Research on the Development Path Model of Strategic Emerging Industries Based on the Full Life Cycle Theory

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Abstract. The development of strategic emerging industries is an important initiative for the state to build a modernized industrial system and promote high-quality economic and social development. China, in its "14th Five-Year Plan" period, has accorded strategic emerging industries a paramount role in the construction of a modernized industrial system. The nation has articulated its intent to expedite the development of these industries, recognizing them as the foundation for future economic sectors. During the period of the "14th Five-Year Plan", China has put strategic emerging industries in the important position of building a modernized industrial system and has proposed to accelerate the development of strategic emerging industries to build the pillar of future industries. For businesses, strategic emerging industries assume a multifaceted role. They serve as a critical foundation upon which to nurture novel economic drivers and realize high-caliber development. Additionally, these industries are instrumental in reshaping competitive advantages on the global stage and bolstering positions within the global industrial hierarchy. Against the backdrop of overarching national strategies such as "Carbon Peak and Carbon Neutrality" and "Self-Reliance and Self-Improvement in Science and Technology," enterprises navigating the strategic emerging industries landscape find themselves at the intersection of remarkable opportunities and formidable challenges. Faced with these new opportunities and heightened requisites, enterprises are compelled to address the deficiencies while capitalizing on the strengths inherent in the development and operational framework of strategic emerging industries. Constructing an advanced industrial development capability is the order of the day, facilitating the structural upgradation of strategic emerging industries and ensuring their high-quality and sustainable development. According to the development trend of strategic emerging industries and the development practices of typical enterprises at home and abroad, we examine the development process of strategic emerging industries and put forward the path model for enterprises to develop strategic emerging industries based on the full life cycle approach of industrial development. We further put forward the dual-wheel development mode, namely, "industrial operation + industrial investment", and give suggestions for enterprises' competence building, guiding enterprises to explore the operation and management mode that matches the strategic emerging industries' development.

Keywords: Strategic Emerging Industries; Full Life Cycle Theory; Development Path; Competence Building.

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1 Introduction

During the period of the "14th Five-Year Plan", China has put strategic emerging industries in the important position of building a modernized industrial system and has proposed to accelerate the development of strategic emerging industries to build the pillar of future industries. For enterprises, strategic emerging industries are not only an important support for them to cultivate new economic driving forces and realize high-quality development, but also a key industry segment to reshape new advantages in international competition and enhance their position in the global industrial chain. Along with major national strategies such as "Carbon Peak and Carbon Neutrality" and "Self-Reliance and Self-improvement in Science and Technology", enterprises' development in strategic emerging industries is facing both great opportunities and huge challenges. Facing new opportunities and high requirements, enterprises need to make up for the shortcomings and forge the longcomings of the development and operation mode of strategic emerging industries, construct a superior industrial development capability, promote the structural upgrading of strategic emerging industries, and ensure enterprises' the high-quality and sustainable development.

2 Strategic Emerging Industries Development Path Modeling

2.1 Typical development practices of enterprises

From the practical experience of typical enterprises at home and abroad [1], the development modes and operation strategies adopted by enterprises demonstrate both common characteristics and staged differences when an industry or a business is in different development stages, aiming at realizing full life cycle management (as shown in Table 1).

Table 1. Strategies for Different Industrial Development Stages for Typical Enterprises at Home and Abroad

Industrial Stage	China Petrochemical Corporation	China Mobile Limited	China Southern Power Grid	The EDF Group
Identification stage	Establishing Industrial Development Institute to research new energy and new businesses.	Establish industrial research institutes to study intelligent transportation industrial energy and financial technology industries.	Study emerging industry investments in industrial investment groups.	Identify innovation trends, start-ups, etc. through the EDF Pulse innovation system.

Entry stage	Establish the Enzer Fund as an important means of investing in new businesses; set up Sinopec Capital to focus on the development of strategic emerging industries.	Deploy strategic emerging industry through CMCC investment company; promote rapid appreciation of invested enterprises through equity operation, cooperative R&D, joint development.	Conduct direct equity investment through the South Network Industry Investment; Establish Jianxin Fund to deploy strategic emerging industries	Relying on EDF Pulse system, discover new business, carry out post-investment empowering management.
Cultivation stage	"Easy Joy" has introduced external capital to implement mixed-ownership reform, and has built its own brand of goods together with external partners.	Create management mode that emphasizes headquarter for overall management, regional department for general operation, and professional departments for construction.	China's Southern Power Grid promotes rapid development through mixed-ownership reforming; promote tenure system & contractual reform to stimulate organizational vigor.	Integrate internal resources to establish several specialized companies, supporting integrated services.
Development stage	Implement reorganization of the oil sales business to promote listing.	Focus on the continuous excavation of customer needs, and constantly innovate solutions.	Strengthen capital operation and increase the rate of asset securitization.	Provide differentiated solutions for customer segmentation needs.
Exit stage	Disposal of inefficient operations through asset sales, asset liquidation, etc.	Traceback business scenarios such as networks and IT for asset liquidation.	Dispose of inefficient assets by equity transfer.	Completely withdrew from U.S. market.

