



## ORIGINAL PAPER

# Legal frameworks for AI-driven markets and their challenges and opportunities in the digital economy

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### Abstract:

The speedy inclusion of artificial intelligence (AI) in international markets has brought about unparalleled challenges and prospects, hence the need to develop flexible legal systems. AI-powered markets transform conventional economic structures by facilitating algorithmic trade, autonomous decision-making, and data-guided business models. Nevertheless, these developments present regulatory concerns regarding responsibility, bias, intellectual property rights, and market competition forces. This article discusses the changing legal landscape governing AI in economic applications, exploring both the limitations of existing frameworks and emerging regulatory approaches.

One of the key challenges of AI regulation is achieving a balance between legal control and innovation. The traditional tools of regulation are unable to address the autonomous and dynamic nature of AI, invoking concern regarding liability, transparency, and compliance. Moreover, the use of AI in market concentration and algorithmic price setting gives rise to antitrust concerns, necessitating pre-emptive legal intervention to ensure level competition. Conversely, AI provides an opportunity for streamlining regulatory efficiency, automating compliance, and mitigating financial risk through predictive analytics and smart contracts.

This study critically assesses global legal frameworks, including the European Union's AI Act, the United States' sectoral regulations, and China's AI regulation policy, against their economic effect. Through an appraisal of legal precedents and current policy debates, the paper presents an equilibrium framework that encourages technological advancement with ethical and economic balance.

Lastly, the intersection of AI, economics, and law calls for a changing regulatory environment that provides room for innovation without undermining market integrity. Surmounting these challenges is essential to having a healthy digital economy that boosts the fortunes of businesspeople, consumers, and policymakers.

**Keywords:** *AI regulation, digital economy, legal frameworks, algorithmic governance, market competition.*

**JEL Classification:** G15, F63, K20.

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## **1. Introduction**

The accelerated introduction of artificial intelligence (AI) into world economies has wrought deep transformations in economic structures, modifying conventional systems of trade, competition, and regulation. AI-driven technologies from algorithmic trading, autonomous decision-making, and machine learning-based financial predictions are revolutionizing the way business is conducted. As these innovations bring about efficiencies and innovations, they also bring about novel legal and economic dilemmas. The autonomous character of the AI systems renders it difficult for current regulatory frameworks, with legal frameworks needing to be adaptive and forward-looking.

The emergence of artificial intelligence within economic markets introduces a range of both prospects and challenges. On one side, AI contributes to increased productivity, diminishes transaction expenses, and streamlines supply chain processes. Conversely, issues related to liability, algorithmic prejudice, intellectual property protections, and market consolidation necessitate immediate legal scrutiny. Regulatory agencies globally face the complex task of reconciling the promotion of innovation with the imperative of maintaining equitable market practices. The absence of clear legal norms poses a threat of regulatory arbitrage, in which companies exploit gaps between jurisdictions to skip compliance.

This paper attempts to critically analyze the evolving legal frameworks for AI-powered markets, both the challenges and opportunities they present to the digital economy. The study will assess the strengths and weaknesses of existing legal strategies for dealing with economic disruptions from AI, examine promising new models including the EU AI Act, the US sectoral approach, and China's AI governance framework, and discuss antitrust ramifications of algorithmically determined prices and market concentration.

In addition, it will discuss possible paths toward greater regulatory efficiency using AI-driven compliance mechanisms, smart contracts, and risk minimization strategies to ultimately offer a balanced approach that balances innovation with economic and ethical concerns.

This study adopts a multidisciplinary approach, incorporating legal analysis, economic theories, and regulatory case study analysis. It stringently examines existing legal tools and court precedents while analyzing the vast implications of artificial intelligence on market structures. The comparative examination of different international regulatory models will provide insightful views concerning the effectiveness of different approaches. In addition, the paper employs economic principles such as competition theory, transaction cost theory, and innovation policy in order to put into context the legal issues involved. By combining these perspectives, this research seeks to give a detailed examination of the legal structures of AI-powered markets and their effects on the digital economy.

## **2. AI-Driven markets overview**

Artificial intelligence has emerged as a key driver of economic transformation, redefining market operations, reshaping competitive dynamics, and influencing global economic structures. Its integration into economic processes enables automation, enhances decision-making, and accelerates innovation. AI-powered technologies are at the core of contemporary digital markets, influencing areas such as financial trading, supply chain management, and consumer behavior analytics. However, these transformations come

with legal, regulatory, and ethical concerns, necessitating a deeper understanding of AI's economic role.

AI's economic impact can be traced back to its ability to enhance productivity and efficiency. Brynjolfsson and McAfee (2014) argue that AI contributes to the "second machine age," where machine intelligence increasingly complements and, in some cases, surpasses human capabilities in economic decision-making. Unlike earlier technological advancements, which primarily replaced routine manual labor, AI increasingly automates cognitive tasks, fundamentally changing white-collar industries. AI's ability to process vast amounts of data and detect complex patterns leads to optimized decision-making in business and finance, creating new economic opportunities while also generating regulatory uncertainties.

