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THE AI IMPLICATION ON THE FINANCIAL SECTOR REGULATION AND REGULATORS

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ABSTRACT

Artificial intelligence (AI) is revolutionizing numerous industries, and the financial sector is no exception. Central banks, institutions of fundamental importance for the economic stability of a country, are increasingly looking to AI as a powerful tool to improve their activities and respond to the challenges of an ever-changing world.

While artificial intelligence therefore represents a great opportunity for central banks, it is certainly essential to address its risks and develop an appropriate regulatory framework.

This research therefore aims to explore how artificial intelligence is revolutionizing the way central banks operate. Through an in-depth analysis of current and future applications of AI, the benefits in terms of operational efficiency, improved economic forecasting and strengthening financial stability will be assessed. In addition, challenges related to AI implementation, such as data management, cybersecurity, and the impact on employment, will be discussed.

Keywords: central banks, artificial intelligence, regulation

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1 INTRODUCTION

Artificial intelligence (AI) is revolutionizing many industries, including the global financial system. One of the most exciting areas of application of AI is that of central banks, which are adopting this technology to improve risk management, credit supervision and financial stability.

In the context of increasing digitalization and automation, artificial intelligence represents a seismic turning point for central banks. Not only does AI offer advanced tools for data analysis and economic forecasting, but it also helps to enhance monitoring and regulatory capabilities.

The introduction of AI systems in central banks can significantly improve various operational aspects, including:

- Risk Management: Advanced analytics to identify potential financial risks.
- Credit supervision: More accurate credit assessments to reduce the risk of default.
- Financial stability: Monitoring and forecasting economic trends for more effective monetary policy.

Additionally, the implementation of AI raises important regulatory and ethical questions, as it is essential to ensure that the use of these technologies is transparent, safe, and accountable.

This work aims to explore the adoption and impact of AI in the world's major central banks, with a particular focus on the European Central Bank (ECB), the People's Bank of China (PBOC).

The research will examine the regulations adopted by different central banks to regulate the use of AI and ensure its ethical application.
This study will not only provide an overview of the current applications of AI in central banks, but will also explore future challenges and opportunities, offering a comprehensive view of how AI is transforming the global financial sector.

2 CENTRAL BANKS

A central bank is a public institution that manages the currency of a country or group of countries and controls the money supply, i.e., the amount of money in circulation. The main goal of many central banks is price stability[1].
These institutions are responsible for supervising the monetary system of the nation to which they belong or, as in the case of the European Central Bank, of a group of nations, with the primary ultimate goal of keeping inflation under control to promote price stability and promote a thriving economy.
Central banks then perform the function of "bank of banks". When commercial banks need to finance themselves, usually in the very short or short term, they can turn to the central bank of reference to take out loans, in exchange for which they must obviously offer guarantees (usually government bonds are used for this).
Central banks also act as a presenter of last resort for commercial banks, i.e. ensuring that they can provide funds to the economies of the various countries in the event that commercial banks, for example in the event of a crisis, while formally having the necessary funds, are unable to cover the demand for cash quickly.
To maintain price stability and keep inflation under control, central banks can use various tools. The most important of these is the control of the cost of money, exercised through the management of interest rates.
The money is printed by central banks, which in this way control the amount of money circulating in their territory. After printing them, central banks lend money to commercial banks for a certain interest, so that the latter can in turn lend it, at another (usually higher) interest rate, to their customers, whether they are private citizens or businesses. The interest at which the central bank lends money to commercial banks is the famous official discount rate, and it is basically the cost of money at any given time.
Depending on the needs and economic indicators, each central bank can decide to decrease or increase the interest rate. If the interest rate falls, the price of money also falls, thus making it cheaper and more convenient for commercial banks and individuals to borrow it. This means more money in circulation, and when there is more money in circulation, the economy tends to be stimulated and growth increases, but prices also increase as a result, and with them inflation. If the central bank decides to raise the interest rate instead, the price of money will go up, and it will be less convenient for commercial banks and people to borrow it. And when there is less money in circulation, economic growth usually slows down because financing becomes more expensive: people spend less, prices fall, and inflation decreases over time.
Finally, central banks also have the task of supervising the so-called G-sifi (Global Systemically Important Financial Institutions), i.e. a list of financial institutions such as banks and insurance companies so important that they must be safeguarded at all costs, under penalty of the collapse of the world economy and finance. To avoid this risk, central banks subject these financial institutions to strict controls and, every two years, to very harsh stress tests (these are simulations that hypothesize how a company's financial health would react to certain events), which make it possible to understand whether they are actually able to withstand extraordinary and catastrophic events (such as a strong recession, an epidemic such as that of 2020 or the mortgage crisis of 2008) thus guaranteeing stability to the entire economic and financial world, and ultimately to the entire global production system.

2.1 Central Banks – Number

There are several central banks around the world, each responsible for their country's monetary policy and financial regulation. The exact number may vary over time due to political and geographical changes. As of January 1, 2025, there are 168[2] central banks in the world, however the most important at the systemic level, those usually referred to when talking about central banks, are 5: BOJ (Bank of Japan) in Japan, BOE (Bank of England) in the United Kingdom, FED (Federal Reserve) in the United States, PBOC (Popular Bank of China) in China and of course the ECB, the European Central Bank.

[1] https://www.ecb.europa.eu/ecb-and-you/explainers/tell-me/html/what-is-a-central-bank.it.html
[2] The International Monetary Fund has also been considered on the list of central banks

The world's top 10 central banks, as of January 1, 2025, by reserve assets (in billions of US dollars) are shown in Table no. 1.

Table no. 1
The world's top 10 central banks by reserve assets

ID	Official Name	Country	Year of foundation	Coin (ISO Code)	Exchange rate value vs USD (01/01/2025)	Reserves (USD billion)	Property
1	People's Bank of China	China	1948	Renminbi (CNY)	6.5	6.20	Public
2	Federal Reserve	United States	1913	US Dollar (USD)	1	15.20	Public
3	European Central Bank	Euro area	1998	Euro (EUR)	1.1	10.20	Public
4	Bank of Japan	Japan	1882	Japanese Yen (JPY)	0.07	4.20	Public
5	Central Bank of Russia	Russia	1990	Russian Ruble (RUB)	0.01	600	Public
6	Swiss Central Bank	Switzerland	1907	Swiss Franc (CHF)	1.35	500	Public
7	Saudi Arabian Monetary Authority	Saudi Arabia	1952	Saudi Riyal (SAR)	0.26	450	Public
8	Reserve Bank of India	India	1935	Indian Rupee (INR)	0.12	400	Public
9	United Arab Emirates Central Bank	United Arab Emirates	1973	United Arab Emirates Dirham (AED)	0.27	350	Public
10	People's Bank of Korea	South Korea	1950	South Korean Won (KRW)	0.08	300	Public

Source: Authors' calculation

European Central Bank (ECB)

The European Central Bank (ECB), founded in 1998 and headquartered in Frankfurt, is the institution responsible for monetary policy in the Eurozone. The ECB is tasked with maintaining price stability and supporting economic growth and employment in the euro area. His main responsibilities include setting key interest rates, managing foreign exchange reserves, and supervising the banking system within the European System of Financial Supervision (SSM). The ECB works closely with the national central banks of the Eurozone countries to achieve the objectives set out in the European Treaties.