2.2 Industrial development path based on full life cycle management

From the perspective of the full life cycle of industrial development, we aim to specify the key tasks and strategies to be adopted by enterprises at different stages of business development, and to design the development path of strategic emerging industries. Based on the full life cycle theory [2][3], according to the five stages of "identification-entry-cultivation-development-exit", relying on the four main bodies of "emerging industry unit, financial business unit, industrial research system, and industrial investment platform", we emphasize the two key points of "business entry" and "business exit" to implement the full life cycle industrial management, cultivating and developing strategic emerging industries, as shown in Figure 1.

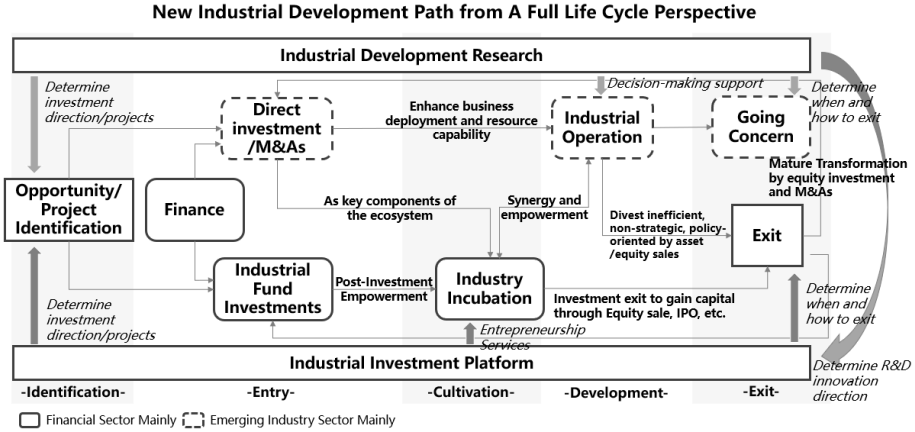

Fig. 1. The Development Path of Strategic Emerging Industries from the Perspective of the Full Life Cycle

2.2.1. Five stages of the full life cycle of industrial development

Identification stage: Carry out industrial development research and identify entry opportunities in emerging industries or new projects relying on specialized teams.

Entry stage: Entering new business areas with "direct investment + industrial fund" as the main method.

Cultivation stage: For start-up enterprises in the cultivation stage, intensify cultivation efforts and provide support services to enable them to grow and mature rapidly.

Development stage: Continuously strengthen the level of competitiveness, to achieve scale development, and become the main contributor of revenue and profit to the company's strategic emerging industries.

Exit stage: Through industry analysis, competitiveness analysis, policy analysis, etc., we clarify whether the industry will continue to develop or undergo a full/partial exit, and determine a favorable timing and effective way of exit.

2.2.2. Promote the four main bodies of industrial development by labor division and synergistic collaboration

Emerging industry unit: Focus on industrial operation aiming at long-term development. Synergize with the industrial investment platform and provide support in terms of application scenarios and resource channels to enhance the overall competitiveness of its own business while promoting the development of invested enterprises [4].

Financial Business Unit: Focus on industrial fund investment with the goal of capital appreciation. Empower invested enterprises in various aspects focusing on post-investment management; effectively coordinate with the emerging industry units to inject mature and competitive high-quality enterprises into the emerging industries, converting from financial investment to shareholding operation.

Industrial Investment Platform: The industrial investment platform utilizes industrial funds for investment and incubation, and promotes the commercialization of innovations through intellectual property transactions. Mature science and technology enterprises can not only obtain capital premiums through investment exit but also be transformed into industrial operations to support the company's business development.

Industrial research system: Through professional, systematic, and continuous research, provide decision-making support for the company's entry, adjustment, and exit strategy of emerging industries with its specific plan.

2.2.3. Two key points to promote the optimal layout of strategic emerging industries

Focusing on industrial entry, the key is to strengthen research on enterprise industrial development policy and strategy [5], optimize the layout of industrial ecosystems, and enhance the core competitiveness of industries.

