

Editorial

World 4.0: Digital Transformation and Cognitive Neurosciences

Mundo 4.0: Transformación digital y Neurociencias Cognitivas

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Applied cognitive neuroscience is a discipline that aims to relate the neural substrate involved in cognitive processes, in the interpretation and most appropriate management of processes in various areas of life, such as in the case of organizations.

Organizations are the typical configuration unit of human society aimed at achieving its growth purposes for the future through strategies for carrying out new businesses.

A social change expected for the coming decades has occurred, which was accelerated by the pandemic (COVID-19), and which constitutes the fourth industrial revolution. It determines substantial changes in the way we live, relate, and work. This has been called by Roig (2017) as Industry 4.0.

Faced with this reality, organizations had to reconvert for digital transformation, which is the application of digital capabilities to processes, products, and assets to improve efficiency, and customer value and discover new business opportunities. This accelerated transformation requires organizations to implement multiple digital technology initiatives to reconfigure work models. Available technologies range from the use of “computers”, “internet”, “cloud” that improves storage and rapid availability, “mobile platforms” that provide access to work from anywhere, “machine learning”

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and “artificial intelligence” that allows you to make decisions and think about more precise strategies, the “blockchain”, the “internet of things”, “augmented and virtual reality” among others. Digital efficient processes and fundamentally automates jobs, giving the chance for people to focus on more value-added tasks.

In this context, and with each new business strategy, the technology area of organizations needs to identify and describe the initiatives that will achieve or accompany the business ambitions defined in the strategy. From these, the technological capabilities necessary to meet these objectives must be identified. Thus, your strategic roadmap is put together, defining the transition of each product or service from the current state to its desired future situation.

In this VUCA (volatility, uncertainty, complexity, and ambiguity) world, people’s skills and competencies, especially in Information Technology, are quickly becoming obsolete due to the speed of technology. To execute these technological initiatives, it is necessary to adapt the organization’s talent to the new needs.

Digitalization implies that organizations make these strategic changes to first modify leadership styles internally and, in parallel, improve the individual skills of their employees and the proper coordination of people, processes and technologies. In organizations, the mere implementation of technology does not imply transformation. All of this will lead an organization to rethink leadership and talent management for the digital reconversion of its talent.

On the other hand, those who provide services must not lose sight of the client. Client-centricity is still a must. Both staff and customers, as we will see later, are part of several generations that interact differently with the digital age. When the transformation that includes technology, personnel, and customers is achieved, we speak of digital maturity.

This maturity combines *digital intensity* (investment in technology) and *transformation management intensity* (investment in leadership to achieve transformation). Digital development should not only improve teams, but employee engagement and development are a priority. Digital resources are scarce, and it is important to know how to retain them, while it is essential to retain the good talent -no matter its generation- that currently exists in organizations, aiming to reconvert it to adapt to the digital world. Transformational leadership is key to achieving digital and cultural change. Leaders must find talented workers to join the digital world and build a succession plan to replace baby boomers who will retire in the coming years, while they must also find strategies to retain them over time.

Thus, digitalization constitutes a challenge for organizations that must implement it by changing the culture of the various generations that are part of and coexist in them. The expectation is that generations with very different work values and expectations, various communication styles and disparate technological habituation will coexist.

But social transformation has not been unidirectional: it is customary to think of it only in the external change due to the application of technology, but it is bidirectional as subjects exposed to the digital world also change their cognitive functioning. People’s memory is no longer only in the hippocampus, as “Google” allows us access to immediacy and data volumes that were unthinkable a few years ago. Contrary to what it is often said and believed, this does not lead to the fallacy of an atrophy of brain functions, but rather to a facilitation and better use of other brain capacities we were not using before, or we were underutilizing. Along with this, there is a change

in information processing; old generations used linear information processing with a hierarchical use of episodic memory. A clear example would be remembering the old movies that showed the same story throughout the movie. With digital evolution, new generations are forced to adopt a multitasking model of parallel thinking that we can also exemplify in cinema with films that intersperse stories in parallel, sometimes with few points of contact. For a centennial, old movies are slow and boring, while for an older person, new movies are disorganized and fast-paced.

For all these reasons, in the digital transformation of organizations, we must think not only about the change in technologies but also about the people who will be part of them, both employees and clients impacted by it. Many organizational transformations have lost sight of the customer and ended up excluding people who cannot interact with the system. As an example of this, there are banks that have lost the perspective of generations and have placed older people in the role of people with *digital disabilities*.

