

Research on the High-Quality Development Path of Henan's Fishing Net Processing Industry from the Perspective of Dynamic Capabilities

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How to cite this paper: Zhu, X. Y., & Zhu, F. Y. (2026). Research on the High-Quality Development Path of Henan's Fishing Net Processing Industry from the Perspective of Dynamic Capabilities. *Open Journal of Business and Management*, 14, 548-556. <https://doi.org/10.4236/ojbm.2026.141032>

Received: November 27, 2025

Accepted: January 16, 2026

Published: January 19, 2026

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Abstract

As a regional characteristic industry and an important engine for rural revitalization, Henan's fishing net processing industry has formed large-scale industrial clusters, but faces development bottlenecks such as slow technological iteration, insufficient industrial chain coordination, and lagging market response. Based on the dynamic capability theory, this study adopts literature research, case analysis, and field investigation methods to systematically analyze the development status and dynamic capability shortcomings of Henan's fishing net processing industry, and constructs an industrial development path from three dimensions: sensing capability, integration and reconstruction capability, and learning and innovation capability. The research finds that the industry needs to break through traditional development dilemmas by strengthening market demand perception, promoting the integration of industrial chain resources, and deepening technological and model innovation. The research conclusions provide theoretical support for the transformation and upgrading of Henan's fishing net processing industry, and also offer practical references for traditional labor-intensive industries to achieve high-quality development through dynamic capabilities.

Keywords

Dynamic Capabilities, Fishing Net Processing Industry, High-Quality Development, Industrial Transformation and Upgrading

1. Introduction

The fishing net processing industry is an important supporting link in the fishery

industrial chain, featuring both labor-intensive and resource-dependent characteristics. It plays an irreplaceable role in promoting county economic development, absorbing rural surplus labor, and facilitating rural revitalization. Relying on the geographical advantages along the Huaihe River and traditional weaving techniques, Henan Province has cultivated several fishing net processing industrial clusters, such as Huaibin County, Lianji Town of Shangshui County, and Shilin Town of Dengzhou City, forming diversified development models including “company + farmer” and “industrial park + e-commerce”. With an annual output value exceeding 2 billion yuan, its products are exported to more than 10 countries and regions at home and abroad.

With the global modernization transformation of fisheries, tightening environmental policies, and diversified market demands, the limitations of the traditional development model of Henan’s fishing net processing industry have become increasingly prominent: products are mainly mid-to-low-end, with high-end functional products accounting for an insufficient proportion; production methods still rely on manual and semi-mechanized operations, with low automation levels; the industrial chain shows a “loose” feature, with insufficient coordination between upstream and downstream; brand awareness is weak, and market bargaining power is limited. In this context, relying solely on static resource advantages is no longer sufficient to cope with the dynamically changing market environment, and it is urgent to build dynamic capabilities to achieve sustainable industrial development.

The dynamic capability theory, proposed by Teece et al., holds that enterprises gain competitive advantages by adapting to environmental changes through a series of dynamic activities such as sensing market opportunities, integrating internal and external resources, and continuous learning and innovation, providing an important theoretical perspective for the transformation and upgrading of traditional industries. Existing studies have mostly focused on the application of dynamic capabilities in manufacturing, service industries and other fields, while research on characteristic county industries such as fishing net processing is relatively scarce. Based on this, this study takes Henan’s fishing net processing industry as the research object, explores its high-quality development path from the perspective of dynamic capabilities, which has important theoretical and practical significance.

This study adopts literature research, case analysis, and field investigation methods: systematically sorting out relevant literatures on dynamic capability theory and traditional industrial transformation and upgrading to lay a theoretical foundation; selecting representative enterprises such as Huaibin Xinyi Net Industry and Shangshui Huile Ecological Fishing Net to analyze their practices in dynamic capability construction and development dilemmas; visiting 4 major fishing net industrial clusters, 12 large-scale enterprises, and 3 industrial parks in Henan, collecting first-hand data through interviews and questionnaires. The research technical route follows the logic of “theoretical combing-current situation

analysis-shortcoming diagnosis-path construction-guarantee measures” to provide a systematic solution for the high-quality development of the industry.

