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(Trabajos correspondientes al XIX Acto Internacional de Barcelona)

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AI AND HARMONIC INNOVATION: NEW IDEAS FOR FIRM GROWTH

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1. Introduction

The level of innovation within a country plays a pivotal role in shaping the AI capabilities of its businesses. Firms in highly innovative nations are often at the forefront of AI adoption and application, benefiting from the advanced infrastructure, technological resources, and deep expertise characteristic of these environments. Such settings provide companies with the support needed to engage robustly in AI research and development, fostering more effective and innovative use of these technologies. Yet, it is not solely the technical advantages that drive success; a harmonious approach to innovation, which balances technological progress with social responsibility and inclusivity, is essential to generating sustainable growth and shared value. Harmonic Innovation represents a development model that promotes the balanced adoption of technology, where AI and other advanced technologies are not just tools for productivity and efficiency but also catalysts for responsible and inclusive growth. This approach fosters an ecosystem in which companies can excel, while simultaneously supporting a cohesive society where technological progress goes hand in hand with social inclusion and environmental sustainability. Economies that embrace Harmonic Innovation encourage a favorable environment for entrepreneurship and the growth of start-ups—often at the forefront of AI adoption—creating a

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dynamic cycle where leading firms attract highly skilled talent and investment, inspiring others to follow and supporting an ecosystem of mutual growth. An essential element of cultivating a harmonic innovation ecosystem is ensuring that technological progress benefits society as a whole rather than creating divides. In this context, AI and other advanced technologies serve as tools for improving quality of life, promoting economic stability, and reducing inequality, while fostering sustainable, long-term growth by aligning economic goals with societal well-being. To strengthen the link between artificial intelligence and harmonic innovation, the European Union launched the *Digital Europe* program, a central element of the Commission's strategy to address digital transformation. This initiative, part of the Multiannual Financial Framework (MFF) for 2021-2027, aims to establish a funding mechanism tailored to the operational needs required to reinforce core AI capabilities. These include accessible data resources, algorithm repositories, and interoperability solutions, ensuring essential capabilities for the digital economy, society, and democracy across the EU. Among its goals, the program seeks to enhance competitiveness in AI and cybersecurity, broaden the use of digital tools—particularly high-performance computing, AI, and cybersecurity—across sectors, and create an inclusive, collaborative digital environment. By investing in open and accessible data and enhancing cross-sector collaboration, Digital Europe lays the groundwork for a synergistic relationship between AI development and harmonic innovation, supporting a more balanced and inclusive technological transformation that aligns technological progress with societal well-being.

2. Background

The interplay between innovation and artificial intelligence (AI) has emerged as a pivotal research area in recent years. The rapid development of AI technologies is not only redefining how we perceive innovation but also reshaping the factors that drive growth in this area. According to the World Economic Forum, there is strong evidence indicating a high correlation between a company's AI capabilities and its innovative potential. Companies adopting AI report enhanced efficiency, cost reductions, and improved product quality, effects that can spur innovation across sectors and contribute to

economic growth (World Economic Forum, 2020). Likewise, the McKinsey Global Institute reports that AI holds immense economic potential, promising productivity gains and value creation across diverse industries. However, this report also underscores the need for effective regulation to encourage responsible AI use and mitigate potential risks (McKinsey, 2020). Academic discussions on AI's role in innovation are increasingly focusing on *Harmonic Innovation*, a concept that emphasizes a balanced approach to technological growth. Harmonic Innovation seeks to ensure that advancements like AI benefit society as a whole, fostering inclusive, sustainable progress. As highlighted by Accenture (2020), building a corporate culture conducive to responsible experimentation and inclusive innovation is crucial for leveraging AI's full potential. In their systematic review, Mariani et al. (2023) explore the intricate relationship between AI and innovation, proposing a framework to understand the causes and effects of AI-driven innovation. Haefter et al. (2021) delve into how AI reshapes organizational structures and innovation management, suggesting that the rapid evolution of AI demands adaptability and ethical frameworks to guide inclusive, sustainable growth. Verganti et al. (2020) present a framework that redefines AI's role in creative problem-solving, positioning human-centered activities such as sensemaking—interpreting and addressing complex social needs—as increasingly central to innovation. Exploring AI's broader impact, May et al. conduct a case study on a well-funded AI company specializing in medical imaging, identifying four key challenges linked to AI and the ways they can be managed, including public expectation management, integration of domain expertise, and balancing user perceptions. Buhbmann et al. (2021) advocate for a deliberative approach, proposing a framework for responsible AI innovation that emphasizes the need for public discourse and cooperative governance among organizations, civil society, and media in establishing ethical standards for AI development. Brem et al. (2021) highlight AI's dual role as both an originator and facilitator of innovation, enabling disruptive models while also supporting existing advancements by enhancing their scalability and inclusivity. This dual role aligns with Harmonic Innovation principles, promoting equitable distribution of AI's benefits and fostering inclusivity within its transformative potential. Wang et al. (2022) demonstrate how AI's evolution promotes new models of collaboration, advancing busi-

