New Quality Productive Forces: Where is the "New"? Post-print

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Abstract

, new quality productive forces can be understood through four main aspects, with the most important being the hierarchical upgrading of DIKWP in "World 3." A crucial dimension for evaluating a country's development quality of new quality productive forces is examining how much D can be transformed into I, how much I into K, how much K into W, and how much W into P.

Full Text

Preamble

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Experts' Perspective: Literature and Data Research in the Context of New Quality Productive Forces

Editor's Note: High-quality development is the primary task in building a modern socialist country in all respects, and developing new quality productive forces is the intrinsic requirement and crucial focal point for promoting high-quality development. The Decision of the Central Committee of the Communist Party of China on Further Deepening Reform Comprehensively to Advance Chinese Modernization, adopted at the Third Plenary Session of the 20th CPC Central Committee, has made arrangements for improving the institutional mechanisms that promote high-quality economic development and fostering new quality productive forces. To thoroughly study and implement the spirit of the Third Plenary Session of the 20th CPC Central Committee and General Secretary Xi Jinping's important discourses on developing new quality productive forces, to accurately grasp the scientific connotation and core

essence of new quality productive forces, and to promote the two-way empowerment and coordinated development of literature and data research with new quality productive forces, the editorial board of *Journal of Literature and Data* has specially invited experts including Lü Benfu, Chu Jingli, Cao Shujin, Liu Shiguo, Wang Jiandong, and Zhang Xiaoxi to discuss from multiple dimensions, aiming to deepen theoretical understanding, promote academic exchange, and provide new ideas and insights for the academic and professional communities.

Where is the "New" in New Quality Productive Forces?

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General Secretary Xi Jinping's important discourses on new quality productive forces represent an innovation and development of Marxist productivity theory. From the perspective of historical materialism, productive forces represent humanity's capacity to transform and conquer nature, forming the foundation of all human social life and history as the decisive force and source of power driving the continuous advancement of human civilization. Laborers, objects of labor, and means of labor constitute the three fundamental elements of productive forces. Under traditional productive forces, economic growth relied primarily on massive resource inputs and highly consumptive energy usage—an unsustainable growth model. To better advance Chinese modernization, we must promote productive forces that manifest entirely new qualitative states in production factors, namely new quality productive forces. What, then, distinguishes new quality productive forces from traditional ones? This article employs the "World 3" theory of British philosopher of science Karl Popper to explain the distinction between "new" and "old" productive forces.

1. The Domain of Productive Forces

Productive forces are fundamentally a kind of "force." Throughout human development, from domesticating cattle and horses to inventing automobiles, trains, airplanes, and rockets, we observe changes in both power and speed. These changes manifest in two dimensions: first, substantial increases in power output; second, continuously improving conversion efficiency. Whether converting mechanical, chemical, electrical, or other forms of energy, these represent concrete manifestations of our transformation of nature and our enhancement of power and efficiency. In physics, force multiplied by distance yields work. Similarly, productive forces require a domain of operation to generate business forms and economic value. Each upgrade of productive forces integrates laborers, tools, and relations within a unified space. From a physical space perspective, humanity continuously excavates value from greater depths in both cosmic and micro

scales, advancing from macro and meso levels toward the cosmic and microscopic realms. New business forms are gradually emerging in domains such as deep space, deep sea, low-altitude economy, and the quantum world. Currently, human activity time in virtual space is trending to exceed that in physical space, with the importance of virtual spaces like the metaverse continuously rising. Developing virtual space relies primarily on the density and caliber of talent rather than the 人海战术 (human wave tactics) of the past.

The expansion of human activity spaces and the transformation of production organizers have become the dominant factors in humanity's transformation of nature and acquisition of material wealth. New spaces often possess monopolistic characteristics that generate monopolistic wealth, making them focal points of international competition. New industries emerge in these new spaces alongside the generation of new knowledge. This expansion of new spaces and creation of new knowledge align perfectly with Popper's "World 3" theory. "World 1" is the physical world, "World 2" the mental world, and "World 3" the world of objective knowledge. These three worlds constitute the three spatial domains for developing productive forces. We can distinguish "new" from "old" productive forces based on their different roles across these three worlds.

2. New Quality Productive Forces in "World 1"

"World 1" represents physical space, which can be divided into four scales: cosmic, macro, meso, and micro. As humanity continuously expands into new spaces, technological development advances from macro and meso scales toward cosmic and micro scales. Current technology and industries are developing toward deep space, deep sea, low-altitude, and quantum worlds. Elon Musk is designing interstellar development projects, exploring the transportation of high-entropy materials from Earth to other planets and bringing back low-entropy materials—domains where humanity previously rarely ventured. Any technology or industry that pioneers new space constitutes new quality productive forces.

