

Article

How to Promote Postgraduates' Innovation Capability: The Crucial Role of Association Branding

Jindong Cui ¹, Xueliang Zhang ², Wei Liang ¹, Qingquan Li ³ and Guoli Qu ^{1,*}

¹ School of Economics and Management, Northeast Electric Power University, Jilin 132120, China; 20142566@neepu.edu.cn (J.C.); 20100044@neepu.edu.cn (W.L.)

² School of Marxism, Northeast Electric Power University, Jilin 132120, China; 20101216@neepu.edu.cn

³ School of Foreign Languages, Northeast Electric Power University, Jilin 132120, China; 20132475@neepu.edu.cn

* Correspondence: 20142490@neepu.edu.cn

Abstract

Cultivating postgraduates' innovation capability is essential for universities to fulfill their function as a social service in this innovation-driven era. Graduate student associations serve as vital carriers for this purpose, yet their potential remains underexplored. This study explores how excellent teachers, particularly graduate supervisors with strong research innovation and resource integration capabilities, contribute to association branding and the cultivation of student innovation capability. We construct a mechanism model based on a dual-leader system with high-level supervisors as key leaders, association branding as the primary approach, and innovation capability cultivation as the core objective. The model's effectiveness is validated through iterative practice at Northeast Electric Power University's Management and Research Association, one of China's 100 model graduate associations. The results demonstrate that influential associations enhance cohesion, facilitate resource pooling through "association + business" integration, and significantly improve postgraduates' capability for scientific innovation. This work contributes to Sustainable Development Goal 4 (Quality Education) through conceptual and applied alignment by promoting sustainable higher education management mechanisms that enhance long-term educational effectiveness and institutional capacity to cultivate innovation.

Keywords: postgraduate student mentors; association branding; postgraduates' innovation capability; cultivation mechanism

1. Introduction

1.1. Background and Challenges

In the context of globalization and rapid technological advancement, fostering innovation capability has become a cornerstone of economic growth and societal development. Universities serve as vital hubs for knowledge creation and dissemination, playing a crucial role in nurturing innovative talent [1,2]. Specifically, postgraduate education is essential for cultivating high-quality professionals who possess advanced skills and innovative capabilities [3,4]. The growing emphasis on innovation necessitates a comprehensive approach to postgraduate education that transcends traditional academic instruction, encompassing practical skills, collaborative abilities, and creative thinking [5].

In recent years, the "association + postgraduates' innovation capability cultivation" mode has begun to be explored [6–8]. However, most existing research contributes gen-



Academic Editor: Fernando Moreira

Received: 18 April 2026

Revised: 30 May 2026

Accepted: 11 June 2026

Published: 27 June 2026

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eral principles rather than providing specific, actionable plans or systematic mechanisms for construction.

1.2. Research Questions and Aims

This paper aims to propose a model for cultivating postgraduates' innovation capability, with association brand building as the primary driving force. And the following research questions were raised:

- (1) Why can graduate student associations enhance innovation capability?
- (2) What are the specific implementation plans for the association-led model for cultivating postgraduates' innovation capability?

This model is designed to achieve the following objectives.

- Using the influential nature of association brands to robustly promote the standardization and systematization of innovation capability cultivation among postgraduate students;
- Make the cultivation of innovation capability more practical through association brand development;
- Align postgraduates' innovation capabilities with their creative thinking through association brand building;
- Broaden the beneficiaries of innovation capability cultivation for postgraduate students and promote the dissemination of successful cultivation practices.

1.3. Core Construction Definition

Postgraduates' innovation capability is the core construct of this study. It refers to the comprehensive ability of postgraduate students, in the processes of academic research, theoretical inquiry, competition practice, and social service, to rely on the accumulation of professional knowledge, training in academic thinking, and cross-domain resource integration, to discover academic and real-world problems, construct research frameworks, and apply research methods to conduct original exploration. The representative indicators for measuring postgraduates' innovation capability primarily include the number of high-level publications, the number of invention patents, the number of discipline competition awards, and the number of participated research projects.

1.4. Research Gap and Contribution

There is an abundance of research on cultivating innovation capabilities among postgraduate students, with studies exploring how personality traits, cognitive abilities, and motivation influence innovation at the individual level [9,10], as well as research focusing on industry–university–research collaboration environments and interdisciplinary cooperation at organizational and contextual levels [11,12].

However, several critical issues remain unaddressed. First, how to systematically cultivate innovative thinking among postgraduate students [13–15]. Second, how to identify mutually beneficial aspects of industry–university–research collaboration [16]. Third, how to align innovation willingness with academic research achievements [17]. Fourth, how to implement and disseminate effective models for fostering innovation capability [18]. Moreover, existing achievements in postgraduates' innovation cultivation largely remain at the programmatic level, lacking implementable and replicable systematic branding mechanisms for association-based education. Furthermore, previous models do not provide systematic branding logic, scalable mechanisms, or explicit leadership mechanisms for association-driven cultivation.

To address these gaps, this study constructs a theoretical framework for association branding empowering innovation cultivation and innovatively proposes the “Double-Five-

One-Practice” model, which not only fills a theoretical void but also possesses value for institutional application and demonstrated effectiveness in cultivating talent.

The subsequent sections of this paper are structured as follows: Section 2 presents a summary and review of the literature on postgraduates’ innovation capability cultivation models. Section 3 offers a theoretical analysis, elaborating on the integration mechanism between association brand building and innovation capability cultivation. Section 4 explicates the methodology. Section 5 focuses on model construction, detailing the specific framework for enhancing innovation capabilities among postgraduate students through association brand building. Section 6 presents practical verification, where the model’s effectiveness is substantiated through practical testing and iterative enhancement in the Postgraduate Association of the School of Economics and Management. Section 7 discusses research limitations and proposes directions for future inquiry. Finally, Section 8 concludes the paper.

2. Related Literature

2.1. Research on Cultivation Models for Postgraduates’ Innovation Capabilities Within Universities

Numerous experts and scholars have developed systematic models for enhancing postgraduates’ innovation capabilities, focusing on aspects such as mentorship systems, professional courses, scientific competitions, and evaluation frameworks. For instance, Liu et al. examined the construction of postgraduate mentor teams from four perspectives: team composition, the formulation of postgraduate training plans, the role positioning of mentors within the teams, and the management of postgraduate training quality [19]. Additionally, Fu et al. established a collaborative mechanism within mentor teams that integrates elements such as professional courses, research topics, progress reports, and collaborative thesis guidance [20]. They implemented diverse pathways including trans-disciplinary knowledge transmission, varied scientific research training, and multi-level process enhancements. These pathways dynamically integrate mentor team collaboration with the cultivation of postgraduates’ innovation capabilities. Ma et al. believed that teamwork benefits the smoothness, flexibility, and originality of work. They also found that team motivation provides greater support for innovative tasks [21]. Furthermore, Anderson et al. developed a comprehensive hierarchical analysis framework to investigate multi-level innovations in individuals, teams, and organizations [22]. This study identified high goal alignment within teams as a critical factor influencing individual innovation.

