REG
REVISTA DE ESTUDIOS GLOBALES
ANÁLISIS HISTÓRICO Y CAMBIO SOCIAL
5/2025 (9) NOVIEMBRE - DICIEMBRE
ISSN electrónico: 2697-0511

SUMARIO

Return to nature in Latin America: Challenges of big data and artificial intelligence for Latin America integration in the transition from Knowledge Capitalism to posthumanism

Carlos Sánchez
Universidad Nacional Autónoma de México (UNAM)
Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)
México

Enrique Roig
Universidad Nacional de Cuyo (UNCUYO)
Argentina

Abstract: The emergence of a new technological and productive base focused on the development of the microprocessor and its articulation with organizational and work management forms linked to the valorization of the cognitive and creative capacities of the workforce allowed the unfolding of a new phase of development, or Knowledge Capitalism, enabling the overcoming of the crisis of Fordism-Keynesianism. This new economic structural base sustained the rise of the sphere of financial capital through big data and artificial intelligence, shaping a surveillance capitalism and its coercive state in the decline of its neoliberal modality. The current transition to a new global order poses serious challenges for the Latin American region, which appears to lack its own project for insertion and integration into the current landscape. The challenge takes on two dimensions of analysis: a social one linked to the absence of a historical subject of transformation; and a technological one, which is explored in this text as a transition towards posthumanism as a scenario of transcendence of the capitalist mode of production.
Keywords: Capitalism; Knowledge; Latin America; Neoliberalism; Posthumanism.

Resumen: La emergencia de una nueva base tecno – productiva centrada en el desarrollo del microprocesador y su articulación con formas organizativas y de dirección del trabajo vinculadas con la valorización de las capacdidades cognitivas y creativas de la fuerza de trabajo, permitieron el desenvolvimiento de una nueva fase de desarrollo o Capitalismo del Conocimiento permitiendo la superación de la crisis del fordismo – keynesiano. Esa nueva base económico estructural sustentó el auge de la esfera del capital financiero a través del big data y la inteligencia artificial, configu-

DOI:https://doi.org/10.6018/reg.687071
https://revistas.um.es/reg
ISSN electrónico: **2697-0511**

Recibido: 15/10/2025 | *Aceptado: 07/11/2025*

rando un capitalismo de vigilancia y su Estado coercitivo en el declive de su modalidad neoliberal. El actual pasaje hacia un nuevo orden global impone serios retos para la region Latinoamericana, que aparece sin un proyecto propio de inserción e integración en el panorama actual. El reto adquiere dos dimensiones de análisis: una social vinculada con la ausencia de un sujeto histórico de transformación; y una tecnológica, que se explora en el presente texto como tránsito hacia el posthumanismo como escenario de trascendencia del modo de producción capitalista.
Palabras clave: Capitalismo; Conocimiento; Latinoamérica; Neoliberalismo; Posthumanismo.

Introduction

The current phase of development or Knowledge Capitalism has been characterized by intensive production and use of knowledge as the main source of the dynamics of the industrial cycle centered on the electronics and telecommunications sector. This process made possible the overcoming of the structural crisis of capitalism in the seventies and the encounter of new increases in the rate of industrial profit in the United States since the eighties of the twentieth century.

The appropriation and valorization of new technological developments by the sphere of financial capital, particularly the expansion of computing capacity brought about by the invention of the microprocessor and the acceleration in data processing and analysis made possible by the development of software, allowed it to establish a set of financial innovations increasingly focused on the needs and preferences of individuals to be satisfied through free market instruments as a characteristic of the neoliberal mode of development.

Hence, this paper associates and exposes the explosion of Big Data as a result of the relentless pursuit of extraordinary profits by the sphere of financial capital as a process progressively transferred from the real world to cyberspace and its accelerated analysis by means of high – powered software focused on artificial intelligence. Thus, inaugurating both a capitalism and a surveillance State in the current phase of development; having as breaking points, both the economic crisis of the bursting bubble of the .com enterprises in 2001-2002, as well as the political – military crisis of the collapse of the twin towers of the World Trade Center in New York in 2001.

Latin America appears especially vulnerable to the current accelerated processes linked to financialization underpinned by the development of disruptive technologies in the West and East, such as artificial intelligence, quantum computing and 5G telecommunications. The inability for structural change

or *wasted decade* by neo – developmentalist governments to change the correlation of forces within the historical blocs in South America, in an attempt to search for post – neoliberal development paths, has widened and deepened the development gap and facilitated the emergence of bizarre neoliberalisms as in the case of Argentina.

This current situation in Latin America makes necessary the formulation of a new *anthropological a priori* that allows the breakdown of the ideology of the social success of the individual through the logic of the market. The recomposition of the social fabric in terms of the construction of a new morality of protest and its mobilization and organization sustained over time. Radical changes are required in the dense set of philosophical, cultural, aesthetic, poetic, economic, political and social planes, to make tangible the production of a new hegemony and the establishment of a post – neoliberal States. In synthesis, Latin America requires an untying and a *return to nature* in order to break with its historical subordinate insertion in the current transit towards a new Global Order.

