Game-Theoretic Framework for International AI Cooperation: Comparative Case Study of China and India

Yichen Wu[a]
SSFBC- The High School Affiliated to Shaanxi Normal University, Xi'an, Shaanxi, 710061, China

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Abstract: In this era of rapid AI development, many countries and industries have benefited from this new technology. Due to the emergence of AI, many researchers have researched policies of AI development and forecasted the future development tendency of AI. However, few have addressed global AI inequality through mathematical and economic lenses, and policy conflicts of AI between different countries as well. To bridge this gap, this paper employs a game-theory model to analyze the lack of global cooperation in AI development. At present, it provides suggestions to solve this inequality situation. China and India are employed as representatives of dominant AI countries and AI developing countries, respectively. AI technology in China has developed quickly in recent years because China has overcome technical obstacles, exemplified by breakthroughs like Deepseek, China has successfully ascended to the rank of dominant AI countries. India is an AI-developing country with many skilled people, but India fails to retain them domestically, and India does not have enough technology and money to do further research in AI development. The article summarizes both external and internal reasons for the global AI development inequality problem. Then, suggestions from these two aspects based on the mathematical calculation in the game theory model and reasons for the problem that have been analyzed will be provided. Finally, the author indicates the significance and limitations of this research.

1 INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has transformed industries such as healthcare, law, finance, and education, demonstrating significant scalability (Hine & Floridi, 2024). However, AI adoption remains uneven globally. Post-pandemic data reveals a 28% growth in AI investment in developed nations compared to just 9% in developing economies, exacerbating global AI inequality.

The U.S. dominates AI innovation, exemplified by ChatGPT. Studies show GPT-3 achieves an IQ of ~150 (99.9th percentile), while GPT-3.5 excels in professional certification exams (Ray, 2023). Its applications span finance, healthcare, and media, enhancing efficiency in developed economies (Nazir & Wang, 2023).

China has also achieved breakthroughs, launching Deepseek—a leading Large Language Model (LLM). Comparative studies rank Deepseek above Claude, Gemini, GPT, and Llama in text classification accuracy and cost efficiency (Gao, et al., 2025). This progress stems from China's strategic policies, including the Next Generation AI Development Plan ($15B allocated for international collaborations) and a focus on technical education. Despite these efforts, China still faces challenges in overcoming technological monopolies from AI-leading nations.

Many developing nations—such as India, Vietnam, and the Philippines—aspire to advance AI but face severe challenges, including limited GDP, skill shortages, and digital infrastructure gaps. This raises a critical question: Is international cooperation essential for equitable AI development? While leading AI nations (e.g., U.S., China) could share expertise, they often prioritize monopolizing core technologies to maintain competitive advantages. AI's transformative potential across industries incentivizes such protectionism. For instance, Foffano et al. highlight regional alliances like the Nordic-Baltic AI collaboration, contrasting with the U.S.-China "tech decoupling" (Foffano, et al., 2023). Schmidt notes that military AI applications further

[a] https://orcid.org/ 0009-0006-0859-2401

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complicate bilateral trust, forcing selective cooperation in shared interests (Schmidt, 2022).

For economically constrained countries, independent AI development is costly and slow. Vietnam's higher education sector, for example, struggles with inadequate technical equipment, yet digital transformation requires prohibitive investments (Quy et al., 2023). Such nations thus seek partnerships to access funding and technology, but power asymmetries persist.

Key Evidence of Inequality: Monopoly vs. Cooperation: Dominant nations restrict critical AI transfers (e.g., U.S. export controls on chips for AI training). Regional Disparities: Nordic-Baltic collaboration vs. developing nations' isolation (Foffano, et al., 2023). Economic Barriers: Vietnam's digital education hurdles reflect systemic underinvestment (Quy et al., 2023).

These cases underscore how AI inequality stems from structural imbalances (resources, policy) and geopolitical competition (U.S.-China rivalry). Addressing this requires rethinking cooperation frameworks beyond zero-sum dynamics.

