Research on the System Dynamics of Deepening and Enhancing State-owned Enterprises Reform and the Paths of Governance Innovation

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Abstract: State-owned enterprises (SOEs) have been identified as playing a pivotal role in the implementation of novel development concepts, the promotion of comprehensive economic and social development, and the provision of high-quality public services. Utilising a mixed-methods research approach, this study aims to develop a systematic governance framework by integrating hierarchical driving forces and adopting structural embeddedness, dynamic adaptability, and system symbiosis as new governance starting points to enhance innovation and reform effectiveness in SOEs. The study proposes a systematic reform strategy comprising the following elements: precise mixed-ownership restructuring, agile strategic decision-making processes, an internally and externally linked symbiotic innovation ecosystem, and iterative, flexible institutional design as key governance pathways. The implementation of these integrated measures is expected to fully unlock new developmental momentum in SOEs, mitigate secondary reform risks, and ensure effective and sustainable governance.

Keywords: State-Owned Enterprise; Deepening and Upgrading; Mixed-Ownership Reform; Governance Innovation Paths

1. Introduction

1.1 Research Background

State-owned enterprises (SOEs) are considered to be a fundamental component of China's unique economic development, with the capacity to enhance comprehensive national power, propel socioeconomic advancement, and safeguard public welfare. The core functions of the state economy include three dimensions namely the productive function of providing products and services, the institutional function reflecting the socialist mode of production, and the governance function as a tool for national macro economic governance[1]. The prevailing economic policies of the Chinese government are explicitly designed to position SOEs as pivotal forces in deepening comprehensive reforms and as key supporters of major economic strategies. The core functions of SOEs are reflected in macroeconomic strategic deployments, including the mitigation of cyclical economic fluctuations, the fostering of advanced technological innovation, the enhancement of the nation's economic competitiveness, and the safeguarding of national security and stability. Key areas for ongoing SOE reform include the optimisation of state-owned economic structures, the acceleration of strategic adjustments, and the establishment of comprehensive evaluation systems to fulfil strategic missions. In the context of economic globalization and the convergence of multiple developmental challenges, SOE reform faces both significant opportunities and profound challenges. As an integral component of building China's new development paradigm and promoting comprehensive reforms, the role of SOE reform is paramount. Despite noteworthy achievements in SOE reforms, persistent challenges remain, including structural inefficiencies, inadequate internal motivation, and resource allocation issues. It is therefore the conclusion of this study that the strategic objectives of China's SOE reform can only be fully realised through the integration of governance innovations with intensified reform practices under the new economic landscape.

1.2 Research Methodology

Researchers ought to select research methods rationally, taking into account the nature of the research question and extant resource constraints[2]. Given the multi-dimensional nature and diverse stakeholders involved in the deepening of state-owned enterprise (SOE) reforms examined in this study, a mixed-methods approach—primarily qualitative analysis supplemented by relevant quantitative data—offers a robust analytical framework. This methodological combination facilitates an in-depth investigation into the institutional mechanisms and structural issues underpinning SOE reform, thereby identifying innovative governance paradigms. Institutional frameworks are of particular significance in this reform context, as effective institutions are indispensable for the attainment of sustainable socioeconomic development and good governance. They serve as explanatory variables for socioeconomic outcomes, enabling integrated and collaborative analytical effects. Additionally, the present study employs a systematic hierarchical dynamic analysis. Hierarchical dynamics refer to distinct levels or tiers of driving forces exerted by various elements upon system development, exhibiting clear progression from lower to higher levels. The development and transformation of the SOE reform system involve multiple driving factors, each varying significantly in impact intensity, scope, and sustainability, thus demonstrating distinct hierarchical differentiation.

1.3 Research Structure

This study explores the historical necessity of state-owned enterprise (SOE) reform by examining underlying institutional and structural factors. From the perspectives of both government and market dynamics, SOE reform constitutes a complex, self-renewing, and iterative developmental process characterized by inherent contradictions and coherence. The paper's first section delineates the research context, underscoring the pivotal role of SOE reform in driving socioeconomic advancement. Then, a hierarchical analysis is employed to elucidate three distinct levels of driving forces underlying SOE reform, emphasising their inevitability in the context of market economic evolution. Furthermore, a novel governance logic for SOE reform in the new development stage is proposed, which articulates it through three interrelated dimensions. Finally, the study identifies innovative developmental pathways for deepening SOE reforms and summarizes the research findings, offering directions for future inquiry.