This contemporary global and regional phenomenon is framed in a transit towards a feasible post – humanism, in which from the development of the productive forces deployed in Knowledge Capitalism it is possible to expand the storage capacities of human memory from the implementation of devices derived from the boom of the current industrial sector of electronics and the storage and accelerated processing of data mediated by artificial intelligences. This poses new challenges to the viability of the current dominant mode of production, configuring post – capitalist and post – humanist scenarios as discussed below.

1. Emergence of big data and artificial intelligence and establishment of surveillance State in Knowledge Capitalism

Big Data, understood as a set of structured and unstructured information that can potentially be stored, processed and analyzed for strategic purposes, was triggered by the boom of the international financial system in the United States during the 1980s. The need of the financial capital sphere to maximize its profits requires the efficiency and acceleration of the financial processes associated with this objective, so it uses a series of technologies to collect and analyze information in order to profile and characterize individuals and social sectors under its economic influence (Lewis, 2014).

The germ of this phenomenon can be traced to the emergence of the shadow banking system in the United States. This banking system, parallel to commercial banking, outside Keynesian regulation and taking advantage of the data processing capacity of the microprocessor and the development of

software, allowed the sphere of financial capital to develop the innovation of mortgage securitization (Financial Crisis Inquiry Commission, 2011). This consists of combining thousands of mortgages in a single exchange, evaluating its status (payment or non-payment) based on probabilistic and statistical methods, inoculating the principles of uncertainty, opacity and speculation to the evaluation of the whole of the exchange (Otte, 2010).

This triggered the need for massive collection of individual data by banking and financial agents, and with it the capacity to store, process, systematize and analyze them in order to maximize the individual's value. Based on a precise characterization of its potential customers, the banking system can offer a series of personalized services, such as mortgage, automobile and educational financing; life, health and unemployment insurance; tourism and entertainment services, among other.

This has meant the progressive absorption of interest in social issues and the resolution of social problems via the market in general and financialization in particular. Social problems such as health, education, housing, and employment, began to be filled in the market space to the detriment of the State, taking advantage of the explosion in the production of personal and social data to form Big Data, and its processing and analysis for capitalist purposes (Harari, 2015).

Around the rise of Big Data and the capitalist valorization of individual and social information, orbit a series of technological and social problems such as: the possession of the infrastructure and materiality needed to carry out the storage of data, the design and development of software with the ability to analyze such amount of information, the attraction by the financial capital of highly specialized individuals in the field (high skilled migration), the production of new scales such as global and cyberspace, the guarantee of privacy of personal data in these new scales, mainly of investors, among others.

The ability of the shadow banking system to pull in extraordinary financial resources enabled a large range of emerging technology companies in the electronics and telecommunications sectors. This new industrial core shaped and molded global production networks driving the rise of a new phase of capitalist development or Knowledge Capitalism since the eighties of the twentieth century. A set of computer companies that deployed in the cyberspace of the Internet took advantage of the material support provided by the first industrial core, shaping the bubble that would burst in the crisis of the puntocom technology companies in 2001–2002.

The favorable outlook for the future provided by the ascending stage of the new phase caused investors to become euphoric about securities associated

with technology companies, which did not necessarily have business models that would provide sustainability and financial returns in the long term. The overtrading of these assets, i.e. speculation or overestimation of their future returns and excessive leverage, generated a bubble or mania that would lead to a panic situation in the absence of increasing returns in the cyberspace technology sector, resulting in the bursting or crash after an increase in the interest rate policy imposed by the Federal Reserve in 2001.

The pressure from venture capitalists on technology companies to obtain extraordinary profits in the technology sector led firms such as Google to inaugurate what Zuboff (2020) labels as surveillance capitalism based on the valorization of the «behavioral surplus». Behavioral surplus refers to a set of data collateral to the search text, such as time, location, gender, age, search history, among others. This information allows the algorithms that analyze it, now powered by artificial intelligence (AI), to elaborate an increasingly accurate profile of the tastes and preferences of users. This result in a high degree of probability that customers will choose to access the advertising presented by the search engine, enabling a virtuous circuit between data, advertising and extraordinary profits, in which the information of cybernauts becomes the main raw material of this process of capitalist valorization.

In parallel, the collapse of the twin towers of the World Trade Center in New York in 2001, accelerated the imposition of a surveillance State implemented by the Central Intelligence Agency and the National Security Agency of the United States, taking advantage of the possession of this government and its companies of an important part of the telecommunications infrastructure that makes possible the deployment of the Internet on a global scale (Snowden, 2019). Submarine cabling, satellite positioning systems, and storage centers are part of the hardware that contains the Big Data; while high – powered software allows processing and analyzing massive amounts of information in order to perform cyberespionage tasks of citizens and governments around the world.

