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PATHWAYS TO OVERCOME THE INCOME TRAP BY LEVERAGING NEW QUALITY PRODUCTIVE FORCES

Zhao Zhenhua[1]

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ABSTRACT

This paper aims to demonstrate the prevalence of income traps at different income stages. It identifies technology trap as the root cause for falling into the income trap and explores how technological innovation serves as the fundamental driving force for overcoming the income trap. By reviewing historical experiences and real-world cases, this paper provides a theoretical interpretation and comparative analysis of the manifestations and technological origins of income traps at different income stages. The findings indicate that low-income economies often stagnate due to insufficient technological accumulation; middle-income economies face technological hollowing-out and transformation difficulties, while high-income economies are constrained by technological stagnation and diminishing innovation efficiency. As China is entering the high-income stage, it is essential to promote the development of new quality productive forces through technological innovation. Only by doing so can the country continuously surmount the high-income trap. This paper concludes with policy recommendations, highlighting the need to strengthen independent innovation, accelerate the commercialisation of scientific and technological achievements, establish institutional environments compatible with new quality productive forces, and refine mechanisms for talent incentives and cultivation.

Keywords: *New Quality Productive Forces; Technological Innovation; Trap.*

INTRODUCTION

In recent years, as China's economic aggregate continues to expand, the country is on the verge of transitioning from a middle-income to a high-income country. Consequently, the issue of "how to avoid falling into the income trap" has emerged as a critical topic for both the academia and policymakers. Traditional research has largely focused on the "middle-income trap" while neglecting its broader phase-specific and structural characteristics. Based on existing studies, this paper further argues that income traps exist in various forms across different stages – whether low-, middle-, or high-income – and that the underlying cause lies in constrained technological progress, leading to stagnation in industrial upgrading and the formation of a "technology trap".

Drawing on historical experience and empirical data, this study explores the intrinsic logic of the relationship between "income trap" and "technology trap". On this basis, it proposes the development of new quality productive forces as a pathway to overcome these traps. Specifically, it is to leverage technological innovation to drive industrial innovation, which in turn spurs management, organisation, and market innovations.

[1] Party School of the CPC Central Committee, China National Academy of Governance, a high-level think tank. E-mail: jiakangccps2025@163.com.

Sections I and II analyse how income traps manifest at different stages, exploring their technological underpinnings, based on a review of existing literature; section III presents policy proposals aimed at developing new quality productive forces; and sections IV and V summarise the findings with recommendations.

I. Income Trap Exists at All Stages of Development

The term "Income trap" refers to a situation in which a country or a region's economy experiences long-term stagnation or low-speed growth. In this situation, per capita gross national product (GNP) or gross domestic product (GDP) remain at the same level for an extended period, preventing the economy from transitioning to a higher-income stage. The World Bank first introduced the concept of the "middle-income trap" in a research report, which essentially posits that few middle-income economies have successfully advanced to become high-income countries, instead becoming ensnared in a period of economic stagnation (Gill, et al., 2007). The most notable examples are some countries or regions in Latin America, which entered the middle-income stage as early as the 1960s and 1970s. Decades later, their per capita GNP or GDP remains at the middle-income level, failing to achieve a transition to a high-income stage. If we further broaden our perspective, we can find that economic traps characterised by long-term stagnation or low-speed growth, with no significant increase in per capita GNP or GDP, exist not only at the middle-income stage but also at the low-income and high-income stages.

An analysis of low-income traps can be conducted from both vertical and horizontal perspectives. Vertically, data shows that, converted into 1990 US dollars, China's per capita GDP was USD 450 in the year CE 50 and remained so in CE 960. By 1280, it had risen to USD 600 but remained at the same level in 1700 (Maddison, 1999) (table 1). From 1700 to 1820, the average annual compound growth rate of global GNP was 0.57 percent, with China, India, Japan, Europe, the US, and Russia recording rates of 0.85, 0.26, 0.21, 0.68, 2.57, and 0.86 percent, respectively. From 1820 to 1952, the global average annual compound growth rate of GNP increased to 1.62 percent, while China, India, Japan, Europe, the US, and Russia recorded rates of 0.22, 0.54, 1.74, 1.71, 3.78, and 2.08 percent, respectively. In terms of the average annual compound growth rate of global per capita GNP, from 1700 to 1820, the global average was 0.09 percent, with China, India, Japan, Europe, the US, and Russia recording rates of 0.00, 0.00, 0.10, 0.22, 0.62, and 0.19 percent, respectively. From 1820 to 1952, the global average annual compound growth rate of per capita GNP was 0.92 percent, while China, India, Japan, Europe, the US, and the Soviet Union (Russia) recorded rates of -0.08, 0.10, 0.95, 1.03, 1.63, and 1.04 percent, respectively (Maddison, 1999) (Table 2).