However, innovation modes primarily led by mentors often target specific disciplines and groups resulting in limited benefits. It also creates challenges in fostering interdisciplinary innovation thinking. To further enhance postgraduate students’ research abilities, practical skills, and creativity, there has been substantial emphasis on multi-level and three-dimensional interdisciplinary talent training mechanisms. For example, Zhong et al. explored an innovative talent training model based on the “one center, three collaborations” framework [23]. Similarly, Xie et al. proposed practical pathways for enhancing postgraduates’ innovation capabilities. These pathways include the “Three-in-One” curriculum innovation, the “Three-Combination” project practice innovation, the “Three-Interaction” platform support for innovation, and the “Three-Pronged” approach for cross-disciplinary enhancement [24]. Yang et al. established an integrated multidimensional innovative practice platform named “Competition–Learning–Research,” providing postgraduate students with opportunities to engage in innovative activities [25]. This platform transcends the constraints of disciplinary education, integrates resources across multiple dimensions, and features a scientifically standardized management, supervision, and incentive guarantee system.

While the implementation of the “Mentor Responsibility System” allows postgraduate students to receive more tailored guidance, it is also limited by mentors’ research fields and capabilities. This restriction can lead to relatively fixed research approaches and methodologies, which may not fully satisfy the demands of innovative practice.

2.2. Research and Practice of Postgraduates’ Innovation Models Led by Industry–Academia–Research Alliances

As the challenge of translating innovation into practical applications becomes increasingly salient, the integrated education system of “Industry–Education–Research–Application” has emerged. This system aims to strengthen cooperation among universities, governments, enterprises, and research institutions. It seeks to overcome the “Ivory Tower” phenomenon in higher education and facilitate the transition of postgraduates innovation training from theory to practice. Mishra et al. assert that social networks, social capital, and social support play a significant role in fostering innovation capability among postgraduate students [26]. Based on the concept of Outcome-Based Education (OBE), Liu et al. propose aligning the cultivation of postgraduates’ innovation capabilities with both the immediate and long-term demands of society and enterprises for high-level talent [27]. Additionally, Hu et al. stress the importance of government-led initiatives to stimulate intrinsic motivation for university–enterprise cooperation. They utilize the educational system as a platform to develop practical course resources and project-based initiatives that enhance cooperative training quality through facilitating multi-party collaboration [28].

Nonetheless, challenges persist in the collaborative cultivation of postgraduate students’ practical innovation capability. These challenges include insufficient participation from diverse stakeholders, difficulties in forming collective training efforts, and a need for enhanced training mechanisms.

In response to these issues, scholars have conducted in-depth research and developed specific implementation pathways focusing on joint training between universities and enterprises, multi-party cooperation, and the establishment of postgraduate student workstations. Chen et al. propose a novel model for postgraduate student training based on the principles of “Integration of Science and Education, Integration of Industry and Education, and Cross-Disciplinary Integration.” This model is driven by the collaborative efforts of students, mentors, management, and external forces [29]. It aims to tap into the innovation potential of postgraduate students and to maximize the “collaborative effect” in cultivating high-level innovative talents. Ke constructs a multi-party collaborative framework, positioning multi-party collaboration as the core and employing composite platforms for resource coordination and institutional innovation [30]. Meanwhile, Cui et al. address issues related to multi-party collaboration among academia, industry, and research institutions within postgraduate student workstations. They advocate for resident postgraduate students to act as innovative agents to enhance the economic benefits for enterprises and to facilitate the transformation and application of research outcomes. Ultimately, it promotes coordinated development and mutual benefit among alliance participants [31].

2.3. Research on Postgraduates’ Innovation Capability Cultivation Models Led by Student Associations

The “Association+” collaborative education model is led by student associations, and offers new guidance for the training of postgraduate students. Exploring mutual promotion mechanisms and pathways between the development of postgraduate student associations and the enhancement of research capabilities has emerged as a significant area of research.

Austin et al. contend that a socialized environment effectively enhances innovation and practical skills among postgraduate students. This establishes a foundation for associations to foster innovation capability in postgraduate students [32]. Similarly, Wu et al.

discovered that an enriched social environment can provide a sufficiently stimulating external innovation ecosystem. The innovation environment is regarded as the most critical factor influencing the development of creativity in college students. Within this environment, the “community” dimension exerts the greatest impact [33]. Gu et al. found that effective and guiding supervision fosters the cultivation of innovation capability in postgraduate students. Meanwhile, student associations embody normative characteristics and goal alignment, enabling them to effectively drive innovation [34]. Additionally, Li et al. argue that innovating the construction of postgraduate student associations is crucial for cultivating top-tier innovative talents [35]. The associations should empower postgraduate students to become primary actors while serving as developmental platforms. Li and Chen et al. concentrate on incorporating mental health education into the curriculum and research systems for postgraduate student innovation, emphasizing the cultivation of values and innovative thinking [36,37]. Their work involves constructing a multi-perspective integrated model for enhancing postgraduates’ innovation capabilities, expanding educational functions, and promoting improvement. Shi et al. propose a focus on “Learning, Practice, and Promotion.” They emphasize that “Learning” lays the foundational knowledge for students’ mental health, “Practice” enhances academic initiative, and “Promotion” is essential for achieving breakthroughs in the mutual enhancement of association building and scientific research [38]. This approach aims to cultivate a synergistic environment where mental health education and research activities are integrated and mutually reinforce one another. Xia et al. aim to explore a new model for enhancing the quality of postgraduate student associations, referred to as “1 + 2 + 3 + 4” [39]. They emphasize developing an “Association + Research Platform” mode to maximize the “Pass, Assist, Carry” effects among members of postgraduate student associations. Consequently, it promotes the cultivation of top-tier innovative talents. Chen has delineated the branding content for university student associations and designed its implementation framework for implementation in the “Internet Plus” context. This enhances the cultivation of postgraduates’ innovative capabilities [40]. Yang et al. advocate a unique talent cultivation model termed “Society + N.” This model emphasizes systematic collaboration to harness synergistic effects. It also establishes association brands that balance “flexible innovation” with “rigid management” [41]. He (2022) believes that university student associations must proactively adjust to new changes and requirements [42]. They should identify key entry points for their initiatives and prioritize the cultivation of innovation capabilities as the core focus of their branding development [42].

