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Practical Research on Multi-Stakeholder Empowerment of New-Quality Productivity in Shaanxi Province Given Regional Heterogeneity

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Abstract

New-quality productivity constitutes the core driving force for high-quality regional development, and region-specific promotion of collaborative empowerment by multiple stakeholders represents a critical pathway to foster new-quality productivity. Taking Shaanxi Province as the research sample and adopting a regional heterogeneity perspective, this paper compares the resource endowments, industrial characteristics and development status of three major regions—Guanzhong, Northern Shaanxi and Southern Shaanxi—and sorts out the practical effects of multi-stakeholder initiatives in empowering new-quality productivity across the province. The study identifies common challenges prevailing throughout Shaanxi, including homogenized empowerment philosophies, ambiguous division of rights and responsibilities among stakeholders, unbalanced factor allocation and insufficient cross-regional collaboration. In addition, each region faces distinctive dilemmas: inefficient commercialization of scientific and technological achievements in Guanzhong, sluggish industrial transformation in Northern Shaanxi, and shortages of high-end production factors in Southern Shaanxi. Aligned with regional development positioning, this paper constructs differentiated empowerment pathways for each region and a cross-regional integrated linkage system, and improves supporting guarantee mechanisms covering five dimensions: institutions, resources, operational mechanisms, incentives and supervision. The research outcomes not only deliver actionable solutions for Shaanxi to coordinate regional development and efficiently cultivate new-quality productivity, but also provide theoretical references and practical experience for other provinces with prominent intra-provincial regional disparities nationwide.

Keywords

Regional Heterogeneity, Multiple Stakeholders, Collaborative Empowerment,

New-Quality Productivity, Shaanxi Province

1. Introduction

1.1. Research Background

In the new era, new-quality productivity has become a key engine driving regional economic transformation, upgrading and high-quality development. The central government has explicitly put forward requirements for cultivating regional new-quality productivity through differentiated, categorized approaches. Development models dominated by a single stakeholder can no longer accommodate the innovative, green and integrated developmental characteristics of new-quality productivity. Collaborative empowerment by multiple stakeholders including governments, enterprises, scientific and research institutions, and social organizations has evolved into the core trend for nurturing regional new-quality productivity.

Shaanxi Province is marked by striking regional differentiation. The Guanzhong area boasts concentrated scientific and technological resources; Northern Shaanxi is dominated by energy industries; Southern Shaanxi is endowed with abundant ecological resources. The three regions differ drastically in development foundations and core development demands, making a unified province-wide empowerment model ill-suited to their differentiated development needs. Against this backdrop, exploring targeted multi-stakeholder empowerment pathways based on regional heterogeneity emerges as a vital issue for Shaanxi to narrow inter-regional development gaps and cultivate new-quality productivity across the whole province.

1.2. Core Concept Definitions and Measurement Criteria

To facilitate the subsequent analysis, this paper provides operational definitions of the core concepts as follows.

New-quality productivity refers to a new qualitative state of productive forces driven primarily by scientific and technological innovation, with high-quality laborers as the main body, intelligent and green tools as the means of labor, and data and information resources as the objects of labor. Its connotation is embodied in three dimensions: first, taking scientific and technological innovation as the core driving force, breaking away from the traditional factor-driven model; second, supported by the innovative allocation of production factors, promoting the leapfrog development of laborers, means of labor, objects of labor, and their optimized combinations; and third, taking green and low-carbon development as the underlying foundation, achieving a harmonious balance between economic growth and ecological protection.

Multi-stakeholder empowerment refers to the process in which, under the strategic guidance of the government, heterogeneous actors—including enterprises, science and innovation institutions (universities and research institutes), and so-

cial organizations (industry associations, social capital, intermediary agencies, etc.)—jointly drive the formation and development of new-quality productivity through division of labor, resource complementarity, and institutional interaction. Its core lies in breaking the traditional linear model dominated by a single actor and building a networked driving pattern of "competition-cooperation-symbiosis" among multiple stakeholders.

Based on the above definitions, this paper measures the development level of regional new-quality productivity from the following three dimensions: 1) the dimension of scientific and technological innovation input, using total R&D expenditure and R&D intensity (the ratio of R&D expenditure to regional GDP) as core indicators to reflect the agglomeration of innovation resources and the intensity of science and technology investment; 2) the dimension of industrial structure, using the share of value added of strategic emerging industries in GDP and the share of value added of core industries of the digital economy in GDP as core indicators to reflect the progress of industrial transformation and upgrading and the effectiveness of new growth drivers; and 3) the dimension of factor allocation, comprehensively examining the degree of agglomeration, circulation efficiency, and allocation rationality of production factors such as talent, capital, and technology within a region, so as to reflect the development level of regional factor markets and the efficiency of resource allocation.

1.3. Research Methods and Data Sources

This paper adopts a research strategy of "qualitative analysis as the mainstay, supplemented by quantitative comparison," and comprehensively employs methods including literature review, comparative analysis, and case induction.

Data Sources. The data in this paper are mainly derived from the following sources: 1) the Shaanxi Statistical Yearbook (2025), which systematically contains statistical data on the economic, social, and technological development of Shaanxi Province and its cities (districts); 2) special statistical publications issued by the Shaanxi Provincial Bureau of Statistics, such as the Overview of R&D Expenditure in Shaanxi Province in 2024; 3) the government work reports of Shaanxi Province and its cities; 4) policy documents and publicly available data released by the Shaanxi Provincial Department of Science and Technology, the Shaanxi Provincial Development and Reform Commission, and other departments; and 5) academic literature included in the China National Knowledge Infrastructure (CNKI).

Research Sample and Time Span. The research sample covers all 10 prefecture-level cities of Shaanxi Province, totaling 10 municipal-level observation units. The time span of the study ranges from 2020 to 2025, with a focus on analyzing the evolutionary trends and phased achievements of new-quality productivity cultivation in each region during the "14th Five-Year Plan" period. For some core indicators (such as R&D expenditure and value added of strategic emerging industries), due to data availability constraints, cross-sectional comparisons are primarily based on data from 2024-2025, while trend changes since 2020 are also

incorporated for dynamic analysis.