Table 1. Vertical Analysis: China's Per Capita GDP (1990 USD)

Year	Per Capita GDP (1990 USD)
CE 50	450
CE 960	450
1280	600
1700	600

Table 2. Horizontal Analysis: Average Annual Compound Growth Rates, %

a) Average Annual Compound Growth Rate of GNP

Period	World	China	India	Japan	Europe	United States	Russia
1700–1820	0.57	0.85	0.26	0.21	0.68	2.57	0.86
1820–1952	1.62	0.22	0.54	1.74	1.71	3.78	2.08

b) Average Annual Compound Growth Rate of Per Capita GNP

Period	World	China	India	Japan	Europe	United States	Russia / Soviet Union
1700–1820	0.09	0.00	0.00	0.10	0.22	0.62	0.19
1820–1952	0.92	-0.08	0.10	0.95	1.03	1.63	1.04

Source: Maddison (1999)

These figures reveal that during the agrarian era, despite relatively low global economic growth rates, significant disparities existed in both economic aggregate growth and per capita GNP growth among countries, with vastly different economic growth speeds. The ratio between the highest and lowest economic growth rates could exceed tenfold. Some countries fell into low-income traps. Notably, over the span of over 130 years from 1820 to 1952, China's average annual GNP growth rate declined from 0.85 to 0.22 percent, and its per capita GNP growth rate dropped from 0.00 to -0.08 percent, representing a classic example of a low-income trap. Deng Xiaoping once commented, "*From the mid-Ming dynasty to the Opium War, China experienced more than 300 years of isolation. Counting from the Kangxi era (1661-1722), the isolation lasted nearly 200 years. Long-term isolation left China poor, backward, and ignorant*" (Deng, 1993).

Horizontally, some contemporary African countries have long been mired in low-income, low-growth economic stagnation, with a large number of people living in absolute poverty. These countries remain at the least-developed, low-income stage, with a significant portion of their populations struggling to meet basic needs for food and clothing, living in absolute poverty. According to World Bank data, there are 195 sovereign countries worldwide. Excluding the Democratic People's Republic of Korea, Cuba, Syria, Afghanistan, Lebanon, and some European micro states (Vatican City, Monaco, Liechtenstein) for which data is unavailable; among the remaining 187 countries, 38 had a per capita GDP below USD 2,000 in 2022, and 19 had a per capita GDP below USD 1,000. Burundi, Sierra Leone, and the Central African Republic had per capita GDPs of less than USD 500, at USD 309, USD 474, and USD 491, respectively (World Bank, 2022). These countries have long been stuck in low-income traps, from which they have been unable to get away.

Table 3. Middle-Income Countries: Long-Term Stagnation in Per Capita GDP

Country	Year 1	GDP per capita (USD)	Year 2	GDP per capita (USD)	Year 3	GDP per capita (USD)	Change / Status
South Africa	1969	5,009	2003	5,053	2022	6,776	Slow long-term growth; no transition to high-income

Brazil	1975	5,098	—	—	2022	8,831	Moderate growth; remains middle-income
Türkiye	2010	10,615	—	—	2022	10,616	No growth over 12 years
Iran	2010	6,459	—	—	2022	4,388	Decline of 2,071 USD

A considerable number of countries have experienced long-term economic stagnation after their per capita incomes reached middle-income levels. An overview of the situation of some contemporary developing countries shows South Africa's per capita GDP had already reached USD 5,009 in 1969, USD 5,053 in 2003, and USD 6,776 in 2022. Brazil's per capita GDP reached USD 5,098 in 1975 and USD 8,831 in 2022. Türkiye's per capita GDP was USD 10,615 in 2010 and USD 10,616 in 2022. Iran's per capita GDP was USD 6,459 in 2010 but declined to USD4,388 in 2022 (*ibid*). None of these countries has successfully transitioned from middle-income to high-income status (table 3).