In this way, what in its beginnings represented the production of the Internet on the scale of the virtual as a free, anonymous, collaborative and creative social space, isolated from the most distinctive features of the logic of capital: the division of society into social classes and its socio – digital division of labor, the alienation of the means of production and the product of collective labor and its value, that is to say a digital communism; became progressively conquered and absorbed by the logic of the market and its capitalist vigilant State. This is the most accelerated transit of a social space that the history of humanity has witnessed, from a primitive – digital communism to a surveillance capitalism, without intermediate phases and without cyber – social revolution.

Thus, the influence capacity of Big Data analysis through artificial intelligence, facilitates the system to shape the decisions of individuals as consumers in the market, as well as voters at the polls. This configures a scenario of questioning the so – called rationality of the Smithian individual and his actions in the sphere of the economy, and deepening the «natural» compatibility between democracy and capitalist society as Roig (2005) states: a democracy sufficiently flawed to be compatible with the interests of financial capital (p. 54).

The progressive implementation of artificial intelligence only not in the sphere of financial capital, but its establishment in the sphere of productive capital, has the potential to displace on a large scale a series of both specialized and unspecialized jobs because of the strengthening of the regenerative capacity of AI. Robotization of tasks linked to the middle and lower links of global production networks, such as the manufacture and assembly of industrial products, as well as the conception and design of products with high added cognitive value and the supply of services linked to it, combine a series of productive activities from which the subordinate classes can potentially be displaced. This is a massive employment annihilation, rapidly narrowing the opportunity gap for the creation of new jobs, which would take place only through ultra – specialization.

The result of the above phenomenon would be the establishment of a super – eliticized society for which the very existence of subaltern groups would tend to lose meaning due to the end of their exploitation and extraction of surplus value. This would imply the vanishing of the social relations of capitalist production, particularly the social division of labor first and the division of society into social classes later. That is, the overcoming of capitalism and the transition to a new phase by the ruling class itself and not by the proletarian class in a situation of revolution: the logic of class struggle in cyberspace applied in the real world.

The progressive development and deployment of a series of disruptive technologies centered on AI, quantum computing and telecommunications, would lead not to a new phase of development of capitalism but to the strengthening of imperialism prior to the overcoming of the current mode of production. This limit scenario of annihilation of employment and of the very existence of the subaltern class opens the need to rethink the organization and social mobilization in the context of a globalization characterized by poverty and social inequality. In this scenario, the United States accentuates its dominant position in cyberspace and in the Global North, from the possession of the physical infrastructure that makes possible the deployment of the Internet.

2. Return to nature and Latin America integration

Latin America is especially vulnerable to the process described above due to a very weak development of its scientific and technological sector in the field of AI, contributing only with 0.21% of granted patents of world total (Maslej, et al., 2024). The absence of technological – digital sovereignty in Latin America, i.e. its lack of ownership and control of the materiality of the Internet, determines its subordinate position in the International System of States Hegemony. The center – periphery relationship is deepening, not only with the United States as the Global North declining power, but now also with China as the Global South rising power focused on the development of disruptive technologies.

This subordinate position of Latin America in a feasible new post – pandemic Global Order, facilitates the implementation of robotized and AI – managed industrial manufacturing and assembly plants by transnational corporations, deepening the phenomenon of job annihilation and techno-enclave production in the Global South. In a new macroeconomic scenario under neoliberalism and its bizarre derivations, determined by low growth rates, high inflation and high interest rates (McKinsey & Company, 2023); a Latin America dislocation is foreseeable as a result of the recrudescence of the problems associated with deindustrialization and the impossibility of structural change: poverty, social inequality, violence, and increased migratory flows to North American regional techno – enclaves.

The entrenchment of imperialism in Latin America, which implies not only the atrophy of structural change but also the loss of meaning of the dense set of superstructural planes: philosophical, political, economic, scientific and social, requires a new social subjectivity that brings with it a renewed morality of protest and Latin America social organization (Roig, 2002). The magnitude of the challenges brought about by a possible transition to a new Global Order, the gap of backwardness, and the superstructural crisis, make necessary a new impetus for the integration of Latin America in order to overcome the historical role of subordination and periphery in the conformation of a new International System of States Hegemony.

While part of the solution to the dilemma of integration crosses through the recomposition of social forces within their Historical Blocs as Gramsci would propose, prior to this it is now indispensable to break the ideology centered on the individual and his social success via the market, progressively imposed by capitalism since the defeat of the social movements of 1968 (Fernandez, 2018) and deepened by its neoliberal mode. This makes the task of recomposing the social fabric in a paradoxically hyper – connected society increasingly complex.

Then it makes sense to retake Roig's (1981) category of *anthropological a priori* to consider the construction of a new subjectivity that leads us to *unleashing*. This is a disconnection from the logic imposed by financial capital from cyberspace and gradually extrapolated to the world of possibilities of the real, allowing a «return to nature» through a «cultural revolution» (Gramsci, 2013). That is, the establishment of new post – neoliberal social relations that reconfigure the current national balances of power in favor of imperialism, and lead to new social structures in pursuit of the goal of Latin America integration.