ness innovation strategies and supporting a more inclusive digital transformation. Their findings suggest that AI-driven digital transformation not only fuels business growth but also supports collaborative approaches that prioritize social welfare. As these developments illustrate, the concept of Harmonic Innovation is increasingly relevant. Research by Marino, Cicione, and Filice (2022) explain the notion of Harmonic Innovation, advocating for AI's integration with societal and ethical imperatives. They emphasize that sustainable, inclusive growth can only be achieved by moving beyond short-term gains and incorporating AI within frameworks that promote balanced development. Their work underlines the importance of models that encourage companies to align economic performance with social responsibilities, positioning AI as a tool for addressing social inequalities and advancing sustainable economic growth. The point we want to start from, however, is to consider harmonic innovation, i.e. innovation that is born and develops if all the agents involved interact positively with each other and with the external environment. Businesses, territories and institutions thus become pieces of a larger puzzle that can only grow if all the actors cooperate and contribute to collective growth. 'Innovation, in the broadest sense, can be identified as the most powerful agent of change in the history of mankind, intimately linked to the concept of progress, which is oriented and shaped by innovation itself [...] It is not a question of reasoning about the many innovations, the many actions, the many possible interventions: it would risk being a weak exercise if it lacked solid foundations. Rather, it is a matter of stopping to reflect on the very concept of innovation, refunding its foundations. This effort takes on a precise formula: the *Harmonic Innovation* paradigm, i.e. the circular innovation that pursues the '*right relationship*' and knows how to combine contrasting elements and tones in a logic of consonance' (Cicione, De Biase, 2021).

The current body of research underscores that while AI is a transformative force in innovation, it calls for a harmonized approach to ensure that advancements align with societal well-being, economic resilience, and sustainable development. This balanced interaction between technological advancement and social impact fosters a virtuous cycle in which AI and innovation fuel progress that is both ethical and inclusive

3. Definition of Harmonic Innovation

Harmonic Innovation is based on a holistic view of progress. It sees technology as a tool for the improvement of the human condition, which must be integrated with ethical and environmental values. In contrast to traditional innovation, which can be characterized by market-oriented competition and closure into specialized domains, Harmonic Innovation promotes an inclusive approach oriented towards the common good.

Ethics: Ethics is at the heart of Harmonic Innovation. It guides technological choices towards goals that benefit the entire community and respect the dignity of the individual. Innovations must be morally sustainable, reflecting values such as respect for the environment and social solidarity.

Intelligence: Intelligence in innovation is not limited to technological effectiveness but expands to human utility. Any technology must be accessible and safe, responding to society's needs and aspirations without creating new forms of dependency or vulnerability.

Generativity: Harmonic Innovation encourages creativity and authenticity, creating a space where ideas can grow and multiply. This fosters an environment where innovation is open to multidisciplinary contributions and evolves continuously, like a living organism.

Pervasiveness: Harmonic Innovation crosses disciplinary boundaries, promoting a multidisciplinary perspective. This approach integrates different competences and offers solutions to complex challenges, taking into account social, economic and environmental variables.

Sustainability: Sustainability is a key component of Harmonic Innovation. Every innovation must respect the environment and contribute to a balance that ensures a loveable future. Technology must be conceived not as an end in itself, but as a means to preserve and improve the well-being of the planet.