Most researchers overview the AI development situation in different countries by researching policies promulgated by AI development in those countries and forecasting the future development tendency of AI. Additionally, a number of scholars focus on investigating the policy conflicts of AI among several countries. However, few researchers have analyzed the competitive or cooperative relationships between powerful countries and relatively poorly developed countries in AI technology by utilizing mathematical or economic models.

Building on these documented disparities, game theory provides an analytical framework to model the strategic interactions between China and India. This paper applies game theory as the basic theory, China as the powerful AI country, and India as the relative lack of developed country in AI fields as examples to analyze different payoffs that can bring to the countries based on different decisions. Therefore, the article formulates the suitable development patterns in AI technology in these two countries, which can maximize payoffs and commit to settling the inequality problem in AI fields.

2 DIVERGENT PATHWAYS: AI DEVELOPMENT IN CHINA AND INDIA

Based on the problems of global AI development inequality, this article aims to model strategic interactions through game-theoretic frameworks to derive optimal cooperation mechanisms by employing the game theory model and anticipating the payoffs of each country to observe the competitive or cooperative relationship between powerful AI countries and AI developing countries. This essay chooses China and India as examples to represent these two types of countries and aims to discover their choices in terms of encountering AI development inequality problems.

When generally reviewing the AI development of China in the past decade, it was a process from accumulation to rapid progress. The tide of AI development in China appeared in 2010; with support from government policies, AI development became a national strategy in China five years later (Qu & Li, 2022). Until the second half of 2022, the core AI industry scale in China had closed up to the leading ranks of AI technology around the world, which was more than 400 billion CNY and had over 3000 companies (Qu & Li, 2022). Tencent Holdings Limited, Baidu, Inc, and Huawei Technologies Co., Ltd are examples of companies that have continuously made progress in AI development. They helped China overcome technical difficulties and applied AI to medical treatment, education, and other industries. In the aspect of international AI development policies, China has always had a positive attitude as an important international force of AI technology in recent years. China appeals to prevent digital hegemonism and promotes AI globalization by coming up with the "Global AI Governance Initiative" to help other countries develop AI (Li & Fan, 2025). Having established China's AI leadership position, this study now examines India's contrasting development trajectory.

As a developing nation, India recognizes AI's strategic importance across industries and defense, mirroring global leaders' urgency. With aspirations to become a tech power, India views AI advancement as critical for competitiveness. However, it faces challenges in talent retention and core technology access despite its software outsourcing strengths.

India has certain advantages in AI development. Initially, India is one of the dominant countries that provides software outsourcing services with a large population and relatively low human cost (Wei, 2024). Additionally, the large population provides India with a number of potential educable technical human resources. Apart from these strengths, India encounters a dilemma as well. The lack of skilled people and the need to break through technical difficulties in chip production are two main components of the dilemma. India's government has

issued some supportive policies and funding to resolve these problems since 2018, and it has a strong incentive to cooperate with those powerful AI countries. Thus, India had some cooperative projects in AI development with the United States and Japan. In the past few years, India and China have collaborated on AI. They co-founded "Sino-Indian Digital Collaboration Opportunity Plaza" and China supported several initially established Indian companies for operation (Wei, 2024). However, India and China started to unhook in recent years, which means the AI cooperation situation between the two countries become more ambiguous (Wei, 2024).

Although India has cooperated with some powerful AI countries, these countries will not provide India with the core technology. Therefore, this article will concentrate on whether India should strive to learn the core technology from these dominant countries in AI technology to collaborate with them or subsidize more on independent research and cultivating skilled people.