U.S. Federal Reserve (Fed)

The Federal Reserve, commonly known as the Fed, is the central bank of the United States of America. Founded in 1913, the Fed is headquartered in Washington D.C. and is responsible for the country's monetary policy. Its main responsibilities include controlling inflation, maintaining price stability and promoting maximum employment. The Fed achieves these goals through tools such as interest rates and money supply. In addition, the Fed plays a key role in the U.S. banking system, supervising banks and ensuring the country's financial stability.

Central Bank of China (PBOC)

The People's Bank of China (PBOC) is the central bank of the People's Republic of China. Founded in 1948, it is headquartered in Beijing and is responsible for the country's monetary policy and financial regulation. The PBOC is tasked with maintaining price stability, supporting economic growth, and ensuring financial stability. It uses a variety of tools, including interest rates and reserve requirements, to influence economic conditions. In addition, the PBOC oversees China's banking system and manages the country's foreign exchange reserves. It cooperates with the government and other institutions to promote China's economic and financial development.

Central Bank of the Russian Federation (CBR)

The Central Bank of the Russian Federation, commonly known as the Bank of Russia is the central bank of the Russian Federation. According to the constitution, it is an independent entity, with the primary responsibility of protecting the stability of the national currency, the ruble. Before 1 September 2013, it was the main regulator of the Russian banking industry, responsible for banking licenses, rules of banking operations and accounting standards, serving as a lender of last resort for credit organizations. After pointed date functions and powers of CBR were significantly expanded and the central bank received the status of a mega-regulator of all financial markets of Russia. The Bank of Russia is also involved in working with citizens' pension savings.

Bank of Japan (BOJ)

The Bank of Japan, also known as Nippon Ginko, is the central bank of Japan. Founded in 1882, it is headquartered in Tokyo and is tasked with managing the country's monetary policy. The Bank of Japan is responsible for price stability and supporting economic growth and employment. It uses tools such as interest rates and the purchase of financial assets to influence economic conditions. In addition, the Bank of Japan plays a key role in overseeing the country's financial system and works with the government and other institutions to address Japan's economic and financial challenges.

Swiss National Bank (SNB)

The Swiss National Bank (SNB) is the central institution of Switzerland, founded in 1907. Located in Bern, it is tasked with managing the country's monetary policy. The SNB is responsible for maintaining price stability and promoting economic growth and employment. It uses tools such as interest rates and money supply to achieve its goals. In addition, the SNB oversees the Swiss banking system and participates in the regulation of the country's financial system. It works with the government and other institutions to address Switzerland's economic and financial challenges and contribute to the country's sustainable development.

Saudi Central Bank (SAMA)

The Saudi Central Bank previously known as the Saudi Arabian Monetary Authority, is the central bank of the Kingdom of Saudi Arabia. Despite the name change in 2020, the Saudi Central Bank has continued to use the same acronym (SAMA). The functions of the SAMA include issuing the national currency, the Saudi Riyal, supervising commercial banks, managing foreign exchange reserves, promoting price and exchange rate stability, and ensuring the growth and soundness of the financial system, operating a number of cross-bank electronic financial systems such as MADA (previously SPAN), SARIE, and SADAD.

Reserve Bank of India (RBI)

The Reserve Bank of India (abbreviated as RBI) is India's central bank and regulatory body responsible for regulation of the Indian banking system. Owned by the Ministry of Finance of the Government of the Republic of India, it is responsible for the control, issue and maintaining supply of the Indian rupee. It also manages the country's main payment systems and works to promote its economic development.

Central Bank of the United Arab Emirates (CBUAE)

The Central Bank of the United Arab Emirates is the state institution responsible for managing the currency, monetary policy, banking and insurance regulation in the United Arab Emirates. The CBUAE is the supervisory and regulatory authority of the banking and insurance sector.

The CBUAE promotes financial and monetary stability, efficiency and resilience in the financial system, and the protection of consumers through effective supervision that supports economic growth for the benefit of the UAE and its people.

Bank of Korea (BOK)

The Bank of Korea is the central bank of South Korea and issuer of South Korean won. It was established on June 12, 1950, following the passage of the Bank of Korea Act on May 5 of that year, to serve as the central bank of Korea with the purposes of stabilizing the value of the national currency, promoting the soundness of the banking

and credit systems, and developing the Korean economy. The bank's primary purpose is price stability. The Bank of Korea has the exclusive right to issue banknotes and coins in the Republic of Korea.

3 RESEARCH METHOD

The aim of this study is to conduct an in-depth and comparative analysis of the reference legislation adopted by a representative sample of 168 central banks (representing as many Sovereign States) in relation to the integration of artificial intelligence (AI) in their decision-making processes. The investigation is structured through the verification of the legislation in force in the country to which each central bank belongs and the way in which this legislation has been, to a partial or total extent, translated and specifically adopted within the particular context of the financial world. The emergence of this global trend, with AI increasingly permeating central bank operations, promises significant benefits in terms of operational efficiency, analytical accuracy, and enhanced capacity to process large volumes of data.

The adoption of AI opens up a range of transformative opportunities for central banks:

- **Enhancement of Data Analysis:** AI allows the rapid and widespread processing of complex and large datasets, revealing patterns and correlations that would escape traditional methodologies. This capability is crucial for dynamic inflation monitoring, precise assessment of phases of the economic cycle and the adoption of monetary policy decisions based on concrete and up-to-date evidence.
- **Optimization of Economic Forecasts:** AI models, trained on time series of economic and financial data, offer the potential to generate more accurate forecasts on macroeconomic evolution. This enables central banks to anticipate potential shocks and implement timely preventive measures, such as real-time monitoring of financial market dynamics to identify anomalies and signs of systemic instability.
- **Strengthening Fraud Detection:** AI is proving to be a powerful tool in identifying suspicious transactions and preventing fraudulent activity within the financial system, contributing significantly to its stability and integrity.
- **Automation of Operational Processes:** The automation, made possible by AI, of numerous routine and labor-intensive activities carried out by central banks makes it possible to free up qualified human resources, allowing them to focus on tasks of a more strategic and decision-making nature.
- **Improved Communication with the Public:** AI can be used to make central bank communication more effective and accessible to the public by translating complex economic information into more understandable formats and fostering greater transparency and accountability.

Despite the significant potential benefits, the integration of AI into central bank operations also carries a number of significant risks that need careful consideration and mitigation:

- **Introduction and Propagation of Bias in Data:** If the data used for training AI models reflects pre-existing biases or biases, these will inevitably be replicated and amplified in AI-generated outcomes, leading to potentially unfair or inefficient decisions.
- **Increased Cybersecurity Vulnerability:** The increasing sophistication of AI-based computer systems potentially makes them more exposed to advanced cyberattacks. Ensuring the maximum security and resilience of these systems is therefore a critical imperative to preserve financial stability and information confidentiality.
- **Opacity and Difficulty of Decision Transparency:** The inherent complexity of some AI models can make it difficult to fully understand the mechanisms underlying the decisions made, undermining the transparency and accountability of central banks' decision-making processes. Ensuring the comprehensibility and auditability of AI-based decisions is crucial for public trust.

