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HOW CAN TECHNOLOGY FACILITATE A MORE INCLUSIVE FUTURE? THE IMPORTANCE OF ASSISTIVE TECHNOLOGY TO REDUCE SOCIAL EXCLUSION AND MARGINALISATION

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1. INNOVATION AND PUBLIC POLICIES: CHANGES, POSSIBILITIES AND RISKS OF EMERGING TECHNOLOGIES[*]

Information and communication technologies (hereafter ICTs) have advanced greatly and quickly over the past three decades.

Producers and suppliers of goods and services have ameliorated the quality of their systems through the implementation and use of innovative technologies, proving to be a powerful tool for improving the standard of life of individuals and the range of their life opportunities.

These ideas form the foundation of the «*Fourth Industrial Revolution*» (4IR, also known as Industry 4.0), a phenomenon that has had a profound impact on the advancement of modern civilization and has fundamentally altered the society, the economy, and politics[2].

This new paradigm focuses on "sustainable" production using an integrated human-machine approach[3].

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[*] This paper builds upon a previous piece of research presented during the Conference of the Autorità per le garanzie nelle comunicazioni (AGCOM) and the Italian Chapter of the International Institute of Communications (IIC) on «*Insights for a Balanced Regulation: considering Platforms Benefits and Protection Needs*», which took place online, on December 14, 2021.This research was conducted under the research project *"RISID – Realizing the rIght to Social Inclusion for persons with Disabilities through new tools of smart communication and sharing knowledge: from international to local effectiveness"*, financed by Fondazione Cariplo.

[2] It was the idea in K. SCHWAB, *The Fourth Industrial Revolution*, World Economic Forum, Geneva, Switzerland, 2016, which asserts that global society is entering a new phase of development, one in which disruptive technologies (artificial intelligence, autonomous vehicles and the internet of things) are merging with humans' physical lives.

[3] According to M. JAVAID, A. HAALEM, R. PRATAP SINGH, R. SUMAN, E. SANTIBANEZ GONZALES, *Understanding the adoption of Industry 4.0 technologies in improving environmental sustaibility*, in *Sustainable Operation and Computers*, Vol. 3, 2022, 203, «industry 4.0 technologies empower to connect all stakeholders, in addition to raw material and products, into a resource for sustainability and future growth. There is a requirement to study the

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One of the main bridges between the physical and digital applications enabled by the Fourth Industrial Revolution is the Internet of Things (IoT), which can be described as a connection of any devices to the internet for communication and data analysis with sensors, software and numerous other means of connecting things[4].

The more recent ICTs, which place a strong emphasis on artificial intelligence (AI), cloud computing, machine learning, nanotechnology, blockchain, big data analytics and other areas, offer a variety of potential benefits to collectivity, including new and innovative consumer goods and services, greater personalization, convenience and remote control[5].

Rapid technological advancements are now the subject of considerable policy discussion in many nations throughout the world[6].

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capabilities of Industry 4.0 technologies in sustainable environmental aspects. Investors, customers, the media, regulators, and other stakeholders are putting growing pressure on companies to consider their environmental impacts and respond to them».

[4] The expression "*Internet of Things*" (IoT) was coined back in 1999 by Kevin Ashton, the British technology pioneer who cofounded the Auto-ID Center at the Massachusetts Institute of Technology.

[5] On this theme, see H. MICKLITZ, O. POLLICINO, A. REICHMAN, A. SIMONCINI, G. SARTOR, G. DE GREGORIO (edited by), *Constitutional Challenges in the Algorithmic Society*, Cambridge University Press, 2021; E. PALMERINI, *The interplay between law and technology, or the RobotLaw project in context*, in E. PALMERINI, E. STRADELLA (edited by), *Law and Technology. The Challenge of Regulating Technological Development*, Pisa, 2013; S. RUSSEL - P. NORVIG, *Artificial Intelligence: A Modern Approach*, 3rd Ed., Pearson, 2010; J. MOOR, *The Dartmouth College Artificial Intelligence Conference: The Next Fifty years*, in *AI Magazine* 27(4), 2006, 87 ss.

[6] All tools useful to support, for example, the public health as well as to provide quick solutions to governments, organizations and people during the coronavirus Covid-19 pandemic. About the topic of the «digitalization» of the activity of the Public Administration and on the importance of analytics in the public sector, see G. BAROZZI REGGIANI, *The smart cities model: a modern way of satisfying the fundamental needs of the citizens through efficiency and participation*, in *Ius Publicum Network Review*, 2021, 1, 1 ss.; R. CAVALLO PERIN, *Pubblica amministrazione e data analysis*, in R. CAVALLO PERIN (eds.), *L'amministrazione pubblica con i big data: da Torino un dibattito sull'intelligenza artificiale*, Torino, Quaderni del Dipartimento di Giurisprudenza dell'Università di

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Innovation has emerged as a crucial component of the Union's economic growth plan.

The European Commission has declared that *«innovation is essential to drive Europe's competitiveness and to ensure the health and well-being of its citizens. Innovation shapes markets, transforms economies, stimulates step changes in the quality of public services and is indispensable to achieve the overarching objectives of the twin green and digital transition»*[7].

Those who have access to digital technology are in fact empowered by it. It also opens up new spheres of human activity and significantly improves communication.