Thus, the problem we face in the region is two-dimensional: the inability to reconstruct the social fabric in a paradoxically hyper-connected society, and the inadequacy of scientific and technical development to achieve a position of technological sovereignty from which to break the historical relationship of dependence on the developed world.

In turn, the first problem has two determinants. The first is the subject's relationship with society, currently mediated by the individualism resulting from neoliberal projections, necessitating the disconnection Roig speaks of and the construction of a new subjectivity that facilitates social reorganization. The second is linked to the characteristics of the dominant class and the absence of an agent to lead the process of social development, allowing the situation of subordination to prevail, as proposed by the main dependency theorists: Marini, Bambirra, and Dos Santos. This first problem is not discussed in this paper.

The second problem is of a scientific-technical nature and the possibilities opened up by the current techno-productive base of Knowledge Capitalism, not only for Latin America to gain a relative position of autonomy in relation to the Global North and emerging powers, but also for transcending the current capitalist mode of production toward a post-humanism. This second process is explored below from a historical perspective, and its outcome is linked to the first problem in terms of the subject leading the development of the material base that sustains it, raising the following question: capitalist continuity or social revolution?

3. Transition towards posthumanism

3.1 History of human memory

From the humanistic perspective, we refer to a phenomenon that is constitutive of the human being, as can also be death, love and communication. An important characteristic of memory is its fragility and ambivalence in the process of remembering (illuminated zone) and forgetting (dark dimension) our past. Thus, our memory allows us to live in our worlds that are not shattered.

To have thoughts that do not occur in a surrogate way without having a duration in time. To remember and forget from the present our pasts as a condition for our consciousness and for our self-consciousness. This allows us to form our identity by taking us out of the purely immediate nothingness.

Thus, memory gives us an identity by making us aware of who we are in the dimensions of time and space. It is thanks to this universal faculty of the human being that we can join two ideas with two words, understand and remember contracts, alliances, conventions, promises and social bonds. However, in its absence (non-memory), society and the bond with others would be impossible. Consequently, we are social beings and we can ask ourselves why we exist, because we have memory.

In turn, the human species has a restrictive biological framework of memory. However, culturally, in each group and individual, the modalities of memory vary according to different regulations given by them. For this reason, different ethical systems come into play that value which facts should be remembered, how they should be remembered and which should be forgotten. This is one of the reasons why different groups or individuals have different memories of the same event. And what is more, they may even have conflicting memories, that is, conflicting ethical values that make up that community.

Let us think that a mediological history of human memory is quite possible. It began in nature. Later, the innate began to be surpassed by the acquired in the processes of socialization. This is how the preponderance of memory and thought in societies began to become more and more important. To such an extent that the cultural transmission of knowledge, techniques, traditions, thoughts, beliefs, emotions and feelings strongly needed the use of memory at a mental level. This means that the exercise of memory was in those times a development of mnemonic procedures or *memory arts*.

On a second historical level, thanks to language and its materialization in the media, we find the externalization of memory and thought through material supports. Second-order archives expand memory, constituted by means of writing and images. Here we move from a mental effort to retain something of the past (also forgetting) to an extended memory, deposited in archives and guarded by bearers and disseminators of memory. Subsequently, the printing press constituted a mechanical enlargement of memory that is produced as an accelerated expansion of modern technical progress. And in our time, it is the Turing Machine or digital computer that is running the limit of the expansion of human memory.

These displacements of memory, by means of its externalization to material supports, awaken the myth of Theuth, a god who helps the forgetful Egyptian king Thamus, by teaching him the wonders of writing. Surely, Thamus would have been astonished to see how the graphein allows to memorize large quantities of messages, but with the danger that we move away from the inner life and the concrete relationship with others, generating false sages and tautological relationships with oneself.

So, if there are no limits to expand our memory in electronic media, it is as if everything is memory and if everything is memory, then there is no memory because «the Menmonist could not forget...not because he forgot the meaning of the word, but because as soon as he read, other words and other images emerged from the past until they suffocated the words of the text before his eyes» (Yerushalmi 2000). We experience this distressing suspicion on a daily basis in our media culture.

There is an intense will to remember, almost a compulsion to the cult of memory, heritage, commemoration, and genealogies, when our public and private lives are increasingly mediated by the apparatuses of spectacularization of the world. This feature of our time reinforces the possibility that an artificial memory grafted into our brain, will definitively push back the biological limits of our memory. And thus, to be able to inhabit a computerized and numerical hypermedia world.

If we have thought about the depth of our lives, as Héctor Schmucler recalls in his essay *La Industria de lo humano (*2001), it is something unpredictable, open to the creative, unknown and irregular, because we are unique, unrepeatable and finite individuals. For this reason, the phenomenon of humanity is based on reproductive chance, in such a way that each subject is singular as unrepeatable, but in its existence, it socializes by recognizing others, and enters into a game of singularity and community.

