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The Future of Social Inclusion in the Digital Age: Challenges and Opportunities of AI and Digitisation

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Abstract
The digital age is reshaping social structures, individual identity and access to opportunities, while raising critical questions about inclusion and new forms of exclusion. This article explores the relationship between artificial intelligence, digitisation and inequalities, analysing how emerging technologies can serve both as tools for empowerment and as mechanisms for reinforcing social barriers. Critically examining the digital divide, this study highlights disparities in access to technology based on income, education, gender and geographical area, and their impact on digital healthcare, education and the labour market.
The rise of 4P medicine, telemedicine and predictive algorithms is transforming healthcare, offering personalised treatment options but also introducing new challenges in terms of accessibility and data protection. AI governance and algorithm transparency emerge as key concerns to ensure an equitable and inclusive digital future. The metaphor of the treehouse illustrates a digital landscape that seems open to all, but remains accessible only to those who have the tools to climb it. This image calls into question the narratives of neutrality and universality often associated with digital innovation. Through a sociological and interdisciplinary approach, this study underlines the urgent need for policies that make digitisation a ladder for all rather than a privilege for the few.

Keywords: *Artificial Intelligence; Digital divide; 4P Medicine; Algorithmic governance; Social inclusion.*

1. Where are we now?

We live in an era of radical transformation, where digitisation is redefining identities, relationships and access to opportunities. The advent of artificial intelligence (AI), generative artificial intelligence (genAI), personalised medicine and digital platforms

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has changed the way we work, communicate and even how we receive medical care (Wachter and Brynjolfsson 2024; Witkowski *et al*. 2024; Couldry and Mejias 2019). However, this revolution raises a fundamental question: Is technology really a means of inclusion or is it reinforcing existing inequalities?

The digital era is often presented as an area of democratisation of information and access to services, but the reality is more complex (Castells 2010). On the one hand, digital technologies have improved the quality of life by expanding access to education, healthcare and economic opportunities (World Economic Forum 2022). On the other, the growing digital divide and algorithmic governance pose new ethical and social challenges, creating invisible barriers between those with access to digital skills and those excluded from them (Norris 2001; Zuboff 2019).

The concept of personalisation has become central in digital strategies, from social platforms to medical diagnostic systems (Vicente, Ballensiefen, Jönsson 2020). Artificial intelligence has made the creation of tailor-made healthcare pathways possible, while big data makes it possible to predict and prevent diseases before they even occur (Rajpurkar *et al*. 2022). But to whom are these services really accessible? Is access to personalisation the same for everyone or does it privilege those who already have greater economic and digital resources (Eubanks 2018)?

This reflection leads us to analyse some of the key issues of the digital era: The impact of digitisation on social relations and perceptions of identity (Giddens 1991); the role of artificial intelligence in critical decisions, from health treatments to access to essential services (Mittelstadt 2022); the ethical implications of the collection and use of personal data, between security, surveillance and control (Zuboff 2019; Lyon 2015; Lupton 2014); the digital divide as a new form of social exclusion and the need for policies to reduce inequalities (UN Women 2024).

The intertwining of technology, ethics and inequality is no longer a question of the future: it is a reality that already shapes our daily lives today (Eubanks 2018). Understanding who really benefits from the digital revolution and who risks being excluded from it is crucial to building a more equitable and inclusive future (European Commission 2020a).

Only through interdisciplinary analysis and deep ethical reflection can we fully understand how the digital is restructuring our society and how, through collective engagement, we can direct these transformations towards a more equitable and inclusive future (Ignatow 2020; Lupton 2014).

2. The digital and the redefinition of social identity

The digital era has radically transformed the way we construct, express and perceive our identity. With the advent of social media and digital platforms, the individual is no longer simply a social actor immersed in a physical context, but an algorithmic profile, constantly analysed, categorised and shaped by digital systems (Couldry and Mejias 2019; Lupton 2014).

