INDUSTRY 4.0 AND SOCIO-ECONOMIC EVOLUTION

Suchacka M., Pabian A. M., Ulewicz R.*

Abstract: The ongoing revolutionary socio-economic changes are particularly evident in the context of implementing the principles of Industry 4.0, aiming to enhance two categories: the efficiency of actions taken and productivity, influenced by the increasing level of process automation. The utilization of robots, automation, and virtual reality are elements that not only characterize the economic practice environment but also the daily life of individuals. The observed situation provided the impetus for conducting survey research, focusing on exploring the functioning of individuals in the environment of new technologies. Information was obtained regarding the knowledge of selected technological solutions among Poles, their understanding of their essence, and the predicted further evolution/regression in this domain by the respondents. The acquired empirical data, reflecting the researched reality, appear to align well with the results of literary studies concerning technological processes and their associated social consequences. Poles have shown awareness of the existence of advanced technologies in various sectors of the economy and daily life, and they more often expressed favorable positions towards the utilization of innovative solutions-recognizing them as convenient and facilitating various tasks. This study provides an opportunity to present the initial and selected conclusions regarding the gathered material.

Key words: new technology, revolution 4.0, human resources, industry 4.0

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Introduction

The advent of Industry 4.0 represents a pivotal juncture in the annals of industrialization, transcending mechanization, and automation to encompass a comprehensive digital transformation. This epochal shift is characterized by the fusion of cyber-physical systems, the Internet of Things (IoT), artificial intelligence (AI), and big data analytics (Pietraszek and Gądek-Moszczak, 2013, Pietraszek et al., 2014, Pawłowicz, 2020), promising unprecedented advancements in efficiency, productivity, and socio-economic paradigms (Pacana and Czerwińska, 2023, Sujová et al. 2023). The trajectory of Industry 4.0 is profoundly intertwined with the evolution of our societal fabric, delineating a symbiotic relationship between

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technological prowess and socio-economic development (Ulewicz et al., 2022; Haseeb et al. 2019, Afonasova et al. 2019, Maltsevich, 2021).

The present article seeks to unravel this intricate interplay, aiming to elucidate how Industry 4.0, with its underpinning technological innovations, shapes and propels the trajectory of societal evolution. Drawing upon an interdisciplinary approach, this study endeavors to amalgamate insights from engineering, economics, sociology, psychology, and policy studies. It seeks to traverse the complex terrain of Industry 4.0, examining its profound implications on the labor market, consumer behavior, governance structures, educational paradigms, and societal dynamics at large. Through a meticulous analysis of emerging trends, challenges, and transformative potentials, this inquiry strives to provide a comprehensive understanding of how Industry 4.0 is redefining the contours of our societies and economies.

New Technologies - Technological and Social Aspects - Discussions around Selected Processes

Researchers from many disciplines write about new technologies and their real impact on the functioning of humans, specific social groups, and the entire economy (Van Rensburg et al. 2019; Paramanik et al. 2020; Popkowa et al. 2019; Gajdzik et al. 2021). Three main threads will be important for us: technological changes towards industry 4.0 and social changes covering broad issues of business management, including human adaptation to upcoming socio-technological changes. Currently, the fourth industrial revolution is underway, which is characterized by the production of cyber-physical systems (CPS) based on heterogeneous integration of data and knowledge (Cioca et al., 2011; Ślusarczyk et al. 2020; Stareček et al. 2023). CPS systems implement tight integration of the computational layer with physical processes. Most often, they occur in the form of embedded systems and networks for monitoring and controlling physical processes, operating in a feedback loop, where physical processes are the source of data for calculating the signal controlling objects. The main goal of Industry 4.0 managers is to achieve higher levels of operational efficiency and productivity using higher levels of automation (Xuet et al., 2018). This is accomplished through a number of emerging technologies and related paradigms, including Radio-frequency identification (RFID), Enterprise Resource Planning (ERP), Internet of Things (IoT), or also cloud production and the development of social products. The development of the necessary infrastructure - broadband networks enabling efficient data transmission - plays an impressive role in this process. Artificial intelligence and its various possibilities of use also play an important role in these processes (Dadi et al., 2021; Kuzior et al., 2019).

Global forecasts regarding the development of Industry 4.0 are a premise for implementing new work patterns and thus changing the paradigm of the concept of human resources management. Robots will increasingly become not only assistants cooperating with employees but will also act as digital/virtual employees themselves. The new reality requires the creation of an HRR (Human Resources and Robots) department, i.e., responsible not only for managing human resources, but also robot resources. Workplace safety seems to be an extremely important HRR

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

activity in this context, even a priority, as emphasized by partners Citrix and Coleman Parkes in the Work 2035 report (Work 2035). Implementing the transformation towards Industry 4.0 is not easy, many companies cannot correctly define current technological capabilities and the possibilities of implementing new, intelligent technologies. One of the most frequently defined barriers is obtaining information and knowledge from employees and transferring it to the digital world. An important factor is employees' fear of whether, after transferring their knowledge, they will still be needed in the new "digital" team (Kuzior, 2022). This also involves the need to constantly improve competences and plans to create "learning" organizations (Antalová et al. 2022). The same problem is associated with unskilled workers who have concerns about working in such an advanced work environment. This is the so-called barrier of society's awareness and culture. It includes people's behavior related to lack of trust in modern solutions, following stereotypes, as well as low acceptance of innovation. This barrier also refers to people's reluctance to work in a team, lack of willingness to take risks, cognitive conservatism, and lack of ability to use their own capabilities (Ingaldi and Ulewicz, 2020). Kagerman and his colleagues noted that it is necessary for companies to use a sociotechnical approach in which employee participation in workplace design is crucial (Kagerman et al., 2013). People are invariably the most important, and thanks to new solutions they will receive much greater support than before. However, employees very often perceive new technologies only through the prism of threat and job loss, which constitutes a huge barrier to the implementation of innovations (Grebski and Mazur, 2020). People with specific competences and the ability to control the fears of ordinary employees are needed. Therefore, managers are sought - employees with specific skills developed at the stage of management studies, such as:

-skill to manage the production process and service,

-skill to use the computer support tools,

-interpretation, in system frame, the relations in enterprise's activity,

-skill to analyze the basic processes and management in the company,

-skill to identify the factors for the enterprise's systems integration,

-skill to analyze the processes occurring in the enterprise, operating in a different area,

-skill of full understanding of trade's structure and strategy, know how to determine the issue of efficient customer service, use the methods and techniques in management processes of quality and how to design the activity and manage it (Grabara 2013).

The times of the Covid-19 epidemic and the lockdown of the economy have also shown that an enterprise is 4.0 only when it manages to connect and integrate with all links in the value chain. In the recent period of the Covid 19 pandemic, it was also necessary to change the nature of the work performed to a greater share of remote work or to create virtual teams (Kamińska-Berezowska and Suchacka, 2022). This made it necessary to provide employees with the opportunity to acquire the necessary digital competences. One of the most interesting ideas that clearly

2023
Vol.28 No.1

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

combines the concept of Industry 4.0 with the need for possible retraining and adaptation to changes is the issue of digital social responsibility. The sources of this concept can be found within the corporate social responsibility (CSR) trend. It translates into shaping and expanding employees' awareness (Suchacka, 2020). As part of the steps taken, programs are created to popularize this responsibility in the field of technologies used and securing digital data, training programs for employees preparing them for difficult situations in how to deal with digital information, as well as taking the concerns of customers and employees seriously using appropriate tools. The main goal of activities focused on an individual approach to each client is to increase the effectiveness of the relationship management process. Breakthrough technologies such as the Internet of Things (IoT), analysis of large data sets and artificial intelligence have allowed for a change in the operating paradigm of companies and the opportunity to retain customers who are currently characterized by a low degree of brand loyalty. Ongoing monitoring allows you to quickly respond to emerging trends. Artificial intelligence also allows you to define the overall customer experience and predict their likely actions in the future. It might seem that innovative solutions in marketing may appear mainly as instruments supporting marketing communication, tools for analysis and data conversion. Nothing could be further from the truth. Artificial intelligence brings new opportunities for the development of marketing creativity. AI is used in branding, giving the opportunity to create and implement non-obvious solutions. Today, logo designs or branding campaigns can be created in cooperation between a marketer and a robo-marketer. Photo generators based on artificial intelligence allow you to create unlimited sets of product arrangements in any style. Thanks to this, it is possible to create photos of non-existent products according to the marketing plan, using an extraordinary vision. Current AI practices in the field of visual arts have even contributed to research in the field of comparing the creative work of humans and machines, and although the opinions obtained during the research are very diverse (from supporters to opponents), new possibilities are undoubtedly being developed. AI can not only create visual stimuli but can also be used for copywriting. Tools such as Jasper, Rytr, Writesonic are based largely on GPT-3, a technology provided by OpenAI - an American research company. These tools allow you to create text content based on predefined models, styles and topics, keywords or commands provided by the user (Kowal, 2023, Kaczorowska-Spychalska 2023, Wojciechowski and Korjonen-Kuusipuro, 2021).

In parallel to the activities undertaken by business practitioners, researchers from various disciplines increasingly often point to the responsibility of broad elites and scientific authorities for the process of raising awareness of potential threats that may completely change our civilization due to technological changes (Fobel and Kuzior, 2019). The perceived, disturbing trends and presented worst-case scenarios lead to the desire to control the development of technology. F. Fukuyama wrote about it at the beginning of the 21st century, pointing out the fundamental difficulties: "The only way to control the spread of technology is to create international agreements on

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

technical restrictions, which are very difficult to negotiate and even more difficult to enforce. In the absence of such international agreements, any country that imposes regulation on its territory will simply help its competitors." (Fukuyama, 2004). The integrity of actions taken at various levels remains a problem. However, it can be assumed that the reason is differences and degrees of advancement in the use and understanding of modern technologies. Hence the need to examine - and even periodically analyze - how they are understood. The dynamics of technological change and its social effects are extremely difficult to grasp. The essential element of this transformation is a well-educated person who implements modern management methods leading to the creation of a people-centered organization.

Research Methodology

The principal objective of this study lies in presenting the empirical research findings regarding the attitudes of the Polish populace towards contemporary technologies, encompassing their understanding, utilization patterns, and socio-psychological dimensions in the realm of modern technological advancements, particularly artificial intelligence. The research primarily delves into comprehending the pronounced phenomena and intricate processes associated with new technologies and endeavors to gauge public awareness regarding forthcoming technological shifts.