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Torino, 2021, 11-18; G. DE MINICO, *L'Amministrazione e la sfida dei big data*, in AA.VV., *L'Amministrazione nell'assetto costituzionale dei poteri. Scritti per Vincenzo Cerulli Irelli*, Torino, 2021, 573 ss.; G.M. RACCA, *La digitalizzazione necessaria dei contratti pubblici: per un'Amazon pubblica*, in *DPCE online*, 2021, 4, 4669- 4706; M. TRESCA, *Lo «Stato digitale»: big data, open data e algoritmi: i dati al servizio della Pubblica Amministrazione*, in *Riv. Trim. Dir. Pubb.*, 2021, 2, 545 ss.; V. VAIRA, *Innovation and local Governance: the government – as – a platform approach*, in *Ius Publicum Network Review*, 2021, 2, 1 ss.; R. CAVALLO PERIN, D. U. GALETTA (eds.), *Il diritto dell'amministrazione pubblica digitale*, Torino, 2020; F. COSTANTINO, *Rischi e opportunità del ricorso delle amministrazioni alle predizioni dei "big data"*, in *Diritto Pubblico*, 2019, 43 ss.; J.-B. AUBY, *Il diritto amministrativo di fronte alle sfide digitali*, in *Istituzioni del Federalismo*, 2019, 619 ss; E. CARLONI, *Algoritmi su carta. Politiche di digitalizzazione e trasformazione digitale delle amministrazioni*, in *Diritto Pubblico*, 2019, 363 ss.; D.U. GALETTA, J.G. CORVALAN, *Intelligenza artificiale per una pubblica amministrazione 4.0?,* in *Federalismi.it*, 2019, 3, 2 ss.; M. FALCONE, *"Big data" e pubbliche amministrazioni: nuove prospettive per la funzione conoscitiva pubblica*, in *Rivista trimestrale di diritto pubblico*, 2017, 601 ss.; F. CARDARELLI, *Amministrazione digitale, trasparenza e principio di legalità*, in *Il diritto dell'informazione e dell'informatica*, 2015, 2, 227 ss.; ID., *Profili di diritto delle tecnologie dell'informazione*, Camerino, 1992.

[7]European Commission, *A New European Innovation Agenda. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, COM (2022) 332 final.

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Although technological evolution is essential for advancing empowering the economy, the society, and the environment, they also bring with them new risks and vulnerabilities that provide substantial difficulties for the European national legal systems[8].

These recent advancements provide potential problems for citizens in terms of transparency and disclosure; privacy and security; interoperability and accountability; discrimination and inequality[9].

Governments therefore face a major challenge: how to best protect citizens' fundamental rights and freedoms, ensure fair markets and enforce regulations, while allowing these new technologies and businesses to thrive?

According to this viewpoint, the role of law and regulation is essential for managing the tension between innovation and risk by maintaining a high degree of protection, providing safety nets, and assigning responsibility for any harm[10].

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[8] As said by E. PALMERINI, *The interplay between law and technology, or the RobotLaw project in context*, in E. PALMERINI, E. STRADELLA (eds), *Law and Technology*, cit., 8, «challeging traditional legal categories and qualifications, posing risks to fundamental rights and freedoms that have to be considered, and more generally demanding a regulatory ground on which they can be developed and eventually launched».

[9] In these theme, see M. BOMBARDELLI , *Dati personali (tutela dei)*, in *Enciclopedia del Diritto*: *I tematici*, 3, "*Funzioni amministrative*", Milano, 2022, 351 ss.; E. CARLONI, *Il paradigma trasparenza. Amministrazioni, informazione, democrazia*, Bologna, 2022, 35 ss.; H. MICKLITZ, O. POLLICINO, A. REICHMAN, A. SIMONCINI, G. SARTOR, G. DE GREGORIO (eds.), *Constitutional Challenges in the Algorithmic Society*, cit.

[10] In these terms M. WEIMER, L. MARIN, *The Role of Law in Managing the Tension between Risk and Innovation: Introduction to the Special Issue on Regulating New and Emerging Technologies*, in *European Journal of Risk Regulation*, 2016, 3, 469–74.

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Innovation is, after all, a necessary response to a world that is becoming more competitive and globalized, but this sovra - individual interest is also a tool that is frequently uncertain and risky[11].

As a result, it requires regulations that, on the one hand, guarantee technological innovation and, on the other hand, ensure a level of security that fosters trust, as this will be crucial for the wider deployment and adoption of emerging technologies[12].

Governments and European institutions must direct new and emerging technologies so that they support inclusive and sustainable development and «*leave no one behind*»[13] since innovation, economic progress and well-being are closely linked.

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[11] For interesting remarks on this theme, see H. SUN, *Technology and the Public interest*, Cambridge University Press, 2022; A.N. LIUK, D.S. SIEGEL, *Innovation, Entrepreneurship and technological change*, OUP Oxford, 2007; H. VAN DUIVENBODEN, M. THAENS, V.J.J.M. BEKKERS (eds), *Information and Communication Technology and public Innovation. Assessing the ICT-driven Modernization of Public administration*, 2006, IOS press, 2006. In a different perspective, see also E. OSTROM, *Governing the Commons: the evolution of Institutions for Collective Action (Political Economy of Institutions and decisions)*, Cambridge University Press, 1990.

[12] On this theme, see J. PELKMANS, A. RENDA, *Does EU Regulation Hinder or Stimulate Innovation*, in *IRMO Occasional Papers* 5, Institute for Development and International Relations, Zagreb, 2014, 1 ss. In this context, we remember the European Union's strategy for data that aims at creating a single market for data that will allow it to flow freely within the EU and across sectors oft he benefit of businesses, researchears and public admininistrations. The Data governance Act and the Data Act are part of the Commission's European Strategy for data aimed at creating a single data that ensures Europe's global competitiveness and data sovereignty.