In recent years, the interplay between “Student Associations and the Cultivation of Postgraduates’ Innovation Capabilities” has begun to garner attention. However, most findings remain in the form of guiding outlines and lack specific, actionable, and effective plans, let alone a systematic construction mechanism. Association branding is a foundational and critical component of developing student associations. It represents the culmination of experiences in advancing theoretical innovation and the development of innovative mechanisms, methods, and platforms. This research proposes a new model that uses student association branding to enhance postgraduates’ innovation capabilities, ensuring that they align with both academic and intellectual pursuits.

3. Theory Analysis

3.1. Challenges Encountered in Cultivating Postgraduates’ Innovation Capabilities

The limitations of traditional models for cultivating postgraduates’ innovation capabilities—such as multidisciplinary collaborative innovation, mentor-guided teams, and industry–university–research partnerships—are becoming increasingly apparent. For instance, while multidisciplinary collaboration is conceptually straightforward, its practi-

cal implementation is fraught with difficulties. Moreover, industry–university–research collaborative training often struggles to synchronize theoretical frameworks with scientific inquiry. The mentor-guided team approach is also limited in terms of its reach and the number of beneficiaries involved. These challenges can be categorized into four distinct facets.

First, the lack of standardized systems for cultivating postgraduates' innovation capabilities and the challenges in systematically fostering innovative thinking are particularly evident. The lack of comprehensive theoretical frameworks for cultivating innovation capabilities results in non-standardized systems, ineffective operations, and limited adaptability. The diverse demands for developing innovation capability complicate the accurate analysis of bottlenecks and pain points, ultimately hindering the establishment of systematic, replicable, and scalable training programs.

Second, the disconnect between the cultivation of innovation capabilities and their practical applications is a pressing concern. Innovation gains value only when applied, and without practical testing, the effectiveness of innovation remains unverified. Although many universities adopt multidisciplinary collaborative training methods to enhance innovation capabilities, a significant gap persists between laboratory research and practical execution.

Third, the difficulties encountered in aligning the interests of industry, academia, and research, as well as achieving synergy between ideas and academic pursuits, are significant obstacles. Collaborative efforts among these sectors can leverage environmental and resource advantages to enhance the cultivation of innovative talent, yet such collaborations only partially ensure the effectiveness of innovative practices. Furthermore, the utilitarian nature of enterprises often impedes mutual progress in the ideas put forth by postgraduate students and the academic community, failing to adequately address pressing national issues and emerging topics.

Fourth, the dissemination and implementation of exemplary models for cultivating postgraduates' innovation capabilities face substantial challenges. While the mentorship system and industry–university–research collaborative models hold potential, their benefits often accrue primarily to the postgraduate students within specific teams, limiting broader accessibility to mentorship resources. Thus, while efforts to maximize the efficacy of mentorship systems are critical, simultaneously expanding the beneficiary scope of innovation initiatives and achieving widespread adoption of successful models remain formidable challenges.

Consequently, there is a growing trend towards identifying new models and practical strategies for enhancing the quality and effectiveness of innovation training for postgraduate students. A problem-oriented approach that addresses the limitations of existing systems and explores methods to improve innovation training effectiveness has emerged as an essential starting point.

3.2. Compatibility Analysis Between Association Branding and the Cultivation of Postgraduates' Innovation Capabilities

The establishment of distinctive association brands for cultivating innovation capabilities in postgraduate students is a significant reflection of the operational effectiveness of student societies. This initiative constitutes an innovative effort to enhance the functioning and mechanisms of student associations. Utilizing association branding to foster postgraduates' innovation capabilities is a novel strategy for promoting scientific research through organizational education, breaking free from traditional, rigid models. This model achieves branding, project-based organization, and standardization of the "Associations + Postgraduate Student Innovation Capability Cultivation" initiative. It facilitates the innovation of institutional mechanisms and methods in integrating student associations

with postgraduate training, effectively addressing the constraints faced when cultivating postgraduates' innovation capabilities.

The influence of association branding strongly promotes the standardization, systematization, and institutionalization of innovation capability development among postgraduate students. The innovative model of "Association + Postgraduate Innovation Capability Cultivation" directly addresses the issues of non-standardization and the challenge of systematically fostering innovative thinking.

Furthermore, association branding enhances the practicality and implementation of postgraduates' innovation capability cultivation. By embracing the principle that "practice is the sole criterion for testing truth," this paper advocates for harnessing the influence of association branding to integrate resources from diverse stakeholders, including governments, universities, and enterprises. This integration facilitates practical application, thereby addressing the disconnect between cultivating innovation capabilities and their real-world applications, as well as facilitating the implementation of innovative practices.

Additionally, using association branding can align the cultivation of postgraduates' innovation capability with ideological objectives. By guiding postgraduate innovation initiatives through associations, this strategy aligns students' academic pursuits with broader ideological goals, emphasizing the importance of addressing "bottleneck" technologies and serving national development strategies, thereby creating fruitful collaborations within industry-academia-research innovation alliances.

Lastly, association branding serves to expand the scope of beneficiaries of the cultivation of postgraduates' innovation capabilities. By incorporating association activities into postgraduate education and utilizing branding to promote and disseminate exemplary training models, this approach mitigates the deficiencies in the postgraduate mentorship system and broadens the base of beneficiaries within innovation capability cultivation. Such a strategy addresses the challenges inherent in implementation and the constraints surrounding widespread dissemination.

3.3. Internal Mechanism of Association Branding in Fostering Postgraduates' Innovation Capability

The underlying mechanism stems from the precise alignment between association branding and the developmental patterns of postgraduates. This alignment also addresses the practical demands of research-oriented education in universities. Institutionalized and standardized practices are employed to establish stable platforms for academic exchange and innovation. The intrinsic logic of this approach lies in its strong congruence with the natural learning characteristics of postgraduates, which include autonomous inquiry, peer collaboration, and progressive research development. Since strong motivation for self-directed learning is exhibited by postgraduates, flexible yet structured environments are provided by branded associations. These environments are supported by comprehensive regulations, routine activities, and regular academic exchanges. Consequently, autonomous topic selection and independent exploration are facilitated, which effectively satisfies the demand for self-driven inquiry. Meanwhile, students sharing identical disciplines and research directions are aggregated to form cohesive academic communities. Through these platforms, academic seminars, experience sharing, and collaborative problem-solving are routinely conducted. As a result, a peer-supportive atmosphere is naturally fostered, thereby enabling knowledge complementarity and intellectual exchange. Furthermore, a tiered development system is established through branding initiatives. Gradient pathways are designed to cover stages from foundational training to advanced research competitions and project investigations. These pathways are calibrated to match the step-by-step research progression of postgraduates. Ultimately, endogenous motivation for innovation is

activated within a stable platform ecosystem, thereby continuously driving the cultivation of postgraduates' innovation capability.