If in classical sociological studies Goffman (1959) described identity as a social performance, today this performance is played out on virtual and algorithm-mediated spaces. Digital platforms are not mere communication tools, but spaces of identity construction, where people stage edited versions of themselves to gain social recognition and validation.

However, this digital hyper-connectedness does not only have positive effects. While technologies allow for greater self-expression, they also impose new forms of control and homologation. Visibility on social media is regulated by algorithmic logics, which favour content in line with dominant trends and penalise atypical or marginal narratives (Tufekci 2017). This has led to phenomena such as the culture of performativity, in which people modify their behaviour to conform to what is most visible and appreciated online (Lupton 2014).

Furthermore, the increasing use of artificial intelligence in decision-making processes raises concerns about identity construction, as many algorithms contribute to digital stereotyping by profiling people based on predefined categories, such as gender, ethnicity, social class and age (Eubanks 2018).

In addition to the redefinition of identity, digitisation has profoundly changed interpersonal relationships. If Bauman's 'liquid society' theory (2000) underlined the fragility of modern relationships, the advent of digital technologies has amplified this precariousness. Today, social interaction is mediated by digital platforms that establish new forms of connection based on rapid, fragmented and often ephemeral interactions (Castells 2010). Friendships, work and even love relationships are shaped by the matching mechanisms of algorithms, which influence who we see, who we know and who we interact with.

However, over-reliance on digital interactions can lead to a phenomenon of emotional disconnection, in which relationships become increasingly superficial and subject to a logic of quick consumption (Turkle 2011). This is reflected, for example, in the increasing difficulty of the younger generations in handling conflicts and face-to-face interactions, as they are more accustomed to communicating through digital messages and interfaces (Carrigan and Fatsis 2021).

Another emerging phenomenon is the connection paradox: the more digitally connected we are, the more isolated we feel in real life. Various studies have shown that excessive use of social media is correlated with increased levels of loneliness and social anxiety, especially among young people (Vogels and Anderson 2019).

The 'privacy paradox' (Solove 2021) is an example of this contradiction: although people claim to be concerned about their privacy online, they continue to share huge amounts of personal data with digital platforms. This dual dynamic reflects the conflict between the need for connection and the desire to protect one's privacy.

The expansion of artificial intelligence in the area of communication and human relations also leads to new challenges. Virtual assistants, chatbots and algorithms that suggest content and interactions are reshaping the way we communicate and relate to others. Recent clinical and forensic research highlights how digital environments can simulate non-verbal dynamics, raising concerns about authenticity, imitation and emotional detachment in algorithm-mediated communication (Calderaro, Mastronardi and Serban 2025). While these technologies improve the accessibility and speed of communication, they also create a risk of alienation, where human interaction is replaced by a dialogue with automated systems (Turkle 2011).

A particular image to understand the impact of digitisation on identity is that of the treehouse. Like a treehouse, offering a privileged space to observe the world from above, digital environments allow individuals to construct and curate their identity in virtual spaces. However, just as the treehouse requires resources, skills and a solid structure to be accessible to all, so access to digital technologies is strongly influenced by economic, cultural and social factors.

3. Artificial Intelligence, algorithms and digital governance

Artificial intelligence (AI) has become one of the main drivers of digital transformation, significantly influencing the world of work, healthcare, the financial market and communication. Its impact extends far beyond improving efficiency: AI redefines who makes decisions, on what criteria and with what consequences for society (Mittelstadt 2022).

The increasing use of automated systems and predictive algorithms poses complex ethical and political challenges related to transparency, fairness and accountability in decisions made by machines (Zuboff 2019). While algorithms can optimise processes and improve access to services, they also risk crystallising pre-existing inequalities, reinforcing discrimination and limiting individual freedom (Eubanks 2018). This concern echoes emerging perspectives in neuroscience and AI, which highlight how behavioural profiling can intersect with biological and educational factors. Şerban (2025), for example, introduces the notion of 'decision spaces' to describe how genetic predispositions, life experiences, and algorithmic evaluations co-form human action, with implications for both inclusion and accountability.