3 STRATEGIC INTERACTION ANALYSIS

3.1 Structural Inequality in AI Ecosystems

3.1.1 Global Disparities

With the quick development of AI technology in some countries, global AI development presents several problems that increase inequality. One of the problems is the unequal data sources. More than 90% of AI model training data are from countries with the English language, which is a factor that reduces the language and cultural diversity in developing countries (Kallus, 2023). Besides, some powerful AI countries become monopolies in the AI field to consolidate their dominant places in AI technology and compete with other dominant countries. Therefore, the difficulties for AI-developing countries to make breakthroughs are high, and the panic of those AI-developing countries will increase due to a lack of technology and skilled people. Additionally, the imbalance in computing power distribution creates an insurmountable barrier as well. Geographical factors reinforce the hierarchies in computing power. The top 1% of institutions control 85% of the resources of global AI development computing in the AI field, which seriously increases the unequal gap (Ahmed & Wahed, 2023). Last but not least, the mobility and emigration of skilled people is an uncontrollable problem for AI-developing countries. These AI-developing countries do not have enough funding to invest in the training of talented people and high-level education. They cannot prevent these people from moving to those AI-developed countries to find better job opportunities, with India losing 42% of top AI graduates annually to 4.7x higher salaries abroad. Therefore, the potential for AI development in these AI-developing countries will be limited.

3.1.2 India's Developmental Constraints

As an AI-developing country, India encounters several problems that impede the development of AI. The inconsistent digital infrastructure is one of these problems. Because of the incomplete coverage (Only 34% of rural areas have >10Mbps internet vs China's 89%) and unreliable connectivity of the internet in India, especially in some rural areas, the scalability of AI solutions will be limited (Sircar & Singh, 2023). These limitations caused by infrastructure and limited resources bring a huge problem to India's AI development. In addition, the quality of massive data utilized to train AI does not meet the standard, and its usability is suspicious. This postponement and lack of high-quality information are setbacks that lower the speed of AI development in India. Moreover, the brain drain problem is a common phenomenon in AI-developing countries, as well as in India. India spends a large amount of money on producing STEM graduates, but the lack of advanced AI institutions and technical jobs with high salaries leads to more skilled people moving to Western countries to work and live (Patel & Khanna, 2023). This is the main reason that fewer domestically skilled people work in India and that the Indian AI development speed has not increased, although it has invested largely in captivating skilled people. The last problem is that the Indian government has not made clear policies in AI development; the lack of clear guidelines in privacy safety, ethics, and industries leads to ambiguous AI development policies and low improvement speed (Verma & Rao, 2022). This disorder caused by the government represents the lack of consciousness of AI development in India and misgoverning in the AI field, which is the main reason for its poor development.

3.2 Game-Theoretic Modeling

3.2.1 Stackelberg Game Framework

In the area of AI development, because of the differences in technology development levels in

different countries, the movements of talented people, and other exogenous variables, the global development of AI technology is becoming more and more unequal. Although many countries have issued some external policies related to AI development based on their national conditions, the general AI development trend is not friendly to those countries with technical obstacles. Some powerful AI countries concentrate more on competing with other dominant countries in the AI field, which means they naturally form technical monopolies and indirectly cause less concentrating problems in those AI developing countries from the international view. In order to discover the reasons for the formation of the present situation of global AI development and provide potential policies to solve the unequal problem, this article here employs the mixed strategy in game theory to analyze and utilize China as the AI-developed country, India as the AI developing country as examples.

Game theory is a theory based on mathematical methodology that studies how multiple individuals or teams make decisions and how these decisions reach equilibrium when the individuals or teams mutually influence each other. It can provide an equilibrium solution framework for and help make decisions based on the rationality of opponents (Abedian et al., 2022). Two typical strategies are in the game theory. Pure strategy is a type of strategy in the complete information game in which each player can only choose one specific strategy under the given information. This article applies another strategy known as the mixed strategy. Mixed strategy is defined as a probability distribution over the set of pure strategies available to a player. The player randomly chooses among different pure strategies based on different probabilities. The probabilities are calculated based on the expected payoff of different choices. This article applies mixed strategies because of the complicated real-world situation of global AI development. A mixed strategy can analyze the strategies of the two countries with more comprehensive consideration when both countries do not have their dominant strategy, and there is no pure strategy Nash equilibrium in the game. Here, the author employs Table 1 to represent the specific payoff when China and India face different global AI development policies.