2. A Hierarchical Analysis of SOEs Reform

2.1 Internal Mechanism Driving Forces

The institutional change is an essential internal driving mechanism for the reform and development of state-owned enterprises (SOEs). Institutions have been shown to play a critical role in economic and social evolution, acting as intentionally designed constraints that structure interactions across the political, economic, and social spheres [3]. The adoption of inclusive economic systems, which facilitate widespread participation in economic activities and effectively leverage individual capabilities, is a hallmark of successful nations. These systems are often characterised by the distribution of power across diverse groups, facilitated by political systems[4]. Prior to the implementation of China's reform and opening-up policy, state-owned enterprises lacked managerial autonomy, with administrative divisions severely hindering horizontal collaboration among firms. The disparity between supply and demand, coupled with a centralised system of income and loss allocation, substantially constrained enterprise dynamism. Since 1978, China has transitioned from a closed economy to whole opening-up, from fragmentation to integration, and from traditional structures to modern practices, achieving developmental milestones that have garnered global recognition.

The market has never been a singular economic form; rather, it is constituted by broad arenas wherein diverse economic organisations coexist, compete, interact dynamically, and evolve collaboratively. The institutional basis for the existence and growth of Chinese SOEs is kind of distinctive economic model, within which SOEs constitute a specialised subset of enterprises operating with the unique market economic characteristics. From this perspective, the transformation of market entities from singularity to diversity and the shift in resource allocation from monopolization to symbiosis have provided crucial institutional changes, thus stimulating the internal driving forces behind SOE reforms. Consequently, this transformation necessitates a renewed examination of SOEs in terms of market-oriented value, internal structural adjustments, and institutional refinement.

2.2 External Passive Driving Forces

Externally imposed competitive pressure from free and orderly markets serves as an external passive driving forces for SOEs reform. China's market-oriented transformation requires not only directional adjustments at the macroeconomic level but also refinements in microeconomic structures [5].The profound reshaping of China's microeconomic landscape by comprehensive and diversified market competition is well-documented. From a corporate governance perspective, SOEs, as government-owned entities, are subject to administrative controls and restrictions, which limit managerial flexibility and resource allocation autonomy. Consequently, market-oriented reforms represent a passive, externally driven forces for SOEs restructuring. In this context, microeconomic structural adjustments and market-oriented transformation interact reciprocally, forming a dynamic process of mutual influence and competition. Market reforms necessitate more efficient economic structures and diversified organisational forms, while micro-level structural adjustments conversely stimulate and deepen the process of marketisation.

China’s market-oriented reform has stimulated the vigorous growth of collective and other economic forms, injecting vitality and momentum into diverse sectors. The direct pressures driving SOEs reform primarily arise from low operational efficiency and inequitable resource allocation. Low efficiency diminishes SOEs' competitiveness in increasingly dynamic markets, whereas inequitable resource allocation leads to resource wastage and disproportionately benefits privileged insiders. Consequently, the passive driving forces behind SOEs reform involve unleashing capital market vitality, enhancing operational efficiency of state-owned capital, overcoming traditional business models and profitability challenges, maintaining and increasing the value of state assets, and ultimately improving service capabilities of SOEs. However, it should be noted that passive driving forces, while effective in the short term, typically lack sustainability.