However, the techniques of life (biotechnology and nanotechnology), which are part of *the Human Industry*, make it possible to manipulate genes and produce new organic and inorganic materials on an atomic scale. Thus, the application of life technologies in human bodies would make it possible to modify what the human being is. The human being could be repeatable in clones, and his or her behavior could be molded according to artificially established parameters. And by receiving a neural implant of artificial memory the human being would have a new form of individual identity shared with the machine world, social existence and recognition of the human-machine other. In short, it would be something different from what we are today.

3.2 Human Brain and Electronic Brain

> Neural implants will increase memory and make it possible to learn in a few minutes complete blocks of information, such as an entire language or the contents of this book. These human beings will have little to do with us... Twenty years from now, a computer costing about a thousand euros could be as complicated as the human brain. Parallel processors could mimic the functioning of the brain and make computers that act intelligently and consciously. Neural implants (artificial memories) may allow a much faster interface between brain and computers, reducing the separation between biological and electronic intelligence (Hawking, 2003).

In this quote, the physicist evokes a figure of the human being as a complex information processing system, so complex that a computer could equal or surpass it by increasing its memory and speed in processing information coded bits. Hawking has blind confidence in modern science and technology. He is a faithful exponent of one of the most outstanding aspects of the enlightenment, which is that:

> …the experimental reason of the science of our days, oriented towards the exploitation of the physical world and whose methods, whose intellectual tools and whose mental pictures have been elaborated in the course of the last centuries, in the laboriously pursued effort to know and master nature (Vernant, 2008).

Therefore, for science to develop neural implants of artificial memories, it must consider the body of the human being as a thing. And if our individual memory were physically in our brain, it would be an object of research on which there is no subjective right to decide: my brain is not an object, because I have memory of my past, which allows me to build my identity and my freedom of decision. Moreover, things have no memory of themselves.

On the other hand, the human being cannot be a thing, because he has memory of himself and this allows him to recognize himself as human. In addition to his individual memory, we have the collective memory, constituent of the social group to which each person belongs by sharing certain ethical values and other categories.

However, the ideas of high scientific legitimacy that support Hawking, in his rationale about brains and electronic intelligence similar to our brains and intelligence, come from the field of cognitive sciences. In this sense, Francisco Varela develops a brief cartography of the beginnings of the sciences of

cognition, to trace the arguments that explain why a Central Processing Unit (computer) is as if it were a human brain, while the term that establishes an equalization between human and machine memory is the category[1] coming from Cybernetics.

3.3 Brief history of Cognitive Sciences

In this part of our work, we will develop a brief genealogy of the Cognitive Sciences delimited in stages. At the same time, we will establish the relationships that emerge here as scientific arguments that support Hawking's proposal and his project of the grafting of artificial memories:

I) 1940-1956, first stage of cognitive science. An intense interdisciplinary dialogue marked its origin. In Switzerland, Jean Piaget formulated a research program called *genetic epistemology*, while Konrad Lorenz worked on *evolutionary epistemology* and Warren McCulloch began to work in terms of *experimental epistemology*.

In turn, the laboratories of MIT and Princeton became the most original promoters of *Cybernetics or Control Science in animals and machines.* The cyberneticists John Von Neumann, Norbert Wiener, Alan Turing, Warren McCulloch, had in that post-war era the intention to create a science of the mind. To that end, they had to express the processes underlying (human) mental phenomena in explicit mechanisms and mathematical formalism (deductive machine).

Thus, the founding principles of cybernetics present in the utopia of neural implants of artificial memory are: a) Preference of mathematical logic to interpret the functioning of the nervous system and human reasoning. b) The statistical theory of information about signals and communication channels.

---

1 In the chapter «The concept of information» by Tiziana Terranova, from the book *Theory Culture Society*, it is important to take into account the argumentation of the different interpretative approaches to the concept of information:

a) organization of living organisms and physical systems (Cybernetics),
b) neguentropy (Molecular Biology),
c) a qualitative change in the mode of production from industrial to post-industrial societies and the formation of the Information Society (Sociology),
d) value added and service economy (Economics),
e) a way of knowing that is no longer reflective or contemplative but reformational and pragmatic (Critical Philosophy of Postmodernity),
f) a discursive construction of the body reduced to its phenomenological quality of corporeality as an abstract and reproducible data pattern (Feminist Theories),
g) a phenomenological weakening of the perception of localized space and time (Sociology), as a form of power to which an ideological critique must be made (Sociology),
h) and finally the recent philosophical line of Gilbert Simondon who points out that we must separate the concept of information from a hylemorphic interpretation (matter and form) and the technical theory that reduces information as an exchange of message between sender and receiver, information as a key to interpret the processes of individuation and problematization of the adaptation of the individual to the environment.

c) The conjunction of systems theory as a meta-discipline, which formulates the general principles governing complex systems. This systems theory can be traced today in engineering, biology and social sciences.