The empirical investigation, commissioned by the University of Silesia in Katowice, transpired during the months of May and June in the year 2022. This study encompassed a nationwide representative sample of 815 individuals. Employing the technique of Computer-Assisted Web Interviewing (CAWI), respondents autonomously completed an online questionnaire via a dedicated research panel facilitated by a contracted surveying agency. Adhering to stringent ethical guidelines governing social research, the interactions with respondents ensured informed consent, data confidentiality, anonymity, protection of personal information, and the overall well-being of the participants. The research instrument comprised a meticulously structured survey questionnaire addressing several pivotal dimensions:

1. Initial Associations: Exploring the nuanced first impressions and cognitive associations with the broad spectrum of modern technologies.
2. Information Sources: Investigating the dissemination channels through which individuals acquire knowledge about new technologies.
3. Future Projections: Delving into the anticipated global shifts, considering the trajectory of new technological advancements.
4. Utilization Patterns: Understanding the intricacies of how modern technologies are integrated into the fabric of daily life.
5. Perceived Threats: Identifying societal values that are perceived to be at risk due to the integration of modern technologies.
6. Conceptual Familiarity: Assessing the level of familiarity and conceptual understanding of selected terminologies linked to modern technologies, encompassing concepts such as artificial intelligence and bots.

Ensuring the representativeness of the sample entailed meticulous consideration of demographic variables including age, gender, educational attainment, size of residential areas, and occupational status. While the research possessed a nationwide scope, its design envisaged serving as a foundational phase for subsequent in-depth investigations, potentially laying the groundwork for comprehensive comparative analyses. The outcomes of the quantitative research underwent rigorous statistical analysis, and carefully selected preliminary conclusions are encapsulated within this study. The primary motivation for embarking on this extensive inquiry lies in bridging a pertinent research lacuna and aspiring to enrich interdisciplinary knowledge by assimilating insights from both the natural and social sciences.

Research Results and Discussion

Deliberations on contemporary technologies within the framework of the technological transformations of the 4.0 revolution and the societal dimensions of human functioning in this new epoch compel a profound exploration of society's disposition toward emerging technologies, comprehension of fundamental concepts, and utilization of the diverse capabilities that these novel technologies afford us in our daily lives.

The research endeavor was meticulously tailored to uphold the representativeness of the Polish populace, considering variables such as gender, age, educational attainment, and place of residence. Among the respondents, 54.1% were female, and 45.9% were male. Considering age distribution, within the youngest age bracket of 18-24 years, 10.9% of the participants were accounted for. In the subsequent age cohorts, the distribution was as follows: 20.6% in the 25-34 age group, 17.5% in the 35-44 age group, 18% in the 45-54 age group, and the most senior group, aged 55 and above, constituted 32.9% of the respondents.

In the context of residential demographics, 38.7% of respondents hailed from rural areas, while 30.9% were from smaller urban locales. These demographic nuances provide valuable insights into the diverse representation within the sample, enriching the understanding of the societal attitudes toward modern technologies and their integration across varying age groups and geographic contexts.

Regarding educational background, the largest contingent was represented by individuals possessing a general or technical secondary education, as well as post-secondary qualifications—cumulatively accounting for a substantial 47.1% of the study cohort. Following this, individuals with higher education qualifications, including vocational, engineering, undergraduate, and graduate degrees, constituted the second most prevalent group at 42.8% of the respondents.

This educational stratification is pivotal in comprehending the diverse knowledge base and expertise within the sample, shedding light on how different levels of educational attainment influence perspectives and engagement with modern technologies in contemporary society.

Undoubtedly, the initial associations made by the participants regarding new technologies offer valuable insights. Notably, these associations predominantly

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

emphasize convenience and an array of facilitative aspects, a viewpoint held by 11% of the surveyed individuals (Figure 1).
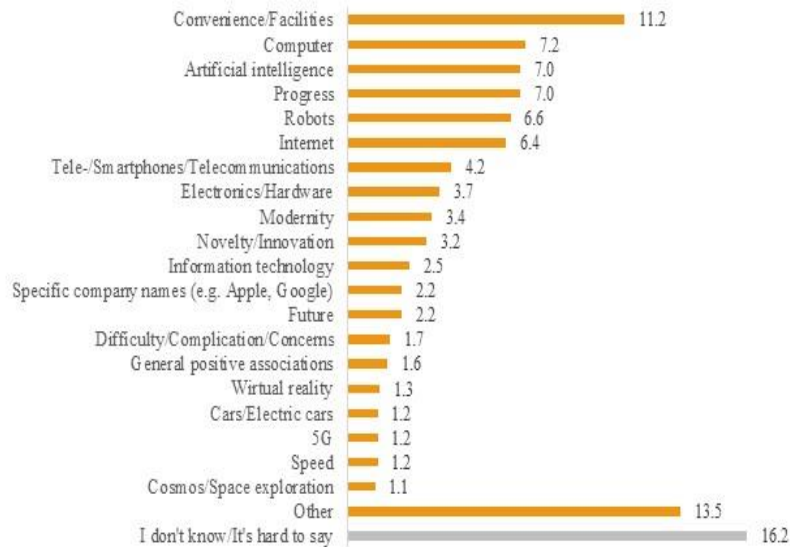

Figure 1: The first spontaneous association with new technologies

However, subsequent responses indicate a more instrumental perspective, viewing technology primarily to accomplish specific tasks. Less frequently cited were terms such as computer, progress, artificial intelligence, and robots (each at 7%). A mere 1.7% of the respondents, in their initial associations, highlighted various apprehensions and challenges tied to embracing novel technology. This broad spectrum of responses underscores the diverse perceptions held by the participants. It is important to emphasize that this question was deliberately left open-ended, devoid of any preconceived response options, to allow for an unbiased exploration of their associations.