2. Theoretical Basis and Literature Review

The dynamic capability theory was defined by Teece et al. as “the ability of enterprises to integrate, build, and reconfigure internal and external resources and capabilities to adapt to rapidly changing environments”, and the three-stage model of “sense-seize-reconfigure” was proposed. Subsequent scholars further clarified that sensing capability, integration and reconstruction capability, and learning and innovation capability are the core dimensions. This theory emphasizes the matching between environmental dynamics and capability adaptability, arguing that traditional static resource advantages are temporary, and only through continuous capability upgrading can sustainable development be achieved in a complex and volatile market environment (Huang, 2025). It has been widely applied in the research on the transformation and upgrading of traditional industries such as textiles and agricultural product processing.

Existing studies have shown that dynamic capabilities are positively correlated with the transformation and upgrading of traditional industries: sensing capability helps industries accurately capture changes in market demand and technological innovation trends (Wang & Liu, 2025); integration and reconstruction capability can promote the coordination of upstream and downstream resources in the industrial chain; learning and innovation capability can drive technological iteration and model innovation (Liu, Fang, & Ma, 2025). In the research on characteristic county industries, scholars have pointed out that characteristic industries clustered with small, medium, and micro enterprises often face problems such as scattered resources and weak technology, and the construction of dynamic capabilities can effectively integrate scattered resources and strengthen technology spillover effects (Xiao, Yang, & Chen, 2025). However, relevant research on industries such as fishing net processing, which have both traditional craftsmanship and modern industrial characteristics, is still relatively lacking.

Research on the fishing net processing industry has mostly focused on the description of industrial status and policy suggestions, such as analyzing the development models of industrial clusters in Chaohu, Anhui and Binzhou, Shandong, and proposing countermeasures such as technological innovation and market expansion (Zhao & Chen, 2023). Some studies have focused on the application of new fiber materials and intelligent cage technology, but few have explored the sustainable development of the industry from the perspective of capability construction. Research on Henan’s fishing net processing industry is mostly local government work reports and news reports, lacking systematic theoretical analysis and empirical research. Existing data show that there are still deficiencies in technological innovation, industrial chain integration, and brand building, which urgently require in-depth analysis from the perspective of dynamic capabilities.

3. Current Development Status and Dynamic Capability Shortcomings of Henan's Fishing Net Processing Industry

Henan has formed four major fishing net processing industrial clusters centered on Huaibin County, Lianji Town of Shangshui County, Shilin Town of Dengzhou City, and Boting Sub-district of Xiping County, covering 16 towns and townships, with 36 large-scale enterprises, more than 5000 family workshops, and over 60,000 employees. Among them, the annual output value of Huaibin's fishing net industry is nearly 700 million yuan, covering 179 product types and exported to Vietnam, Australia and other countries; the annual output value of Lianji Town, Shangshui County reaches 1 billion yuan, and its net weight products account for 80% - 90% of the national market share; Xiping County has planned and constructed a three-industry integrated fishing gear industrial park, which is expected to achieve an annual output value of 1 billion yuan after completion. The formation of industrial clusters has promoted technical exchanges and resource sharing, and reduced production costs.

The industry has explored diversified development models: Huaibin Xinyi Net Industry has driven 34,000 jobs through the model of "semi-finished product processing + farmer recognition + cash settlement"; more than 70 farmyards in Shilin Town, Dengzhou City have been transformed into processing points, absorbing more than 580 employees with an average annual income increase of over 25,000 yuan; 109 e-commerce entities in Lianji Town, Shangshui County have achieved annual sales of 350 million yuan through platforms such as Taobao and Pinduoduo, forming a "dual-network mutual promotion" development pattern. Some leading enterprises have begun to introduce modern production technologies and equipment: Shangshui Huile Ecological Fishing Net has created 5 "national firsts" by applying technologies such as wireless slicing and warp knitting machine speed-up; Huaibin Binhuai Net Industry uses leftover materials from textile and garment enterprises to produce fishing net accessories, expanding product types from traditional fishing nets to bird nets, sunshade nets, leisure fishing nets and other diversified products. However, high-end functional products are still relatively lacking.

In terms of dynamic capability construction, Henan's fishing net processing industry has obvious shortcomings:

- **Insufficient sensing capability:** The industry as a whole passively perceives changes in market demand. Most enterprises rely on traditional customer orders, lack systematic research on international market standards, environmental policies, and consumption upgrading trends, respond slowly to new market demands such as degradable fishing nets and high-strength fishing nets for deep-sea aquaculture, and have low willingness to apply new materials and automated equipment.
- **Weak integration and reconstruction capability:** The industrial chain shows the characteristics of "scattered upstream, homogeneous midstream, and single downstream". The upstream raw material supply relies on external pro-

curement; midstream enterprises have serious product homogenization and widespread low-price competition; downstream sales channels are insufficiently high-end. There is a lack of effective collaborative mechanisms among enterprises, and industrial parks have not formed an integrated service system. Meanwhile, the industry exhibits obvious insufficient market perception capability. With the global emphasis on marine environmental protection, the market demand for biodegradable fishing nets has been rising rapidly driven by policies and environmental needs, but most enterprises in the industry lack sensitivity to this trend, with slow technological research and development and product iteration, failing to timely adapt to the upgrading market demand.