However, in Stephen Hawking we also find the foundational principles of cybernetics but taken to an extreme. Above all, when he describes that:

> …another way to increase the complexity of electronic circuits (i.e. complex systems) while maintaining their speed is to copy the functioning of the human brain, which does not have a single processing unit -CPU- that serially processes all the instructions, but millions of processors working in parallel simultaneously. This massive parallel processing will also be the future of artificial intelligence (Hawking, 2003).

Let's keep in mind that a CPU, is the part of a «computer» equipment[2] that fetches and executes instructions and processes data. It contains the arithmetic and logic unit, as well as circuits for decoding instructions and moving data stored in the computer's memory.

II) At the beginning of 1956, Francisco Varela places the second stage of cognitive sciences. There, Herbert Simon, Noam Chomsky and Marvin Minski debated in Cambridge and Datmouth, taking up the legacies of the previous cybernetic stage and defining the new guidelines of cognitive science.

We can summarize this second moment of cognitivism in the following aspects: a) Establishment of the idea that human intelligence and computer intelligence are very similar in their essential characteristics. b) Cognition is defined as the computation of symbolic representations. c) Elaboration of a mechanical model of thought, by proposing that the development of symbol computation (operation performed by means of symbols) that operates inside a computer is similar to human thought; because the latter also functions as a computation of signs. e) The cognitive model provided by the digital computer is not performed on the semantic dimension of the symbol, but only on the physical form of the symbols.

Thus, the science that questions knowing comes to the conclusion that cognition is the processing of information or manipulation of symbols based on rules. The offshoot of such cognitivism, most visibly manifested at present, is the a*rtificial intelligence*. At this point of our analysis, we see how the imagination that mobilizes artificial intelligence and Hawking consists in the construction of a ma-

2 At this point it is necessary to consider what Alexander Galloway has said about the computer as a physical means of data transport. It is important to consider what is expressed about the physical means of operation of decentralized and distributed networks, the IP address of a computing machine and the formation of the rhizomatic structure of the Internet, and the composition of the layers of communication protocols between turing machines.

chine similar to the human being. It would have its infancy, learn its mother tongue, discover the world through it, and finally venture into the study of thought.

However, Joseph Weizenbaum's ethical philosophy of computation warns us that this illusion is possible if one starts from a theory of artificial intelligence that understands the computer and the human being as a species of the genus *information processing system*. The problem lies in the fact that the human being is not a species of the same genus as the computer; because «human language brings out the memory of man, which is something entirely different from the storage of a computer, which has been anthropomorphized into memory» (Weizenbaum, 1978).

3.4 Biological life and electronic life

In his theory, Hawking sets forth the thesis of how life on earth evolved. He says that life (complex systems containing organized and codified information) originated in the oceans that covered the earth 4 billion years ago, as a result of random collisions between atoms that formed macromolecules capable of self-reproducing and joining together to form more complicated structures. Subsequently, around 3.5 billion years ago, complex DNA molecules had already appeared, being the basis of life on earth. Finally, human beings appeared around 500,000 years ago.

Biological evolution is a random and very slow path. But at a certain point Hawking begins to associate the complexity characteristic of living systems (i.e. that have DNA molecules as their vital base) to the term *bits of information* encoded in DNA. Of course, a DNA molecule also contains genetic information, determined by the order in which the four bases (cytosine, guanine, thymine and adenine) that make up the DNA molecule and allow it to assemble around itself an organism and self-reproduce.

However, in the mathematical and logical realm of microcomputers, made up of wires and microchips, the *bit* does not mean genetic information of living organisms. On the contrary, it is a:

> …binary unit of information, stored as logical 1's or 0's.» Bits are generally represented in the information processor as low or high voltages. In general, bits are represented in the information processor as low or high voltages. This all-or-none property of the bit affects all aspects of machine operation...all information processed in the machine must be as rows of different binary units. The byte is the measure of electronic information: 1 byte equals 8 bits. Each byte contains enough information to represent a letter, digits and control codes used by standard computers (Bolter, 1999).

However, Hawking links the genetic information of living organisms, defined by the biological theory of Francis Crack and James Watson as certain information arranged in DNA chains, a term coming from the field of molecular biology, with «the complexity, or number of bits of genetic information encoded in DNA» *(*Hawking, 2003), being both the term *bits* and *byte* or *bytes* originating from the field of computer science.

What Hawking does is a transfer of terminology from different areas of knowledge, beginning to establish a parallelism between the genetic information of the body of the living organism of the human being with the non-living machine. The consequences that arise is the possibility that *biological life* and *electronic «life» will* continue to develop in complexity at an increasingly rapid pace, until the *life of machines* is more complex than that of humans, resulting in the need for man to incorporate prostheses to improve his physical and psychic abilities in the face of electronic beings. Therefore, this would make it necessary for neural implants of electronic memories to be socially accepted.

3.5 Human and mechanical memory

If we were to take the encephalocentric theory of memory, the brain is the most complex material object known to us and the neurocognitive workings of our individual memory would be found in it. According to the neuronal model of Gerald Edelman's theory, called TGSN, the brain of each of us is characterized by an ideosyncratic development culminating in somatic diversity.