Similarly, an unprompted response was sought for the subsequent inquiry concerning locales or circumstances—excluding the professional realm—where respondents interface with nascent technologies (Figure 2). Participants predominantly identified new technologies within domestic environments (21%) and amidst commercial transactions or shopping activities (18%). Subsequent mentions included critical sectors like medicine (13%) and automotive (9%). Moreover, respondents elucidated an extensive array of additional categories, underscoring the nuanced appreciation of the pervasive influence of emerging technologies across multifarious domains, encompassing sectors such as energy, sports, security, and even gastronomy.
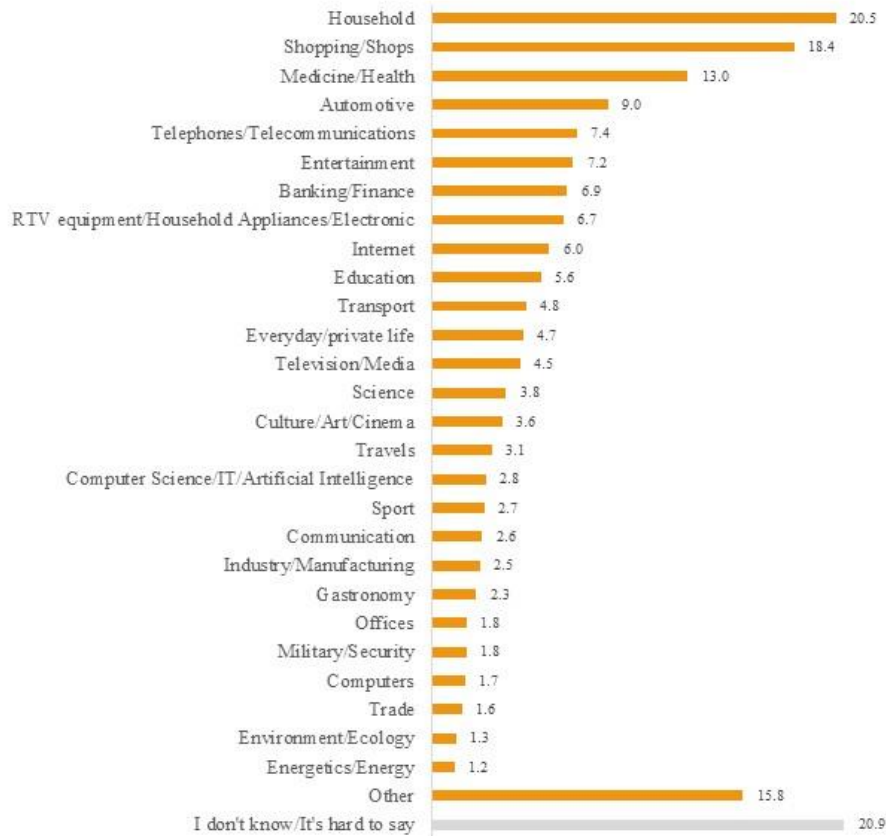
**Figure 2: Situations – outside of work, in which respondents
have to deal with new technologies**

In subsequent segments, inquiries were directed towards ascertaining the primary sources from which respondents derived information about burgeoning technologies. Notably, a prominent majority, amounting to 57% of the participants, identified traditional media as their key conduit for acquiring insights into emerging technologies. Additionally, discernible value was ascribed to informal dialogues with acquaintances (49%) and active engagement with social media platforms (48%). Participants were provided the latitude to select up to three options, affording them the opportunity to elucidate the sources they routinely accessed. This nuanced pattern of responses alludes to a propensity for corroborative knowledge evaluation across a spectrum of sources, indicative of an analytical and critical disposition (Figure 3). Remarkably, close to 23% gravitated towards an alternative that entailed perusing scientific and popular-scientific discourse within specialized journals. This trajectory may underscore an escalating appetite for disseminating knowledge in an accessible manner within this domain.
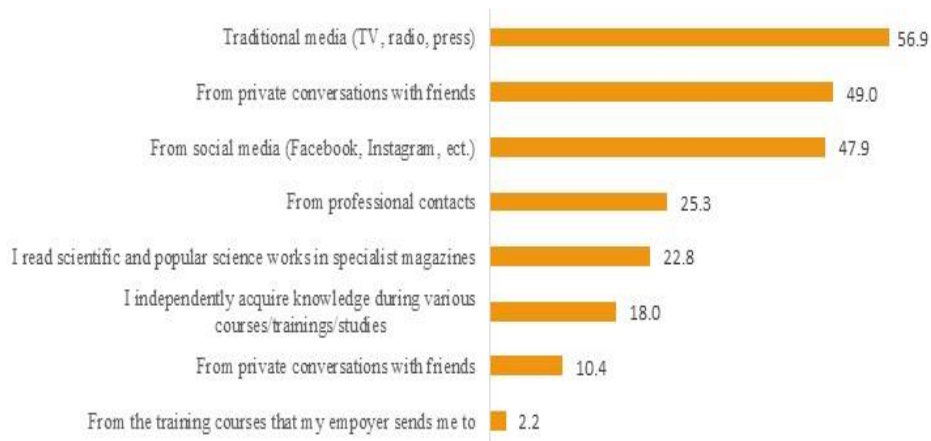
POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