- **Lack of learning and innovation capability:** Investment in technological research and development is seriously insufficient. Most enterprises do not have specialized R&D teams, and core technologies rely on external introduction. Product innovation is limited to superficial adjustments, with high-value-added products accounting for less than 10%, and the promotion of modern business models is limited.

4. High-Quality Development Path of Henan's Fishing Net Processing Industry from the Perspective of Dynamic Capabilities

Based on the dynamic capability theory, combined with the industry's development status and shortcomings, this study constructs a trinity high-quality development path of "sensing-integration-innovation".

4.1. Strengthening Sensing Capability

Establish an industry joint research team to conduct regular domestic and foreign market surveys, focusing on core information such as fishery policies, changes in market demand, and international standards, form an "Industry Market Dynamic Report" for sharing. Encourage enterprises to establish long-term cooperative relationships with large-scale fishery breeding households and ocean-going fishing companies, and optimize product design through order feedback. At the same time, use big data analysis tools to mine sales data from e-commerce platforms to achieve differentiated product supply.

In terms of technological trend sensing, rely on industry chambers of commerce and industrial parks to build a technology information sharing platform, cooperate with scientific research institutions such as Donghua University and Chinese Academy of Fishery Sciences to push technological innovation dynamics, organize enterprises to participate in international fishery exhibitions and industry seminars, and establish a technology early warning mechanism to layout relevant technological R&D and product upgrading in advance.

4.2. Enhancing Integration and Reconstruction Capability

Promote vertical integration of the industrial chain: Introduce or cultivate fiber

production and auxiliary material processing enterprises in the upstream link, focusing on the production of high-strength synthetic fibers and degradable materials to achieve “local sourcing and local processing”; encourage leading enterprises in the midstream link to integrate small and medium-sized family workshops through mergers and reorganizations, promote production standardization and large-scale development, and popularize the division of labor and cooperation pattern of “core enterprises + supporting enterprises”; integrate e-commerce resources in the downstream link to build a regional unified e-commerce operation center, expand cross-border e-commerce channels, and develop international markets such as Europe, America, and Southeast Asia. For example, the “blue circulation”-driven high-end intelligent fishing net manufacturing cluster in Taizhou/Ningbo, Zhejiang, is a notable case. Focusing on R&D of environmentally friendly fibers for fishing nets upstream, it has introduced supporting enterprises for special modified polyester and biodegradable resins, achieving local R&D and supply. In the midstream, leading enterprises formulate industry standards and integrate SMEs into a precision processing consortium. Downstream, leveraging cross-border e-commerce pilot zones, it has built a global trading platform for fishing nets, with products exported to Europe, America and Southeast Asia. Its whole-chain integration experience via circular economy offers a replicable paradigm for Henan’s fishing net industry to break upstream-downstream barriers and boost added value.

For horizontal resource integration, build a “four-party linkage” platform involving government, enterprises, scientific research institutions, and financial institutions: The government optimizes the business environment and provides policy support; enterprises establish industry chambers of commerce and formulate unified standards; scientific research institutions jointly build R&D centers; financial institutions launch targeted credit products. At the same time, integrate logistics resources to build a regional logistics industrial park to achieve intensive transportation.

4.3. Cultivating Learning and Innovation Capability

Deepen technological innovation and talent training: Increase investment in technological R&D, encourage enterprises to cooperate with scientific research institutions to establish a “Fishing Net Technology Research Institute”, focusing on tackling key core technologies such as degradable fishing net materials and automated weaving equipment. Provide subsidies to enterprises introducing automated equipment and promote the application of circular economy technologies. In terms of talent training, carry out “school-enterprise cooperation” to cultivate technical workers oriented to the industry, invite experts to conduct multi-field training, and set up a “technological innovation reward fund” to stimulate innovation vitality.