3.4. Functional Mechanism of Association Branding in Promoting the Cultivation of Postgraduates' Innovation Capability

The systematic support for cultivating postgraduates' innovation capability is delivered by association branding across four dimensions: organizational leadership, competency development, research mentoring, and practical application. At the organizational leadership level, senior supervisors are designated as association leaders to anchor academic frontiers and innovation directions. Consequently, strategic guidance and resource coordination are provided for postgraduates' research progression. Regarding competency development, systematic research training frameworks are established through routine, branded academic activities. Through these initiatives, innovative thinking, academic foundations, and research habits are progressively cultivated. Research mentoring is operationalized via internal mentoring and targeted peer-pairing mechanisms. As a result, the resource constraints and limited coverage of traditional mentorship are effectively mitigated, thereby ensuring equitable access to innovation training. For practical application, resources from universities, local governments, industries, and enterprises are integrated. Authentic innovation scenarios are subsequently constructed to facilitate the translation of theoretical research into practical applications. These four dimensions are closely interconnected and sequentially structured. Accordingly, the full-cycle developmental needs of postgraduates, from initial research engagement to advanced practical innovation, are precisely addressed. This configuration is ultimately aligned with the institutional requirements for large-scale and standardized cultivation of innovative talent in higher education.

4. Methodology

This study adopts a theoretical modeling approach, which is supplemented by an illustrative case study. Initially, a theoretical framework is constructed to illustrate how association branding empowers the cultivation of postgraduates' innovation capability. This construction is grounded in the analysis of the underlying integration mechanisms between these two elements. To validate the proposed model, a representative case is selected for empirical examination. This case features the "Double-Five-One-Practice" brand developed by the Management and Research Association at Northeast Electric Power University. The theoretical model is subsequently tested through practical application. This validation is achieved by documenting the brand-building process and analyzing the specific mechanisms through which postgraduates' innovation capability is enhanced.

The data presented in this study were derived from first-hand sources accumulated by the teaching reform research team over 15 years. They were cross-validated with official statistics from the Graduate School and Department of Scientific Research Administration at Northeast Electric Power University to ensure authenticity.

5. Model Construction

Addressing the existing challenges, bottlenecks, and pain points in the cultivation of postgraduates' innovation capabilities, the authors propose a model that integrates "association + postgraduate innovation capability cultivation." This model actively explores innovative approaches to using association branding to enhance the development of postgraduates' innovation capability. It aims to significantly advance organizational strategies for nurturing students and promoting scientific research education.

5.1. Branding Prerequisites: A Mechanism for Selecting High-Quality Leaders in Postgraduate Student Associations

To effectively develop student associations, it is essential to focus on the “key minority.” Enhancing the educational function of these associations requires prioritizing their leadership. Leaders of student associations serve as “pacesetters” and key executors of the “Association Branding + Postgraduates’ Innovation Capability Development” model. Their performance and capabilities significantly influence brand development; hence, selecting high-performing leaders for postgraduate student associations is a prerequisite for leveraging brand building to foster postgraduates’ innovation capability.

Currently, most postgraduate student associations are led by college tutors or students, with a notable shortage of postgraduate advisors—especially high-performing ones—in leadership roles. Many tutors and student leaders often lack the necessary qualifications and competencies for cultivating postgraduates’ innovation capabilities, thereby limiting their effectiveness in leadership. To expand the dual-leader system, it is imperative to strongly advocate for exceptional postgraduate supervisors or advisors with outstanding innovation capabilities to assume leadership roles in postgraduate student associations. First, as leaders, excellent tutors can enhance the authority and credibility of the “Postgraduates’ Innovation Capability Cultivation Association Brand,” thereby strengthening organizational power and brand attractiveness. Second, they can leverage their academic influence to integrate the cultivation resources of universities and societies to support the brand. It is particularly crucial for colleges and universities to adopt a proactive mindset; they must ensure that excellent tutors recognize the importance of this initiative and understand the criteria for the selection and evaluation of tutors acting as leaders, thereby guaranteeing quality leadership.

5.2. Branding Foundation: Enhancement Program for Innovation Capability Among Members Within Postgraduate Student Associations

The foundation of a strong student association is in its members, whose innovation capabilities form the basis of the association’s branding as a postgraduates’ innovation capability training entity. Creating special activities is an essential method for enhancing the innovation capabilities and overall quality of association members by transforming organizational advantages into a powerful resource for scientific research and innovation. This foundational project is crucial for improving the collective innovation capability of the organization.

To effectively improve the individual innovation quality and business acumen of members, we must promote the integration of association work with scientific research tasks for mutual reinforcement. Throughout this process, three key issues must be addressed: First, association activities should be designed to foster the formation of postgraduate research habits and be grounded in scientific principles that support the cultivation of innovation capability. Second, it is vital to develop an effective model for implementing these special activities to maximize the proactive engagement of association members. Finally, constructing an accurate assessment system is essential for validating the effectiveness of association activities in enhancing innovation outcomes, with a focus on simplicity and ease of implementation (Figure 1).

It is crucial to recognize that the primary innovative role of association members is the internal driving force behind brand building. Specifically, we need to stimulate members’ intrinsic motivation during innovative activities, transforming the mindset from “wanting to innovate” to “I want to innovate,” so they actively engage in and contribute to brand building. This approach fosters a state of positive interaction between the association and its members, facilitating impactful and appealing innovative activities.

