

SUSTAINABLE DEVELOPMENT MODEL OF MIXED-OWNERSHIP  
SCHOOL-RUNNING IN HIGHER VOCATIONAL COLLEGES  
IN SHANDONG PROVINCE

QI SHUZHAN

A thesis paper submitted in partial fulfillment of the requirements for the Degree of  
Doctor of Philosophy Program in Educational Management for Sustainable Development


Academic Year 2025

Copyright of Bansomdejchaopraya Rajabhat University

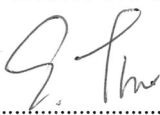
**Thesis Title** Development Model of Mixed Ownership School-Running in Higher Vocational Colleges in Shandong Province

**Author** Miss Qi Shuzhan

**Thesis Committee**

  
..... Chairperson  
(Associate Professor Dr. Chollada Pongpattanayothin)

  
..... Committee  
(Assistant Professor Dr.Patchareeporn Bangkhaw)

  
..... Committee  
(Associate Professor Dr.Sunate Thaveethavornsawat)

---

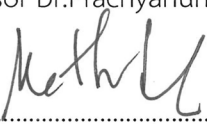
Accepted by Bansomdejchaopraya Rajabhat University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Educational Management for Sustainable Development

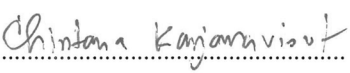
  
..... Dean of Graduate School  
(Assistant Professor Dr. Nukul Sarawong)

  
..... President  
(Assistant Professor Dr. Kanakorn Sawangcharoen)

**Defense Committee**

  
..... Chairperson  
(Professor Dr.Prachyanun Nilsook)

  
..... Committee  
(Associate Professor Dr.Methinee Wongwanich Rumpagaporn)

  
..... Committee  
(Associate Professor Dr.Chintana Kanjanavisut)

Title	Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province
Author	Qi Shuzhan
Program	Education Management for Sustainable Development
Major Advisor	Associate Professor Dr. Chollada Pongpattanayothin
Co-advisor	Assistant Professor Dr. Phatchareephorn Bangkheow
Co-advisor	Associate Professor Dr. Sunate Thaveethavornsawat
Academic Year	2025

## ABSTRACT

The objectives of this study were: (1) to investigate the current status, existing problems, approaches, and influencing factors affecting the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province; (2) to construct a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province, clarifying the corresponding implementation strategies for each core dimension. (3) to verify the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province. The sample consisted of stakeholders involved in mixed-ownership school-running at five higher vocational colleges in Shandong Province. Based on the Krejcie and Morgan (1970) sampling table, a total of 586 participants were selected, including 365 students, 115 teachers, and 106 administrators. A mixed-methods research design was employed. Research instruments included questionnaires, interviews, focus group discussions, and evaluation forms. The Index of Item-Objective Congruence (IOC) was 0.97. The overall reliability of the questionnaire, measured using Cronbach's alpha coefficient, exceeded 0.8. Data analysis techniques included thematic analysis, coding systems, statistical analysis, content analysis, and integrated mixed-method analysis.

The research findings revealed that the overall level of implementation of mixed-ownership school-running in higher vocational colleges in Shandong Province was at a moderate level. The developed sustainable development model consisted of five core dimensions: (1) appropriate design of property rights attributes; (2) development of the educational environment; (3) enhancement of institutional environmental support; (4) improvement of administrative and management mechanisms; and (5) strengthening of resource guarantees. Specific implementation strategies were formulated for each dimension. The overall evaluation results indicated that the sustainable development model demonstrated a high level of feasibility ( $\bar{x}=4.14$ ) and a high level of suitability ( $\bar{x}=4.46$ )

Based on the research findings, in order to promote the practical implementation of the model, it is recommended that priority be given to improving the dimension of property rights design, which received the lowest score. Additionally, efforts should focus on enhancing the educational environment, strengthening internal campus support systems, improving management mechanisms, and systematically reinforcing resource guarantees. These improvements should be implemented through targeted strategies such as balancing property rights structures, flexibly updating curricula in response to dynamic changes, designing and allocating learning spaces appropriately, developing governance structures, and expanding funding channels. Such measures are expected to comprehensively enhance the quality of educational management and the sustainable development capacity of mixed-ownership higher vocational colleges in Shandong Province.

**Keywords:** Higher Vocational Colleges; Mixed-Ownership School-Running; Sustainable Development; Development Model; Implementation Strategies

ชื่อเรื่อง	รูปแบบการพัฒนาที่ยั่งยืนของการจัดการศึกษาระบบ ร่วมทุนในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาใน มณฑลชานตง
ชื่อผู้วิจัย	ฉี ชูจาง
สาขาวิชา	การจัดการศึกษาเพื่อการพัฒนาที่ยั่งยืน
อาจารย์ที่ปรึกษาหลัก	รองศาสตราจารย์ ดร. ชลลดา พงศ์พัฒนโยธิน
อาจารย์ที่ปรึกษาร่วม	ผู้ช่วยศาสตราจารย์ ดร. พัชรินทร์ บางเขียว
อาจารย์ที่ปรึกษาร่วม	รองศาสตราจารย์ ดร. สุเนตร ทวีถาวรสวัสดิ์
ปีการศึกษา	2568

### บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อ (1) ศึกษาสภาพปัจจุบัน ปัญหาที่มีอยู่ แนวทางดำเนินงาน และปัจจัยที่มีอิทธิพลต่อการพัฒนาที่ยั่งยืนของการจัดการศึกษาระบบร่วมทุนในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาในมณฑลชานตง (2) สร้างรูปแบบการพัฒนาที่ยั่งยืนของการจัดการศึกษาระบบร่วมทุน โดยกำหนดมิติหลักและกลยุทธ์การดำเนินงานที่สอดคล้องกัน และ (3) ตรวจสอบความเหมาะสมและความเป็นไปได้ของรูปแบบการพัฒนาที่ยั่งยืนดังกล่าว กลุ่มตัวอย่างที่ใช้ในการวิจัยเป็นผู้มีส่วนเกี่ยวข้องกับจัดการศึกษาระบบร่วมทุนในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษา 5 แห่งในมณฑลชานตง โดยกำหนดตามตารางของ Krejcie และ Morgan (1970) จำนวนทั้งสิ้น 586 คน ประกอบด้วย นักศึกษา 365 คน อาจารย์ 115 คน และผู้บริหาร 106 คน วิธีวิทยาการวิจัยใช้แบบการวิจัยผสมวิธี โดยใช้เครื่องมือวิจัยที่หลากหลาย ได้แก่ แบบสอบถาม การสัมภาษณ์ การสนทนากลุ่ม และแบบประเมินผล ผลการหาค่าดัชนีความสอดคล้องอยู่ที่ 0.97 ผลการหาค่าความเชื่อมั่นของแบบสอบถามใช้ค่าสัมประสิทธิ์แอลฟาของครอนบาคโดยภาพรวมสูงกว่า 0.80 การวิเคราะห์ข้อมูลใช้การวิเคราะห์เชิงประเด็น ระบบการเข้ารหัสข้อมูล การวิเคราะห์ทางสถิติ การวิเคราะห์เนื้อหา และการวิเคราะห์แบบผสมผสาน

ผลการวิจัยพบว่า ระดับการดำเนินงานด้านการจัดการศึกษาระบบร่วมทุนในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาในมณฑลชานตงอยู่ในระดับปานกลาง รูปแบบการพัฒนาที่ยั่งยืนที่พัฒนาขึ้นประกอบด้วย 5 มิติหลัก ได้แก่ (1) การออกแบบคุณลักษณะด้านสิทธิในทรัพย์สินให้เหมาะสม (2) การพัฒนาสภาพแวดล้อมทางการศึกษา (3) การเสริมสร้างการสนับสนุนด้านสภาพแวดล้อมของสถานศึกษา (4) การพัฒนากลไกด้านสภาพแวดล้อมการบริหารจัดการ และ (5) การเสริมสร้าง

หลักประกันด้านทรัพยากร พร้อมทั้งได้กำหนดกลยุทธ์การดำเนินงานสำหรับแต่ละมิติ ผลการประเมิน โดยภาพรวมแสดงให้เห็นว่า รูปแบบการพัฒนาที่ยั่งยืนดังกล่าวมีความเป็นไปได้ในระดับสูง ( $\bar{x}=4.14$ ) และมีความเหมาะสมในระดับสูงเช่นเดียวกัน ( $\bar{x}=4.46$ )

จากผลการวิจัย เพื่อส่งเสริมการนำรูปแบบไปสู่การปฏิบัติอย่างเป็นรูปธรรม จึงเสนอให้ให้ความสำคัญเร่งด่วนกับการปรับปรุงมิติการออกแบบคุณลักษณะด้านสิทธิในทรัพย์สิน ซึ่งมีคะแนนต่ำที่สุด พร้อมทั้งพัฒนาสภาพแวดล้อมทางการศึกษา ยกกระตือรือร้นสนับสนุนภายในวิทยาเขต ปรับปรุงกลไกการบริหารจัดการ และเสริมสร้างหลักประกันด้านทรัพยากรอย่างเป็นระบบ โดยผ่านยุทธศาสตร์เฉพาะ เช่น การสร้างสมดุลโครงสร้างสิทธิในทรัพย์สิน การปรับปรุงหลักสูตรอย่างยืดหยุ่นตามพลวัต การออกแบบและจัดสรรพื้นที่การเรียนรู้ที่เหมาะสม การพัฒนาโครงสร้างธรรมาภิบาล และการขยายช่องทางการระดมทุน ทั้งนี้เพื่อยกระดับคุณภาพการจัดการศึกษาและศักยภาพการพัฒนาอย่างยั่งยืนของวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาแบบความเป็นเจ้าของผสมในมณฑลชานตงอย่างรอบด้านและยั่งยืนต่อไป

**คำสำคัญ:** วิทยาลัยอาชีวศึกษาระดับอุดมศึกษา; การจัดการศึกษาระบบร่วมทุน; การพัฒนาที่ยั่งยืน; รูปแบบการพัฒนา; กลยุทธ์การดำเนินงาน

## Acknowledgement

In January 2022, I commenced my doctoral studies at Bansomdejchaopraya Rajabhat University in Bangkok, Thailand. I would like to sincerely thank all the teachers, classmates, and friends who have cared for and encouraged me throughout this period.

I express my deepest gratitude to my Major Advisor, Associate Professor Dr. Chollada Pongpattanayothin, for her professional, meticulous, and patient guidance. Her support has greatly enhanced my theoretical understanding, professional knowledge, and learning ability. I consider myself extremely fortunate to have been under her supervision.

I also wish to thank my two Co-advisors, Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornasawat. Both have provided valuable guidance and helped refine the ideas and methodology of my thesis.

My thanks extend to my committee members for their expert advice and constructive suggestions throughout this research. A special note of appreciation goes to Bansomdejchaopraya Rajabhat University for the stimulating discussions and enjoyable moments shared over the past few years—our collaboration has been truly valuable. I am also grateful to the University for providing the necessary resources and a conducive research environment.

My sincere appreciation goes to my family and friends for their understanding and unwavering support during my studies. Without their constant encouragement and guidance, I could not have completed this journey.

Finally, I would like to acknowledge everyone who has helped me along the way for their support and assistance. Completing this thesis has been a significant journey, and I am deeply thankful to all who contributed to its success.

Qi Shuzhan

# Contents

	Page
Abstract.....	i
Abstract (Thai).....	iii
Acknowledgement.....	v
Contents.....	vi
List of Figures.....	viii
List of Tables.....	ix
Chapter	
<b>1 Introduction</b> .....	1
Rationale.....	1
Research Question.....	6
Objective.....	6
Scope of the Research.....	6
Advantages.....	14
Definition of Terms.....	17
Research Framework.....	20
<b>2 Literature Review</b> .....	23
Mixed-Ownership School-Running in Higher Vocational Colleges.....	23
Sustainable Development of Higher Vocational Colleges.....	39
Research on the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges.....	48
Related Research.....	59
<b>3 Research Methodology</b> .....	68
Population/Sample Group.....	72
Research Instruments.....	83
Data Collection.....	86
Data Analysis.....	89
Research Framework.....	92

## Contents (Continued)

	Page
<b>4 Results of Analysis</b> .....	96
Part I: Data Analysis of Questionnaires and Interviews Regarding The Current Status, Existing Problems, Approaches, and Influencing Factors.....	97
Part II: Data analysis of interviews and focus groups used in construct model.....	137
Part III: Evaluative Analysis of the Feasibility and Suitability of the Model..	179
<b>5 Discussion Conclusion and Recommendations</b> .....	186
Conclusion.....	187
Discussion.....	192
Recommendations.....	199
<b>References</b> .....	205
<b>Appendices</b> .....	213
A List of Specialists and Letters of Specialists Invitation for IOC Verification...	214
B Official Letter.....	227
C Research Instrument.....	250
D The Results of the Quality Analysis of Research Instruments.....	289
E Certificate of English.....	300
F The Document for Accept Research.....	302
<b>Researcher Profile</b> .....	304

## List of Figures

Figure	Page
1.1 Conceptual Framework.....	22
2.1 The Advantages of Mixed-Ownership School-Running in Higher Vocational Colleges.....	28
2.2 Small-Scale Mixed" Model of Mixed-Ownership School-Running in Higher Vocational Colleges.....	35
2.3 The "Large-scale Mixed" Model of Mixed-Ownership School-Running in Higher Vocational Colleges.....	37
2.4 Connotations of Sustainable Development School-Running and Sustainable Development.....	47
2.5 Various Influencing Factors.....	56
3.1 Population Distribution Table of the Questionnaire Survey.....	75
3.2 Sample Distribution Table of the Questionnaire Survey.....	76
3.3 Research framework.....	94
4.1 Logical Diagram of SWOT-PEST Combined Analysis.....	131
4.2 Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province.....	169
4.3 Structure of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies).....	170
4.4 Implementation Flow Chart of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province.....	173

## List of Tables

Table	Page
2.1 Relevant Practices of Mixed-Ownership School-Running in Higher Vocational Colleges Around the World.....	32
2.2 Policies on Mixed-Ownership School-Running of Higher Vocational Colleges China.....	61
2.3 Policies on Mixed-Ownership School-Running of Higher Vocational Colleges Shandong Province.....	63
3.1 Research Steps.....	69
3.2 Questionnaire Sample Distribution Table (by College).....	74
3.3 Selection Criteria for Interviewees and Focus Group Participants.....	79
3.4 Number of Focus Group Participants.....	80
3.5 Qualification Criteria for Experts in the Focus Group to Evaluate the Draft Model.....	81
3.6 Qualification Criteria for Experts Evaluating the Final Model.....	82
3.7 Research Methodology Table.....	92
4.1 Number of Respondents and Percentage (For Students).....	98
4.2 Number of Respondents and Percentage (For Teachers).....	99
4.3 Number of Respondents and Percentage (For Administrators).....	102
4.4 Current Status of Mixed-Ownership School-Running.....	105
4.5 Current Status of Property Right Attributes in Mixed-Ownership School-Running.....	105
4.6 Current Status of Educational Environment in Mixed-Ownership School-Running.....	107
4.7 Current Status of Campus Environment in Mixed-Ownership School-Running.....	109
4.8 Current Status of Management Environment in Mixed-Ownership School-Running.....	110

## List of Tables (Continued)

Table	Page
4.9 Current Status of Resource Environment in Mixed-Ownership School-Running.....	112
4.10 Interview Content Analysis Table.....	116
4.11 Results of SWOT-PEST Combined Analysis.....	132
4.12 Results of TOWS Matrix Analysis.....	134
4.13 Interview Content Analysis Table.....	139
4.14 Draft Sustainable Development Model (including Implementation Strategies for each dimension).....	160
4.15 Feasibility of the Draft Model.....	166
4.16 Suitability of the Draft Model.....	167
4.17 Application of 5 core dimensions.....	175
4.18 Evaluation of the Feasibility and Suitability of the Final Model.....	181

# Chapter 1

## Introduction

### Rationale

In October 2022, the United Nations Educational, Scientific and Cultural Organization (UNESCO) released the Strategy for Technical and Vocational Education and Training (TVET) (2022-2029) (UNESCO, 2022), outlining the overall development direction and key goals for global technical and vocational education and training over the next eight years. It calls for equipping all youth and adults with the skills required for employment, decent work, entrepreneurship, and lifelong learning, and promoting the implementation of the entire 2030 Agenda for Sustainable Development. This document continues and updates UNESCO's consistent focus on TVET, encouraging future TVET to continuously expand and adapt to social development and economic conditions, while focusing on skills development based on evaluation experience and major trends in educational transformation.

China has consistently emphasized the importance of vocational education and mixed-ownership school-running. In 2014, the State Council of China promulgated the Decision on Accelerating the Development of Modern Vocational Education, introducing the concept of mixed ownership into vocational education for the first time. This document proposed "stimulating the vitality of vocational education institutions and exploring the development of shareholding and mixed-ownership vocational colleges," which has been re-emphasized in multiple subsequent key policy documents. These directives indicate that mixed ownership is an important measure adopted by China to accelerate the development of modern vocational education, a major innovation introducing mixed-ownership structures into the vocational education sector, and an inevitable choice for vocational education to adapt to the socialization of capital (China Education News Network, 2021).

Mixed-ownership school-running in higher vocational colleges refers to the transformation of the school-running entity from a single investor to diversified investment entities, including state-owned capital, collective capital, and non-public capital. Such vocational colleges are characterized by a diversified ownership structure (Wang & Liu, 2015). Furthermore, mixed ownership is a new school-running model involving joint investment, establishment, governance, and development by the government, society, enterprises, individuals, and the institution (Li & Zhang, 2018). Emerging under China's new context of developing a mixed-ownership economy, mixed-ownership vocational colleges introduce diversified ownership capital into vocational colleges to form diversified investment entities, thereby promoting connections among investors and fostering the sustainable development of higher vocational colleges.

Shandong Province has actively responded to national policies, becoming one of the first pilot provinces for industry-education integration in 2015. As a birthplace of mixed-ownership school-running in China, Shandong has explored the establishment of a "vocational education college entrance examination" system to construct dual tracks for vocational education and general education. The People's Government of Shandong Province has successively issued multiple policy documents, including the National Vocational Education Reform Implementation Plan (2019), the Opinions of the Ministry of Education and the People's Government of Shandong Province on Promoting the Whole Province to Advance Quality Improvement and Excellence and Building an Innovation and Development Highland for Vocational Education (2020), and the Guiding Opinions on Promoting Mixed-Ownership School-Running in Vocational Colleges (2020), requiring the in-depth advancement of mixed-ownership school-running in vocational colleges (Ma, 2021).

China's first local mixed-ownership school-running policy and the first incentive measures for industry-education integration combining "finance + fiscal support + land + credit" were born in Shandong. These initiatives have attracted more enterprises to actively participate in vocational education, achieving positive results. Shandong has established 47 mixed-ownership vocational colleges, 322

mixed-ownership secondary colleges, 993 mixed-ownership programs, and 1,900 training bases. A total of 524 large-scale enterprises have settled in, attracting over 12 billion yuan in social investment. For Shandong's "Ten Strong Industries," 70% of the new labor force is trained and supplied by vocational colleges. Vocational colleges in the province provide skills training for over 2 million person-times annually, serving regional industrial upgrading, rural revitalization, marine province construction, etc. (Li, 2021).

The central and local governments have successively issued relevant policies to promote pilot applications of mixed-ownership colleges. Local education administrative departments and some higher vocational colleges have actively attempted to practice mixed-ownership school-running, attracting high attention in the application and research within the vocational education field (Wu et al., 2023). As the carriers of vocational education, higher vocational colleges bear the mission of cultivating high-skilled, application-oriented professionals needed in production, construction, service, and management fronts, serving as an important cornerstone of China's educational modernization. Mixed-ownership school-running not only ensures the public welfare and fairness of education but also promotes the realization of educational marketization and effectiveness (Wu & Liang, 2023). It helps stimulate the vitality of higher vocational colleges, improve talent quality (Liu & Sun, 2023), enhance operational efficiency, and thereby promote the sustainable development of institutions. Therefore, mixed-ownership school-running has become an important pathway for higher vocational colleges to improve education quality and meet social needs, making its development a key topic of concern for Chinese higher vocational colleges at the current stage.

However, currently, vocational and technical colleges face certain obstacles in implementing mixed-ownership school-running. Yuan and Zhang (2021) argue that the development of mixed-ownership vocational colleges is inseparable from the circulation of human, financial, and material resources. With deepening application and exploration, financial and asset management issues have gradually become prominent. Xie and Liu (2021) believe that the mixed-ownership development of

higher vocational colleges will lead to dilemmas in their school-running entities, nature, ownership attribution, and coordinated governance. Yang (2021) posits that current mixed-ownership school-running development faces problems such as mismatched existing laws and policies, contradictions between capital's profit-seeking nature and the public welfare nature of education, difficulties in securing operational funding, lack of investment exit mechanisms, and unclear ownership attribution. Furthermore, most research on mixed-ownership school-running in higher vocational colleges provides empirical suggestions from a practical perspective, lacking empirical studies.

Therefore, resolving these issues is of significant importance. How to improve the mixed-ownership school-running system in higher vocational colleges? How to enhance the quality of school-running in higher vocational colleges? Constructing a sustainable development model for mixed-ownership school-running in higher vocational colleges is crucial. This will promote the adaptation of mixed-ownership school-running in higher vocational colleges to societal development needs, becoming key to enhancing educational vitality and employment quality, and achieving sustainable development.

The selection of this research topic is driven by both practical urgency and academic value. Practically, Shandong Province, as a national pilot for industry-education integration, has taken the lead in exploring mixed-ownership school-running in vocational education, yet it still faces prominent challenges such as unclear property rights division, superficial school-enterprise cooperation, and imperfect benefit distribution mechanisms. These problems hinder the sustainable development of mixed-ownership vocational colleges and call for targeted empirical research to provide solutions. Academically, existing studies mostly focus on theoretical discussions or fragmented practical experiences, lacking systematic empirical investigations and model construction tailored to Shandong's regional characteristics. This research thus aims to fill the gap between theory and practice, constructing an operable sustainable development model to address real-world dilemmas.

This study holds distinct advantages in addressing the research topic. Firstly, the research object is highly representative: the 5 selected mixed-ownership higher vocational colleges are benchmark cases in Shandong, covering different school-running models (e.g., whole-institution reform, secondary college cooperation) and industrial fields, ensuring the universality of research findings. Secondly, the research methodology is comprehensive: integrating questionnaire surveys, in-depth interviews, focus group discussions, and mixed-methods analysis, it achieves complementary advantages of quantitative and qualitative data, enhancing the scientificity and reliability of conclusions. Thirdly, the research orientation is practice-oriented: the model construction closely aligns with national and Shandong's vocational education policies, and the proposed strategies are derived from on-site investigations, ensuring strong policy compatibility and operability. Finally, the research value is dual-dimensional: theoretically, it enriches the research system of mixed-ownership school-running in vocational education; practically, it provides actionable decision-making references for governments, vocational colleges, and cooperative enterprises, contributing to the high-quality development of vocational education in Shandong.

In summary, mixed-ownership school-running is an important measure by the Chinese government to promote the sustainable development of higher vocational colleges. Against the backdrop of Shandong Province taking the lead in piloting industry-education integration and mixed-ownership reforms in vocational education, the researcher is interested in this topic to address existing problems and find ways to create benefits. This study takes higher vocational colleges in Shandong Province as the research object, employing questionnaire surveys, interviews, and expert surveys, followed by focus group discussions and evaluation forms to explore influencing factors for the sustainable development of mixed-ownership school-running, construct a model, and formulate supporting strategies. The research not only contributes to the improvement of teaching quality, enhancement of school-running vitality, and sustainable development of higher vocational colleges but also

provides actionable references for local policy optimization, benefiting both organizations and students.

### **Research Question (s)**

1. What is the current status and existing problems of mixed-ownership school-running in higher vocational colleges in Shandong Province?
2. What should be the core structure and implementation approaches of a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province?
3. What is the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province?

### **Objective(s)**

1. To investigate the current status, existing problems, approaches, and influencing factors affecting the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.
2. To construct a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province, clarifying the corresponding implementation strategies for each core dimension.
3. To verify the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

### **Scope of the Research**

The model constructed in this study focuses on the "core dimension design + supporting strategy implementation" for mixed-ownership school-running in higher vocational colleges in Shandong Province. It does not involve adaptability analysis for cross-provincial promotion for the time being, and regional differentiated adaptation can be a direction for future research.

1. The current status, existing problems, and approaches for the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Influencing factors for the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

3. The construction of a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

### **Population and the Sample Group**

The research population in this study includes individuals from 5 higher vocational colleges in Shandong Province that practice mixed-ownership school-running, namely: Shandong Maritime Vocational College, Jinan Engineering Vocational and Technical College, Binzhou Vocational College, Shandong Vocational Animal Science and Veterinary College, and Shandong Chemical Engineering Vocational College.

These five institutions are among the most representative successful cases of mixed-ownership school-running in Shandong Province, serving as exemplary and benchmark colleges in this field. Therefore, they possess mature experience and advanced practices in mixed-ownership school-running, worthy of in-depth study and research.

Firstly, Shandong Maritime Vocational College is the nation's first practical institution for mixed-ownership school-running and a founding member of the National Vocational Education Mixed-ownership school-running Research Alliance. Secondly, the other institutions are also representative higher vocational colleges practicing mixed-ownership school-running. Jinan Engineering Vocational and Technical College established the country's first Door, Window, and Curtain Wall College. Binzhou Vocational College promotes deep cooperation between the college and enterprises. Shandong Vocational Animal Science and Veterinary College successfully applied for Shandong Province's Major Projects for New and Old Kinetic Energy Conversion and Weifang City's Key Projects due to its mixed-ownership initiatives. Finally, Shandong Chemical Engineering Vocational College is the first

public higher vocational college in Shandong Province to undergo a whole-institution mixed-ownership reform.