2.3 External Active Driving Forces

External active driving forces represent a critical intermediate dynamic situated between external passive forces and internal mechanism-based drivers. The distinct from external passive forces, such as policy mandates or market pressures, active driving forces embody proactive initiatives, strategic adaptability, and deliberate pursuit of greater development opportunities within dynamic external environments. Transitioning from passive to active external driving forces marks a pivotal shift for state-owned enterprises (SOEs), enabling their progression from passive adaptation under policy constraints or market pressures towards proactive engagement and strategic autonomy. This transformative process involves internalizing external resources and opportunities, thereby generating stable, internal mechanism-based driving forces and building long-term competitive advantages. Under this dynamic framework, SOEs must actively identify, adapt to, and strategically leverage external development opportunities, resources, and incentives to drive deeper reform. Considering China's long-term socioeconomic development strategies and evolving market demands, structural inefficiencies, resource misallocations, and imbalances in market distribution have become increasingly prominent and urgently require resolution for sustainable growth. Concurrently, SOEs face significant risks and transformation challenges stemming from global economic integration and rapid informatization. Addressing these complex issues effectively requires proactive and sustained innovation, continuous strategic adjustments, and active integration into capital markets to seize developmental opportunities, fostering deep synergy with traditional economic sectors.

3. System Dynamics Modelling

The modern governance can be defined as a complex and multifaceted systemic project. Its aim is to resolve developmental constraints and incompatibilities between governance frameworks and socioeconomic advancement. In doing so, it is intended to drive innovation within governance systems. As a critical component of modern governance, SOEs reform necessitates the construction of a stable, long-term dynamic mechanism.

3.1 System Dynamics Model

SOEs reform encompasses a hierarchical driving-force structure and an innovative governance paradigm. The identification of multiple hierarchical driving forcces and their feedback interactions within SOEs reform enables the development of a comprehensive system dynamics model that can effectively elucidate reform stability and sustainability. As illustrated in Table 1, distinct hierarchical driving forces correspond to specific key factors within SOEs reform.

Table 1. Classification of Power Levels

dynamical level	key factors
Internal mechanism driving forces	Optimisation of Shareholding Structure, Improvement of Governance Structure, Effectiveness of Incentive Mechanism, Decision-making Efficiency, Operational Efficiency
External passive driving forces	Policy pressure, intensity of administrative directives, competitive market pressure, intensity of compliance constraints
External active driving forces	Market Opportunity Capture Rate, Policy Opportunity Utilisation Efficiency, Integration Rate of Financing Channels and External Resources, External Strategic Co-operation Efficiency

Analysis of these hierarchies and their respective factors indicates that the new governance paradigm for SOEs reform emerges from the interplay among structural, operational, and developmental dimensions. The collective manifestation of these elements unveils the underlying mechanisms of the SOE reform dynamic system. The comprehensive characterisation of complex dynamic systems in terms of these three logical dimensions provides a foundation for understanding how such systems achieve long-term stability and continuous evolution. The present study develops an innovative dynamic system and a new governance framework for state-owned enterprise reforms, building upon this analytical foundation (As shown in figure 1).