According to the World Bank database, Sweden's per capita GDP was USD 60,756 in 2011, but decreased to USD 56,424 in 2022, a decline of USD 4,332 over a span of 11 years. Japan's per capita GDP was USD 44,197 in 1995, but fell to USD 33,911 in 2022, a decrease of USD 10,286 over 27 years. Italy's per capita GDP was USD 40,944 in 2008, but dropped to USD 34,876 in 2022, a decrease of USD 6,068 over a span of 14 years. Spain's per capita GDP was USD 35,510 in 2008, but declined to USD 29,674 in 2022, a decrease of USD 5,836 over 14 years. France's per capita GDP was USD 45,515 in 2008, but fell to USD40,886 in 2022, a decrease of USD 4,629 over 14 years (World Bank, 2022) (table 4).

Table 4. High-Income Countries: Decline in Per Capita GDP (World Bank Data)

Country	Peak Year	GDP per capita (USD)	2022 GDP per capita (USD)	Decline (USD)	Duration
Sweden	2011	60,756	56,424	**–4,332**	11 years
Japan	1995	44,197	33,911	**–10,286**	27 years
Italy	2008	40,944	34,876	**–6,068**	14 years
Spain	2008	35,510	29,674	**–5,836**	14 years
France	2008	45,515	40,886	**–4,629**	14 years

These figures indicate that many high-income countries have experienced economic stagnation for more than a decade, with their per capita GDP experiencing significant drops instead of growth. Given the current overall situation of these countries, they still lack strong drivers for economic growth and show no signs of emerging from national economic stagnation. They are likely to experience a prolonged period of sluggish development. It is reasonable to conclude that these countries have fallen into high-income traps.

II. Behind the Income Trap Lies the Technology Trap

From both historical and contemporary perspectives, the reasons why countries' income status are undoubtedly multifaceted. Why some countries have remained stagnant at low-income levels, trapped in the low-income trap, while others have successfully advanced to middle-income status; or why some countries have managed to transition from middle-income to

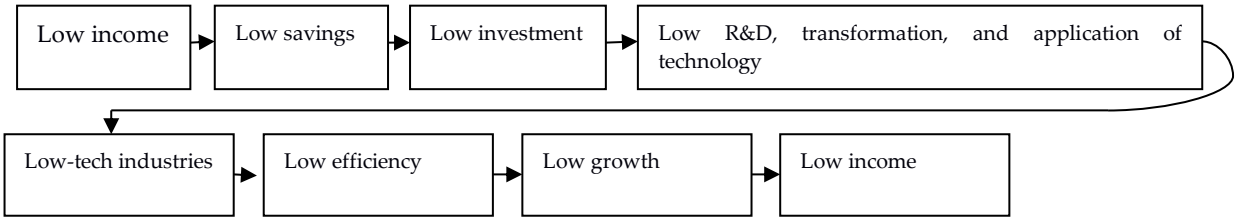
high-income status, while others have remained stuck in the middle-income trap. Moreover, why some high-income countries have sustained long-term economic growth while others have experienced prolonged stagnation (for over a decade) – with per capita GDP sharply declining.

Each country has its unique circumstances, such as political, economic, or social and cultural factors. However, in general, these phenomena can all be attributed to the lack of sustained technological innovation and its application in industrial development. Stalled technological progress leads to sluggish industrial upgrading. Advanced technologies are not static but dynamic, and a defining feature of the current wave of technological revolution is the accelerating pace of innovation. Today, the speed of advancements in information technology has far surpassed Moore's Law, with technologies iterating at an unprecedented rate. The once-advanced technologies possessed by these countries are increasingly surpassed by others, and the markets once controlled by these countries have been captured by their competitors.