**Phase I:** The Current Status, Existing Problems, Approaches, and Influencing Factors for the Sustainable Development of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

1.1 Using Questionnaires to Study the Current Status of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

### **The Population**

These groups constitute the core practitioners of mixed-ownership school-running and important sources of information for observation and verification. This study covers the entire research population of 8,906 individuals from 5 mixed-ownership higher vocational colleges in Shandong Province, as detailed below:

1) Students	7580 people
2) Teachers	728 people
3) Administrators	598 people

### **The Sample Group**

When investigating the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as the existing problems, approaches, and constraining factors for its sustainable development, this study adopted stratified random sampling and the simplified proportional formula proposed by Krejcie and Morgan (1970). The population was stratified based on occupational characteristics, and random sampling was conducted within each stratum to ensure the representativeness of the sample and avoid sampling bias (Cochran, 1977). Due to the differences among samples in each stratum, stratified sampling can improve accuracy and representativeness, thereby enhancing sampling efficiency. In this study, the sample was divided into three groups (students, teachers, and administrators) according to occupational characteristics. Samples from the three groups were randomly selected from the aforementioned 5 higher vocational colleges, totaling 586 individuals, as follows:

1) Students	365 people
2) Teachers	115 people
3) Administrators	106 people

The sampling situation is shown in Table 1.1.

### 1.2 Using Interviews to Study the Existing Problems, Approaches, and Influencing Factors for the Sustainable Development of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

Interview participants were from the 5 higher vocational colleges in Shandong Province. Purposive sampling was used to randomly select 15 individuals with over 5 years of work experience, specifically:

1) Teachers	5 people
2) Administrators	5 people
3) Stakeholders	5 people

### **Phase II:** Construction of a Sustainable Development Model for Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

2.1 To systematically sort out the existing models and supporting strategies of mixed-ownership school-running in higher vocational colleges in Shandong Province, this study conducted relevant research through the interview method. The data used in the study were sourced from 5 representative mixed-ownership higher vocational colleges in Shandong Province. A total of 15 interviewees were selected via purposive sampling, all of whom have been deeply engaged in fields related to mixed-ownership school-running for more than 5 years. Their rich practical experience and industry insights provide solid support for the refinement of existing models (see Table 3.3 in Chapter 3 for the selection criteria of interviewees). The specific number of participants is as follows:

1) Senior teachers	5 people
2) Senior Administrators	5 people
3) Senior Stakeholders	5 people

2.2 On the basis of sorting out existing models—fully drawing on mature practical experience and identifying potential bottlenecks to avoid redundant exploration—this study aimed to comprehensively analyze the internal and external environments of mixed-ownership school-running in higher vocational colleges in Shandong Province and accurately identify core issues, thus drafting the draft sustainable development model of mixed-ownership school-running (including supporting strategies) through Focus Group Discussions (FGD). The number of participants in the focus group discussions of this study is divided according to the selected 5 higher vocational colleges, with the specific distribution as follows: Each of the five colleges—Shandong Maritime Vocational College, Jinan Engineering Vocational and Technical College, Binzhou Vocational College, Shandong Vocational Animal Science and Veterinary College, and Shandong Chemical Engineering Vocational College—is assigned 1 focus group institution. Each focus group of each college includes 1 senior teacher, 1 senior administrator, and 1 senior stakeholder, ensuring multi-role coverage that aligns with the actual school-running scenario. In terms of the total number, 5 focus group institutions are set up across the 5 colleges, with 5 senior teachers, 5 senior administrators, and 5 senior stakeholders respectively, totaling 15 participants in the focus groups.

Participants in the focus group discussions were randomly selected via purposive sampling, with a total of 15 individuals. Through in-depth deliberations from multi-subject and multi-perspective perspectives, the core demands of all parties for model construction were effectively integrated, providing an important guarantee for the scientificity and pertinence of the draft (see Table 3.3 in Chapter 3 for the eligibility criteria for selecting participants in the focus group discussions). The specific number of participants is as follows:

- |                          |          |
|--------------------------|----------|
| 1) Senior teachers       | 5 people |
| 2) Senior Administrators | 5 people |
| 3) Senior Stakeholders   | 5 people |

When studying the existing models of mixed-ownership school-running in higher vocational colleges in Shandong Province and drafting the draft sustainable development model (including supporting strategies) of mixed-ownership school-running, interview method and focus group were respectively adopted for data collection, with purposive sampling used as the sampling method. The samples cover senior teachers with more than 5 years of work experience, senior administrators closely engaged in student cultivation and policy formulation, and senior stakeholders closely involved in student cultivation and policy formulation from these 5 universities. The specific number of participants in the interviews and focus group discussions is shown in Table 3.3 and Table 3.4 in Chapter 3.

2.3 The draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies) was evaluated through expert focus group discussions. During the discussions, the feasibility and suitability of the draft model were thoroughly deliberated, leading to the formulation of the sustainable development strategies for mixed-ownership school-running in higher vocational colleges in Shandong Province.

A purposive sampling method was adopted to randomly select 5 experts, including 1 expert with knowledge and experience in strategy formulation, 2 senior teachers, and 2 senior administrators. The total number of experts participating in the focus group for evaluating the draft model is 5 (see Table 3.5 in Chapter 3 for the eligibility criteria for selecting experts to evaluate the draft model).

**Phase III: Evaluation of the Feasibility and Suitability of the Sustainable Development Model for Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province**

When verifying the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province, the evaluation form method (i.e., expert survey method) was adopted. For the theme of this study, 5 experts were specially invited, who need to possess certain authority and experience in the field of mixed-ownership school-running development in higher vocational colleges, have rich experience in

vocational education, curriculum formulation, employment management, etc., and be directly responsible for student education, student management, or student employment work. In accordance with the selection criteria, these experts were selected from renowned higher vocational colleges and enterprises. Among them, there are 2 experts with knowledge and experience in strategy formulation, 2 academic administrators, and 1 senior administrator of educational institutions. The total number of experts in the focus group participating in evaluating the feasibility and suitability of the final model is 5 (see Table 3.6 in Chapter 3 for the eligibility criteria for selecting experts to evaluate the final model).

### **The Variable**

#### **Independent Variable**

Property rights attributes, Educational environment, Campus environment, Management environment, Resource environment.

#### **Dependent Variable**

Sustainable development of Mixed-Ownership School-Running in Higher Vocational Colleges

#### **Content (s)**

This study primarily focuses on higher vocational colleges practicing mixed-ownership school-running in Shandong Province. It comprehensively employs questionnaire surveys, interviews, and expert surveys to analyze influencing factors for the sustainable development of mixed-ownership school-running. Utilizing focus group methods, evaluation forms, and analyzing best practices from higher vocational colleges practicing mixed-ownership school-running, it constructs a sustainable development model for mixed-ownership school-running in higher vocational colleges. The research contributes to comprehensively enhancing the operational vitality of higher vocational colleges, improving talent cultivation quality, and thereby promoting their sustainable development.

The core dimensions of the sustainable development model for mixed-ownership school-running in higher vocational colleges include the following aspects:

1. Property rights attributes: Refers to the diversity of school entities, resources invested by each entity, equity structure proportions, etc.

2. Educational Environment: The school's educational environment includes forms of professional talent cultivation, students' skill mastery, and employment situations.

3. Campus Environment: The school's campus environment includes management systems, hardware facilities, campus cultural atmosphere, etc.

4. Management Environment: The school's management environment refers to the degree of organizational order, faculty situation, and benefit distribution, etc.

5. Resource Environment: The school's resource environment refers to practical resources, industry-education integration, external cooperation, research projects, and collaborative projects, etc.

The sustainable development model for mixed-ownership school-running in higher vocational colleges refers to the sustainability of education, operation, and development when a higher vocational college practices mixed-ownership school-running. For such colleges, student education work can be carried out, educational goals can be achieved, teaching activities for teachers and students can proceed orderly, school activities can operate smoothly, various investment entities can realize profits without violating the public welfare nature of the school or the interests of other stakeholders.

**Theories involved in this study include:**

Mixed-Ownership School-Running: Mixed ownership in the education field primarily exhibits three characteristics: diversification of ownership structure, diversity of governance structure, and flexibility of operational mechanisms. mixed-ownership school-running in higher vocational colleges is reflected in five aspects: Property rights attributes, educational environment, campus environment, management environment, and resource environment.

Educational Sustainable Development: Education is a primary force for sustainable development transformation, improving people's ability to turn social

ideals into reality. Education not only provides scientific and technical skills but also offers motivation, justification, and social support for pursuing and applying these skills. Education for sustainable development has four main areas: promotion and improvement of basic education, reorienting existing education at all levels to emphasize sustainability, fostering public understanding and awareness of sustainability, and training. Reflected in the operation of higher vocational colleges, it manifests in three aspects: education, operation, and development.

### **Time**

This research is planned to be conducted mainly from January to October 2024, divided into the following key stages:

January to February 2024: Complete the writing of Chapters 1, 2, and 3, aiming for a successful proposal defense in April.

April 2024: Strengthen the content of the first three chapters based on guidance and feedback from advisors and experts. Simultaneously, modify and improve research methods and content.

May to September 2024: Under the guidance of the supervisor, conduct the writing of the research content.

October to December 2024: Conclude the thesis writing, summarize the dissertation, and complete the thesis publication work.

### **Advantages**

The conclusions of this study bring the following beneficial impacts:

1. Gain an in-depth understanding of the current status of mixed-ownership school-running in higher vocational colleges. The beneficiary entities mainly include various higher vocational colleges in Shandong Province (especially the participating research institutions: Shandong Maritime Vocational College, Jinan Engineering Vocational and Technical College, Binzhou Vocational College, Shandong Vocational Animal Science and Veterinary College, and Shandong Chemical Engineering Vocational College), teaching administrators and frontline teachers of higher vocational colleges. By deepening the cognition of the challenges and difficulties

faced in the sustainable development process of mixed-ownership school-running in higher vocational colleges, it can help teaching administrators of higher vocational colleges accurately identify school-running shortcomings, and frontline teachers optimize teaching and talent cultivation models, thereby promoting the improvement of educational quality, helping schools comprehensively enhance their school-running quality and service levels, and better adapting to the development needs of mixed-ownership school-running.

2. Construct an accurate sustainable development model of mixed-ownership school-running in higher vocational colleges. The beneficiary entities cover various higher vocational colleges in Shandong Province, current students of higher vocational colleges, and cooperative enterprises. Based on the understanding and analysis of the current status, exploring and identifying key influencing factors and constructing a sustainable development model can promote the optimal allocation of educational resources: it helps higher vocational colleges formulate more targeted school-running strategies and methods, stimulate school-running vitality, and improve school-running quality; it helps current students clearly grasp the channels and paths for comprehensively improving vocational skills, clarify learning directions, and grow into skilled talents more adaptable to the needs of the market and cooperative enterprises, ultimately achieving personal development goals and career objectives; at the same time, it also transports more suitable talents for cooperative enterprises, reduces enterprise talent training costs, and realizes a win-win situation for schools and enterprises.

3. Construct an effective evaluation system for the sustainable development model of mixed-ownership school-running in higher vocational colleges. The beneficiary entities include educational administrative departments in Shandong Province, various higher vocational colleges, cooperative enterprises participating in mixed-ownership school-running, and relevant social institutions. Formulating an evaluation system while constructing the development model helps ensure the smooth achievement of school-running goals: for higher vocational colleges, the evaluation system can be used to better exert the effectiveness of mixed-ownership

school-running strategies and continuously enhance their own sustainable development capabilities; for educational administrative departments, it can fully grasp the actual situation of mixed-ownership school-running in higher vocational colleges within their jurisdiction through the evaluation system, and accurately introduce support policies and optimize supervision methods; for cooperative enterprises and relevant social institutions, they can understand the school-running quality and development potential of higher vocational colleges relying on the evaluation system, thereby carrying out more targeted cooperation and investment, and ultimately promoting the rational allocation of educational resources and the steady improvement of regional economy.

The study constructs a sustainable development model for mixed-ownership school-running in higher vocational colleges, which is rooted in rigorous empirical research on 5 representative institutions in Shandong Province and consists of five core dimensions—"Optimize the Design of Property Rights Attributes, Improve the Construction of the Educational Environment, Upgrade Campus Environment Support, Optimize Management Environment Mechanisms, and Strengthen Resource Environment Guarantees"—and 25 targeted supporting implementation strategies. This model is not only highly applicable to mixed-ownership higher vocational colleges in Shandong Province but also features strong scalability, with its applicability easily extended to large-sample scenarios involving more institutions or broader regional scopes. It is implemented through phased promotion (problem identification → model adaptation → strategy landing → effect evaluation) and targeted optimization of key dimensions (e.g., prioritizing property rights attribute improvement), with built-in flexibility to adapt to the unique characteristics of different institutions. The application of this model can effectively address core pain points such as unclear property rights division, superficial school-enterprise cooperation, and imperfect benefit distribution mechanisms. It not only balances the public welfare of education and the reasonable profit demands of investors but also promotes in-depth industry-education integration, improves the quality of talent cultivation, and enhances the operational vitality and sustainable development

capacity of colleges. Additionally, it provides a standardized operational framework for governments, schools, and enterprises, ensuring the safety of state-owned assets while stimulating the enthusiasm of social capital participation, thus achieving win-win outcomes for multiple stakeholders.

### **Definition of Terms**

**Higher Vocational College:** Higher Vocational Colleges are institutions dedicated to cultivating talents with higher education knowledge and professional technical skills, specifically tailored to meet the societal demand for technically applied and skilled professionals. Focusing on nurturing individuals equipped with both foundational higher education and specialized technical competencies, these colleges prioritize practical application and hands-on operational abilities in teaching. Their names typically end with "Vocational and Technical College," "Vocational College," or "Higher Professional College." As a key segment of higher education, higher vocational education emphasizes the cultivation of high-level technical and application-oriented talents who can directly adapt to production, construction, service, and management roles.

**Mixed Ownership:** Mixed Ownership refers to an organizational form jointly established by investment entities of different ownership natures within an enterprise or institution. In this structure, multiple types of ownership coexist, where different owners hold varying proportions of equity or interests and may participate in the organization's management and decision-making processes. Originating in the field of economics, the mixed-ownership model has expanded beyond its traditional boundaries in recent years, gaining increasing traction in non-economic sectors such as education. It offers organizations diversified ownership structures and flexible development paradigms, facilitating the integration of diverse resources and strengths.

**Mixed-Ownership School-Running in Higher Vocational Colleges:** mixed-ownership School-Running in Higher Vocational Colleges is an innovative school-running paradigm jointly invested in, established, governed, and developed by the

government, society, enterprises, individuals, and educational institutions. Higher vocational colleges may collaborate with leading regional or industry-specific enterprises boasting advanced technologies and strong brand influence, as well as other social forces capable of supporting vocational education development. Together, they establish educational entities and projects such as vocational colleges, secondary colleges, productive training bases, and skill training centers, fostering deep collaboration between multiple stakeholders.

**Sustainable Development Model for Mixed-Ownership School-Running in Higher Vocational Colleges:** Based on diversified property rights, the Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges encompasses five core dimensions: property rights attributes, educational environment, campus environment, management environment, and resource environment. Through coordinated operational mechanisms and supporting implementation strategies for each dimension, the model balances the public welfare nature of education with the reasonable profit demands of investors, integrating the advantages of government, enterprises, and other social resources to provide high-quality educational services for vocational college students. It creates a favorable ecosystem for students' growth, teachers' professional development, institutional operation, and stakeholders' interest satisfaction, while injecting vitality into the long-term sustainable development of the economy, society, and education. Essentially, it is a systematic school-running framework that achieves three-dimensional sustainability: educational sustainability, operational sustainability, and developmental sustainability.

#### **Definitions of the Five Core Dimensions of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges**

The sustainable development model of mixed-ownership school-running in higher vocational colleges constructed in this study divides its core dimensions into five categories: property rights attribute design, improvement of the educational environment, enhancement of campus environment support, optimization of

management environment mechanisms, and strengthening of resource environment guarantee. The specific definition of each dimension is as follows:

1. Property Rights Attribute Design: As the core foundational dimension for the sustainable development of mixed-ownership school-running in higher vocational colleges, it refers to clarifying the equity ratio, interest distribution, and responsibility division among different investment entities such as the government, enterprises, and social institutions, standardizing property rights registration, transfer, and withdrawal mechanisms, balancing the public welfare nature of education with the rationality of investment, realizing the diversification and standardized management of property rights, and providing institutional guarantee for the sustainable development of school-running.

2. Improvement of the Educational Environment: As the core talent cultivation dimension for the sustainable development of mixed-ownership school-running in higher vocational colleges, it refers to basing on the orientation of vocational education, integrating educational resources from schools and enterprises, optimizing professional settings, curriculum systems, and teaching models, strengthening practical teaching and skill training, building an educational and teaching system that adapts to market demands and student development, and ensuring the steady improvement of educational and teaching quality.

3. Enhancement of Campus Environment Support: As the core guarantee dimension for the sustainable development of mixed-ownership school-running in higher vocational colleges, it refers to optimizing the campus hardware facilities and software environment, improving the construction of hardware such as training bases, teaching equipment, and information platforms, creating a campus cultural environment that integrates academic atmosphere, professional literacy, and cooperative culture, and providing favorable supporting conditions for teachers' teaching, scientific research, and students' growth.

4. Optimization of Management Environment Mechanisms: As the core operational dimension for the sustainable development of mixed-ownership school-running in higher vocational colleges, it refers to establishing and improving school-

enterprise collaborative governance mechanisms, decision-making mechanisms, incentive mechanisms, and supervision mechanisms, clarifying the management powers and responsibilities of all parties, standardizing school-running management processes, improving management efficiency and standardization level, and ensuring the orderly and efficient operation of school-running activities.

5. Strengthening of Resource Environment Guarantee: As the core supporting dimension for the sustainable development of mixed-ownership school-running in higher vocational colleges, it refers to integrating government policy resources, enterprise industrial resources, social capital resources, and the colleges' own resources, establishing a resource allocation mechanism featuring resource sharing and complementary advantages, and ensuring the sufficient supply and efficient utilization of various resources such as funds, talents, technology, and equipment during the school-running process.

### **Conceptual Framework**

The conceptual framework of this study centers on the core theme of "Sustainable Development of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" and adopts the core logic of "Problem-Oriented - Dimension Synergy - Goal Implementation". The main body of the framework consists of five core dimensions: "Property Rights Attribute Design - Improvement of the Educational Environment - Enhancement of Campus Environment Support - Optimization of Management Environment Mechanisms - Strengthening of Resource Environment Guarantee". Among them:

1. "Property Rights Attribute Design" serves as the institutional foundation, clarifying the rights, interests and rules of multiple subjects;
2. "Improvement of the Educational Environment" is the core talent cultivation carrier, aligning with industrial needs to optimize teaching;
3. "Enhancement of Campus Environment Support" acts as the physical and cultural basis, providing hardware and atmosphere guarantees;

4. "Optimization of Management Environment Mechanisms" functions as the operational link, ensuring efficient school-enterprise collaboration;

5. "Strengthening of Resource Environment Guarantee" serves as the driving force, integrating multi-party resources to address supply bottlenecks.

The operation of the framework follows a progressive path of "Current Status Diagnosis - Model Construction - Feasibility Verification": first, it analyzes existing problems in each dimension through research; then, it iteratively develops a draft model with supporting strategies relying on focus groups; finally, it verifies the feasibility and suitability of the model through expert evaluation. Ultimately, it aims at the goals of "Educational Sustainability (improving talent cultivation quality), Operational Sustainability (efficient school-enterprise collaboration), and Developmental Sustainability (adapting to regional industries)", providing clear guidance for practice. This conceptual framework is presented in Figure 1.1.

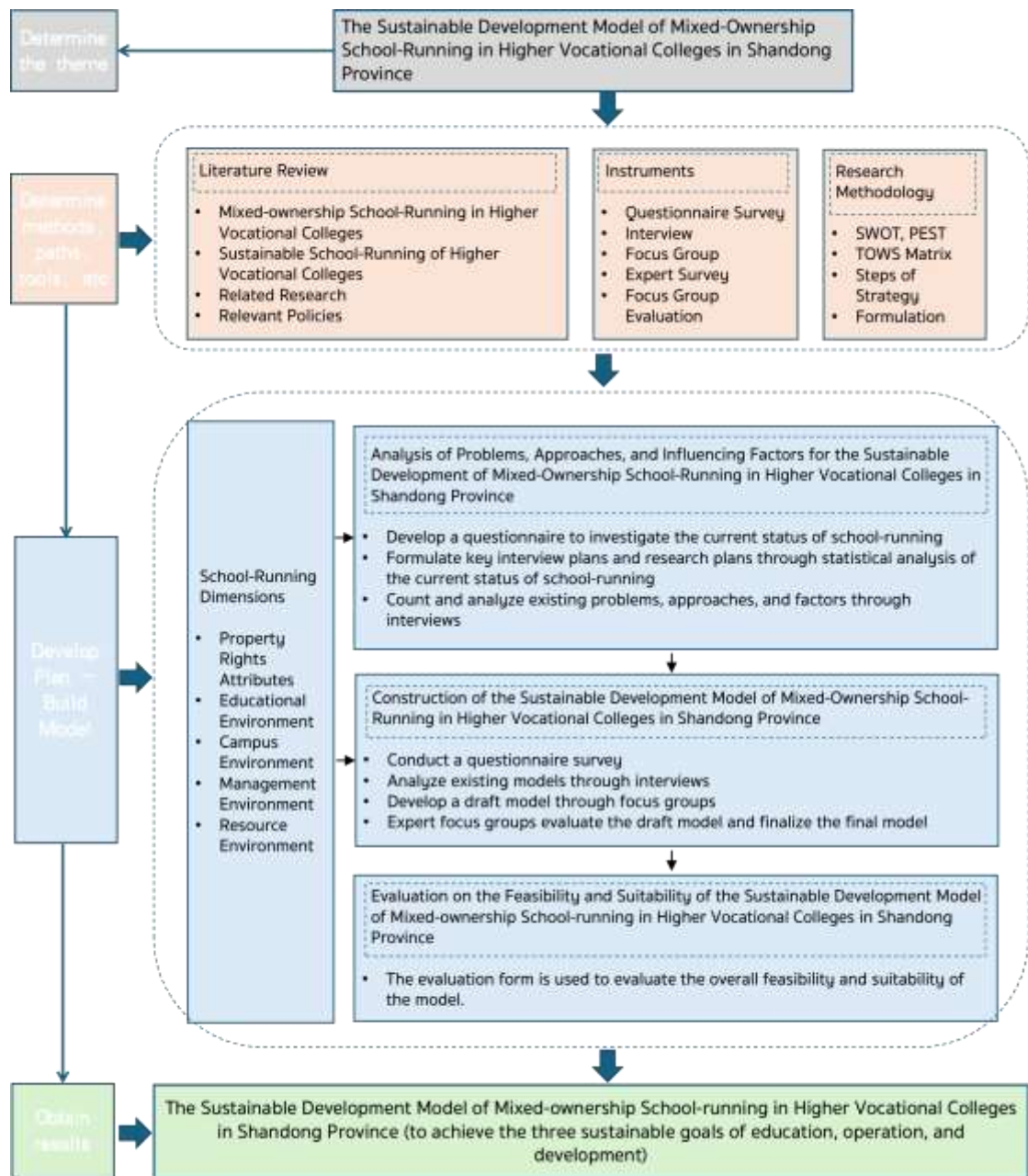


Figure 1.1 Conceptual Framework

## Chapter 2

### Literature Review

This chapter conducts a comprehensive review of relevant research. The collation and review of existing literature help lay a theoretical foundation. We explore the concepts and related research on mixed-ownership school-running in higher vocational colleges, sustainable development strategies of higher vocational colleges, and the sustainable development model of mixed-ownership school-running in higher vocational colleges. This chapter is divided into the following sub-themes:

1. Mixed-ownership school-running in higher vocational colleges
2. Sustainable development of higher vocational colleges
3. Research on the sustainable development model of mixed-ownership school-running in higher vocational colleges
4. Related Research

#### **Mixed-Ownership School-Running in Higher Vocational Colleges**

Mixed-ownership school-running in higher vocational colleges is an innovative extension of the economic concept of "mixed ownership" in the field of vocational education, and also an important path to deepen vocational education reform and promote industry-education integration. Centering on this core theme, this section sorts out the content from three dimensions—definition and significance, foreign school-running practices, and Chinese practices—systematically presenting existing research on its connotation, value, and practical models at home and abroad, so as to provide a reference for the subsequent analysis of the current status and problems of mixed-ownership school-running in higher vocational colleges in Shandong Province.

### 1.1 Definition and Significance

Definition and significance form the foundation for understanding mixed-ownership school-running in higher vocational colleges. Only by clarifying its core connotation, essential characteristics, and diverse values can we clearly grasp its development logic and practical direction. This part first defines the core definitions of higher vocational colleges and mixed-ownership school-running, then sorts out scholars' research perspectives on its essential characteristics, and finally summarizes its diverse significances for colleges, students, enterprises, and society.

Higher vocational colleges, full name of higher vocational and technical colleges. From the perspective of educational tasks, higher vocational colleges are institutions that implement higher vocational education. From the perspective of educational levels, the educational levels of vocational education in China are clearly divided in the "Vocational Education Law of the People's Republic of China", including elementary, secondary and higher levels. Higher vocational colleges are vocational colleges at the higher level. From the perspective of educational attributes, the "Higher Education Law of the People's Republic of China" clearly states that higher education in China includes higher vocational education, so higher vocational colleges are institutions with higher education and vocational education attributes. From the perspective of talent training, it is a vocational college that cultivates high-quality workers and technical and skilled talents to meet the needs of the rapid development of social economy and industrial structure. Therefore, under the guidance of national macro policies, higher vocational colleges carry out higher vocational education and employment guidance for students, and at the same time shoulder the responsibilities of ensuring educational quality, regulating school-running order and improving school-running conditions.

Mixed-ownership school-running in higher vocational education is the application of the economic concept of "mixed ownership" in the field of vocational education. It refers to the school-running of higher vocational colleges jointly funded by different types of economic components, such as state-owned capital and non-

public capital, and multiple parties jointly participate in school-running through the establishment of a coordination mechanism.

Wang Shoubin and Liu Huiping (2015) believe that mixed-ownership school-running in higher vocational colleges is an innovation and development of the current vocational education school-running model based on the practice of integration of production and education and school-enterprise cooperation.

It is believed that the essential characteristics of mixed-ownership school-running in vocational education of higher vocational colleges are mainly reflected in the diversification of school-running subjects, the dominance of state-owned capital, and the modernization of governance methods.

In addition, scholars have put forward their views on the definition and connotation of higher vocational colleges.

Fang Yiming and Dai Shiming (2021) believe that mixed-ownership industrial colleges are jointly constructed and operated by enterprises and colleges. Facing the entire industry and enterprises, they have the functions of academic upgrading, skill training and technological research and development, and even a fusion of industry and teaching with certain production functions to a certain extent.