Figure 3: Sources of information about new technologies

The advent of novel technologies evokes a blend of apprehension and hope among individuals. Respondents in Poland demonstrate a keen awareness of the myriad transformations that could unfold over the forthcoming decade, as illustrated in Figure 4. Allowing for the selection of three responses, participants primarily identified the trajectory of robotics and the increasing substitution of human labor with automated machines, garnering a considerable consensus of 18.2%. Subsequently, prognostic focus extended to the advancement of artificial intelligence (9%) and the progressive evolution of electric and autonomous vehicular technologies (8%). Furthermore, notable attention was directed toward advancements in medicine and environmental sustainability, both categories receiving a commendable acknowledgment at 7.2%. Within the domain of concerns, some respondents expressed worries pertaining to restricted human interactions and the potential escalation of warfare and armaments, albeit constituting slightly over 1% of responses. Intriguingly, most responses, delineated by the highest percentage, clustered within the top quintile of categories. This recurring trend likely signifies that, by and large, respondents primarily associate new technologies with auspicious prospects, reflecting an optimistic outlook in anticipation of the transformative technological landscape.
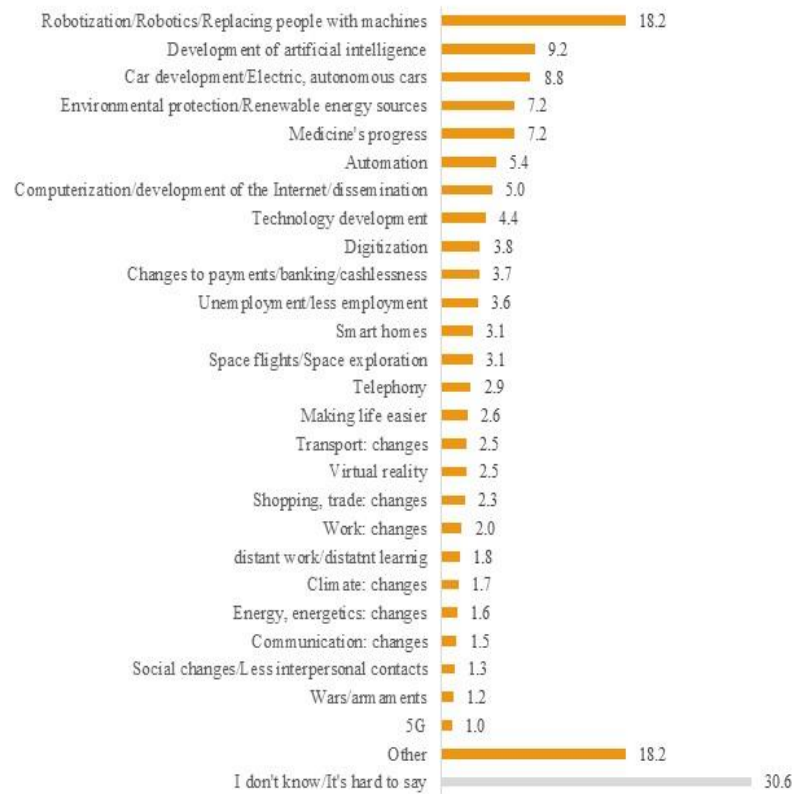
Robotization/Robotics/Replacing people with machines	18.2
Development of artificial intelligence	9.2
Car development/Electric, autonomous cars	8.8
Environmental protection/Renewable energy sources	7.2
Medicine's progress	7.2
Automation	5.4
Computerization/development of the Internet/dissemination	5.0
Technology development	4.4
Digitization	3.8
Changes to payments/banking/cashlessness	3.7
Unemployment/less employment	3.6
Smart homes	3.1
Space flights/Space exploration	3.1
Telephony	2.9
Making life easier	2.6
Transport: changes	2.5
Virtual reality	2.5
Shopping, trade: changes	2.3
Work: changes	2.0
distant work/distatnt learnig	1.8
Climate: changes	1.7
Energy, energetics: changes	1.6
Communication: changes	1.5
Social changes/Less interpersonal contacts	1.3
Wars/armaments	1.2
5G	1.0
Other	18.2
I don't know/It's hard to say	30.6

**Figure 4: Changes that may happen in the next 10 years
due to the development of new technologies**

Simultaneously, in the context of advancing modern technologies, respondents articulate considerable apprehensions concerning the potential erosion of fundamental societal values (Figure 5). This inquiry afforded participants the latitude to delineate three values from a curated list. Foremost among the concerns was the threat to human labor posed by the evolving landscape of new technologies, resonating profoundly with 30% of the respondent cohort. Subsequently, and with comparable prevalence, respondents highlighted concerns regarding human dignity (22%) and human nature (22%). Noteworthy is the relegation of 'happiness' to the least mentioned value, perceived to be potentially jeopardized by the burgeoning influence of modern technologies, garnering apprehension from merely 4.3% of the respondents. Values such as justice, equality, religion, and courage were also ranked lower, each evoking concern in approximately 6-7% of the responses. This nuanced examination provides insights into the multidimensional anxieties pervasive in society concerning the transformative trajectory of technological progress. It

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

underscores the necessity for a comprehensive discourse on the ethical, societal, and labor ramifications entailed in the relentless evolution of technology.
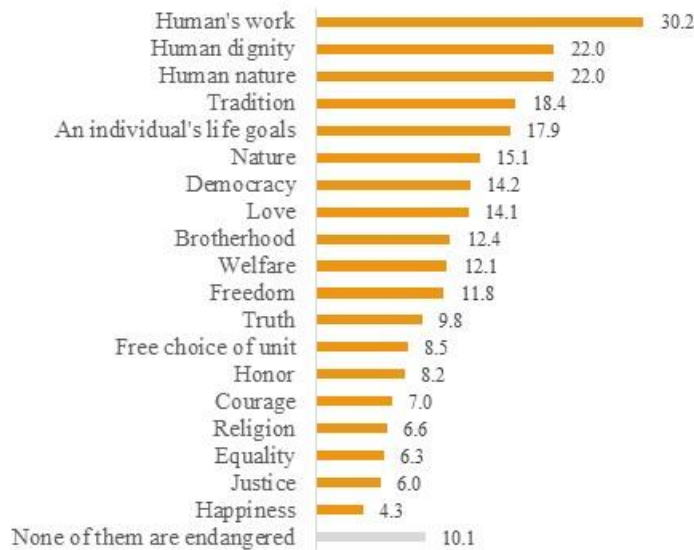

Figure 5: The most endangered values due to the development of new technologies

The respondents demonstrate a keen assimilation of modern technological trends, particularly within the realms of electronic banking and contemporary modes of communication (Figure 6). An overwhelming 70% of the study's participants explicitly convey their familiarity and frequent utilization of electronic banking services. An additional 20% acknowledge occasional engagement with this digital financial mechanism. Notably, 6% of respondents exhibit awareness of this technology without active utilization-an intriguing indication of the diffusion of awareness.