Algorithms are often perceived as neutral and objective tools, based on numerical data and free of bias. However, this view ignores the fact that every algorithm is programmed by human beings, with the risk of incorporating pre-existing biases and reproducing discriminatory patterns (Gillespie 2018).

One of the main problems is the 'black box' of algorithms, i.e. their lack of transparency. Many AI systems make decisions based on complex statistical models that are often incomprehensible to users and even to the programmers who developed them (Burrell 2016). This opacity raises questions of accountability: who is responsible when an algorithm makes an unfair or wrong decision? How can we ensure that automated decisions are justifiable and verifiable? In the health sector, for example, AI systems are increasingly used for personalised diagnosis and treatment. However, an algorithm that excludes some patients from certain treatments based on incomplete or biased data could reinforce health inequalities rather than reduce them (Rajpurkar *et al*. 2022).

Another critical aspect of the use of AI is the reproduction and amplification of social discrimination. Algorithms are not unbiased: if they are trained on historically unbalanced data, they will end up perpetuating the same inequalities (Noble 2018).

A case in point concerns the use of AI in personnel selection processes. Amazon withdrew an automated selection system after it was discovered that it systematically penalised female applicants for technical roles because the historical data on which it was trained was male-dominated (Dastin 2018).

Similar biases also emerge in predictive justice systems used in some countries, where algorithms suggest probation decisions or prison sentences based on models that tend to penalise minority groups (Eubanks 2018).

In the healthcare sector, one study showed that an AI system for care management in the United States assigned lower priority levels to black patients than to white patients, even with the same clinical condition, because the algorithm was based on historical healthcare spending data rather than on actual patient needs (Obermeyer *et al*. 2019).

The increasing use of AI in strategic sectors makes the creation of regulations and ethical standards for its application increasingly urgent. The lack of clear governance

entails the risk of technologies emerging in a regulatory vacuum, without verification and control mechanisms (European Commission 2020b).

The European Union introduced the Artificial Intelligence Regulation, the first attempt to classify AI systems according to their level of risk and to impose specific rules to ensure transparency and security (European Commission 2024). However, regulation of AI is still in its infancy and many countries do not have clear guidelines on how to balance innovation and protection of human rights.

AI is not inherently good or bad: its impact depends on how it is developed, regulated and used. If designed fairly and transparently, it can improve quality of life, optimise public services and reduce waste. However, if left unchecked, it risks becoming a tool of exclusion and discrimination (Zuboff 2019).

From a sociological point of view, AI is not just a technological issue, but an issue of power and governance. Those who control the data control the decisions, and those who control the decisions control the future (Couldry and Mejias 2019). Society therefore has a collective responsibility: to ensure that emerging technologies are developed to serve humanity as a whole and not just a small elite.

4. The digitisation of healthcare and the case of 4P medicine

In recent years, the digitisation of healthcare has accelerated rapidly, radically transforming the relationship between patients, doctors and health technologies. The introduction of tools such as artificial intelligence, telemedicine, big data and wearable devices has redefined how diseases are prevented, diagnosed and treated (Alonso *et al*. 2019).

One of the most significant developments in this context is the spread of 4P Medicine, a healthcare paradigm based on four fundamental principles: Predictive − Using AI to identify risk factors early; Preventive − Developing strategies to reduce the incidence of disease; Personalised − Treatments personalised to the patient's genetic and biological profile; Participatory − Greater involvement of patients in managing their health.

These changes represent a tremendous opportunity to improve the quality of healthcare, but also pose new ethical and societal challenges, including unequal access to digital technologies, security of health data and the increasing role of algorithms in medical decisions (Rajpurkar *et al*. 2022).

As Maturo (2024) points out, the digitisation of medicine is not just a technological advance, but a redefinition of the role of the patient and his or her relationship with the healthcare system. The introduction of 4P Medicine brings with it a transformation of the figure of the patient, who from being a passive subject of care becomes an active actor in his or her own health journey.

