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Human – Artificial Intelligence interaction at the workplace

A social science glimpse into today's challenges and tomorrow's expectations

Summary: Nowadays, more than ever our society is challenged with the rapid and constant technology evolution, new trends appearing by the day. Following this framework, human – machine interaction has left many questions unanswered, underlining a top priority for human centricity approach, for building social-technic systems with regard towards human user variables, for ethics and diversity protection, and the list can be expanded further. The present chapter endeavor explores briefly, in a social science keynote, various stances of human challenges in relation with artificial intelligence, smart systems, devices and new technology at work, following up to date research, human variables and organizational sectors. As a general view, studying the interaction between the user and the technology advances solicits new research steps and further comprehensive studies in a world that many a time focuses more frequent on the technological or marketing aspect of every new developed device, sometimes leaving aside, addressing partially and not fully understanding the human variables, that are involved inside the equation.

Keywords: human centricity, artificial intelligence, organizational sector, innovation, social view.

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A. General premises

I. New realities at work

A simple scan and search inside the major scholarly literature databases, especially in recent years, can present quite a generous range of research articles on the new trends in technology and artificial intelligence (AI), in various organizational sectors. Yet the search results focus more on the technical aspects, developing prototypes and planning future implementation, cost control and production efficiency while articles exploring human dimensions with regard to AI or any other smart systems are rather scarce and heterogenous in results and perspectives. Supplementary, concept clarification and theory based patterns are clearly needed in order to stimulate a more unitary and consolidated area of definitions, guidelines and paradigms, which in turn can explain better human user interaction with new technology at work, device management and learning associated with employee development, personnel training at work with regard to skills, individual and organizational performance, values and ethical principles, well-being preservation and so on.

The new technology reality is here now, either the Internet of Things (IoT) or the Internet of Medical Things (IoMT), the Industry 5.0 (European Commission et al., 2021) or Society 5.0 (Deguchi et al., 2020) just to mention a few examples, coexist, are constantly evolving and interacting, developing a new sense of work and organizational habitat. The setting is not yet complete and technology should be bound to focus more on the human topic, from a centricity point of view, even if at present the tech discourse, generally speaking, advocates for human user objective principle. Aside from the renowned and widely circulated concept of AI, the organizational domain contains several other numerous smart technologies such as virtual reality (VR), augmented reality (AR), mixed reality (MR) which impact the development of work, level of performance, job design, employee training and skill resources and so on. From this perspective, certain authors mentioned the concept of human artificial intelligence (HAI) or human centered artificial intelligence (HCAI), which allow the completion of simple AI with a human centered approach, where developing tech smart systems for the future will require human user values, perspectives, conditions and context (Shneiderman, 2020a; 2020b; 2021; Yang et al. 2021). In other words, at job and organizational level, the human factor should dictate primarily the use of technological systems, their development and implementation beyond simple performance or task related optimization. Concepts like well-being, discrimination, procedure or distributive justice,

diversity, integration, communication, training, perceptions and attitudes need to be taken into account when researching and adapting technology to the human user and not the other way around. Some authors already placed these socio-technical dimensions into discussion through their studies, which encompass the long awaited stance and dialogue between the individual's work related position and the use of technology adaptation (Boada, Maestre, and Genís 2021; Giermindl et al. 2022; Dwivedi et al. 2023; Heyder, Passlack, and Posegga 2023; Popa, 2023). Moreover, placing the new technology at work in relation with principles of transparency, accountability, privacy, security, fairness, justice, sustainability, responsibility, autonomy or humanity may help shape the fundamentals of sociotechnical theory with focus on sociomateriality (Heyder, Passlack, and Posegga 2023).

The new reality at work when interacting with smart technology, either is AI or VR, a virtual simulator or intelligent training station, a device or a different reality procedure, implies the human factor as a vector for either promotion or resistance to such logistics and resources. As such it is important that future research, projects or activities should focus more at work on the human variable with all its challenges, needs, motivations, principles and perspectives with regard to new work technology systems.

II. Organizational sectors and technology development

Present trends of using smart tech at work are commonly centered around the industrial sector, IT and communications areas. On an extended note, the academic research literature mentions more, such as medical, military, education, training, transportation and entertainment areas, which make use of a wide range of applications and intelligent systems, from various applications, sensors, displays, human-machine interaction devices to AI technologies and different types of reality (Zhu, Fan & Zhang, 2019; Sharma, Yadav & Chopra, 2020; Pogan & Popa, 2020b; Martin, Lilic & Martinez, 2022; Lomborg, 2022; Popa & Pogan, 2022).