[13] See *UN General Assembly, Transforming our world : the 2030 Agenda for Sustainable Development, 21 October 2015*, A/RES/70/1, available at: https://www.refworld.org/docid/57b6e3e44.html.

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2. HARMONIZING TECHNOLOGICAL INNOVATION WITH SOCIAL INCLUSION

The Internet of Things and the extremely quick development of digital technologies have changed many elements of work and daily life and, in many cases, have become essential to our personal lives as well. The economy and society's structures, however, were also changed by them.

Information technologies make it possible to access what has hitherto been inaccessible, offering new solutions to previously unsurpassed problems; at the same time, rapid advances can have serious downsides if they outpace the ability of societies to adapt.

In particular, they can exacerbate and create new digital disparities for access to these online resources, which can lead to an increase in inequality.

Undoubtedly, those with disabilities are among the most at danger of social exclusion in the information technology-based society because they frequently encounter impediments to economic, social, political and cultural participation[14].

Emerging technologies have been extremely essential throughout the pandemic in many areas, including healthcare, economy, the educational system and others, to monitor or combat the impact of the Covid shock, but they have made other elements more challenging.

The isolation has highlighted population inequalities and emphasised the gaps in technology regulation and digital skills (the so called «*digital divide*»), increasing social

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[14] One billion people globally live with disabilities, that are physical, sensory, psychiatric, neurological, cognitive, or intellectual. Their disabilities are dynamic and can be temporary or permanent, singular or plural, from birth or developed, and can change over time.

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exclusion and marginalisation among people with disabilities who need appropriate assistive technologies to make the content accessible to their needs[15].

The advantages of implementing new technology have become a major concern for the society in general, but these benefits are particularly important for people with disabilities.

The inclusion, involvement, and independence of persons with disabilities can be enhanced through assistive technology[16], artificial intelligence and other kinds of innovations[17].

As technological innovation enhances efficacy, access to that technology becomes always more important.

Therefore, it is essential that people with disabilities have the same opportunity to benefit from the full range of mainstream communication products and services that are

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[15] On this theme, see M. RAMAJOLI, *La gestione dell'emergenza pandemica tra Schmitt e Kelsen*, in *Ceridap*, 2021, 2, 98-108; L. ROBINSON, J. SCHULZ, A. KHILNANI, H. ONO, S.R. COTTON, N. MCCLAIN, L. LEVINE, W. CHEN, G. HUANG, A.A. CASILLI, P. TUBARO, M. DODEL, A. QUAN-HAASE, M. L. RUIU - M. RAGNEDDA, D. AIKAT, N. TOLENTINO, *Digital inequalities in time of pandemic: COVID-19 exposure risk profiles and new forms of vulnerability*, in *First Monday*, 2020, 7; J.M. RYAN (eds.), *COVID-19: Global Pandemic, Societal Responses, Ideological Solutions*, Routledge, 2020.

[16] An AT System is defined by M. MACLACHLAN, J. MCVEIGH, M. COOKE, D. FERR, C. HOLLOWAY, V. AUSTIN, D. JAVADI, *Intersections Between Systems Thinking and Market Shaping for Assistive Technology: The SMART (Systems-Market for Assistive and Related Technologies) Thinking Matrix*, in *Int. J. Environ. Res. Public Health* 2018, *15*, 2229, as «the development and application of organized knowledge, skills, procedures, and policies relevant to the provision, use, and assessment of assistive products».

[17] We could consider the work of scientics in the fields of neuroscience, engineering, artificial intelligence, robotics, biotechnology and machine learning in order to development new devices, such as visual prothesis, bionic eye, brain-computer Interface (BCI) for communication.

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necessary to participate equally in employment, education, recreational, and other settings, in order to enable them to participate in a welcoming and barrier-free information society. This will help close the gap in society[18].

In order to lessen inequality, laws, policies and programs should adequately represent the rights and the interests of people with disabilities while also taking accessibility requirements into account.

As will be seen in the following paragraph, the European Union has recently adopted a wide range of measures to encourage social cohesion and integration of people with disabilities.

As part of these measures, attempts are made to control technology in a way that will increase its beneficial benefits and minimize its detrimental ones.

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[18] Despite the progress made in the past decade, persons with disabilities still face considerable barriers and have a higher risk of poverty and social exclusion. For interesting remarks on the theme of poverty in general, see C. FRANCHINI, *L'intervento pubblico di contrasto alla povertà*, Napoli, 2021 and L. GALLI, *La coprogrammazione e la coprogettazione dei servizi di integrazione dei migranti. Paradigmi di coinvolgimento della società civile nei percorsi di inclusione sociale*, Torino, 2022.

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3. DIGITAL INCLUSION IN THE AGE OF OPPORTUNITIES: THE LATEST POLICIES AND PRACTISES FOR THE ADOPTION OF ASSISTIVE TECHNOLOGY IN THE EUROPEAN UNION

The integration of technological innovations that could facilitate the daily life of people with disabilities has for a long time been hampered by multiple barriers, mainly physical as infrastructure, but also intangible as cultural barriers, ethical and psychological.

But it's important to remember that definitions and perspectives on disabilities have evolved greatly throughout time[19].

For many years, in particular, the term "disability" was used to refer to a condition that results from a physical characteristic of an individual[20].

The medical model views disability indeed as an obstacle stemming from the functional limitations of the disabled person rather than as a societal problem arising from disabling and discriminatory barriers.