If, on the one hand, personalised medicine allows a greater adherence to individual needs, on the other hand, it risks transferring part of the responsibility for the disease to the patient himself, who has to self-manage through monitoring technologies and digital devices (Maturo 2024). This phenomenon raises critical questions: does the increasing personalisation of medicine strengthen the sense of empowerment or does it create new forms of social pressure?

Self-monitoring of health, facilitated by devices such as smartwatches and biosensors, can increase awareness of one's physical state, but at the same time risks generating a surveillance medicine, in which the boundary between prevention and control becomes increasingly blurred.

Artificial intelligence is revolutionising the diagnosis and treatment of diseases. By processing huge amounts of clinical data, neural networks and machine learning algorithms are able to identify abnormalities in medical imaging tests more accurately than humans, predict the evolution of chronic diseases by analysing historical patient data, optimise hospital management, reduce waiting times and improve resource allocation. A study published in *Nature Medicine* (Rajpurkar *et al*. 2022) showed that an AI algorithm outperformed human radiologists in identifying malignancies in mammograms, reducing false positives by 5.7 per cent and false negatives by 9.4 per cent (McKinney *et al*. 2020).

However, as Maturo (2024) argues, the increasing reliance on technology in diagnosis brings with it the risk of over-medicalisation and reduction of the physician's role in decision-making. Algorithms can analyse large volumes of data, but can they interpret the clinical context and psychological nuances of the patient?

Telemedicine has emerged as one of the most promising solutions to improve accessibility of care. With video consultations, wearable devices and electronic medical records, it is possible to provide care to patients who live in rural areas or have mobility difficulties (Saputra and Aminah 2024).

Some of the most obvious benefits of telemedicine include the reduction of geographical barriers as patients can receive care without physically moving; continuous monitoring as devices such as smartwatches and biometric sensors allow for real-time data collection; and reduced waiting times and emergency room visits.

However, new inequalities are also emerging here. The digital divide between those who have access to a stable internet connection and those who do not may prevent some people from benefiting from telemedicine (World Bank Group 2024). In addition, the elderly and people with low digital literacy may find it difficult to use these tools, requiring greater investment in digital education and training, which is not always possible.

With increasing digitisation, the protection of health data has become a major concern. Electronic health records and telemedicine platforms collect a huge amount of sensitive information, which must be adequately protected to avoid privacy breaches.

The risk of cyber attacks on healthcare systems is increasing. According to American Hospital Association (2025), the healthcare sector is among the most vulnerable to cyber threats, with a significant increase in attacks on healthcare data in recent years.

Some critical points include: who has access to patient health data? Can pharmaceutical and insurance companies use this data for commercial purposes? Is there a risk of discrimination based on genetic and health data?

4P Medicine represents an exciting future, in which technology is enabling the delivery of increasingly precise and personalised care. However, for this transformation to be truly inclusive and effective, some crucial challenges need to be addressed. The biggest risk is not the use of technology per se, but its implementation without a clear ethical and social vision. If the digitisation of healthcare is not accompanied by appropriate inclusion policies and training, the risk is that the benefits of 4P Medicine will be reserved only for a privileged minority, leaving those with fewer resources behind (Maturo 2024).

5. Gap or social lift?

Digitisation is often described as a social lift, offering new opportunities to anyone who wants to ride it. However, for many, this lift does not exist at all or is only accessible to those with the economic resources, digital skills and appropriate infrastructure. Rather than a means of social mobility, the digital world is in danger of becoming a treehouse that