Organizations alike, whether a hospital, company, school, communication or media center, place nonetheless the employee in relation more and more with intelligent systems, devices and technology on a daily base. Quite frequently, without even realizing it, people at work use, rely on, develop or train with such systems. Even if people themselves are the beneficiaries of technology improvement at the job site, we yet need to ask whether it is time to go beyond the marketing and technical objectives and immerse into deeper comprehension and research of human variables, human values, human principles and well-being at the workplace? To give a short example for thought: picture an employee that works completely remote and online,

thanks to technology, being present in virtual teams and virtual meetings, holding the full hourly work schedule just with a computer, and a virtual assistant as colleague most of the time. At first glance, costs are reduced, performance is reached, task is conducted and so on, but what about the social side of the job or work itself if any? To what degree is the human-machine total interaction healthy and efficient at work? While technology gives way for simplifying tasks, is it influencing the user to do things in a certain way? Is the user actually adapting to the technology while it should be the other way around?

In recent years, the debate over technology development in organizations has taken more interest in addressing human centered challenges and principles at work, an approach still in pioneer times. Moreover, there is a constant concern that if the regulating bodies lose the momentum and delay generating up to date policies, procedures, principles and views or fail to understand them with regard to the rapid advances of technology on the work market, it will be more difficult to reach and fully comprehend them as time goes by.

Table 1 contains just a few examples of technology driven applications at work, in various sectors of the organizational domain.

Table 1. Organizational sectors and new technology applications

Organizational sector	New technology applications
Industry	– Intelligent assistive systems – Workplace and task design – Simulation and evaluation – Human-robot collaboration – Visual documentation – Prototype development – Mass production – Cybersecurity – Training platforms
Health	– Neurotechnical interfaces – Surgery – Prosthetics – Assistive devices – Neural networks
Education	– Assistive training – Language development – Data networks

Organizational sector	New technology applications
Communication	– Data management – Networking – Data security – Big data – Data analytics

As observed, the potential and impact of these applications is limitless, with infinite resources and potential developments in numerous activity areas. The employees tasks and work itself are constantly undergoing a process of transformation, changing under the terms of performance, efficiency, cost reduction and technology advances. In this regard, in 2020, the Organisation for Economic Co-operation and Development underlined several principles which should be adopted when using AI in a specific system, among which some refer to: human centered values, fairness, transparency, sustainable and inclusive development, well-being, security and safety, accountability (OECD, 2020). From this point onwards stakeholders, policy makers and any regulating organization should envisage and shape a work market in which the new technology dynamics follows legal and regulatory frameworks, reduces risks of negative outcomes, combats discrimination, and protects human rights and well-being of employees. These next steps in regulating the labor market and organizational sectors with regard to new systems, will have to cover not only the AI topic but all the new technical developments that shape work, tasks, job environments, organizational culture and climate as well as the work force. So far AI has been more prominent due to its overwhelming publicity and interesting outcomes, somehow on occasions overshadowing the rest of technological advances such as virtual realities, data networks and intelligent robotics just to name a few. On the medium and long term, AI has the potential to become the focal point that integrates and binds the other technologies together, given the fact that information or data constitutes the basis of any process, device, platform, invention or innovation. But until then, research in organizations is bound to explore all aspects of technology evolution and revolution in order to provide an exact and efficient analysis, response and regulations to the matter. In 2019, Hudson presented several AI impacts on major areas such as economy, politics, people, society for the future, outlining that from an economic perspective, three scenarios can be depicted, ranging from a traditional model to an all technology control setting (Hudson, 2019). Oberson (2019) also concluded that if policy makers and regulating bodies will not elaborate on more analysis, solutions and developing strategies, the economy as it is will likely see tax and social security contributions

fail, it will witness first hand unemployment rise and growing demand for financial support, alongside steep consumption reduction at a generalized level. In other words, a human centricity approach on future needs and demands when dealing with AI, can prevent the risk of inequality escalation due to tech revolution which does not encompass human variables.

The debate is ongoing still, whether AI will enhance labor markets, improve work and work life of employees or on the opposite it will diminish it, replacing present structures and mechanisms with new types of work approaches that require extended and profound comprehension. In the future, the work domain may import new and challenging stances with a direct impact on the society known today, affecting not only jobs, daily activities or simple tasks but entire organizational structures, global markets, attitudes and behaviors towards its own core principles and functionalities.