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[19] The analysis of the different disability models can be found in T. SHAKESPEARE et al., *Models*, in G. ALBRECHT (eds.), *Encyclopedia of Disability*, Thousand Oaks, 2006, 1101 ss.; J.H. STONE, M. BLOUIN (eds.), *International Encyclopedia of Rehabilitation*, 2010, New York; N. EREVELLES, *Disability and difference in global context. Enabling a Transformative Body Politic*, New York, 2011; J.E. BICKENBACH, *The International Classification of Functioning, Disability and Health and its Relationship to Disability Studies*, in N. WATSON (eds.), New York, 2012, 51 ss.; D. WASSERMAN, *Disability: Definitions, Models, Experience*, in E.N. ZALTA (eds.), *The Stanford Encyclopedia of Philosophy*, 2013; M. BERGHS, K. ATKIN, H. GRAHAM, C. HATTON, C. THOMAS, *Implications for public health research of models and theories of disability: a scoping study and evidence synthesis*, Southampton, 2016; M. OLIVER, *Defining Impairment and Disability*, in *Emens, Disability and Equality Law*, London, 2017, 3 ss.

[20] If you want, see B. RABAI, *The role of technology and innovation in digital and social inclusion. The case of disability in a public perspective*, in *Media Laws*, 2022, 1, 199-211 and the bibliography within it.

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The perception of disability evolved subsequently from a medicalized characterization of the individual to a definition located in the environment and the social and political context.

According to the social model, a disability is not something that a person is born with; rather, it is a problem that society has created.

As a result, a disability may be imposed on people with impairments by society through isolation and exclusion from everyday activities.

It also as D'Aboville said «*within the social model, disability is seen as arising, not as the direct result of an impaired, but out of interaction between an impaired individual and an essentially hostile environment. ...the social model focuses on the steps not the wheelchair. Accordingly, disability is recognized as the restrictions placed by society, which isolate and oppress them*»[21].

In other words, the social model's central tenet is that disability shouldn't be viewed as a personal issue but rather as a fact of life in society, shifting blame for the negative effects of a person's physical limits on society's inability to anticipate and accommodate differences[22].

In the light of this model, the World Health Organization (WHO) established a new definition of disability, understood as «*the outcome or result of a complex relationship*

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[21] E. D' ABOVILLE, *Social Work in Organisation of Disable Person*, in M. OLIVER (eds.), *Social Work, Disabled People and Disability Environment*, Jessica, Kingsley, 1993, 199.

[22] In this sense see P. HUNT, *A critical condition*, in *Stigma: The Experience of Disability*, London, 1966; M. OLIVER, *The Politics of Disablement*, New York, 1980; T. SHAKESPEARE, N. WATSON, *Defending the social model*, in *Disability and Society*, 1997, 2, 293-300; ID., *The Social model of Disability: An Outdated Ideology?*, in S.N. BARNARTT, B.M. ALTMAN (eds.), *Research in Social Science and Disability: Exploring Theories and Expanding Methodologies*, New York, 2001, 9 – 21. For a critique of the social model of disability see, among others, D. MARKS, *Dimensions of Oppression: theorising the Embodied Subject*, in *Disability and Society*, 5, 1999, 611 ss.

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between an individual's health condition and personal factors, and of the external factors that represent the circumstances in which the individual lives»[23].

At the international level, the Convention on the Rights of Persons with Disabilities UNCRPD[24] - the goal of which is to ensure the protection and promotion of the rights of persons with disabilities on an equal basis with others, through the creation of a legislative framework concrete, enforceable and time-bound benchmarks to monitoring the gradual implementation of accessibility - does not offer a definition of disability, but rather a broad definition that is meant to be broadly inclusive.

In particular, article 1 of the mentioned Convention includes persons with disabilities who have long-term physical, mental, intellectual or sensory disabilities who, in their interaction with the various barriers, may hinder their full and effective participation in society on an equal footing with that of others.

This description of disability shifts the focus toward the social and environmental barriers that hinder an individual's participation in society rather than on the individual's impairments.

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[23] D.B. PETERSON, *International classification of functioning, disability and health: an introduction for rehabilitation psychologists*, in *Rehabilitation Psychology,* 2005, 2, 105.

[24] The United Nation Convention on the Rights of Persons with Disabilities (CRPD) was adopted by the UN General Assembly on 13 December 2006, and the Optional Protocol governing enforcement mechanisms came into force on 3 April 2008 (for see the Map of Signatures and Ratifications, you can visit the page www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html).

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As a result, the Convention on the Rights of Persons with Impairments outlines the fundamental liberties and human rights of those who have disabilities and gives them the ability to live lives that respect their innate dignity[25].

However, at the European level, the European Union has only recently moved to encourage accessibility, on the one hand, and research, development and innovation, on the other[26].

Article 13 of the Amsterdam Treaty (now article 19 TFUE) enables the Council to take appropriate actions to combat discrimination based on disability and invites the Community

