 1, 2020 was 73.6% [17].

³ 1000 respondents formed a subsample including 68% of respondents who turned out to be working people. The gender and age characteristics of the interviewed working citizens corresponded to the general structure of the city’s working-age population. The study was conducted based on the Center for Sociological and Internet Studies, Scientific Park, St. Petersburg State University in 2019.

Table 1. Distribution of working citizens by the use of digital technologies in professional activity depending on age, %

Constantly use or often use	18–49 years	50 years and over
Personal computer or notebook computer	71	56
Copiers	57	43
Office programs (Microsoft World, Excel)	58	42
Internet-browsers (Google, Yandex)	61	40
Internet-messengers (Telegram, Skype, Viber)	49	22
Cloud storage	34	16
Social networks (VKontakte, Facebook, Odnoklassniki)	29	17

increase the quality of life of citizens, preserve and increase human capital, and stimulate sustainable economic development. In this perspective, information technologies are transformed from a self-sufficient goal into a means, a tool for building a high-quality urban environment, and the goals are people-centeredness, inclusiveness, and sustainable development.

The social effects of digitalization are determined by the extent to which citizens are involved in the use of digital solutions, that is, the extent to which they are informed about their availability (1), have a sufficient level of income to purchase technical devices and pay for telecommunications services (2), and also have the appropriate skills and competencies (3), which are necessary for the confident application of the latest technologies in everyday practice (in this regard, it is important to combine all three components at the same time). If there is a discrepancy between the availability of modern digital solutions and their actual use in everyday practices by people of different age groups, the positive social effects of digitalization of the urban environment are weakening. The most vulnerable social group from the point of view of involvement in digitization is the elderly population, whose lifestyle did not previously involve the use of digital technologies as a tool to achieve daily goals. As a result, elderly people are excluded from digitization more often than other age groups and do not have an opportunity of using its benefits to improve the quality of life. The reasons for this situation require close attention of researchers.

Of the three conditions listed above that determine the involvement of elderly citizens in digitization, awareness, sufficient income, and having the necessary digital skills, the last one is believed by us to be the most problematic (the presence of the necessary digital skills in elderly people.⁴ Digital skills are not so much a product of education as a product of socializa-

tion. As a rule, mastering digital technologies does not take place in the format of traditional training (at school, university), but in the course of solving applied problems both in daily and professional activities. Elderly people often distance themselves from the digital environment even at the stage of their professional life, when the tasks of using and mastering new technologies are entrusted to younger employees. As a result, elderly people are discriminated against in the workplace, which stimulates their alienation from digitization. Let's consider this phenomenon in more detail.

DIGITALIZATION OF THE SPHERE OF WORK AND TECHNOAGISM IN PROFESSIONAL ACTIVITY

Modern information and communication technologies have become firmly established in the labor practices of the population. According to the results of the telephone survey conducted in St. Petersburg, the majority of working citizens are able to use various technical devices (personal computer, copiers) and the Internet (search programs, instant messengers, social networks) (Table 1). At the same time, the boundaries between “professional” and “consumer” digital technologies are gradually disappearing, an “entertainment” element of the World Wide Web such as social networks (VKontakte, Facebook, Odnoklassniki) is increasingly turning into a working tool. But if we consider the practice of using new technologies by employees over 50 years old (persons of pre-retirement and elderly age), then the picture changes, the difference can be 2 times or more (in the case of Internet messengers and cloud storage).

The gap is the most noticeable as regards various Internet technologies (especially search engines and instant messengers), which can help in solving both professional and everyday tasks (make an appointment with a doctor, order a service or product, stay in touch with relatives). Studies show that people use the Internet to a limited extent after the age of 55 years; they mainly study information about goods and services and communicate in social networks. However, only 10% of elderly users shop online [10].

⁴ Digital skills are usually understood as a totality of skills of using digital devices, communication applications and networks for searching and managing information, creation and distribution of digital content, interaction and cooperation, as well as solving problems in the context of effective and creative self-actualization, learning, work, and social activity as a whole.