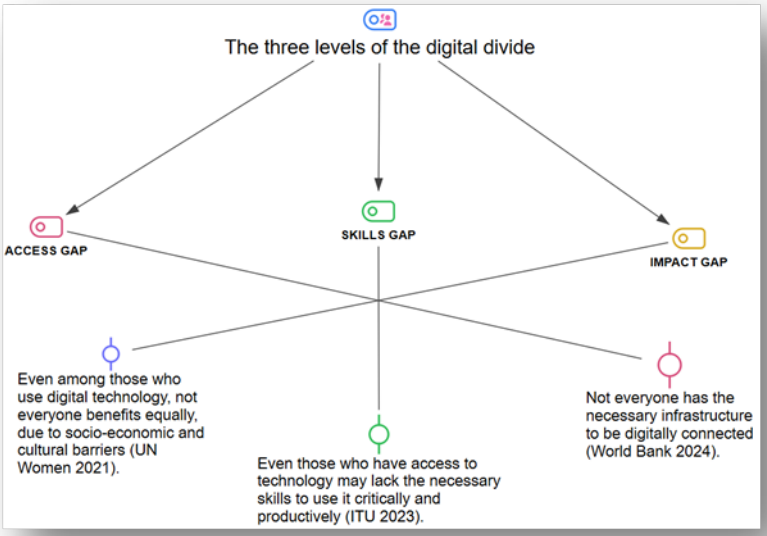
appears to be open to all, but is actually only accessible to those who have the tools to climb it.

This image highlights a fundamental contradiction: technological progress can be a democratising factor, but only if it is accompanied by policies of accessibility and inclusion. Otherwise, the digital divide becomes a new frontier of inequality, creating an ever-widening divide between those who can take advantage of digital opportunities and those who remain excluded (Couldry, Mejias 2019).

The digital divide is not only about the availability of connections and devices, but also about differences in digital skills, quality of use and benefits gained from technology (Van Dijk 2020). In other words, it is not enough to have a computer or a smartphone to overcome the digital divide: it is crucial to know how to use them effectively for education, work, health and social participation (European Commission 2024).

This phenomenon manifests itself on three distinct levels: access gap, skills gap, and impact gap. The image of the treehouse is particularly useful to describe this situation. Those who manage to climb the digital ladder find an environment full of opportunities, while those who remain on the ground can only observe from afar, without being able to actively participate in the digital society.

Figure no. 1. Representation of the three levels of the digital divide



Source: Author's elaboration based on cited sources

The digital divide is not just an issue of access to technology, but reflects deeper dynamics of social, economic and cultural inequality. There are several barriers that prevent people from benefiting from the opportunities offered by digital. Income and social class are among the main factors influencing access to technology: low-income households often cannot afford up-to-date devices or stable internet connections, creating a clear divide between those who can use digital tools for education, work and health and those who are excluded (World Bank Group 2024; Ragnedda 2020). Education level also plays a crucial role, as those with advanced digital skills are better able to exploit online

resources, while those with limited education struggle to navigate the digital world with awareness and autonomy (European Commission 2024; Norris 2001).

Gender inequalities are also reflected in the digital sphere, with women in many areas of the world having less access to technology and career opportunities in the technology sector. According to UN Women (2024), the gender digital divide is still a significant obstacle, with the gap persisting not only in access to devices, but also in digital-related educational and employment opportunities. Couldry and Mejias (2019) also point out that the issue is not only access to technology, but also who controls its use and benefits, with the risk that digital innovation reinforces inequalities rather than reducing them.

Geographical area strongly affects digital accessibility: rural regions often suffer from a lack of adequate digital infrastructure, which limits access to fast connectivity and essential services such as telemedicine and online education (European Commission 2024, ITU 2023). The health sector is particularly affected by this gap, as many people, especially the elderly and individuals with low digital literacy, are unable to take full advantage of digital health innovations, risking exclusion from advanced health services (Maturo 2024; Saputra and Aminah 2024).

Education and the world of work are also strongly influenced by digital disparities. During the pandemic, millions of students were excluded from distance learning due to a lack of devices and connection, further widening the educational gap between those with access to technology and those without (European Commission 2024; UN Women 2024). In the labour market, the increasing demand for digital skills has created a new imbalance, penalising those who have not had the opportunity to acquire such skills, thus reducing their employment opportunities and increasing the risk of exclusion from the world of work (World Economic Forum 2022).