Table 1: The payoff matrix of China and India

China (AI developed country) / India (AI developing country)	Cooperation in AI development	Monopoly in the AI field
Cooperation in AI development	e, d	h, b
Individually research and develop AI	f, a	g, c

3.2.2 General Payoff Introduction

In Table 1 above, China and India represent an AI-developed country and an AI-developing country, respectively. Table 1 assumes two options for each country. For China, the options are cooperating with India in AI development or forming a monopoly in the AI field. For India, the options are cooperating with China to increase the speed of AI development or doing the research and development individually to break the technical obstacles. Therefore, four pairs of payoffs are presented in Table 1 based on different option patterns between the two countries. In order to demonstrate each payoff clearly, the author utilizes the small letters s ‘a’ to ‘h’ to represent the eight different payoffs for the two countries when facing different options, and they can have specific values. If both countries choose to cooperate in AI development, the pair payoff for them is（e, d）, ‘e’ is for India, and ‘d’ is for China. Based on the same principle, if India is willing to cooperate while China chooses to be a monopoly in the AI field, the pair of payoffs is (h, b). Additionally, if India chooses to develop AI technology independently and China is willing to cooperate, the pair of payoffs is（f, a). Finally, if India continues to choose research independently and China chooses to become a monopoly in AI technology, the pair of payoffs is（g, c).

In this model, the value of a＞b＞c＞d＞e＞f=g ＞h. In general, neither country has any dominant strategies in this model, which means a mixed strategy can be utilized to indicate the expected payoff for each country based on different probabilities of two opportunities that another country will choose. If India chooses to cooperate with China in AI development, China can receive a higher payoff through being a monopoly as well. And if India chooses to research individually, the better response for China is choosing cooperation because ‘b’ ＞ ‘d’ and ‘a’ ＞ ‘c’. When China chooses to cooperate, India can receive a higher payoff through choosing cooperation. And if China chooses to become a monopoly in the AI field, independent

research to develop AI technology can bring a higher payoff to India because 'e' > 'f', 'g' > 'h'.

In general, all the payoffs of China are higher than all the payoffs of India because even if China chooses to cooperate with India in AI development and share some technology with India, China still has a larger market share, a more developed technology foundation, and the number of skilled people than India. The payoff for China will be lower when the two countries cooperate, but the leading place of China in the AI field cannot be simply shaken. Additionally, suppose China chooses to be a monopoly in the AI field. In that case, the payoff of China will be apparently higher than any payoff that India can receive among all options due to the technical obstacles. Therefore, in this model, China always has advantages in getting higher payoffs than India, which is the reason that a>b>c>d>e>f=g>h in the payoff matrix.

3.2.3 Specific Payoff Analyzing for China

For China, if India chooses to develop AI technology independently and China chooses to cooperate, China can receive the highest payoff among the four payoffs of China, which is the value "a". This is because choosing cooperation can reflect the open and inclusive policies in the diplomacy of China and it is a great chance to erect the helpful international image of China. This positive international image can bring many further benefits to China in terms of international relationships and economic trade with other countries. The action of being willing to cooperate only causes a small amount of cost for China, which can be ignored. Additionally, because India is willing to develop AI technology independently, China will not sell the AI technology to India, which means China can maintain its competitiveness in the international AI market. However, if India's research is successful in some areas, the competitiveness and market share of the AI industry will increase. This private benefit India receives will threaten China's market share to a small degree. Nevertheless, the negative effects that this option pattern has brought to China are much less than the benefits that China can receive. Therefore, China is willing to choose to cooperate when India independently researches, and China's payoff is highest in this option pattern.