Harmonic Innovation is strongly influenced by philosophical thinking and the concept of meaning. Many philosophers have explored the relationship between man and technology, proposing a vision in which progress is not an end in itself but a path towards understanding our place in the universe. Kant, with his 'kingdom of ends,' reminds us that human dignity must be preserved even in the context of technical progress. Pascal's philosophy introduces the idea of a 'secret presence' that gives meaning to events, while Heidegger emphasizes the need for critical thinking that can confront the radical changes imposed by technology. The concept of the 'ontology of progress' is crucial for Harmonic Innovation, which interprets progress as a process of self-knowledge. This process is linked to an ongoing tension between kairos (opportune moment) and chronos (linear time), reflecting the need to integrate temporality with wisdom and meaning. Harmonic Innovation thus proposes a model of innovation in which ethics, philosophy and science coexist in an interdisciplinary dialogue that enriches the understanding of the world and technology. Sustainability is one of the main goals of Harmonic Innovation, which aims to respond to environmental and social challenges through a balanced development model. Documents such as the UN 2030 Agenda, the European Green New Deal and the Encyclical *Laudato si* 'outline a sustainable development path that considers the protection of the planet and natural resources as a priority. Harmonic Innovation aligns with these principles, promoting responsible resource use and waste reduction. In particular, the sustainable approach of Harmonic Innovation aims to create circular solutions, where materials and resources are reused to minimize environmental impact. This concept is essential for tackling global problems such as climate change, pollution and biodiversity loss. Furthermore, Harmonic Innovation promotes an inclusive vision of sustainability, which also considers social welfare. This includes reducing inequalities, respecting human rights and promoting a culture of peace. Harmonic Innovation is committed to creating an equitable and just society, where technological progress serves the global community.

4. Artificial Intelligence and Harmonic Innovation

4.1. The role of AI in enhancing Harmonic Innovation

Artificial Intelligence (AI) represents one of the most important and complex technological developments of our time, with potential ranging from industrial efficiency to social transformation. However, the adoption and management of AI raises issues that are not only technical, but touch on ethical, social and cultural dimensions. Harmonic Innovation applied to AI can help integrate these technologies within a framework of values oriented towards the common good, offering a perspective that emphasizes sustainability, ethics and respect for human dignity. AI can be both an accelerator and a stabilizing factor for Harmonic Innovation. On the one hand, it enables companies to develop new solutions and approaches, improving productivity and product quality; on the other hand, AI, if used responsibly, can become a tool to address global challenges such as environmental sustainability, inequality reduction and social inclusion. Indeed, its ability to process large amounts of data and identify complex patterns can be applied in areas such as environmental monitoring, energy efficiency and resource optimization, with a direct impact on the sustainability of the planet. In order to achieve these goals, Harmonic Innovation applied to AI should promote an ethical and transparent use of technology that focuses on the dignity of the individual and the good of the community. In this context, one of the key aspects is the accessibility of the benefits of AI: advanced technologies should not be the preserve of a few large companies or developed countries, but should be made available to all economic, social and cultural realities. The integration of AI within the Harmonic Innovation paradigm entails several challenges. First, the technical complexity and breadth of the AI domain make it difficult for companies, especially small and medium-sized enterprises (SMEs), to adopt advanced solutions without significant availability of resources and expertise. It is therefore crucial that policies exist to support the adoption of AI, such as incentives for the training of specialized personnel and the acquisition of appropriate technological infrastructure. Another challenge is the need to ensure that the use of AI complies

with ethical principles and does not compromise people's rights. Some algorithms can introduce or amplify pre-existing biases, discriminating against groups of individuals and perpetuating inequalities. Therefore, Harmonic Innovation requires AI to be designed and developed in a way that minimizes such risks, adopting an approach based on transparency and accountability. In this context, the concept of *Explainable AI* (XAI) becomes crucial, as it allows users to understand how an algorithm arrives at certain conclusions or decisions, helping to reduce the opacity that often characterizes AI systems. AI has the potential to revolutionize the sustainability sector in a harmonious way, offering tools that can improve energy efficiency, reduce waste and optimize the use of resources. For example, smart grids and energy management systems can use AI algorithms to predict peak demand and distribute energy more efficiently, reducing emissions and improving infrastructure reliability. In agriculture, AI can help monitor and optimize the use of water, fertilizers and pesticides, helping to reduce environmental impact and ensure sustainable food production. Similarly, in the manufacturing industry, AI can optimize production processes to reduce waste and promote circular economy practices, e.g. by identifying opportunities to reuse materials and minimize waste. The role of AI in sustainability is not limited to resource management, but also extends to the ability to monitor and predict complex environmental phenomena, such as climate change. Advanced AI models can analyses huge amounts of environmental data to predict events such as floods, helping communities and governments to better prepare for natural disasters and mitigate associated risks.