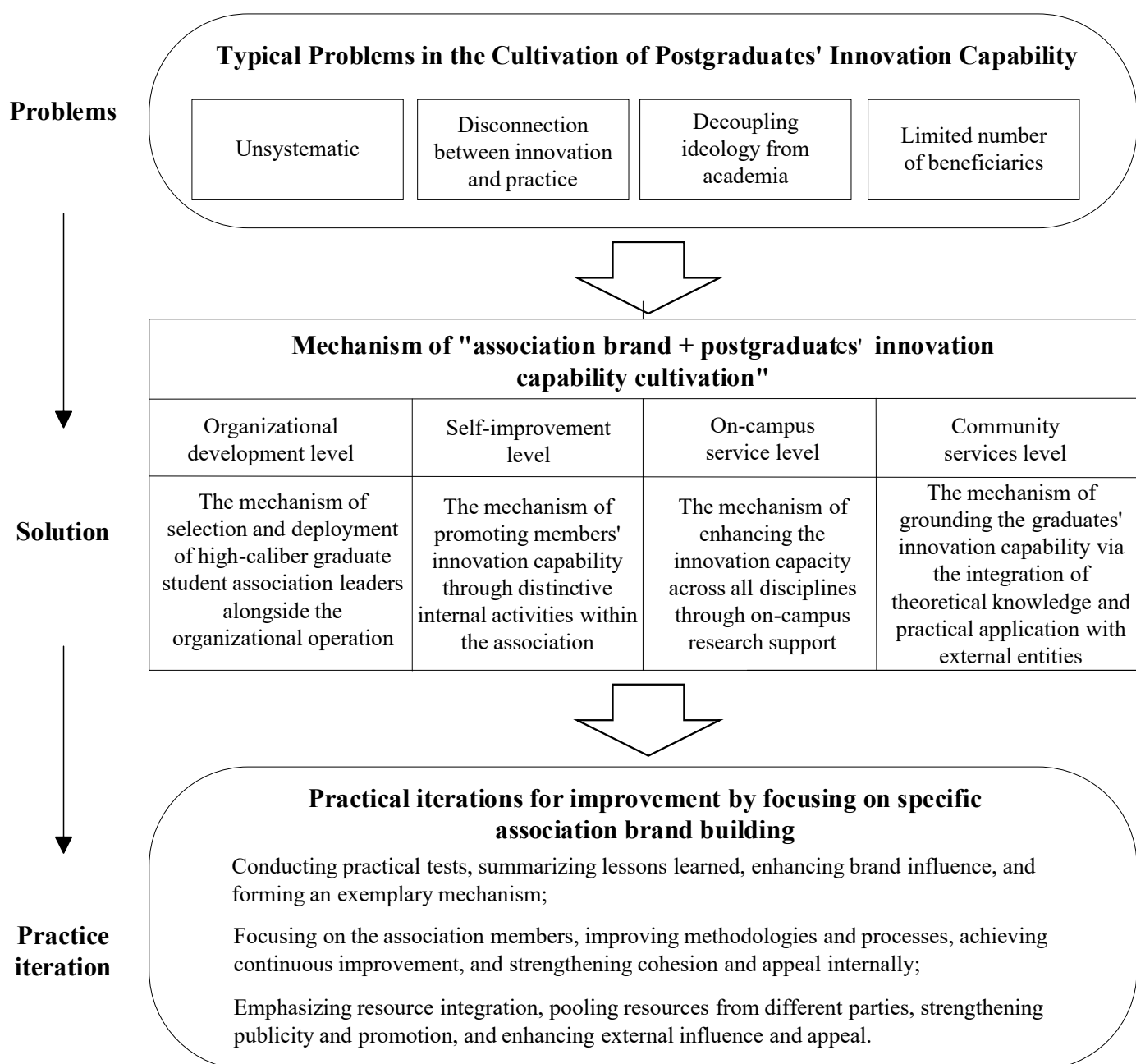


Figure 1. The framework for building brands in the cultivation of postgraduates' innovation capability.

5.3. Core of Branding: Service Model of Research and Innovation Assistance to External Entities Provided by Postgraduate Student Associations

The primary purpose of association activities is to serve the community. It is a fundamental duty of postgraduate societies to serve their respective majors and classes, as well as to improve the overall innovation capability of postgraduate students within their disciplines. The target audience for the branding of the postgraduates' innovation capability cultivation association is postgraduates within the relevant discipline, major, and class, with the goal of enhancing their overall innovation capabilities embodied in the brand.

Brand building can enhance the ability of an association and its members to serve students, providing a means to summarize and promote successful experiences in cultivating innovation capability. It can also help resolve internal conflicts among students, strengthen their sense of belonging to the brand, and enhance the effectiveness and influence of brand development efforts. Unlike from regular associations that typically focus

on life support, the primary focus of brand construction for postgraduates' innovation capability associations is the provision of multi-directional scientific research support and innovation guidance to external entities.

Three key issues need to be addressed in this work. First, the selection of scientific research support targets should be based on equitable criteria to maximize the number of individuals benefiting from innovation. Second, the measures for providing scientific research support should be developed systematically to ensure that the assistance is personalized, comprehensive, and tailored to specific needs. Third, it is essential to integrate scientific research support with other innovative activities, community initiatives, and external collaborations to guarantee collective advancement among association members.

5.4. Key to Branding: Activities to Ground Postgraduate Association Members in Innovative Practical Skills

Practice serves as the benchmark for testing innovation effectiveness; without practice, innovation remains a theoretical construct. Practical engagement is pivotal not only for enhancing postgraduates' innovation capabilities, but for fostering their awareness and consciousness of innovation. Practical activities enable the application of knowledge while providing firsthand material for innovation, establishing a symbiotic relationship between practice-driven innovation and innovation testing.

The innovation-focused practical activities of postgraduate associations should address three essential issues. First, they must prioritize high-level objectives. The training in postgraduates' innovation capabilities should target high-end talent, with natural science practices concentrating on national "bottleneck" technologies while social science innovations address pressing societal issues. Second, the focus should remain grounded. Postgraduate innovation practices should have high aspirations yet be achievable in their implementation. Practical components must be feasible, and challenges must be gradually introduced to avoid setting overly ambitious goals. Third, the activities should highlight their distinctiveness. Postgraduate innovation practices should align with the characteristics of the industry, university, and discipline. Scientific research and innovation should synergize with industry practice, combining the unique aspects of universities and disciplines while closely aligning academic directions with social practice. This approach should emphasize cultivating members' consciousness, of innovation, practical skills, and collaborative abilities to better understand and contribute to societal needs.

5.5. Branding Support: Summary and Iterative Enhancement of Postgraduate Association Branding Experiences

Building the brand of postgraduates' innovation capability associations around specific groups represents a form of self-revolution. This effort requires the continuous promotion of theoretical innovation as well as the evaluation of working mechanisms, methods, and resources. The realization, implementation, summarization, and iterative enhancement of the association brand serve as the driving forces for its ongoing development. This iterative process should not only consolidate effective methodologies accumulated through practice, but also address challenges and shortcomings in brand development while proactively seeking new scientific methods for innovative breakthroughs and demonstrating readiness for self-reform.