AI has become a key driver of business growth and innovation, reshaping market dynamics and economic structures. According to Mitrache et al. (2024), AI technology fosters competitive advantages by optimizing business processes, enhancing decision-making, and enabling data-driven strategic planning. However, they also emphasize that while AI accelerates economic expansion, its unregulated or poorly governed implementation may lead to disparities in market competition and ethical dilemmas.

One of AI's most transformative effects is in financial markets, where algorithmic trading systems execute transactions at speeds and frequencies beyond human capabilities. High-frequency trading (HFT) algorithms leverage AI to identify market patterns and execute trades within microseconds. According to Easley, López de Prado, and O'Hara (2012), HFT enhances liquidity and reduces bid-ask spreads but also raises concerns regarding market stability, systemic risk, and the potential for flash crashes. The 2010 Flash Crash, where AI-driven trading algorithms contributed to a sudden market downturn, highlights the unintended consequences of AI's growing role in financial decision-making. Regulatory bodies, such as the U.S. Securities and Exchange Commission (SEC) and the European Securities and Markets Authority (ESMA), have sought to impose stricter oversight on algorithmic trading, yet challenges persist in effectively regulating self-learning AI systems.

Beyond financial markets, AI is transforming supply chain management and logistics. Predictive analytics powered by AI allows firms to anticipate demand fluctuations, optimize inventory levels, and enhance operational efficiency. Ivanov and Dolgui (2020) discuss how AI-driven supply chain automation improves resilience, particularly in the face of global disruptions such as the COVID-19 pandemic. However, these advancements also raise concerns regarding employment displacement, data security, and the monopolization of AI-driven logistics platforms. Large multinational corporations, such as Amazon and Alibaba, leverage AI to achieve supply chain dominance, prompting antitrust regulators to examine potential market concentration risks.

The rise of AI-driven consumer behavior analytics further solidifies AI's role in economic transformation. Recommendation algorithms and personalized advertising models, such as those used by Google and Meta, analyze vast amounts of consumer data to predict purchasing preferences and influence decision-making. Shoshana Zuboff (2023) argues that AI-powered surveillance capitalism enables corporations to manipulate consumer behavior through predictive analytics, raising ethical concerns regarding privacy, autonomy, and informed consent. The European Union's General Data Protection Regulation (GDPR) seeks to mitigate these concerns by imposing stringent data protection requirements, but enforcement remains a challenge given the global nature of AI-driven economic activities.

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While AI's economic transformation presents significant opportunities, it also introduces regulatory and legal complexities. The autonomous and dynamic nature of AI systems challenges traditional legal frameworks, particularly in areas such as liability, competition law, and data governance. As AI continues to reshape economic structures, policymakers and legal scholars must develop adaptive frameworks that balance innovation with regulatory oversight.

The efficiency gains from algorithmic decision-making stem from AI's ability to process vast amounts of information at a speed and scale beyond human capabilities. In financial markets, machine learning models analyze historical price movements, macroeconomic indicators, and social sentiment to generate real-time trading strategies. AI-driven investment models outperform traditional portfolio management strategies due to their adaptability and ability to learn from new market conditions. However, these same characteristics pose challenges for financial regulators, as self-learning algorithms operate in ways that are difficult to predict and control. The Financial Stability Board (FSB) has warned that algorithmic decision-making, particularly in high-frequency trading, can amplify market volatility and increase the risk of systemic failures.

One of the most widely debated concerns surrounding algorithmic decision-making is the issue of bias and fairness. While AI is often perceived as objective, it is ultimately shaped by the data it is trained on. If the input data reflects historical inequities, the algorithm will likely perpetuate those biases in its decisions. In lending and credit markets, AI-powered risk assessment models determine an individual's creditworthiness based on complex predictive analytics. However, studies by Barocas, Hardt, and Narayanan (2023) have demonstrated that these models can unintentionally discriminate against marginalized groups, leading to regulatory scrutiny. In response, policymakers have advocated for fairness-aware machine learning models and explainable AI to ensure transparency and accountability in algorithmic decision-making.

A significant legal and ethical challenge arises from the "black-box" nature of many AI systems. Unlike traditional rule-based programming, machine learning models develop decision-making processes that are often opaque even to their creators. This lack of interpretability complicates efforts to assign liability when AI-driven decisions lead to negative economic consequences. According to Selbst and Barocas (2018), the opacity of algorithmic systems undermines traditional legal principles of accountability and due process, particularly in cases where AI influences employment, insurance rates, and criminal sentencing. The European Union's AI Act has proposed strict transparency requirements, mandating that high-risk AI systems provide explainability features to ensure compliance with legal and ethical standards.