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[25] On the theme of fundamental rights of disabled person in Italian context, see P. ADDIS, *Discriminare fra persone con disabilità. Note a partire da Szpital Kliniczny im. dra J. Babiński Samodzielny Publiczny Zakład Opieki Zdrowotnej w Krakowie*, in *DPCE online*, 2021, 2; G. ARCONZO, *I diritti delle persone con disabilità. Profili costituzionali*, Milano, 2020; C. COLAPIETRO, F. GIRELLI, *Persone con disabilità e Costituzione*, Napoli, 2020; M. RAMAJOLI, *Sui molteplici criteri di riparto della giurisdizione in materia di servizi di sostegno scolastico alle persone con disabilità*, in *Dir. proc. amm.*, 2, 2020, 275 ss.; M. D'AMICO, F. BIONDI (eds), *Diritti sociali e crisi economica*, Milano, 2017; F. FONTANA, A. TARANTINO (eds.), *Dignità e fragilità della persona umana*, Napoli, 2017; N. ZANON, *Corte costituzionale, evoluzione della "coscienza sociale", interpretazione della Costituzione e diritti fondamentali: questioni e interrogative a partire da un caso paradigmatico*, in *RivistaAic.it*, 4, 2017; M.G. BERNADINI, *Disabilità, giustizia, diritto. Itinerari tra filosofia del diritto e Disability Studies*, Torino, 2016; S. CASSESE, *Dentro la Corte. Diario di un giudice costituzionale*, Bologna, 2015; D. SICLARI, *Riflessioni sullo stato giuridico della disabilità nell'ordinamento italiano*, in *Il diritto dell'economia*, 2015; L. VIOLINI, *Il diritto all'assistenza delle persone disabili*, in C. COLAPIETRO, A. SALVIA (eds.), *Assistenza, inclusione sociale e diritti delle persone con disabilità*, Napoli, 2013; F. FURLAN, *La tutela costituzionale del cittadino portatore di handicap*, in C. CATTANEO (eds.), *Terzo settore, statualità e solidarietà sociale*, Milano, 2001, 231 ss.; M. AINIS, *I soggetti deboli nella giurisprudenza costituzionale*, in *Politica del Diritto*, 1999; M. LUCIANI, *Sui diritti sociali*, in VV.AA., *Studi in onore di Manlio Mazziotti di Celso*, Padova, 1995; R. BIN, *Diritti e argomenti. Il bilanciamento degli interessi nella giurisprudenza costituzionale*, Milano, 1992.

[26] The attention to the social model has been unattainable for a long time due to the absence of EU competences in the field of social policies capable of exercising an active influence on the situation of people with disabilities.

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Institutions to take account «*of the needs of persons with a disability when adopting measures*» and implementing legislation[27].

The Commission in its Communication «*Building an Inclusive Europe*», invites the Member States to strengthen their commitment and to promote greater solidarity for more inclusive economies and societies, because «*the challenge is not only to provide a better assistance to those excluded (or at risk of exclusion), but also to actively address the structural barriers to social inclusion thus reducing the incidences of social exclusion*»[28].

Therefore, the European Commission acknowledges that persons with disabilities face several obstacles when attempting to enter the labour market, social services and education, as well as significant risks of falling into poverty and social exclusion.

So, the European Union (EU) has recently adopted a number of initiatives to promote social and digital inclusion at the policy and legislative levels[29].

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[27] However, we also have to consider antidiscrimination directives: Directive 2000/43/EC against discrimination on grounds of race and ethnic origin; Directive 2000/78/EC against discrimination at work on grounds of religion or belief, disability, age, or sexual orientation; Directive 2006/54/EC equal treatment for men and women in matters of employment and occupation; Directive 2004/113/ EC equal treatment for men and women in the access to and supply of goods and services.

[28] Communication from the Commission, Building an inclusive Europe, COM (2000) 79 final.

[29] The expression "digital inclusion" combines defining terms such as "digital divide" and "social inclusion", together with the assumptions, ideologies and value systems they carry (in this sense see J. STEYN, G. JOHANSON, *ICTs and sustainable solutions for the digital divide: Theory and Perspectives*, IGI Global, 2011, 45).

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The European Disability Strategy 2010-2020 sought to integrate disability in all areas of EU policy in accordance with the UNCRPD, and it recognised social exclusion as one of the key obstacles facing people with disabilities in Europe[30].

The social participation of people with impairments, such as the blind or deaf, is still threatened by the inaccessibility of the Web and Internet-enabled mobile technology.

In this perspective, particular attention is paid to recent regulatory interventions by the European Union on digital accessibility, including the so-called European Accessibility Act[31] on the accessibility requirements of numerous products and services, currently being implemented by the Member States[32], which completes the so-called Web Accessibility

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[30] See Commission Communication of 15 November 2010-2020 «*European Disability Strategy 2010-2020: A renewed Commitment to a Barrier-Free Europe*», SEC (2010) 1324 final and Communication from the Commission to the European Parliament, The Council, «*the European Economic and Social Committee and the Committee of the Regions. European Disability Strategy 2010-2020: A Renewed Commitment to a Barrier-Free Europe*» SEC (2010) 1223-24, in which the European institutions and the Member States have called upon to work together under this Strategy to build a barrier-free Europe for all.

[31] Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (European Accessibility Act), [2019] OJ L 151, 70 ss. The European disability movement (see the European Disability Forum, 2019, «*European Accessibility Act: A Big Step Forward on a Long Journey*») hailed the Directive as «an important step» that improves the accessibility of these kinds of products and services. For a critique, see D. Ferri, S. Favalli, *Web accessibility for people with disabilities in the European Union. Paving the road to social inclusion*, in *Societies*, 2018, 8, 40 ss.

[32] The deadline for implementing this Directive, which also establishes penalties for non-compliance, is set for June 28, 2022. The EAA will go into effect on June 28, 2025. The European Directive of April 17, 2019, No. 882 on the standards of accessibility of products and services has been applied in Italy by Legislative Decree No. 82 of May 27, 2022, which was published in the Official Journal on July 1 (General Series No. 152). (c.d. European Accessibility Act). In particular, the Legislative Decree provides for a system of supervision of products and services placed on the European market, which attributes powers to the MISE (Ministry of Economic Development), in the case of services, and the Agency for Digital Italy, in the case of products, the latter as Authority for the Supervision of Services. As a result, if the aforementioned Supervisory Authorities find that the product or service does not comply with the requirements, they must demand that the economic operator take corrective action to bring it into

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(Directive 2016/2102) on the accessibility of websites and mobile applications of public bodies[33].