In the course of this iterative improvement, three aspects must be prioritized: First, the brand construction of the association should encompass multi-modal publicity and marketing strategies to attract broader social participation and leverage diverse social resources, thereby fostering the formation and amplification of brand impact. Second, emphasizing the core theme of "Association + Postgraduates' Innovation Capability Cultivation," brand building should reflect both the intrinsic qualities and external characteristics of postgrad-

uate training in the contemporary context, striving to achieve harmonious progress in academia and innovative ideas. Third, brand iteration should focus on feedback from association members, facilitate the timely summarization of successes and shortcomings, highlight exemplary roles, and thoroughly showcase creativity and innovation while enhancing the scientific rigor, relevance, openness, and effectiveness of the association's branding efforts.

6. Practical Test

This section presents an applied illustration and empirical validation of the developed model. The specific validation process is illustrated in Figure 2.

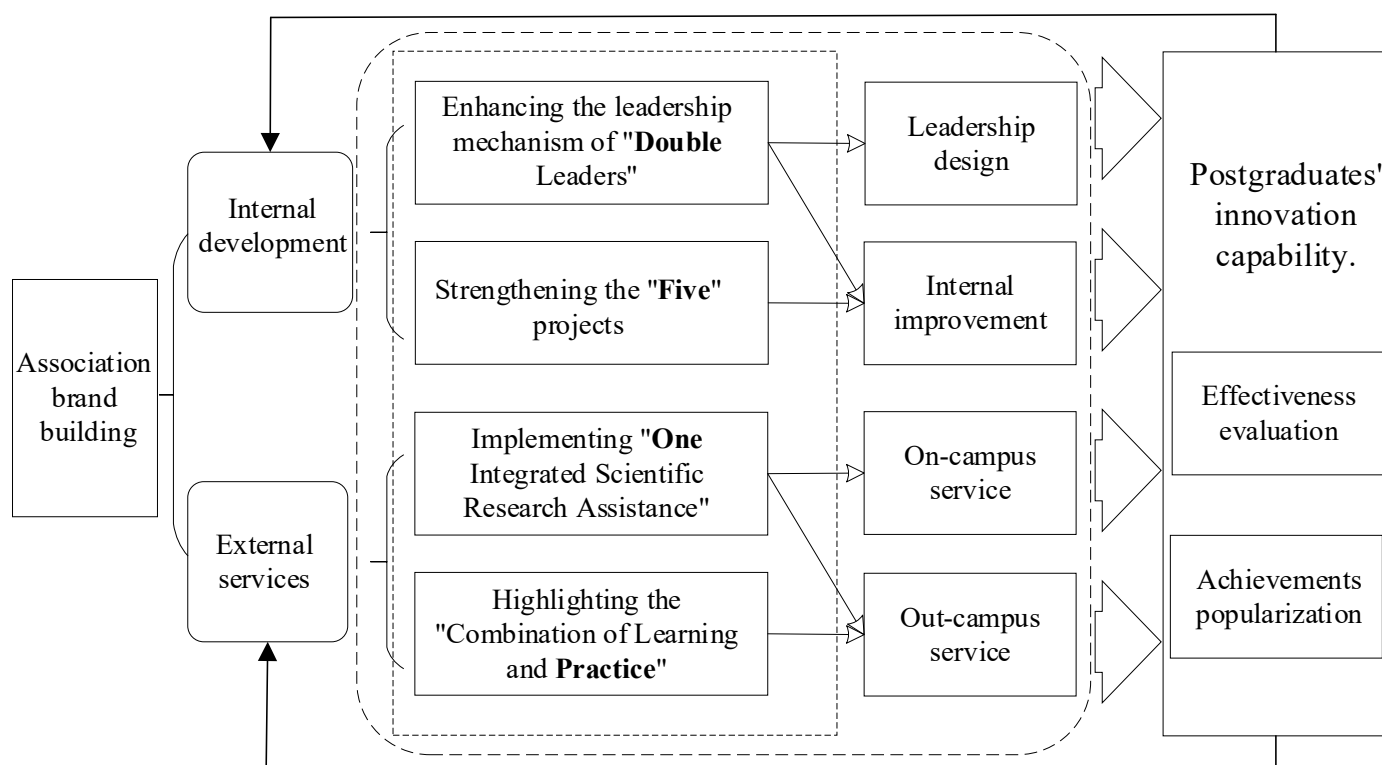


Figure 2. Association brand of Double-Five-One-Practice. Solid-line boxes denote specific practices or outcomes. Dashed-line boxes represent logically related clusters of practices or outcomes. Broad arrows indicate logical sequence. Solid arrows signify direct hierarchical dependencies in the workflow.

(1) Case introduction

To demonstrate the effectiveness of social science innovation in guiding postgraduate research, postgraduates from the School of Economics and Management at Northeast Electric Power University were selected as the research subjects. Northeast Electric Power University is recognized as a prominent institution in China's power sector, with its overall academic standing ranked at a moderate national level. The management discipline slightly exceeds the national average in performance. Furthermore, enrollment numbers in this discipline have remained relatively stable over the past 15 years, which establishes its typicality for this study. The training of management-focused postgraduates has sequentially progressed through three distinct phases. These phases include the traditional mentor responsibility system, the industry–academia–research collaborative training model, and the association-led innovation approach.

The “Double-Five-One-Practice” serves as a distinctive brand within the Management Research Association at Northeast Electric Power University. It was selected among the

inaugural cohort of specialized postgraduate association brands in Jilin Province. Additionally, it is recognized as part of the second cohort of the “100 Model Postgraduate Associations in China.” Consequently, it functions as a representative case for implementing the association branding-based cultivation model. Specifically, this acronym encompasses four core operational practices. It represents a comprehensive approach designed to strengthen the construct of ‘Double Leaders,’ enhance the ‘Five Projects,’ implement ‘One Integrated Scientific Research and Assistance Service,’ and underscore the ‘Combination of Learning and Practice.’

With the integration of association development and postgraduates’ innovation capability cultivation as the focal point, novel approaches to research-oriented education are actively explored. Through this initiative, the “Double-Five-One-Practice” grassroots brand is systematically established. Rigorous standards are enforced across ideological guidance, structural development, quality assurance, pioneering leadership, and demonstrative innovation. Ultimately, organizational education is leveraged to drive research-focused talent development.

The brand framework is predicated on the strategic deployment of “Dual Leader” supervisors. Internal innovation capability is subsequently fortified through the “Five Ones” activities. The coverage of innovation training is then expanded via class-wide integrated research mentoring. Furthermore, the practical application of research is broadened through community-engaged social practices. These components are highly structured and logically interconnected. Consequently, a systematic enhancement of postgraduates’ innovation capability is achieved.