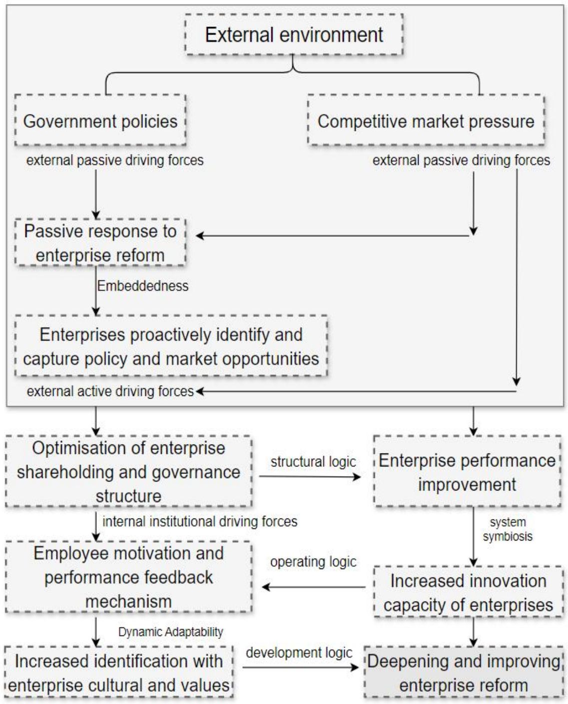

Figure 1. Innovative Dynamical Systems for SOEs Reform

3.2 The Governance Logic of the Complex Dynamical System

3.2.1 Embeddedness

Embeddedness can be defined as the structural logic that underpins the complex dynamic system of SOEs reform. Embedded within a nation's historical traditions, political structures and socio-cultural contexts, the public administration system inherently carries its unique endogenous attributes, emerging as a comprehensive outcome of national governance ecology [6]. Embeddedness, therefore, is a distinctive governance feature accompanying shifts in the political-economic paradigm. The classical "political-economic paradigms" – traditional neoliberal economic theories, policies, narratives, and power structures – have experienced significant failures within contemporary governance contexts. Consequently, the concept of embeddedness in governance structures has become a focal logic within emerging governance systems. In theoretical terms, any economic doctrine is contextually and temporally bound, and is therefore inherently embedded within the developmental stage of the nation, and the corresponding industrial, social, institutional and cultural frameworks that exist at the time of its formulation [7].

In the practical governance of deepening SOEs reforms, embeddedness implies that the dynamic system driving SOEs reform does not exist in isolation, but is integrated within specific socioeconomic, policy, and cultural environments. This embedded characteristic establishes interactive, influential, and constraining relationships between the dynamic system and external systems. Internal components of SOEs governance, including governance structures, property rights systems and incentive mechanisms, are profoundly embedded within broader institutional frameworks. These frameworks encompass the national economic regime, property rights reform policies and industrial strategies. This embeddedness is a guarantee of the adaptability and effectiveness of reform measures. So, it is essential to embed SOEs reform, development, and investment practices within new social governance systems and structures if we are to overcome traditional perceptions of inefficiency and bureaucracy.

3.2.2 Dynamic adaptability

The concept of dynamic adaptability signifies the capacity of a dynamic system to perpetually recalibrate and enhance its structural framework and operational modalities in response to both internal and external environmental shifts. This logic highlights system "resilience" and "response speed," emphasising the necessity for self-adjustment and iterative optimisation during operation. Two critical premises underpin research into the dynamic adaptability of economic development. Firstly, economic development exhibits inherent cyclicality. Secondly, it involves fundamental uncertainties. Economic cycles manifest spontaneously and recurrently; therefore, a thorough understanding of these cycles provides deeper insights into adaptive economic operations. The inherent uncertainties of economic cycles necessitate dynamic adjustments within economic development strategies. Furthermore, the integration of global economies and the concomitant volatility of global markets necessitates the adoption of more adaptable policy measures and market planning by economies.

In advancing reform initiatives, the SOEs must continually adjust their internal dynamic structures, reform measures, institutional arrangements, and operational mechanisms according to evolving external and internal contexts, thereby ensuring reform flexibility, adaptability, and effectiveness. It is imperative for SOEs to discern the transitions between dynamic layers, ranging from external passive driving forces to active external forces, and culminating in internal mechanism-driven forces. The transition rates among these driving forces should be dynamically modulated in alignment with SOEs reform requirements, allowing enterprises to effectively respond to changing socioeconomic conditions.

3.2.3 Systematic symbiosis

In the context SOEs reform, "system symbiosis" refers to a dynamic interaction wherein multiple driving elements are not merely accumulated, but rather mutually interdependent and reinforcing, forming a positive feedback mechanism that ensures sustained stability and coordinated development. The concept of system symbiosis is derived from the biological theory of symbiosis, which is often regarded as a novel branch within evolutionary theory. The original intention of this theory was to describe relationships among populations. Scott explicitly defined symbiosis as a balanced physiological interdependence among two or more organisms, distinct from unilateral dependency [8]. Theory of symbiosis has been expanded to other fields, including sociology, economics and political science, where it is employed to examine the interactive relationships and mutual pathways among enterprises, industrial development and environmental improvement within symbiotic systems in SOEs reform [9]. Consequently, symbiosis theory functions not only as a foundational logic for scientific investigation but also as a catalyst for synergistic economic development and prosperity.