Justification for the Selection of the Three Analytical Dimensions. This paper constructs a regional comparison framework based on the three dimensions of scientific and technological innovation input, industrial structure, and factor allocation, for the following reasons: First, the core connotation of new-quality productivity is driven by scientific and technological innovation, carried by industrial upgrading, and supported by optimal factor allocation; the three dimensions correspond precisely to the triple logic of "driving force-structure-efficiency" of new-quality productivity. Second, the key indicators for these three dimensions (e.g., R&D intensity, the share of strategic emerging industries, and factor agglomeration) are systematically recorded in the Shaanxi Statistical Yearbook and various municipal statistical bulletins, ensuring comparability and operability. Third, domestic academic circles generally adopt multi‑dimensional comprehensive indicator systems in studies measuring new-quality productivity; the selection of these three dimensions is consistent with mainstream research paradigms.

1.4. Theoretical Basis and Literature Review

1.4.1. Theoretical Basis

This paper is grounded primarily in the innovation ecosystem theory and polycentric governance theory.

The innovation ecosystem theory draws on biological metaphors, this theory frames innovation activities as an organic ecosystem composed of heterogeneous stakeholders, emphasizing symbiotic evolution, knowledge flow and value co-creation among diverse participants including governments, enterprises, research institutes, end users and intermediary organizations. Its core logic holds that innovation is not driven linearly by a single actor, but relies on complementary interdependence, niche differentiation and co-evolution of all elements within the system. This theory offers three analytical values for this research: first, it helps identify the structural features and functional weaknesses of the innovation ecosystem in each of the three regions—Guanzhong features dense stakeholders yet fractured collaboration; Northern Shaanxi has a narrow set of local stakeholders with insufficient external embeddedness; Southern Shaanxi suffers from sparse stakeholders and fragile ecological foundations. Second, it explains how the dynamic "competition-cooperation-symbiosis" relationships among stakeholders affect empowerment efficiency. Third, it provides a theoretical basis of "niche differentiation development" for designing region-specific pathways, namely each region should adopt tailored stakeholder collaboration models in accordance with its own ecological niche.

The polycentric governance theory was systematically elaborated by the Bloomington School represented by the Ostroms. It advocates that in complex public affairs governance systems, multiple independent decision-making centers (including government departments, market entities, social organizations, communities, etc.) form spontaneous order through competition, cooperation and conflict resolution mechanisms, often yielding superior governance performance

compared to centralized control by a single authority. Its implications for this paper are as follows: first, it breaks the traditional binary opposition between government and market, justifying the governance functions of social organizations, scientific research institutions and other multi-stakeholder actors. Second, it provides operational principles for designing cross-regional and cross-stakeholder collaboration mechanisms—namely, institutional design shall foster collaborative incentives to align decentralized decision-making with overall optimal outcomes. Third, it draws attention to the impacts of institutional diversity on governance performance, which aligns closely with the regional heterogeneity perspective adopted in this paper.

The combined application of the two theories forms a dual "structure-order" analytical perspective: the innovation ecosystem theory diagnoses structural barriers to regional empowerment (whether stakeholders are complete, interactions adequate and knowledge flows unobstructed), while the polycentric governance theory addresses order-related challenges (how to divide rights and responsibilities, realize collaboration and resolve conflicts). Together they constitute the foundational analytical framework of this paper.

1.4.2. Literature Review

Domestic academia has conducted extensive research on multi-factor and multi-stakeholder drivers of new-quality productivity, covering fields including education and technology, digital data, finance and fiscal policy, industrial integration and business environment. Existing studies mainly discuss driving mechanisms, practical dilemmas and implementation pathways. In the education and technology domain, scholars have analyzed higher education (Wang, 2025), vocational education (Zhang & Fu, 2026), integration of industry and education, and coordinated development of science, education and talent (Fan, 2026). Digitalization, data elements and artificial intelligence constitute another major research hotspot, with numerous studies exploring the driving logic and practical models of digital transformation and intelligent technologies (Song & Zhang, 2024; Ao, 2026). Additionally, academia has extended research to finance, fiscal policy, industrial integration, intellectual property rights and business environments (Zhang & Ma, 2026; Zhu & Zeng, 2026; Qu, 2025; Xu, 2025). A small number of papers preliminarily discuss regional carriers, yet fail to delve into intra-regional development disparities.

Overall, extant research exhibits prominent limitations. Most studies analyze single factors without integrating governments, enterprises, research institutes and social organizations into a unified analytical framework, resulting in insufficient research on multi-stakeholder collaborative mechanisms. Existing literature tends to adopt universal macro analysis, largely ignoring the heterogeneity of regional resource endowments and industrial structures, showing a tendency toward homogenized research. Meanwhile, empirical research focusing on specific provinces is scarce, lacking targeted differentiated empowerment schemes, while exploration of cross-regional factor mobility and inter-stakeholder linkage re-

mains superficial, making theoretical outcomes difficult to implement in practice.

Taking Shaanxi Province as the research sample, this paper breaks the research paradigm of single stakeholders or single factors, incorporates governments, enterprises, scientific research institutions and social organizations into an integrated analytical framework, proposes the core concept of "collaborative empowerment by multiple stakeholders", and reveals the complex mechanisms of division, interaction and coupling among stakeholders in cultivating new-quality productivity, filling the research gap regarding multi-stakeholder collaboration mechanisms. Furthermore, it introduces a regional heterogeneity mindset to transcend homogenized research paradigms, constructing differentiated empowerment pathways tailored to Guanzhong, Northern Shaanxi and Southern Shaanxi. The research conclusions not only deliver practical schemes for Shaanxi to comprehensively advance new-quality productivity development, but also provide reference paradigms for provinces with stark regional disparities to carry out relevant research.