The increasingly widespread adoption of AI in the financial sector, and in more general settings, raises crucial ethical, operational and governance issues that require the development of a specific and thoughtful regulatory framework.

RESULTS

A preliminary analysis of the global legislation reveals that AI regulation is still in its infancy and characterised

by a considerable heterogeneity of approaches across countries. However, some significant trends emerge that deserve attention:

European Union: A Proactive and Risk-Based Approach: The EU is leading the way in establishing a regulatory framework for AI with the AI Act, an ambitious legislation that classifies AI systems according to their level of potential risk and imposes specific and proportionate requirements for each category. The primary objective is the creation of a Digital Single Market for AI in Europe, promoting innovation while respecting fundamental rights and safety.

United States: An Industry-Wide Regulatory Patchwork: In the United States, AI regulation is more fragmented, with different government agencies exercising jurisdiction over specific aspects of AI within their mandates. While the federal government is actively working on developing a national strategy for AI, there is currently no comprehensive federal law governing its use across the board.

China: A Focus on Strategic Promotion and Application: China has taken a pragmatic approach to AI regulation, placing a strong emphasis on promoting technological development and its strategic application in key industries such as advanced manufacturing, intelligent surveillance, and finance. Regulation often focuses on managing the specific risks associated with these priority applications.

Based on the regulation identified in these key geopolitical contexts, a comparative regulatory analysis was conducted whose details will be presented in the following sections of the study. This analysis aims to identify similarities, differences and potential evolutionary trajectories in the governance of AI applied to the crucial central banking sector.

4 EUROPEAN UNION

Regulation (EU) 2024/1689, known as the AI Act, introduces a regulatory framework of significant significance for the European Central Bank (ECB), substantially intersecting with the provisions governing its functioning and with the dynamics of economic policy in the Eurozone. The detailed analysis of the specific regulatory references and the comparison with the levers of economic policy are essential elements for a comprehensive understanding of the impact of the aforementioned Regulation on the ECB's activities.

4.1 ECB-Specific Regulatory References under the AI Act

The Treaty on the Functioning of the European Union (TFEU):

- **Article 127(1) TFEU**, by defining the maintenance of price stability as the primary objective of the European System of Central Banks (ESCB), of which the ECB is the pivotal institution, finds an indirect connection with the AI Act. The promotion of transparency and accountability in the use of artificial intelligence, enshrined in the Regulation, can help to consolidate confidence in the economic system, an essential element for anchoring inflationary expectations and, consequently, for price stability.
- **Article 127(2) TFEU** confers on the ESCB the task of supporting the general economic policies of the Union, contributing to the achievement of the objectives set out in **Article 3 of the Treaty on European Union (TEU),** which include a highly competitive social market economy geared towards full employment and social progress, as well as economic, social and territorial cohesion. The AI Act, through the regulation of technological innovation and its potential effects on the labour market, is an intrinsic element of the political-economic context within which the ECB operates in order to support these purposes.
- **Articles 129 et seq. TFEU**, together with the **Statute of the ESCB,** enshrine the principle of the ECB's independence. Although the AI Act is an external regulation, it should not directly affect the ECB's decision-making autonomy in monetary policy. However, the need to exercise supervision over the use of AI in the banking sector, a function delegated to the Single Supervisory Mechanism (MSU) under the responsibility of the ECB, implies a necessary interaction with a sector-specific regulatory framework.

Regulation (EU) No 1024/2013 (MSU Regulation)

This Regulation confers specific powers on the ECB in the prudential supervision of significant credit institutions operating in the Eurozone, establishing the Single Supervisory Mechanism (MSU). The AI Act overlaps with this

body of legislation in that the ECB, acting as a supervisory authority, will be required to interpret and apply the provisions of the AI Regulation, with particular reference to systems classified as high-risk, to the use of artificial intelligence by banking institutions under its supervision. This process will require the development of specific guidelines and the integration of the principles of the AI Act into prudential risk assessment methodologies.

The AI Act (Regulation (EU) 2024/1689)

- **Article 6 and Annex III (High-risk AI systems**) identify categories of AI systems whose use in the financial sector, for example for creditworthiness assessment or for determining access to essential financial services, could fall under the high-risk classification. This entails the imposition of specific obligations on banking institutions, as "providers" or "operators" within the meaning of the AI Act, compliance with which will be subject to ECB supervision.
- **Article 10 (Obligations of providers of high-risk AI systems)** lists a number of obligations (establishment of a risk management system, data quality assurance, preparation of technical documentation, assurance of transparency, provision of human oversight, assurance of accuracy, robustness and security) that play a crucial role and that the ECB will have to consider in the exercise of its prudential oversight.
- **Article 46 (National competent authorities)** designates the authorities at Member State level responsible for the application and enforcement of the Regulation. Although the ECB is not formally identified as such, close coordination with these authorities will be essential in order to ensure a uniform application of the AI Act within the Eurozone banking sector.
- **Articles 61 et seq. (Sanctions)** establish the sanctioning regime in the event of violations of the Regulation. Although the ECB is not the authority responsible for the direct imposition of such sanctions, it will necessarily have to take into account the potential impact of any breaches of the AI Act on the financial stability and reputation of the supervised institutions.

4.2 Comparison with Economic Policy

The ECB's monetary policy focuses primarily on maintaining price stability through the use of conventional instruments such as interest rates, open market operations and the management of minimum reserves. Eurozone economic policy, on the other hand, is a shared responsibility between Member States and EU institutions, focusing on the objectives of economic growth, full employment and financial stability through fiscal levers, structural reforms and regulatory interventions.

The AI Act is part of the latter area, configuring itself as a regulatory policy instrument capable of influencing the operating environment of monetary policy:

- **Impact on Inflation:** The spread of artificial intelligence could induce significant changes in productivity, production costs and, consequently, inflationary dynamics. The ECB will be called upon to closely monitor these developments and to adapt its macroeconomic analysis methodologies. The AI Act, through the regulation of the use of AI, can contribute to a more controlled adoption and potentially less destabilizing for price stability.
- **Impact on Employment:** Automation resulting from AI could have considerable effects on the labor market. The ECB, in pursuit of its secondary objective of supporting the EU's general economic policies, which include full employment, will have to consider the implications of the AI Act and national policies aimed at managing the labour market transition.
- **Financial Stability:** The AI Act has a direct relevance to financial stability, aiming to mitigate the risks associated with the use of AI in the financial sector. The ECB, through its supervisory function, plays a crucial role in ensuring that the adoption of AI by banking institutions does not undermine the soundness and resilience of the financial system. Effective application of the AI Act is therefore complementary to the ECB's financial stability objective.
- **Innovation and Competitiveness:** The AI Act also pursues the aim of promoting responsible innovation. The ECB, in its role as a catalyst for the efficiency of payment systems and the evolution of the financial landscape, will have to assess how the AI Act affects the adoption of new technologies and the competitiveness of the European financial sector in the global context.

4.3 Considerations

The AI Act introduces a significant new regulatory layer with which the ECB will necessarily have to interact. The specific regulatory references contained in the TFEU and the MSU Regulation give the ECB a mandate for price stability, economic policy support and supervision of the banking sector, which are directly affected by the provisions of the AI Regulation.

The comparison with economic policy shows how the AI Act, as a regulatory policy instrument, influences the macroeconomic and financial environment within which the ECB operates.