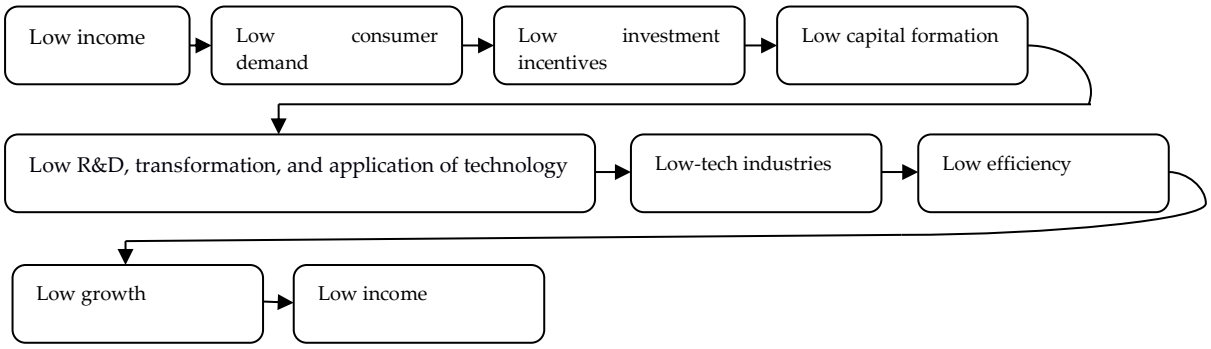
Meanwhile, new technologies – particularly strategic emerging industries driven by major breakthroughs in cutting-edge technologies and significant developmental needs, which play a pivotal role in leading and propelling overall economic and social progress – have been severely insufficient to sustain growth. Accordingly, the overall national economic growth has been sluggish, and inevitably the countries have been stuck in the high-income trap. Thus, behind the income trap lies the technology trap. Although many of these high-income countries still lead the world in certain technological fields, their advancements are insufficient to sustain the development of their national economies.

Regarding the low-income trap, during the long feudal era, the countries with large populations that utilised the most advanced tools of the time – such as iron implements – and adopted suitable farming techniques while prioritising irrigation projects experienced relatively fast economic growth and relative prosperity, as reflected in the high agricultural and handicraft output. Otherwise, economies stagnated for centuries, with zero or even negative growth. Today, the low-income trap is essentially an industry trap, and behind the industry trap lies the technology trap. Intermediate technologies are predominantly concentrated in middle-income or even high-income countries, where the high-end markets are monopolised by others. Consequently, two low-income traps emerge from the supply and demand sides, or what can be seen as an adapted version of Nurkse's theory on the vicious circle of poverty (Nurkse, 1953).

From the supply side, the circle can be presented as follows:



From the demand side, the circle can be presented this way:



The fundamental way to get out of the low-income trap lies in attracting investments in higher-tech industries to increase employment, expand consumption, and foster markets by leveraging advantages such as low labour and land costs, thus, creating a favourable business environment.

Regarding the middle-income trap, some middle-income countries in Latin America, Africa, and Southeast Asia managed to get out of the low-income trap primarily by absorbing industries and technologies transferred from developed countries during the 1960s and 1970s, aligning with market demands and achieving rapid income growth in a short period of time. However, due to insufficient indigenous innovation capabilities, these countries failed to digest, absorb, and innovate imported technologies or achieve timely technological iteration and industrial upgrading. Developed countries are unwilling to transfer their most advanced technologies and industries to middle-income countries, leading to slow or stalled industrial technological progress.

Moreover, as incomes rise in these middle-income countries, the costs of production factors increase, which prompts the relocation of intermediate-tech industries to low-income countries with greater comparative cost advantages. As a result, these countries lack the leadership of high-tech industries – especially strategic emerging industries – while losing the strong support of intermediate-tech industries, which can be summed up as the hollowing-out of intermediate-tech sectors to some extent. As economic growth slows, these countries experience long-term low or even negative growth in the middle-income trap.

As for the high-income trap, countries like Japan, France, Italy, and Sweden are among the few that successfully transitioned from middle-income to high-income status. Each has its unique experience in overcoming the middle-income trap, with a key experience being prioritising technological innovation and industrial upgrading. However, scientific, and technological progress does not follow a linear trajectory; it operates in cycles, requiring substantial investment, the selection of correct technological pathways, and the willingness to bear the risks of failure. The higher the level of technological R&D and transformation, the more challenging it becomes, which is comparable to scaling Mount Qomolangma (Everest). Meanwhile, their once-advanced technologies are continually surpassed and replaced by others, with scientific and technological progress increasingly concentrated in a handful of countries. Some former high-income countries, due to sluggish technological advancement, have fallen into low growth or even stagnation, with zero or negative per capita GDP growth, thus succumbing to the high-income trap.