Furthermore, a significant majority of respondents, constituting 56% of the participant pool, assert habitual utilization of advanced communication modalities. Likewise, nearly 55% of respondents underscore their active involvement in online shopping—a noteworthy testament to the burgeoning impact of e-commerce in the consumer landscape. This empirical inquiry illuminates a technologically adept populace, exemplified by the substantial proportion of Polish individuals showcasing not only awareness but practical integration of an array of contemporary technological advancements. This includes interfacing with 'smart home' devices, engaging with AI-powered virtual assistants such as Google, Siri, or Alexa, navigating mechanisms for controlling online personalization, and embracing the adoption of electric or hybrid vehicles.
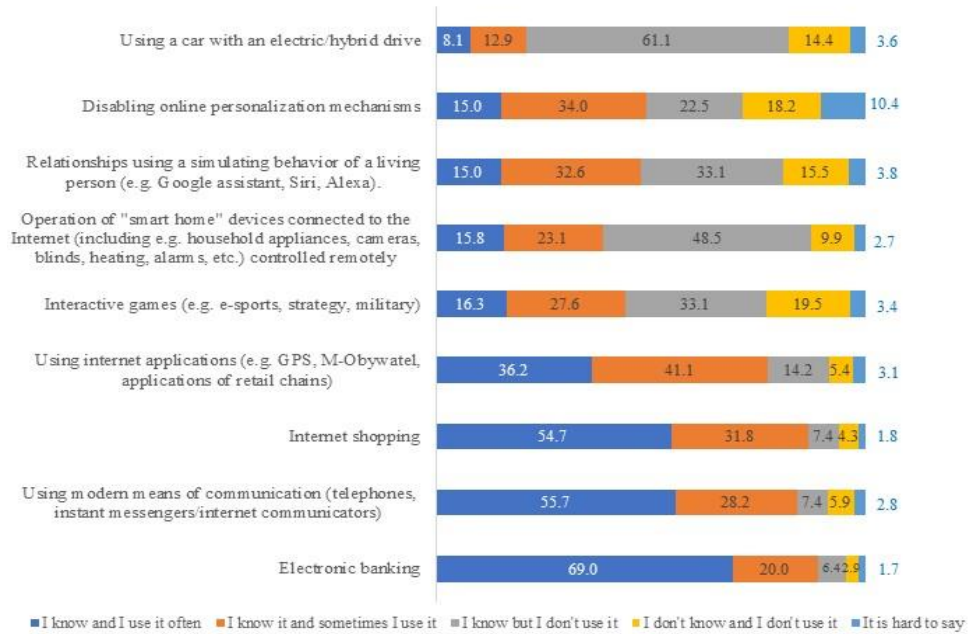
2023
Vol.28 No.1

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

Figure 6: Knowledge and use of modern technologies

The respondents were probed regarding their familiarity with specific terminologies pertinent to contemporary technologies. Noteworthy findings indicate that a substantial majority, precisely 75% of participants, possess a certain degree of familiarity with the term 'artificial intelligence.' Furthermore, exactly half of the individuals exhibit partial comprehension of the semantic essence encapsulated by the term 'Bot' (Figure 7). 'Humanoid,' albeit understood to some extent, is explicable by no less than one-third of respondents (35%). It is pertinent to highlight that respondents demonstrate a comparatively lower level of acquaintance with terminologies such as 'Big data' (29%) and FOMO (18%). These empirical insights underline the varying degrees of familiarity and comprehension levels concerning pivotal technological lexicons among the respondents. The comprehension of such fundamental concepts is fundamental for a nuanced understanding of societal assimilation and discourse surrounding the dynamically evolving technological milieu.
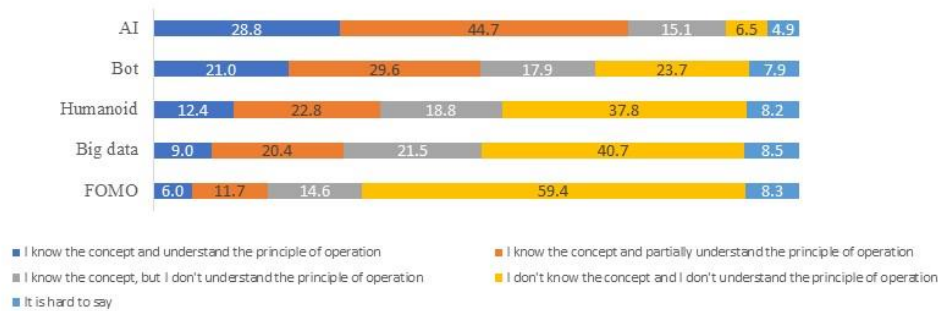
POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

Figure 7: Knowledge of concepts related to new technologies

The subsequent question was structured to elicit from respondents the selection of three plausible scenarios from a provided list, with a consideration of the likelihood of realization and a global perspective. The data gleaned from these responses illuminates that over an extended time frame (30 years), respondents predominantly envision the ongoing displacement of human labor by robots and machines (16% indicating this as their top choice). Notably, 13% of the respondents anticipate favorable consequences stemming from technological progress, including home automation and robotic assistance in daily life. An analogous percentage of participants (12%) consider the emergence of novel professions as the most probable scenario.