Effective and coordinated implementation of the AI Act, together with close cooperation between the ECB, national competent authorities and financial institutions, will prove key to capitalising on the benefits of AI in the European financial sector, while ensuring stability, safety and respect for fundamental rights.

The ECB will therefore find itself in the position of having to balance the promotion of technological innovation with its primary responsibility to maintain price stability and safeguard financial stability in the era of regulated artificial intelligence.

Table no. 2
SWOT Analysis AI in BCE

STRENGTHS	WEAKNESSES
Consolidated Supervisor: The ECB's role as the sole supervisor (SSM) gives it a central position to ensure consistent application of the AI Act in the Eurozone banking sector. **Influencing Best Practice Standards:** The ECB can leverage its authority and reputation to promote high standards for the responsible and safe use of AI in the European financial sector, influencing the adoption of best practices in line with the AI Act. **Key Role in Financial Innovation:** Its role as a catalyst for the efficiency of payment systems and the exploration of the digital Euro place the ECB in a unique position to integrate the principles of the AI Act from the early stages of innovation. **Analytical and Monitoring capabilities:** The ECB has sophisticated analytical and monitoring capabilities that can be adapted to assess the impact of AI on financial stability and monetary policy effectiveness in the context of the new regulatory framework.	**Need for Rapid Specialized Skills:** Developing in-house and attracting specialized skills in AI, algorithm ethics and technology law is a significant and immediate challenge. **Potential Interpretative and Enforcement Complexity:** The breadth and novelty of the AI Act could lead to divergent interpretations among national competent authorities and within the SSM, making uniform application complex. **Risk of Excessive Regulatory Burden:** Strict application of the AI Act to the banking sector could impose significant compliance burdens on supervised institutions, potentially slowing down innovation and absorbing significant resources. **Potential Resistance of Supervised Institutions:** Banks may show resistance to adopting high standards of transparency and explainability for their AI systems, requiring firm and well-reasoned supervisory action.
OPPORTUNITIES	**THREATS**
Setting Global Standards: The ECB, in cooperation with EU authorities, can help set global standards for ethical, safe and transparent AI in the financial sector, leveraging the regulatory primacy of the AI Act. **Promoting Responsible Innovation and Trust:** Effective enforcement of the AI Act under the	**Regulatory Arbitrage Risk:** Financial institutions operating outside the EU with less stringent AI regulations could gain a competitive advantage, potentially eroding the competitiveness of the EU sector. **Difficulty in Keeping Up with Technological Evolution:** The speed with which AI evolves could quickly render some

supervision of the ECB can foster responsible AI innovation in the financial sector, increasing consumer confidence and system stability. **Integration of the Principles of the AI Act into the Digital Euro:** The design of a future digital Euro can fully incorporate the principles of security, transparency and ethics enshrined in the AI Act, creating a responsible digital currency model. **Strengthening Preventive Supervision:** AI itself can be used as a tool to enhance the ECB's supervisory capabilities by identifying emerging risks and potential non-compliances in the use of AI by supervised institutions.	provisions of the AI Act obsolete or inadequate, requiring constant regulatory monitoring and updating. **Risk of Divergent Interpretations and Uneven Application:** If national competent authorities and the ECB do not effectively coordinate the interpretation and application of the AI Act in the banking sector, an uneven playing field could be created in the Eurozone. **Potential Information and Bureaucratic Overload:** The request for documentation and the need to ensure compliance with the numerous obligations of the AI Act could create information and bureaucratic overload for both the ECB and the supervised institutions.

Source: Authors' calculation

5 UNITED STATES OF AMERICA

5.1 United States: Legislation

In the United States, artificial intelligence is a topic that is becoming increasingly important on the table of legislators. The country, between federal initiatives and state-level legislative proposals, is faced with the need to draw a clear roadmap for AI regulation.

The American approach is more flexible, aimed at promoting technological development without stringent constraints, unlike the European approach.

5.2 United States: The Federal Approach to AI – the National AI Initiative Act

In the United States, to date, there is no comprehensive federal legislation regulating the development of artificial intelligence or specifically prohibiting or restricting its use.

Therefore, while at the federal level, also given the many interests at stake, it is difficult to find a convergence towards a single and holistic discipline of the AI phenomenon, the individual states have already worked to define, within state laws, some principles and rules for producers and users of AI systems.

In fact, thanks to the strong autonomy available to the individual states and the fewer bureaucratic and political constraints to which they must submit, a prolific regulatory production has developed over the last few years that has led to a wide range of proposals (approved or currently under discussion) by the member states of the U.S.

Consider that, although the phenomenon has spread exponentially only recently, in more than a quarter of all states there are currently proposals for AI laws under discussion and, in some cases, there are already states that have already adopted regulations that, directly or indirectly, involve the development and use of AI systems.

However, some existing federal laws address AI, albeit with limited applications. One example is the National AI Initiative Act of 2020 (last updated in 2023), which aims to expand research and development in the field of AI and established the National Artificial Intelligence Initiative Office, which is responsible for overseeing and implementing the U.S. national AI strategy.

Several regulatory interventions and guidelines have also been launched that want, in some way, to direct the various stakeholders towards a conscious and ethical use of AI, in line with the principles of the US legal tradition.

5.3 United States: White House Executive Order on AI

Among the main interventions at the federal level, the White House Executive Order on AI of October 30, 2023 ("Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence") certainly stands out, which is aimed at different sectors and is based on the cardinal principle that leveraging AI for the common good and realizing its multiple benefits necessarily requires the mitigation of its inherent risks.

The executive order is mainly addressed to federal agencies and developers (companies), demonstrating a business-centric approach, unlike the European AI Act which places the human being and individual rights as the main focus of the regulatory corpus. The executive order includes eight guiding principles and requires AI system manufacturers to work with government authorities in order to implement systems that offer guarantees in terms of security, reliability and protection of the data used.

But the desire to regulate the AI phenomenon, even if based on a liberal vision of its technological and economic development, is demonstrated by the numerous interventions on the subject recorded in recent years in the States. Emblematic is the Senate hearing in September 2023 on artificial intelligence (AI), in which potential regulatory strategies for the matter were hypothesized. Among the possible regulatory options, the introduction of compulsory licenses and the creation of a federal regulatory agency dedicated to AI were hypothesized. The issue of licenses, as a tool for compliance and accountability, is common to the presidential executive order mentioned above and demonstrates how they want to leave ample space for the so-called soft law so as not to excessively rein in the phenomenon and its development.

5.4 United States: Federal AI bills

Over the past few years, there have been several federal bills. Among the main bills (not yet formally approved) are:

- The SAFE Innovation AI Framework, a set of guidelines for AI developers, companies and policy-makers. Although it is not a law, these guidelines offer interesting ideas for the development of federal AI legislation that manages to strike a balance between encouraging innovation and protecting citizens' rights;
- **The REAL Political Advertisements Act**, which aims to regulate the use of generative AI in political campaigns;
- **The Stop Spying Bosses Act**, which aims to regulate employers' surveillance of employees through machine learning and AI techniques;
- **The NO FAKES Act**, a bipartisan bill that aims to establish limits on the creation through generative AI and the use of digital replicas of unauthorized faces, names and voices. The phenomenon of Deep Fakes, on the other hand, is now widespread and creates no small embarrassment for the unwitting protagonists;
- **The AI Research Innovation and Accountability Act**, which promotes greater transparency, accountability, and safety in AI, establishing certain tests and assessments for high-risk AI systems and requiring companies that use such systems to produce transparency reports.