Another area of concern is the growing role of algorithmic decision-making in market competition and pricing strategies. Companies increasingly deploy AI-powered dynamic pricing algorithms that adjust prices in real-time based on consumer demand, competitor pricing, and market conditions. While such strategies enhance efficiency, they also introduce risks of algorithmic collusion, where competing firms' AI systems learn to coordinate pricing strategies without direct human intervention. Ezrachi and Stucke (2016) highlight that traditional antitrust laws are ill-equipped to address AI-driven collusion, as current legal frameworks rely on explicit evidence of human intent. This regulatory gap has led competition authorities, including the U.S. Federal Trade Commission (FTC) and the European Commission, to explore new methodologies for detecting and mitigating AI-facilitated anti-competitive behavior.

Despite these challenges, algorithmic decision-making also offers opportunities for regulatory compliance and risk mitigation. AI-powered compliance tools automate regulatory reporting, fraud detection, and financial risk assessment, reducing the burden on human regulators. In the banking sector, AI-driven anti-money laundering (AML) systems analyze transaction patterns to detect suspicious activities, enhancing financial security. Similarly, AI-driven tax compliance models help businesses navigate complex tax codes and optimize their financial reporting. Von Moltke (2023) argues that AI can serve as a regulatory tool rather than merely a subject of regulation, suggesting that well-designed AI systems can enhance governance and economic oversight.

The emergence of data as a core economic asset has led to the concept of “data capitalism,” where companies derive value primarily from collecting, processing, and monetizing information. Zuboff (2023) argues that the modern economy is defined by surveillance capitalism, in which firms such as Google, Meta, and Amazon use predictive analytics to manipulate consumer behavior, creating new forms of market power. Unlike traditional business models that rely on tangible assets or labor, data-driven enterprises extract economic value from digital footprints, often without explicit consumer consent. This transformation has led to growing concerns about the monopolization of data and its implications for competition and market fairness.

Market concentration in data-driven economies is particularly evident in the dominance of tech giants that control vast datasets. Furman et al. (2019) note that companies with privileged access to consumer data gain a competitive advantage by refining AI models more effectively than smaller firms. The phenomenon of “network effects” reinforces this dominance, as larger datasets lead to better AI performance, attracting more users and further consolidating market power. This self-reinforcing cycle has led to regulatory scrutiny, with competition authorities investigating whether data monopolies stifle innovation and limit market entry for smaller competitors. In response, policymakers have proposed data-sharing mandates and interoperability requirements to level the competitive playing field. The European Union’s Digital Markets Act (DMA) is one such attempt to address the monopolization of data by enforcing obligations on large online platforms.

According to Spulbar et al. (2021), the Efficient Market Hypothesis (EMH), which assumes that asset prices fully reflect available information, is being reconsidered in light of AI-driven adaptive trading strategies. However, while AI enhances market liquidity and predictive accuracy, it also introduces new risks, including algorithmic herding behavior, flash crashes, and potential market manipulation, requiring proactive regulatory oversight to ensure market integrity and stability.

A significant legal and ethical issue surrounding data-driven business models is the question of consumer privacy and data protection. AI-driven firms collect extensive user information to enhance personalized services, but this raises concerns about the potential misuse of personal data. The General Data Protection Regulation (GDPR) in the European Union sets strict guidelines on data collection, requiring informed consent and providing users with greater control over their information. However, research by Acquisti, Taylor, and Wagman (2016) suggests that consumers often lack a clear understanding of how their data is used, leading to an imbalance of power between individuals and corporations. The trade-off between personalized services and privacy remains a contentious debate, with scholars arguing that current legal frameworks may be insufficient to address the complexities of AI-driven data economies.

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Beyond privacy, data-driven business models influence labor markets and economic inequalities. AI-powered automation, fueled by data analytics, has led to significant workforce disruptions, particularly in sectors reliant on routine tasks. Autor (2015) highlights that while AI enhances productivity, it also exacerbates income disparities by disproportionately benefiting high-skilled workers while displacing low-skilled labor. Data-driven gig economy platforms, such as Uber and Deliveroo, further illustrate how AI reshapes employment relationships, often blurring the lines between independent contracting and traditional employment. Regulatory bodies are grappling with how to adapt labor laws to the realities of algorithmic management and automated decision-making.

Despite these challenges, data-driven business models present opportunities for economic growth and regulatory innovation. AI-powered analytics enable firms to anticipate market trends, optimize supply chains, and enhance customer experiences. In financial services, data-driven risk assessment improves fraud detection and credit evaluation, increasing efficiency and financial inclusion. Moreover, AI-driven policymaking, where governments leverage big data to design evidence-based regulations, represents a promising development in economic governance. Sunstein (2021) argues that AI-enhanced regulatory models could lead to more precise and adaptive legal frameworks, reducing inefficiencies in traditional rule-making processes.

### **3. Legal challenges in AI-powered economic systems**

Traditional regulatory tools were designed for human decision-makers, yet AI introduces complexity through autonomous actions, opaque decision-making processes, and cross-jurisdictional economic interactions. Ensuring that AI-powered economic systems function within legal and ethical boundaries while maintaining market stability and innovation requires a re-evaluation of liability structures, competition law, intellectual property rights, and regulatory enforcement mechanisms.