1.5. Research Logic Framework

This paper follows a progressive research logic of "status description—dilemma diagnosis—path construction." The full analytical chain is laid out as follows:

The first link: Description of regional differences. From the perspective of regional heterogeneity, this section systematically portrays the differentiated characteristics of the three major areas—Guanzhong, Northern Shaanxi, and Southern Shaanxi—across three dimensions: core endowments, development levels, and empowerment practices.

The second link: Diagnosis of practical dilemmas and their causes. Building on the status description, this section extracts practical dilemmas at both the province-wide common level and the region-specific level, and then conducts an in-depth analysis of the underlying causes from the three dimensions of institutional, cultural, and interest factors.

The third link: Construction of differentiated paths. Based on the findings of the dilemma diagnosis, this section proposes countermeasure plans from two levels—precise zone-specific empowerment and province-wide collaborative coordination—and designs supporting safeguard mechanisms.

2. Development of New-Quality Productivity and Multi-Stakeholder Empowerment Status in Shaanxi from a Regional Heterogeneity Perspective

2.1. Core Heterogeneous Endowments of the Three Major Regions in Shaanxi

Shaanxi Province is divided into three functional zones based on resource and industrial characteristics, with vastly different development endowments and core demands.

The Guanzhong Science and Technology Leading Zone hosts over 90% of the

province's universities, research institutes and high-tech enterprises, with concentrated high-end manufacturing and modern service industries and strong economic radiation from the Xi'an Metropolitan Area. Its core missions are accelerating the commercialization of scientific and technological achievements and expanding emerging industrial clusters. Nevertheless, intra-regional industrial layouts converge, leading to cutthroat competition for high-quality factors such as talent and capital.

The Northern Shaanxi Energy Transformation Zone possesses the province's largest reserves of coal, oil and natural gas, with heavy chemical industries accounting for over 70% of industrial output of enterprises above designated size. Its development priorities lie in promoting the green and low-carbon transformation of traditional energy, fostering new energy sectors and diversifying industrial forms (Shaanxi Provincial Bureau of Statistics, 2025). Its primary weaknesses include a scarcity of high-end scientific and technological platforms and talent, with industrial chains positioned predominantly at the mid-to-low end of the value chain.

The Southern Shaanxi Green Ecological Zone boasts forest coverage rates exceeding 60%, endowed with unique ecological, characteristic agricultural and cultural tourism resources. Its core development focuses on realizing the value of ecological products, upgrading characteristic industries and attracting high-end production factors. However, its industrial chains are short, agricultural and cultural tourism products deliver low added value, innovation stakeholders are inadequate, and overall development momentum remains weak.

2.2. Differentiated Comparison of New-Quality Productivity Development Levels across the Three Regions

This study, based on statistical data from various cities (districts) in Shaanxi Province, conducts a quantitative comparison across three dimensions: scientific and technological innovation input, industrial structure, and factor allocation.

Dimension of Scientific and Technological Innovation Input. In 2024, the province's total R&D expenditure reached 92.620 billion yuan, an increase of 9.5% over the previous year; the R&D intensity was 2.61%, up by 0.12 percentage points from the previous year, ranking 10th nationwide. By region, there were 7 areas with R&D expenditure exceeding 10 billion yuan, namely Xi'an, Xianyang, Yulin, Baoji, Weinan, Hanzhong, and Yan'an, with a total investment of 90.758 billion yuan, accounting for 98.0% of the province's total R&D expenditure. Xi'an (5.39%) was the only region with an R&D intensity exceeding the provincial average. In terms of the distribution across the three major regions, the Guanzhong region accounted for over 85% of the province's R&D expenditure (of which Xi'an accounted for 71.749 billion yuan, or 77.5% of the provincial total), Northern Shaanxi accounted for less than 10% (Yulin 2.906 billion yuan, Yan'an 1.203 billion yuan), and Southern Shaanxi accounted for less than 5% (Hanzhong 2.906 billion yuan, with the other two cities even lower). It is worth noting that from

2020 to 2024, the province's R&D expenditure grew at an average annual rate of approximately 8.7%, yet the investment gap between Guanzhong and Northern Shaanxi and Southern Shaanxi not only failed to narrow but actually widened.

Dimension of Industrial Structure. In 2025, the added value of strategic emerging industries accounted for 11.4% of the province's GDP, an increase of 0.8 percentage points over the previous year. However, from a regional distribution perspective, Xi'an's output value of strategic emerging industries reached 215.6 billion yuan, accounting for 44.4% of the provincial total; Yulin's strategic emerging industries accounted for only 6.8% of its industrial output above designated size, with an output value of 23.4 billion yuan; the combined share of the three cities in Southern Shaanxi was even lower. The added value of the new energy industry grew by 11.6%, the digital creative industry by 9.4%, the electrical machinery and equipment manufacturing industry by 26.3%, and the automobile manufacturing industry by 20.2%. The share of added value of core digital economy industries in GDP further increased, yet the gap in digital infrastructure coverage between Guanzhong and Northern Shaanxi and Southern Shaanxi remained significant—by 2025, eight cities including Xi'an and Yulin had joined the ranks of national gigabit cities, but 5G coverage in some counties and districts of Southern Shaanxi still lagged behind the provincial average (the province's 5G coverage rate was 99.3%).

Dimension of Factor Allocation. Guanzhong boasts the highest factor agglomeration and circulation efficiency, but high-quality factors such as talent and capital are overcrowded and intensely contested, with prominent internal competition—Xi'an's R&D intensity (5.39%) is 2.06 times the provincial average, accounting for 77.5% of the province's total R&D expenditure. In Northern Shaanxi, factors are concentrated in the traditional energy sector, with a severe scarcity of high-end innovation platforms and talent—Yulin's R&D intensity is only 0.72%, less than one-third of the provincial average. Southern Shaanxi experiences slow inflows of high-end factors and ranks lowest in allocation efficiency—Hanzhong's R&D intensity is 1.52%, higher than Northern Shaanxi but far below Guanzhong.