Table 2. Distribution of working citizens by possession of digital skills in professional activity depending on age, %

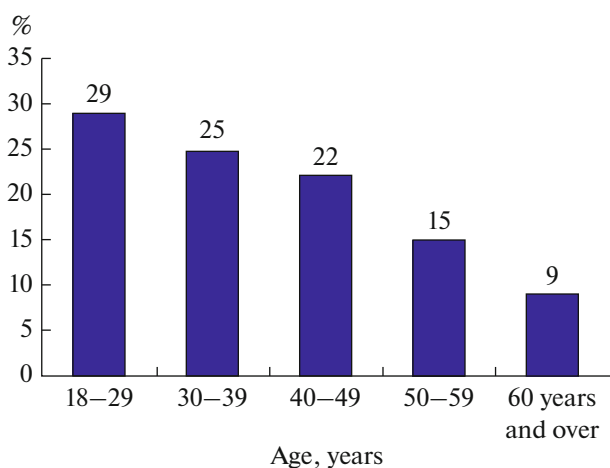
Fully master or mostly master	18–49 years	50 years and over
E-mail	90	51
Search systems (Google, Yandex)	90	52
Various professional programs (Photoshop, Autocad)	48	15
Information analytical systems (Konsultant+)	31	13
Programs for enterprise resource management	33	19
Programming (for example, Python)	18	3

Deep immersion in digital services (I fully master or I mostly master) not only contributes to the formation of various digital skills among employees (Table 2), but also motivates them for further training and self-development. In our study, every fourth respondent considers computer literacy to be a prerequisite for performing work functions. Elderly people are also observed to have a motivation to acquire digital skills, but this motivation is different. First of all, the feeling of loneliness prompts this category of the population to join digital products. The desire for professional retraining or development becomes a motivator to a much lesser extent [8].

For this reason, the mastering of digital skills in professional activities among people 50 years of age and older is approximately 2 times lower than among younger workers, which is reflected in Table 2. The use of complex, professionally oriented applications and digital tools turns out to be even more difficult.

The survey data show that the exclusion of elderly workers from digitization affects the formation of their digital skills and the development of motivation for acquiring computer literacy, the desire to improve digital literacy only decreases with age (Fig. 1).

The most significant difference between representatives of different age groups is manifested in the abil-

**Fig. 1.** Desire of people of different ages to increase computer literacy.

ity to use various professional programs (3 times less) and how to program (6 times less), that is, to use those tools that make it possible not only to have additional income, but also to work remotely if necessary (for example, in a pandemic). In other words, the limited use of new technologies by employees over 50 years old not only worsens the formation of their digital competencies and reduces the motivation for computer literacy, but also negatively affects their adaptive capabilities in the event of any crisis situations. The question arises, what are the reasons for excluding elderly people from digitization?

The texts of in-depth interviews suggest that the main social reason for the exclusion of the elderly in the process of technological renewal of an enterprise or company is technoagism. As a rule, when professional equipment is updated and new technologies are actively introduced into the practice of internal communications, elderly people are displaced from their previous positions for no apparent reason (both with an official change of position and without) or they lose touch with ongoing internal organizational processes and do not have the opportunity of “developing together with the company.” The authors came to this conclusion based on the analysis of the texts of in-depth interviews: for example, all cases of technoagism, which the informants spoke about in the study, were associated with some kind of technological renewal of the company and led to “going away” or “keeping away from the company.”

Let’s consider this phenomenon in more detail. Agism as the creation of stereotypes and discrimination against individuals or groups on the basis of age⁵ is an urgent problem, first of all, in relation to people of the elderly age group. According to some data, 60% of city dwellers have prejudices against the elderly to one degree or another [4]. At the same time, the majority of ageist stereotypes are associated with the denial of the social significance of people of older age groups, their “lesser value” compared to people of a different age (“young people are dear everywhere,” “the future belongs to the young”) [10, 15].

Technoagism is built on a similar principle. Here are some typical statements of in-depth interviews:

⁵ The definition suggested by the WHO <https://www.who.int/>.