In particular, the aim of the Directive 2016/2102 is to ensure that public bodies websites and mobile applications are accessible to all, particularly to EU citizens who experience different forms of disabilities, by making them «*perceivable, operable, understandable and robust*»[34].

So, all public sector websites and mobile apps must have a web accessibility statement.

In order to ensure that all users have equal access to content and functionality on websites that have been properly built, updated, and modified all public sector websites and mobile applications must comply with a web accessibility declaration.

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compliance within a reasonable amount of time and in a manner that is proportionate to the type of non-conformity found. The Supervisory Authorities may set a reasonable extension period for the removal of the product from the market if the concerned economic operator does not take the necessary corrective action within that time. In the case of services, they may also block the specific service that does not adhere to the accessibility standards and, if necessary, remove the mobile application from the app store, or they may take other appropriate action. Finally, the decree in comment also includes a system of punishments that takes into consideration the degree of non-conformity, the quantity of units of non-conforming goods or services, the number of harmed users, and other factors.

[33] Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies.

[34] AgID has released the Guidelines on the Accessibility of IT Tools, in effect as of 10 January 2020, as part of the implementation of EU Directive 2016/2102, which instructs the Public Administration to provide services that are more accessible. Public Administrations are required to publish the Accessibility Statement, which attests to the level of compliance with the accessibility standards of each website and mobile application. In Italy, finally, Law No. 4 of January 9, 2004, is widely recognised as the reference norm for digital accessibility.

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Therefore, respect for people' basic right to access information is a prerequisite for accessibility.

Instead, the EAA applies to private businesses (or public organizations offering the type of products/services listed)[35] and it is meant, according to the European Commission, to «*improve the functioning of the internal market for accessible products and services, by removing barriers created by divergent rules in Member States*».

The act's goal is to consolidate and standardise accessibility guidelines so that services and goods adopt a «*design for all*» approach[36].

According to the UN Convention of Rights on the Persons of Disabilities, this approach «*means the design of products, environments, programs and services should be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design*».

Therefore, certain services and computer products, such as mobile phones, e-books, electronic ticket offices in stations and airports, banking services, etc., will have to adhere to

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[35] The EU Directive specifically covers public entities and the third-party suppliers they work with. In addition, the EU Directive only applies to websites and applications, instead the EAA covers hardware, software, and the online. In light of this, the European Parliament passed the «Web Accessibility Directive» in an effort to require public sector organisations to include accessibility features for persons with impairments in their websites and mobile applications. So, Public service providers are required by the online accessibility directive to «*take the necessary steps to make websites and mobile apps more accessible by making them perceivable, operable, comprehensible, and resilient*».

[36] In particular, see considerando n. 50, in order to which "accessibility should be achieved by the systematic removal and prevention of barriers, preferably through a universal design or « design for all» approach, which contributes to ensuring access for persons with disabilities on an equal basis with others. According to the UN CRPD, that approach means « the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design». In line with the UN CRPD, «universal design' shall not exclude assistive devices for particular groups of persons with disabilities where this is needed».

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specific requirements laid out in the European directive in order to be accessible to all, ensuring full and effective equal participation of people with disabilities [37].

According to the mentioned European Accessibility Act, mainstream accessible technology must be interoperable with assistive technology.

Companies will now have three years to make their services and products comply with the common EU accessibility requirements, but there are a large number of exceptions, including for contracts concluded before that date and for products that have a long economic life[38].

Compared to the Web accessibility Directive, the compliance of the rules will be monitored by market surveillance of products authorities[39].

In turn, consumers will benefit from a bigger and more inclusive offer at reasonable costs, which will encourage innovation and ensure shared standards throughout the EU internal market.

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[37] To comply with the accessibility requirements, ATMs for example could be equipped with visual and audible signals that indicate where to insert your bank card, or where the cash comes out.

[38] See considerando n. 47, in order to which «the four principles of accessibility of websites and mobile applications, as used in Directive (EU) 2016/2102, are: perceivability, meaning that information and user interface components must be presentable to users in ways they can perceive; operability, meaning that user interface components and navigation must be operable; understandability, meaning that information and the operation of the user interface must be understandable; and robustness, meaning that content must be robust enough to be interpreted reliably by a wide variety of user agents, including assistive technologies. Those principles are also relevant for this Directive».

[39] In Italy, the Ministry of Economic Development serves as an Authority for market surveillance of products, while the Agency for Digital Italy serves as an Authority for service supervision.

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Implementation of the Accessibility Act contributes to the Strategy for the Rights of Persons with Disabilities 2021-2030, which aims to ensure their full participation in society, on an equal basis with others in the EU and beyond[40].

People with disabilities are after all one of the groups that the 2030 Agenda deems deserving of special attention, and the associated Sustainable Development Goals (SDGs) specifically mention people with disabilities, especially in the context of decent work and economic growth[41].

The 2030 Agenda's promise to «*leave no one behind*» aims to accept social diversity and help people in ways that will enable them to take advantage of their chances and realise their full potential.

People with disabilities' autonomy is becoming more and more dependent on digital components, thus it is crucial to take these steps to ensure that all people with disabilities have access to high-quality assistive technologies that are both inexpensive and readily available.

