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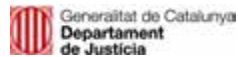
**LA HUELLA DE LA INTELIGENCIA ARTIFICIAL
EN LA ECONOMIA HUMANISTA**

**SOLEMNE ACTO ACADÉMICO CONJUNTO
ENTRE LA UNIVERSIDAD MEDITERRÁNEA DE
REGGIO CALABRIA Y LA REAL ACADEMIA
DE CIENCIAS ECONÓMICAS Y FINANCIERAS
DE ESPAÑA**

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LA HUELLA DE LA INTELIGENCIA ARTIFICIAL
EN LA ECONOMÍA HUMANISTA
(Solemne Acto Académico Conjunto entre
la Universidad Mediterránea de Reggio Calabria y la
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HUMAN AND NON-HUMAN AGENTS IN THE MARKET: DISTORTION, COMPETITION AND IMPLICATIONS FOR LIBERAL MARKET ORDER

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1. Introduction

Isaac Asimov's Three Laws of Robotics articulate an essential ethical framework guiding human-robot relations, which prioritize human safety above all. These laws, which prioritize non-harm, obedience, and the robot's self-preservation in hierarchical order, seem simple but pose real-world implementation challenges due to their anthropomorphic assumptions and the complexities of interpreting concepts like harm and obedience in diverse scenarios. Reevaluating Asimov's notions to consider robots as entities with a "nonhuman personality" surfaces profound ethical, moral, and legal questions. Philosophically, this prompts a reassessment of our duties towards both biological beings and technological constructs, advocating for a recognition of rights based on intrinsic value akin to the tenets of deep environmentalism. Legally, the concept of granting rights to nonhuman entities is gaining ground, demonstrated by New Zealand's acknowledgment of the Whanganau River as a legal person and the EU's exploration of an "electronic personality" for advanced AI systems. Such legal precedents suggest expanding rights and responsibilities beyond human entities, offering a framework for the legal recognition of AI.

These innovations provoke essential debates on balancing the rights of human and nonhuman entities and establishing accountability for autonomous non-biological agents. As our technological landscape evolves, our ethical and legal frameworks must also progress to incorporate and regulate these new

¹ Member of Barcelona Economics Network

forms of intelligence and life, ensuring they enhance societal welfare while respecting diverse existences. The question that arises, then, is whether non-human persons can be considered agents. To answer this question, a differentiation must be made between the concept of agent in ethical terms (moral agent) or in economic terms (economic agent). From an ethical point of view, an agent is generally regarded as an entity that can act morally, i.e., make decisions based on moral values. Morally responsible agents have the ability to distinguish between right and wrong and are responsible for their actions. Martins Marthinho et al. (2021) conduct an interesting survey on the concept and critical issues of artificial moral agents. In this context, ethics is often concerned with determining which actions are right or wrong and how the agent should behave. In economics, on the other hand, the term ‘agent’ often refers to an entity that makes decisions, such as an individual, a company or a government. In the context of game theory, agents are the parties that make decisions in a game. These decisions often concern how to maximise their own benefit or utility. The concept of ‘rationality’ is frequently discussed in economics: agents are assumed to act rationally, seeking to maximise their utility or profit given the set of information available to them.

If we find ourselves discussing nonhuman persons, limited to animals or the spirit of places, it is clear that this distinction makes no sense because a nonhuman person belonging to these types may at most be the holder of a set of rights but has no possibility of acting either as an economic agent or even less as a moral agent. If, however, we broaden the field to include digital nonhuman persons and artificial intelligences, it remains true and peaceful, at least thus far, that these subjects cannot be defined as agents in the moral sense (Brozek et al., 2019), but at the same time, they can certainly act as economic agents. This difference may seem subtle, but it is relevant because, for instance, nonhuman persons cannot be held guilty of any crimes they may have committed because it is in no way possible to identify the subjective element in their actions in relation to the crime committed. Therefore, should their social dangerousness be proven, they could be deactivated on the basis of a principle similar to the one whereby it appears lawful to suppress certain animals if their behavior is of serious harm to the community. The suppres-