III. Developing New Quality Productive Forces is the Fundamental Path to Overcome an Income Trap

The World Bank's World Development Indicators (WDI) data reveal that China's per capita GDP reached USD 12,720 in 2022 (World Bank, 2022). According to the World Bank's updated data for the same year, the countries with a per capita GNP exceeding USD 13,205 are classified as high-income countries, which means that China is on the verge of transitioning from a middle-income to a high-income country. Since the start of reform and opening up, one of the key reasons for China's rapid economic growth and successful navigation through the middle-income trap has been its strategy of invigorating the country through science and education, bringing about a continuous increase in the contribution of scientific and technological progress to the national economy.

According to the Global Innovation Index report (WIPO, 2023), China has risen into the ranks of innovative countries. In 2023, China's investment in R&D reached RMB 3.32 trillion, with an R&D intensity of 2.64 percent. Calculated at an average annual exchange rate of 7.05, this amounts to approximately USD 472 billion. In 2023, China granted 3.649 million patents, and by the end of that year, the number of valid invention patents in China stood at 4.991 million, including 4.015 million domestic (excluding Hong Kong, Macao, and Taiwan) invention patents, representing a year-on-year increase of 22.4 percent. China has become the first country in the world to have more than four million valid domestic invention patents (WIPO, 2023). From the depths of the ocean to the vastness of space, from new energy to next-generation information technology, and from industrial robots to artificial intelligence, a lot of significant scientific and technological achievements have emerged. The contribution of scientific and technological progress to the national economy has exceeded 60 percent.

China's transition from a low-income to a middle-income economy relied on scientific and technological advancements. To achieve sustained economic growth under high-income conditions and continuously surpass the high-income trap, China must continue to rely on scientific and technological progress, particularly revolutionary technological breakthroughs and the new quality productive forces generated by continuous industrial upgrading. As President Xi Jinping pointed out in his speech at the 11th collective study session of the Political Bureau of the Communist Party of China (CPC) Central Committee, new quality productive forces have taken shape in practice and are providing powerful impetus and support for high-quality development.[2] To vigorously develop new quality productive forces, it is essential to earnestly study and implement the essence of President Xi Jinping's important speeches and adopt comprehensive measures.

First, it is imperative to step up scientific and technological innovation. It is logical that new quality productive forces originate from new industries, models, and drivers, which, in turn, stem from new technologies, especially disruptive major technological breakthroughs. Key core technologies cannot be obtained, purchased, or begged for; the only path forward is to advance independent innovation. As President Xi Jinping emphasised, "*It is a must to strengthen scientific and technological innovation, especially original and disruptive innovations, accelerate the efforts to build high-level self-reliance and strength in science and technology, and do a good job in making breakthroughs in core technologies in key fields, so that original and disruptive scientific and technological innovations can emerge one after another, and foster more momentum for*

[2] *People's Daily*. Editorial: Accelerating the development of new quality productive forces and substantially promoting high-quality development, 2 February 2024, p. 1.

the development of new quality productive forces".

To achieve independent innovation, it is necessary to deepen the reform of the scientific research system and fully mobilise the strengths of the market, government, and society to increase R&D investment. The decisive role of the market in resource allocation should be fully leveraged, with a view of encouraging increased R&D investment and implementing more substantial tax incentives for corporate investment in basic research, and thus enabling enterprises to become the mainstay of scientific and technological innovation and play a leading role in R&D investment and the commercialisation of scientific and technological achievements.

The Government should better fulfil its role, fully leveraging the advantages of the new national system under the socialist market economy, vigorously promoting organised scientific research, and increasing investment in major scientific research infrastructure and critical bottleneck technologies.[3] The enthusiasm and creativity of researchers should be fully mobilised, and the reform of the scientific research evaluation system should be advanced. President Xi Jinping emphasised that "*It is imperative to improve the income distribution system involving various production factors, such as labour, knowledge, technology, management, capital and data, to boost the vitality of these production factors, and better realise the market value of knowledge, technology and talent, so as to nurture an environment that champions innovation and allows for failure*".

Second, efforts should focus on the transformation of scientific and technological achievements into practical results. Scientific and technological achievements are not transformed into productive forces until they are applied to production. Hence, it is necessary to improve both physical and virtual trading markets for scientific and technological achievements and establish a fair, just, and objective trading mechanism. Venture capital should be nurtured and expanded to promote the formation of future industries. The internet should be leveraged to create an integrated problem release mechanism,[4] a horse racing mechanism,[5] and a financial support mechanism that encompass industry, academia, research, application, and finance, facilitating the smooth and timely transformation of scientific and technological achievements into real productive forces. As President Xi Jinping pointed out, "*It is essential to promptly apply scientific and technological innovation achievements to specific industries and industrial chains, transform and upgrade traditional industries, cultivate and*

3. Major bottleneck technologies are the key technologies that play a critical supporting role in China's economic development, industrial security, or national defense, which have long relied on external sources. If foreign parties restrict or cut off the supply of such technologies, they could severely constrain related industrial chains and even impact China's overall strategic security. In short, they are technologies that would strangle us if their supply were cut off by others.