Focusing on industrial exit, the key is to continuously optimize the industrial structure and focus on the development of critical fields and key capabilities. On the one hand, an investment exit could realize capital gains and facilitate the funds for the next round of industrial entry and deployment. Enterprises can exit an investment through equity sale, initial public offering (IPO), etc. On the other hand, an industrial exit could bring about business structure adjustment and a further refocus on the main business and competitive business areas. Enterprises can divest ineffective or inefficient assets, non-strategic assets, etc. through asset sales and asset liquidation; they can also withdraw from certain business areas through equity sales, or change the role from equity holding to equity participation. The business exit approach is shown as Figure 2 below.

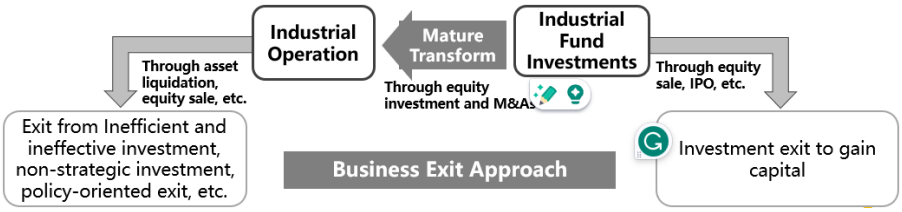

Fig. 2. Approach to Business Exit

3 Core Competence Construction for the Development of Strategic Emerging Industries

Given the core competence required for the development of strategic emerging industries, we propose to build the dual-wheel development capability of "industrial operation + industrial investment" to ensure the healthy and rapid development of strategic emerging industries. **Industrial operation** means combining the parent company's advantages to realize independent development based on enterprise's the existing strategic emerging industries, and therefore highlight the strategic value and strengthen the specialized operation. **Industrial investment** focuses on the discovery and cultivation of high-quality resources and projects that closely relate to the enterprise's strategic development, forming an ecosystem together with the existing industries. Relying on the enterprise's financial sector or external investment management

company to incubate incremental business, emphasize resource synergy, and focus on the incubation of investment.

3.1 Enhancement of industrial operation capacity

3.1.1. Transform development philosophy.

First, truly establish a customer-centered development philosophy [6]. Promote a philosophy transformation from investment-based, large-scale development to customer-centric development, and set up a market-oriented development concept that is deeply grounded in the market and is willing to face challenges. To enhance the concept of market-oriented development, it is necessary to strengthen the market sense, understand the needs and find opportunities from customers, and promote the sustainable development of the business.

Second, accelerate the nurturing of market competition culture in industrial units. Stimulate the staff's pioneering spirit and build the inner strength to strive for excellence; strengthen the spirit of group struggle and break the constraints of the administrative system thinking to form the ideological consensus of "playing the market advantage as well as bearing the market risk".

3.1.2. Strengthen operational capability

First, strengthen the synergy between industry, academia, and research and aggregate R&D and innovation resources of strategic emerging industries to provide professional support for the development of front-line business [7].

Second, highlight the synergy between industry and finance and organically combine with the financial business of enterprises or external financial institutions to form a co-force in project investment and financing, key capabilities construction, etc.

3.1.3. Intensify external cooperation

First, focusing on customer demand, it is necessary to unite with external professional forces to provide supporting products and services in niche areas, explore business model innovation, improve customer solutions, and create benchmark projects.

Second, with the help of industrial platforms, business alliances, and other external resources, continue to expand external ecological cooperation and jointly promote key technology and product R&D to inject momentum for sustainable development [8][9].

3.2 Enhancement of industrial investment capacity

Utilize existing industrial financial platforms and tools to implement professional operation of industrial investment, strengthening the investment and incubation capacity of strategic emerging industries, and supporting the long-term development of strategic emerging industries. For large conglomerates, it is necessary to establish an industrial investment platform within the enterprise. We take large energy enterprises as an example in this study and put forward key measures to enhance industrial investment capacity.

3.2.1. Establish industrial investment platforms to create a "testing ground" for investment in strategic emerging industries