(2) Alignment between the case and the model

The “Double-Five-One-Practice” association brand demonstrates a high degree of congruence with the theoretical education model developed in this study. Furthermore, a structured, layer-by-layer correspondence is inherently established between the two. Specifically, the organizational leadership dimension of the theoretical model corresponds directly to the “Dual Leaders” framework. Through this structure, senior supervisors are appointed as association heads to reinforce academic direction and organizational governance. The competency development dimension is aligned with the “Five Ones” specialized initiative. Systematic academic training is thereby delivered to solidify the foundational research and innovation capacities of postgraduates. The research mentoring dimension maps onto the integrated research assistance mechanism. Consequently, the scope of innovation education is effectively broadened through targeted peer-mentoring partnerships. The practical application dimension corresponds to the integrated learning and practice phase. Through industry investigations and community services, theoretical outcomes are successfully translated into applied innovations. Finally, the iterative enhancement dimension corresponds to the systematic summarization, dissemination, and dynamic optimization of brand experiences. These processes guarantee the continuous refinement, replicability, and scalability of the entire cultivation framework. Ultimately, a comprehensive system is established, characterized by the deep integration and logical closure between the theoretical model and the practical brand. Table 1 maps the core elements of the Double-Five-One-Practice model to the identified challenges in Section 3.

Table 1. Double-Five-One-Practice Model Elements and Challenge Mapping.

Model Element	Challenge Addressed (from Section 3.1)	How the Element Addresses the Challenge
Double Leaders	Challenge 1: Non-standardization of cultivation systems	Provides systematic leadership ensuring standardized processes; academic supervisor establishes quality criteria and evaluation standards
Five Projects	Challenge 1: Non-standardization; Challenge 3: Difficulties in aligning industry–academia–research interests	Standardized skill development pathway; regular activities cultivate research habits and critical thinking; systematic approach ensures replicable training
One Integrated Scientific Research and Assistance Service	Challenge 4: Challenges in dissemination and implementation of exemplary models	Extends benefits to broader student population; peer mentoring creates multiplier effect; overcomes limited beneficiary scope of traditional mentorship
Combination of Learning and Practice	Challenge 2: Disconnect between cultivation and practical applications	Directly addresses theory–practice gap; applies knowledge to real-world problems; validates innovation through practical testing

6.1. Strengthening the Construction of “Double Leaders” and Fostering Leaders in Scientific Research and Education

The professional competencies of association leaders exert a significant impact on association development. Through the integration of organizational management expertise, academic accumulation, and broad educational vision, the association architecture is effectively coordinated. Operational mechanisms are standardized, and internal and external research resources are integrated. Consequently, a robust organizational foundation is firmly established for the branding of the association. Furthermore, leaders who thoroughly understand operational dynamics and possess forward-looking educational perspectives are capable of addressing the specific research needs of postgraduates. As a result, traditional operational paradigms are effectively transcended. Targeted brand activities, encompassing academic training, research mentoring, and practical innovation, are precisely designed. Subsequently, a tiered system for the cultivation of postgraduates’ innovation capability is constructed. Ultimately, new developmental momentum is injected at the foundational level to shape innovative thinking, enhance research capabilities, and facilitate the translation of practical outcomes.

Dr. Cui Jindong, a professor and master’s supervisor, currently serves as the leader of the Management and Research Innovation Association. He has been designated as a Changbaishan Youth Top Talent and has been recognized for outstanding technical and innovative contributions at the provincial level. Additionally, he is included in the inaugural cohort of the “NEPU Scholars” program. His professional career is consistently conducted at the forefront of academic instruction and scientific research. Consequently, industry developments and academic frontiers are closely monitored, while active contributions are continuously directed toward the advancement of the power and energy sector. Over the past five years, innovative theories have been consistently applied to guide practical initiatives and optimize operational workflows. The distinctive characteristics and developmental patterns of postgraduate associations have been systematically analyzed. Consequently, new developmental pathways are continuously explored. Under his direction, a total of 32 distinctive activities have been organized. Notably, these innovative practices have been prominently reported by provincial-level media on three separate occasions.

6.2. Consolidating the ‘Five Projects’ to Build a Strong Foundation for Scientific Research and Education

The unique activities of the association led by Dr. Cui are essential for improving the effectiveness of scientific research and education. The association prioritizes deep integration and executes five characteristic projects: hosting weekly discussions on current affairs, writing a weekly high-quality reading note, analyzing a high-quality academic paper each week, learning a mathematical mode each month, and writing a top-tier paper each semester. While the “Five Projects” appear straightforward, they encompass the entire innovation process, from topic selection and situational analysis to problem identification and result presentation.

Through these characteristic activities, the association transforms its organizational strengths into a driving force for scientific research and innovation, significantly enhancing the quality and capabilities of individual postgraduate students. Moreover, it promotes the integration of research with association activities, ensuring their mutual reinforcement. These initiatives have been carried out continuously for ten semesters and have produced remarkable outcomes. This is evidenced by over 150 publications in highly regarded journals, including SCI, EI, and CSSCI, with all members receiving national scholarships in their respective fields.

6.3. Implementing ‘One Integrated Scientific Research and Assistance Service’ and Broadening the Benefits Derived from Talent Cultivation Through Research

To maximize the pioneering and exemplary contributions of its members and to reinforce their sense of belonging, the association led by Dr. Cui actively encourages members with significant accomplishments in scientific research to solve practical challenges faced by peers encountering difficulties in research and innovation. Members are assigned to form “Targeted Assistance Groups,” collaborating with students in need. Through methods such as “point-to-point assistance,” “point-to-line improvement,” and “point-to-surface sublimation,” personalized, customized, and comprehensive assistance is offered, encompassing both academic support and everyday life.

The ‘One Integrated Scientific Research and Assistance Service’ initiative is fundamental to the association’s mission, benefiting over 1200 individuals to date. The impact of these activities is tangible, as evidenced by the first-time pass rate for postgraduate thesis defenses ranking highest in the university. Additionally, over the past three years, members of the association have led classmates in various interdisciplinary innovation competitions, accruing 96 awards at the provincial level or higher, with an award rate exceeding 89%. This initiative effectively expands the reach of innovation training, ensuring that support services benefit students from all academic disciplines.

6.4. Highlighting the ‘Combination of Learning and Practice’ and Actively Pursuing Innovative Engagements in Talent Cultivation Through Research

Under Dr. Cui’s leadership, the association embodies the principle of “learning through practical application” by engaging in “social practice” activities. In alignment with the characteristics of management disciplines at energy-focused universities, the association organizes collective seminars addressing prevailing issues in the energy industry during holidays and delegates social practice research tasks to specific groups. They have conducted extensive research on topics such as “China’s Carbon Emission Market,” “Prospects for Electric Energy Substitution in Northeast China,” “Status and Challenges in Charging Pile Development,” and “Transforming Technological Achievements in Energy Conservation and Emission Reduction.” After thorough deliberation, specific solutions are proposed to provide reference frameworks and technical assistance for local economic and social development.