In terms of business model innovation: Expand diversified product application scenarios such as agricultural protection nets, leisure and entertainment nets, and

industrial nets; integrate new media channels such as live e-commerce and community marketing to build a “origin direct supply + live streaming” model and promote online-offline integrated sales; rely on the construction of Xiping County’s three-industry integrated fishing gear industrial park to realize the three-industry integrated development of “planting-processing-sales-logistics-tourism” and extend the industrial chain.

4.4. Implementation Challenges and Mitigation Strategies

During the implementation process, challenges such as small family workshops’ resistance to industrial integration, insufficient R&D investment of small and medium-sized enterprises (SMEs), and weak digital transformation capabilities will be encountered. In response, the government can take the lead in establishing a government-enterprise communication platform and providing transition subsidies for small family workshops; promote financial institutions to expand R&D credit support to reduce innovation costs; and rely on industrial parks to carry out free digital training, helping enterprises enhance adaptive capabilities and ensuring the steady implementation of the development path.

5. Guarantee Measures

5.1. Government Level

Formulate the “High-Quality Development Plan for Henan’s Fishing Net Processing Industry”, clarify industrial development goals, key tasks, and supporting policies; increase financial investment to support the construction of infrastructure such as industrial parks, R&D centers, and logistics bases; implement policies such as tax incentives and loan interest subsidies to reduce enterprise R&D and expansion costs. At the same time, strengthen industry supervision, formulate product quality standards and environmental protection standards, regulate market order, crack down on behaviors such as low-price competition and shoddy products, build a brand promotion platform, organize enterprises to participate in domestic and foreign exhibitions, and create the “Henan Fishing Net” regional public brand.

5.2. Industry Level

Give play to the bridge and link role of chambers of commerce, establish a provincial-level fishing net processing industry chamber of commerce, formulate industry self-regulation conventions, and standardize enterprise production and operation behaviors; build an information sharing platform to timely release market dynamics, technical information, policies and regulations, and promote exchanges and cooperation among enterprises. Promote the standardization of the industry, jointly formulate a series of standards for product quality, processing technology, safety and environmental protection with scientific research institutions to improve the overall quality level of the industry; organize technical training, experience exchange and other activities to promote the popularization and

application of advanced technologies and models.

5.3. Enterprise Level

Strengthen main responsibilities and innovation awareness: Leading enterprises should play a leading role, increase R&D investment, carry out core technological research and business model innovation, and drive the coordinated development of small and medium-sized enterprises; small and medium-sized enterprises should take the initiative to learn advanced experience, actively participate in the division of labor in the industrial chain, and focus on niche markets to create characteristic products. Strengthen the construction of talent teams, introduce professional technical and management talents, cultivate local technical backbones, establish brand awareness, strengthen product quality control and brand packaging and promotion, and improve product added value and market bargaining power.

6. Conclusion and Prospects

The core innovative contribution of this study lies in the first systematic application of the dynamic capability theory to traditional agglomerative industries such as fishing net processing, breaking through the previous research limitations that focused solely on single technological upgrading or scale expansion. Compared with the superficial strategies of general industrial upgrading, the introduction of this theoretical framework profoundly reveals the core logic for traditional agglomerative industries to break through development bottlenecks—not relying on external factor input, but adapting to changes in the external environment through internal capability iteration. This provides a new analytical perspective for industrial transformation from “scale agglomeration” to “capability-driven”. Henan’s fishing net processing industry has formed large-scale industrial clusters, explored diversified development models, and achieved remarkable results in driving employment and facilitating rural revitalization. However, it still faces dynamic capability shortcomings, such as insufficient market and technology sensing, weak industrial chain integration and reconstruction capabilities, and lack of learning and innovation capabilities. Based on the dynamic capability theory, the industry needs to build a trinity development path of “sensing-integration-innovation” by establishing a market and technology sensing system, promoting the integration of industrial chain resources, and deepening technological and model innovation. Meanwhile, relying on the collaborative guarantee of the government, industry, and enterprises, high-quality development can be realized, which also provides referable theoretical tools and practical paradigms for the transformation of similar county-level characteristic industries. Through investigation and case analysis, this study constructs the aforementioned development path, but there is still room for improvement in the depth and breadth of the research. In the future, the scope of research samples can be further expanded to carry out quantitative research to verify the correlation between each dimension of dynamic capabilities and industrial performance, so as to continuously improve the universality of the

theoretical framework. With the advancement of fishery modernization, the tightening of environmental policies, and the prominent trend of consumption upgrading, the fishing net processing industry will transform towards intelligence, greenization, and internationalization. The continuous upgrading of dynamic capabilities will become the core support for the industry to meet challenges and seize development opportunities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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