Zhang Yu and Wang Wei (2022) proposed that higher vocational mixed-ownership industrial colleges are innovations in the organizational form of traditional public higher vocational colleges, and also important products of deepening mixed-ownership school-running in vocational education in China, with the characteristics of diversified governance systems, industrialized service orientation, and comprehensive educational functions.

In short, these views hold that mixed-ownership school-running in higher vocational colleges is an innovative application of mixed ownership in the field of education, which has changed the traditional school-running model and the governance structure of colleges. The essence of mixed-ownership school-running in higher vocational colleges is that under the guidance of the principle of benefit sharing and risk sharing, different property right subjects substantially participate in the investment and school-running of higher vocational colleges with resource

factors such as capital, knowledge, technology, management and equipment. By stimulating school-running vitality, gathering multiple resources, applying governance systems, innovating governance mechanisms, and deepening the integration of production and education, it aims to improve the level and quality of school-running, and has the characteristics of diversified property right structure, diverse governance structure and flexible operation mechanism.

Xin (2016) proposed to enhance the school-running vitality of schools by mobilizing the enthusiasm and resource advantages of enterprises and industries. This provides a solid guarantee for improving the talent training environment. mixed - ownership school-running is a booster for the development and innovation of vocational education.

Zhou Hongli and Wu Shenggang (2021) believe that the development of mixed-ownership school-running is more conducive for higher vocational colleges to be closer to the production front line, understand enterprise needs, and thus realize the positive interaction between higher vocational education and social economy.

Xia Lingya (2021) believes that mixed-ownership school-running in higher vocational colleges promotes the integration of industry and teaching. mixed - ownership school-running is the connotation embodiment of the integration of production and education and craftsman spirit, which helps schools base themselves on learning situation, teaching situation, industry and social development needs, promote the in-depth development of the integration of production and education, and thus realize the high-quality development of higher vocational education.

Chen Junpeng and Zhu Huabing (2021) believe that mixed-ownership school-running helps improve the quality of vocational education. Mixed -ownership school-running in higher vocational colleges is to promote the diversified innovation of the school-running system and mechanism of colleges, and stimulate the endogenous motivation of the integration of production and education in higher vocational education. At the same time, it is also an important measure to realize the high-quality development of vocational education.

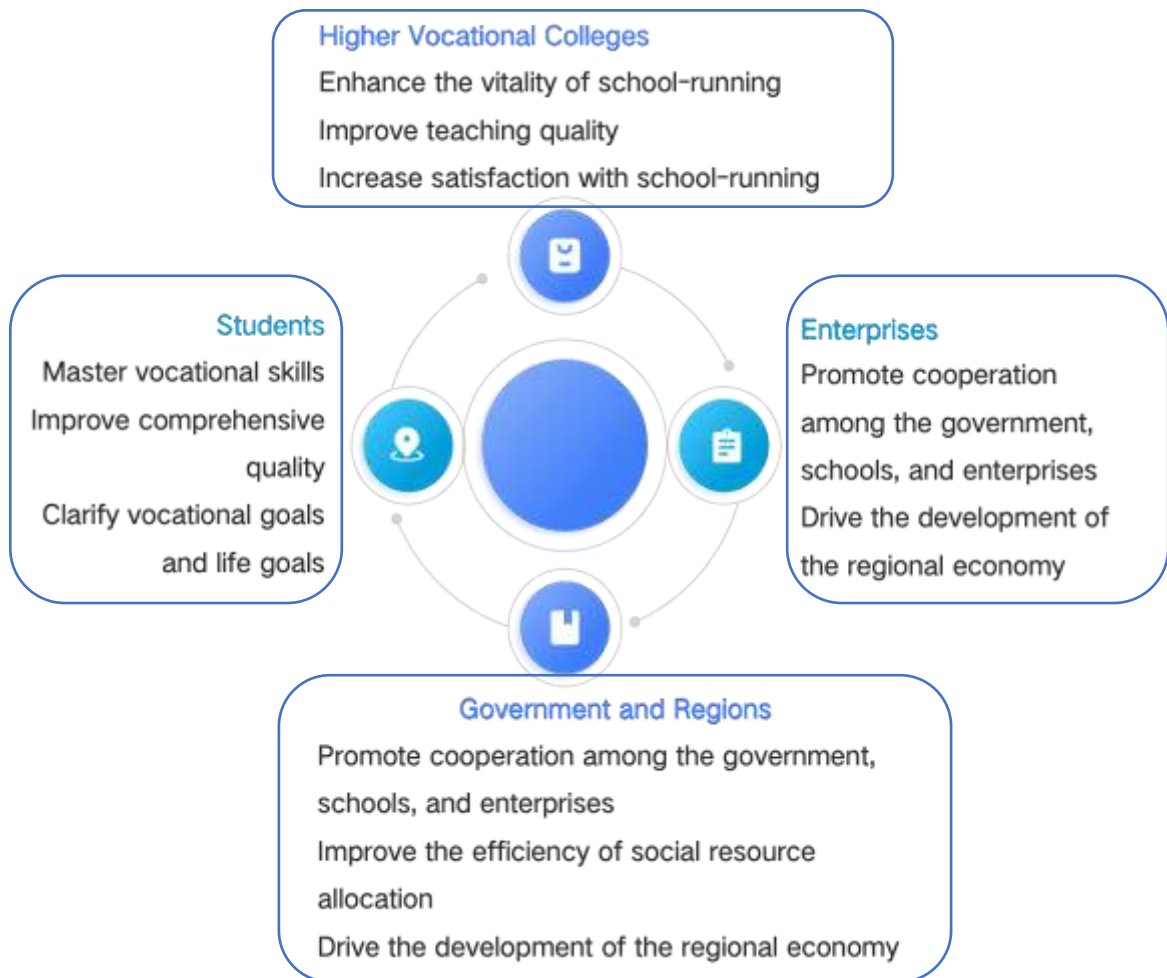
Zhang Zhiquan (2022) believes that mixed-ownership school-running helps optimize the teaching staff. With the deepening development of higher vocational education in China, higher requirements have been put forward for the teaching staff. Mixed-ownership school-running in higher vocational colleges helps promote the innovation and improvement of the teaching staff, construction methods and structure of higher vocational colleges.

Sheng Fuxiang and Pan Jianfeng (2023) believe that mixed-ownership school-running in higher vocational colleges is a new school-running model jointly participated by schools, governments and enterprises, and also an innovative practice. This innovative model breaks the traditional school-running pattern and operates the school by means of modern enterprise management.

Zhu Heqing and Li Yinghui (2024) believe that the agglomeration of multi-party resources under the pluralistic structure helps improve the drawbacks of effective resource input and resource redundancy and waste of a single subject. Through the matching and cooperation of various resources, a resource agglomeration effect is formed, which promotes the in-depth integration of educational factors and forms an inter-connected educational ecological chain, laying a solid foundation for the innovative vitality of higher vocational colleges under mixed-ownership school-running.

In a word, mixed-ownership school-running in higher vocational colleges is of great benefit to multiple stakeholders. Firstly, mixed-ownership school-running promotes the innovation and progress of colleges, stimulates school-running vitality, grasps social needs, and improves school-running quality. Secondly, mixed-ownership school-running in higher vocational colleges also promotes the education and employment of students, helps students fully master knowledge and vocational skills, and correctly establish vocational goals and life goals. Thirdly, mixed-ownership school-running in higher vocational colleges meets the talent needs of enterprises. The appropriate intervention and management of enterprises helps cultivate high-quality talent plans. Fourthly, mixed-ownership school-running in higher vocational colleges builds a cooperation bridge between the government,

schools and enterprises, and promotes the efficient utilization and effective output of social resources. Finally, mixed-ownership school-running in higher vocational colleges cultivates high-quality talents for enterprises, industries and regions, and promotes the high-quality development of regional economy. The significance of mixed-ownership school-running in higher vocational colleges is shown in Figure 2.1.



**Figure 2.1** The Advantages of mixed-ownership school-running in Higher Vocational Colleges

This section clarifies the core attributes and responsibilities of higher vocational colleges, defines the connotation of mixed-ownership school-running in higher vocational education, and sorts out scholars' consensus on its essential characteristics—including the diversification of school-running entities and the

modernization of governance methods. Meanwhile, it summarizes the diverse significances of mixed-ownership school-running: it not only stimulates the school-running vitality of colleges, optimizes the teaching staff, and deepens industry-education integration, but also achieves a multi-stakeholder win-win situation for colleges, students, enterprises, and society, laying a conceptual foundation for subsequent practical research.

### **1.2 Foreign School-Running Practices**

Although there is no explicit concept of "mixed-ownership school-running" abroad, the models adopted in their actual school-running practices are essentially consistent with the "mixed ownership" we propose. For instance, public-private cooperation models such as Germany's Dual System, American Community Colleges, British Collaborative Vocational Education, and Australian TAFE Colleges all reflect the core logic of multi-stakeholder participation and collaborative school-running, which is highly consistent with China's mixed-ownership school-running concept. The core of the mature experiences of these models lies in: government-led guarantee, in-depth participation of industries and enterprises, improved institutional systems, and close alignment between school-running and regional economic needs, providing important reference for the practice of mixed-ownership school-running in China's higher vocational colleges.

Due to the differences in economic systems and development histories of various countries, the forms reflected in vocational education are also different. There is no clear "mixed-ownership school-running" in foreign vocational education, but the public-private cooperative school-running abroad is similar to it. Developed countries have accumulated relatively mature and effective models of integration of production and education and school-enterprise cooperation in the application and development of vocational education. Their experiences and lessons have important reference significance for the development of mixed-ownership school-running model in China.

The concept of mixed-ownership school-running does not appear in Germany; instead, the construction of the "dual system" model in vocational education is

similar to it. Vocational education in Germany is the core of its higher education. It uses enterprise resources to cultivate the technical talents it needs, and these talent resources in turn promote the improvement of enterprise strength. Germany's dual system, characterized by joint governance by schools and enterprises, shares the core logic of multi-subject collaboration with mixed-ownership school-running". Germany supports the system of school-enterprise cooperative school-running at the national level and promotes it to the national vocational education school-running, becoming the main model of national vocational education school-running.

The school-running model similar to "mixed-ownership school-running" in the United States is another school-running model combining schools with enterprises or communities - community colleges, where the school-running subjects are schools, communities and enterprises. In this school-running model, the college formulates its construction purpose and training objectives according to the economic development and needs of the community, and the purpose of students receiving college education is also to work and live in the community. It combines classroom education with productive work experience, thus forming a cooperative partnership between students, schools and enterprises. Therefore, the construction purpose of the college and the learning purpose of students are very clear, both around the development and construction of the community, serving the economic and industrial development of the local community (Liu, 2019).

The public-private cooperative vocational education in the United Kingdom has similar characteristics to mixed-ownership school-running, which they call "collaborative vocational education". It is a college directly under the British Department for Education jointly established by the state and enterprises. In this school-running model, the teachers and students of vocational schools are all from enterprises, the public facilities required for school-running are supported by the school, enterprises provide relevant material resources according to professional teaching, and both schools and enterprises jointly participate in the setting of courses. It is a relatively sound cooperative model of private capital investment in public school-running. There is a clear distinction between commercial profit and

non-commercial profit in the development of higher education in the United Kingdom. The reasonable governance of university charters, the separation between investors and ownership.

Zhu Qianqian (2021) proposed that the United Kingdom has formulated relevant policies for mixed-ownership school-running at the national level, sorted out the internal governance mechanism of mixed ownership, and steadily promoted the pilot application of mixed-ownership school-running in secondary colleges, so as to build a development path to resolve conflicts and contradictions.

The Australian TAFE (Technical and Further Education) model organically integrates the government, industry, enterprises and schools, highlights the leading role of industry and enterprises, and jointly participates in all links of TAFE college school-running. TAFE is the vocational education and training department in Australia's education system. Its main goal is to provide technical and vocational training, and provide students with the organic combination of practical skills and theoretical knowledge. It has flexible curriculum settings, focuses on practical teaching and employment training, and cultivates students' practical skills and vocational competitiveness.

In summary, after years of theoretical research and practical exploration, vocational education in developed countries has formed a mature system of integration of production and education with improved systems, government guidance, multi-party participation and coordinated development, which has effectively promoted the common progress of vocational education and economic industries.

Zhu Qianqian (2021) believes that most of the public-private cooperative school-running models of foreign vocational education are led by the national government. The society, industries and enterprises invest corresponding school-running resources in vocational colleges to jointly serve the economic development of the society or region. This model of higher vocational education development highly in line with the needs of economic development is worthy of our learning.

**Table 2.1** Relevant Practices of Mixed-Ownership School-Running in Higher Vocational Colleges Around the World

Country	Name	Participating Subjects	Content
Germany	Dual System	Colleges, Enterprises, Government	Higher Vocational Colleges use enterprise resources to cultivate the technical talents they need, and these talent resources in turn promote the improvement of enterprise strength.
USA	Community College	Colleges, Communities, Enterprises	Colleges formulate their construction goals and training objectives according to the economic development and needs of the community, and cultivate talents needed by enterprises and communities.
UK	Cooperative Vocational Education	Government, Enterprises, Colleges	The teachers and students of the vocational school are all from enterprises, the public facilities needed for school-running are supported by the school, the enterprises provide relevant material resources according to professional teaching, and the school and enterprises jointly participate in the curriculum setting.

Table 2.1 (Continued)

Country	Name	Participating Subjects	Content
Australia	TAFE College	Government, Industry, Enterprises, Schools	TAFE focuses on vocational education and training, with the main goal of providing technical and vocational training. It highlights the leading role of industry and enterprises and jointly participates in all aspects of TAFE college school-running.
China	Mixed Ownership	Government, Enterprises, Colleges	It is a new type of school-running model jointly invested, established, governed and developed by the government, society, enterprises or individuals and colleges.

In summary, public-private cooperation models in vocational education in developed countries such as Germany, the United States, the United Kingdom, and Australia (e.g., Germany's Dual System, American Community Colleges) are well-established. These models have been tested and optimized through long-term practical exploration, forming a systematic and operable framework. Their practices in industry-education integration and school-enterprise collaboration—covering participating subjects, core content, and operational logic—have yielded refined experiences. In particular, their effective mechanisms for resource integration, quality assurance, and interest coordination provide actionable insights for addressing key challenges in China's mixed-ownership reform. Characterized by government leadership and multi-stakeholder participation, these experiences are highly aligned

with economic development needs and thus hold significant reference value for the mixed-ownership school-running of higher vocational colleges in China.

### **1.3 Practice in China**

Mixed-ownership school-running in China's higher vocational colleges has developed on the basis of drawing on foreign experiences and aligning with the needs of domestic vocational education reform. Through years of continuous exploration and practice, it has formed development models with distinct Chinese characteristics that adapt to the country's institutional context. This section first systematically sorts out the development foundation of mixed-ownership school-running in China, then focuses on analyzing two academically recognized core models—"small-scale mixed" and "large-scale mixed". It clarifies their characteristics, practical forms, advantages and disadvantages, and comprehensively presents the current status of mixed-ownership school-running practice in China.

Prior to the explicit proposal of mixed-ownership school-running in higher vocational colleges, many domestic institutions of higher education had already exhibited mixed-ownership characteristics, such as school-enterprise cooperation and the provision of practical training bases, laying a preliminary foundation for the subsequent formalization and promotion of the model.

Luo Ruzhen et al. (2022) proposed that distinguishing whether a higher vocational college adopts mixed-ownership school-running lies in determining whether there are other types of capital besides state-owned capital participating in the school's operation. Due to differences in national conditions and years of localized development, similar school-running models have evolved with distinctive features in China.

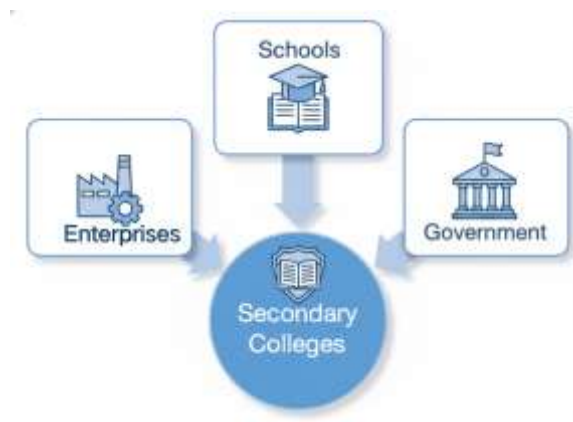
Mixed-ownership school-running in higher vocational colleges can be classified in various ways according to different criteria. Among these classifications, the division into "large-scale mixed" and "small-scale mixed" has gained widespread recognition and acceptance in academic circles.

1.3.1 "Small-Scale Mixed" Model of School-Running with Social Subject Participation

Shortly after the proposal of mixed-ownership school-running in higher vocational colleges, due to the novel concept and lack of practical experience, many higher vocational colleges did not dare to carry out large-scale application. Most higher vocational colleges chose to conduct pilots in secondary colleges, do small-scale experiments, and consider in-depth mixing when the pilots are mature.

Hardy and Liu (2022) believe that "small-scale mixed" refers to cooperation at the level of secondary colleges or projects. By allowing other social subjects to jointly participate in the school-running of colleges, it promotes the release of innovative vitality of schools. Improve the participation of the two subjects in the school-running of secondary colleges, and gradually form a "school + enterprise" model based on benefit sharing.

The organizational structure of the "small-scale mixed" model is shown in Figure 2.2 below.



**Figure 2.2** "Small-Scale Mixed" Model of Mixed-Ownership School-Running in Higher Vocational Colleges

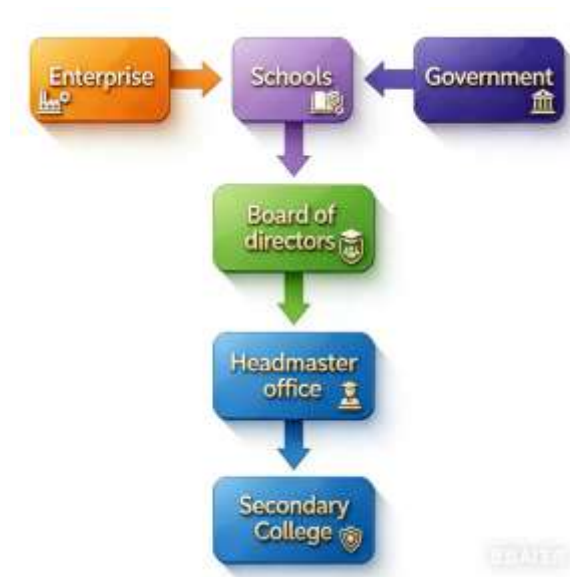
The "small-scale mixed" model mainly consists of two models. The first is to promote the cooperation of "production, teaching and research" by setting up experimental centers and training bases in schools. Enhance the professional resources of the school, promote the practicality of academic research, and narrow the distance from talent training to application. The other is the "enterprise + government" model focusing on higher education and the "school + government +

enterprise" model aiming at promoting industry development. It is mainly to cultivate applied talents, such as Huawei ICT Academy and Dingli Academy of Sichuan Changjiang Vocational College. The "small-scale mixed" model is the initial form of mixed-ownership school-running in higher vocational colleges, with limited cooperation intensity and radiation scope.

Lu Wuxia (2021) believes that "small-scale mixed" does not require higher vocational colleges to carry out large-scale application and large-scale investment from social forces, and the equity structure only changes slightly or not. Therefore, "small-scale mixed" is also the model chosen by most higher vocational colleges for mixed-ownership school-running, with small risks and small returns.

### 1.3.2 "Large-scale Mixed" Model of Social Subject Investment-oriented School-running

Compared with "small-scale mixed", "large-scale mixed" is manifested in deeper cooperation and closer connections. "Large-scale mixed" refers to the mixing of different property right subjects at the level of property right system. Different capitals invest in higher vocational colleges and jointly operate higher vocational colleges. There are mainly two ways of investing in shares: capital contribution and indirect investment. Capital contribution means that enterprises and the government directly invest in shares by means of appropriations and checks. Compared with capital contribution, indirect investment has more abundant forms, converting various resources such as technology, management and knowledge into shares to participate in school-running. For example, Suzhou Industrial Park Vocational and Technical School and Shandong Chemical Engineering Vocational College. The investment-oriented model is an upgraded model of "small-scale mixed", which breaks the drawbacks of small scope. The organizational structure of the "large-scale mixed" model is shown in Figure 2.3.



**Figure 2.3** The "Large-scale Mixed" Model of Mixed-Ownership School-Running in Higher Vocational Colleges

Most "large-scale mixed" models re-establish a board of directors to formulate all policies and rules and regulations of the school. The board of directors is composed of representatives elected by each subject according to the proportion of capital contribution, which to a certain extent mobilizes the enthusiasm of various school-running subjects and balances the interests of various interest groups. The president's office is set up under the board of directors. The president is elected by the board of directors, whose main responsibility is to implement the decisions of the board of directors and manage the daily work of the school. In this way, the decision-making power and administrative power are separated, avoiding the situation of one dominant party. The thorough implementation of mixed-ownership school-running in higher vocational colleges can greatly change the original drawbacks of colleges and present a new situation. However, its equity structure changes greatly, and even the control right is easy to deviate, so there are certain risks, which will be carefully considered in actual practice.

On the whole, after years of development, mixed-ownership school-running in higher vocational colleges has derived different development models and shown positive characteristics such as deeper cooperation, more comprehensive cooperation and more inclusive cooperation. The transformation from "small-scale mixed" to "large-scale mixed" not only indicates that the level of multi-subject participation in the school-running of higher vocational colleges has deepened, but also that deeper cooperation has increased the right to speak of multi-subjects, prompting the application of higher vocational colleges to move towards a market-oriented and scientific direction and gradually show the advantages of joint decision-making in mixed ownership. The cooperation between subjects also presents the characteristics of diversification and multi-faceted. On the basis of long-term planning, there are different degrees of cooperation in strategy formulation, teaching, experiment and practice, student employment, campus construction and school affairs outsourcing, striving to achieve win-win results for multi-subjects. The process of mixed-ownership school-running in higher vocational colleges also reflects a more inclusive feature, not only in the inclusiveness of multiple subjects, from government subjects to enterprise subjects, grass-roots organization subjects and group organization subjects, etc.

Yuan Mingshuo and Zhang Zhikang (2021) also proposed other classification methods. For example, divided by cooperation mode, they are: mixed-ownership vocational colleges with independent legal person status, mixed-ownership vocational departments with secondary legal person status of the school, and school-enterprise cooperation at the non-legal person level.

Fan Lin and Deng Zhongbo (2021) proposed that it can also be divided according to the construction model: multi-investment school-enterprise mixed co-construction model, mixed-ownership secondary industrial college model, hierarchical undertaking system development model and joint promotion system development model.

In practice, mixed-ownership school-running in China's higher vocational colleges has developed core development models centered on "small-scale mixed"

and "large-scale mixed", which present distinct gradient development characteristics. Through years of exploration and iteration, these models have become flexible options for institutions at different stages of development: "small-scale mixed" mainly focuses on cooperation at the secondary college or project level, featuring low risks and low thresholds, making it the preferred pilot choice for most colleges; "large-scale mixed" delves into the property rights level, enabling closer cooperation and stronger vitality, yet it faces potential risks of equity structure adjustment. In addition, scholars have proposed various classification methods, which not only reflect the diversity and flexibility of mixed-ownership school-running practices in China but also indicate the trend of its development from initial pilot projects to in-depth advancement.

This section systematically sorts out the definition, essential characteristics, and diverse significances of mixed-ownership school-running in higher vocational colleges, and conducts a comparative analysis of the mature experiences of foreign public-private cooperative vocational education practices and China's "small-scale mixed" and "large-scale mixed" practical models. The study finds that mixed-ownership school-running is an important path for the innovative development of vocational education. Foreign experiences provide a valuable reference direction of "government-led, multi-stakeholder participation, and industry-education synergy" for China, while China's practical models are closely aligned with the reality of domestic vocational education, showing the characteristics of gradient development and diverse forms. This not only enriches the practice of vocational education reform but also lays a solid practical foundation for the subsequent research on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province.

### **Sustainable Development of Higher Vocational Colleges**

The sustainable development of higher vocational colleges is a core requirement for the high-quality development of vocational education and an important goal orientation of mixed-ownership school-running—one of the core

values of mixed-ownership school-running is to inject new momentum into the sustainable development of higher vocational colleges. Centering on the sustainable school-running of higher vocational colleges, this section expands from three dimensions: connotation and characteristics, importance, and the correlation between sustainable development and mixed-ownership development. It clarifies the core requirements of the sustainable development of higher vocational colleges, sorts out its internal logic with mixed-ownership school-running, and provides theoretical support for the construction of the sustainable development model in the following text.

### **2.1 Connotation and Characteristics**

Clarifying the connotation and characteristics of the sustainable development of higher vocational colleges is the foundation for grasping their development laws and formulating development strategies. This part first defines the core connotation of the sustainable development of higher vocational colleges, then sorts out their essential core characteristics by integrating existing literature, and clearly presents the essential requirements and development direction of the sustainable development of higher vocational colleges.

Higher vocational education is a subsystem closely related to the external environment of the entire social system. The sustainable development of society depends on the sustainable development of higher vocational education. The sustainable development of higher vocational colleges should establish a people-oriented concept, build a harmonious development operation mechanism, and cultivate talents with sustainable development capabilities. The sustainable development of higher vocational colleges is based on the sustainable development and utilization of educational resources, and takes the coordinated development with economy and society and the construction of a harmonious educational environment as the premise. The sustainable development of higher vocational colleges includes three aspects: people-centered goals, coordinated development of internal structure, and coordinated development with the external environment.

For the development of higher vocational education, the characteristic of sustainability means that the development of higher vocational colleges should be consistent with the external environment, and always be moderately ahead in the current and long-term periods. It should not only meet the requirements of the economy and society for vocational education, but also consider the new needs that changes in the long-term economy and society may have on future educated persons.

Combined with the definition, structure and connotation characteristics of the sustainable development of higher vocational colleges, and referring to existing literature, the sustainable development of higher vocational colleges should include the following characteristics.

2.1.1 Sustainability. Zhou Bin (2021) proposed that sustainability is the basic characteristic of the development of higher vocational colleges, which reflects the dynamics and long-term nature of sustainable development. The sustainability of the development of higher vocational colleges mainly includes the sustainability of various elements within the higher vocational education system and the sustainability of various influencing elements in the external environment.