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[40] However, there are a few crucial details surrounding the Directive that should be noted. First off, the range of the offered services and goods is quite constrained. In addiction, for the products and services covered by the Directive, some exemptions are also allowed. For instance, a service is excluded from the Directive's criteria if it is connected to urban, suburban, or regional transportation or is offered by a small firm. Additional exemptions may be granted under certain circumstances, such as when a product or service undergoes a fundamental change or when an economic operator is subject to an excessive burden. Finally, the Member States' transposition period is lengthy, and the implementation duration for some products and services is unduly protracted.

[41] See the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development, which the EU is dedicated to putting into practise. In this sense, the European Parliament, with the Resolution 7.10.2021 on the protection of persons with disabilities, underlines the need to concretely implement the UN Convention and guarantee effective social inclusion, to get closer to the sustainable Development Goals.

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4. THE ROLE PLAYED BY PRIVATE ACTORS IN THE ADOPTION OF INNOVATIVE TECHNOLOGIES

Before concluding, it is important to revisit regulation and policy making by situating these concepts in a larger context.

Digital technologies have acquired a primary role in individual and community life, turning the physical world into a «*global village*»[42] where we all seem to be connected as an online community as information travels to the farthest reaches of the planet with the click of a mouse[43].

However, it is crucial to maintain accessibility and give individuals with disabilities access to the most appropriate assistive technology they require in order to participate in all facets of social life.

Giving everyone the same possibilities via participation, engagement, and communication is the challenge of inclusion.

Big tech companies like Apple, Google, Facebook and Microsoft have used breakthroughs in speech recognition, computer vision and artificial intelligence to give guidance to help individuals with disabilities during the past few years.

In addition, new technology like voice-activated devices and more captioning on websites and social media have made some online services more accessible to all users.

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[42] C. DALGLISH, *From globalization to the 'global village'*, in *Global Change, Peace & Security*, 2006, 2, 115-121.

[43] Given how it may change individuals and create an isolating bubble, digital technology is frequently viewed in this context with a great lot of suspicion.

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More than any other group of people, those with severe sensory impairments including physical disabilities, vision impairments, or hearing have profited from advancements in assistive technologies (such as speech-to-text, screen readers, portable notetaking devices, communication devices, etc.).

The basic goal of assistive technology is to maintain or improve a person's independence and functioning in order to promote participation and general well-being.

Despite the benefits of information and communication technology (ICT) for people with disabilities being acknowledged, emerging technologies' opportunities have frequently been underutilised for a variety of reasons related to stakeholders, funding, social and educational services, and other factors.

Making it possible for people with disabilities to participate fully and effectively in political and decision-making processes is a first step toward development that is disability inclusive.

Emerging technologies like artificial intelligence (AI), robots, 3D scanning, and printing are bringing about new accessible and beneficial solutions for people with impairments; as a result, it is crucial that these barriers can be removed through a better understanding of these people's needs and by learning more about how various technologies can aid them.

True co-design is required, in which individuals with disabilities are included on the design team and throughout the design process. Through digital diaries or in-person interview the process can highlight important needs, in order to ensure that persons with disabilities benefit from an EU-wide single market for Assistive Technologies, so they can select the

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most suitable technology for them, and that these technologies are of quality, available, and affordable to all persons with disabilities[44].

Companies may achieve far more success in these endeavours, whether they are embarking on a full digital transformation or creating new goods and services, when they incorporate the needs and viewpoints of persons with disabilities into original planning and objectives.

Additionally, technological advancements may really boost everyone's productivity, career options, and leisure opportunities. From this point of view, it will be intriguing to see how businesses will react to stricter accessibility laws.

After all, it is crucial that the laws in this area be upheld and that the organisations they affect have good opportunity to get ready for the shift to greater inclusiveness.

The digital revolution is bringing about one of the biggest changes to the globe since the time of the industrial revolution, and the European Union is fully aware that our society has to be ready for new technology to permeate our lives at an ever-increasing rate.

The next goals of the European institutions will be to create a fair understanding of the potential and advantages of digital technologies with a strong social focus, which is regarded as paying attention to shared European values, protecting human rights, or taking ethical issues into account.

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[44] In this sense, see L. NIERLING, M. MAIA, L. HENNEN, G. WOLBRING, T. BRATAN, P. KUKK, J. CAS, L. CAPARI, J. KRIEGER-LAMINA, E. MORDINI, *Assistive technologies for people with disabilities* - Part II: *Current and emerging technologies*, European Parliamentary Research Service Scientific Foresight Unit (STOA), 2018.

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In this light, it would be crucial for the European Union to encourage Member States to pay much more attention to the social aspects of disability, and producers and businesses to involve disabled people more closely in product design, because this same attitude would promote inclusion and equity as well as innovation, confirming the idea of innovation, and the benefit resulting from it, as a sovra – individual interest[45].

5. CONCLUDING REMARKS

As was seen in the paragraphs above, emerging technologies can improve access to public services, government, healthcare, education and job development. Because technology is frequently inaccessible and not everyone can enjoy the same rights, new technologies can also widen inequities and strengthen the social vulnerability trap.

To ensure that persons with disabilities may participate in many facets of social life, it is crucial to maintain accessibility and offer the most advanced assistive technologies. Experience has taught us that without active action, technology accessibility cannot be ensured.