Addressing the digital divide requires concrete strategies, such as investments in digital infrastructure, technological literacy programmes and measures to make devices and connections accessible to all. According to the World Bank Group (2024), effective public policies must ensure not only physical access to technology, but also educational tools that help people develop digital skills useful for everyday life and work. Digitalisation can be a ladder to new opportunities, but only if it is accompanied by inclusive policies that prevent it from becoming a treehouse accessible only to the privileged few.

Table no. 1. The digital divide – determinants, impacts and informed inclusion strategies

Determinants of the digital divide	Impact on access to technology and opportunities	Informed inclusion strategies
Income and Social Class	Low-income and marginalised groups face systemic barriers to accessing up-to-date devices and reliable Internet.	Implement structural policies for the public provision of affordable digital tools and universal Internet as a right, not a commodity.
Education and Digital Literacy	Those with higher education have a structural advantage in	Introduce lifelong digital learning in public education

	acquiring advanced digital skills.	and promote community-based digital literacy programmes for marginalised adults.
Gender	Women, especially in patriarchal or resource-poor contexts, have limited access to technology, digital capital and leadership roles.	Tackling intersectional inequalities through gender-sensitive digital policies, representation in technology sectors and incentives aimed at inclusion.
Geographical Area	Rural and peripheral regions are structurally underinvested, resulting in a lack of digital infrastructure and access to services.	Promoting territorial equity through public investment in broadband and decentralised technology hubs rooted in the needs of local communities.
Digital Health	People with low digital health literacy (often elderly, disabled or socio-economically disadvantaged) are excluded from eHealth innovations.	Co-designing accessible and intuitive digital health services with users, particularly vulnerable groups, ensuring inclusive health citizenship.
Online Education	Lack of access to digital devices and stable connections exacerbates educational inequalities, especially during crises.	Ensure universal access to digital learning tools and design inclusive pedagogies that address socio-economic digital disadvantage.
Work and Digital Skills	Workers without access to digital retraining risk being excluded from the evolving digital labour market, reinforcing class divisions.	Develop inclusive labour policies to support affordable retraining and empower trade unions to negotiate digital transition rights.

Source: Author's elaboration based on cited sources.

6. Conclusions

The digital era is not an inescapable destiny, but a malleable space where technology and society continuously reshape one another, creating opportunities while also generating new forms of exclusion. This article has highlighted how artificial intelligence and digitisation hold great transformative potential, yet risk reinforcing inequalities if not guided by inclusive policies and ethical governance.

In the field of medicine, this dynamic is especially evident. Digital medicine, particularly 4P Medicine, exemplifies both the promises and the pitfalls of innovation: personalised care, early diagnosis and efficient systems, but also unequal access, privacy concerns and algorithmic opacity. Similarly, the digital divide − too often reduced to a

matter of infrastructure—emerges as a deeply social issue shaped by income, education, gender and geography. The metaphor of the digital treehouse captures this contradiction: a world seemingly open to all, but accessible only to those with the resources to climb.

Building a more inclusive digital society requires more than technological advancement. It demands long-term public investment in digital literacy, accessible infrastructure in underserved areas, and transparent, participatory governance of AI systems. The future will not be written in code alone, but in the social frameworks we choose to construct, through inclusive decision-making, civic dialogue and collective accountability.

International frameworks such as UNESCO's *Recommendation on the Ethics of AI* (2021) and the EU's *AI Act* (2024) provide useful guidance. Yet, it is local action that makes inclusion real, through initiatives such as community-based telemedicine, digital literacy training for older adults, or participatory oversight of algorithmic systems. These are not utopias, but replicable pathways.

Sociologists play a key role in this transition, not only as observers, but as active interpreters of complexity. Their contribution is crucial to ensure that technological innovation remains grounded in human dignity, social justice and the shared imagination of an inclusive future.

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