sion of a dangerous animal or a humanoid robot that causes problems for the community is not so much framed as a form of punishment or punishment but simply as a form of protection of human life and wellbeing. However, at the same time, the gulf between moral and economic action that can be found in digital nonhumans opens up new horizons because as they can legitimately and fully be considered economic agents, they can not only be holders of rights and protections, but in the final analysis, they can be allowed to manage assets and thus actively operate in markets just like human economic agents and thus be civilly liable for the damage they cause with the use of their assets. They can thus be holders of property rights and can be subject to property liability towards other economic agents. This presents economics and business ethics with new problems and challenges. As long as the concept of the non-human person is limited to animals or, at most, to natural entities, the problems that arise are all in all insignificant, remaining confined to the sphere of compensation for damage that can always be placed in the hands of those with a duty of care or to a balancing of interests in which, however, the interests of the human person always have a greater degree of protection. In general, if the concept of the nonhuman person remains limited to animate beings, no conflicts arise that would call into question our traditional liberal model of the market economy (Teubner, G., 2006). Expanding the concept to digital nonhuman persons introduces a myriad of complications within the sphere of market liberalism, sparking complex debates about the characterization of economic agents and the applicability of free market principles to non-human entities. Within this doctrine, which champions economic freedom, private property rights, and minimal government interference, the inclusion of ‘nonhuman persons’ as economic actors brings forth a slew of issues and nuanced considerations. Specifically, when human individuals have established property rights and the capability to form binding contracts, complexities arise in how to orchestrate interactions and uphold agreements involving entities that may lack awareness or volition. Further complexities emerge considering that in a free market, individuals are typically held accountable for their business dealings and legal commitments. The challenge then becomes how to attribute and enforce similar responsibilities onto entities that inherently lack human faculties like conscience or intention. Extending legal responsibility to nonhuman

entities would mean considering how to attribute responsibility and possible sanction to entities that may not have the capacity to understand the consequences of their actions. Another aspect concerns the relationship between competition and competition. In markets, different agents (households, firms, state) compete with each other to maximise the results of their objectives. If nonhuman agents were to enter the economic arena within markets, one would have to reflect not only on the conditions necessary to maintain perfect competition but also on the fairness and regularity of the competition mechanism itself in the presence of actors that might have very different characteristics and resources. The introduction of nonhuman interacting agents into the economic system could also affect the distribution of resources and wealth, with possible effects on economic inequality. This would require reflection on how to balance the interests of these entities with those of people, especially in resource-constrained scenarios. Finally, considering the presence of nonhuman agents in the market should lead to a greater need for regulation and more public intervention to ensure the proper functioning of the market and protect the interests of all stakeholders. After these introductory considerations, the paper will develop with a survey on the relationship between artificial intelligence and business ethics. In section 3 the new market scenarios with competing human agents and digital agents will be discussed, and in section 4 one will try to understand how these aspects can be compatible with our liberal market order. Concluding remarks will point out the many open problems that digital nonhumans pose to society, also suggesting regulatory policies.

2. Artificial Intelligence, Market Competition and Liberal Market Order Implications

The issue that arises forcefully at this point in terms of business ethics is that of the compatibility of artificial intelligence with our liberal market order, and that is the question of whether, in light of potential existential risk, the forms that AI are developed in our liberal market order are challenging. Is competition, for instance, diminishing AI safety? Or to the contrary, does

open competition uncover mistakes? In a market economy characterised by liberalism and competition, the accelerated development of AI technologies can lead to considerable social and economic impacts. For example, AI-based automation could lead to massive and rapid job losses, creating economic and social inequalities. Moreover, the rise of AI could amplify the concentration of power in the hands of a few large companies, undermining competition and the free market principle. Another critical aspect is related to potential existential risks. Technological progress in AI could lead to the development of highly intelligent autonomous systems that could exceed human capabilities in unpredictable ways. This raises questions about the ability to control and manage such systems, which could evolve beyond our understanding and control. The regulation of AI in a free market context is a complex challenge. On the one hand, innovation and competition are key drivers of the liberal market order, but on the other hand, it is necessary to balance these drives with the need to ensure the security, ethics and risk management associated with advanced AI.

Since AIs can make economic decisions that impact the market and society, determining who is responsible for these decisions and their consequences can become a complex issue. Another major problem concerns bias and discrimination. AIs learn from the data they are trained with, and if these data contain biases or inequalities, the decisions made by AIs may reflect them. This can lead to discriminatory or unfair decisions that affect market fairness and effectiveness. A crucial aspect is also the impact on employment. Advanced AI could automate many work tasks, leading to the replacement of human workers. The supervisor of workers could be a nonhuman person. This raises questions about unemployment, the need for new skills and how to ensure a transition of workers' rights in this new scenario. The concentration of power represents another challenge. Large companies and institutions with resources to develop sophisticated AI could gain a significant competitive advantage, contributing to a greater concentration of economic power and influencing the interplay of market dynamics. In addition, AI could be used to manipulate financial markets, e.g., through high-frequency trading, lead-