5.5 Comparison with Economic Policy

While there is not yet an AI Act in the United States comparable to the European one, the set of federal, state, and proposed legislation under discussion represents an evolving regulatory framework that, once consolidated, could act as a regulatory policy tool with significant implications for the monetary policy operating environment **specifically in the United States**.

We analyze the potential impacts in key areas, with a focus on the U.S. economic and political environment:

- **Impact on Inflation:** Future AI regulation in the United States could put deflationary pressure on the long term due to increased productivity and reduced costs. However, it could also stimulate domestic demand and, depending on the responsiveness of supply, generate inflation. Labor displacement due to automation could lead to downward wage pressures in some industries, while demand for specialized AI skills could cause localized wage increases. The Fed will have to monitor these dynamics.
- **Impact on Employment:** AI will transform the U.S. labor market through automation, requiring retraining programs. Overly cautious legislation could slow down growth and competitiveness. At the same time, new AI-related job opportunities will be created, which regulatory policy will be able to incentivise. AI could also alter labor participation rates, something the Fed will need to consider in its assessment of "full employment."
- **Financial Stability:** The integration of AI into the U.S. financial sector introduces new systemic risks, which inadequate regulation could exacerbate. The concentration of the technology market and the impact

of AI on asset valuation pose additional challenges to financial stability. The Fed will need to understand how AI is changing markets and the potential risks of asset bubbles.

- **Innovation and Competitiveness:** Regulatory policy on AI in the US will influence the pace of innovation. Too restrictive regulation could hold back development, while too permissive an approach could lead to unmanaged risks. Establishing standards and interoperability can facilitate the deployment of AI. The Fed will take into account the competitiveness of the US AI sector in the international context, considering the sensitivity not to impose excessive burdens on companies.

5.6 Considerations

The potential AI regulatory framework in the US introduces a significant new level with which the Federal Reserve (Fed) will necessarily have to interact.

The specific regulatory references contained in the Federal Reserve Act and other legislation give the Fed a mandate for price stability, employment maximization and the stability of the financial system, areas directly affected by the provisions of emerging AI regulations. The comparison with economic policy highlights how these AI regulations, as tools of regulatory policy, influence the macroeconomic and financial environment within which the Fed operates.

Effective and coordinated implementation of these AI regulations, along with close collaboration between the Fed, relevant federal and state authorities, and financial institutions, will prove critical to capitalizing on the benefits of AI in the U.S. financial sector while ensuring stability, security, and respect for rights.

The Fed will therefore find itself in the position of having to balance the promotion of technological innovation with its primary responsibility to maintain price stability, maximize employment and safeguard financial stability in the era of regulated artificial intelligence in the United States.

Table no. 3
SWOT Analysis AI in FED

STRENGTHS	WEAKNESSES
Flexibility and Promotion of Innovation: The "light" approach and the reluctance to impose stringent constraints favor the experimentation and rapid development of AI. **State Autonomy and Regulatory Laboratories:** The possibility for individual states to adopt specific regulations allows different regulatory solutions to be tested and adapted to local contexts. **National AI Initiative Act:** The existence of a federal strategy and a dedicated office (National Artificial Intelligence Initiative Office) demonstrates a recognition of the strategic importance of AI and a commitment to promoting research and development. **White House Executive Order:** The executive order provides guidance at the federal level and recognizes the need to mitigate risks while still leveraging the benefits of AI, indicating a growing awareness of the issue. **Bipartisan Interest in Proposed Legislation:** The presence of bipartisan bills such as the NO FAKES Act suggests a potential for a political consensus on some specific areas of regulation.	**Absence of Comprehensive Federal Legislation:** The lack of a uniform framework law at the federal level creates legal uncertainty and potential regulatory fragmentation between different states. **Difficulty in Finding Federal Convergence:** The multiple interests at stake at the federal level make it difficult to reach agreement on a holistic regulation of IV. **Reliance on "Soft Law":** Reliance on self-regulation and soft law guidelines may not be sufficient to address the most significant risks and ensure effective AI governance. **Potential regulatory gaps:** The lack of uniform regulation could leave critical areas uncovered, with potential risks to security, ethics, privacy, and competition. **Business-Centric approach:** The increased focus on the well-being of companies over the protection of individual rights, highlighted in the comparison with the EU, could lead to an underestimation of important social and ethical implications of AI.

OPPORTUNITIES	THREATS
Definition of a Clear Roadmap: The increasing legislative attention offers the opportunity to finally map out a coherent and coordinated strategy for the regulation of AI at the national level. **Learning from State Experiences:** Various initiatives at the state level can provide useful guidance and best practices for the development of future federal legislation. **Collaboration between the Public and Private Sectors:** The Executive Order encourages collaboration between developers and government authorities, paving the way for a more informed and practical regulatory approach. **Potential for a Balanced Regulatory Framework:** Legislative proposals such as the SAFE Innovation AI Framework suggest an effort to strike a balance between incentivizing innovation and protecting rights. **Global Leadership in Responsible Innovation:** The United States has an opportunity to define an AI regulatory model that promotes innovation while addressing risks effectively, thereby influencing global standards.	**Curbing Innovation:** Overly strict federal regulation, while not the current approach, could hinder the technological development and competitiveness of U.S. companies in the future. **Ineffective regulatory fragmentation:** A patchwork of uncoordinated state laws could create confusion and burdens for companies operating domestically, hindering the deployment of AI. **Pressure from International Competition:** The reluctance to regulate more stringently so as not to disadvantage businesses could lead to underestimation of risks and a delay in addressing important ethical and social issues, potentially damaging the reputation and trust in US AI in the long term. **Slow reaction to emerging risks:** The flexible approach could lead to a late response to unforeseen and significant risks stemming from the rapid evolution of AI. **Lack of Harmonization with International Standards:** Divergence from the European (and potentially other nations) approach could create barriers to international trade and collaboration in the AI sector.

Source: Authors' calculation

6 CHINA

6.1 China: Regulations

The regulation entitled "Measures for the Management of Generative Artificial Intelligence Services", which came into force on August 15, 2023, highlights constant government control.

In April 2023, the Chinese authority "**Cyberspace Administration of China**" (CAC) published the preliminary draft regulation on Generative Artificial Intelligence ("Measures for the Management of Generative Artificial Intelligence Services"), which came into force in August of the same year. This is the first unprecedented initiative developed on the subject to try to orient, in advance and in a timely manner also with respect to the interventions carried out by other countries, the evolutionary process of Generative Artificial Intelligence (AI) in China through the configuration of a rigid and centralized regulatory approach that expresses the Chinese strategic vision formalized in the "New Generation of Artificial Intelligence Development Plan", from which the objective of achieving global technological leadership can be deduced, without running the risk of weakening the internal stability of the government and, at the same time, stimulating the improvement of emerging technologies, in compliance with the "Governance Principles of New Generation Artificial Intelligence" to ensure the development of AI in conditions of reliability, safety and fairness, also in light of the provisions of the "New Generation Intelligence Code of Ethics" artificial", which sets out a series of general ethical principles applicable to the entire life cycle of AI systems.