The second highest payoff for China occurs when India chooses to cooperate, and China chooses to be a monopoly. Under this option pattern, China can maintain its competitiveness in the AI field in the global AI market due to the unsuccessful cooperation with India because China will not sell the exclusive technology to India. In addition, it is time-consuming for India to find cooperation and persuade China. The money and time spent on negotiating and transportation will distract India's attention from developing AI, which means the opportunity cost of finding cooperation is high. India can receive a higher payoff by utilizing the funding and time in directly choosing to research individually. Since India has wasted time and money, the achievement it can receive will be lower, which means it can only share a small amount of market share. Therefore, the negative influences brought to the Chinese payoff will be small compared with the market competitiveness China can maintain. However, China cannot receive further benefits from the international image under this option pattern. This is the reason that the value of "b" is smaller than"a" in this model.

When both China and India are not willing to cooperate, China can receive the third highest payoff. Under this option pattern, India can share more market share because it spends money and time on independent research directly, which means India saves on opportunity costs and will have more breakthroughs. Besides, due to the unsuccessful cooperation, China can still maintain its competitiveness in the global AI market and compete with other dominant AI countries. Therefore, the payoff that China receives will be lower than when India has a small market share, which means the value of "c" is smaller than "b".

The last payoff of China occurs when both countries cooperate successfully. Under this option pattern, China can receive further benefits from its positive international image. China will also receive a patent fee when it sells AI technology to India. However, due to the successful cooperation, the speed of AI development in India will become much faster than before, and India will make more breakthroughs in the AI field, which means it can take away a large amount of market share from China because of the same technology they have.

This separation in the global market share brings a huge loss of Chinese payoff, and the loss is much higher than the benefits China can receive from cooperation. Moreover, China cannot maintain its competitiveness compared with other dominant AI countries because India has the same technology as China. Therefore, the payoff of China is the lowest under this option pattern, which explains the reasons that the value of "d" is the lowest among "a" "b" "c" and "d".

3.2.4 Specific Payoff Analyzing for India

For India, the highest payoff occurs when both countries choose to cooperate. With the help of China, India can develop AI technology much more quickly than before. And the signs of progress will bring several private benefits to other domestic industries. For example, the quality of education and medical treatment will increase due to the utilization of AI, which means that domestic living standards will increase and inequality problems will be reduced. Furthermore, the external benefits India can receive are large as well. India can gain a large market share because of technological breakthroughs. This market share can widen India's international AI market and facilitate India's receiving higher profits from global trades related to the AI industry. However, the patent fee should be considered India's main cost under this option pattern, but compared with the benefits India can receive from cooperation, the cost is relatively small. Therefore, India's payoff is highest when the two countries cooperate successfully.

If India directly chooses to develop AI technology independently, the payoff for India will be the same whether China chooses to cooperate or be a monopoly. Under these option patterns, India does not need to pay for the patent fee, but the progress it can make will be less than cooperating with China. Thus, the market share and private benefits India can receive are smaller than in the case of cooperation. Generally, although the benefits of India are much smaller than before, the little progress can bring a small scale of beneficial influence to India, which means the payoffs are not the highest, but not too bad. This is the reason that e＞f＝g in the payoff matrix.

India receives the lowest payoff when China chooses to be a monopoly, and India is willing to cooperate. India will put effort and money into facilitating the cooperation, thereby distracting India's attention to AI development. After wasting time and money, Indian initial funding for AI development will decrease due to the opportunity cost, which means India can make less progress than directly concentrating on independent research. Therefore, the market share and private benefits India can receive will be much lower than the benefits it can get from individual research. And with the cost of facilitating cooperation, India's payoff is the lowest among the four payoffs. Thus, "h" is the lowest value among all payoffs in the matrix.

3.2.5 Mixed Strategy Equilibrium

The mixed strategy Nash equilibrium requires the following: the probability of China choosing cooperation is 'p'. To choose to become a monopoly is '1-p'. The probability of India choosing cooperation is 'q', and choosing to conduct individual research is '1-q'. Based on the relationship of the size of the eight payoffs, the author adds eight specific values of the payoffs to make further descriptions of choices between the two countries.