4. An integrated problem release mechanism is a collaborative system that closely integrates various innovation entities – enterprises (industry), universities and colleges (academia), research institutions (research), end-users (application), and financial institutions (finance) – to jointly identify and publish key technical challenges in light of real-world application needs. This mechanism emphasises problem orientation, collaborative innovation, and resource integration, helping to align R&D efforts more effectively with the practical needs of economic and social development, thereby improving the precision and effectiveness of technological breakthroughs.

5. A horse racing mechanism means that, for a given critical technical challenge, no single research path or implementing unit is predetermined. Instead, a fair competitive environment is established to encourage multiple teams with different technical approaches to tackle the problem simultaneously, with the best-performing solution ultimately adopted. This mechanism emphasises competitive selection and survival of the fittest, helping to stimulate innovation vitality and improve the success rate and operation efficiency of the breakthroughs in key core technologies.

strengthen emerging industries, make plans for the development of future industries, and improve the modern industrial system".

Third, efforts should be made to develop new production relations that are compatible with new quality productive forces. According to Marxism, productive forces determine production relations, and production relations, in turn, exert a reactive influence on productive forces. When production relations adapt to the development of productive forces, they promote their development; otherwise, they hinder it. Production relations include the form of ownership of the means of production, the status of people in production, and the form of product distribution. To accelerate the development of advanced new quality productive forces, it is necessary to form new production relations that are compatible with them. The fundamental criterion for judging a production relation hinges on its ability to promote the development of productive forces.

In his political report On Coalition Government at the 7th CPC National Congress in 1945, Mao Zedong profoundly stated, "*The effectiveness of the policies and practices of all political parties in China, as manifested among the Chinese people, ultimately depends on whether and to what extent they contribute to the development of the productive forces of the Chinese people, and whether they constrain or liberate the productive forces*" (Mao, 1991). With the accelerating pace of scientific and technological progress, the increasing number of innovative elements, the expanding scope of involvement, and the diversifying forms of scientific and technological innovation, it is objectively necessary to continuously improve the form of ownership, the form of distribution, and the status of workers in production in accordance with the new changes required by new quality productive forces.

Today's productive forces differ from traditional ones, and so do today's production relations. In terms of ownership forms, it is necessary to adhere to the coexistence of a public ownership system as the mainstay supplemented by diverse forms of ownership, treat all forms of ownership equally, and vigorously develop mixed ownership. In terms of distribution forms, it is necessary to adhere to the coexistence of distribution according to work as the mainstay supplemented by diverse distribution methods, and improve income distribution forms such as wages, bonuses, equity, and options. In terms of the status of people in production, it is necessary to accentuate the role and status of scientific and technological personnel all the more and effectively protect the legitimate rights and interests of various scientific researchers. Or, as Deng Xiaoping astutely put it, "*In reforming the economic system, what I care about most is talent. In reforming the scientific and technological system, what I care about most is still talent*" (Deng, 1993).

It is essential to deepen reforms across economic, scientific, and technological systems. These reforms are intended to foster new production relations and promote the development of new quality productive forces. Deng Xiaoping profoundly stated, "*Reforms in both the economic and scientific and technological systems are aimed at liberating productive forces. The new economic system should be one that facilitates technological progress. The new scientific and technological system should be one that promotes economic development*". Reform involves identifying the production relations that are incompatible with the development of new quality productive forces and focusing on removing obstacles and bottlenecks that hinder their formation and development. It is necessary to break down regional blockades, departmental divisions, and industry monopolies, so as to develop a unified national market, especially a market for production factors, and enable various production factors to promptly gather in the areas that promote the formation and development of new quality productive forces.