“There was a moment when we renewed all the equipment, and what I worked with was decommissioned. Young people were sent to training, but I was simply taken and transferred to another department, I am no longer engaged in installation work”; “The training was in English there, we decided that it would be expedient to send those who speak the language better. Mostly they were younger, of course”; “Previously, we had mailings, they came personally to each employee, and now more and more of them are in the Workplace.⁶ It’s hard for me to follow the information there, I constantly miss something important, some announcements.”

Analysis of the interviews revealed three key characteristics of technoagism in the workplace. First, unlike “ordinary” agism, technoagism is more often auto-stereotyped (the perception of an elderly person as “lagging behind” can be shared among the elderly). Our elderly informants did not always perceive the exclusion of themselves from technological innovations as discrimination, characterizing the current situation as “it has become easier,” “calmer,” “there is less responsibility,” “I have got a good post,” “everything is good as it is” (it’s hard for me to drive around objects, tinker with towers, all the more something new is constantly appearing, I don’t have time to keep up with it. I don’t have such ambitions as young people do.” “I have a good post, I am the head of a department, what will I use this for? It is only an unnecessary headache. And I feel good anyway”).

Second, the process of involving elderly citizens in digitization is often accompanied by technostress (anxiety, fear of missing something important) [18], which significantly reduces their adaptive capabilities and “feeds” technoagist stereotypes from within. Elderly workers are particularly vulnerable to technostress; on the one hand, they do not have the necessary practical and psychological training for working with new technologies, on the other hand, they have to constantly face them (at the same time, the fear of losing their job, being worse than others, and being alone is often used as an incentive to learn).

Let us consider the specific manifestations of technostress identified in the interviews. These texts were analyzed according to the strategy of grounded theory, which involves the conceptualization of the initial data (two modalities were identified in the perception of new technologies by elderly people, “aggression” and “helplessness”), the combination of the initial codes into two generalized categories (“fight” and “flight”). “Fight” with new technologies implies a desire to avoid their use in professional activities, to hinder their implementation, and to advocate a return to the traditional (“doing everything in the old way”). This is manifested in the desire to minimize electronic means

of communication (preference for personal visits instead of using a messenger), preference for mailing instead of receiving information from the news feed in corporate social networks, organizing offline (face-to-face) meetings instead of remote ones (“A five-minute meeting with the latest news from the head must take place once a week”). “Fear” of new technologies manifests itself as general confusion, self-doubt, inability to keep up with changes, control the use of technologies, and cope with large flows of information (“The flow of information has turned into information noise, all this greatly interferes with work, does not allow concentration”; “You are flooded with a shower of information that comes from different levels, and it seems that you need to look through everything, but it is not clear what to do with it, and the working time is running out”).

Third, increasing digitalization leads to digital inequality between young and elderly workers. For example, when traditional (face-to-face) training in a company is completely transferred to the online mode, a kind of vicious circle is formed: in order to successfully cope with professional duties, an employee needs to master new software; in order to master new software, one needs to master new technologies; in order to master new technologies, one needs to know the particulars of software and so on (“Training in our company is now all in the online mode, and I have not gotten accustomed to such a mode, I do not have time to do everything, and there are also technical difficulties”).

Technoagism in professional activity continues in everyday life. As a result, technoagism in the workplace not only negatively affects the results of work, but also affects the quality of life of elderly people, increasing the risk of social exclusion, which yields in significance only to the risk of poverty and material disadvantage [11].