One of the most significant legal concerns surrounding AI-powered economic systems is the issue of liability. AI algorithms operate autonomously, making decisions without direct human intervention. This raises fundamental legal questions: Who is responsible when AI systems cause harm? Existing legal frameworks, such as product liability and negligence laws, are built on the premise of human agency. However, as AI models evolve and develop unexpected behaviors, establishing accountability becomes increasingly difficult. Pagallo (2013) highlights that traditional tort law principles may be inadequate for dealing with AI-driven errors, necessitating new legal doctrines such as strict liability for AI developers or the introduction of electronic personhood for advanced AI systems. The European Union's AI Act proposes a tiered risk-based approach, where higher-risk AI applications face stricter liability standards, yet the question of who bears ultimate responsibility remains unresolved.

Another critical area of legal scrutiny is algorithmic bias and discrimination. AI systems, particularly those used in hiring, lending, and criminal justice, have been found to reinforce existing biases due to the nature of their training data. Barocas, Hardt, and Narayanan (2023) argue that while AI promises objectivity, it often replicates historical inequities, leading to discriminatory outcomes. In response, jurisdictions such as the United States and the European Union have introduced regulations requiring transparency and fairness in AI-driven decision-making. However, enforcing these principles is challenging given the complexity of machine learning models. Explainability and

interpretability remain key legal concerns, as courts and regulators struggle to assess whether an AI system's decisions comply with anti-discrimination laws.

AI-driven markets also pose significant antitrust and competition law challenges. Traditional antitrust laws are designed to prevent collusion and market concentration through explicit human agreements. However, AI-enabled pricing algorithms can engage in tacit collusion, where competing firms' algorithms learn to set prices in a way that maximizes collective profits without direct communication. Ezrachi and Stucke (2016) warn that existing antitrust tools may be insufficient to regulate AI-driven collusion, as intent a central element in competition law is difficult to establish when pricing decisions are made autonomously. Regulators in the European Union and the United States are currently exploring ways to adapt competition law to algorithmic markets, with proposals ranging from stricter algorithmic transparency requirements to the use of AI-powered enforcement mechanisms.

Intellectual property (IP) law faces new challenges with the rise of AI-generated content. Copyright and patent systems were designed to protect human creativity and invention, but AI is now capable of generating literature, art, and even novel scientific discoveries. The question of whether AI-generated works should be eligible for copyright protection remains unresolved. In the United States, the Copyright Office has ruled that only human-created works qualify for protection, but ongoing debates suggest that revisions to IP law may be necessary as AI becomes a more significant contributor to creative industries. Similarly, patent law faces issues regarding AI-assisted inventions, with policymakers considering whether AI should be recognized as an inventor or merely a tool used by human creators.

Data governance is another pressing legal challenge in AI-powered economic systems. The increasing reliance on big data for training AI models raises concerns about data privacy, security, and ownership. The General Data Protection Regulation (GDPR) has set global benchmarks for data protection, but enforcing these rules in AI-driven economies remains difficult. Many AI systems operate across multiple jurisdictions, creating conflicts between national data protection laws. Furthermore, AI's ability to infer sensitive personal information from seemingly benign datasets poses risks that existing privacy laws may not fully address. Wachter, Mittelstadt, and Floridi (2017) propose the concept of "right to explanation" as a legal safeguard, ensuring that individuals affected by AI-driven decisions have the right to understand and challenge automated processes.

The table below summarizes the key legal challenges associated with AI-powered economic systems and highlights regulatory responses from different jurisdictions:

**Table 1: Key legal challenges and regulatory responses in AI-powered economic systems**

Legal Challenge	Description	Regulatory Response	Source
<b>Liability in AI decisions</b>	Determining legal responsibility for AI-driven actions, especially in autonomous decision-making	EU AI Act (risk-based approach), proposals for AI-specific liability laws	Pagallo (2013)
<b>Algorithmic bias</b>	AI replicates historical biases, leading to discriminatory decisions in hiring, lending, and law enforcement	Fairness-aware AI models, EU GDPR transparency requirements, U.S. AI Bill of Rights	Barocas et al. (2023)

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<b>AI-enabled collusion</b>	Pricing algorithms autonomously coordinate to manipulate markets without explicit agreements	Increased scrutiny under antitrust laws, proposals for AI-powered regulatory enforcement	Ezrachi & Stucke (2016)
<b>Intellectual property challenges</b>	Uncertainty over copyright and patent protection for AI-generated content	U.S. Copyright Office rulings against AI authorship, ongoing legal debates	U.S. Copyright Office (2023)
<b>Data privacy and AI</b>	AI-driven data processing raises concerns about privacy, security, and cross-border data transfers	GDPR, California Consumer Privacy Act (CCPA), emerging AI-specific privacy laws	Wachter et al. (2017)

Source: Own work based on research methodology

While regulatory efforts are underway, the legal challenges of AI-powered economic systems require continuous adaptation and international cooperation. Policymakers must balance innovation with legal protections, ensuring that AI fosters economic growth without undermining ethical and societal values. A harmonized legal framework that addresses liability, competition law, intellectual property, and data governance will be essential in shaping the future of AI-driven markets.