Table 2: The payoff matrix of China and India with specific values and probabilities

Probability		p	1-p
	China / India	Cooperation in AI development	Monopoly in the AI field
q	Cooperation in AI development	5, 6	3, 8
1-q	Individually research and develop AI	4, 10	4, 7

When the probability of China choosing to cooperate is "p", to choose to be a monopoly is "1-p", the total expected payoff of India can be written as:

$$\mathbb{E}(\pi) = q[5p + 3(1-p)] + (1-q)[4p + 4(1-p)] = 2pq - q + 4 \quad (1)$$

Then, the relationship between E(π) and "p" can be demonstrated as:

$$\frac{\partial \mathbb{E}(\pi)}{\partial p} = 2q \quad (2)$$

The "q" is a number between 0 and 1, so 2q＞0, which means "p" and $\mathbb{E}(\pi)$ have a positive relationship. When the value of "p" increases, the value of $\mathbb{E}(\pi)$ increases. And if "q" is greater, when "p" increases, $\mathbb{E}(\pi)$ increases with a faster speed. Therefore, India is willing to see China have a higher probability of tending to cooperate, which can lead to a rise in the total expected payoff of India.

When the probability of India choosing to cooperate is "q", to choose to research and develop AI technology independently is "1-q", the total expected payoff of China can be written as:

$$\mathbb{E}(\pi) = p[6q + 10(1-q)] + (1-p)[8q + 7(1-q)] = 3p - 5pq + q + 7 \quad (3)$$

Then, the values of "p" and "q" can be calculated by utilizing the following equation:

$$\frac{\partial \mathbb{E}(\pi\ China)}{\partial q} = 1 - 5p = 0 \quad So, p = \frac{1}{5} \quad (4)$$

$$\frac{\partial \mathbb{E}(\pi\ China)}{\partial q} = 1 - 5p = 0 \quad So, p = \frac{1}{5} \quad (5)$$

$$\frac{\partial \mathbb{E}(\pi\ China)}{\partial q} = 1 - 5p = 0 \quad So, p = \frac{1}{5} \quad (6)$$

Therefore, when $p = \frac{1}{5}, q = \frac{3}{5}$, China's expected payoff will be maximized, and China is not willing to see any changes in the probability that India will choose between different options.

Thus, from the calculation above, India wants to promote the value of "p" to increase, which can lead to an increase in the value of "q" to increase Indian total expected payoff. However, if "p" is greater than $\frac{1}{5}$, the relationship between the value of "p" and the total expected payoff of China will be negative, which means $\frac{\partial \mathbb{E}(\pi\ China)}{\partial q} < 0$. Then, China hopes the value of "q" to decrease to increase the total expected payoff of China. Therefore, there is a conflict between the choices of the two countries. These mathematical procedures explain in detail the reasons why it is difficult for dominant AI countries to cooperate with AI-developing countries. If they are willing to find a balanced solution when encountering this game, both of them should make a concession.

4 SUGGESTIONS

4.1 Framing the Solution: A Balanced Approach to AI Inequality

As this article mentioned before, the global AI development inequality problem is caused by both external global reasons and internal reasons from the AI developing countries. Therefore, to resolve these problems, both the global and inner factors of developing AI countries should be considered. The suggestions will try to find the balance point of AI development between dominant AI countries and AI developing countries. In the complex global landscape, trade-offs are inevitable, and no country can unilaterally maximize benefits without considering broader implications. Any choices a country makes should consider some practical factors, such as feasibility, morality, international image, and the concept of community with a shared future for mankind. Therefore, in the field of AI development, no country can be alone. By considering the complicated reasons, many dominant AI countries are willing to help AI-developing countries to a certain degree. However, this willingness has not been well implemented due to the loss of payoffs in AI-dominant countries. Thus, the suggestions will provide more cooperation potential for the two types of countries.