These findings offer profound insights into societal foresight and perception of evolving employment landscapes in the wake of advancing technology. It underscores the need for strategic considerations and policy frameworks that can proactively address the anticipated shifts in labor dynamics and the potential emergence of novel occupations.

At the bottom of the choices made, we find 'establishing emotional connections with robots,' which only 4% of the respondents pointed to as the most likely scenario (Figure 8).

Furthermore, participants were queried about their beliefs regarding emerging technologies, with several statements presented for their consideration. Delving into their beliefs and sentiments concerning interactions with these advancements, 6 out of 10 study participants express the view that children should receive education on the ethical dimensions of engaging with modern technologies. Beyond this, assessments were conducted on various aspects, encompassing the influence of modern technologies on household dynamics, feelings of vulnerability, social isolation, the dynamics of control, and the desire to incorporate robots into the domestic sphere. These assessments collectively underscore a readiness to engage with emerging technologies in interpersonal contexts and an eagerness to acquire knowledge about them (Figure 9).

These findings shed light on the evolving societal attitudes and underscore the critical need for educational and ethical frameworks to guide responsible integration

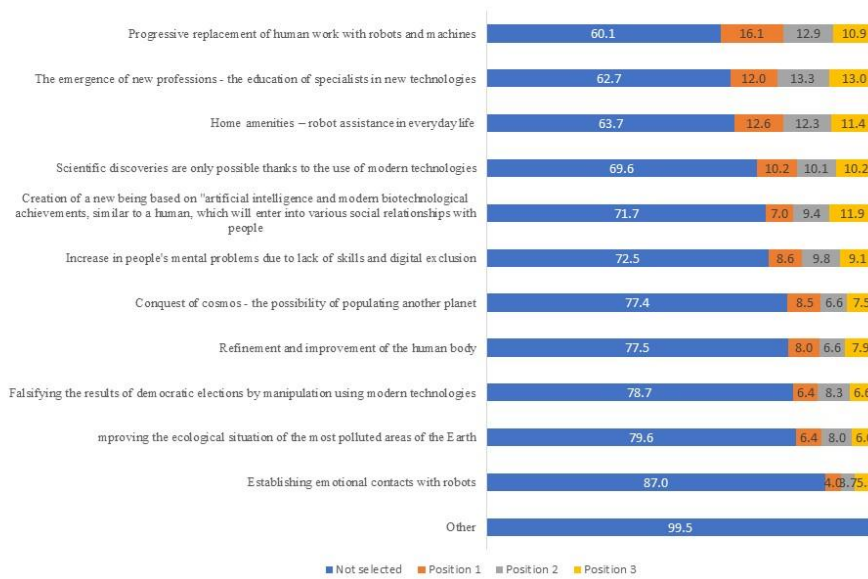and utilization of advanced technologies, especially as they become more pervasive in our daily lives.

Figure 8: The most possible situations in the next 30 years related to the development of new technologies
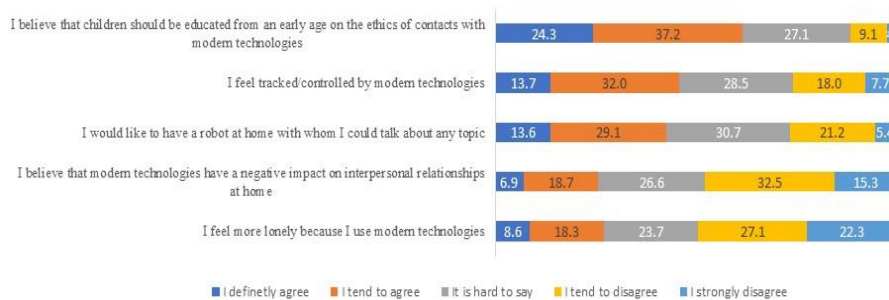

Figure 9: Beliefs and feelings about contact with new technologies

The amassed data delineates a discerning awareness among respondents regarding the potential hazards arising from the advancement of novel technologies. Nearly half of the respondents (46%) hold the perspective that modern technologies exert a detrimental influence on interpersonal dynamics within the domestic sphere, and 43% acknowledge feeling surveilled or controlled by these technologies. Furthermore, an intriguing insight is revealed, with 27% of the participants expressing a genuine interest in possessing a conversational robot capable of engaging in diverse topics. Equally compelling is the revelation that one in every four individuals experiences an augmented sense of social isolation due to their

POLISH JOURNAL OF MANAGEMENT STUDIES
Suchacka M., Pabian A. M., Ulewicz R.

2023
Vol.28 No.1

interaction with modern technologies. The select research findings presented above constitute a pioneering discussion within the academic realm since their inception. They stand as empirical exemplars illuminating preceding contemplations concerning the paradigmatic shifts emblematic of the Fourth Industrial Revolution. This corpus of insights serves as a foundational substrate for further comprehensive analyses, aiming to elucidate the nuanced determinants underpinning the anticipated transitions or investigate the causal antecedents characterizing specific processes concomitant with these transformative waves.

Conclusion

The results obtained from the conducted research align effectively with the delineated technological and societal processes expounded upon in the earlier section of this article. The collective consciousness of society is discernibly attuned to the ongoing transformations wrought by new technologies, both within professional domains and everyday life. A crucial consideration is the imperative of adapting to shifting conditions, albeit accompanied by the recognition of certain attendant threats. This recognition often stems from an incomplete comprehension of specific processes and inadequacies within the educational paradigms.