2.3. Practical Status of Multi-Stakeholder Empowerment for New-Quality Productivity in Shaanxi

2.3.1. Province-Wide Empowerment Outcomes: An Initial Multi-Stakeholder Collaborative Framework

Shaanxi has established an embryonic collaborative system for empowering new-quality productivity, featuring government guidance, enterprise leadership, support from scientific and research institutions and participation by social organizations.

- Governments: Undertake strategic guidance and institutional supply. Specialized policies covering industrial innovation, digital economy and green transformation have been issued; 21 Qinchuangyuan industrial innovation clusters have been built in two batches. Policy tools including guidance funds and technical transformation subsidies have mobilized social capital, with annual pro-

vincial fiscal spending on science and technology growing by over 15% in the past three years.

- Enterprises: Serve as the primary force for technology commercialization and industrial upgrading. The number of high-tech enterprises and technology-based small and medium-sized enterprises has grown at an annual rate exceeding 30% over the past three years, reaching 16,700 and 23,900 respectively in 2025 (2025 Government Work Report of Shaanxi Provincial People's Government). Investment in enterprise technological transformation continues to expand, with leading enterprises taking the lead in establishing innovation consortia to drive coordinated transformation of upstream and downstream industrial chains.
- Scientific and research institutions (universities, research institutes): Provide original technological supply and talent support. Thousands of technological achievements are delivered annually, with the "Three Reforms" accelerating the transfer and commercialization of scientific and technological achievements. Relying on the Qinchuangyuan platform, researchers participate in enterprise technical research to form joint teams of scientists and engineers.
- Social organizations (industry associations, social capital, etc.): Supplement service provision and resource allocation functions. Industry associations lead the formulation of group standards and organize supply-demand matching events; venture capital and industrial funds have increased investment in early-stage scientific and technological projects, with some regions piloting a "venture capital + industrial park" empowerment model.

Overall, the province-wide cultivation system for new-quality productivity has taken shape, yet the depth of cross-stakeholder collaboration remains insufficient and resource matching efficiency requires improvement.

2.3.2. Region-Specific Empowerment Practices: Differentiated Stakeholder Roles and Collaboration Modes

Based on local resource endowments, the three regions have formed differentiated multi-stakeholder empowerment pathways, while all face common barriers including insufficient cross-stakeholder collaboration and mismatched resource allocation.

Guanzhong (Science and Technology Collaboration-Driven): Centered on government platform construction, enterprise technology commercialization and original innovation by universities and research institutes. Leveraging the Qinchuangyuan platform, the "Xi'an R&D, Prefecture-level City Commercialization" model is implemented. Governments build off-site incubators to guide the transfer of scientific and technological achievements from Xi'an universities to enterprises in surrounding cities. Leading enterprises collaborate with research institutes to deploy industrial chains covering photonics, aerospace and other sectors. In 2025, investment in technological transformation by industrial enterprises in

Xi'an rose by 53.0% year-on-year, with sustained improvements in the efficiency of scientific and technological achievement commercialization.

Northern Shaanxi (Energy Transformation-Driven): Guided by government policies, led by industrial flagship enterprises and supported by social capital. Relying on the Yulin Energy Revolution Innovation Demonstration Zone, local governments implement low-carbon incentive policies and advance large-scale coal chemical projects. Leading enterprises including Yanchang Petroleum and Shaanxi Coal Industry invest in R&D for CCUS, hydrogen energy and other technologies. Social capital participates in investment, construction and operation of new energy power stations and supporting energy storage facilities. Installed capacity of new energy sources expands steadily, driving the high-end and low-carbon upgrading of energy industries.

Southern Shaanxi (Ecological Value Conversion-Driven): Featuring government resource integration, development by market operators and participation by social organizations in pilot programs. Governments take the lead in integrating ecological and agricultural resources, guiding cultural tourism enterprises and agricultural cooperatives to develop health care and green pharmaceutical industries. Industry associations promote ecological product certification and brand building. Shangluo City has been selected as a national pilot city for realizing the value of climate and ecological products, gradually paving a viable path for ecological industrialization.

3. Practical Dilemmas and Root Causes of Multi-Stakeholder Empowerment for New-Quality Productivity under Regional Heterogeneity

3.1. Common Province-Wide Empowerment Dilemmas

Four universal challenges persist across Shaanxi Province: First, homogenized empowerment philosophies prevail, with uniform policy models and "one-size-fits-all" governance widely adopted across all regions. Second, the division of rights and responsibilities among governments, enterprises, research institutions and social organizations remains ambiguous, with blurred functional boundaries. Third, resource allocation suffers from poor matching, as high-quality talent, technology and capital fail to be targeted to address regional development weaknesses. Fourth, collaborative operational mechanisms are incomplete, lacking regular communication channels and prominent barriers to cross-departmental, cross-industry and cross-regional cooperation.

3.2. In-Depth Analysis of Two Core Bottlenecks

3.2.1. The "Innovation Isolation" Predicament in Guanzhong: Structural Disconnections in the Achievement Commercialization Mechanism

The Guanzhong region concentrates the vast majority of the province's scientific and technological innovation resources, yet the problems of scientific and technological achievements being "difficult to implement on the ground" and "slow

to commercialize" remain prominent. In 2025, the province's technology contract transaction value exceeded 526 billion yuan, a nearly twofold increase from 179.5 billion yuan in 2020; in 2025, the technology contract transaction value of universities and research institutes across the province reached 50.691 billion yuan, a year-on-year increase of 25.28%. However, a large number of achievements remain trapped in the cycle of "from laboratory to laboratory," and the rate of local commercialization of scientific and technological achievements still has considerable room for improvement. Specific supporting data are as follows: the province has certified 1719 technology managers, an increase from the previous 1292, but this number remains insufficient relative to the thousands of commercializable achievements generated each year across the province; although 113,000 job-related scientific and technological achievements have been placed under separate asset management, a large number of researchers are still constrained by the traditional evaluation system; and the number of institutions participating in the "Three Reforms" has expanded to 201, but this still accounts for a limited proportion of the total number of universities and research institutes in the province.