### 4. Global Regulatory Approaches to AI in Markets

The legal governance of artificial intelligence in economic markets varies significantly across jurisdictions, reflecting differences in legal traditions, economic priorities, and technological strategies. While AI has the potential to enhance efficiency and market competition, its risks ranging from liability concerns to algorithmic bias necessitate proactive regulatory measures. The fragmented global regulatory landscape presents both challenges and opportunities for harmonizing AI governance.

Three major regulatory approaches have emerged in response to AI's economic implications: the European Union's risk-based regulatory model, the United States' sectoral approach, and China's state-driven AI governance. Each of these approaches reflects a distinct legal and economic philosophy, with the EU emphasizing fundamental rights and ethical AI, the US focusing on innovation and industry self-regulation, and China integrating AI development into its broader geopolitical and economic strategy. Understanding these models is essential for assessing their impact on AI-powered markets and evaluating potential paths toward international regulatory convergence.

The European Union has taken a proactive stance in AI regulation, positioning itself as a global leader in ethical AI governance. The Artificial Intelligence Act (AI Act) proposed by the European Commission in 2021 is the world's first comprehensive legislative framework designed to regulate AI across economic sectors. The AI Act adopts a risk-based approach, classifying AI systems into four categories based on their potential impact on fundamental rights and economic stability: unacceptable risk, high risk, limited risk, and minimal risk (European Commission, 2021).

At the core of the AI Act is the principle of proportional regulation, meaning that AI systems with higher risks are subject to stricter legal requirements. Unacceptable-risk AI systems, such as social scoring systems and subliminal manipulation, are outright prohibited. High-risk AI systems, including those used in hiring, financial services, and critical infrastructure, must comply with strict transparency, accountability, and data governance rules. Limited-risk AI applications, such as chatbots and recommendation algorithms, require only basic transparency measures, while minimal-risk AI systems face



no regulatory obligations. This tiered structure seeks to balance technological innovation with fundamental rights protection, ensuring that AI adoption does not compromise market integrity or consumer rights.

One of the key innovations of the AI Act is its emphasis on explainability and accountability. AI developers and deployers of high-risk AI systems must provide clear documentation of their models' decision-making processes, ensuring compliance with EU fundamental rights standards (Wachter, Mittelstadt, & Russell, 2021). The act also mandates the creation of conformity assessments, requiring companies to demonstrate that their AI systems meet regulatory standards before deployment. This approach is similar to the General Data Protection Regulation (GDPR), which imposes strict compliance requirements on organizations handling personal data.

However, the AI Act also faces significant legal and economic challenges. Critics argue that the compliance burden for high-risk AI systems may stifle innovation and deter investment in AI startups. Veale and Zuiderveen Borgesius (2021) highlight that smaller AI firms may struggle to meet the stringent documentation and auditing requirements, leading to a market environment where only large technology corporations can afford regulatory compliance. Additionally, there are concerns about regulatory fragmentation within the EU, as member states may interpret and enforce the AI Act differently.

Despite these challenges, the AI Act represents a significant step toward global AI governance. By establishing a structured framework for AI risk assessment and compliance, the EU aims to create a legal environment that fosters responsible AI development while protecting consumers and businesses. Moreover, the extraterritorial scope of the AI Act similar to the GDPR means that companies worldwide must comply if they offer AI services within the EU. This has led some scholars to refer to the AI Act as a model for "AI regulatory globalization" (Tzimas, 2023).

Unlike the European Union's centralized and comprehensive AI regulatory framework, the United States has adopted a sectoral and decentralized approach to AI governance. Rather than imposing overarching AI-specific legislation, the U.S. regulatory model relies on existing legal frameworks, industry self-regulation, and sector-specific guidelines to address AI-related challenges. This approach is rooted in the American legal and economic philosophy of market-driven innovation, which prioritizes technological advancement and economic growth over broad regulatory constraints (Calo, 2017). However, the absence of a unified federal AI law has raised concerns about regulatory fragmentation, enforcement gaps, and ethical risks in AI-powered markets.

One of the defining features of the U.S. AI regulatory approach is its reliance on industry-specific regulations. Various federal agencies oversee AI-related risks within their respective domains, leading to a patchwork of regulations that vary across sectors:

- The Federal Trade Commission (FTC) enforces AI-related consumer protection and competition laws, particularly in digital markets and data privacy. The FTC has warned against AI-driven deception, bias, and anti-competitive practices, emphasizing the need for algorithmic transparency and fairness (FTC, 2021).
- The Securities and Exchange Commission (SEC) regulates AI in financial markets, particularly in algorithmic trading and robo-advisors. AI-driven investment models are subject to SEC oversight to prevent market manipulation, insider trading, and systemic risks (Aldasoro et al., 2024).
- The Food and Drug Administration (FDA) oversees AI in healthcare, ensuring that AI-driven medical technologies meet safety, efficacy, and ethical standards before deployment in clinical settings (FDA, 2021).