ing to unwanted fluctuations or economic instability. The complexity of algorithms and decisions made by AIs could lead to opacity, creating distrust in the market. Social and economic inequality is a further problem. If AIs lead to productivity and profit gains, they could also exacerbate preexisting economic disparities if appropriate measures are not taken to manage them. Issues of surveillance and privacy are also pressing. The widespread use of AI in the economy could lead to increased collection of personal data, raising concerns about data protection and violation of individuals' privacy. Finally, decisions made by AI could conflict with ethical and human values. Determining which values to follow and how to incorporate them into the actions of AIs represents a fundamental ethical challenge. Regulating a business environment in which human and nonhuman agents, such as artificial intelligence (AI), interact requires a multifaceted approach that addresses unique challenges within a new scenario. Addressing this novelty requires a number of key considerations. First, it is crucial to establish mechanisms to ensure the transparency of decisions made by AIs. This implies that the reasons behind AI choices must be understandable to human agents, allowing for a greater understanding of the impact of AI on the business environment. The issue of legal responsibility is crucial. Regulation should define who is held responsible for the decisions of AIs and their consequences. This can include the developers of AIs and those who use them, establishing a well-defined accountability framework. Verification and certification of AIs could be introduced to ensure that only reliable and well-designed AIs participate in the market. These verification processes could include performance and compliance testing, helping to mitigate the risk of using faulty AIs. Bias prevention in AI is another critical aspect. The adoption of techniques that minimise bias and discrimination in AI decisions should be encouraged, promoting fairness and justice. Continuous monitoring of the interaction between human and nonhuman agents is essential to identify emerging problems at an early stage. Ensuring adequate training and awareness-raising of human agents is equally important. Users of AIs should be trained to understand the capabilities and limitations of AIs, ensuring responsible use. Finally, cooperation between researchers can ensure a uniform and cohesive approach in addressing issues related to human and nonhuman economic agents. To manage an economic environment in which

both human agents and artificial intelligence (AI) interact, different strategies and regulatory tools can be adopted. Therefore, there is a need to address the unique challenges of this complex coexistence and ensure a balance between technological innovation and social welfare. Developing specific laws and regulations that address the key issues related to AI and human agents in the economic environment is crucial. These regulations should start with topics such as accountability of AI decisions, fairness, transparency and other critical issues, and dedicated regulatory agencies could be established to ensure compliance. These agencies would be responsible for oversight and enforcement of regulations, with the objective of monitoring the activities of AIs and mitigating potential risks. One option is to introduce certification programs for AIs. These programs would provide for tests and quality standards that IAs would have to meet before participating in the market. This would help to ensure that only reliable and well-designed AIs are involved in economic activities. To maintain transparency and understanding of the actions of AI, developers and users could be needed to provide details on the decisions of AI and their impact on the business environment. This can promote trust and enable a better understanding of the dynamics at play. Independent experts could be commissioned to conduct regular audits on AIs and their interactions with the business environment. These audits could verify compliance with regulations and ensure that AIs are used in an ethical and responsible manner. To promote the adoption of ethical practices, codes of conduct could be established for AI developers and users. These codes outline clear guidelines for the responsible use of AI in business. An open and collaborative approach can help create more representative and well-considered regulations. To address emerging challenges effectively, regulation should be agile and adaptable. This requires continuous updates of laws and regulations to respond to changing economic and technological conditions. The abovementioned Asilomar's 23 principles of so-called beneficial artificial intelligence are a good starting point for regulating the hybrid model of interaction between nonhuman digital and human persons. However, to truly realize the potential of beneficial artificial intelligence, actions must be taken at a more operational level. This includes a 'pedagogical' development of the digital nonhuman entity, steered by human guidance. This educational process begins with the databases used to train AI.

These databases need to be ethically designed not only to prevent biases (such as racial prejudice) but also to incorporate exemplary behavioral patterns that AI should adopt. Thus, a ‘pedagogical’ strategy should be employed to ethically nurture AI, akin to how parents teach children to distinguish right from wrong. Therefore, machine ethics must instill values and beliefs through a method of ethical constructivism, enabling AI to make decisions that align with the universally upheld ethical values of humanity and shun behaviors that could detract from its primary goal of benefiting humanity. To embody ethics, artificial intelligence must mirror a value system reflective of those upheld by human social and institutional frameworks. When discussing these frameworks, it’s important to acknowledge the potential for ambiguity as different societies may have varied social norms. Broadly, the ethical function of artificial intelligence can be described as its capacity to consistently make decisions that protect human dignity, adhere to principles of subsidiarity, and foster solidarity.