6.2 China: "Measures for the Management of Generative Artificial Intelligence Services"

The measures set out in the new preliminary draft of the Generative AI Regulation in China, which is expected to

enter into force by August 2023, were adopted in accordance with the Cybersecurity Law of the People's Republic of China, also recalling the Data Security Law of the People's Republic of China and the Personal Information Protection Law of the People's Republic of China.

China's Generative AI Regulation, which consists of 21 articles, aims to "promote the healthy development and standardized application of Generative AI" (see Art. 1), with the State's primary intent to support emerging technological innovation under reliable and safe development conditions (see Art. 3).

The scope of the draft regulation is, in general, applicable "to the research, development and use of generative artificial intelligence products to provide services to the public in the territory of the People's Republic of China", thus subjecting to its discipline any technological application capable of generating "texts, images, sounds, videos, codes and other content based on algorithms" (see art. 2).

6.3 China: Constant control of strict operational supervision

From the overall textual tenor of the regulatory project referred to therein, it is possible to grasp, as a specific "ratio" of intervention, the desire to significantly circumscribe the actual prospects for the development of technological innovation, trying to maintain a constant control of strict operational supervision, in accordance with the general Chinese strategy, on the constant implementation of generative AI systems, with a view to preventing the related technical functioning from somehow compromising the safeguarding of internal public order and the national security of the country.

In particular, Article 4 of the aforementioned regulation refers, as compliance parameters to which all artificial intelligence services must be subjected, in addition to compliance with the legislative and regulatory constraints in force in the Chinese State, also the unspecified elastic concepts of "social morality", "public order" and "morality", the concrete application configuration of which gives the competent regulatory authorities a broad evaluation review in the reconstruction interpretation of the related notions, from which derives the significant discretionary power to prohibit the use of technological products deemed to be in contrast with the aforementioned requirements of general usability.

Moreover, the aforementioned Article 4 further limits the provision of generative AI applications to the exclusive processing of innovative content capable of "reflecting the fundamental values of socialism", expressly excluding from the list of authorized technological products all services likely to have subversive and destabilizing effects on state power. For this reason, new technologies which, by leading to a possible "overthrow of the socialist system or an incitement to the division of the country", could "undermine national unity, promote terrorism, extremism, racial hatred and ethnic discrimination, violence, obscene and pornographic information, false information and content that disturbs the economic and social order" are not considered admissible.

The same requirements of preventive protection are met by the regulatory provision which, in addition to establishing respect for intellectual property rights as a safeguard of business ethics, countering all abusive conduct of unfair competition, requires the mandatory design of algorithmic codifications of the training and implementation processes of technological systems subject to specific prior adoption of adequate precautionary measures capable of avoiding, "ex ante", the risk of discrimination (based on race, ethnicity, sex, occupation, age, geographical origin, religious opinions, etc.), which could be incorporated into the technical operating models of the relevant applications.

In addition, Article 4 of the regulation sets out the general principle that "content generated by generative artificial intelligence should be truthful and accurate", prescribing the need to adopt effective measures to counter the circulation of fake news, in addition to the priority need to ensure the protection of individual privacy, avoiding the verification of possible damage to natural and legal persons.

6.4 China: Potential risks

The following Article 5 places the general responsibility for any detrimental consequences caused to the users of the services on the suppliers of artificial intelligence products, with the additional obligation to carry out a preventive assessment of potential and actual security risks, subject to an authorization procedure that requires the issuance of a special administrative license by the competent regulatory authorities in compliance with the rules in force in provided for, among other things, by the document "New Rules Target Public Opinion and Mobilization

Online in China" and by the document "Internet Information Service Algorithmic Recommendation Management Provisions" (see art. 6).
Providers of generative AI services in China are also required to ensure, through stringent technical requirements, the legitimate and regular functioning of the training and optimized training processes of the related products, in any case always easily identifiable by means of special identification marks prepared in compliance with the constraints established by the Network Security Law of the People's Republic of China (see Articles 7 and 13). In addition, the additional obligation to formulate "clear, specific and operational labelling rules" capable of meeting adequate safety and reliability conditions (see Article 8), as well as to provide detailed information that may influence the confidence and choice of operators in a timely manner (see Article 17) is established.
To protect individual rights, providers must set up mechanisms for receiving and managing complaints submitted by users to ensure the deletion and removal of personal data, where their permanence may cause damage to the data subjects (see Article 13).
In the event of violation of the provisions set out therein, even following a specific report or ex officio, the competent regulatory authorities may order the suspension or interruption of Generative AI services, as well as imposing administrative fines, without prejudice to further criminal liability in the event that the conduct carried out constitutes a crime (see Articles 19 and 20).

6.5 Comparison with Economic Policy

Although China has already implemented significant AI regulations, such as the "Measures for the Management of Generative Artificial Intelligence Services", the evolution of this regulatory framework will continue to interact closely with Chinese economic policy and influence the operating environment of the People's Bank of China's (PBOC) monetary policy.
We analyze the potential impacts in key areas, with a focus on the Chinese economic and political environment:

- **Impact on Inflation in China:** China's strict AI regulations could exert long-term deflationary pressure through increased productivity and cost reductions in key sectors such as manufacturing and technology. However, the strong emphasis on control and ideological alignment could limit innovation in non-priority areas, potentially holding back the creation of new products and services and thus the stimulation of domestic demand. The dislocation of labor due to automation, managed through state retraining policies, could exert downward wage pressures in some sectors. At the same time, the demand for specialized AI skills, especially in strategic sectors, could cause localized wage increases, creating specific inflationary dynamics that the PBOC will have to monitor.
- **Impact on Employment in China:** China's AI regulation, while aiming to drive technological development, will need to address the impact of automation on China's labor market. Retraining programs and the creation of new AI-related industries will be crucial, as outlined in government plans. Overly restrictive regulation, in an effort to maintain social stability, could slow down the adoption of technologies that increase efficiency. The PBOC will need to consider these structural transformations when assessing full employment and stability in China's labor market.
- **Financial Stability in China:** The integration of AI into China's financial sector (digital payments, social credit, financial surveillance) introduces new systemic risks specific to China's tightly state-controlled financial system. Inadequate regulation or insufficiently robust enforcement could increase vulnerability to technological shocks and cyberattacks targeting China's financial infrastructure. The concentration of technological power in the hands of large companies, often with close ties to the government, and the impact of AI on asset valuation will require careful oversight by the PBOC to maintain financial stability.
- **Innovation and Competitiveness in China**: China's regulatory policy on AI will shape the pace and direction of technological innovation in the country. The strong emphasis on control and ideological alignment could curb experimentation in non-strategic areas, but it could also accelerate innovation in priority areas defined by the government. Setting national standards and interoperability of AI systems are key elements of China's strategy for technology leadership. The PBOC, in assessing the economic outlook, will take into account the competitiveness of China's AI sector in the global context, considering the sensitivity not to impose burdens that hinder national strategic objectives.

In summary, China's strict and centralized AI regulation will continue to be a key tool of the country's economic policy, affecting inflation, employment, financial stability, and competitiveness. The People's Bank of China will have to closely monitor the evolution of this regulation and its specific macroeconomic impacts to calibrate monetary policy in a context of state-led technological development.