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• The National Highway Traffic Safety Administration (NHTSA) regulates AI in autonomous vehicles, focusing on liability, safety standards, and accident accountability (NHTSA, 2022).

This decentralized model allows flexibility and sector-specific expertise but also creates inconsistencies in AI governance. Unlike the EU’s AI Act, which establishes a unified compliance structure, the U.S. approach requires companies to navigate multiple regulatory bodies, increasing legal uncertainty. Critics argue that this fragmentation may lead to regulatory arbitrage, where firms exploit gaps between agencies to evade stricter oversight (Denvir et al, 2019).

A key legal challenge in the U.S. AI regulatory landscape is the lack of federal AI legislation. While several states have enacted AI-related laws such as Illinois’ Biometric Information Privacy Act (BIPA) and California’s Consumer Privacy Act (CCPA) there is no comprehensive national framework governing AI ethics, liability, or consumer protection. The Algorithmic Accountability Act, introduced in Congress in 2019 and 2022, sought to require companies to conduct AI impact assessments to mitigate risks of bias, discrimination, and consumer harm. However, legislative progress has been slow due to political divisions and lobbying by technology firms (Pasquale, 2020).

Despite the absence of AI-specific laws, existing federal regulations are being adapted to address AI-related risks. The Civil Rights Act and Equal Credit Opportunity Act are increasingly invoked to regulate AI-driven discrimination in hiring, lending, and criminal justice. The Antitrust Division of the Department of Justice (DOJ) has begun investigating AI-powered algorithmic collusion in pricing models, signaling a growing regulatory focus on competition law and AI-driven market power (Khan, 2019).

The AI Bill of Rights (2024) represents an important step toward a more structured AI governance approach. This policy framework outlines five key principles:

- Safe and effective AI systems;
- Algorithmic discrimination protections;
- Data privacy and control;
- Transparency and explainability;
- Human alternatives and fallbacks.

While the AI Bill of Rights provides guiding principles, it lacks binding legal enforcement, relying instead on voluntary compliance and agency-level oversight (Amarikwa, 2024). This reflects a broader trend in U.S. AI governance, where self-regulation and corporate accountability play a central role.

**Table 2: Comparison with the EU Approach**

Feature	United States (Sectoral Approach)	European Union (AI Act)
Regulatory structure	Decentralized, sector-specific	Centralized, risk-based framework
Main regulatory bodies	FTC, SEC, FDA, NHTSA, DOJ	European Commission, AI regulatory agencies
AI liability rules	Case-by-case enforcement	Strict liability for high-risk AI
Transparency requirements	Industry self-regulation	Mandatory AI documentation
Legal enforcement	No federal AI law, voluntary compliance	Binding EU-wide legislation

Source: Own work based on research methodology

The United States' sectoral approach has advantages in fostering AI-driven innovation, particularly in finance, healthcare, and autonomous systems. However, its lack of a unified AI framework creates legal uncertainties, weak enforcement mechanisms, and potential risks of biased and unregulated AI deployment. As global AI markets evolve, pressure is mounting for the U.S. to adopt a more cohesive AI regulatory strategy that balances market flexibility with ethical and legal safeguards.

China's AI governance model is characterized by three key pillars: centralized government oversight, industry-driven compliance, and national security considerations. These elements are reflected in the country's legal framework, regulatory enforcement mechanisms, and long-term AI policy goals. The New Generation Artificial Intelligence Development Plan (AIDP), launched in 2017, sets ambitious objectives for China to become the world leader in AI by 2030. To achieve this, the government has introduced a series of laws and policies that balance economic incentives, strict regulatory oversight, and state control over data and digital infrastructure (Roberts et al., 2021).

Unlike the EU's AI Act, which primarily focuses on risk-based regulation, or the U.S. approach, which relies on sectoral laws, China regulates AI through a combination of government policies, administrative measures, and direct industry oversight. Some of the most significant regulatory initiatives include:

- The Personal Information Protection Law (PIPL). China's equivalent to the EU's GDPR, imposing strict data governance rules, but with a key difference. The Chinese government retains broad access to private data for national security and economic planning purposes (Tan et al., 2021).
- The Data Security Law (DSL). Establishes a hierarchical classification system for data, prioritizing government control over critical data, including AI-related datasets. Companies must store key data domestically and comply with stringent security protocols (Hu, 2024).
- The Algorithmic recommendation regulations require AI platforms to ensure algorithmic transparency and fairness, prohibiting recommendation systems from promoting content that disrupts social order. This regulation directly affects platforms such as TikTok and WeChat, reinforcing government control over digital media (Abiri & Huang, 2022).
- Deep synthesis and deepfake regulations are some of the first laws globally to regulate AI-generated content, mandating watermarking, identity verification, and government approval for AI-generated media (Broinowski et al., 2024).