According to general systems theory, characteristics such as wholeness, interconnectedness, hierarchical structures, dynamic equilibrium, and temporal sequencing constitute fundamental aspects common to all systems. This theory explores the properties of systems in a holistic way [10]. Symbiosis theory encapsulates a dual-dimensional logic encompassing both symbiotic relationships among governance entities and multidimensional interactions among diverse elements within systems. The research and application of symbiotic system theory are inherently integrative, practical, and dynamic, with explanatory tensions across dimensions mutually complementary and reinforcing. In the context of SOEs reforms, external forces (both passive and active) and internal institutional mechanisms form a symbiotic relationship that mutually supports the enterprise's long-term development. The deepening of reform in SOEs involves symbiotic interactions among internal restructuring processes and external markets, policies, and industrial ecosystems. Enterprises enhance their competitive edge by embedding within external environments, while simultaneously contributing to the optimisation and advancement of those environments through enterprise growth. System symbiosis thus provides sustained impetus for SOEs long-term development, preventing confrontational, isolated, or mutually weakening interactions among driving factors.

4. Innovative Paths for Deepening and Enhancing SOES Reform

Fundamentally, SOEs reform constitutes a complex systemic reconstruction, intertwining political, economic, and social objectives, necessitating corresponding adjustments in institutional arrangements and the development of appropriate incentive mechanisms to regulate stakeholders' behaviors [11]. Consequently, SOEs reform strategies must leverage this foundation to optimize innovative approaches in governance structures and institutional selections, implementing structural and instrumental innovations at the policy-provisioning level.

4.1 Implementing Precise Mixed Ownership Reforms to Enhance the Market Suitability of the Governance Structure

Specific resource-allocation decisions or market- and actor-related characteristics facilitate market formation, while other factors inhibit it [12]. Efficient and rational resource allocation fosters market innovation, economic development, and growth, effectively eliminating distortions and mismatches, potentially increasing total factor productivity by more than one-third [13]. Within economic development, governments must fully acknowledge the decisive role of market mechanisms in resource allocation, refraining from imposing mandatory tasks or timelines for mixed-ownership reforms through administrative coercion or interference with market operations. Allowing markets to assume a dominant role in resource allocation can effectively mitigate the "vicious cycle of resource allocation deferment" [14].Under the highly market-oriented conditions, precise mixed-ownership reform involves meticulously designing and implementing reform strategies tailored to enterprise-specific attributes, operational characteristics, developmental stages, and strategic requirements. Such reforms encompass deliberate determinations of equity structures, strategic investor selection, governance optimization, and aligned incentive mechanisms, thus avoiding a uniform, one-size-fits-all approach. Depending on the functional positioning of state-owned enterprises (commercial or public-oriented), industry characteristics (competitive, monopolistic, or strategic), and the competitive market environment, governments should identify appropriate reform modalities and accurately determine equity ratios between state-owned and non-state-owned capital according to strategic goals and governance needs. Continuous advancement and deepening of mixed-ownership reforms necessitate active engagement of state-owned shareholders, enhancement of corporate governance, mitigation of insider-control issues, and reduction of adverse selection and moral hazard. Given the differing roles non-state-owned shareholders play within mixed ownership structures, particular emphasis should be placed on mobilizing private and foreign capital contributions [15]. Such innovative measures could ensure a sustainable driving force for SOEs development.

Additionally, the governments should implement market-oriented compensation and incentive systems, dynamically optimize performance evaluation frameworks, establish comprehensive monitoring and feedback mechanisms throughout the reform process, and enhance specialized talent support. The optimization of state capital distribution helps to improve the efficiency of enterprise resource allocation[16].In summary, the core of precise mixed-ownership reform lies in accurate classification, mechanism precision, and execution accuracy, emphasizing customized strategies and adaptive solutions. Collaborative efforts from governments, enterprises, and diverse market actors are required to systematically transition SOEs reforms from scale-oriented, quantity-focused approaches towards precision-driven, efficiency-enhancing practices. These efforts will comprehensively improve the market adaptability of governance structures and ultimately achieve high-quality SOEs development.