2.1.2 Fairness. Luo Jing and Zhang Zhen (2024) believe that fairness refers to the equality of opportunity choice. That is to say, the education of higher vocational colleges should be based on meeting people's basic educational requirements, and promote the sustainable development of more effective resource allocation and more fair educational results. This reflects the concept of higher vocational colleges continuously serving the society.

2.1.3 Stability. The sustainable development of higher vocational colleges is inseparable from a relatively stable internal and external development environment. The development of higher vocational colleges is not only the pursuit of temporary scale expansion, but also the pursuit of long-term and effective sustainable development. Therefore, current higher vocational colleges should avoid crises caused by blind expansion, follow the objective laws of educational

development, and promote the sustainable development of higher vocational colleges.

2.1.4 Innovation. Huang Li (2020) proposed that the requirements of society and enterprises for students' vocational abilities are constantly improving, so the curriculum settings and training models of higher vocational colleges should also be changed in a timely manner. Through innovative teaching and innovative curriculum system settings, continuously cultivate students' comprehensive abilities and promote students' targeted development.

2.1.5 Suitability. As an integral part of the social ecology, higher vocational education adapts to and coexists harmoniously with the external environment. The social and economic environment is constantly changing, so higher vocational education should also be updated and developed in a timely manner to continuously adapt to the needs of the external environment. This is also an important manifestation of the long-term sustainable development capacity of higher vocational colleges.

2.1.6 Ethics. Li Yuan (2021) believes that as an economic and social organization, higher vocational colleges have public welfare and assume certain social functions and responsibilities. Therefore, the sustainable development of higher vocational colleges must adhere to ethics, adhere to social responsibility and educational mission. Whether in school-running or education, values and professional ethics should be implemented to ensure and promote the physical and mental health of teachers and students. Only in this way can the school achieve sustained and coordinated development and always maintain a growth and development trend in line with social ethics.

Therefore, the sustainable development of higher vocational colleges needs to conform to sustainability, fairness, stability, innovation, suitability and ethics. Thus, it promotes the sustainable development of human resources in higher vocational colleges and better meets the training needs of contemporary vocational and technical talents.

This section clarifies the core connotation of the sustainable development of higher vocational colleges—based on the sustainable utilization of educational resources and premised on coordinated development with the economy and society, it covers three core aspects: "people-centered, coordinated internal structure, and coordinated external environment". Meanwhile, it summarizes six core characteristics: sustainability, fairness, stability, innovation, suitability, and ethics. These six characteristics are interrelated and indispensable, jointly forming the evaluation criteria and practical orientation for the sustainable development of higher vocational colleges.

## **2.2 Importance**

As the core position for cultivating technical and skilled talents, the sustainable development of higher vocational colleges is not only related to the improvement of their own school-running quality but also has an important impact on socio-economic development and industrial upgrading. Drawing on existing literature, this section sorts out the importance of the sustainable school-running of higher vocational colleges from multiple dimensions such as talent cultivation, industrial upgrading, and economic development, highlighting its epochal value.

With the surge of China's economy, higher vocational colleges have played an important role. With the continuous expansion of the enrollment scale of higher vocational colleges, the rationalization of professional settings, and the regularization of international exchanges, it has effectively promoted the development of professional characteristics and the improvement of service awareness of higher vocational colleges, and transported a large number of high-quality and comprehensive high-end skilled talents for high-tech enterprises. Li Yonghua and Guo Zhiqiang (2021) believe that these progress and development have laid the foundation for higher vocational colleges to improve school-running quality, achieve high-quality development, and enhance their core competitiveness.

Zhang Qiang (2023) proposed that the sustainable development of higher vocational colleges helps improve the talent training structure. The implementation of sustainable development in higher vocational colleges plays an indispensable role

in adjusting the social talent structure, improving the level of skilled talents, and carrying out elite education and training.

Zhou Jianmei (2021) proposed that the sustainable development of higher vocational colleges helps promote industrial structure upgrading. The implementation of high-quality development in higher vocational colleges is of great significance and far-reaching impact for promoting China's economic transformation in the new era.

Deng Xiaohua and Fu Chuan (2023) believe that the sustainable development of higher vocational colleges helps promote the high-quality development of the economy. High-quality skilled talents are the foundation of economic development. At present, China's economy is growing continuously, and the demand and requirements for labor are increasing day by day. The sustainable development of higher vocational colleges and the continuous training of talents have important strategic significance for promoting the rapid and sustainable development of China's economy.

The sustainable school-running of higher vocational colleges bears profound epochal value and strategic significance against the backdrop of national industrial transformation and the comprehensive reform of vocational education. Not only does it drive the improvement of their own school-running quality and enhance core competitiveness, but it also effectively optimizes the social talent cultivation structure and promotes industrial structure upgrading. By cultivating a steady stream of high-quality technical and skilled talents, it effectively bridges the structural talent gap between educational supply and industrial demand, serving as a pivotal measure to connect education with the economy and propel the high-quality development of vocational education.

### **2.3 Sustainable Development and Mixed-ownership Development**

There is a close internal correlation between mixed-ownership school-running and the sustainable development of higher vocational colleges, forming a mutually reinforcing symbiotic relationship that underpins high-quality development: mixed-ownership school-running provides diversified momentum for sustainable

development by integrating multi-stakeholder resources and mechanisms, while sustainable development clarifies a clear goal orientation for mixed-ownership school-running with a long-term perspective. Drawing on existing literature, this section sorts out the internal correlation between the two, decomposes the sustainable mixed-ownership development of higher vocational colleges into three core dimensions, clarifies their specific connotations, and clarifies the logic of their coordinated development, laying a theoretical foundation for subsequent model construction.

Based on the concept, connotation, and characteristics of the sustainable development of higher vocational colleges, and referring to existing literature, the sustainable mixed-ownership development of higher vocational colleges is a systematic project that requires the coordination of multiple elements and mechanisms, covering sustainability in various aspects. It can be summarized into three dimensions, as shown in Figure 2.4.

#### 2.3.1 Educational Sustainability

Educational sustainability takes talent cultivation as its core. Through the training provided by higher vocational colleges under mixed-ownership development, students can acquire the vocational competencies and employability skills required by society and enterprises, develop good professional quality and literacy, and thus promote their long-term sustainable development—equipping them with the adaptability to thrive in dynamic industrial environments (Tao & Wang, 2021).

#### 2.3.2 Operational Sustainability

Operational sustainability mainly involves the coordinated development of the internal structure of the higher vocational college system. Multiple forces participate in school-running, with in-depth integration of diverse resources to enhance resource utilization efficiency and stimulate school-running vitality. In addition, it promotes the balanced development of school-running scale, management structure, educational quality, and efficiency benefits under mixed-ownership development, realizing a balanced advancement of scale expansion and quality improvement (Liu & Chen, 2020).

### 2.3.3 Developmental Sustainability

Developmental sustainability refers to the coordination of the external environment of the higher vocational college system. Specifically, it involves establishing long-term cooperative mechanisms with external governments, enterprises, industries, and communities, building a long-term win-win cooperation platform, and leveraging the advantages of resource agglomeration to foster synergistic development among multiple stakeholders (Sheng & Pan, 2023).

Therefore, mixed-ownership development provides new momentum for the sustainable development of higher vocational colleges. By aligning with industrial upgrading trends, it exerts a positive impact on the development of industrial colleges in aspects such as multi-relationship embedding and subject collaborative symbiosis. Centering on the needs of economic industries, industrial colleges of higher vocational colleges explore the operational mechanism of mixed-ownership industrial colleges, construct a multi-coordinated teaching curriculum system, and establish a teacher integration mechanism. These efforts collectively promote the sustainable and innovative development of higher vocational colleges, bridging the gap between vocational education and industrial demands.



**Figure 2.4** Connotations of Sustainable Development  
School-Running and Sustainable Development

Mixed-ownership development and the sustainable development of higher vocational colleges maintain a mutually supportive and synergistic symbiotic relationship, forming an interdependent ecosystem that drives high-quality development: mixed-ownership school-running injects diversified resources and vitality into the sustainable development of higher vocational colleges, while the sustainable development of higher vocational colleges clarifies the three core goals of "educational sustainability, operational sustainability, and developmental sustainability" for mixed-ownership school-running. Among them, educational sustainability focuses on talent cultivation, operational sustainability on internal coordination, and developmental sustainability on external linkage. These three dimensions jointly constitute a systematic framework for the sustainable mixed-ownership development of higher vocational colleges.

This section clarifies the connotation, six core characteristics, and diverse significance of the sustainable school-running of higher vocational colleges, sorts out its internal correlation with mixed-ownership development, and proposes the three sustainable dimensions of "educational sustainability, operational sustainability, and developmental sustainability". Research shows that the sustainable development of higher vocational colleges is a core requirement for the high-quality development of vocational education, while mixed-ownership school-running is an important pathway to achieve this goal. Their coordinated development not only promotes the improvement of the colleges themselves but also serves industrial upgrading and high-quality economic development, laying a solid theoretical foundation for bridging theoretical exploration and practical application and providing goal orientation and a theoretical framework for constructing the sustainable development model of mixed-ownership school-running in the following text.

### **Research on the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges**

The sustainable development model of mixed-ownership school-running in higher vocational colleges is the core carrier connecting mixed-ownership school-running practices and sustainable development goals, and constructing a scientific and feasible model is one of the core objectives of this study. Centering on this core, this section sorts out the content from three aspects: existing problems and corresponding solutions, core influencing factors, and existing models in China, clearly presenting the achievements and shortcomings of existing research, and providing reference and support for constructing the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province in the following text.

#### **3.1 Problems and Measures**

Although mixed-ownership school-running in higher vocational colleges has achieved certain results in practice, it still faces many dilemmas that restrict its sustainable development. These challenges are both universal in vocational

education reform and specific to the mixed-ownership context. This part sorts out the core problems in mixed-ownership school-running practices mentioned in existing literature and summarizes the targeted solutions proposed by scholars, providing a reference for analyzing relevant problems of higher vocational colleges in Shandong Province and formulating supporting strategies in the following text.

The mixed-ownership school-running model of higher vocational colleges is a win-win move for schools, governments and enterprises. It enhances the vitality and enthusiasm of colleges and universities in school-running, meets the demand for high-quality talents of enterprises, and provides endogenous motivation for the high-quality development of local economy. In recent years, local education administrative departments and some vocational colleges have actively explored the application of mixed-ownership school-running. Higher vocational colleges in Shandong, Jiangsu, Jiangxi and other places have taken the lead in carrying out mixed-ownership school-running pilots and achieved certain results. However, some problems have emerged in the application process that need to be solved urgently.

Luo Qiao et al. (2021) observed that in the process of the development of mixed-ownership school-running, higher vocational colleges are facing problems such as weak teachers' quality, single teaching materials and methods, waste of experimental and training resources, and insufficient in-depth school-enterprise cooperation. To effectively implement mixed-ownership school-running, it is suggested that schools should take advantage of the unique advantages of mixed-ownership school-running, and with the assistance of enterprises, continuously promote and deepen the integration of production and education and school-enterprise cooperation. Thus, improve the quality of vocational education and students' entrepreneurship and employment ability, and improve the quality of talent training.

Zheng Rongyi and Jiang Xinge (2021) found that under the background of deepening the integration of production and education, modern industrial colleges have shown a rapid development trend, but they also face problems such as vague construction strategies, backward governance systems, and rigid talent training

models. Therefore, efforts should be made to build a new path for the construction of modern industrial colleges that integrate higher vocational colleges and enterprises, realize multi-subject coordination, co-construction and co-governance, and combine education and training.

Zhang Chuanyong and Bian Yuwei (2022) believe that in the process of mixed-ownership school-running in higher vocational colleges, there are difficulties such as imperfect laws and regulations, low enthusiasm of enterprises, and insufficient integration of schools and enterprises. In the future, the countermeasures to strengthen the construction of mixed-ownership secondary colleges in higher vocational colleges include: improving laws and regulations; increasing incentives for enterprises; establishing and improving the corporate governance structure.

Ping Xianbing and Yi Zhiheng (2022) found that in the process of promoting the collaborative governance of mixed-ownership school-running in higher vocational colleges, there are still difficulties in thinking cognition, demands for rights and resources, and willingness to cooperate. To improve the collaborative governance capacity of mixed-ownership in higher vocational colleges, we should improve the governance system, consolidate the basic guarantee for the collaborative governance of mixed-ownership in higher vocational colleges; realize benefit sharing, enhance the willingness to cooperate in the collaborative governance of mixed-ownership in higher vocational colleges; optimize the governance mechanism, and enhance the capacity of collaborative governance of mixed-ownership in higher vocational colleges.

These problems are urgent to be solved in the development of mixed-ownership school-running in higher vocational colleges, which hinder sustainable development, but they are also the key points that higher vocational colleges need to pay attention to in their future development. The opinions of academic circles also provide valuable suggestions for the sustainable development of mixed-ownership school-running in higher vocational colleges.

Existing research indicates that mixed-ownership school-running in higher vocational colleges faces various dilemmas in practice, mainly focusing on teachers' quality, school-enterprise integration, governance systems, laws and regulations, and enterprises' enthusiasm. To address these issues, scholars have proposed targeted measures such as deepening industry-education integration, improving laws and regulations, optimizing governance structures, and strengthening enterprise incentives. These achievements provide important reference for the subsequent analysis of existing problems in mixed-ownership school-running in higher vocational colleges in Shandong Province and the formulation of supporting implementation strategies.

### **3.2 Influencing Factors**

The sustainable development of mixed-ownership school-running in higher vocational colleges is affected by multiple factors. Clarifying these core influencing factors is a prerequisite for constructing a scientific and feasible sustainable development model. Drawing on existing literature, this part sorts out the core influencing factors for the sustainable development of mixed-ownership school-running, and analyzes the specific connotations and influence mechanisms of each factor one by one, providing a basis for the dimension design of the subsequent model construction.

Higher vocational education is an important part of the modern vocational education system. The connotative development of higher vocational education needs to be guaranteed by the quality of talent training.

Deng Zemin and Li Xin (2021) pointed out that under the background of the integration of production and education and school-enterprise cooperation, mixed-ownership school-running has become a new way for higher vocational colleges to apply, with multi-subjects participating in school-running and jointly cultivating high-tech and skilled talents. In this model, more subjects and elements are involved.

Chen Xiaozhong (2022) believes that the construction process of mixed ownership in higher vocational colleges is actually the result of the interaction or multiple interactions between macro systems and micro behavioral logic. The

government, enterprises and higher vocational colleges are the core actors in the construction of mixed ownership. Therefore, the sustainable development and operation of mixed-ownership school-running in higher vocational colleges are closely related to many factors.

Summarizing existing literature, the influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges studied in existing research can be roughly divided into property right attributes, educational environment, campus environment, management environment and resource environment.

### 3.2.1 Property Right Attributes

Property rights attributes are the core characteristic of mixed-ownership school-running and the primary factor influencing its sustainable development. The key lies in clarifying the ownership attribution, benefit distribution, rights and obligations of multiple subjects to achieve win-win collaboration among them. Guo (2018) argued that multiple subjects of mixed-ownership school-running should perform their duties in their respective positions to realize the long-term and effective operation of mixed-ownership development in higher vocational colleges. He emphasized that under different interest goals, it is necessary to find the balance point of interests of stakeholders, build a consultation and communication mechanism and platform of "joint discussion, co-construction, and sharing", and meet the interest demands and needs of multiple subjects.

Zhu Hongxiang (2021b) believes that benefit distribution plays an important role in the mixed-ownership school-running of higher vocational colleges. Asset evaluation and property right transfer are key links for social capital to participate in the mixed-ownership school-running of higher vocational colleges, and also their core interest concerns. Asset evaluation should be based on application objectives and ensure an objective and fair evaluation stance.

Regel et al. (2022) believe that the mixed-ownership development of higher vocational colleges involves multiple subjects and diverse interests, including

main stakeholders such as enterprises, governments, universities, students, and venture capital enterprises.

Zheng Yue and Qu Caixin (2022) believe that the interest balance of multiple subjects is the endogenous driving force for the mixed-ownership development of higher vocational colleges, and the rationality of the corresponding authorization of functions, benefit distribution and withdrawal mechanism is the key to realizing interest balance.

### 3.2.2 Educational Environment

The educational environment serves as the external support for the sustainable development of mixed-ownership school-running. Its core refers to the talent cultivation environment formed by the connection between colleges and enterprises, industries, and the market, directly affecting the quality of talent cultivation and the adaptability between school-running and industries. Qin Feng (2021) argued that higher vocational colleges under mixed-ownership school-running can better grasp market trends and industry needs due to enterprise participation in school-running. Therefore, they combine these needs with talent cultivation and formulate corresponding curriculum systems and training plans.

Wu Wei (2023) believes that under mixed-ownership school-running, teachers go to enterprises to understand the real needs of enterprises and have front-line work experience, which can provide better guidance for students; while enterprise supervisors also integrate into teaching life to help students with the practice of educational projects such as curriculum systems and practical projects.

### 3.2.3 Campus Environment

The campus environment is the internal support for the sustainable development of mixed-ownership school-running. Its core refers to the college's own teaching environment, school-running philosophy, and atmosphere of industry-education integration, directly influencing teaching quality and the enthusiasm of teachers and students to participate in mixed-ownership school-running. Xie Zhixin and Gong Lanfang (2022) held that the campus environment is the direct support for teaching and is related to the level of teaching quality. Therefore, the campus

environment of higher vocational colleges under mixed-ownership development is also crucial for sustainable development.

Fan Weili (2023) believes that the mixed-ownership development of higher vocational colleges is not only a change in ownership, but the core and key link should be the construction of the core field of higher education. Jointly formulate professional talent training plans and curriculum systems to provide a more convenient and modern teaching environment for teachers and students.

Sheng Fuxiang and Pan Jianfeng (2023) believe that we should vigorously promote the integration of production and education, promote the comprehensive collaborative cooperation of "schools, governments and enterprises", build an integrated platform of "production, teaching and research", and promote the high-quality development of higher education. Shorten the distance between school students and talents needed by society, and solve the "last mile" from teaching to production.

#### 3.2.4 Management Environment

As the operational guarantee for the sustainable development of mixed-ownership school-running, the management environment primarily refers to an institution's governance structure, management systems, and employment mechanisms—key elements that directly affect school-running efficiency and the collaborative effect of multiple subjects. Serving as the institutional cornerstone for the efficient operation of mixed-ownership initiatives, it plays a pivotal role in balancing interests and standardizing processes. Li Zengjun et al. (2021) argued that after the innovation and restructuring of higher vocational colleges, the new property right structure and governance system are confronted with multiple challenges, which may involve decision-making efficiency, interest coordination, and other aspects. Improving various management systems is conducive to reducing conflicts, and this can be achieved by establishing a board of directors system, a person-in-charge management system, and a withdrawal mechanism in advance to ensure the smooth operation of school-running.

Duan Ming (2021) proposed that a joint human resource management mechanism should be established to build a high-level teaching team and promote a flexible employment mechanism. Introducing a performance appraisal system to determine salaries can effectively enhance the enthusiasm of faculty and staff, while setting up special financial accounting and asset management departments to ensure transparent and public accounts helps standardize human and financial operations.

Li Yunlong et al. (2022) emphasized the need to formulate school-running charters, connect with key regional industries, build characteristic disciplines, and adjust enrollment plans in response to market demand. A sound management environment and governance structure not only ensure the orderly advancement of mixed-ownership school-running but also enhance its adaptability to market changes, serving as a solid guarantee for the sustainable development of mixed-ownership school-running in higher vocational colleges.

### 3.2.5 Resource Environment

The resource environment serves as the driving support for the sustainable development of mixed-ownership school-running, providing core impetus for the long-term growth of institutions. Its core refers to various resources such as capital, technology, talents, and information gathered by multiple subjects, as well as their allocation efficiency, which directly influence an institution's school-running strength and development potential. Tian Weina and Zhang Yingfan (2021) believed that under the guidance of the concept of mutual complementarity and win-win results, the mixed-ownership school-running development of higher vocational colleges aggregates the capital, information, technology, knowledge, and talent resources of multiple subjects to form a resource agglomeration effect, breaking the barriers of self-protection and mutual competition among various subjects and promoting the efficient flow of resources between education and industries.

Deng Zemin and Li Xin (2021) argued that it is necessary to fully explore the primary and secondary attributes of resources, give play to the maximum effectiveness of various resources, and form an effective allocation of resources. Avoiding resource idleness or mismatch, whether the aggregated resources under

multiple property rights can be effectively utilized to create more value is also a key factor for the sustainable operation of higher vocational colleges.

Luo (2022) suggested expanding resource agglomeration channels by introducing enterprises' modern production and service facilities and venues, advanced technologies, high-quality industrial resources, modern management models, and operation models. This helps broaden the breadth and depth of resource supply for colleges, improving the situation of insufficient original resources and inadequate external communication.

Guo Junchao (2022) held that higher vocational colleges carry out cooperative school-running with other cooperative subjects by providing teaching venues, joint training, teaching staff, and intellectual property rights, injecting new momentum into the sustainable development of multiple subjects. Seeking a cooperative method that maximizes overall interests and integrating the talent resources, financial resources, material resources, technical resources, organizational resources, and information resources of various subjects helps form a win-win resource integration ecosystem.



Figure 2.5 Various Influencing Factors

### 3.3 Chinese Model

The mixed-ownership school-running model is an innovation and development of higher vocational colleges based on industry-education integration and school-enterprise cooperation. Constructing a sustainable development model for mixed-ownership school-running in higher vocational colleges is a key issue urgently needing to be solved to realize win-win cooperation between schools and enterprises and promote mixed-ownership school-running. In recent years, scholars have paid attention to this problem and explored the sustainable development model of mixed-ownership school-running in higher vocational colleges from different perspectives.

The subject selection model proposed by Zhu Hongxiang (2021a) provides an important reference for the selection of property rights subjects in the model. As the initiator of mixed-ownership development, higher vocational colleges should investigate the introduction of social capital based on whether it can deepen industry-education integration, improve the education level of higher vocational colleges, enhance the school-running strength of higher vocational colleges, and innovate the management model of higher vocational colleges. On the basis of comparison, they should identify their respective advantages and disadvantages, and determine the introduction objects in combination with the phased goals of mixed-ownership development and relevant policy provisions. Extensive selection, precise negotiation and comparative determination are three introduction methods with different application scenarios. Schools should decide how to choose according to the characteristics of the three methods and their own conditions.

Zhou Jianmei (2021) proposed a collaborative education model. The adjustment of the social industrial structure has put forward higher requirements for the comprehensive practical ability of higher vocational students. Under the mixed-ownership development model, many higher vocational colleges have begun to comprehensively analyze their own development status, and explore the school-enterprise collaborative education model in combination with the future development needs of students. Finally, good results have been achieved, which is

beneficial to the overall development of higher vocational colleges, students and enterprises.

Peng Yujing (2021) proposed a multi-subject cooperation model. The education of mixed-ownership higher vocational colleges involves multiple subjects, and higher vocational colleges have gradually become the main battlefield for multi-subject collaborative education. Studying the multi-subject collaborative education mechanism of higher vocational colleges can promote effective cooperation between higher vocational colleges and the government, social organizations, enterprises, scientific research institutes, venture capital institutions, etc., and build a dynamic and open collaborative system.

Three existing core models each have their own focus: The Subject Selection Model centers on the screening of property rights subjects, the Collaborative Education Model focuses on the core of talent cultivation, and the Multi-subject Cooperation Model emphasizes the multi-subject coordination mechanism. Together, they constitute the model framework for the sustainable development of mixed-ownership school-running. However, the existing models still have common shortcomings: first, they are highly universal and lack targeted design combined with regional industrial characteristics and policy environments; second, there is insufficient research on model feasibility verification and optimization paths; third, the synergistic effect of various influencing factors is not fully considered, and the systematicness of the models needs to be improved. These shortcomings provide optimization directions for constructing a characteristic sustainable development model for higher vocational colleges in Shandong Province in the following text.

In summary, focusing on the sustainable development model of mixed-ownership school-running in higher vocational colleges, domestic scholars have proposed three core models—Subject Selection, Collaborative Education, and Multi-subject Cooperation. Each model addresses school-running dilemmas and improves operational mechanisms from different perspectives, providing important reference for the practical advancement and subsequent research of mixed-ownership school-running. Carrying out mixed-ownership development in the field of higher vocational

education is a useful exploration to gather social elements to participate in school-running. Studying the construction model of mixed-ownership in higher vocational colleges can promote the application and development of mixed ownership, and help higher vocational colleges develop continuously, soundly, and healthily. However, existing models lack regional pertinence and systematicness, making it difficult to directly adapt to the actual development of higher vocational colleges in Shandong Province. In the subsequent research, it is necessary to optimize the existing models by combining Shandong's policy environment, industrial characteristics, and the current status of higher vocational colleges, so as to construct a sustainable development model with Shandong characteristics.

### **Related Research**

Policy support is an important guarantee for the sustainable development of mixed-ownership school-running in higher vocational colleges. Clarifying relevant policies at the national and regional levels can define the institutional boundaries, support directions, and development orientations of school-running, laying an institutional foundation for the conduct of this research. This part focuses on sorting out relevant policies on mixed-ownership school-running in higher vocational colleges at the national and Shandong provincial levels, analyzes the evolutionary trends, core content, and key support areas of the policies, clarifies the advantages and shortcomings of policy supply, and provides institutional support for the subsequent construction of a sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province and the formulation of supporting strategies in combination with the policy environment.

The development of mixed-ownership school-running in higher vocational colleges is inseparable from the macro guidance of national policies and the specific support of regional policies. National-level policies mainly clarify the legal status, development direction, and core requirements of mixed-ownership school-running, building a unified national policy framework; as one of the first provinces to organize and implement mixed-ownership school-running, Shandong Province takes the lead

in policy support nationwide. Its relevant policies are more targeted and operable, clarifying specific implementation paths and support measures in combination with Shandong's industrial characteristics and the actual development of higher vocational education. This part will sort out the relevant policies of China and Shandong Province respectively, and systematically analyze the policy connotations and their supporting roles in school-running practice.

#### **4.1 Policies in China**

To study the institutional implementation of mixed-ownership development in vocational colleges, we searched for policies on mixed-ownership school-running in China, based on the analysis of institutional texts on mixed-ownership development in vocational education. The basic national policy provisions on mixed-ownership development in vocational colleges stipulate that mixed-ownership school-running in vocational education is a form of vocational education run by social forces, mainly in the form of establishing colleges and training institutions. Social forces can participate in school-running with factors such as capital, knowledge, technology and management and enjoy corresponding rights. The state encourages, supports and guides the development of mixed-ownership in vocational education. Table 2.2 shows the policies on mixed-ownership school-running of higher vocational colleges in China.