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[45] On this theme, see D. LINDERS, *From e-government to we-government: Defining a typology for citizen coproduction in the age of social media*, in *Government information Quarterly*, 2012, 4, 446-454; T. NAM, *Suggesting frameworks of citizen-sourcing via Government 2.0,* in ID.,2012, 1, 12-20; S. MARTIN, *Engaging with citizens and other stakeholders, Public management and governance*, in T. BOVAIRD, E. LOFFLER (eds), London, 2009, 279. On the principle of subsidiarity, see G.C. SALERNO, *Servizi di interesse generale e sussidiarietà orizzontale fra ordinamento costituzionale e ordinamento dell'Unione europea*, Torino, 2010; F. GIGLIONI, *Il principio di sussidiarieta orizzontale nel diritto amministrativo e la sua applicazione*, in *Foro amm CdS*, 2009, 2909; L. GRIMALDI, *Il principio di sussidiarietà orizzontale tra ordinamento comunitario e ordinamento nazionale*, Bari, 2006; V. CERULLI IRELLI, voce «*Sussidiarietà (dir. amm.)*», in *Enc. giur*, XII, Roma, 2003, 95 ss.

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According to the principles of the free market, goods are typically targeted at the d emographic of consumers who meet the criteria for being *«able-bodied»*[46].

Therefore, users with specific needs must adapt to technology rather than expecting technology to fulfill all of their requirements.

When used wisely, technology has the power to lower barriers and vastly increase the likelihood that individuals with disabilities can succeed and have independent, fruitful li ves.

This commitment requires the development of specific policies inspired by a strong sense of social responsibility towards those who, now weaker, can become stronger through technology.

In this task, an important role should be played by Public Powers: Governments can reduce inequality using a variety of tools, such as regulations, economic and fiscal tools, as well as improved trade, investment, industry, education and innovation policies.

Therefore, there is much discussion about emerging technologies and digital inclusion in both public and political agendas all around the world.

It should be emphasized, nevertheless, that public policies and regulation play a crucial role in removing actual barriers to innovation, fostering consumer confidence and risk management skills, and it can also, in some situations, act as a potent stimulant for innovation.

But sometimes the time of the rules and the time of the innovation are completely different.

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[46] T. NAM, *Suggesting frameworks of citizen-sourcing via Government* 2.0, cit. 12.

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Emerging technologies are developing at an ever accelerating pace, whereas legal mechanisms for potential oversight are, if anything, slowing down.

In some instances, the slow development of new laws or the modification of current laws in reaction to scientific discoveries or advancements might obstruct research and innovation and inhibit the development of new technologies.

Other times, the result of this expanding discrepancy between the pace of technology and law is an increase of obsolete and ineffective structures and processes to control emergent technologies.

This approach has often translated into "*a cat and mouse game*" between public policies and regulators (on the one hand) and economic actors (on the other): the increasing use of technology in recent years has therefore added complexities and posed challenges for regulators and supervisors across the globe[47].

To guarantee models adhere to evolving and new regulations, continuous monitoring of new regulations and quick development processes are required.

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[47] In order to take account of this changing quality of the subject matter to be regulated and to maintain the regulation linked to a dynamic reality, regulatory authorities, use several techniques: hard law, soft law, various recommendations. In this perspective, see, in general, M. RAMAJOLI, *Soft Law e ordinamento amministrativo*, in *Diritto Amministrativo*, 2017, 1, 147-162 and, with particular reference to new technologies, see, B. MARCHETTI, *Amministrazione digitale,* in *Enciclopedia del Diritto*: *I tematici*, 3, "*Funzioni amministrative*", Milano, 2022, 75 ss.; R. CAVALLO PERIN, D.U. GALETTA (eds.), *Il diritto dell'amministrazione pubblica digitale*, cit.; G. AVANZINI, *Decisioni amministrative e algoritmi informativi. Predeterminazione analisi predittiva e nuove forme di intelligibilità*, Napoli, 2019; M. KRYGIER, *The rule of law: Teleology, Sociology*, in G. PALOMBELLA, N. WALKER (eds.), *Relocating the rule of Law* (Hart 2009), 45; A.G. FERGUSON, *The rise of big data: Surveillance, Race and the Future of Law Enforcement*, New York University Press, 2017; A.J. COCKFIELD, *Towards a Law and Technology Theory*, Manitoba Law Journal, 2004, 383-415.

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Successful strategies and policies need to be built on strong policy frameworks, bringing together concepts and visions that connect different elements and provide a means to understand often complex interventions.

According to this viewpoint, the public sector may contribute significantly to the growth of an information society that is truly open to everyone, motivated by the desire to meet the requirements of each individual, with the help of the private sector and the constituents of civil society.

After all, new assistive technology can truly make a difference for persons with disabilities. Every aspect of social life has been impacted by the digital revolution, which has also significantly altered the way that laws are written. In order to maintain their efficacy and social value, laws must inevitably adapt to these changes.

The only way to accomplish the goals of the 2030 Agenda is through concerted action at the state and EU levels. The definition and implementation of disability policies and programmes that take into account the suggestions made by the European Parliament will fall to member states, regional governments, and local governments. The EU will thereafter need to assume a significant supporting and continuing monitoring role.

At the internal level, the Italian government has decided to invest a significant amount (5-6 billion euros) of the so-called PNRR (National Resistance and Resilience Plan) in ICT, and this represents a significant opportunity for digital inclusion.

In conclusion, even if the future may be bright, if we want to foster an equitable environment for all, we must start now making the proper moves in the direction of a more inclusive society.

This could be achieved through the adoption of progressive legislation and the definition of standards that facilitate communication between producers, consumers with disabilities and public actors, thus activating a virtuous circle that can promote social inclusion.

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Abstract. *The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) pledge to leave no one behind and recognize disability as an issue that cuts across all SDGs. The contribution aims to analyse the role played by public and private actors to reduce social exclusion and marginalisation, focusing on the issue of digital divide and implementation of assistive technologies.*

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