This problem became especially acute under the conditions of the Covid-19 pandemic. In our opinion, the situation is aggravated not only by the physiological characteristics of the organism of an elderly person (the elderly are at a higher risk of infection and a severe course of the disease) or the overload of the health care system (the inability of doctors to provide timely and full medical care to all those who need it), but also measures of physical distancing, which are aimed at curbing the spread of the virus among the population, especially those people who live in densely populated cities (Moscow, St. Petersburg, Minsk). The bans and restrictions officially introduced in Russia and Belarus have deeply affected the lives of elderly people: many people were cut off from the services, support, and care that they used to count on before. Having lost the opportunity to implement everyday practices in the traditional way (visiting shops, pharmacies, clinics, communicating with relatives and friends, paying for utilities), they were often not ready to “virtualize”

⁶ A corporative communication platform developed based on the Facebook network that includes the opportunities such as the creation of groups, mailing, renewal of the news feed.

them all at once. The usual support in such cases from children, grandchildren, and consultants at a bank or post office was not available. As a result, elderly people actually found themselves in complete social isolation, which negatively affected their psychological well-being and made them an easy target for a dangerous disease.

Human interaction with digital technologies can be interpreted in the context of thinking about “creative destruction” of J. Schumpeter, who used this concept as a synonym for the concept of “innovation” [2]. Indeed, when faced with new challenges (for example, daily real-time viewing of large streams of news on social networks or the need to be registered and authorized to use mobile applications), individuals develop cognitive skills such as the ability to search, systematize, synthesize and evaluate information, learn the principles of network security, and improve overall computer literacy. The skills formed in everyday practice reduce the manifestations of technostress, help to adapt to the emergence of new technologies in everyday life (for example, having mastered e-mail and learning to search and systematize information on the Internet, an individual gets the opportunity to order food delivery to his home; see the work schedule of specialists in the clinic; sign up to a doctor using the electronic registration system, etc.). Regular use of digital products in everyday life increases the chances of elderly people adapting to digital transformations in the field of professional activity, minimizing technoagism and its consequences. It is obvious that measures aimed at developing the digital literacy of the elderly and adapting to new technologies will have a positive impact on their technological behavior in everyday and professional practices, which may lead to leveling the technoagism effect.

CONCLUSIONS

Technical behavior of elderly citizens and their adaptability to digitization are directly related to the availability of digital products in professional and everyday life, opportunities for the development of digital skills. Our research has shown that the “alienation” of elderly people from digitalization products leads to reluctance, distrust, and often even fear to master digital resources. In-depth interviews have demonstrated the stereotypes of representatives of elderly age groups who believe that “working in the old way” is no less effective. We also observed a reflection on self-exclusion from digitalization processes, “I’m too old for that.”

It is natural that technical behavior in professional and everyday spheres of life is in many respects identical. Moreover, they are interconnected: having learned how to use a computer and the Internet to solve everyday tasks (online services, contacts with relatives using instant messengers, etc.), an individual can easily apply these skills for professional purposes.

Technoagism and technical behavior are interdependent phenomena, the first determines the attitude towards the subject of activity, and the second forms the behavioral response (adaptability) of elderly people. As a variety, technoagism is in many ways similar to agism, but it has pronounced distinctive features: it is based on stereotypes and discrimination of elderly people, for whom the processes and products of digitization are “inaccessible” (“unknowable”) (sometimes because of false concern, guidance by formed stereotypes about their helplessness). It is more often auto-stereotyped, provoking technostress, while the intensification of digitalization in professional and everyday life only intensifies the digital divide. In addition to the obvious negative impact on the professional life of older workers, technoagism leads to their dependence in everyday life, deprives them of self-confidence, and teaches them to rely on other people (often younger) in solving any problems. It significantly increases the risk of social exclusion, which can be disastrous in crisis situations (such as a pandemic).

The results of the conducted research allow us to assert that regular practices of using digital technologies in everyday life contribute to better assimilation of introduced innovations in the labor sphere. But for older people, the introduction to digital should be stimulated, rather, by sources of the external environment. The thesis proposed in the telephone survey that “most information technologies today can be mastered on one’s own” was answered positively by only 5.2% of respondents aged 60 years and over. This suggests a conclusion about the need for social measures involving elderly people in the digital environment, ensuring its accessibility, explaining the advantages and effectiveness of using digitalization products. Social policy aimed at involving people over 60 in the processes and products of digitization in everyday and professional life is believed by us to be capable of transforming attitudes towards people of this age group, as well as their behavior stereotypes, significantly reducing the social costs of using new technologies by the elderly.

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