- Cultural root cause: Scientific and educational resources in Guanzhong are highly concentrated in universities and national research institutes, forming relatively closed academic communities. Severe information asymmetry exists between researchers and market players, with insufficient technical managers to bridge supply and demand. At present, Shaanxi Province only has 1292 provincial-level technical managers, far below the demand for commercializing massive scientific and technological achievements.
- Interest root cause: Ownership of job-related scientific and technological achievements and revenue distribution mechanisms remain imperfect. While the "Three Reforms" have implemented separate asset management, unclear rules governing benefit sharing among researchers, affiliated institutions and commercialization platforms in practice create widespread reluctance and hesitation to transfer achievements.

3.2.2. Failed Transformation Incentives in Northern Shaanxi: Endogenous Barriers to the Transformation of Traditional Energy Enterprises

The energy industry in Northern Shaanxi accounts for over 70% of the industrial output above designated size, yet the willingness of market entities to undergo transformation remains weak. In 2025, Yulin's strategic emerging industries accounted for only 6.8% of its industrial output above designated size, and although the installed capacity of new energy has been steadily expanding, it remains negligible compared with the scale of traditional energy. Specific supporting data are as follows: Yulin's three-industry structure ratio stands at 4.4%, 72.2%, and 23.4%, with the secondary industry still occupying a dominant position; the added value of Yulin's strategic emerging industries has grown at an average annual rate of 6.7%, but despite a certain growth rate, the base is too small; the new energy in-

dustry accounts for 56.5% of the industrial strategic emerging industries, yet the overall output value of new energy is vastly disproportionate to the scale of the coal industry—in 2025, the province's raw coal production reached 805 million tons, indicating that the new energy industry still has a long way to go in replacing traditional energy.

- Institutional root cause: Under the current fiscal and taxation system, local government revenue relies heavily on energy industry taxes. Yulin allocated 4.56 billion RMB to policy packages supporting economic development in 2025, yet fluctuations in energy prices place local governments in a dilemma between advancing industrial transformation and safeguarding economic growth. Short-term transformation costs (employment resettlement, tax revenue losses) are borne locally, while long-term benefits generate positive externalities. This asymmetry between costs and returns weakens local government motivation to drive transformation.
- Cultural root cause: Long-term reliance on resource dividends has fostered path dependence among Northern Shaanxi energy enterprises, whose management teams exhibit conservative risk preferences and low acceptance of new technologies and industrial formats. Meanwhile, Northern Shaanxi lacks the dense pool of scientific and technological talent available in Guanzhong, discouraging external research teams from participating in energy innovation.
- Interest root cause: Highly entrenched interest structures dominate traditional energy industrial chains, with stable benefit distribution mechanisms across coal mining and coal chemical sectors. Transformation would necessitate restructuring existing interest allocations. Existing incentive measures including tax breaks and technical transformation subsidies lack sufficient strength to offset opportunity costs of industrial restructuring. Although Yulin established a 10 billion RMB fund for commercializing scientific and technological achievements, its scale remains insignificant relative to the trillion-yuan energy industry.

3.3. Systematic Analysis of Underlying Causes of Dilemmas

Collectively, the root causes of the aforementioned dilemmas fall into five categories: First, top-level institutional design lacks differentiated regional considerations, with provincial policies consisting mainly of general provisions without classified guidance tailored to the three regions. Second, construction of a clear rights and responsibilities system for stakeholders lags behind, lacking standardized lists of respective functions. Third, province-wide resource coordination mechanisms are incomplete, with no integrated platform for allocating production factors across the province. Fourth, cross-regional cooperation institutions are absent, obstructing the orderly flow of Guanzhong's scientific and technological resources to Northern and Southern Shaanxi. Fifth, incentive and constraint mechanisms are underdeveloped, featuring insufficient support and rigid mandatory clauses.

4. Differentiated Empowerment Pathways Oriented toward Regional Heterogeneity

4.1. Targeted Multi-Stakeholder Empowerment Pathways for the Three Regions

4.1.1. Guanzhong Science and Technology Leading Zone: Science and Technology-Driven Empowerment through Integrated Multi-Stakeholder Collaboration

As the province's hub of scientific and technological resources, Guanzhong adopts an empowerment model centered on scientific research institutions and high-tech enterprises with coordinated support from all stakeholders (Yuan, 2026). It fully leverages universities, research institutes and key laboratories as sources of original innovation, focusing on cutting-edge technological research in strategic emerging industries including artificial intelligence, high-end equipment manufacturing, new materials and aerospace. Local governments undertake overall coordination and guarantee functions, optimizing scientific and technological support policies and streamlining approval procedures for achievement commercialization. Relying on the Qinchuangyuan innovation platform, a comprehensive incubation system for innovation and entrepreneurship is improved, alongside public service platforms for technology trading and supply-demand matching to eliminate bottlenecks in the innovation chain. High-tech enterprises respond to market demand by independently undertaking laboratory achievements, conducting pilot-scale testing and industrialization to translate innovative technologies into tangible products and industrial clusters. Industry associations and scientific and technological service organizations deliver supporting services covering intellectual property operation, legal consulting, market promotion and talent matching, forming a full-chain scientific and technological service ecosystem. In-depth integration of governments, enterprises, universities and social organizations addresses barriers slowing the commercialization of scientific and technological achievements, expands emerging industrial clusters, and converts Guanzhong's scientific and technological resource advantages into industrial competitiveness, establishing the core innovation growth pole for new-quality productivity in Shaanxi Province.