3. The New Rules of Competition

If we consider competition not only as a set of rules and behavior but also as an ontological reality, a sort of ‘essence’ of the way agents interact in the economic sphere, then yes, the introduction of nonhuman agents could have profound implications. The very essence of competition, thus far, has presupposed a certain type of agent: the human being, with his motivations, limited rationality, emotions, ethics and often unpredictable behavior. The human being acts on the basis of a mixture of self-interest, empathy, social and cultural pressures, and more. The introduction of nonhuman agents, especially those guided by artificial intelligence, introduces a completely different variable into the system. These agents operate without emotion, without fatigue, and can process enormous amounts of information in fractions of a second. Their ‘rationality’, if one can call it that, is of a different type from that of humans. Thus, we might ask: does the very nature of competition change when one of the competitors has no fears, hopes, desires or ethics? When can deci-

sions be made without the weight of social or moral consequences? Given that these nonhuman agents can operate in ways that humans cannot even fully comprehend, how do the ‘rules of the game’ change? First, the decision and reaction speed of artificial agents far exceeds that of humans. This means that traditional dynamics based on observation, adaptation and response may become obsolete, as an artificial agent can respond almost instantaneously to changes in the market. Furthermore, artificial agents have the ability to process and analyse large amounts of data. This may allow them to anticipate market trends and to identify and exploit inefficiencies long before a human can perceive them. This could lead to a kind of technological ‘arms race’, where superiority in terms of computing power and data analysis becomes a decisive key to competitiveness. Transparency and understanding of decisions also become critical issues. Humans, with all their imperfections, tend to act according to understandable, if sometimes irrational, motivations and logic. Artificial agents, on the other hand, might make decisions based on complex algorithms that are not easily understood or predicted by humans. This could make it much more difficult for market actors to predict or understand the actions of their competitors. The competition between human and digital agents could be represented as animal spirits vs. digital rationality. This exposes the market to new risks. The interaction between ‘Animal Spirits’ and ‘Digital Rationality’ can lead to an amplification of market volatility. Trading algorithms can react quickly to price changes, and when these changes are caused or amplified by the emotional reactions of investors, a domino effect can be created that accentuates volatility. Another relevant risk is the possibility of market manipulation. Market participants with access to sophisticated algorithmic platforms could try to exploit investors’ emotional reactions. For instance, by releasing misleading information or speculating on events that they know will cause an emotional reaction, they may try to move the market to their advantage. Overreliance on ‘digital rationality’ can also create a false sense of security. Investors may assume that because decisions are based on data and algorithms, they are inherently sound. However, algorithms are only as good as the data on which they are formed. If there are gaps or errors in the data or if the algorithms are unable to account for unforeseen external factors,

the decisions made can lead to severe losses. On the other hand, overreliance on ‘animal spirits’ can lead to irrational decisions. Investors, driven by fear, greed or other emotions, may ignore crucial data or obvious trends, leading to poor investment choices. Finally, the interplay between ‘Animal Spirits’ and ‘Digital Rationality’ can make unexpected scenarios and ‘tail’ events, i.e., rare events with large impacts, more frequent. For instance, in a market dominated by algorithms, a panic-driven increase in sales could trigger a series of algorithmic sales, creating a steep fall in prices very quickly. Finally, the relationship between security and AI is also affected by this competition between human and nonhuman digital agents.

There is competition that diminishes the security of AI because, due to fierce competition in the development of AI technologies, one could look for shortcuts or release products and services that might not be subjected to thorough security evaluations. In the race to gain a competitive advantage, companies could neglect fundamental security considerations, resulting in the implementation of AI systems that have not been adequately tested for potential risks. Moreover, competition could incentivise the development of rival technology, resulting in a reluctance to share information about security practices and mistakes made. This lack of transparency could hinder the overall progress of AI security, as developers and researchers may miss the opportunity to learn from the experiences and mistakes of others. Instead, there is an open competition that helps discover mistakes that is definitely beneficial for AI security. When multiple organisations compete to create AI systems, a number of security problems are more likely to be identified and addressed. Different teams might tackle problems from different angles, leading to the discovery of vulnerabilities and risks that might not otherwise have been apparent. In addition, competition may drive an increased emphasis on rigorous testing, validation and risk assessment. As companies strive to outperform rivals, they may invest more resources in ensuring the security and reliability of their AI systems to avoid costly mistakes that could damage their reputation or business prospects.