In "World 1," new energy technologies remain paramount. The development and utilization of solar, wind, hydro, and nuclear energy have transformed traditional energy production and consumption patterns, reducing dependence on fossil fuels while offering high efficiency and low pollution. For instance, high-efficiency solar panel technology can more effectively convert solar energy into electricity, providing clean power for society. Second is intelligent manufacturing equipment. Industrial robots and automated production lines enhance production efficiency and product quality while achieving intelligent and automated production processes. For example, robotic production lines in automotive manufacturing plants can precisely and efficiently assemble automotive components. Third is biotechnology and gene editing that impact species. In agriculture and medicine, these technologies can cultivate superior crop varieties to improve agricultural yield and quality, while in healthcare they can treat difficult and complicated diseases. For example, CRISPR/Cas9 gene editing technology of-

fers new hope for gene therapy.

3. New Quality Productive Forces in "World 2"

In "World 2," the development of humanity's mental world is becoming increasingly rich. Human activities in various artificial and virtual spaces are also generating significant economic value. Recently, the film *Ne Zha: The Devil Boy* (*Ne Zha 2*) and the game *Black Myth: Wukong* have captivated global audiences, fully demonstrating the value of mental products. On one hand, the creative nature of mental products generates enormous economic value. In cultural and creative industries, creativity and design constitute core productive forces. Unique creativity and exquisite design can add value to products and services—excellent animation design and architectural design not only satisfy aesthetic needs but also create economic value.

On the other hand, as the value (and temptation) of virtual spaces grows, with many people immersing themselves in games, "feel-good" dramas, or short videos, we must also be vigilant against various risks arising from such addiction. "World 2" also contains hidden new quality productive forces—innovative thinking and concepts. Innovative business models and management concepts belong to the "World 2" category, and these hidden new quality productive forces can better drive economic and social development. For example, the sharing economy concept improves resource utilization efficiency and creates new economic growth points by integrating idle resources. Shared bicycles and shared cars have already transformed people's travel patterns.

4. New Quality Productive Forces in "World 3"

"World 3" contains the most significant changes in productive forces. Traditionally, the objective knowledge in "World 3" was managed by media, publishing, and library and information institutions. With digital technology development, the business forms of "World 3" have undergone major transformations. The DIKWP model can describe new quality productive forces in "World 3." D represents the data element collection industry; transforming D into I (data into information) constitutes the informatization business form; transforming I into K (information into knowledge) represents the era of small AI models; transforming K into W (knowledge into wisdom) involves determining whether the relationship between two variables (information) is correlational or causal—calculating a causal relationship adds new knowledge. K represents the small model era, while W represents the large model era; large models capable of determining causal relationships possess wisdom. Based on large models, accomplishing specific objectives P represents vertical models and intelligent agents.

Overall, D represents data elements, I represents informatization, K represents small models, W represents large models, and P represents vertical models—all constitute new quality productive forces. This hierarchical progression holds important value and finds extensive applications in finance, healthcare, trans-

portation, and other fields. For example, banks use big data to analyze customer credit status for precise risk assessment and credit decisions. Data can be reused, information simplifies processes, and models improve efficiency. The upgrading across the five DIKWP layers should be the core of developing new quality productive forces. New quality productive forces create new technologies, methods, and experiences in practice, continuously enriching "World 3" and promoting its development.

5. New Quality Productive Forces Derived from "World 3"

Beyond the new quality productive forces inherent in "World 3" itself, "World 3" can also empower "World 1" and "World 2," fully activating their old business forms to rejuvenate them with new appearances and derive new quality productive forces. New quality productive forces often originate from the innovation and application of knowledge in "World 3"—for example, quantum mechanics theory provides theoretical support for quantum computing as a new quality productive force.

The first form of empowerment from "World 3" is the application of digital technology across various industries, thereby discovering blue oceans in each sector and enhancing industrial competitiveness. Digital agriculture, digital circulation, digital globalization, and digital services are all "renewed industries" and practical measures for new quality productive forces. In a local market, even relatively backward capacity or outdated business forms can constitute new quality productive forces if new technologies can improve enterprise management levels, transform product quality, and achieve upgrades and differentiated competitive advantages in that local market. Low cost itself is not new quality productive forces, but if it can help reduce costs and increase efficiency, it may also be considered as such.

In summary, new quality productive forces can be understood through four main aspects, with the most important being the hierarchical upgrading of DIKWP in "World 3." A crucial dimension for evaluating a country's development quality of new quality productive forces is examining how much D can be transformed into I, how much I into K, how much K into W, and how much W into P.

Note: Figure translations are in progress. See original paper for figures.