4.1.2. Northern Shaanxi Energy Transformation Zone: Market-Led Empowerment Backstopped by Policy Support

Northern Shaanxi adopts an empowerment pathway featuring independent market-driven transformation of energy enterprises, policy-backed incentives, and collaborative assistance from scientific and technological and social actors. Local large-scale energy and chemical enterprises take the lead as core market entities, gradually reducing reliance on single fossil energy sources (Ma & Zhang, 2026). Building on existing industrial foundations, they pursue energy conservation, carbon reduction and technical renovation to upgrade traditional energy industries toward green, refined and high-end development. Meanwhile, leveraging local land, wind and solar resources, enterprises proactively deploy energy storage, wind power, photovoltaic and other new energy industries to diversify industrial formats and resolve the sin-

gle-industry structural dilemma. Governments fulfill policy backstop functions by issuing green transformation incentives including tax reductions, special subsidies and land use guarantees, establishing dedicated energy transformation funds and formulating negative lists for industrial transformation to standardize market entity development. Domestic and foreign scientific research institutions and low-carbon technical teams are introduced to deliver technical solutions for traditional industrial renovation and new energy project construction. Social capital is actively mobilized to participate in investment, construction and operation of new energy projects, broadening financing channels for industrial transformation. Coordinated efforts across all stakeholders drive the iterative upgrading of traditional energy sectors and expansion of emerging energy industries, constructing a modern energy industrial system supported by diversified sectors.

4.1.3. Southern Shaanxi Green Ecological Zone: Government-Guided Empowerment with Downward Engagement of Social Actors

Relying on superior ecological resources, Southern Shaanxi implements an empowerment model featuring government overall planning and deep participation by diverse social actors at the grassroots level (Wang, Hui, & Zhao, 2026). Governments at all levels undertake core responsibilities for resource integration, planning guidance and factor attraction. Based on ecological endowments, they rationally plan the layout of characteristic industries including ecological agriculture, cultural tourism integration and green health care, improve infrastructure such as transportation, digital networks and cold chain logistics, and introduce preferential policies to attract external stakeholders. Local enterprises engaged in characteristic planting and breeding, agricultural product processing and cultural tourism operation receive targeted support to cultivate leading local market entities that drive clustered development of small and medium operators. External social capital, cultural tourism groups and agricultural industrialization enterprises are encouraged to invest locally, deeply unlocking the economic value of ecological resources, extending industrial chains for characteristic agriculture and cultural tourism, and raising product added value. Simultaneously, links are established with domestic and foreign universities and research institutes to introduce professional talent and technologies for agricultural technology and ecological cultural tourism planning, bridging gaps in high-end production factors. Adhering to the principle of ecological protection as a priority, the region integrates ecological resources and industrial development to convert ecological advantages into economic strengths, forming an eco-friendly, diversified and sustainably dynamic green development model for new-quality productivity.

4.2. Province-Wide Linked Multi-Stakeholder Collaborative Empowerment Pathways

4.2.1. Build Cross-Regional Collaboration Platforms to Eliminate Administrative Barriers

At the provincial level, unified cross-regional cooperation carriers shall be estab-

lished to break geographical segmentation and administrative barriers, creating unobstructed communication channels for governments, enterprises, research institutes and social organizations across regions (Wu & Luo, 2026). Drawing on existing innovation and industrial service platforms, regular matching mechanisms shall be created to support stakeholder negotiations, resource docking and project implementation, laying operational foundations for province-wide linkage.

4.2.2. Promote Two-Way Factor Circulation to Realize Complementary Regional Functions

A standardized resource circulation system shall be constructed to form a coordinated pattern: Guanzhong exports scientific and technological advances, Northern Shaanxi advances industrial transformation, and Southern Shaanxi supplies ecological products. Guanzhong transfers technologies, high-end talent and advanced management experience to help Northern and Southern Shaanxi address innovation shortages; Northern Shaanxi leverages its energy and industrial advantages to provide energy security and industrial supporting capacity for the whole province; Southern Shaanxi adheres to ecological bottom lines and supplies green agricultural and cultural tourism products. The three regions pursue differentiated development with complementary strengths.

4.2.3. Improve Linked Guarantee Mechanisms to Optimize Factor Allocation

Cross-regional benefit-sharing and risk-sharing systems shall be refined to incentivize joint project development and market expansion by enterprises across the three regions. Scientific and technological platforms and market entities shall be permitted to establish branches across regions, guiding the free flow and efficient allocation of capital, talent and technology throughout the province. Region-specific development highlights shall be realized through differentiated strategies, while coordinated province-wide development momentum shall be consolidated through cross-regional linkage, advancing balanced and synergistic cultivation of new-quality productivity across Shaanxi.

5. Guarantee Mechanisms and Feasibility Analysis

5.1. Institutional Guarantee: Formulate Differentiated Overall Layouts

Specialized provincial policy documents shall be issued aligned with the development positioning of the three regions, incorporating targeted supportive clauses for scientific and technological achievement commercialization, energy transformation and ecological industrialization. Clear boundaries of functions and responsibilities shall be defined for all stakeholders, alongside differentiated evaluation systems: Guanzhong shall be assessed primarily on the commercialization of scientific and technological achievements; Northern Shaanxi on the green transformation of energy industries; Southern Shaanxi on the realization of ecological product value.

Implementation Barriers and Risk Contingency Plans: Formulating differentiated policies requires extensive basic data support, yet statistical calibers vary across cities in Shaanxi at present. Pilot implementation shall be launched in Xi'an, Yulin and Shangluo first, with scaled promotion following accumulated experience. Meanwhile, risks of excessive fragmentation arising from differentiated policies shall be mitigated via a provincial-level coordination mechanism to ensure policy coherence and complementarity across the three regions.

5.2. Resource Guarantee: Optimize Targeted Province-Wide Factor Allocation

A unified provincial ledger of production factors shall be established to relieve oversaturation of high-end factors in Guanzhong by guiding redundant resources to flow outward. Focused support shall be directed to address shortages of scientific and technological resources in Northern Shaanxi and high-end factors in Southern Shaanxi, with priority given to deploying high-end innovation platforms, professional talent and industrial capital in these two regions.

Implementation Barriers and Risk Contingency Plans: Cross-regional factor allocation faces dual resistance from administrative barriers and local protectionism. A "factor flow compensation mechanism" shall be established: provincial fiscal compensation shall be provided when Guanzhong exports technical talent to Northern and Southern Shaanxi. Simultaneously, off-site economic industrial parks shall be developed, allowing factor source regions to claim a proportional share of economic returns generated in recipient regions.