This structuring presents simultaneously genetic and epigenetic components (which are outside the genes), which implies that the connections between cells are not pre-specified in the human genome. For this reason, it is a process in which structuring evolves by competition and selection among populations of neurons, with a great variability in neuronal connections. This is so great that some theorists define the central nervous system as a soft brain and fluctuating central state.

In contrast, in the structure of the central processing unit, CPU or computer, the memory does not vary from computer to computer, i.e. each computer is not a unique and unrepeatable individual. This memory has no identity and interiority with respect to each machine.

On the other hand, it should be taken into account that the physical substrate of memory is not yet known in humans. In the CPU, memory does have a physical medium where it is located, and this is fixed and determined by the computer industry. In general, memory is:

> …all the equipment or program dedicated to data storage. Internal memory is the portion of the machine (nowadays almost composed of transistors) that preserves programs and data awaiting execution by the CPU. External memory is any storage element, say, a tape, that allows long-term preservation of information for probable use in the machine (Bolter, 1999).

From the neurobiological perspective of the TGSN, human memory is dynamic and with certain imprecision in the memory or not entirely exact copy of the memorized object, producing modifications in each new experience of memory making. On the contrary, the artifact memory replicates the stored data. Therefore, it is not dynamic like the neurobiological structure of the human brain. In contrast, the latter's memory is plastic and flexible, because with each new experience the subject reorganizes its own schema differently. Machine memory, on the other hand, is an information store.

Thus, in human thought operations, symbolization, subjective experiences, ethical values and the intentionality of pointing to a past event, as in the case of remembering an image organized by the consciousness, come into play. On the contrary, in the technical memory, the image of a digitized object on the screen is a simulacrum. No intentionality is manifested here. Consequently, we can speak of the structure of artificial memory as static, printing, recording, fixing and preservation of stored data. Therefore, we cannot argue that between electronic memories there is reciprocity and human emotional play, because all there is repetition of data, recitation, according to a scheme programmed by the human being.

Conclusion

The set of disruptive technological developments that have emerged since the rise of the industrial pattern of electronics and telecommunications have made possible the deployment of the sphere of financial capital in increasingly uncertain and speculative forms that led to the bursting of the financial – productive bubble of 2008. This crisis marked a turning point and a questioning of the neoliberal mode of development in the following terms: the viability of the market for the solution of a set of social problems, the explanatory and predictive capacity of the theoretical core of classical economics, and the divergence between productive and financial capitals based on the latter's synergetic relationship with the technological circuit.

This synergy has allowed the establishment of a cognitive and material base with possibilities of expanding the storage capacity of human memory

and the processing and analysis of this set of data at accelerated speeds. This poses a scenario not only of criticism and questioning of the dominant mode of development within Knowledge Capitalism, but the very viability of this last phase as a historical mode of production, in the face of a possible transit towards post – humanism and the challenges that this entails in the different planes of the super structure.

These new challenges, which may occur under modes of production that are not necessarily capitalist, test the cohesion and organizational capacities of particularly eroded social matrices such as those of Latin America countries. It is therefore necessary to rethink the individual in its relationship in and with the social. That is to say, the discussion of a new *anthropological a priori* that allows again the cohesion of a subaltern class with sufficient capacity of social convocation towards the construction of a *new hegemony*, which prevents its subaltern insertion not only in a possible new Global Order but also in a post–human one.

References

Abbagnano, F. (2004). *Diccionario de filosofía.* México: Fondo de Cultura Económica.

Bolter, D. (1999). *El hombre de turing. La cultura occidental en la era de la computación.* México: Fondo de Cultura Económica.

Candeau, J. (2006). *Antropología de la memoria.* Buenos Aires: Nueva Visión.

Deleuze, G. (1999). Posdata sobre las sociedades de control. In C. Ferrer. (Comp.), *El lenguaje libertario* (pp. 115 – 121). Buenos Aires: Altamira.

Fernández, F. (2018, mayo). Tres pistas para intentar entender mayo del 68. *El viejo topo,* (364), pp. 12 – 17.

Financial Crisis Inquiry Commission. (2011). Financial Crisis Inquiry Report. Washington: U.S. Government Printing Office.

Galloway, A. (2004). *Protocol, or, How Control Exists after Decentralization.* Cambridge – London: MIT Press.

Gramsci, A. (2013). Socialismo y cultura. In A. Gramsci. (Aut.), *Antología. Selección, traducción y notas de Manuel Sacristán* (pp. 21 – 24). España: Akal.

Harari, Y. (2015). Capítulo 9: La gran desconexión. In Y. Harari. (Aut.), *Homo Deus. Breve historia del mañana.* (pp. 262 – 296).

Hawking, S. (2003). *El universo en una cáscara de nuez.* Barcelona: Crítica – Planeta.