These laws reflect China's dual approach to AI governance promoting AI-driven economic growth while ensuring strict government oversight and ideological alignment. Unlike Western regulatory models, which emphasize individual rights and market competition, China's AI laws prioritize social stability, state security, and economic centralization (Roberts et al., 2021).

China's AI regulation is closely linked to its industrial policy, where the government plays a proactive role in supporting domestic AI firms while regulating private sector influence. The State Council and the Cyberspace Administration of China (CAC) oversee AI development, ensuring that companies like Alibaba, Tencent, and Baidu align with national strategic goals.

However, the government has also taken steps to curb the power of large AI-driven tech companies. In 2020-2021, China launched a sweeping antitrust crackdown on AI-powered digital platforms, including Alibaba and Meituan, imposing heavy fines and stricter regulations to prevent monopolistic behavior (Zhang, 2024). Unlike the U.S.,

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where tech companies wield significant influence over AI policy, China's regulatory model ensures that the state retains ultimate control over AI markets.

A key distinction of China's AI regulatory framework is its deep integration into national security and surveillance infrastructure. AI is widely used in facial recognition, predictive policing, and social credit systems, raising concerns about human rights implications (Cheng et al, 2023).

The Social Credit System, powered by AI and big data analytics, exemplifies how AI is used for both economic governance and social control. By monitoring businesses and individuals, the system enforces compliance with legal and ethical norms, rewarding good behavior and penalizing violations (Kostka, 2019). AI-driven surveillance also plays a crucial role in China's domestic security strategy, particularly in Xinjiang, where facial recognition and predictive analytics have been used for population monitoring, drawing international criticism (Daly, 2019).

**Table 3: Comparison with the U.S and EU Approach**

Feature	China (State-Driven Approach)	United States (Sectoral Approach)	European Union (Risk-Based Model)
<b>Regulatory philosophy</b>	Centralized state control over AI	Market-driven, sectoral laws	Rights-based, risk-based regulation
<b>AI liability rules</b>	State oversight, corporate compliance	Case-by-case enforcement	Strict liability for high-risk AI
<b>Competition law</b>	Government-enforced restrictions on tech monopolies	Industry self-regulation, DOJ oversight	Antitrust rules for AI pricing algorithms
<b>Data privacy &amp; AI</b>	Government retains access to private data	Patchwork of state-level laws	GDPR-style consumer rights
<b>AI and national security</b>	AI integrated into surveillance and state governance	AI in defense, but with private sector control	Ethical AI focus, strict human rights safeguards

Source: Own work based on research methodology

China's AI regulation is unique in its combination of industrial policy, digital governance, and state security concerns. While the U.S. focuses on market-led innovation and the EU on human rights and transparency, China's model ensures that AI serves the strategic interests of the state.

China's AI governance model is shaping international regulatory debates, particularly in countries with state-controlled digital economies. Some nations have adopted elements of China's AI laws, particularly in data localization, AI-driven surveillance, and algorithmic content control (Cheng et al., 2023). However, this model has also raised concerns about the globalization of digital authoritarianism, with critics arguing that China's AI laws set a precedent for state intervention in AI markets at the expense of personal freedoms.

At the same time, China's leadership in AI infrastructure development particularly through the Belt and Road Initiative (BRI) is exporting its AI governance model to developing countries, influencing regulatory trends beyond its borders. This growing regulatory divergence between China, the U.S., and the EU raises critical questions about whether global AI regulation can be harmonized or whether competing AI governance models will fragment digital markets along geopolitical lines.

### **5. Balancing AI regulation, innovation, and market integrity**

The regulation of artificial intelligence in economic markets is at a crossroads. As AI-driven markets continue to evolve, governments and policymakers face the challenge of crafting legal frameworks that balance innovation, ethical governance, and economic stability. Over-regulation risks stifling technological advancements and slowing AI-driven progress, while under-regulation could lead to market distortions, unfair competition, and ethical concerns. Achieving an equilibrium requires a strategic approach that considers both legal adaptability and economic dynamism.

The influence of AI extends beyond economic markets, increasingly impacting judicial and regulatory decision-making. As AI-driven algorithms assist in legal analysis, case predictions, and even sentencing recommendations, concerns arise regarding transparency, accountability, and potential biases embedded in AI models. According to Spulbar and Mitrache (2024), the assessment of AI's role in court decisions presents both opportunities for efficiency and challenges in ensuring fairness and due process. They highlight the urgent need for legal frameworks that establish clear guidelines on AI-assisted judicial reasoning, preventing automated systems from undermining fundamental legal principles such as human oversight, fairness, and proportionality. These concerns mirror broader regulatory debates on AI's role in governance, competition law, and economic decision-making, emphasizing the necessity of comprehensive oversight mechanisms to prevent systemic distortions.