5.3. Mechanism Guarantee: Improve Multi-Stakeholder Collaborative Linkage Mechanisms

Regular consultation platforms linking governments, enterprises, universities and social organizations shall be established, with standardized cross-regional cooperation procedures and streamlined approval processes for joint projects and factor circulation. Inter-stakeholder collaboration relationships shall be rationalized to form a well-defined, seamlessly connected operational framework.

Implementation Barriers and Risk Contingency Plans: The primary challenge to multi-stakeholder collaboration lies in divergent objective functions: governments pursue public interests, enterprises prioritize profit maximization, and research institutions focus on academic reputation. A contractual collaboration model shall be adopted, with formal cooperation agreements clarifying respective rights, responsibilities and benefits for all parties. Third-party evaluation institutions shall be introduced to independently assess collaboration performance.

5.4. Incentive Guarantee: Refine the Multi-Stakeholder Incentive System

Enterprises engaged in scientific and technological innovation in Guanzhong shall receive enhanced rewards for achievement commercialization; energy enterprises

in Northern Shaanxi shall be granted tax incentives and technical transformation subsidies; market entities in Southern Shaanxi shall enjoy preferential land use and financing policies. A combination of monetary rewards, honor recognition and priority access to projects shall be deployed to stimulate endogenous motivation among all stakeholders.

Implementation Barriers and Risk Contingency Plans: Incentive policies face dual risks of insufficient motivation and distorted incentives. Weak incentives fail to mobilize stakeholders, while overly generous incentives may induce rent-seeking behavior. A dynamic incentive effect evaluation mechanism shall be implemented, with independent assessments of all incentive policies conducted biennially to adjust policy intensity based on outcomes.

5.5. Supervision Guarantee: Establish a Dynamic Evaluation and Optimization Mechanism

A quantifiable evaluation indicator system centered on multi-stakeholder empowerment shall be constructed to conduct regular dynamic monitoring and tracking assessments, forming a closed-loop management framework of "monitoring-evaluation-optimization".

Implementation Barriers and Risk Contingency Plans: Supervision and evaluation face obstacles including limited data accessibility and difficulties in quantifying indicators. A unified data collection system for empowerment performance shall be built based on existing platforms such as Qinchuangyuan, adopting a hybrid evaluation model combining objective statistical data and subjective assessments to avoid overreliance on quantitative metrics.

6. Conclusion and Prospects

6.1. Research Conclusion

From a regional heterogeneity perspective, this paper systematically analyzes the development of new-quality productivity and multi-stakeholder empowerment across Shaanxi's Guanzhong, Northern Shaanxi and Southern Shaanxi regions by comparing their resource endowments, industrial structures and development demands. The study confirms stark disparities in developmental foundations across the three regions: Guanzhong leverages scientific and technological and metropolitan advantages to prioritize the commercialization of innovative achievements; Northern Shaanxi focuses on green transformation of traditional energy and industrial diversification; Southern Shaanxi relies on ecological resources to advance the monetization of ecological value.

Current multi-stakeholder empowerment initiatives across Shaanxi suffer from universal province-wide challenges including homogenized development philosophies, ambiguous rights and responsibilities, unbalanced resource allocation and insufficient cross-regional collaboration. Region-specific bottlenecks also emerge from divergent development foundations: Guanzhong struggles with low efficiency in translating scientific and technological achievements into industrial applica-

tions; Northern Shaanxi's market entities lack endogenous motivation for industrial transformation; Southern Shaanxi faces shortages of high-end production factors and market operators.

Targeted differentiated empowerment pathways are formulated aligned with regional positioning: Guanzhong pursues science and technology-led integrated multi-stakeholder development; Northern Shaanxi adopts a market-driven model backed by policy support; Southern Shaanxi implements government-led development with extensive participation by social actors. A province-wide linkage framework is established featuring scientific and technological output from Guanzhong, industrial support from Northern Shaanxi and ecological product supply from Southern Shaanxi. Supporting guarantee mechanisms covering institutions, resources, collaboration, incentives and supervision are designed to form a complete multi-stakeholder collaborative empowerment framework tailored to Shaanxi's provincial conditions. This research clarifies functional positioning and collaboration logic of diverse stakeholders in cultivating regional new-quality productivity, verifies the practical value of differentiated and synergistic empowerment models, and delivers clear pathways for regions to nurture new-quality productivity based on local distinctive strengths.

6.2. Research Limitations and Future Prospects

Constrained by research conditions and data availability, this paper exhibits certain limitations. The analysis is primarily qualitative; although regional development gaps are compared using available statistical data, large-sample quantitative empirical testing is absent, lacking in-depth measurement of the driving intensity and influencing factors of diverse stakeholders and production factors. Furthermore, case analysis remains macro-level, without in-depth micro-level investigation of cities, counties, flagship enterprises and scientific and technological platforms, resulting in insufficient discussion of on-the-ground practical details.

Follow-up research can expand analytical dimensions and methodological approaches. On one hand, econometric models can be introduced for quantitative analysis to calculate the driving efficiency of various stakeholders and factors, enhancing the objectivity and precision of research conclusions. On the other hand, in-depth field research of typical regions and benchmark stakeholders can be conducted to summarize replicable operational experience. Through theoretical deepening and empirical supplementation, more refined and implementable theoretical foundations and practical schemes can be provided for Shaanxi to advance multi-stakeholder collaborative empowerment of new-quality productivity and realize balanced, high-quality regional development.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

2025 Government Work Report of Shaanxi Provincial People's Government (2025). https://www.shaanxi.gov.cn/zfxxgk/zfgzbg/szfgzbg/202502/t20250205_3425117_wap.html

Ao, M. (2026). "AI Plus" Driving New-Quality Productivity: Internal Mechanisms, Transition Paths and Policy Coordination. *Industrial Technology & Economy, 45,* 40-48. (In Chinese) http://dianda.cqvip.com/Qikan/Article/Detail?id=7203205258