4. Market manipulation, impact on efficiency and regulation

A very interesting case that better clarifies the previous considerations is without a doubt that of market manipulation that artificial agents can implement in financial markets. Indeed, competition between human and artificial digital agents in financial markets has created new regulatory challenges to maintain market efficiency and stability. Digital agents, equipped with sophisticated algorithms and often employed in high-frequency trading, can manipulate markets through practices such as spoofing, causing volatility and price distortions. To address these challenges, regulatory policies should focus on several key aspects. First, it is crucial to implement surveillance systems that continuously monitor trading activities in real time. This allows for the detection of anomalous behavior and suspicious manipulations using advanced data analysis and artificial intelligence technologies. In addition, it is essential to establish rules that compel all market participants, including digital agents, to report their trading strategies and transaction data in detail. Transparency helps maintain trust in the market and makes it easier to identify manipulative behavior. Limitations on the trading volumes that a single agent can execute in a short period of time are another crucial aspect. These limitations can prevent manipulation practices that exploit high frequency and large order volume to influence market prices. Defining strict and immediate penalties for anyone found to be manipulating the market is crucial. Penalties, which can include large fines, trading license suspensions, and, in extreme cases, criminal prosecution, must be deterrent enough to discourage manipulation. By implementing these policies, regulators can create a more stable and fair market environment for both human and digital agents.

5. Conclusions

Technological progress in the field of artificial intelligence has opened new frontiers for the econ The concept of a nonhuman person represents one of the most significant innovations introduced by the evolution of ar-

tificial intelligence technologies. A nonhuman person can be defined as an artificial entity with advanced operational and decision-making capabilities that can assume roles and responsibilities traditionally reserved for humans. These entities, although lacking subjective awareness and intentionality, possess characteristics that make them economically and legally relevant. An advanced artificial intelligence can autonomously manage complex processes, make decisions based on large volumes of data, and interact with the environment in ways that significantly affect society and the economy. The liberal market order is based on principles of competition, private property and individual responsibility. These principles have been fundamental to economic development and prosperity in many modern societies. Competition, in particular, is seen as an engine of efficiency, innovation and economic growth. The introduction of nonhumans into the marketplace poses significant challenges to these principles, and the integration of artificial agents into the marketplace can create a distortion in the mechanisms of competition. Indeed, artificial agents operate on a completely different basis than human agents. They can process information and make decisions at speeds and with an accuracy that humans cannot match. This computational advantage can lead to a concentration of power and resources in the hands of those who control the most advanced artificial intelligences, threatening fair competition. Non-humans are able to analyze large amounts of data and predict market trends with an accuracy inaccessible to humans. This creates a significant information gap, where AI-based decisions can overpower human ones, leading to an unfair competitive advantage position. Artificial agents can operate relentlessly without the need for rest, reducing operational costs and increasing productivity beyond human limits. This unequal efficiency could lead to reduced job opportunities for humans and greater economic inequality. Companies that develop and control advanced artificial intelligence technologies may gain dominant market power, stifling competition and establishing monopolies or oligopolies. This phenomenon runs counter to liberal market principles, which promote decentralization of economic power and competition. Artificial agents operate according to predefined algorithms, which may not always align with existing ethical

and legal norms. Accountability for an artificial agent's actions is complex to assign, creating gray areas in terms of accountability and compliance with laws. To address these challenges, it is necessary to develop a regulatory framework that can effectively integrate nonhuman persons into the marketplace without compromising the fundamental principles of the liberal order. This includes the regulation of intellectual property, establishing clear rules on the ownership and use of artificial intelligence technologies to prevent monopolies and promote equitable innovation. It is necessary to create a legal system that clearly defines liability for the actions of artificial intelligences, ensuring that their creators and operators are held accountable for damages caused. Implement policies that ensure fair competition between human and non-human agents, for example, through the imposition of specific taxes or regulations on the operations of artificial intelligences. Adopt measures that protect the rights of human workers and promote job inclusion in an increasingly automated market. Promote innovation in artificial intelligence through incentives that reward not only efficiency and productivity, but also adherence to ethical and social standards. Because artificial intelligence knows no national boundaries, it is critical that regulations be developed in collaboration with international bodies to ensure a consistent and coordinated approach. The future of the relationship between accountability and artificial intelligence will depend on our ability to adapt regulations to new technological realities. This requires forward-looking vision, dynamic regulation, and an ongoing commitment to ensure that emerging technologies serve the common good. Only then can we build a future in which artificial intelligences and humans coexist in an equitable, prosperous, and sustainable economic system. With the rapid evolution of technology, these issues are no longer domains of science fiction but become tangible realities that require deep reflection and action. Addressing these challenges requires a broad collaboration between different disciplines, including engineering, ethics, law, philosophy and economics. The key will be to strike a balance between the adoption of new technologies and the preservation of values, fundamental rights and the liberal order of the economy and society.

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