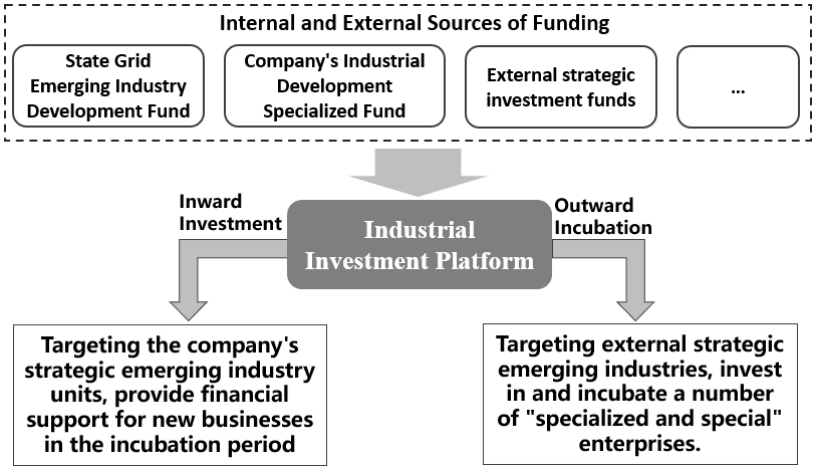

Fig. 3. Industrial Investment Platforms

Business: The platform is aimed to track the development trend of cutting-edge technology and industrial evolution and focus on emerging and future incremental businesses such as artificial intelligence, hydrogen energy, energy storage, CCUS, etc. [10]

Functional positioning: The platform is positioned as an incubator and testing ground for future business, planning a deployment of several future pillar industries with promising development prospects.

Organizational structure and operation mechanism: The industrial investment platform is established through equity diversification. The platform would introduce specialized experts and construct a full life cycle management mode including investment, development, operation, and exit mechanisms to make “experimental” investments in emerging industries.

Core Advantages: Internally, it is conducive to flexible capital operation, business layout optimization, emerging industries incubation and cultivation, and transformation to “capital management”; it can form a more flexible trial and error mechanism and reduce the risk of emerging business development. Externally, empowered by investment, a cooperative ecology of industrial investment is conducive to strengthening the comprehensive competitiveness of emerging industries.

The industrial investment platform is shown as Figure 3.

3.2.2. Improve outbound investment management capabilities to build an ecosystem for new business incubation and cultivation

First, optimize industrial investment funds and leverage social capital to jointly deploy strategic emerging industries. In recent years, large enterprises have actively established funds to develop emerging industries. As for fund establishment, in addition to the joint government and state-owned enterprises, the proportion of social capital is gradually increasing. Enterprises are inspired to jointly set up investment funds together with key local governments, industry chain-related enterprises, financial institutions, etc., focusing on areas of comprehensive energy services, charging services, “double carbon” and so on.

Second, improve pre-investment management. Establish a strict pre-investment checking and due diligence mechanism. For investment projects, it is suggested to establish a refined due diligence process and strict project review standard, and to form pre-investment analysis reports covering industry analysis, enterprise and entrepreneur evaluation, investment justification, risk assessment, etc., ensuring the reliability of the invested projects. Improve the investment decision-making organization to enhance the scientificity of decision-making. Construct a professional investment committee and decision-making mechanism and introduce industry experts to strengthen the review of specialized fields. Enhance the participation of strategic finance, legal compliance, and other professional functions to assess risks from multiple perspectives and ensure the reliability of the invested projects.

Third, strengthening post-investment management. Strengthen post-investment transaction integration. We have gained an in-depth understanding of the management and business of the investee company and promoted the transaction integration of the investee company in terms of corporate governance, business continuity, strategic consistency, and value realization. Develop dedicated posts to promote the relevant work and ensure that the terms of the transaction are honored. Improve post-investment supervision and audit. Establish a daily monitoring and early warning mechanism to monitor and manage the invested enterprises based on the dynamic feedback of their operating information. Setting up security levels for various matters and regularly reviewing matters with low-security levels. Regularly conduct audits of investment rights and interests, and decide whether to enter or exit.

Fourth, improve the whole process risk management system. Strengthen the risk management awareness and culture, and rely on the industrial investment platform to realize the control and isolation of business expansion risks. Highlight the standardization of corporate governance and internal control of the industrial investment platform to substantiate the independent legal entity status of the industrial investment platform. Intensify the management of investment decision-making, reporting system of major matters, project execution, etc.

4 Conclusions

To develop strategic emerging industries, enterprises should strengthen strategic guidance as the basis, focus on improving industrial operation capability and industrial investment capability, explore market-oriented institutional mechanism which is more suitable for the development of emerging industries, and form a virtuous cycle of institutional mechanism innovation and development capability enhancement. Strengthening strategic guidance capacity requires enhancing the full-cycle strategic management of the industry, implementing differentiated management and assessment methods for businesses at different stages of development, and clarifying the guiding principles. Meanwhile, enterprises need to clarify the development path of new business and build the dual-wheel development capability of "industrial operation + industrial investment". On the one hand, large enterprises should change the development concept, solidify business capability, strengthen external cooperation, and enhance the industrial operation capability of strategic emerging industries; on the other hand, large enterprises can establish industrial investment platforms to implement internal and external professional investment operation, strengthen the investment incubation capability of

new business, and build the ecology of new business incubation and cultivation by enhancing the external investment management capability.

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