4.2 Establishment of Strategic Response and Agile Decision-Making Mechanisms to Enhance the Dynamic Adaptive Capacity of Enterprises

In the context of deepening SOEs reforms, rapid external changes and intensifying market competition increasingly require enhanced strategic responsiveness and agile decision-making capabilities. Establishing efficient strategic response and agile decision-making mechanisms has therefore become critical to improving the dynamic adaptability of SOEs. Leveraging next-generation information technologies, big data and artificial intelligence (AI), SOEs should build dynamic environmental monitoring and intelligence analysis platforms that enable real-time perception and predictive assessment of external environmental changes. Such platforms require capabilities for instant information gathering, rapid data analysis, and robust decision support systems that provide executives and managers with timely access to market and policy information, significantly improving the effectiveness and accuracy of decision-making.

At the same time, SOEs need to adapt internal organisational structures to better respond to dynamic environments by establishing and strengthening flat management models. In addition, decision-making agility depends fundamentally on iterative optimisation capabilities within the decision-making framework itself. SOEs need to implement effective performance monitoring and feedback systems to continuously track and assess decision outcomes and promptly adjust initial assumptions, expected targets and actual results as necessary. When significant changes in the external environment or discrepancies between expectations and realised outcomes are identified, enterprises should quickly optimise decision-making pathways to ensure precise alignment between corporate strategies and market demands.

Finally, SOEs reforms must also focus on improving leadership skills and management philosophies. By promoting the professionalisation, specialisation and market-oriented transformation of leadership teams, SOEs can effectively implement strategic responses.

4.3 Building a Symbiotic Innovation Ecosystem with Internal and External Linkages

Less-developed countries achieve convergence with advanced economies primarily through improvements in technological capabilities, expertise, skills and educational attainment, rather than simply serving as an asset of wealthier nations. Innovation is a systemic process that cannot move instantaneously from basic breakthroughs to disruptive technologies, but must evolve gradually, moving sequentially from technology acquisition and imitative innovation to original, breakthrough and ultimately disruptive innovation. Encouraging craftsmanship and entrepreneurship at the micro level can stimulate substantial incremental and improvement-oriented innovation, thereby fostering breakthrough developments [17]. The key to preserving and enhancing the value of state-owned assets lies in improving the core competitiveness and innovation capabilities of SOEs.

Building a symbiotic innovation ecosystem that integrates internal and external resources fundamentally involves synchronising the internal innovation mechanisms of enterprises with their external innovation environments. This coordination promotes resource complementarity, mutual benefit and synergistic coexistence among different innovation participants. Internally, enterprises should develop open innovation platforms that break down segmented innovation barriers between departments and hierarchies, enable efficient resource integration, and enhance internal innovation dynamism and effectiveness. Externally, companies should expand their innovation boundaries to deepen the integration between internal innovation systems and external resources. Although state-owned enterprises generally have substantial technological and financial resources, they typically lag behind in terms of market responsiveness, sensitivity to emerging technologies and market-oriented application capabilities. Therefore, building an innovation ecosystem network around SOEs that includes upstream and downstream enterprises, research institutes, universities, government agencies and financial institutions can effectively address these shortcomings.

In addition, building a symbiotic innovation ecosystem requires comprehensive mechanisms for sharing the benefits of innovation and incentives to encourage the active participation of multiple stakeholders. SOEs should develop innovative benefit-sharing models that accurately allocate innovation-related gains among ecosystem participants through equity incentives, technology licensing, profit sharing and other diversified mechanisms to ensure fair rewards for all stakeholders. Such benefit-sharing frameworks foster long-term and stable collaborative relationships within the innovation ecosystem, thereby preventing collaborative failure due to inequitable benefit distribution.

Finally, the stable operation of the symbiotic innovation ecosystem requires deep cultural integration. Internally, companies should foster an open, collaborative and inclusive innovation culture by regularly organising innovation competitions, thematic forums and technology exchanges to continuously improve cultural communication and integration between internal and external actors. This cultural alignment can bridge perceptual gaps regarding innovation concepts, technological paths, and strategic goals, strengthen mutual trust among ecosystem participants, and enhance overall cohesion and collaborative effectiveness within the innovation ecosystem.