Research reports produced by association members have achieved first place three times and second place six times in the National University Student Energy Conservation and Emission Reduction Competition. Their research and suggestions on new energy utilization and low-carbon development in Jilin Province have drawn attention from the provincial government, with their recommendations adopted on four occasions. In recent years, the association's practical research initiatives have expanded from serving specific industries to addressing broader local needs.

6.5. Overall Effectiveness Evaluation

The “Dual Leaders” component ensures strategic guidance, while the “Five Ones” initiative consolidates foundational skills. Furthermore, the “Integrated Mentoring” expands service coverage, and the “Practice-Oriented” element facilitates real-world application. Through these components, a systematic model for the cultivation of postgraduates' innovation capability is constructed. This model is characterized by a clear hierarchical structure and progressive development. The observed institutional records show higher per capita indicators during the association-led period.

Data spanning the past 15 years are presented in Table 2. Key performance metrics were systematically analyzed, including the number of high-level publications, invention patents, disciplinary competition awards, and media coverage of social services. These indicators are used as observable institutional proxies of innovation capability. They do not exhaust the full construct, which also includes cognitive, collaborative, leadership, and practice-oriented dimensions that require qualitative or longitudinal assessment in future studies. To eliminate biases caused by fluctuations in student enrollment, per capita indicators were adopted for evaluation.

Table 2. Comparative analysis of postgraduates' innovation capability indicators across different cultivation models.

Year	Dominant Cultivation Model	Number of Postgraduates	Innovation Capability Indicators (Per Capita)			
			Number of High-Level Publications	Number of Invention Patents	Number of Disciplinary Competition Awards	Number of Participated Research Projects
2011–2014	Mentor-Led Model	198	0.177	0	0.025	0.022
2015–2018	Industry–Academia–Research Collaborative Model	225	0.248	0.111	0.08	0.177
2019–2025	Innovation Association-Led Model	322	0.491	0.149	0.434	0.745

Data source: First-hand sources accumulated by the research team and archival records and statistical files from the student management office. Counting criteria: High-level publications refer to SCI, SSCI, EI, and CSSCI journal papers where students serve as the first author or corresponding author. Patent data include only invention patents where students are the first inventor, or where the supervisor is the first inventor and the student is the second inventor. Disciplinary competitions are limited to those listed in the Ministry of Education's university competition ranking catalog. Award counts are calculated by the number of winning projects to avoid duplicate personnel counts. Research participation includes government-funded projects and enterprise-commissioned projects. Government project counts follow the number of graduate students listed in the project contract, while enterprise project counts are based on graduate student numbers in the project filing roster maintained by the Department of Scientific Research Administration.

The “Double-Five-One-Practice” association brand emphasizes practical outcomes, possesses distinctive characteristics, and demonstrates high scalability. Consequently,

student associations are effectively positioned as pivotal platforms for the cultivation of postgraduates' innovation capability within higher education institutions. Through this framework, organizational education is leveraged to advance research-oriented development. As a result, the inherent limitations of traditional cultivation approaches are effectively mitigated. These traditional approaches typically rely on individual mentor guidance, multi-disciplinary collaboration, or industry–academia–research partnerships. Furthermore, these distinctive practices have been prominently featured in authoritative media outlets, including Guangming Daily, Chinese Postgraduates, China Jilin Network, and New Culture News. Over a total of 57 reports have been published, and substantial social impact has been generated.

7. Limitations and Further Research

This study developed a model based on association branding for cultivating innovative capabilities among postgraduate students, following a comprehensive theory analysis of the challenges faced. However, because the empirical component is based on a single institutional case and aggregated administrative records, the findings should be interpreted as situated and descriptive rather than as causal evidence of model effectiveness. Moreover, it did not thoroughly examine external factors—such as economic conditions, industry trends, or government policies—that may affect the efficacy of association branding in enhancing postgraduates' innovation capability. Future research should investigate these aspects. Additionally, while the current study emphasizes immediate outcomes such as organizational cohesion and effectiveness, evaluating the long-term impacts of association branding on postgraduate students' innovation capabilities and career trajectories would be immensely valuable.

8. Conclusions

The findings indicate that association branding may provide a distinct organizational pathway to support the cultivation of postgraduates' innovation capability. This potential is particularly realized when the branding is integrated with strong academic leadership, sustained research activities, peer mentoring, and practice-oriented engagement.

The association branding model developed in this study shows higher descriptive per capita indicators in the observed institutional records and that it may support transferability under suitable institutional, disciplinary, leadership, and resource conditions. The underlying framework is grounded in four core dimensions: organizational leadership, competency development, research mentoring, and practical application. Since these dimensions operate independently of specific disciplinary boundaries, the model is readily applicable across diverse academic contexts, including the humanities, natural sciences, and engineering. Furthermore, a modular architecture is adopted to ensure structural flexibility. Activity formats, training platforms, and practical scenarios can be dynamically adjusted to align with the distinct characteristics of various disciplines and association types. Provided that the core operational mechanisms remain intact, direct implementation can be efficiently achieved. A standardized construction workflow and an iterative optimization mechanism have been formally established for the complete system. Consequently, cross-departmental and cross-association replication within a single institution can be seamlessly executed. Simultaneously, the model can be systematically extended to multidisciplinary postgraduate cohorts in comparable universities. Additionally, the core elements of this framework can be directly mapped to universities and research institutions across various countries that prioritize postgraduates' innovation training. As a result, the model demonstrates universal educational value and significant potential for large-scale implementation.

Author Contributions: Conceptualization, J.C.; methodology, J.C.; software, G.Q.; validation, X.Z.; formal analysis, G.Q.; investigation, W.L.; resources, W.L.; data curation, X.Z.; writing—original draft preparation, J.C., X.Z., W.L. and Q.L.; writing—review and editing, G.Q.; visualization, G.Q.; supervision, Q.L.; project administration, Q.L.; funding acquisition, J.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Key Research Project of Graduate Education Teaching Reform of Jilin Province, “Innovative Research on High-Level Talent Cultivation Model in the Field of Energy Management for the ‘Dual Carbon’ Goals” (Grant No. JJKH20260033JG), and the Education Research Project of the Jilin Provincial Association of Higher Education, “Research and Practice on the Cultivation Model of Graduate Students’ Innovative Ability by Taking the Opportunity of Building the National ‘100 Model Party Branches for Graduate Students’” (Grant No. JGJX2023D182).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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