4.2. Public policy and regulation: a harmonized approach to AI

The harmonious adoption of AI requires a regulatory framework that balances support for innovation with protection of individual and collective rights. Public policies play a crucial role in creating an environment conducive to Harmonic Innovation by providing incentives for companies that adopt ethical and sustainable practices and by promoting the creation of digi-

tal infrastructures that facilitate access to AI. The European Union, through programs such as *Digital Europe*, has embarked on a path towards AI regulation that aims to protect the EU's core values and ensure that AI is used ethically. The program includes measures to improve the transparency and accessibility of AI, encouraging companies to use open data and to respect the principles of privacy and data security. A central element of *Digital Europe* is also the promotion of cybersecurity, which is a key challenge in the AI era. AI technologies can be vulnerable to attack and manipulation, with potentially devastating consequences for critical infrastructure and national security. Harmonic innovation in this field requires cybersecurity to be integrated from the earliest stages of AI systems development, with the aim of protecting data and people without limiting the innovative potential of the technology. Harmonic Innovation applied to AI must promote social responsibility that aims to ensure the inclusion and participation of all citizens, regardless of their economic or social background. This requires that AI is not only used to improve corporate profits, but also to respond to pressing social problems, such as unemployment, access to education and healthcare. For example, AI can be used to improve education systems by offering customized learning tools that meet the specific needs of each individual. Similarly, in healthcare, AI can support more accurate diagnoses and personalized treatments, helping to reduce inequalities in access to care and improving people's quality of life. An inclusive and participatory AI model must also consider the impact on the labour market. Although AI can automate many tasks, reducing costs and increasing productivity, it is important that companies take steps to retrain workers and promote new skills. This approach requires collaboration between companies, governments and educational institutions to ensure that the transition to an AI-based economy is managed fairly and sustainably. Integrating AI into Harmonic Innovation is not only about technology, but also involves creating a culture that promotes values such as collaboration, inclusion and responsibility. Companies must be aware of the social and ethical impact of their technology choices and act accordingly. A harmonious corporate culture must encourage the responsible use of AI and the participation of employees and stakeholders in strategic deci-

sions. In this context, leadership assumes a key role. Corporate leaders must promote an ethical and sustainable vision of AI by investing in training and raising employee awareness on digital ethics and sustainability. The creation of interdisciplinary teams.

5. Conclusions and Future Perspectives

Harmonic Innovation represents a new and important paradigm for innovation, merging humanistic and scientific values in a coherent and sustainable vision of progress, aiming for a balance between technological progress and social welfare. This approach is not limited to creating new technologies, but aims to shape a future in which innovations are ethical, inclusive and environmentally friendly, ensuring that progress is sustainable and shared. This model of innovation promotes the development of technologies that genuinely serve people and the planet, fostering a type of growth that takes into account the needs of present and future generations. Among the goals of Harmonic Innovation is to build a society in which technology contributes to improving the quality of life and solving global problems, such as climate change, resource scarcity, and social and economic inequalities. Future perspectives for Harmonic Innovation highlight a growing interest in ethical and sustainable innovations, and an increasing commitment to strengthening collaboration between different sectors, such as technology, economics, environment, and social sciences. This approach also promotes a more inclusive global dialogue on the role of technology, encouraging public policies that support responsible innovations and regulations that protect human rights and the environment. Despite significant challenges in its implementation, such as the need to move beyond immediate commercial interests and invest in solutions that have a long-term impact, Harmonic Innovation offers a positive and constructive vision for the future. It represents a framework that can guide mankind towards a more balanced and respectful coexistence with the environment, with an emphasis on international cooperation to address global challenges and responsible use of resources.

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