A key aspect of this balance is legal flexibility. AI is a constantly evolving technology, and static regulations may quickly become obsolete. Regulatory frameworks should be adaptive, allowing for periodic reassessment and revision in response to technological advancements. A model that incorporates regulatory sandboxes controlled environments where AI technologies can be tested under temporary legal exemptions could enable innovation while providing regulators with empirical data on AI's real-world implications. Such an approach would help ensure that AI regulations remain relevant and effective without hindering progress.

Harmonization of AI regulations across different jurisdictions is another essential factor. The current global landscape is fragmented, with the European Union, the United States, and China each adopting distinct regulatory philosophies. While these models reflect different political, economic, and cultural priorities, excessive divergence in legal frameworks may lead to regulatory conflicts, compliance burdens for multinational businesses, and barriers to global AI trade. International cooperation through standardized AI ethics guidelines, interoperability requirements, and cross-border compliance mechanisms could facilitate a more cohesive global AI governance structure.

AI-powered models are increasingly used to enhance managerial efficiency, automate compliance, and support strategic corporate decisions, raising important legal and ethical considerations. According to Mitrache et al. (2024), AI-driven corporate governance creates a synergistic link between corporate management and intrapreneurship, where organizations leverage AI to streamline operations, foster innovation, and maintain competitive advantages. However, they caution that without proper regulatory oversight, AI's role in corporate strategy could lead to unintended market consequences, governance loopholes, and ethical dilemmas. This highlights the need for adaptive legal frameworks that ensure AI-powered corporate governance aligns with market integrity, transparency, and fair competition.

Beyond legal mechanisms, industry self-regulation and corporate accountability will play a critical role in shaping the future of AI-powered markets. Companies developing

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and deploying AI systems should adopt transparent governance policies, robust risk assessment frameworks, and proactive ethical AI principles. Voluntary compliance with AI ethics charters and fair competition commitments can mitigate the need for overly stringent regulations. Moreover, integrating AI ethics committees within corporations could ensure that AI deployment aligns with societal and economic interests rather than merely focusing on profitability.

AI-driven economies also require consumer and business education. The general public, as well as businesses leveraging AI, must have a clear understanding of how AI systems function, their potential risks, and their impact on privacy, competition, and employment. Regulatory bodies should collaborate with academic institutions, civil society, and industry stakeholders to develop awareness campaigns, training programs, and public consultations that foster informed decision-making in AI adoption.

Looking ahead, the next phase of AI regulation will depend on technological advancements, policy evolution, and market adaptations. The regulatory landscape should be dynamic and capable of addressing emerging challenges such as AGI (Artificial General Intelligence), AI-human collaboration, and quantum-enhanced AI systems. Future regulatory discussions must also address AI's environmental impact, workforce displacement due to automation, and ethical concerns surrounding AI-human interactions.

### **6. Conclusions**

Artificial intelligence is no longer a futuristic concept it is a reality shaping economic markets, influencing decision-making, and redefining the regulatory landscape. The challenge before us is clear: How do we govern an evolving technology without suffocating its potential? How do we ensure that AI-driven economies remain fair, competitive, and ethically sound, rather than tools of monopolistic power or instruments of unchecked surveillance?

Throughout this discussion, we have seen the legal complexities and economic opportunities that AI presents. The European Union has taken a structured and rights-based approach, the United States has leaned on sectoral governance and self-regulation, while China has integrated AI into its national strategy with strict government oversight. But in a world increasingly interconnected by AI-powered markets, can these competing models coexist, or will they lead to regulatory fragmentation that stifles cross-border AI collaboration?

Liability, bias, data privacy, and market fairness remain at the heart of AI regulation, but one fundamental issue persists: Can regulation keep pace with the rapid evolution of AI? Laws and policies are reactive by nature, while AI continues to evolve at an unprecedented rate. Will regulatory sandboxes, ethical AI principles, and adaptive legal mechanisms be enough to prevent AI-driven markets from spiraling into legal and economic uncertainty? Or will we find ourselves permanently chasing a technology that refuses to be contained?

Yet, AI regulation is not just a legal or economic issue it is a societal one. AI is not inherently ethical or unethical, fair or unfair it reflects the values and priorities of those who create and deploy it. So the ultimate question remains: What kind of AI-powered world do we want to build? One where technology serves only the most powerful, or one where it is harnessed for collective economic prosperity and human advancement?

The answers to these questions will define the next era of AI governance. While there may never be a perfect balance between innovation and regulation, the ongoing debate is a sign that we are asking the right questions. AI-driven markets are still in their infancy,

and the decisions we make today will determine whether AI becomes a force for economic progress or a catalyst for digital inequality.

As we look ahead, the conversation must continue. AI is not waiting for regulators, policymakers, or businesses to catch up, it is moving forward with or without them. The real question is: Will we shape AI, or will AI shape us?

#### Authors' Contributions:

The authors contributed equally to this work.

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