4.4 Improving the Flexibility and Iterative Mechanisms of Institutional Design

The impact of institutional arrangements on economic development and their mechanisms vary across economies. On the new journey, the state-owned economy will assume a more important historical mission, and will face new requirements. To achieve optimum layout and structure, we need to make good use of guidance mechanisms, integration mechanisms, operational mechanisms, and regulatory mechanisms to promote the optimization of the layout and structural adjustment of the state-owned economy from the industrial level, the regional level and the enterprise level[18]. Hurwicz's mechanism design theory views institutions and mechanisms as given exogenous variables that seek optimal resource allocation or decision making under specific economic conditions, including preferences, endowments and technologies. This theory also provides a rigorous analytical approach to scenario-based research, illustrating how certain interactive rules (mechanisms) can be scientifically designed to meet specific social objectives [19]. Institutional innovations that occur outside conventional market and state frameworks do not abandon market-based systems; rather, they innovate within the broader framework of market economies [20].

Flexible institutional design emphasises institutional adaptability, allowing for dynamic adjustments to evolving circumstances. Such flexibility does not imply arbitrary standards or reduced rigour, but enhances the ability of institutions to dynamically adjust their boundary conditions and implementation pathways. Given the complexities faced by SOEs during reform, initial institutional designs should incorporate sufficient elasticity and scope for delegation to allow SOEs managers and implementers to flexibly adjust implementation plans within a defined institutional framework. Flexible institutional arrangements should also provide greater autonomy to front-line operational units, stressing practical outcomes rather than rigid adherence to procedures.

Iterative institutional mechanisms refer to continuous improvement cycles established through institutional design, implementation, feedback and optimisation processes. Central to such iterative mechanisms is the cycle of "pilot exploration, evaluative feedback and dynamic optimisation". When implementing new institutional arrangements, companies may initially conduct pilot programmes in specific areas or business units to evaluate institutional effectiveness and suitability within a limited scope. Feedback gathered during pilot implementation is promptly analysed by institutional designers and decision-makers, who quickly formulate improvements for subsequent optimisation iterations.The state-owned economy should clearly recognize policy responsibilities, find functional positioning, and tilt resources not only in providing public goods and balancing regional layout, but also in leading national scientific and technological progress and maintaining national economic security[21]. Enterprises need to establish comprehensive institutional evaluation and feedback systems that facilitate bi-directional communication, both top-down and bottom-up.

Internally,the enterprises should refine information dissemination channels and encourage employees to actively report implementation difficulties and proposals. At the same time, decision-makers should develop efficient mechanisms for processing feedback, using advanced information technology and data analysis to continuously monitor institutional performance, identify design flaws in a timely manner and make responsive adjustments.

5. Conclusion

State-owned enterprise (SOEs) reform is an inevitable component in the evolution of social and market economies. During the course of this reform process, inherent tensions emerge among diversified interests, market segmentation, and unified economic growth. It is therefore essential to undertake a comprehensive exploration of the historical, institutional and structural dimensions in order to elucidate the driving forces behind SOE reform and to clarify their underlying dynamic mechanisms.

This study systematically explores the hierarchical driving forces underlying enterprise innovation and reform, and constructs an innovative governance framework in the context of deepening reforms in state-owned enterprises (SOEs). Specifically, it proposes targeted governance strategies, including precise mixed-ownership reforms, agile strategic response and decision-making mechanisms, the construction of internal-external symbiotic innovation ecosystems, and flexible, iterative institutional designs. These governance pathways aim to enhance the market adaptability, strategic responsiveness and sustainable innovation capabilities of SOEs, thereby ensuring effective, adaptive and sustainable outcomes in SOEs reform. As a result, this innovative governance framework provides clear guidance for SOEs seeking dynamic adaptability and sustainable competitive advantage in complex market environments.

However, there still remain a number of limitations. First, the applicability of the proposed framework lacks sufficient empirical validation through large-scale data-driven case studies. Second, the implementation of these innovative governance pathways may face practical barriers due to institutional inertia and resistance inherent in traditional SOEs management cultures-issues that are insufficiently discussed or tested in the current study. Therefore, future research should systematically examine implementation barriers and resistance factors in the SOEs context, including comparative analyses of successful and unsuccessful cases. In addition, the integration of emerging technologies such as big data analytics, artificial intelligence, and blockchain into governance structures represents an exciting research frontier that can significantly enhance the dynamic adaptability and responsiveness of SOEs governance frameworks.

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