**Table 2.2** Policies on Mixed-Ownership School-Running of Higher Vocational Colleges in China

No.	Time	Policy Name	Content
1	2014	Decision on Accelerating the Development of Modern Vocational Education	Stimulate the vitality of vocational education school-running, and explore the development of joint-stock and mixed-ownership vocational colleges
2	2016	Several Opinions on Encouraging Social Forces to Run Education and Promoting the Healthy Development of Private Education	Promote the public-private partnership (PPP) model, and encourage social capital to participate in the construction and operation management of educational infrastructure
3	2017	Several Opinions on Deepening the Industry-education integration	Clarify that "relevant provincial people's governments" are the responsible entities for exploring mixed-ownership development pilots
4	2019	National Vocational Education Reform Implementation Plan	Stipulate that "the development of joint-stock, mixed-ownership and other types of vocational colleges and various vocational training institutions shall be encouraged"
5	2022	Opinions on Deepening the Reform of the Construction of the Modern Vocational Education System	Deepen the application of the construction of the vocational education system, which is an integrated project. The core force is to establish a coordinated

Table 2.2 (Continued)

No.	Time	Policy Name	Content
6	2022	Implementation Plan for the Project to Meet the School-Running Conditions of Vocational Schools	<p>cooperation and development mechanism among the government, industry, enterprises, and schools, and the core goal is to achieve the transformation from a government-led school-running pattern to a school-running pattern with overall government management and multi-party social participation</p> <p>Encourage local governments to explore multi-channel investment mechanisms involving social forces, and establish and improve relevant systems for joint-stock and mixed-ownership school-running in vocational schools</p>
7	2023	Implementation Plan for the Action to Enhance the Empowerment of the Industry-education integration in Vocational Education (2023-2025)	Optimize the cooperation model for the industry-education integration through mixed-ownership school-running

## 4.2 Policies in Shandong Province

As one of the first provinces to organize and implement mixed-ownership school-running, Shandong has taken the lead in policy support. Shandong took the lead in introducing the country's first mixed-ownership school-running policy and improving relevant supporting measures to attract enterprises to participate in vocational education. This study takes higher vocational colleges with mixed-ownership school-running in Shandong Province as the research object. Therefore, clarifying the relevant policies in Shandong Province is very necessary for the conduct of the research. Table 2.3 shows the policies on mixed-ownership school-running of higher vocational colleges in Shandong Province.

**Table 2.3** Policies on Mixed-Ownership School-Running of Higher Vocational Colleges in Shandong Province

No.	Time	Policy Name	Content
1	2015	Opinions on Further Improving the Modern Vocational Education Policy System	Construct a mechanism for in-depth integration of schools and enterprises in school-running, formulate relevant policies for the participation of the government, schools, industries, enterprises, and society, strengthen cooperative school-running efforts, and implement the charging policy
2	2018	Ten Opinions on Running Vocational Education Well in the New Era	Formulate measures to promote school-enterprise cooperation, accelerate the construction of a work pattern with coordinated promotion by the government, schools, enterprises, industries, and society, encourage colleges to rely on

Table 2.3 (Continued)

No.	Time	Policy Name	Content
3	2019	Implementation Opinions on Deepening the industry-education integration to Promote the Conversion of New and Old Kinetic Energy	<p>enterprises to build secondary colleges (departments) and other cooperation models, and encourage the establishment of mixed-ownership secondary colleges</p> <p>Support the development of joint-stock school-running models, establish a number of mixed-ownership development pilot units, and encourage the introduction of enterprises, industries, social organizations, and other parties to participate</p>
4	2019	Measures for Promoting School-Enterprise Cooperation in Vocational Schools in Shandong Province	<p>Establish vocational schools through various forms such as joint-stock systems, mixed ownership, and cooperative agreements, and jointly build and manage vocational education parks, industrial colleges, engineering (technology) centers, inheritance and innovation platforms, "mass entrepreneurship and innovation" bases, practical bases, and other teaching and research institutions</p>

Table 2.3 (Continued)

No.	Time	Policy Name	Content
5	2020	Guiding Opinions on Promoting Mixed-Ownership School-Running in Vocational Colleges	Fully mobilize the enthusiasm and initiative of enterprises and other social forces to participate in vocational education, support the government, schools, and enterprises and other social forces to implement various forms of mixed-ownership school-running, innovate the governance system and mechanism, deepen the industry-education integration and school-enterprise cooperation, optimize the supply of vocational education, promote the formation of a multi-party school-running pattern, and provide technical and skilled talent support for the conversion of new and old kinetic energy in the province

The development of mixed-ownership school-running in China is an important measure for the comprehensive deepening of the education system reform, as well as a key move to adapt to the development of the market economy and meet the demand for talents in industries. Policies at the national level have been gradually improved, forming a policy framework of "macro guidance, encouraging pilots, and supporting innovation", which clarifies the legal status and development direction of mixed-ownership school-running. However, it lacks specific implementation rules, providing space for the refinement of local policies. As a pioneering pilot province for

mixed-ownership school-running, Shandong Province has issued a series of targeted policies, offering support from multiple aspects such as school-enterprise integration, pilot construction, and the establishment of secondary colleges. Closely aligning with the needs of the conversion of new and old kinetic energy in Shandong Province, these policies highlight the core of "multi-stakeholder participation and industry-education integration", with strong pertinence and operability, providing solid institutional support for the practice of mixed-ownership school-running in higher vocational colleges in Shandong Province. Meanwhile, Shandong Province's policies also focus on supporting improvement, gradually constructing a policy system of "guidance - support - standardization", which provides a clear policy orientation for the subsequent construction of a sustainable development model in line with Shandong's reality.

In summary, the development of mixed-ownership in China is an important measure to comprehensively deepen the reform of the education system and a key move to adapt to the market economy. This study comprehensively analyzes the relevant literature on the development of mixed-ownership school-running in colleges and universities, the sustainable development of higher vocational colleges and the sustainable development model of mixed-ownership school-running in higher vocational colleges in recent years. On this basis, it summarizes and refines the key influencing factors for the sustainable development of mixed-ownership school-running in higher vocational colleges as Property rights attributes, educational environment, campus environment, management environment and resource environment. In addition, the sustainable development of mixed-ownership school-running in higher vocational colleges is reflected in educational sustainability, operational sustainability and developmental sustainability. The literature review has laid an important foundation for this study, guided the subsequent data collection and analysis, and finally drawn relevant conclusions.

To sum up, the existing literature has clarified the core influencing factors of mixed-ownership school-running (five dimensions including property rights and education) and the core connotation of sustainable development (education,

operation and development), providing a theoretical basis and dimensional framework for the model construction in the following text.

Based on the above literature review, this study comprehensively adopts the literature analysis method, questionnaire survey method, interview survey method and expert survey method. Through literature analysis, relevant studies on the practice, existing problems, key influencing factors and sustainable development models of mixed-ownership school-running in higher vocational colleges at home and abroad are conducted. The current situation, problems and influencing factors of mixed-ownership in higher vocational colleges in Shandong are comprehensively analyzed by means of questionnaire survey, interview survey and expert survey. Construct and verify the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong.

## Chapter 3

### Research Methodology

To construct a scientific and operable sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province, this study fully integrates theoretical analysis with empirical investigation, and comprehensively adopts a variety of standardized research methods (i.e., mixed-methods analysis) based on field surveys and multi-source data collection to systematically investigate the following key aspects:

1. The current status, existing problems, approaches, and influencing factors affecting the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. The construction of a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies).

3. The evaluation of the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

The research steps are presented in Table 3.1.

Table 3.1 Research Steps

NO.	Research phases	Resources/ Target Group	Research methodology	Analysis	Research processes	Research Results
1	Analysis of the current status, existing problems, approaches, and influencing factors affecting the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province	1.1 365 students, 115 teachers, 106 administrators  1.2 5 teachers, 5 administrators, 5 stakeholders	1.1 Questionnaire survey method  1.2 Interview method	1.1 Statistical Analysis, Content Analysis  1.2 Thematic Analysis	1.1 Formulate a questionnaire to investigate the current situation of school-running; Formulate key interview plans and research plans through statistical analysis of the current situation of school-running;  1.2 Statistics on existing problems, approaches and factors through interviews;	Obtain the current situation, existing problems, approaches and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.
2	Construction of a sustainable development model for mixed-ownership school-running in higher vocational	2.1 5 senior teachers, 5 senior Administrators, 5 senior stakeholders	2.1 Interview method	2.1 Thematic Analysis	2.1 Analyze the existing models (including supporting strategies) through interviews;	Construct a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province

Table 3.1 (Continued)

NO.	Research phases	Resources/ Target Group	Research methodology	Analysis	Research processes	Research Results
	colleges in Shandong Province (including supporting strategies)	2.2 5 senior teachers, 5 senior Administrators, 5 senior stakeholders	2.2 Focus group method	2.2 Mixed Analysis	2.2 Draft a model (clarify core dimensions + supporting strategies) through focus group discussions;	(including supporting strategies).
		2.3 5 experts	2.3 Focus group method Expert investigation method Evaluation table method	2.3 Mixed Analysis	2.3 Expert Focus Group evaluates the draft model and finalizes the final model (including supporting strategies)	

Table 3.1 (Continued)

NO.	Research phases	Resources/ Target Group	Research methodology	Analysis	Research processes	Research Results
3	Evaluation of the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province	5 experts	Expert investigation method Evaluation table method	Statistical Analysis	5 experts evaluate the overall feasibility and suitability of the model (including the implementability of supporting strategies for each dimension) using evaluation forms	Verify the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

In this chapter, the research methodology will be clarified, including four key components:

1. The Population / The Sample Group
2. Research Instruments
3. Data Collection
4. Data Analysis

### **Phase I: The Current Status, Existing Problems, Approaches, and Influencing Factors**

The research methods adopted in this section mainly include the questionnaire survey method and the interview method, which are both typical empirical research tools in the field of vocational education. The researcher uses the questionnaire survey method to systematically investigate the current status of mixed-ownership school-running, and adopts the interview method to further deeply explore the existing problems, practical approaches, and key influencing factors of mixed-ownership school-running.

1.1 Adopt the questionnaire survey method to systematically study the current practical situation of mixed-ownership school-running in higher vocational colleges in Shandong Province

### **Population/Sample Group**

Data from the Department of Education of Shandong Province in 2024 shows that there are 95 higher vocational colleges in the province, which form the main carrier of vocational education development in Shandong. Based on the principles of research focus and sample representativeness, this study selected 5 mixed-ownership higher vocational colleges officially recognized by the Ministry of Education as research objects, namely Shandong Maritime Vocational College, Jinan Engineering Vocational and Technical College, Binzhou Vocational College, Shandong Vocational Animal Science and Veterinary College, and Shandong Chemical Engineering Vocational College. These colleges are distributed in different regions and

cover various professional categories, with typical exemplary significance in the practice of mixed-ownership school-running. Their school-running experience and development characteristics can objectively and effectively reflect the overall development status of this field in Shandong Province, and provide a solid empirical basis for the in-depth development of this study.

### **The Population**

These research subjects are generally the core practical subjects of mixed-ownership school-running. Their composition can fully reflect the diversified participation scenarios of this school-running mode, and they are also the key information sources for the observation, verification and data collection conducted in this study. The 5 mixed-ownership higher vocational colleges in Shandong Province covered in this study involve a total of 8,906 people, as detailed below:

1) Students	7580 people
2) Teachers	728 people
3) Administrators	598 people

### **The Sample Group**

When investigating the current situation, existing problems, and restrictive factors of mixed-ownership school-running in higher vocational colleges in Shandong Province, this study adopted stratified random sampling and the simplified proportional formula proposed by Krejcie and Morgan (1970). Stratified random sampling is widely used in educational management empirical research for its advantage in capturing subgroup characteristics, and we stratified the population according to their demographic and occupational features, followed by random sampling within each stratum to ensure sample representativeness and thereby avoid sampling bias (Cochran, 1977). The application of Krejcie and Morgan's (1970) formula further guaranteed the scientificity of the sample size, laying a solid foundation for subsequent data analysis. Due to the differences in characteristics among samples of different groups, stratified sampling can effectively improve the accuracy and representativeness of the sample, thereby enhancing the overall efficiency of sampling. In this study, the samples were divided into three groups

according to their occupational characteristics: students, teachers, and administrators. Samples of the three groups were randomly selected from the above-mentioned 5 higher vocational colleges, with a total of 586 participants, specifically as follows:

1) Students	365 people
2) Teachers	115 people
3) Administrators	106 people

The detailed distribution of the questionnaire samples is presented in Table 3.2. The sample structure is rationally distributed and fully covers participants from different colleges, grades, teaching ages, and management positions. Such a comprehensive and well-structured sample composition ensures the objectivity and representativeness of the research data, providing a solid, comprehensive and targeted data foundation for subsequent status analysis and problem exploration.

**Table 3.2** Questionnaire Sample Distribution Table (by College)

College	Students		Teachers		Administrators	
	Pop.	Sam.	Pop.	Sam.	Pop.	Sam.
1. Shandong Maritime Vocational College	1000	48	92	18	90	22
2. Jinan Engineering Vocational and Technical College	1400	68	140	23	113	23
3. Binzhou Vocational College	2300	110	226	36	135	21
4. Shandong Vocational Animal Science and Veterinary College	1380	67	140	21	135	21
5. Shandong Chemical Engineering Vocational College	1500	72	130	17	125	19
<b>Total</b>	<b>7580</b>	<b>365</b>	<b>728</b>	<b>115</b>	<b>598</b>	<b>106</b>

Table 3.2 presents the distribution of the total population and the determined sample across the five colleges. The distribution of the questionnaire samples divided by college can be seen in Figure 3.1. Additionally, the distribution of the questionnaire samples divided by group nature is illustrated in Figure 3.2.

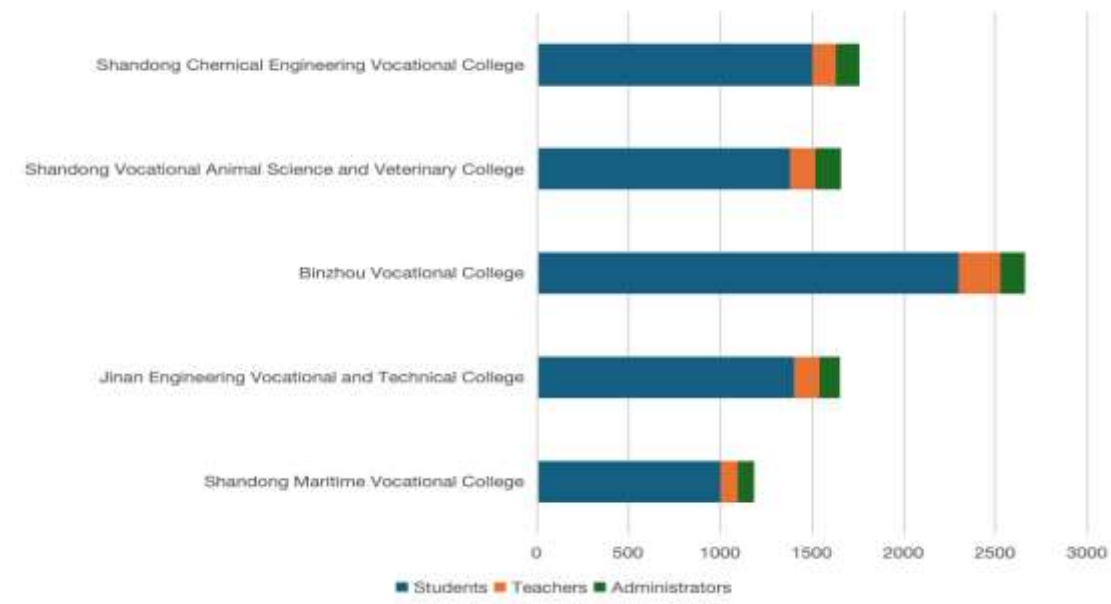
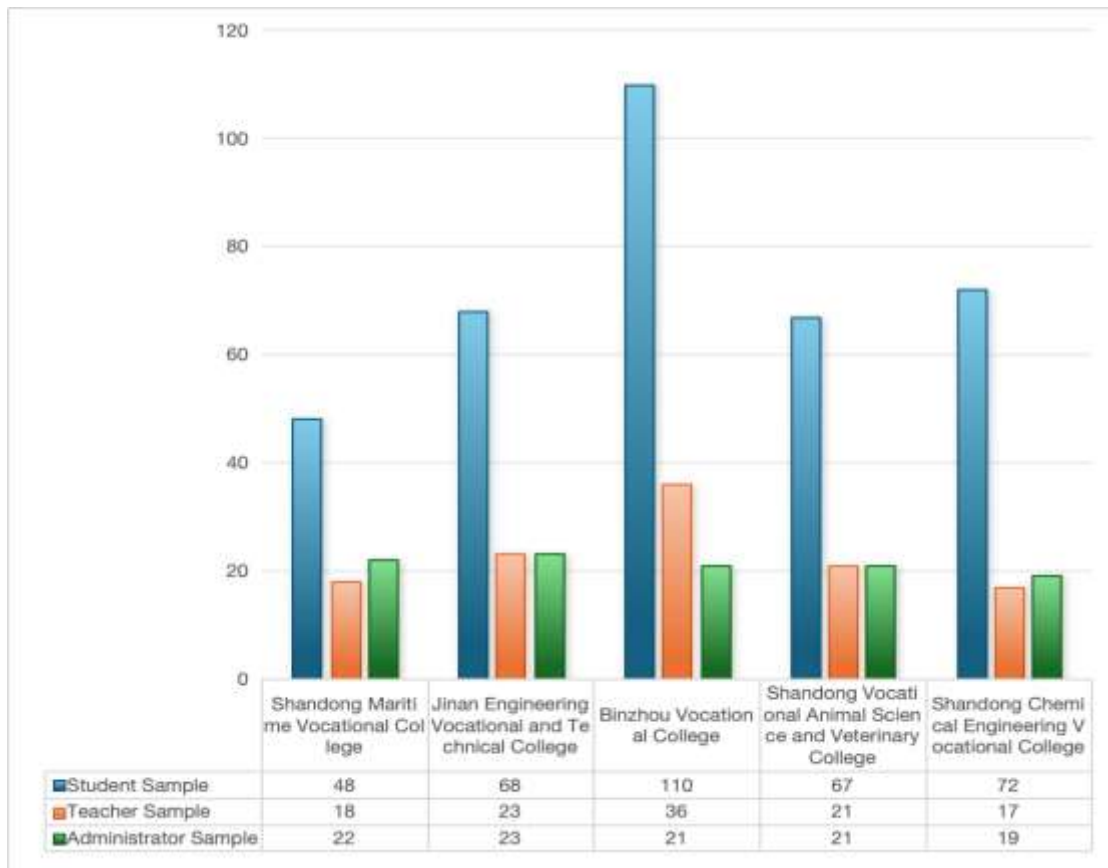


Figure 3.1 Population Distribution Table of the Questionnaire Survey



**Figure 3.2** Sample Distribution Table of the Questionnaire Survey

According to the sampling table proposed by Krejcie and Morgan (1970), this study finally determined a total sample of 586 participants, including 365 students, 115 teachers, and 106 administrators. The detailed distribution of the sample is shown in Figure 3.1.

The entire sampling process strictly followed classical and scientific sampling principles. To ensure the representativeness of the sample for the population and the validity of the data, key characteristics including participants' gender, grade, professional background, and job rank were fully taken into account during sampling, so as to avoid single-dimensional bias.

Meanwhile, from the perspective of research ethics, the whole data collection process strictly implemented the principle of informed consent. The personal information of participants was anonymized in the whole process, which

comprehensively protected the legitimate rights and privacy security of each participant and was in line with the ethical norms of academic research.

1.2 This study systematically explored the existing problems, practical pathways, and core influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province through the interview method. The interviewees were all from the aforementioned 5 mixed-ownership higher vocational colleges and were required to have 5 or more years of relevant work experience to ensure their in-depth understanding and voice in the school-running practice. A purposive sampling method was adopted to randomly select 15 participants, and the sample was not limited to a single college, covering three core groups: teachers, administrators, and stakeholders (5 people in each group) to ensure the comprehensiveness and depth of interview information. The specific sampling criteria and sample details are as follows:

1) Teachers	5 people
2) School administrators	5 people
3) Stakeholders	5 people

### **Phase II: Model Construction and Supporting Strategies**

The research methods adopted in this section include the interview method, focus group method, expert survey method, and evaluation form method. The researcher uses the interview method to investigate the existing application models of mixed-ownership school-running, employs the focus group method to construct the draft of the sustainable development model of mixed-ownership school-running, and then adopts the focus group method, expert survey method, and evaluation form method to evaluate the draft of the sustainable development model of mixed-ownership school-running.

2.1 This study sorted out the existing models and supporting strategies of mixed-ownership school-running in higher vocational colleges in Shandong Province through the interview method. The interviewees were selected from 5 representative mixed-ownership higher vocational colleges in Shandong Province, covering three core groups: Senior Teachers, Senior Administrators, and Senior Stakeholders. A

purposive sampling method was adopted to randomly select 15 participants. All interviewees have long-term engagement in mixed-ownership school-running practice, ensuring in-depth insights into the actual operation of relevant models. The sample selection was not limited to a single workplace and was conducted in strict accordance with the qualification selection criteria specified in Table 3.3, ensuring that each interviewee possesses relevant practical experience in mixed-ownership school-running and providing diverse practical perspectives for the systematic sorting of existing models.

2.2 This study analyzed the internal and external environments of mixed-ownership school-running in higher vocational colleges in Shandong Province through Focus Group Discussions (FGD), and then drafted the draft sustainable development model of mixed-ownership school-running and its supporting strategies. Participants in the discussions were also selected from the aforementioned 5 higher vocational colleges, including Senior Teachers, Senior Administrators, and Senior Stakeholders, with 15 individuals randomly selected via purposive sampling. The samples were screened in accordance with the college distribution requirements as shown in Table 3.4 to ensure the representativeness and rigor of the data. Their qualification selection criteria are consistent with those of the aforementioned interview samples (see Table 3.3 for details), and specific information about the group members is provided in Appendix B "List of Experts for Focus Group Discussions". The multi-perspective exchanges in the focus group effectively integrated the demands of different stakeholders, laying a solid foundation for the rationality of the draft model.

**Table 3.3** Selection Criteria for Interviewees and Focus Group Participants

Sample Type	Sample Situation	Quantity
Senior Teachers	1) More than 5 years of teaching experience, with rich practical experience; 2) Title of Professor or above; 3) Participate in students' teaching and employment guidance work, and pay attention to students' education.	5 teachers from 5 Higher Vocational Colleges
Senior Administrators	1) More than 5 years of management experience, with rich practical experience; 2) Positions closely related to students' teaching and employment work; 3) Engage with students or participate in policy formulation.	5 administrators from 5 Higher Vocational Colleges
Senior Stakeholders	1) Participate in the school-running and management of the college; 2) Participate in students' teaching and employment work, give more than 10 classes to students every year, or help more than 10 students find jobs.	5 stakeholders from 5 Higher Vocational Colleges
<b>Total</b>		<b>15</b>

Table 3.3 presents the interviewees for existing models and the focus group members for constructing the draft model, with the same personnel qualification selection criteria applied to both research groups. The difference is that the interviewees are not restricted by workplace and are randomly selected, while to ensure the scientificity and representativeness of the data, the focus group members are evenly selected from the five colleges, as shown in Table 3.4.

**Table 3.4** Number of Focus Group Participants

School	Number of Institutions	Senior Teachers	Senior Administrators	Senior Stakeholders
1. Shandong Maritime Vocational College	1	1	1	1
2. Jinan Engineering Vocational and Technical College	1	1	1	1
3. Binzhou Vocational College	1	1	1	1
4. Shandong Vocational Animal Science and Veterinary College	1	1	1	1
<b>Total</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>
		<b>15</b>		

2.3 Through expert focus group discussions, a systematic evaluation of the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies) was conducted using the focus group method, expert survey method, and evaluation form method. In-depth deliberations were carried out focusing on the logical rationality of the model's core dimensions, the practical operability of the supporting strategies in implementation, as well as the overall suitability and feasibility of the model. Following multiple rounds of demonstration and optimization, the final sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province was constructed.

This study adopted a purposive sampling method to randomly select 5 experts, who are not restricted by nationality. All of them possess profound academic accumulation in vocational education, practical experience in mixed-

ownership school-running, and capabilities in management strategy formulation, with their research and practice scopes fully covering the five core dimensions of the model. Specific information about the group members is detailed in Appendix B "List of Experts for Focus Group Discussions", and the sampling criteria are as follows:

**Table 3.5** Qualification Criteria for Experts in the Focus Group to Evaluate the Draft Model

Selection Qualification Criteria	Number of People
1. Experts with more than 10 years of work experience, doctoral degree, and knowledge and experience in strategy formulation	1
2. Senior teachers with more than 10 years of teaching experience, title of Associate Professor or above, participating in students' teaching and employment guidance work, and paying attention to students' education	2
3. Senior Administrators with more than 10 years of work experience, positions closely related to students' teaching and employment work, engaging with students or participating in policy formulation, and title of Associate Professor	2

### **Phase III: Model Validation and Implementation of Supporting Strategies**

To systematically verify the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province, this study adopted the evaluation form method (i.e., expert survey method) to conduct targeted empirical verification, quantifying the practical suitability of the model through a standardized evaluation index system.

Five experts were specially invited, all of whom possess more than 10 years of in-depth experience and recognized industry authority in the field of mixed-ownership school-running in higher vocational colleges. They have accumulated

profound practical achievements in core fields such as vocational education management, curriculum system construction, and employment quality improvement, and have long been directly responsible for student education, management, or employment-related work. Their research and practice scopes fully cover the five core dimensions of this study: "Property Rights Attributes, Educational Environment, Campus Environment, Management Environment, and Resource Environment".

In accordance with strict multi-dimensional selection criteria, the experts were selected from higher vocational colleges (both within and outside the province, as well as domestic and foreign), leading industry enterprises, and vocational education policy research institutions, covering diverse backgrounds such as college management, enterprise practice, and policy formulation. This ensures that the evaluation opinions not only rely on academic theories to support professionalism but also closely align with the actual needs of the industrial front line, possessing both scientificity and practical guiding value, and providing an accurate and authoritative empirical basis for the optimization and improvement of the model.