4.2 Global Strategies: Reducing AI Disparities

Unequal data distribution and language barriers hinder AI-developing countries' access to quality training data, which means their AI products cannot be trained with updated information. To solve this problem, firstly, the data should be translated into different languages to increase language and culture diversity in the AI database for those AI developing countries and help them to train their AI products conveniently. Additionally, it promotes the utilization of open-access AI models in AI-developing countries. Then, they can have more computing resources without building expensive data infrastructure and spending money on collecting updated data. Moreover, the dominant AI countries should concentrate less on competition with other dominant countries and focus more on solving global AI technology inequality. If they all help AI-developing countries, their competitiveness will remain the same. At the same time, they can have a better global reputation and image. To foster equitable AI growth, both North-South Cooperation and South-South Cooperation can be utilized. For instance, the U.S. and India's AI collaboration demonstrates how North-South cooperation can be mutually beneficial. China is a developing country with advanced AI technology, and it has several AI cooperations as well. As the game theory model mentioned before, China and India have a trade-off in whether they should cooperate. By considering the payoffs of both countries, when China cooperates with India in some fundamental AI technology, both countries can benefit. This is because China can receive a better global image through cooperation. It does not sell the most advanced and exclusive technology to India, so China can maintain its competitiveness. At the same time, India can receive some assistance from China to increase its AI development speed, which will benefit India. Therefore, other dominant AI countries and AI developing countries can utilize similar methods between China and India to solve the unequal problem. Last but not least, applying for international investment to construct some high-power computing instruments in AI developing countries to increase their computing power and prevent the monopoly in the top computing institutions to reduce inequality.

4.3 National Strategies: Building AI Capacity from Within

A key domestic challenge is the lack of cohesive AI policies, leading to fragmented efforts." Therefore,

the most important thing for the governments of these AI-developing countries is to recognize the importance of AI development and establish clear policies to facilitate AI technology improvement. In addition, although some AI-developing countries have trained some skilled people, the emigration rate is high due to low incomes in their domestic countries. Thus, properly increasing the income for those technically skilled people and increasing subsidies to those AI development projects can attract more domestic skilled people to help local AI development. Moreover, some infrastructures should be improved as well. Governments should leverage international partnerships to secure funding for critical infrastructure, such as internet connectivity and power supply in underserved regions.

5 CONCLUSION

This study examines global AI inequality through a game theory analysis of China-India dynamics. It identifies both external factors (like data/resource disparities) and internal challenges (particularly India's policy fragmentation and brain drain). The model frames China as representing developed AI nations and India as developing ones, using payoff matrices to quantify cooperation barriers. Results reveal how short-term competition often outweighs collective benefits, perpetuating inequality.

Solutions require multilateral action: Developed nations should provide foundational AI tools (like open-access models) while maintaining core IP, creating balanced cooperation. International investments must expand computing infrastructure to break institutional monopolies. For developing countries, three priorities emerge: (1) implementing coherent AI policies, (2) incentivizing skilled workforce retention through competitive compensation, and (3) upgrading digital infrastructure - especially in rural areas - to enable equitable AI adoption.

This article provides suggestions for AI development for developing countries by applying the case study of India. This article utilizes the game theory model to explain the detailed decision-making process when dominant AI countries and AI developing countries encounter trade-offs and different option patterns. These mathematically supportive procedures indicate the balance between the two types of countries, and the suggestions provide more available methods to improve the development potential of AI technology for those developing AI countries. This explanation fills the gap in the research in utilizing mathematical models and economic methods to solve the inequality problem of global AI development, which will benefit local residents and industries in AI-developing countries.

Since the article applies China and India to represent dominant AI countries and AI developing countries as a case study, the suggestions may not be suitable for all countries facing this problem. The actual national situations are different in different countries, so specific solutions for the inequality problem are different. Therefore, only utilizing two countries as examples may have a halo effect on the solutions. Additionally, the values added to eight payoffs in the matrix are only based on the theory. They can be more valid by considering factors like national GDP and the specific market shares they received. Future research should establish a typology of AI-developing nations to calibrate policy recommendations.

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