Thus, the importance of understanding the different generations and their interaction with the digital world appears, which will allow optimizing not only the use of technological equipment and available human resources but also incorporating the entire society into the change.

The concept of generation supposes a group of people born on a certain date, belonging to a growing community, with similar relationships and common interests. Knowing generational characteristics is key to addressing this digital reconversion of jobs and thus being able to evaluate and promote the inclusion of current and future employees and potential clients.

There are various generations that have been marked by sociocultural events and that determined different behaviors and capabilities. Among them, we can find:

1. The *silent generation* (over 80 years old) who lived through the war and the Great Depression in the United States. They valued teamwork, personal relationships, and sacrifice to achieve their goals. They are far from digital life, only 15% use smartphones or the internet. They are already retired from their working lives but consume digital products with great difficulty. This generation is no longer part of the employees, but they are clients. Many of them are the modern digital disabled and are wrongly excluded from systems, unable to access procedures or operate television remote controls, being forced to rely on others to carry them out, disabling them beyond the fact that they do not have a cognitive impairment. In many cases, perhaps at a cognitive level, they are in perfect condition but at a physical level, they find it difficult, for example, to hold a small cell phone or press the small buttons on a remote control.
2. The *baby boomer generation* (aged 60 to 80) corresponds to people after the Second World War who lived through a period of economic and labor prosperity that favored births (baby boom) who gave a strong relevance to work and family. They do not dedicate much time to leisure and recreation activities because of the guilt that the previous generation instilled in them (they are *workaholics*). They are the current “seniors” with significant purchasing power and even roles in companies: most of them being now marked with the need of upskill or reskilling due to the talent type needed for digital transformations. They prioritize their health, they want to stay active and “young” and integrated, but they are digital immigrants. They were born, developed, and triumphed in the analog era and usually need more time or even help from others for their digital inclusion.

3. The generation X (45 to 60 years old) or transition to the digital world, also experienced a period of economic prosperity marked by consumerism. They want to have fun, socialize, and spend more time traveling than shopping. They prioritize a healthy lifestyle and balancing their energy between work, children, and leisure. They are a transition generation or Peter Pan Generation and can coexist in a balanced relationship between technology and social life. They do not need the Internet to live, they are nostalgic for the 80s but they accept technological changes and the majority achieve digital inclusion.
4. The “Millennials” or generation Y (ages 24 to 44) were the first digital natives. They have great self-sufficiency and the ability to be self-taught. For them, virtual life is an extension of real life: they can use technology to be more productive. They like to work on what inspires and motivates them; they live only in the present. They don’t leave their life at work. They prioritize balance between personal and work life. They change jobs frequently. Digital environments motivate them, and they do not understand the analog world. Its relationship with digital transformation is very effective.
5. Generation Z or “Centennials” (under 24 years of age) are truly the authentic digital natives (they have used the Internet since they were children). They went through the last global economic crisis, so they are more responsible and careful with consumption. They have a global perspective of the world and prioritize inclusion and diversity. Its characteristics are multitasking, multi-monitors, and a high propensity to consume information. They can live immersed in the digital world. Generation Z or “ZeroPaper” works much better with a screen than between papers, they perform tasks only online and love immediacy.

These last two generations will mark a before and after in the world of work and will be key in the real digital transformation of organizations. But the above must be considered both in labor inclusion and in their role as recipients of services. Customers must also adapt and live with these changes. The latter must be included and considered to define the digital complexity of products or processes according to the type of generations and not convert them into digitally disabled.

Another point to consider are the digital barriers for social areas excluded from this evolution not only due to age but also due to lack of economic or cultural access. The digitally disabled will be those who present difficulties in understanding and using technology, regardless of whether the cause of this difficulty is social, economic, physical, or cognitive.

The pandemic was an accelerator of the digital transformation that constitutes the fourth industrial revolution with substantial changes in the way we live, relate, and work. Society and organizations had to abruptly move towards a total virtuality that had been sought for several years and with the passing of generations. This means that we must understand that in today’s world digital immigrants coexist with digital natives, and this must also be considered in the transformations, to prevent excluding them from the world and generating disabilities. The future is today, and cognitive neuroscience allows us to understand, model the changes and adapt them to the real life of both organizations and customize them for each human being.