**Table 3.6** Qualification Criteria for Experts Evaluating the Final Model

Selection Qualification Criteria	Number of People
1. Experts with more than 10 years of work experience, doctoral degree, and knowledge and experience in strategy formulation	2
2. Academic Administrators with more than 10 years of work experience, doctoral degree, and title of Associate Professor or above	2
3. Senior administrator of educational institutions with more than 10 years of work experience, doctoral degree, and title of Associate Professor or above	1

## Research Instruments

### 1. Literature Research Method

A systematic literature review method was adopted to extensively review relevant academic literature, policy documents, and research reports at home and abroad, conducting comprehensive integration and in-depth induction of existing research results. Focusing on three core areas—the practice of mixed-ownership school-running in higher vocational colleges, the sustainable development mechanism of higher vocational colleges, and the sustainable development model of mixed-ownership school-running—this study systematically clarified the research context, core viewpoints, and cutting-edge trends in this field, conducted in-depth analysis of the current development status, existing problems, and key influencing factors at the practical level, and fully drew on the successful practical experience and mature governance models of typical cases at home and abroad.

This process not only helped the researchers accurately grasp the research boundaries and core issues but also laid a solid theoretical foundation and provided scientific methodological guidance for the construction of the research framework, clarification of research ideas, and conduct of subsequent empirical research for this project.

### 2. Questionnaire Survey

#### 2.1 Design the Questionnaire

**Part 1:** The first part of the questionnaire collects the basic information of the respondents, including detailed information such as gender, age, grade, major, and position.

**Part 2:** The main content of this study is to conduct a questionnaire survey on the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province. The evaluation content includes Property rights attributes, educational environment, campus environment, management environment, and resource environment.

## 2.2 Construct the Questionnaire

The construction process of the questionnaire is as follows:

**Step 1:** Conduct a comprehensive review of relevant literature, sort out and analyze the relevant concepts, theories, and research on mixed-ownership school-running in higher vocational colleges in Shandong Province.

**Step 2:** Design a questionnaire on the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province. Submit the draft to the thesis supervisor for review and revision according to the supervisor's suggestions.

**Step 3:** Three experts review the Item Objective Congruence (IOC) of the questionnaire, ensuring that the IOC index exceeds 0.9.

**Step 4:** Improve the questionnaire according to the experts' feedback.

**Step 5:** Distribute the questionnaire to 30 students, teachers, and Administrators for pre-test. The 30 students, teachers, and Administrators in the pre-test are not included in the formal sample (365 students, 115 teachers, 106 Administrators) and are only used for the reliability test of the questionnaire. Cronbach's alpha coefficient is used for reliability evaluation to check whether it meets the standards. The pre-test questionnaire has good reliability: the Cronbach's Alpha coefficient of the student questionnaire is 0.92, the teacher questionnaire  $\alpha=0.91$ , and the Administrator questionnaire  $\alpha=0.93$ , all higher than the standard threshold of 0.8, indicating that the internal consistency of the questionnaire is reliable.

**Step 6:** The questionnaire is distributed through online platforms (such as Wenjuanxing- a professional online survey platform) combined with offline paper versions to ensure that the sample covers respondents of different grades and titles. It is distributed to 365 students, 115 teachers, and 106 Administrators. The questionnaire survey is implemented, and the questionnaires are collected and counted.

### 3. Interview

Based on the results of the questionnaire survey on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province, a structured interview outline was designed, covering five dimensions: Property rights attributes, educational environment, campus environment, management environment, and resource environment. Each interview lasted between 30 and 45 minutes. Data were documented using a combination of manual note-taking and audio recording. Subsequently:

**First round:** Focusing on the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province, structured interviews were conducted with 15 individuals (5 teachers, 5 administrators, and 5 stakeholders) who have more than 5 years of work experience from 5 higher vocational colleges in Shandong Province.

**Second round:** Centering on the existing models for the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province, structured interviews were conducted with 5 senior teachers, 5 senior administrators, and 5 senior stakeholders from 5 higher vocational colleges in Shandong Province.

In addition, field visits were conducted to the 5 higher vocational colleges to observe the teaching implementation, operation, and development status of mixed-ownership school-running. This aims to gain an in-depth understanding of the actual development and key influencing factors of mixed-ownership school-running, providing a solid foundation for the establishment of a sustainable development model for mixed-ownership school-running in higher vocational colleges.

### 4. Focus Group Discussion

#### 4.1 Design Idea

By analyzing the results of the questionnaire survey on the current status of mixed-ownership school-running and the interviews on its sustainable development's problems, approaches, and influencing factors, combined with the experience in formulating development strategies for successful mixed-ownership

school-running in Shandong's higher vocational colleges, a scientific and reasonable draft model (including supporting strategies) was constructed, integrating the core conclusions of SWOT-PEST combined analysis and TOWS matrix.

#### 4.2 Discussion Content

The feasibility and suitability of the draft model (including supporting strategies) for the sustainable development of mixed-ownership school-running in Shandong's higher vocational colleges were evaluated through focus group discussions, fully absorbing optimized suggestions from multi-stakeholder perspectives and finalizing the sustainable development model after multiple rounds of demonstration.

### 5. Evaluation Form

The researchers construct it as follows:

#### 5.1 Design Purpose

To evaluate the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

#### 5.2 Design Idea

To assess the effectiveness of the model from two core aspects: feasibility and suitability.

### Data Collection

Data collection is a core link in the empirical research on the sustainable development strategies of mixed-ownership school-running in higher vocational colleges in Shandong Province. It is necessary to balance the complementarity of qualitative and quantitative data to ensure the scientificity and reliability of research conclusions. The following is the specific data collection plan, which is systematically carried out in two dimensions: qualitative and quantitative:

## 1. Qualitative Data Collection

### 1.1 Interviews

Conduct interviews with 5 teachers, 5 administrators, and 5 stakeholders from 5 higher vocational colleges in Shandong Province to understand the problems, pathways, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Conduct interviews with 5 senior teachers, 5 senior administrators, and 5 senior stakeholders from 5 higher vocational colleges in Shandong Province to understand the existing models (including supporting strategies) of mixed-ownership school-running in higher vocational colleges in Shandong Province.

### 1.2 Focus Group Discussions

Form a focus group consisting of 5 senior teachers, 5 senior administrators, and 5 senior stakeholders from 5 higher vocational colleges in Shandong Province. Combined with the questionnaire survey results on the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as the existing problems, pathways, influencing factors, and current policy implementation of mixed-ownership school-running, conduct multiple rounds of discussions around the draft sustainable development model of mixed-ownership school-running and the model implementation plan. Fully absorb practical experience from multiple parties to optimize the model framework and explore the draft sustainable development model and model implementation plan of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Invite 5 authoritative experts deeply engaged in the fields of vocational education and mixed-ownership school-running to form a focus group. Evaluate the draft model (including supporting strategies) from dimensions such as theoretical adaptability and practical operability, and finally finalize the sustainable development model and implementation plan of mixed-ownership school-running in higher vocational colleges in Shandong Province.

## 2. Quantitative Data Collection

### 2.1 Questionnaire Survey

**Step 1:** Send letters to coordinate with 5 mixed-ownership higher vocational colleges in Shandong Province to targeted collect basic information of 365 students, 115 teachers, and 106 administrators, ensuring that the sample covers different grades, teaching ages, and job levels.

**Step 2:** Adopt a combined method of "online distribution relying on professional research platforms (such as Wenjuanxing) + offline targeted distribution of paper questionnaires" to distribute questionnaires to the target samples and carry out the survey. After strict screening and review, all sampled questionnaires were validly recovered with no invalid questionnaires, and the recovery rate reached 100%, ensuring data completeness.

### 2.2 Feasibility and suitability Evaluation

Design a specialized evaluation scale and invite 5 authoritative experts with experience in model construction, strategy planning, and mixed-ownership school-running research to conduct quantitative evaluation from two core dimensions: the adaptability of the model to the development of vocational education in Shandong Province and the practical feasibility of supporting strategies. Adopt the Rensis Likert (1932) five-point scale to collect data, providing expert-level empirical support for the scientific verification of the model.

The specific data collection includes the following processes:

**Step 1:** Send letters to 5 mixed-ownership higher vocational colleges and relevant units, clarifying the purpose, scope, and confidentiality commitment of data collection to obtain research support.

**Step 2:** C Conduct consultations with 5 experts with recognized authority in the field of mixed-ownership school-running in higher vocational colleges, and simultaneously distribute evaluation scales, requiring them to independently complete the evaluation of the model's feasibility and suitability, with a target recovery rate of 100%.

All data collection processes strictly follow academic ethics, with full anonymization of participants' personal information throughout to protect their privacy and legitimate rights and interests.

## **Data Analysis**

Data analysis should adopt targeted methods based on data types. Through the integrated analysis of qualitative and quantitative data, in-depth exploration of core research issues is conducted to provide solid support for the construction of a sustainable development model for mixed-ownership school-running:

### **1. Qualitative Data Analysis**

#### 1.1 Thematic Analysis

Conduct thematic analysis on the qualitative data collected through interviews and focus group discussions. Focus on the five core dimensions of "optimizing property rights attributes, improving the educational environment, upgrading campus support, optimizing management mechanisms, and strengthening resource guarantees" to extract key issues and practical demands, forming a structured analytical framework.

#### 1.2 Coding System

Design a standardized coding system to classify and code responses to open-ended questions according to core themes. First, transcribe audio materials verbatim into text, and adopt the double-coding cross-validation method (coding consistency coefficient  $Kappa \geq 0.85$ ) to ensure coding reliability. At the same time, track and analyze the frequency of each theme to identify core contradictions and key breakthrough points.

### **2. Quantitative Data Analysis**

#### 2.1 Statistical Analysis

Use SPSS 26.0 statistical analysis software to process the quantitative survey data. Analyze the demographic characteristics of the sample (gender, age, educational background, professional title/position, work experience, etc.) through

frequency and percentage to clarify the distribution of respondents and verify the rationality of the sample distribution.

Use the mean value and standard deviation method to quantitatively evaluate the feasibility and suitability of the draft model and the final model respectively. Based on Likert's (1932) interpretation of the mean value, the final score obtained for the item is interpreted as follows:

5: Indicates the highest score for the item.

4: Indicates a higher score for the item.

3: Indicates a moderate score for the item.

2: Indicates a lower score for the item.

1: Indicates the lowest score for the item.

Moreover, based on Likert's (1932) interpretation of the mean value, when analyzing the questionnaire, the final score obtained for the item is interpreted as follows:

4.50–5.00: Indicates the highest level.

3.50–4.49: Indicates a higher level.

2.50–3.49: Indicates a moderate level.

1.50–2.49: Indicates a lower level.

1.00–1.49: Indicates the lowest level.

## 2.2 Content Analysis:

By adopting SWOT, PEST, TOWS analysis methods and statistical software such as SPSS (note: corrected the possible typo "PSPSS" to "SPSS" in line with academic norms and the attached paper's terminology), this study systematically analyzes the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as the internal and external factors for model construction (internal strengths and weaknesses, external opportunities and threats), providing data support for model optimization.

## 3. Mixed Analysis

Integrate qualitative and quantitative data to identify the intersection points of the two types of data, avoiding the limitations of a single data type and providing

a more comprehensive understanding. As a core feature of mixed-methods research, this cross-type data integration complements the shortcomings of each data type, enhancing the depth and robustness of the analysis. The mixed analysis in this paper refers to conducting correlation analysis between the thematic coding results of qualitative interviews and the dimension means of quantitative questionnaires (calculated via SPSS 26.0 software) to cross-verify the importance ranking of the five core dimensions. Specifically, by correlating the thematic coding results of interviews with the dimension means of the questionnaire, the importance ranking of each core dimension is verified to ensure the rationality of the model dimensions. Through in-depth analysis, researchers can identify advantages and opportunities in the research on the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province, which not only guarantees the theoretical rationality of the model dimensions but also takes into account practical feasibility, providing a comprehensive and three-dimensional decision-making basis for constructing the sustainable development model.

All data analysis processes strictly follow academic norms to ensure the transparency and reproducibility of data processing, laying a solid foundation for the credibility of research conclusions.

In summary, the logical diagram of the overall framework of the research methodology can be summarized as follows:

**Table 3.7** Research Methodology Table

Step	Content	Method
Step 1	Study the existing problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province	Literature Research Method, Questionnaire Survey Method, Interview Method
Step 2	Construct a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies)	Interview Method, Focus Group Method, SWOT Analysis, PEST Analysis (combined with SWOT) TOWS Analysis
Step 3	Verify the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province	Expert Survey Method, Evaluation Form

### Research Framework

Taking "the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province" as the core goal, this research framework unfolds following the complete logical chain of "theoretical foundation—methodological support—problem diagnosis—model construction—evaluation and verification—final output". Firstly, through a systematic literature review, it combs core theories such as mixed-ownership school-running, the sustainable development of higher vocational colleges, relevant policies and their effects. Centering on the five core dimensions of property rights attributes, educational environment, campus environment, management environment, and resource environment, it lays a solid theoretical foundation and analytical framework for the research. On this basis, it comprehensively adopts qualitative and quantitative

research methods (Instruments) such as questionnaire survey, interview, focus group, and Delphi method, and assists with strategic analysis tools including SWOT, PEST, and TOWS matrices to conduct a systematic diagnosis of the practical problems, development paths, and key influencing factors of mixed-ownership school-running in higher vocational colleges in Shandong Province. Through statistical analysis and in-depth interviews, it accurately identifies school-running pain points and core variables. Subsequently, a draft model is constructed through multiple rounds of questionnaire surveys, interview analysis, and the Delphi method, which is then iteratively optimized through focus group evaluation to form the core framework of the sustainable development model. Finally, through multi-dimensional evaluation of suitability, feasibility, and sustainability, the model's applicability and promotion value in higher vocational colleges in Shandong Province are verified, ultimately outputting a set of sustainable development model for mixed-ownership school-running that possesses both theoretical scientificity and practical operability

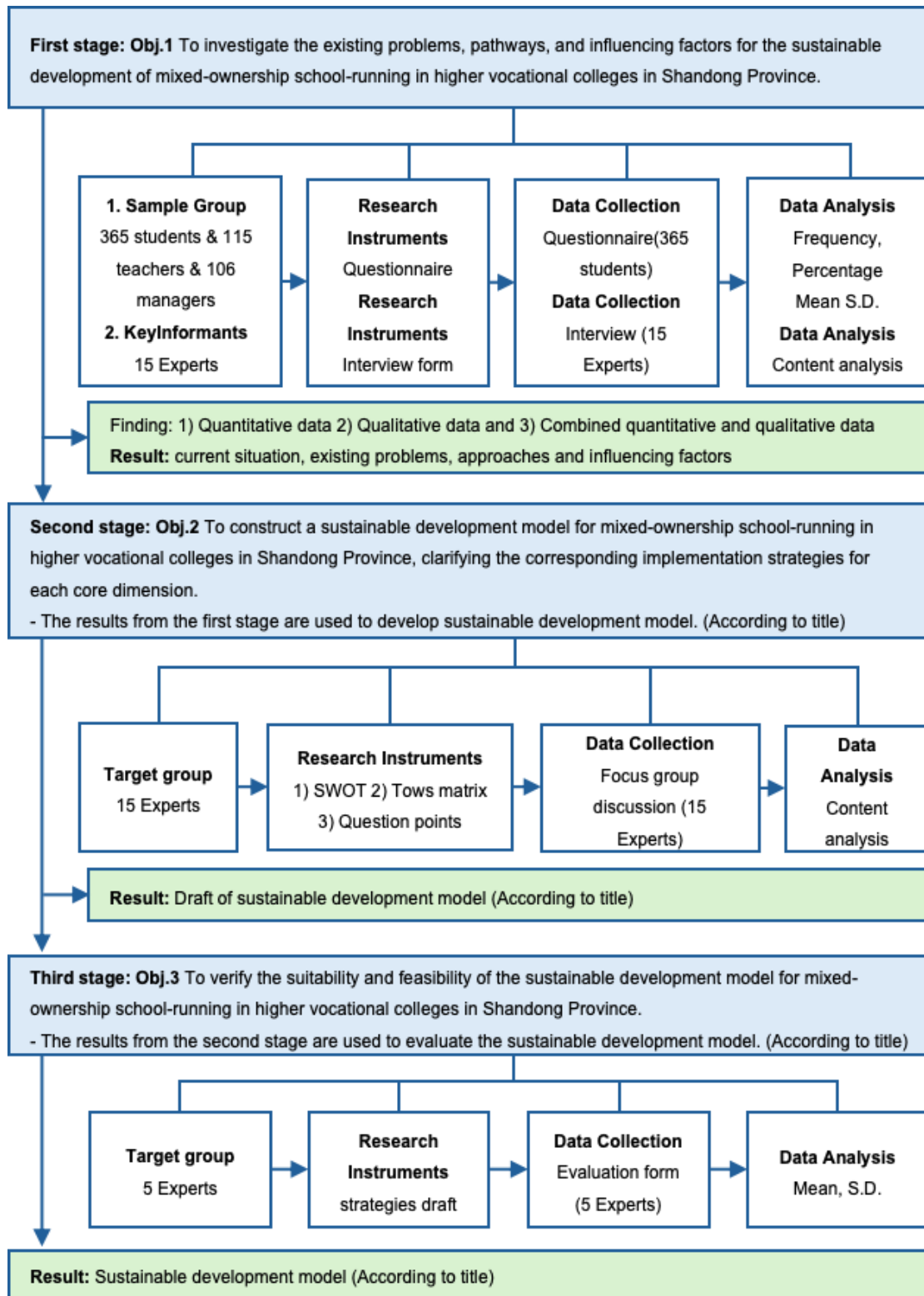


Figure 3.3 Research Framework

In this study, the literature review provides a theoretical perspective and an analytical framework for problem diagnosis, and anchors the direction for subsequent research by sorting out research gaps and practical contradictions. Research methods provide dual support for model construction: quantitative methods (questionnaire surveys) ensure the representativeness and objectivity of data, while qualitative methods (interviews and the Delphi method) ensure that the model is deeply aligned with practical needs. These two types of methods act jointly on the problem diagnosis stage to accurately identify school-running pain points and key variables.

The results of problem diagnosis directly guide model construction, endowing the model design with a clear problem orientation and targeted nature. The core output of model construction enters the evaluation stage, where its effectiveness and implementability are verified through multi-dimensional tests of suitability, feasibility, and sustainability. The evaluation results are fed back to optimize the model, ultimately forming a scientific, feasible, and sustainable school-running model. A rigorous closed-loop logic is formed among all modules, which ensures the coherence and rigor of the research from theory to practice.

## Chapter 4

### Research Analysis

To achieve the research objectives of "The Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province"—1) investigating the current status, existing problems, approaches, and restrictive factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province; 2) constructing a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province and clarifying the supporting implementation strategies for each core dimension; 3) verifying the feasibility and suitability of the sustainable development model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province.

The data analysis of this study is divided into three phases: Phase I analyzes the current status of school-running and existing problems through questionnaire surveys and interviews (Part I); Phase II constructs a draft model based on the current status and verifies its suitability and feasibility via focus group discussions (Part II); Phase III revises the draft by incorporating expert opinions to form the final model and complete the final evaluation (Part III). The data of each phase corresponds to the respective tables.

The results of the data analysis can be presented as follows:

1. Symbols and Abbreviations
2. Presentation of Data Analysis
3. Results of Data Analysis

The details are as follows.

### Symbols and Abbreviations

The meanings of the symbols in the data analysis are as follows:

N : Represents the sample group

$\bar{x}$  : Represents the mean value

S.D. : Represents the standard deviation

### Presentation of Data Analysis

The results of the data analysis can be presented as follows:

Part I: Conduct questionnaires and interviews on the current status, existing problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province, and analyze the obtained data. Data will be presented in the form of frequency, percentage, mean value, and standard deviation.

Part II: Conduct interviews around the construction of a sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies), and analyze the relevant interview data.

Part III: Analyze the evaluation of the feasibility and suitability of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province. Data will be presented in the form of mean value and standard deviation.

### Part I: Data Analysis of Questionnaires and Interviews Regarding The Current Status, Existing Problems, Approaches, and Influencing Factors

1. Analysis of Basic Information in the Questionnaire on the Current Situation of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

A total of 586 valid participants were involved in this study, including 365 students, 115 teachers, and 106 administrators. To further analyze the characteristics of each research subject, the analysis results of the personal information of the

questionnaire respondents are classified by school type, gender, age, educational background, professional title (position), work experience, etc., and presented in Tables 4.1-4.3, with data shown in the form of frequency and percentage.

**Table 4.1** Number of Respondents and Percentage (For Students)

	Personal Information	Frequency	Percentage (%)
Gender	Male	182	49.86%
	Female	183	50.14%
	<b>Total</b>	<b>365</b>	<b>100.00%</b>
Age	20 years or below	195	53.42%
	21 to 25 years	170	46.58%
	26 to 45 years	0	0.00%
	46 to 60years	0	0.00%
	61years or above	0	0.00%
	<b>Total</b>	<b>365</b>	<b>100.00%</b>
Grade	The first grade	99	27.12%
	The second grade	88	24.11%
	The third grade	82	22.47%
	The fourth grade	54	14.79%
	The fifth grade	42	11.51%
	<b>Total</b>	<b>365</b>	<b>100.00%</b>
Expected career planning	Further education	64	17.53%
	Work	301	82.47%
	<b>Total</b>	<b>365</b>	<b>100.00%</b>

Table 4.1 shows that this study involves 365 valid participants, all of whom are students from the selected 5 mixed-ownership higher vocational colleges. 1) In terms of gender, there are 182 males, accounting for 49.86%, and 183 females,

accounting for 50.14%, showing a nearly balanced gender ratio. 2) In terms of age, there are 195 participants aged 20 years or below, accounting for 53.42%, 170 participants aged 21 to 25 years, accounting for 46.58%, and 0 participants in the age groups of 26 to 45 years, 46 to 60 years, and 61 years or above, accounting for 0.00% respectively, which is consistent with the age characteristics of higher vocational college students. 3) In terms of grade, there are 99 participants in the first grade, accounting for 27.12%, 88 participants in the second grade, accounting for 24.11%, 82 participants in the third grade, accounting for 22.47%, 54 participants in the fourth grade, accounting for 14.79%, and 42 participants in the fifth grade, accounting for 11.51%, covering all key grades of the research population. 4) In terms of expected career planning, there are 64 participants choosing further education, accounting for 17.53%, and 301 participants choosing work, accounting for 82.47%, reflecting the main career orientation tendencies of vocational college students. Such a demographic distribution aligns with the research objectives and provides reliable support for subsequent analyses.

**Table 4.2** Number of Respondents and Percentage (For Teachers)

	Personal Information	Frequency	Percentage (%)
<b>Gender</b>	Male	49	42.61%
	Female	66	57.39%
	<b>Total</b>	<b>115</b>	<b>100.00%</b>
<b>Age</b>	25 years or below	4	3.48%
	26 to 35 years	35	30.43%
	36 to 45 years	38	33.04%
	46 to 60years	35	30.43%
	61 years or above	3	2.61%
	<b>Total</b>	<b>115</b>	<b>100.00%</b>

Table 4.2 (Continued)

	Personal Information	Frequency	Percentage (%)
<b>Educational Background</b>	Bachelor's degree	24	20.87%
	Master's degree	57	49.57%
	Doctoral degree	21	18.26%
	Other	13	11.30%
	<b>Total</b>	<b>115</b>	<b>100.00%</b>
<b>Professional Title</b>	Teaching assistant	33	28.70%
	Lecturer or Assistant Professor	38	33.04%
	Associate professor	26	22.61%
	Professor	18	15.65%
	<b>Total</b>	<b>115</b>	<b>100.00%</b>
	<b>Work Experience</b>	Within 5 years	19
5 to 10 years		18	15.65%
11 to 15 years		28	24.35%
16 to 20 years		26	22.61%
Over 20 years		24	20.87%
<b>Total</b>		<b>115</b>	<b>100.00%</b>

As presented in Table 4.2, the valid participants in this study were rigorously screened, with a total of 115 respondents, ensuring the sample's representativeness and reliability for subsequent data analysis. The participants' demographic and occupational profile was systematically categorized and analyzed from five core dimensions, as detailed below:

Gender distribution: Among the participants, 49 were male (42.61%) and 66 female (57.39%). The reasonably balanced gender ratio effectively avoided potential

gender bias in the research results, laying a solid foundation for the objectivity of follow-up analysis.

**Age group distribution:** The participants' age structure was clearly hierarchical and representative. Specifically, 4 participants (3.48%) were 25 years old or below; 35 (30.43%) in the 26–35 age group; 38 (33.04%) in the 36–45 age bracket; 35 (30.43%) aged 46–60; and only 3 (2.61%) aged 61 or above. The sample was predominantly concentrated in the 26–60 age group—covering core practitioners and researchers in vocational education—ensuring the collected data accurately reflect the practical experience and professional insights of key stakeholders.

**Educational background distribution:** In terms of academic qualifications, 24 participants (20.87%) held a bachelor's degree; 57 (49.57%) a master's degree; 21 (18.26%) a doctoral degree; and 13 (11.30%) other educational backgrounds. The high proportion of master's and doctoral degree holders guaranteed the professionalism and academic depth of feedback, crucial for optimizing the research model.

**Professional title distribution:** Regarding professional titles, 33 participants (28.70%) were teaching assistants; 38 (33.04%) lecturers or assistant professors; 26 (22.61%) associate professors; and 18 (15.65%) professors. Coverage of titles from grassroots teaching staff to senior researchers ensured the research integrated both frontline practical experience and high-level academic guidance.

**Work experience distribution:** In terms of work experience, 19 participants (16.52%) had less than 5 years; 18 (15.65%) 5–10 years; 28 (24.35%) 11–15 years; 26 (22.61%) 16–20 years; and 24 (20.87%) more than 20 years. The diversified work experience distribution enabled the research to comprehensively capture the development context of mixed-ownership school-running in higher vocational colleges at different stages, providing a full-dimensional reference for constructing the sustainable development model.