Fan, B. (2026). Coordinating the Integration of Education, Science, Talent and Finance to Accelerate the Cultivation of New-Quality Productivity: Path Exploration and Policy Suggestions Based on Shaanxi's Scientific and Educational Resource Endowments. *Western Journal, No. 7,* 10-14. https://doi.org/10.16721/j.cnki.cn61-1487/c.2026.07.016

Ma, L., & Zhang, Q. (2026). Paths and Effects of Digital Economy Empowering Urban-Rural Integration Development in Shaanxi Province. *Resources Development & Market, 42,* 1037-1044. (In Chinese) https://kns.cnki.net/kcms2/article/abstract?v=jit-Bskw5eRZEti_W5IA25U4lKI-LXMy9AKhn6OVNfQaSrlYdgls2nTQ9x-W_wwWjjOJIxgwsvaYuGL-9gxWOSiKgMkmDDJcZOUc3yhGyald6CnwgzZH3IfL8D4GH02ax3fKgi9Mjw2lZM3kgcaeD-CugFtcjf7z6&uniplatform=NZKPT

Qu, X. (2025). Intellectual Property Protection and New-Quality Productivity: Institutional Adaptation and Implementation Paths. *Journal of Weinan Normal University, 40,* 65-73. (In Chinese) http://dianda.cqvip.com/Qikan/Article/Detail?id=7202498123

Shaanxi Provincial Bureau of Statistics (2025). *Shaanxi Statistical Yearbook (2025).* China Statistics Press. https://tjj.shaanxi.gov.cn/tjsj/ndsj/tjnj/sxtjnj/index.html?2025

Song, H., & Zhang, X. (2024). Digital Transformation Driving New-Quality Productivity: Mechanisms, Challenges and Path Options. *Journal of Beijing Institute of Technology (Social Sciences Edition), 26,* 41-51+73. (In Chinese) http://journal.bit.edu.cn/sk/cn/article/id/365669af-84d5-4e9d-a119-44fd52665b82

Wang, B. (2025). Internal Mechanisms, Practical Obstacles and Practical Paths of Higher Education Innovation and Entrepreneurship Education Driving the Development of New-Quality Productivity. *Theory and Practice of Education, 45,* 3-7. (In Chinese) http://dianda.cqvip.com/Qikan/Article/Detail?id=7200937802

Wang, M., Hui, Z., & Zhao, K. (2026). Digital Empowerment of Industrial Transformation: An Analysis of the Dynamic Evolution of Digital-Real Economy Integration in Shaanxi. *Journal of Hunan University of Finance and Economics, 42,* 98-109. (In Chinese) https://doi.org/10.16546/j.cnki.cn43-1510/f.2026.03.009

Wu, F., & Luo, K. (2026). An Analysis of Regional Collaboration in Promoting the Development of New Quality Productive Forces According to Local Conditions. *Journal of Northwest University (Philosophy and Social Sciences Edition), 56,* 46-59. (In Chinese) https://kns.cnki.net/kcms2/article/abstract?v=jit-Bskw5eRLB0nvsqRQ2Cze4zI3x3D85RnWg0_b7QaLEbNaDIqWWrrIJMUqntCQwKX-ahl71iaKnNdjnNZU8XJ9yVQD3I3Q4ct-c9_ZMEMBD8yALWA1jSGkELDeVPbVLf8rnxhzI3_XeOzY-aYA2FILO7DxG2_sUA&uniplatform=NZKPT

Xu, X. (2025). Impacts of Business Environment on New-Quality Productivity—Based on fsQCA Method. *Monthly Journal of Finance and Accounting, 46,* 123-129. (In Chinese) http://dianda.cqvip.com/Qikan/Article/Detail?id=7113681004

Yuan, X. (2026). Dynamic Evaluation and Improvement Pathways of Regional Collaborative Innovation Development in Shaanxi Province. *Investment and Cooperation, No. 2,* 55-57. (In Chinese)
https://kns.cnki.net/kcms2/article/abstract?v=jit-Bskw5eR8WMJTG26cfpSFSq4Oidg72ertyqVdMUTSmFjy8pjSeHpNr7WTG-PIrPfX6WE_zNO9Iuid3ZU-j1n9A1K_bRfr-oGkuG3h8Bvd5r4ddjPlPael2xdDjwjm1W3G3XMytygpFrSvwM-Khk6xUtJz3cX2089LBhm7p71zQ=&uniplatform=NZKPT

Zhang, H., & Fu, J. (2026). Direction Compliance and Action Routes of Vocational Education Driving the Development of New-Quality Productivity. *Research on Education and Equipment, No. 6,* 1-7+20. (In Chinese)
http://218.28.6.71:81/Qikan/Search/Index?key=A%3D%E5%BC%A0%E8%BE%89%E8%93%89

Zhang, W., & Ma, Y. (2026). Impacts and Mechanisms of Fiscal Agriculture Support on Agricultural New-Quality Productivity. *Journal of Yunnan Agricultural University (Social Sciences), 20,* 44-52. (In Chinese)
https://xb.ynau.edu.cn/jwk_sk/cn/article/doi/10.12371/j.ynau(s).202512054

Zhu, Y., & Zeng, T. (2026). Path Exploration of New-Quality Productivity and High-Quality Regional Economic Development under Industrial Integration. *Business Observation, 12,* 36-38+54. (In Chinese)
https://kns.cnki.net/kcms2/article/abstract?v=jit-Bskw5eTuDmybvKvuX6NAz1Yn_djCzb74p8NSJ5n2KpGl74ZVEpe0RYS6AV4Sk1osKhjNqJmTREIq5GxVeGg9ICvv5TAsA6VUG-BiA9iqNZy5Wn5YENsrtZ4XCerQ58HUNpYyVouwyerxhIEfK0OV-kwDH4RixwgVdEZmYo8Yg=&uniplatform=NZKPT