B. Social views on technical innovation in organizations

Innovation has always captured the imagination and motivation of people wanting to create, develop and improve work, tasks, machines and processes, aiming at a better product quality, higher levels of performance and utility, quicker services or better use of resources at hand. The technical innovation underwent the same path as the research and technological development, transforming the workplace, work environment and relations, work culture and climate. At the same time, innovation implies to navigate in uncharted areas, which from a social science point of view raises several awareness over human behavior, belief and action towards the unknown.

Strictly, observing the organizational sector, the introduction of new technology has always been met with a wide variety of perceptions and behaviors among employees, ranging from enthusiasm, curiosity and engagement all the way to resistance, avoidance and refusal. At work, same as in life, people seek a sense of certainty and prediction, stability and clarity in their daily tasks and career. Now, when a new technology is introduced, certain variables will determine how employees will react to it in terms of perceptions, attitudes, behaviors and usage, as follows, just to mention a few: the degree of interaction with the new mechanism, the level of understanding with regard to its functions, the degree of clarity in explaining the purpose of implementing it, the previous and constant experience with tech presence, the exposure time, the impact on the employee work related tasks. In the case of AI or any new smart technology, employees have met the implementation with some degree of caution, in terms of risks, costs and gains. Probably, the new technology being in its prime and still developing,

answers are not yet easy to find regarding the issue. In an interesting study, Hudson (2019) has shown there is a polarization phenomenon concerning people's views about the presence and impact of robots for example, from opposition to favoring them. As one of the major results and key insights, the same author highlighted a certain profile of users in terms of older age, less education, women, unskilled manual workers or rural areas residence to adopt a less approving attitude in relation with robots while those holding expertise positions or exercising leadership roles, as well as younger people and prosperous ones have a tendency towards approval (Hudson, 2019). In another study, Pogan and Popa (2020a) underlined the importance of employee usage and experience level with various smart devices, which may lead to reserved attitudes and fears at the workplace if misunderstood, unclear perceived usefulness if not explained, and to a variety of negative perceptions that can challenge work adaptability. At work, as well as in daily activities a paradox can be noticed: even if employees already use a wide range of smart gadgets (e.g. phone, watch, applications, game consoles, smart TV etc.), when it comes to AI or any new tech development considered more consistent, such as AR, VR, robots or intelligent training stations, there is an interesting degree of resistance, avoidance or unfamiliarity sense, giving the fact that all mentioned devices use the same technical base, concept and background. One potential explanation may reside in the lack of experience and knowledge related to such technologies and their low level of direct contact usage in the act of work for the standard employee, alongside the novelty character which no one can fully explain or predict. Another explanation may refer to the user degree of understanding on how these systems work, learn and interact, which at the moment lack the needed clarity, certainty or security assurances. Job tasks and objectives require stability, transparency, predictability and awareness in order to ensure performance, job security and task engagement. Working with AI solicits the employee to rely on an exclusive new and undocumented technology which has not yet prove its full efficiency, risk control, positive or negative outcomes. Therefor it is normal for people in their jobs to be reluctant when dealing with a new tech innovation, including AI. In spite of continuous endeavors, AI remains unclear, with concept debates and complexity limitations, at times with unstable functionalities and risks, a sense of opacity and non-transparency and difficult apprehension (Duberry, 2022).

These variables make the user – AI interaction at the workplace quite challenging, uncertain and conflicting at times. There is yet a lot more to discover concerning the utility and application of AI at work and human user impact, with regard to ethical and moral principles, practical and human rights implications, diversity and risk control.

C. Conclusion

At present, the work sectors and industries are more focused on the technical and economical outcomes of intelligent innovations, leaving aside the human user variables which should represent the core element for any development in this areas and at this level. Going through the debate, human – smart technology interaction is at a starting point, already showing polarization and challenging issues which need to be addressed in the future. There are no guidelines, no secret recipes or road maps to manage the new incoming tech rapid developments. To make things complicated, technology does not waste time, it embarks on a multi-channel path, manifesting a turbulent evolution. In the end, one may wonder: who is being left behind or aside?

In this light of recent developments and transformations, human centricity should be addressed quickly and clearly in the present equation, alongside detailed and specific regulations, while adapting technology to the human user and not the other way around at work and the daily life.

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