**Table 4.3** Number of Respondents and Percentage (For Administrators)

	Personal Information	Frequency	Percentage (%)
<b>Gender</b>	Male	38	35.85%
	Female	68	64.15%
	<b>Total</b>	<b>106</b>	<b>100.00%</b>
<b>Age</b>	25 years or below	2	1.89%
	26 to 35 years	32	30.19%
	36 to 45 years	32	30.19%
	46 to 60years	39	36.79%
	61 years or above	1	0.94%
	<b>Total</b>	<b>106</b>	<b>100.00%</b>
<b>Educational background</b>	Bachelor's degree	23	21.70%
	Master's degree	57	53.77%
	Doctoral degree	21	19.81%
	Other	5	4.72%
	<b>Total</b>	<b>106</b>	<b>100.00%</b>
<b>Position</b>	Educational administrators	71	66.98%
	Educational and teaching administrators	23	21.70%
	School leaders above the position of vice principal	12	11.32%
	<b>Total</b>	<b>106</b>	<b>100.00%</b>
<b>Work experience</b>	Within 5 years	7	6.60%
	5 to 10 years	32	30.19%
	11 to 15 years	21	19.81%
	16 to 20 years	24	22.64%
	Over 20 years	22	20.75%
	<b>Total</b>	<b>106</b>	<b>100.00%</b>

Table 4.3 shows that this study involves 106 valid participants. 1) In terms of gender, there are 38 males, accounting for 35.85%, and 68 females, accounting for 64.15%. 2) In terms of age, there are 2 participants aged 25 years or below, accounting for 1.89%, 32 participants aged 26 to 35 years, accounting for 30.19%, 32 participants aged 36 to 45 years, accounting for 30.19%, 39 participants aged 46 to 60 years, accounting for 36.79%, and 1 participant aged 61 years or above, accounting for 0.94%. 3) In terms of educational background, there are 23 participants with a bachelor's degree, accounting for 21.70%, 57 participants with a master's degree, accounting for 53.77%, 21 participants with a doctoral degree, accounting for 19.81%, and 5 participants with other educational backgrounds, accounting for 4.72%. 4) In terms of position, there are 71 educational administrators, accounting for 66.98%, 23 educational and teaching administrators, accounting for 21.70%, and 12 school leaders above the position of vice principal, accounting for 11.32%. 5) In terms of work experience, there are 7 participants with work experience within 5 years, accounting for 6.60%, 32 participants with 5 to 10 years of work experience, accounting for 30.19%, 21 participants with 11 to 15 years of work experience, accounting for 19.81%, 24 participants with 16 to 20 years of work experience, accounting for 22.64%, and 22 participants with over 20 years of work experience, accounting for 20.75%.

## 2. Analysis of Questionnaire Data on the Current Situation of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

This part analyzes the questionnaire results on the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province, presents data in the form of mean value and standard deviation, and mainly includes framework determination, questionnaire finalization, and reliability testing. The details are as follows:

1. By referring to literature, research reports, and data related to variable measurement, define the operational definitions of variables and the framework for variable measurement, and propose 5 first-level indicators and 35 second-level indicators. The 5 first-level indicators are: property rights attributes, educational

environment, campus environment, management environment, and resource environment.

2. To ensure the scientificity and applicability of the questionnaire, the content analysis form and questionnaire are first submitted to 5 authoritative experts in this field, requesting them to consider the consistency and applicability of each question based on appropriate and inappropriate operations, and at the same time seek suggestions on improving the definition and expression of the questionnaire to check the content validity. Then, calculate the item-objective consistency index (IOC) and operational definition corresponding to each question. The results show that the index of each question is between 0.8 and 1.1, indicating that each question is consistent with the operational definition. In addition, the Delphi technique is used to seek expert consensus, further improve the theme and expression of the questionnaire, and finally confirm the questionnaire. After the questionnaire is sent to authoritative experts in the industry, it is tested by the experts.

3. Conduct the survey and reliability test. The questionnaire is tested on 365 students, 115 teachers, and 106 administrators from Higher vocational colleges in Shandong Province. Then, the collected data are used to check the quality of the tool. The Cronbach's Alpha coefficient is used to analyze the reliability of the questionnaire, and it is found that the reliability of the questionnaire is above 0.977, indicating very high reliability and consistency.

The questionnaire can be divided into 5 dimensions, and respondents answered according to the actual situation. The researcher defined the standards for data interpretation and conducted statistical analysis after collecting the questionnaires. Based on the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as the mean value and standard deviation, it can be reflected in the following aspects:

**Table 4.4** Current Status of Mixed-Ownership School-Running

(n=586, n1=365, n2=115, n3=106)

Contents	$\bar{x}$	S.D.	Level	Rank
Property Rights Attributes	3.197	0.966	moderate	5
Educational Environment	3.389	1.106	moderate	1
Campus Environment	3.261	1.021	moderate	3
Management Environment	3.213	0.990	moderate	4
Resource Environment	3.298	1.022	moderate	2
<b>Total</b>	<b>3.272</b>	<b>1.045</b>	<b>moderate</b>	

As shown in Table 4.4, the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province involves 5 aspects, with an overall average level at a moderate level ( $\bar{x}$ =3.272). Among them, the educational environment has the highest average level ( $\bar{x}$ =3.389), followed by the resource environment ( $\bar{x}$ =3.298), campus environment ( $\bar{x}$ =3.261), management environment ( $\bar{x}$ =3.213), and finally the property rights attribute, which has the lowest average level ( $\bar{x}$ =3.197).

**Table 4.5** Current Status of Property Right Attributes in Mixed-Ownership School-Running

(n=586)

Contents	$\bar{x}$	S.D.	Level	Rank
1 Diversified property rights have a positive impact on the school's teaching and management activities	3.213	1.261	moderate	2
2 The equity structure of each investment subject of the school is conducive to the rational allocation and efficient use of school resources	3.206	1.254	moderate	3

Table 4.5 (Continued)

(n=586)

	Contents	$\bar{x}$	S.D.	Level	Rank
3	The school's decision-making mechanism fully considers the opinions and interests of each investment subject	3.200	1.219	moderate	4
4	The school's property rights attributes are clear and the legal protection is complete	3.193	1.227	moderate	5
5	learning resources and facilities, directly enhancing students' learning opportunities and academic development	3.227	1.248	moderate	1
6	The school has attracted more social investment and can balance the profit needs of each investment subject with long-term development goals	3.172	1.235	moderate	6
7	Many investors have strengthened the school's reputation through resource sharing and coordinated development	3.166	0.963	moderate	7
	<b>Total</b>	<b>3.197</b>	<b>0.966</b>	<b>moderate</b>	

According to Table 4.5, the overall current situation of the property rights attribute of mixed-ownership school-running in higher vocational colleges in Shandong Province is at a moderate level ( $\bar{x}$ =3.197), mainly reflected in the following seven aspects: "The diversified investment structure has increased learning resources and facilities, directly enhancing students' learning opportunities and academic development" has the highest average level ( $\bar{x}$ =3.227), followed by "Diversified property rights have a positive impact on the teaching and management activities of the school" ( $\bar{x}$ =3.213), "The equity structure of various investment

subjects in the school is conducive to the rational allocation and efficient utilization of school resources" ( $\bar{x}$ =3.206), "The school's decision-making mechanism fully considers the opinions and interests of each investment subject" ( $\bar{x}$ =3.200), "The school's property rights attribute is clear, and legal protection is sound" ( $\bar{x}$ =3.193), and "The school has attracted more social investment and can balance the profit demands of various investment subjects with long-term development goals" ( $\bar{x}$ =3.172). "Many investors have strengthened the school's reputation through resource sharing and coordinated development" has the lowest average level ( $\bar{x}$ =3.166).

**Table 4.6** Current Status of Educational Environment in Mixed-Ownership School-Running

(n=586)

Contents	$\bar{x}$	S.D.	Level	Rank
1. More practical and forward-looking teaching content	3.430	1.383	moderate	2
2. More innovative curriculum settings and teaching methods	3.358	1.368	moderate	6
3. More diversified teaching methods and more distinctive educational features	3.451	1.349	moderate	1
4. The current teaching content is attractive and can stimulate students' learning interest	3.316	1.374	moderate	7
5. The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals	3.418	1.365	moderate	3

Table 4.6 (Continued)

(n=586)

Contents	$\bar{x}$	S.D.	Level	Rank
6. Under the mixed-ownership school-running model, the school's professional settings and curriculum updates are more in line with industry needs and student development	3.365	1.377	moderate	5
7. Mixed-ownership Higher vocational colleges have good educational quality and can improve students' comprehensive quality and employability	3.384	1.382	moderate	4
<b>Total</b>	<b>3.389</b>	<b>1.106</b>	<b>1.106</b>	

According to Table 4.6, the overall current status of the educational environment of mixed-ownership school-running in Higher vocational colleges in Shandong Province is at a moderate level ( $\bar{x}=3.389$ ), mainly reflected in the following seven aspects: "More diversified teaching methods and more distinctive educational features" has the highest average level ( $\bar{x}=3.451$ ), followed by "More practical and forward-looking teaching content" ( $\bar{x}=3.430$ ) and "The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals" ( $\bar{x}=3.418$ ), then "Mixed-ownership Higher vocational colleges have good educational quality and can improve students' comprehensive quality and employability" ( $\bar{x}=3.384$ ), "Under the mixed-ownership school-running model, the school's professional settings and curriculum updates are more in line with industry needs and student development" ( $\bar{x}=3.365$ ), and "More innovative curriculum settings and teaching methods" ( $\bar{x}=3.358$ ). Finally, "The current teaching content is attractive and can stimulate students' learning interest" has the lowest average level ( $\bar{x}=3.316$ ).

**Table 4.7** Current Status of Campus Environment in Mixed-Ownership School-Running

(n=586)

Contents	$\bar{x}$	S.D.	Level	Rank
1. The campus hardware facilities are convenient, and the learning and teaching environments are comfortable	3.422	1.383	moderate	1
2. Learning resources and teaching resources are easily accessible, and it is easy to access library resources, digital learning tools, and platforms	3.253	1.287	moderate	4
3. Satisfied with the school's logistics services such as catering, accommodation, and medical care	3.317	1.275	moderate	2
4. mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure	3.210	1.298	moderate	5
5. The school has a good campus cultural atmosphere and rich campus activities	3.203	1.301	moderate	6
6. Mixed-ownership school-running supports policies that promote educational equity and inclusive student services	3.135	1.224	moderate	7
7. The school can protect the rights and interests of teachers and students and create a good teaching and learning environment	3.288	1.013	moderate	3
<b>Total</b>	<b>3.261</b>	<b>1.021</b>	<b>moderate</b>	

According to Table 4.7, the overall current situation of the campus environment of mixed-ownership school-running in higher vocational colleges in Shandong Province is at a moderate level ( $\bar{x}$ =3.261), mainly reflected in the following seven aspects: "The campus hardware facilities are convenient, and the learning and teaching environments are comfortable" has the highest average level ( $\bar{x}$ =3.422), followed by "Satisfied with the logistics services provided by the school, such as catering services, accommodation conditions and medical care" ( $\bar{x}$ =3.317) and "The school can protect the legitimate rights and interests of teachers and students and create a good teaching and learning environment" ( $\bar{x}$ =3.288), then "Learning resources and teaching resources are easily accessible, and it is convenient to access library resources, digital learning tools and platforms" ( $\bar{x}$ =3.253), "mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure" ( $\bar{x}$ =3.210), and "The school has a good campus cultural atmosphere and rich campus activities" ( $\bar{x}$ =3.203). Finally, "mixed-ownership school-running supports policies that promote educational equity and inclusive student services" has the lowest average level ( $\bar{x}$ =3.135).

**Table 4.8** Current Status of Management Environment in Mixed-Ownership School-Running

(n=586)

	Contents	$\bar{x}$	S.D.	Level	Rank
1.	The school has a sound management system, efficient management, safety, and order	3.235	1.281	moderate	3
2.	The school has high administrative efficiency and service quality	3.218	1.266	moderate	4
3.	The school has high decision-making transparency, sound systems, and efficient processes	3.157	1.306	moderate	7

Table 4.8 (Continued)

(n=586)

	Contents	$\bar{x}$	S.D.	Level	Rank
4.	The school can promptly respond to and handle risk management such as safety issues, public opinion management, and legal issues	3.244	1.231	moderate	2
5.	The school's information management covers the core business system	3.253	1.244	moderate	1
6.	The school has a good teaching staff and a mature training and promotion channel	3.203	1.246	moderate	5
7.	The school has a high degree of democratic participation, a good cultural atmosphere, and the right to participate in school decision-making and the warmth of organizational culture	3.179	1.281	moderate	6
<b>Total</b>		<b>3.213</b>	<b>0.990</b>	<b>0.990</b>	

According to Table 4.8, the overall current status of the management environment of mixed-ownership school-running in Higher vocational colleges in Shandong Province is at a moderate level ( $\bar{x}$ =3.213), mainly reflected in the following seven aspects: "The school's information management covers the core business system" has the highest average level ( $\bar{x}$ =3.253), followed by "The school can promptly respond to and handle risk management such as safety issues, public opinion management, and legal issues" ( $\bar{x}$ =3.244) and "The school has a sound management system, efficient management, safety, and order" ( $\bar{x}$ =3.235), then "The school has high administrative efficiency and service quality" ( $\bar{x}$ =3.218), "The school has a good teaching staff and a mature training and promotion channel" ( $\bar{x}$ =3.203), and "The school has a high degree of democratic participation, a good cultural

atmosphere, and the right to participate in school decision-making and the warmth of organizational culture" ( $\bar{x}$ =3.179). Finally, "The school has high decision-making transparency, sound systems, and efficient processes" has the lowest average level ( $\bar{x}$ =3.157).

**Table 4.9** Current Status of Resource Environment in Mixed-Ownership School-Running

(n=586)

	Contents	$\bar{x}$	S.D.	Level	Rank
1.	The school has rich educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained	3.329	1.270	moderate	3
2.	The school has rich digital resources and provides sufficient online open courses and online school-enterprise resources	3.258	1.268	moderate	4
3.	The school has rich personal development resources, providing club activities, internship opportunities, research projects, and international exchange and learning opportunities	3.372	1.378	moderate	2
4.	The school has many industry-university-research cooperation opportunities, actively provides social services, and promotes regional economic and social development	3.254	1.279	moderate	5
5.	The school has sufficient funds to cover the needs of school development	3.210	1.225	moderate	7

Table 4.9 (Continued)

(n=586)

Contents	$\bar{x}$	S.D.	Level	Rank
6. The school's resource allocation is reasonable and can meet the needs of different majors and courses	3.447	1.307	moderate	1
7. The school cooperates with other higher education institutions or enterprises to jointly promote educational innovation	3.215	1.322	moderate	6
<b>Total</b>	<b>3.298</b>	<b>1.022</b>	<b>1.022</b>	

According to Table 4.9, the overall current status of the resource environment of mixed-ownership school-running in Higher vocational colleges in Shandong Province is at a moderate level ( $\bar{x}=3.298$ ), mainly reflected in the following seven aspects: "The school's resource allocation is reasonable and can meet the needs of different majors and courses" has the highest average level ( $\bar{x}=3.447$ ), followed by "The school has rich personal development resources, providing club activities, internship opportunities, research projects, and international exchange and learning opportunities" ( $\bar{x}=3.372$ ) and "The school has rich educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained" ( $\bar{x}=3.329$ ), then "The school has rich digital resources and provides sufficient online open courses and online school-enterprise resources" ( $\bar{x}=3.258$ ), "The school has many industry-university-research cooperation opportunities, actively provides social services, and promotes regional economic and social development" ( $\bar{x}=3.254$ ), and "The school cooperates with other higher education institutions or enterprises to jointly promote educational innovation" ( $\bar{x}=3.215$ ). Finally, "The school has sufficient funds to cover the needs of school development" has the lowest average level ( $\bar{x}=3.210$ ).

Subsequently, the researcher calculated the KMO value of the questionnaire data. As shown in the figure, the KMO value is 0.990 (see Appendix D), which is much higher than 0.8, indicating that the questionnaire has good validity, and the survey information is fully supported and consistent with the analysis of the thesis. At the same time, the chi-square value of Bartlett's test of sphericity can be verified at the data level. The correlation matrix between variables is positively correlated, so further analysis of the data can be carried out.

As shown in the table, the reliability of the questionnaire is 0.978, indicating that the questionnaire results are reliable. The mean value of the questionnaire is 3.272, which fully reflects the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province. All five aspects—property rights attribute, educational environment, campus environment, management environment, and resource environment—are at a moderate level.

#### 1.2 Data Analysis of Interviews Concerning the Existing Problems, Approaches and Influencing Factors of Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

The implementation of the interview phase at this stage is closely based on the completion and comprehensive statistical analysis of the questionnaire survey. After conducting the questionnaire survey and statistically analyzing all the responses, researcher adopted the interview outline designed by the researchers specifically for this study. Every question in the outline has been carefully refined, and the information provided by the interviewees was collected through structured interviews.

The interviewees were all selected from the pre-established research sample pool. Several higher vocational colleges in Shandong Province, which are recognized by the Ministry of Education and carry out mixed-ownership school-running, were chosen as the interview sites, and the interviewees were members of the study's sample group.

All these interviewees have more than 5 years of working experience in higher vocational colleges, including 5 teachers, 5 administrative staff, and 5 stakeholders

who are engaged in relevant work, totaling 15 people. This ensures that the study can comprehensively capture multi-dimensional perspectives, laying a solid empirical foundation for the subsequent construction and optimization of the sustainable development model for mixed-ownership school-running.

**Table 4.10** Interview Content Analysis Table

(Existing Problems, Approaches, and Influencing Factors of the Sustainable Development of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
<b>Q1: What problems do you think exist in the sustainable development of mixed-ownership school-running in higher vocational colleges in terms of property rights, education, campus, management, and resources?</b>																	
1) Unclear division of property rights, leading to disputes among parties in decision-making, profit distribution, etc.			√			√	√				√	√	√		√	7	46.67%
2) Unreasonable profit distribution mechanism, making it difficult to balance the public welfare attribute of schools and the profit demand of enterprises		√		√		√		√	√		√	√	√	√	√	10	66.67%
3) Imperfect corporate governance structure, resulting in low decision-making efficiency with multi-party participation in school-running			√			√	√		√	√			√	√		7	46.67%
4) Low enthusiasm of social capital to participate, lacking motivation for long-term investment		√	√	√			√		√		√	√	√		√	9	60.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5) Insufficient in-depth school-enterprise cooperation, mostly staying on the surface without forming a real talent cultivation community	√	√	√	√	√		√	√	√	√	√		√	√	√	13	86.67%
6) Imperfect school-running quality supervision system, making it difficult to ensure the stability of education and teaching quality	√	√	√		√					√	√	√	√		√	9	60.00%
7) Lagging construction of teaching staff, with a low proportion of teachers having both teaching experience and enterprise experience, which cannot meet the needs of mixed-ownership school-running	√	√		√	√	√		√	√		√	√	√	√	√	12	80.00%
8) Disconnection between talent cultivation and enterprise needs, with slow updates in curriculum setting and teaching content	√	√	√	√			√						√	√		7	46.67%
9) Lack of effective risk prevention and control mechanisms, resulting in weak ability to respond to market changes and changes in cooperative parties					√					√			√		√	4	26.67%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
10) Low social recognition of mixed-ownership school-running, leading to insufficient trust from parents and students	√	√		√		√	√	√	√	√				√	√		10	66.67%
<b>Q2: What problems exist in the sustainable development of mixed-ownership school-running in your current school?</b>																		
1) The cooperative enterprises introduced have low matching degree with the school's majors, and the cooperative projects have low practicality	√					√	√		√					√	√		6	40.00%
2) Limited resources invested by enterprises, especially failing to meet teaching needs in terms of practical training equipment and technical support		√		√	√	√	√					√	√	√	√		9	60.00%
3) Unsmooth communication and coordination mechanism between schools and enterprises, with delayed information transmission, affecting cooperation efficiency	√		√	√		√	√	√	√	√	√			√	√	√	12	80.00%
4) Inadequate publicity of mixed-ownership school-running, leading to insufficient understanding among teachers, students and the society						√	√			√	√	√	√		√		7	46.67%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5) Low participation of enterprises in the curriculum system, failing to fully integrate enterprise actual needs and industry standards	√		√	√	√	√	√	√	√		√		√	√	√	12	80.00%
6) Lack of professional operation and management teams, resulting in insufficient ability to control mixed-ownership school-running projects	√	√	√	√	√	√	√		√	√	√	√	√		√	13	86.67%
7) Insufficient incentives for teachers participating in mixed-ownership school-running, affecting their participation enthusiasm		√		√	√	√	√		√	√	√		√			9	60.00%
8) Low transparency in fund use, making it difficult to evaluate the use efficiency of social capital investment	√		√		√	√	√		√	√				√		8	53.33%
<b>Q3: What characteristic measures has your current school taken to promote the sustainable development of mixed-ownership school-running in terms of property rights, education, campus, management, and resources?</b>																	
1) Jointly build industrial colleges with leading enterprises in the industry to realize resource sharing and complementary advantages between schools and enterprises	√	√	√	√				√	√	√	√	√	√	√	√	13	86.67%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
2) Introduce social capital to participate in the construction of school practical training bases to improve practical teaching conditions	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
3) Jointly formulate talent cultivation plans with enterprises and jointly develop courses and teaching materials	√	√		√		√		√				√	√			7	46.67%
4) Recruit enterprise technical backbones as part-time teachers to participate in classroom teaching and practical training guidance		√	√	√	√	√	√	√	√	√	√	√	√	√		13	86.67%
5) Organize teachers to conduct practical training in cooperative enterprises to improve their practical teaching ability		√	√	√		√		√	√	√	√	√	√	√	√	12	80.00%
6) Carry out order-based cultivation to provide enterprises with targeted skilled talents	√		√	√	√	√	√		√			√				8	53.33%
7) Establish joint scientific research teams with enterprises to jointly carry out technological research and development and project tackling	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
8) Implement the modern apprenticeship system to enable students to learn skills in real positions of enterprises	√					√			√	√		√	√			6	40.00%
9) Cooperate with enterprises to carry out vocational skills training to serve the society and enterprise employees.	√		√	√	√	√		√		√		√	√	√	√	11	73.33%
10) Establish a school-enterprise cooperation council to jointly participate in school-running decision-making and management		√	√	√	√	√	√	√		√	√	√		√	√	12	80.00%
11) Share enterprise production resources, introduce enterprise workshops into the campus, and carry out productive practical training			√	√		√			√			√	√	√		7	46.67%
12) Organize skill competitions through school-enterprise cooperation to improve students' professional skills		√	√	√		√	√	√	√		√	√	√			10	66.67%
13) Use the enterprise's market resources to expand students' employment channels and entrepreneurship platforms	√				√		√	√		√		√	√	√	√	9	60.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
<b>Q4: What do you think are the strengths and weaknesses affecting the sustainable development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province?</b>																		
<b>Strengths</b>																		
1) Solid foundation of manufacturing industry in Shandong Province, with large demand for skilled talents from enterprises, providing broad space for school-enterprise cooperation	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
2) High attention paid by local governments to vocational education, and introduction of multiple policies to support mixed-ownership school-running		√		√		√		√			√	√	√				7	46.67%
3) Long school-running history of some Higher vocational colleges, accumulating rich experience in school-enterprise cooperation	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
4) Sound industrial association organizations, which can effectively coordinate the cooperative relationship between schools and enterprises	√	√	√	√	√	√	√		√	√		√	√	√	√		13	86.67%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5) Superior geographical location and convenient transportation, facilitating enterprises to participate in school-running activities	√	√	√	√	√	√	√	√	√	√	√	√	√			12	80.00%
6) Mature development of vocational education, providing a resource integration platform for mixed-ownership school-running		√		√	√	√	√	√	√		√	√		√	√	11	73.33%
<b>Weaknesses</b>																	
1) Large number of Higher vocational colleges in the region, fierce competition, and relatively concentrated high-quality enterprise resources	√		√	√	√	√		√	√	√	√		√		√	11	73.33%
2) elatively lagging reform of property rights system, and complex procedures for introducing social capital	√	√	√	√		√	√	√	√	√	√	√	√			12	80.00%
3) Insufficient understanding of vocational education by some enterprises, leading to low enthusiasm for participation in cooperation				√	√	√		√	√		√		√		√	7	46.67%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
4) Unreasonable structure of teaching staff in Higher vocational colleges, and imperfect training mechanism for teachers with both teaching experience and enterprise experience	√	√		√		√		√	√	√			√	√			9	60.00%
5) Unbalanced development of regional vocational education, making it difficult for Higher vocational colleges in some areas to carry out mixed-ownership school-running		√		√			√	√					√				5	33.33%
6) Imperfect supporting service system for mixed-ownership school-running, lacking professional consulting and legal services	√	√	√	√	√	√	√	√		√	√			√	√	√	13	86.67%

**Q5: What do you think are the opportunities and threats influencing the sustainable development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province?**

**Opportunities**

1) The state promotes vocational education reform, and the Vocational Education Law provides clear policy basis		√	√		√	√	√	√	√	√				√	√		10	66.67%
---	--	---	---	--	---	---	---	---	---	---	--	--	--	---	---	--	----	--------

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
2) Shandong Province, as a highland for vocational education innovation, receives national policy inclination and financial support	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
3) The conversion of new and old kinetic energy leads to a surge in demand for high-quality technical and skilled talents, driving school-enterprise cooperation		√	√	√				√			√	√			√	7	46.67%
4) Solid foundation of manufacturing industry, with leading enterprises such as Haier and Weichai having resources to participate in school-running	√	√		√	√	√	√	√		√		√		√	√	11	73.33%
5) Local governments introduce policies such as tax reduction and exemption to reduce the cost of enterprises participating in school-running		√	√	√		√			√	√	√		√			8	53.33%
6) The willingness of social capital to participate has been strengthened, and the enthusiasm of private enterprises for investing in vocational education has been heightened.	√		√	√	√	√	√	√	√	√			√	√	√	12	80.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
<b>Threats</b>																		
1) Fierce competition among Higher vocational colleges in the region, leading to the concentration of high-quality resources in a few colleges		√	√	√		√			√		√	√	√	√			9	60.00%
2) Cognitive bias of some enterprises towards mixed-ownership school-running, resulting in insufficient cooperation stability					√	√	√	√			√				√		6	40.00%
3) Under the pressure of economic downturn, enterprises may reduce investment in vocational education	√	√	√	√			√	√	√	√	√					√	10	66.67%
4) Obstacles in the reform of property rights system, and cumbersome procedures for asset disposal	√	√		√		√	√		√				√		√	√	9	60.00%
5) Rapid development of vocational education in surrounding provinces, which may attract the outflow of high-quality enterprise resources in the province		√	√	√			√		√				√				6	40.00%
6) The increased recognition of vocational education by society has affected the student intake of mixed-ownership schools	√		√	√	√	√	√		√	√	√			√	√	√	12	80.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
<b>Q6: What do you think are the areas that higher vocational colleges need to improve most in the sustainable development of mixed-ownership school-running?</b>																		
1) Improve the corporate governance structure, clarify the rights and responsibilities of all parties, and improve decision-making efficiency	√			√			√	√	√		√	√	√				8	53.33%
2) Optimize the property rights structure and profit distribution mechanism to balance the interest demands of all parties	√	√	√	√	√				√		√		√		√		9	60.00%
3) Strengthen in-depth integration of schools and enterprises to build a real talent cultivation community	√		√		√	√	√	√	√	√		√	√	√			11	73.33%
4) Improve the introduction and exit mechanisms of social capital to reduce the investment risks of enterprises	√			√		√	√	√	√	√	√	√	√	√	√		12	80.00%
5) Strengthen the construction of teaching staff to improve teachers' practical teaching ability	√	√	√		√	√		√	√	√	√	√	√		√		12	80.00%
6) Establish a dynamic curriculum adjustment mechanism to ensure that talent cultivation is synchronized with enterprise needs						√		√		√		√		√	√		6	40.00%

Table 4.10 (Continued)

Responses	Interviewer															Freq.	Prop.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
7) Build a diversified school-running quality evaluation system to ensure the quality of education and teaching		√	√		√	√		√						√			6	40.00%
8) Strengthen efforts to strive for policies and improve supporting support measures	√	√	√	√	√		√						√	√			8	53.33%
9) Improve the market-oriented operation ability of schools to enhance the attraction to social capital		√	√	√		√	√		√				√	√		√	9	60.00%
10) Strengthen the publicity of mixed-ownership school-running to improve social recognition	√	√	√	√	√	√	√	√	√	√	√			√	√	√	14	93.33%
11) Establish and improve a risk prevention and control system to respond to various uncertain factors	√	√		√	√	√	√	√	√	√	√	√		√	√		13	86.67%
12) Promote the integration of school culture and enterprise culture to reduce conceptual conflicts in cooperation	√	√			√	√		√	√	√	√	√	√	√	√	√	12	80.00%
13) Improve the practical training management and guarantee mechanism for students to enhance the effect of practical teaching		√	√	√		√	√	√		√	√	√	√	√	√	√	12	80.00%

Based on the special questionnaire survey data regarding the current situation of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as the in-depth interview results targeting its internal core factors for sustainable development (such as property right structure, faculty development, and management mechanism) and external key variables (such as policy orientation, industrial demand, and market environment), this study systematically disassembles the interactive influence of internal and external factors through the SWOT-PEST combined analysis framework. It further derives adaptive development paths by conducting matching analysis with the TOWS matrix, and carries out coding, frequency statistics, and cross-validation on the collected valid questionnaire data and interview records. By comprehensively integrating quantitative data and qualitative conclusions, this research makes up for the limitations of single-method research and provides solid empirical support and a rigorous logical basis for constructing a draft sustainable development model of mixed-ownership school-running (including supporting strategies) that is scientifically sound and closely aligned with practical scenarios.