Hawking, S. (2003). *Historia del tiempo. Del Big Bang a los agujeros negros.* Buenos Aires: Crítica.

Hayles, K. (1999). *How we became posthuman. Virtual bodies in cybernetics, literature, and informatics.* Chicago & London: The University of Chicago Press.

Jelin, E. (2004). *Los trabajos de la memoria.* Buenos Aires.

Lewis, M. (2014). Capítulo 5: Poniéndole cara a la alta frecuencia. In M. Lewis. (Aut.), *Flash Boys. La revolución de Wall Street contra quienes manipulan el mercado* (pp. 159 – 186). México: Paidós.

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J., Shoham, Y., Wald, R., & Clark, J. (2024). *The AI Index 2024 Annual Report*. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.

McKinsey & Company. (2023). *The Great Banking Transition. The Global Banking Annual Review 2023.* McKinsey Global Financial Services Marketing and Communications.

Nancy, J. (2006). *El intruso.* Buenos Aires: Amorrortu.

Otte, M. (2010). *El crash de la información. Los mecanismos de la desinformación cotidiana.* Barcelona: Ariel.

Pasquinelli, M. (2010). *The Ideology of Free Culture and the Grammar of Sabotage.* In D. Araya & M. Peters. (Comp.), *Education in the Creative Economy: Knowledge and Learn-*

ing in the Age of Innovation. New York: Peter Lang.

Roig, A. (2005). Cabalgar con Rocinante. Democracia participativa y construcción de la sociedad civil. *Pensares. Quehaceres. Revista de Políticas de la Filosofía*, (1), 43 – 64.

Roig, A. (2002). *Ética del poder y moralidad de la protesta. La moral latinoamericana de la emergencia.* Quito: Universidad Andina Simón Bolívar, Corporación Editora Nacional.

Roig, A. (1987). Nacionalidades, nacionalidad continental y cultura en nuestra América. In N. García et al. (Aut.), *Temas de cultura latinoamericana* (pp. 71 – 101). México: Universidad Autónoma de Estado de México.

Roig, A. (1981). *Teoría y crítica del pensamiento latinoamericano.* México: Fondo de Cultura Económica.

Sancho, M. & Hernández, F. (1994). La ideología de los ordenadores y la ética de los informáticos. Entrevista a Joseph Weizenbaum. *Revista Telos,* (38).

Schindel, E. & Ferrer, C. (2001). Entrevista a Joseph Weizenbaum. *Revista Artefacto, Pensamiento sobre la técnica,* (4).

Schmucler, H. (2008). Ética y Memoria, el lugar de la cultura mediática. Seminar at *Centro de Estudio Avanzados, UNC*.

Schmucler, H. (2001). La industria de lo humano. *Revista Artefacto, Pensamiento sobre la técnica,* (4).

Simondon, G. (2009). Introducción. In *La individuación a la luz de las nociones de forma y de información* (pp. 23 – 44). Buenos Aires: La Cebra – Cactus.

Simondon, G. (2007). Función reguladora de la cultura en la relación entre el hombre y el mundo de los objetos técnicos. In *El modo de existencia de los objetos técnicos* (pp. 131 – 168). Buenos Aires: Prometeo.

Sloterdijk, P. (2001). El hombre operable. Notas sobre el estado ético de la tecnología genética. *Revista Artefacto, Pensamiento sobre la técnica,* (4).

Sloterdijk, P. & Heinrichs, H. (2003). *El sol y la Muerte. Investigaciones dialógicas.* Madrid: Siruela.

Snowden, E. (2019). *Permanent Record.* New York: Metropolitan Books.

Terranova, T. (2006). The concept of information. In *Theory, culture, society* (pp. 286 – 288).

Tiqqun. (2015). *La hipótesis cibernética*. Madrid: Acuarela Libros.

Todorov, T. (2000). *Los abusos de la memoria.* Barcelona.

Varela, F. (2002). *Conocer. Las ciencias cognitivas: tendencias y perspectivas. Cartografías de las ideas actuales.* Barcelona: Gedisa.

Vernant, J. (2008). *Los orígenes del pensamiento griego.* Buenos Aires: Paidós Studio.

Weizenbaum, J. *La frontera entre el ordenador y la mente.* Pirámide.

Wiener, N. (2016). L' homme et la machine. In Barthélémy, J. H., Iliadis, A., Mella-

mphy, N. B., de Vries, M., & Simondon, N. Book Symposium on Le concept d'information dans la science contemporaine. Cahiers de Royaumont, Les Éditions de Minuit/Gauthier-Villars 1965. *Philosophy & Technology*, *29*(3), 99 - 132. https://doi.org/10.1007/s13347-015-0205-z

Yerushalmi, J. (2009). *Zajor*. México.

Zuboff, S. (2020). Capítulo 3: El descubrimiento del excedente conductual. In S. Zuboff. (Aut.), *La era del capitalismo de vigilancia. La lucha por un futuro humano frente a las nuevas fronteras del poder*. México: Paidós.