The conducted research affirms the following observations:

-Respondents express a conviction that modern technologies confer convenience, aid, and streamlining in daily life. Conversely, the collective perception associates technology with computers, progress, artificial intelligence, robots, and the internet.

-Poles perceive the impact of new technologies in various domains, encompassing households, in-store and online shopping, healthcare and well-being, domestic management, and diverse industrial applications of communication.

-The primary sources of knowledge acquisition regarding new technologies for Poles include traditional media and private discussions with acquaintances, followed by social media and professional contacts. This underscores the enduring educational role played by traditional media. Other sources, arguably the most credible ones, such as scientific papers, training, professional courses, or academic studies, were cited at lower ranks.

-New technologies evoke a duality of concern and hope. A substantial fraction of respondents, almost a third, when spontaneously questioned about anticipated changes in Poland's developmental trajectory over the next decade, were unable to articulate anticipated changes. This suggests a potential lack of interest in modern technologies or an inability to discern their consequential impacts. Those who did foresee changes indicated heightened robotization, the advancement of artificial intelligence, and advancements in medical technologies.

-Respondents highlight work as the paramount value imperiled by modern technologies. The dignity of humanity, human nature, individual traditions, and life objectives followed in subsequent order. Intriguingly, happiness emerged as the least threatened value, inviting further comprehensive analysis on the extent to which modern technologies can either enhance or jeopardize human well-being.

-A substantial majority of respondents, nearly 70%, engage in online banking, and over half profess proficiency in utilizing modern communication tools and engaging in online shopping. In contrast, knowledge pertaining to disabling personalization mechanisms on the internet or interacting with AI simulating human behavior is less pervasive.

-Respondents exhibit familiarity with the concept of artificial intelligence and profess at least partial understanding of its functioning, akin to their comprehension of terms like a bot, humanoid, or the concept of Big Data. However, this is not the case for the term FOMO, signaling a concerning gap in awareness given its association with the potential threat of new technology, and underscores the existing information and educational deficit.

-The events deemed most likely in the next 30 years concerning technological development, as indicated by participants, encompass the progressive displacement of human labor by robotics and machines. Respondents also underscored the prominence of domestic conveniences, facilitated by robotic assistance in daily life, and the advent of novel occupations in the realm of new technologies.

-Regarding their relationship with new technologies, respondents emphasize the necessity for early ethical education for children concerning their interactions with these technologies. Additionally, they unequivocally assert the negative impact of modern technologies on interpersonal relationships within private life. A cause for concern is the revelation that over 40% of the respondents feel under surveillance due to modern technologies.

In summary, from the vantage point of scholarly discussions and research outcomes, it can be surmised that Polish society exhibits a moderate level of preparedness for engaging with the rapidly evolving landscape of new technologies. Numerous concerns and apprehensions arise, stemming, on one hand, from mismatches within the educational system and information-educational policies, and on the other hand, from the dynamic transformations transpiring within this domain. Many significant solutions and innovations remain confined to a select group of specialized industry professionals, potentially leading to the phenomenon known as 'future shock,' first articulated by Alvin Toffler over 50 years ago (Toffler, 1970). 'Future shock' represents a state of shock and disorientation experienced by individuals exposed to exceedingly substantial changes in an extraordinarily brief period. Its causality and essence lie in the rapidity and compulsion of change. Within the milieu of such profound and rapid transformations, hitherto unprecedented in human history, our readiness to embrace new technologies remains wanting. Toffler initially conceptualized this notion in the context of the third industrial revolution when changes did not transpire with the same celerity as they do now amidst the fourth industrial transformation, as expounded upon by Neil Postman.

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PRZEMYSŁ 4.0 A EWOLUCJA SPOŁECZNO-GOSPODARCZA

Streszczenie: Trwające rewolucyjne zmiany społeczno-gospodarcze są szczególnie widoczne w kontekście wdrażania zasad Przemysłu 4.0, którego celem jest zwiększenie efektywności podejmowanych działań oraz produktywności, pod wpływem rosnącego poziomu automatyzacji procesów. Wykorzystanie robotów, automatyzacji i rzeczywistości wirtualnej to elementy, które charakteryzują nie tylko otoczenie praktyki gospodarczej, ale także codzienne życie jednostek. Obserwowana sytuacja stanowiła impuls do przeprowadzenia badań ankietowych, skupiających się na badaniu funkcjonowania jednostek w środowisku nowych technologii. Uzyskano informacje dotyczące znajomości wybranych rozwiązań technologicznych wśród Polaków, ich zrozumienia istoty tych rozwiązań oraz przewidywanej dalszej ewolucji/regresu w tej dziedzinie według respondentów. Uzyskane dane empiryczne, odzwierciedlające badaną rzeczywistość, zdają się dobrze korespondować z wynikami studiów literaturowych dotyczących procesów technologicznych i ich związanych z nimi konsekwencji społecznych. Polacy wykazali świadomość istnienia zaawansowanych technologii w różnych sektorach gospodarki i życia codziennego, a także coraz częściej wyrażali pozytywne stanowiska wobec wykorzystywania innowacyjnych rozwiązań, uznając je za wygodne i ułatwiające różne zadania. Niniejsze badanie daje możliwość przedstawienia wstępnych i wybranych wniosków dotyczących zebranego materiału.

Słowa kluczowe: nowa technologia, rewolucja 4.0, zasoby ludzkie, przemysł 4.0