Fourth, efforts should be made to develop mechanisms for fostering, attracting, using, and facilitating the rational flow of talent that can promote the development of new quality productive forces. We must focus on cultivating high-calibre talent, with an eye toward the global frontiers of science and technology for the next 30 to 50 years. We will build world-leading national strategic laboratories to attract top scientists from around the globe and nurture strategic scientists. Efforts will also be made to cultivate a large pool of highly skilled engineers, designers, and architects. Additionally, we must foster national-level expert artisans with extensive hands-on production experience, exceptional skills, and an unwavering pursuit of excellence. Furthermore, we need to train strategic entrepreneurs who possess a deep understanding of technology, industry, capital, markets, and management.

We must make dedicated efforts to attract all types of urgently needed talent. While continuing to render support and expand opportunities for studying abroad, it is even more crucial to implement a returnee programme to encourage students overseas to return and serve the country. We should provide them with greater convenience and support, ensuring they can work and live in China with peace of mind, comfort, and satisfaction.

It is essential to improve the fault-tolerance mechanism and foster an environment that encourages innovation and tolerates failure. Innovation inherently involves challenging the past, and the process of innovation is one of continuous trial and error. The utmost tolerance and understanding should be given to failures encountered in innovation. Thus, we must prioritise the utilisation of innovative talent, fully trusting them and empowering them to take on major responsibilities without hesitation. A mechanism for the rational flow of talent should be established to promote the efficient and balanced allocation of innovative professionals.

Higher education discipline offerings must be optimised. On the one hand, we should focus on major scientific discoveries and technological breakthroughs, emphasising and strengthening foundational disciplines to cultivate more high-quality talent in basic sciences. On the other hand, in line with the demands of new quality productive forces, we must promptly adjust disciplinary structures and intensify efforts to turn out highly sought-after talent.

FINDINGS

By analysing historical data and real-world cases, this study summarises the typical manifestations of the income trap at the low-income, middle-income, and high-income stages, along with a theoretical explanation about the underlying technology trap.

1. Manifestations of the Low-Income Trap and the Logic of Technological Deficiency. At the low-income stage, economic growth primarily relies on traditional agriculture and the production and export of primary goods. Technological progress is slow, and productivity remains at a low level for extended periods of time.

2. Structural Characteristics of the Middle-Income Trap and the Risk of Technological Hollowing-Out. The development bottleneck at the middle-income stage is reflected in two key aspects: First, as labour costs rise and the competitive advantage of low-end manufacturing weakens, the original growth model becomes unsustainable. Second, insufficient capacity for technological innovation prevents the transition from "technology introduction" to "independent innovation," hindering industrial upgrading.

3. Manifestations of the High-Income Trap and the Deceleration of Technological

Replacement. High-income countries face a different kind of trap: On the one hand, the high cost and long payback period of R&D lead to diminishing innovation efficiency. On the other hand, despite their core technological strengths accumulated in earlier stages, these countries are overtaken by emerging economies, while the delays in new technology iteration give rise to risks of technological stagnation. Although this type of trap does not lead to absolute poverty, prolonged economic stagnation poses severe challenges to social welfare and fiscal sustainability.

CONCLUSIONS AND RECOMMENDATIONS

By examining income traps across different stages and analysing their technological logic, this study draws the following conclusions and provides some recommendations:

1. Conclusions

Income traps are prevalent across all development stages, with their root cause lying in the phased manifestations of a technology trap. A technology trap manifests as insufficient technological accumulation, hindered diffusion, and lack of replacement capabilities at different stages, leading to failed industrial transformation, economic stagnation, or even regression. Technological innovation is the fundamental driver for overcoming the trap; the development of new quality productive forces serves as the key lever for achieving such innovation, and such development depends on the coordinated advancement of institutional innovation in science and technology, the construction of a robust innovation ecosystem, and the improvement of talent mechanisms.

2. Recommendations

(1) Prioritise technological innovation as the core driver, leveraging the decisive role of market forces in resource allocation while enhancing government support to sustain independent innovation.

(2) Accelerate the commercialisation of scientific and technological achievements by deepening the integration of demand-driven development and technology supply, ensuring timely application of technological breakthroughs in industries and supply chains.

(3) Establish new production relations compatible with new quality productive forces, advancing reforms in economic and sci-tech systems to build an institutional environment conducive to the free flow of innovation factors.

(4) Establish mechanisms that facilitate the cultivation, recruitment, utilisation, and rational mobility of talent to boost new quality productive forces, while improving mechanisms for training and attracting technological talent. It is imperative to refine research evaluation and incentive systems to stimulate innovation vitality among researchers.

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