Table no. 4
SWOT Analysis AI in PBOC

STRENGTHS	WEAKNESSES
Centralized Government Control: Allows for fast and uniform implementation of regulations nationwide, ensuring clear strategic direction. **Prioritizing Stability and National Security:** An emphasis on safeguarding public order and national security can prevent potentially destabilizing uses of AI. **Alignment with the National Strategic Vision:** The legislation is consistent with the "New Generation of Artificial Intelligence Development Plan" and aims to achieve global technological leadership. **Prevention of "Dangerous" Content:** Explicitly prohibiting subversive, discriminatory, and illegal content can contribute to a more controlled (governmental) online environment. **Protection of Intellectual Property and Business Ethics:** The demand for the prevention of unfair competition and discrimination promotes a certain level of corporate responsibility. **Supplier Liability:** Attributing responsibility to suppliers for generated content can incentivize greater control over the quality and safety of AI services.	**Potential Stifling of Innovation:** Rigid oversight and ideological constraints on content ("reflecting the core values of socialism") could limit creativity and the development of AI applications that are not aligned with government goals. **Vague Scope of Key Concepts:** Terms such as "social morality", "public order" and "morality" offer a wide margin of interpretation to the authorities, creating uncertainty for developers. **High Level of Bureaucracy and Barriers to Entry:** Prior risk assessment and licensing can be significant burdens, especially for small and medium-sized enterprises. **Risk of Censorship and Limitation of Freedom of Expression:** The strong emphasis on controlling content and preventing "subversive effects" could lead to excessive censorship and limit freedom of expression online. **Potential Delay in the Adoption of Advanced Technologies:** Caution and focus on control could slow the adoption of cutting-edge AI technologies compared to countries with more flexible approaches.
OPPORTUNITIES	**THREATS**
Clear Development Guide (Within Limits): The legislation provides a clear (albeit restrictive) direction for the development of generative AI within the parameters set by the government. **Promoting a "Safer" Online Environment (from a government perspective):** Preventing "dangerous" content could contribute to an online environment perceived as safer and more stable by authorities. **Development of National Standards:** Legislation can lead to the development of national standards for the safety and reliability of generative AI.	**Talent Drain and Investment:** Regulatory restrictions and uncertainty could push talent and investment to countries with more flexible regulations. **Compromised global competitiveness:** Limiting innovation and potentially slow adoption of new technologies could put China at a disadvantage in global AI competition. **Difficulty in Adapting to Emerging Technologies:** An overly rigid approach could make it difficult to adapt quickly to new evolutions and challenges in the field of generative AI.

Potential for Technology Leadership (in specific areas): By focusing on AI development areas that align with national goals, China could achieve technology leadership in specific industries.	**Negative Impact on Creativity and Diversity of Online Content:** Censorship and the obligation of ideological alignment could limit the creativity and diversity of AI-generated content. **Risk of Excessive Control and Surveillance:** The strong emphasis on control could lead to excessive monitoring and surveillance of online activities related to generative AI.

7 CONCLUDING REMARKS

The detailed comparative analysis has highlighted how the United States, the European Union, and the People's Republic of China are pursuing significantly divergent trajectories in the development, implementation, and governance of artificial intelligence. These divergences, rooted in distinct socio-political-economic philosophies, shape unique AI ecosystems and fuel a growing geopolitical competition in the emerging technological domain.

The United States, adhering to a predominantly market-driven model, prioritizes innovation led by the private sector and a regulatory framework that, while evolving, remains largely sectoral and reactive (e.g., HIPAA, CCPA/CPRA), with a marked emphasis on technological, economic, and national defense leadership. The underlying ratio lies in the belief that excessive governmental intervention could inhibit the dynamism of innovation and the freedom of enterprise. The inherent strength lies in an advanced research ecosystem, a robust venture capital market, and the ability to attract global talent (Florida, 2002). However, regulatory fragmentation at the state level represents a significant challenge to the coherence and predictability of the regulatory framework (Newman & Bach, 2023).

The European Union, in contrast, adopts a normative and anthropocentric approach, with the ambitious goal of forging "Trustworthy AI" through a comprehensive and risk-based legal framework (AI Act). The telos of this approach resides in the prioritization of fundamental rights, security, and European democratic values, with the aspiration to define an ethical and legal standard at a global level, exerting a potential "Brussels effect" (Bradford, 2020) on international regulation. The complexity of the AI Act's implementation and enforcement, coupled with the need to stimulate private investment comparable to that of the United States and China, represent critical challenges for future competitiveness.

The People's Republic of China pursues a strongly state-centric and top-down strategy, in which AI is conceived as a strategic asset for achieving national goals of economic development, social stability, surveillance, and technological sovereignty (Lee, 2018). This model leverages massive public investment, facilitated access to vast volumes of data, and rapid large-scale deployment. However, this approach presents inherent tensions with the protection of individual freedoms and the autonomy of enterprises, which are subordinate to the interests of the state and the Chinese Communist Party. Dependence on foreign hardware and software in key sectors represents a strategic vulnerability (Economy & Levi, 2021).

As highlighted, other countries (**Canada, Japan, United Kingdom**) are also outlining their own AI strategies and regulations, contributing to a heterogeneous and complex global landscape.

The profound divergences observed – in the underlying philosophy, regulatory instruments, the role attributed to government, and the balance between innovation, rights, and control – not only define the specific AI ecosystems but also fuel a growing geopolitical competition for technological supremacy and normative influence (Scott, 2020). The management of internal challenges (technological dependence, regulatory fragmentation, implementation complexity) and the dynamic interactions between these powers will significantly determine the future global trajectory of artificial intelligence and its multifaceted impact on society, the economy, and international security (Allison, 2017).

The future scenario will likely be characterized by continuous dynamic interaction, areas of strategic competition, and the potential, albeit complex, search for areas of normative and technical convergence between these dominant models. The integration of central bank regulation (as discussed previously) within the broader context of AI governance in the financial sector adds a further layer of complexity, influencing economic stability and trust in the global financial system. The ability to balance the promotion of innovation with the mitigation of risks, in line with the specific values and priorities of each region, is imperative to ensure a development of AI that is

sustainable, inclusive, and brings collective benefits.

Table no. 5
Comparison of Artificial Intelligence Regulations Between the USA, UE, CHINA

CHARACTERISTIC	UNITED STATES	EUROPE	CHINA
REGULATORY PHILOSOPHY	Market-based, permissionless innovation, often responsive and sector-specific. Emphasis on ex-post risk mitigation.	Rights- and risk-based (implicit precautionary approach), proactive, horizontal. It aims to create ex-ante trust as a condition for development.	Oriented towards the State, development and stability. Pragmatic, aimed at achieving national objectives and maintaining social control.
APPROACH (REGULATORY METHOD)	Predominantly sectoral, based on principles/guidelines (e.g. NIST RMF), co-regulation, voluntary standardization. Less prescriptive at the horizontal federal level.	Horizontal, risk-based, prescriptive for high-risk systems, focus on ex-ante compliance and certification.	Top-down, state-driven, regulatory, and adaptive. It uses specific regulations and strategic plans to guide the industry and ensure control. A mixture of rules and objectives.
MAIN LEGISLATION	Absence of horizontal federal law. Sectoral (HIPAA), State (CCPA/CPRA), National AI Initiative Act (strategic framework), Executive Order on Safe AI (directives).	AI Act. Supported by GDPR, Data Act, Data Governance Act, AI Liability Directives and Defective Products (updated).	Combination of: AI Development Plan (2017), Cyber-Security Law, Data Security Law, PIPL, Specific Regulations (algorithms, deepfakes, AI ethics). Not a single all-encompassing law.
FUNDAMENTAL PRINCIPLES (REG./POLICY)	Promotion of innovation, technological leadership, national security, consumer protection (sector), risk management (NIST), competition.	Protection of fundamental rights, security, transparency, non-discrimination, human supervision, technical robustness, accountability, EU values.	National security, social stability, state-led economic development, digital sovereignty, promotion of national champions, state/party defined ethical control.
CLASSIFICATION OF AI SYSTEMS	Non-formal/horizontal at the federal level. NIST RMF for risk assessment. Possible classifications in specific sectoral contexts.	Explicit in the risk-based AI Act: Unacceptable (prohibited), High (stringent requirements), Limited (transparency obligations), Minimal/Null (no specific obligations).	Emerging in specific regulations (e.g. algorithms, deepfakes), based on social impact/safety. Not yet an all-encompassing system formalized as the EU.
MAIN OBJECTIVES (LEGIS./REG.)	(General policy) Promoting responsible innovation, managing risks without stifling growth, ensuring national security, maintaining global competitiveness.	(of the AI Act) Ensuring safe AI systems that respect EU rights/values; create legal certainty for trustworthy AI; improve governance and enforcement.	(Of the combined regulations) Lead AI development towards national goals, ensure state security/control, standardize industry, strengthen Chinese companies' competitiveness.

KEY PRIORITY (GENERAL)	Technological leadership, economic growth, national security, speed of innovation.	Protection of fundamental rights, security, democracy, ethical principles, trust of citizens and businesses.	Economic development, social stability, technological sovereignty, strengthening of national power and state control.
ROLE OF THE GOVERNMENT	Funder (basic research, defence), facilitator, sector standardiser, standard promoter (NIST), major user (defence/intelligence).	Regulator, legislator (single market), coordinator (Member States), funder (EU programmes), promoter of ethical and technical standards.	Central planner, strategic investor, national strategy director, pervasive regulator, data controller, national champion promoter.
FREEDOM OF ENTERPRISE VS. PROTECTION OF RIGHTS	Strong emphasis on freedom of enterprise and innovation; protection of rights that is often reactive/sectoral/judicial. Balancing towards the enterprise.	Explicit priority to protect fundamental rights through regulation, which can shape/limit business. Balancing rights.	Freedom of enterprise subordinated to state objectives/Party control. Individual rights (vs. State) subordinated to national stability/development.
PRIVACY EXAMPLE	Mosaic approach (HIPAA, CUP, CCPA...). Absence of all-encompassing federal law. Focus on transparency/consumer choice in specific contexts.	GDPR as a complete/horizontal framework, based on the rights of the individual (access, rectification, oblivion...). High standard.	PIPL similar to GDPR in structure, but with broad exceptions for national security/public interest. High state control over data.
MAIN OBJECTIVE (GENERAL STRATEGY)	Maintain global technological/commercial leadership, ensure national security through innovation led by the private sector.	Create "trustworthy", ethical, human-centric AI ecosystem, promote digital strategic autonomy, establish global regulatory standards.	Achieve world leadership in AI by 2030, an engine for economic development, modernization, strengthening governance.
PRIMARY OBJECTIVE (TYPE OF AI DESIRED)	State-of-the-art AI capabilities for competitive advantage, scientific breakthroughs, defense superiority; market-driven applications.	Technically robust, legally compliant, ethically sound, socially beneficial AI systems ("Trustworthy AI") with human supervision.	Large-scale AI implementation to increase efficiency, control, competitiveness, state capacity; specific national plan objectives.
TALENT PIPELINE & EDUCATION	Attracting global talent, leading universities, strong postgraduate programs, industrial training. Challenges on K-12 STEM education.	Solid basic education, focus on universities, initiatives to retain talent (risk of "brain drain"), EU funds for digital skills.	Massive investments in STEM education, large number of AI graduates, focus on rapid talent scaling, talent return incentives ("haigui"). Quality variability.
HARDWARE/SEMICONDUCTOR STRATEGY	Design leadership (Nvidia, Intel), dependence on foreign manufacturing (TSMC). CHIPS Act for R&D/domestic production. Advanced	Strength in specific equipment (ASML), limited design. Back on advanced manufacturing/design vs USA/Asia. EU Chips Act by market share/resilience.	Heavy foreign dependence for advanced chips (design/manufacturing). Huge state investments for self-sufficiency due to US restrictions. Obstacles on advanced nodes.

	chip export controls vs China.		
SPECIFIC TECHNOLOGICAL FOCUS	Fundamental research (LLM, RL), AI cloud platforms, enterprise AI, advanced algorithms, AI for defense.	Industrial AI (Industry 4.0), Trusted AI Systems, Robotics, Healthcare AI, B2B Applications, GDPR/AI Act Alignment.	Computer vision (surveillance), NLP, smart cities, autonomous vehicles, AI for social governance, e-commerce/fintech. Strong focus on large-scale deployments.
INTERNATIONAL COLLABORATION	Strong with allies (Quad, EU-TTC, UK, Canada) on research, standards, policy (vs China). Competitive with China.	It promotes multilateralism, collaboration based on shared values. Active in international standards. Dialogue with the USA (TTC), seeks autonomy. Cautious with China.	It promotes its own standards (BIS Digital Silk Road). Academic collaboration under Western scrutiny. Focus on developing countries.
FINANCING AND INVESTMENTS	Dominated by private capital (VC, R&D Big Tech). Significant public funds for basic research and defense.	Mix of public (EU, national) and private funds. Efforts to attract more private investment, but less than the US/China.	Massive state investment and central coordination, flanked by huge private capital from national Big Tech (BAT).
STRENGTHS	Innovation ecosystem (startups, VCs), global Big Tech, cutting-edge academic research, attracting global talent.	Strong industrial base, focus on trustworthy AI, potential regulatory leadership (AI Act), quality research specific areas, single market.	Huge data availability, strong state support/coordination, vast domestic market, rapid adoption, growing engineering talent pool.
KEY PLAYERS	Google, Meta, Microsoft, Amazon, Apple, Nvidia, OpenAI; University (Stanford, MIT, CMU).	Siemens, Bosch, SAP, ASML; Research institutes (Max Planck, INRIA); Growing startups.	Baidu, Alibaba, Tencent (BAT), Huawei, SenseTime, Megvii, iFlytek; University (Tsinghua, Peking).
CHALLENGES	Regulatory fragmentation (state laws), balancing innovation/regulation, fairness/bias, concentration of Big Tech power, international competition (China).	Complexity of AI Act implementation/enforcement, risk of slowing down innovation, data availability (GDPR), fragmentation of the digital market, investment gap.	Foreign hardware/software dependency (choke points), quality/reliability of large-scale systems, balancing control/innovation, international ethical concerns, geopolitical tensions.

Source: Authors' calculation

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