The PEST analysis is a strategic tool used to assess the macro-environment of an organization, encompassing four core dimensions: Political, Economic, Social, and Technological. Widely applied in the fields of strategic management and educational policy research, this tool provides a standardized framework for holistic macro-environmental assessment. It analyzes factors from these four aspects to grasp the overall macro-environment and evaluate the impact of these factors on an organization's strategic goals and the formulation of relevant strategies.

The SWOT analysis is a diagnostic tool designed to examine the internal and external environments of an organization, consisting of four dimensions: Strengths, Weaknesses, Opportunities, and Threats. This analytical method helps researchers move beyond fragmented thinking and clarify the core context of an organization's development from a holistic perspective, thereby organically integrating the organization's strategies with its internal resources and external environment. Various major strengths, weaknesses, opportunities, and threats closely related to the

research object are identified through investigation, listed in a matrix format, and then analyzed in a matched manner using the idea of systematic analysis. A series of corresponding conclusions are derived from this process, and these conclusions usually carry distinct strategic implications, providing precise decision-making guidance for subsequent model construction and path selection.

This study organically integrates PEST analysis with SWOT analysis, adopting an integrated analytical framework that breaks through the boundaries of single-tool analysis to achieve a panoramic review of both macro external environments and micro internal conditions. First, it scans the external macro-environment through PEST analysis to identify opportunities and threats, then diagnoses the internal conditions via SWOT analysis to clarify strengths and weaknesses. Finally, it relies on the TOWS matrix to conduct matching analysis of internal and external factors, deriving development paths that are both feasible and targeted. By combining PEST and SWOT analyses in this way, the study assesses an organization's internal environment to summarize its strengths and weaknesses, while simultaneously analyzing the external environment to identify opportunities and threats—these findings serve as the fundamental basis for formulating strategies. As shown in Figure 4.1:

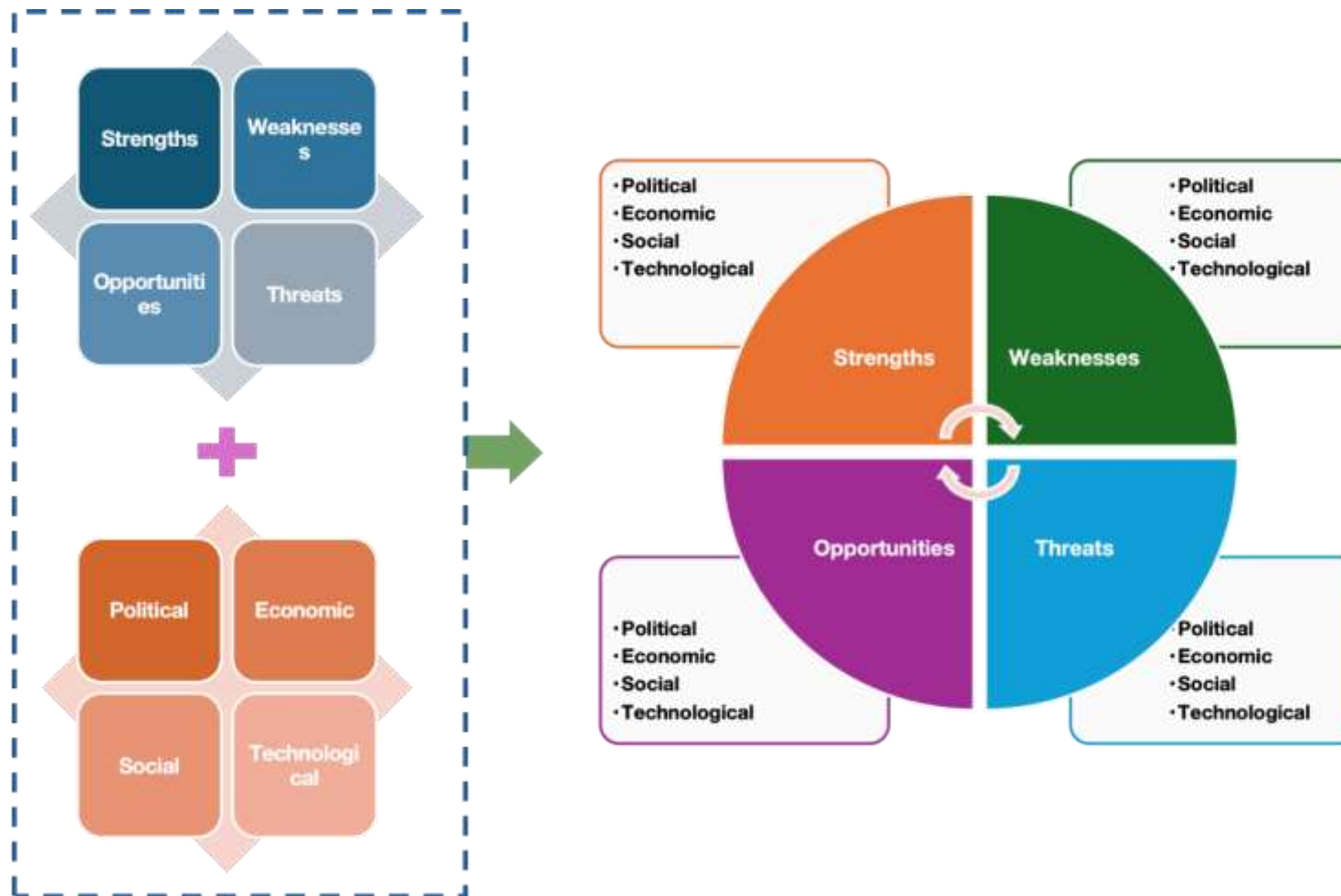


Figure 4.1 Logical Diagram of SWOT-PEST Combined Analysis

**Table 4.11** Results of SWOT-PEST Combined Analysis

Strengths	Weaknesses
<p><b>1. Economic Aspects:</b></p> <p><b>S1:</b> Shandong Province has a solid manufacturing foundation, with strong enterprise demand for skilled talents, providing broad space for school-enterprise cooperation.</p> <p><b>S2:</b> Favorable geographical location and convenient transportation facilitate enterprise participation in school-running activities.</p> <p><b>2. Political Aspects:</b></p> <p><b>S3:</b> Local governments attach great importance to vocational education and have introduced multiple policies to support mixed-ownership school-running.</p> <p><b>3. Social Aspects:</b></p> <p><b>S4:</b> Some Higher Vocational Colleges have a long history of school-running and have accumulated rich experience in school-enterprise cooperation.</p> <p><b>S5:</b> Well-established industry associations effectively coordinate cooperative relationships between schools and enterprises.</p> <p><b>S6:</b> Mature vocational education development provides a platform for resource integration in mixed-ownership school-running.</p>	<p><b>1. Economic Aspects:</b></p> <p><b>W1:</b> A large number of Higher Vocational Colleges in the region lead to fierce competition, with high-quality enterprise resources relatively concentrated.</p> <p><b>2. Political Aspects:</b></p> <p><b>W2:</b> The reform of the property rights system lags relatively, and the process for introducing social capital is complex.</p> <p><b>W3:</b> The supporting service system for mixed-ownership school-running is incomplete, lacking professional consulting and legal services.</p> <p><b>3. Social Aspects:</b></p> <p><b>W4:</b> Some enterprises have insufficient understanding of vocational education, resulting in low enthusiasm for cooperation.</p> <p><b>4. Technological Aspects:</b></p> <p><b>W5:</b> The structure of teaching staff in Higher Vocational Colleges is irrational, and the training mechanism for "double-qualified" teachers (with both teaching and enterprise experience) is incomplete.</p> <p><b>W6:</b> Unbalanced regional vocational education development makes it difficult for Higher Vocational Colleges in some areas to implement mixed-ownership school-running.</p> <p><b>W7:</b> The supporting service system for mixed-ownership school-running is incomplete, lacking professional consulting and legal services.</p>

Table 4.11 (Continued)

Opportunities	Threats
<p><b>1. Political Aspects:</b></p> <p><b>O1:</b> The state promotes vocational education reform, and the Vocational Education Law provides a clear policy basis.</p> <p><b>O2:</b> As a highland for vocational education innovation, Shandong Province receives national policy inclinations and financial support.</p> <p><b>2. Economic Aspects:</b></p> <p><b>O3:</b> The conversion of new and old kinetic energy has led to a surge in demand for high-quality technical and skilled talents, driving school-enterprise cooperation.</p> <p><b>O4:</b> A solid manufacturing foundation, with leading enterprises such as Haier and Weichai possessing resources to participate in school-running.</p> <p><b>O5:</b> Local governments have introduced policies such as tax reductions to reduce the cost of enterprises participating in school-running.</p> <p><b>O6:</b> Increased willingness of social capital to participate, with enhanced enthusiasm of private enterprises to invest in vocational education.</p>	<p><b>1. Economic Aspects:</b></p> <p><b>T1:</b> Fierce competition among Higher Vocational Colleges in the region may concentrate high-quality resources in a few institutions.</p> <p><b>T3:</b> Under economic downturn pressure, enterprises may reduce investment in vocational education.</p> <p><b>T5:</b> Rapid development of vocational education in neighboring provinces may attract the outflow of high-quality enterprise resources within Shandong.</p> <p><b>2. Social Aspects:</b></p> <p><b>T2:</b> Some enterprises have cognitive biases towards mixed-ownership school-running, resulting in insufficient cooperation stability.</p> <p><b>T6:</b> Social recognition of vocational education needs improvement, affecting the student recruitment of mixed-ownership school-running programs.</p> <p><b>3. Political Aspects:</b></p> <p><b>T4:</b> Obstacles exist in the reform of the property rights system, with cumbersome processes for asset disposal.</p>

Furthermore, based on the combined SWOT-PEST Combined analysis, the TOWS Matrix (also known as the inverted SWOT analysis) was adopted. This tool reverses the order of SWOT analysis by first analyzing market opportunities and threats, then assessing organizational strengths and weaknesses. It identifies market opportunities, evaluates whether the organization can leverage its strengths to seize these opportunities and mitigate threats, thereby complementing the aforementioned analyses.

**Table 4.12** Results of TOWS Matrix Analysis

	Internal Strengths	Internal Weaknesses
External Opportunities	<p><b>SO Strategies</b></p> <p>1. S1 + O3 + O4: Relying on the manufacturing foundation, surging talent demand, and resources of leading enterprises, promote the joint construction of "industrial colleges" by schools and enterprises, integrating enterprise technical standards into the curriculum system.</p> <p>2. S3 + O1 + O2: Leveraging local government attention, national vocational education reform policies, and Shandong's advantage as a vocational education innovation highland, collaborate with industry associations to apply for mixed-ownership demonstration projects.</p>	<p><b>WO Strategies</b></p> <p>1. W2 + W3 + O2: Address the lag in property rights reform and insufficient supporting services by utilizing Shandong's policy advantages as a vocational education innovation highland to introduce professional institutions for pilot reforms of "clear property rights + standardized services".</p> <p>2. W5 + O1 + O6: Rely on national vocational education reform policies and social capital to establish a "high-quality teacher training fund" and improve teacher training mechanisms.</p>

Table 4.12 (Continued)

	Internal Strengths	Internal Weaknesses
<b>External Opportunities</b>	<p><b>3.</b> S2 + O5 + O6: Utilize favorable geographical location, tax reductions, and social capital enthusiasm to attract enterprises to participate in campus infrastructure construction and build "school-enterprise shared practical training bases".</p> <p><b>4.</b> S4 + O4: Leverage the experience of colleges in cooperation to connect with resources of leading enterprises and promote the "order-based cultivation + modern apprenticeship" model.</p> <p><b>5.</b> S6 + O3: Rely on the resource integration platform to respond to talent demand, integrate high-quality courses and enterprise resources across colleges, and form a regional vocational education collaboration network.</p>	<p><b>3.</b> W6 + O1 + O2 + S4: Address unbalanced regional development by organizing experienced colleges to provide "one-on-one" assistance to underdeveloped regional institutions, supported by national policies and funds.</p> <p><b>4.</b> W1 + O3: In response to inter-college competition, adopt differentiated positioning based on talent demand, focusing on cultivating talents for characteristic industries.</p> <p><b>5.</b> W4 + O5: Link enterprise participation with tax reductions through policy incentives to enhance enterprises' willingness to cooperate.</p>
<b>External Threats</b>	<p><b>ST Strategies</b></p> <p>1. S5 + S6 + T1 + T5: Use industry associations as a link and rely on the resource integration platform to establish a "high-quality enterprise resource sharing alliance" and formulate inter-college cooperation mechanisms.</p>	<p><b>WT Strategies</b></p> <p>1. W1 + T3: Establish a "school-enterprise risk fund" and simplify asset disposal processes to reduce losses from cooperation termination.</p>

Table 4.12 (Continued)

	Internal Strengths	Internal Weaknesses
External Threats	<p>2. S3 + S4 + T2: Led by local governments, organize colleges with cooperation experience to share cases and invite enterprises to conduct on-site inspections to correct enterprises' cognitive biases.</p>	<p>2. W4 + T2 + S5 + O5: Develop an "enterprise participation evaluation system" led by industry associations, link results with tax reductions, and establish a reserve pool of alternative enterprises.</p>
	<p>3. S1 + S4 + T6: Utilize enterprise talent demand and college employment outcomes to jointly organize "vocational education open days" with enterprises to enhance social recognition.</p>	<p>3. W6 + T6 + O3: Launch "targeted enrollment + local employment" programs in underdeveloped areas to enhance student recruitment appeal through enterprise employment commitments.</p>
	<p>4. S2 + T5: Strengthen collaboration with local enterprises in Shandong through convenient transportation and sign long-term cooperation agreements to reduce the risk of enterprise outflow.</p>	<p>4. W5 + O6: Use social capital to establish a special recruitment fund for double-qualified teachers to optimize the teaching staff structure.</p>
	<p>5. S3 + T3: Local governments introduce subsidies for enterprises participating in vocational education to offset investment reductions caused by economic downturns.</p>	<p>5. W2 + T4 + O1: Pilot property rights system innovation in accordance with national vocational education reform policies to simplify asset disposal processes.</p>

Based on the systematic collation and in-depth analysis of the questionnaire and interview data targeting the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province—which covers diverse types of mixed-ownership vocational colleges and multi-stakeholder perspectives including college administrators, enterprise partners, and frontline faculty—this study identified the core challenges, feasible pathways, and key priority areas that require improvement for such development. These key areas are concluded as follows: 1) Management environment, 2) Property right attributes, 3) Resource environment, 4) Educational environment, and 5) Campus environment. Notably, these dimensions are derived from empirical data rather than subjective assumptions, which lays a solid foundation for the targeted optimization of the subsequent development model. Moreover, these five dimensions are not isolated but interrelated, forming an integrated framework that underpins the sustainable operation of mixed-ownership school-running models.

## **Part II: Data analysis of interviews and focus groups used in construct model**

### **2.1 Analysis of Interview Data on the Existing Sustainable Development Models (Including Supporting Strategies) of Successfully Run Mixed-ownership Higher Vocational Colleges in Shandong Province**

This part conducts an in-depth analysis of the interview data focusing on the sustainable development strategies of successful mixed-ownership school-running practices in higher vocational colleges of Shandong Province, aiming to accurately extract the practical experience and core strategies in this field. The research adopts a structured interview outline designed exclusively for this study, through which the information provided by the interviewees is systematically collected and sorted out.

The interviewees are members of the pre-established research sample group, and the selected interview schools are well-recognized benchmark higher vocational colleges in Shandong Province with proven success in mixed-ownership school-

running. Specifically, these interviewees are recruited from 5 such colleges, all with no less than 5 years of working experience in higher vocational education. The panel consists of 5 senior teachers, 5 senior administrators, and 5 senior stakeholders who are directly responsible for mixed-ownership related work, totaling 15 participants. This diversified and experienced interviewee lineup ensures the authority and representativeness of the collected interview data.

Table 4.13 Interview Content Analysis Table

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.	
	Interviewer																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
<b>Q1: Please briefly introduce your college's main achievements and landmark outcomes in the sustainable development of mixed-ownership school-running.</b>																		
1) Jointly established industrial colleges with industry-leading enterprises to achieve resource sharing and collaborative talent cultivation.	√	√	√	√			√						√				6	40.00%
2) Introduced social capital to build domestically advanced practical training bases, improving practical teaching standards.			√	√			√	√	√	√			√	√			8	53.33%
3) Jointly developed core courses with enterprises, which were recognized as "high-quality courses".		√		√		√	√	√	√	√	√		√	√			10	66.67%
4) The employment rate and professional counterpart rate of graduates have remained stable and improved.						√	√		√	√		√	√	√			7	46.67%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5) The proportion of teachers with enterprise experience has increased, and teachers have participated in enterprise project research and development.	√	√		√	√	√	√	√		√		√	√		√	11	73.33%
6) Cooperated with enterprises to carry out technological research and development and obtained patents, creating economic benefits for enterprises.	√	√	√	√	√	√		√				√	√			9	60.00%
7) Built productive practical training workshops to integrate teaching with production.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
8) The vocational skill level identification center provides identification services for social personnel and students.	√		√			√	√		√		√					6	40.00%
<b>Q2: What do you think are the core factors for the success of your school in the sustainable development of mixed-ownership school-running?</b>																	
1) The school and enterprise have consistent concepts and both recognize the cooperation principle of "education first, benefit sharing".		√	√	√			√	√	√				√	√		8	53.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
2) Clear property rights and a cooperation agreement with balanced rights and responsibilities, providing guarantees for multi-party cooperation.	√	√			√	√	√	√	√	√	√	√	√	√	√	9	60.00%
3) Diversified profit distribution mechanism to balance the interest demands of schools and enterprises.	√	√				√	√	√	√	√	√	√	√	√	√	12	80.00%
4) Strong leadership team that values mixed-ownership school-running and actively promotes its implementation.	√		√	√	√				√		√	√	√	√	√	10	66.67%
5) Improved corporate governance structure to ensure the scientificity and efficiency of multi-party decision-making.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
6) High-quality cooperative enterprise resources, with strong alignment with the college's majors and significant investment.			√	√	√	√					√	√	√	√		8	53.33%
7) High-quality teaching staff adaptable to the needs of mixed-ownership school-running.	√	√				√	√	√		√			√			7	46.67%
8) Flexible talent cultivation strategies to quickly respond to enterprise and market demands.	√		√	√	√			√		√	√	√	√	√	√	10	66.67%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
9) Strong support from government departments, providing policy and financial guarantees.	√	√			√			√	√	√	√	√	√	√	√	11	73.33%
10) Sound risk prevention and control mechanism to effectively respond to various cooperation risks.			√	√		√	√	√	√	√	√	√	√	√	√	12	80.00%
11) Good communication and coordination mechanism between schools and enterprises to timely solve problems in cooperation.			√			√	√	√	√				√	√	√	8	53.33%
12) Focus on brand building to improve the social recognition of mixed-ownership school-running.	√	√	√		√	√					√		√			7	46.67%
13) Continuous reform and innovation awareness to constantly optimize school-running strategies and management mechanisms.	√	√		√				√	√		√		√	√	√	9	60.00%
<b>Q3: What core concepts and guiding principles should we follow when formulating a draft strategy for the sustainable development of mixed-ownership school-running?</b>																	
1) "Talent cultivation as the fundamental" principle, with talent cultivation quality as the core of school-running.			√	√		√	√			√	√		√			7	46.67%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
2) "Clear property rights" principle, clarifying the ownership of property rights and the division of rights and responsibilities among parties.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	11	73.33%
3) "Benefit sharing, risk sharing" principle, balancing the interests of all parties and jointly assuming school-running risks.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	14	93.33%
4) "School-enterprise collaboration" principle, promoting in-depth integration between schools and enterprises to form a joint force for talent cultivation.	√	√					√	√	√	√		√				7	46.67%
5) Principle of "combining market-oriented operation with public welfare attributes", balancing efficiency and equity.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
6) "Dynamic adjustment" principle, enabling strategies to adapt to changes in the external environment and internal development.	√	√	√	√	√			√	√			√	√	√		10	66.67%
7) "Fairness and impartiality" principle, safeguarding the legitimate rights and interests of teachers, students, and other relevant groups.	√	√	√	√	√	√	√	√	√	√	√	√	√			13	86.67%
8) "Openness and inclusiveness" principle, encouraging multi-subject participation in school-running to form a sound ecosystem.	√	√	√	√			√		√		√	√	√			8	53.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
9) "Quality priority" principle, establishing a sound quality supervision system to ensure school-running quality.	√	√			√	√		√	√		√	√	√	√	√	9	60.00%
<b>Q4: What core content and supporting strategies should be included in the "property rights attribute design" dimension when promoting the implementation of the mixed-ownership school-running model?</b>																	
1) Define the ownership of various assets and the proportion of equity.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
2) Stipulate the rights and obligations of each property rights subject.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
3) Design an equity transfer mechanism and a dispute resolution mechanism for property rights.	√	√		√	√	√	√	√	√	√	√		√	√	√	13	86.67%
4) Determine profit distribution methods, balancing the public welfare attributes of schools and the reasonable returns of social capital.		√	√	√	√	√	√	√	√		√	√	√	√	√	13	86.67%
5) Standardize asset disposal processes, such as methods for asset appreciation, depreciation, and scrapping.						√	√	√		√	√	√		√	√	9	60.00%
6) Establish a property rights information disclosure system to safeguard the right to information of all stakeholders.	√		√	√	√	√	√		√	√	√			√	√	11	73.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
7) Consider a dynamic adjustment mechanism for property rights to adapt to the expansion of school-running scale or strategy adjustments.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
8) Clarify the ownership and usage rules of intellectual property rights to protect the outcomes of school-enterprise cooperative R&D.	√	√	√	√				√	√	√	√	√	√			10	66.67%
<b>Q5: What aspects should be emphasized in the educational environment for mixed-ownership school-running?</b>																	
1) Alignment of the curriculum system with industry needs to ensure teaching content keeps pace with industrial development.	√				√		√	√	√	√	√	√	√	√	√	11	73.33%
2) Design of practical teaching links, such as arrangements for practical training, internships, and project cooperation.	√	√	√	√	√	√	√	√		√	√	√	√	√	√	14	93.33%
3) Integration of school and enterprise teaching staff, including the proportion and depth of enterprise mentors' participation in teaching.					√	√	√		√	√	√	√	√	√	√	11	73.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
4) Integration of campus culture and enterprise culture to cultivate students' professional literacy.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
5) Innovation in teaching methods, such as project-based teaching and case-based teaching.		√	√			√	√	√			√	√	√	√		9	60.00%
6) Effectiveness of students' career planning guidance to help students clarify their development directions.					√	√	√		√	√	√	√	√	√	√	11	73.33%
7) Scientific nature of the educational evaluation system, balancing the assessment of knowledge acquisition and practical abilities.		√	√	√	√	√		√	√	√	√	√	√	√	√	13	86.67%
8) Integration of cross-disciplinary teaching resources to cultivate compound talents.	√	√	√	√	√	√	√	√		√	√	√	√	√	√	14	93.33%
9) Cultivation of students' comprehensive qualities, including communication skills and teamwork abilities.	√	√	√				√	√			√	√	√	√		9	60.00%
10) Realization of educational equity to safeguard the learning opportunities and resource access of students from diverse backgrounds.					√	√	√	√	√			√	√	√		8	53.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.	
	Interviewer																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
<b>Q6: How to improve the campus environment to support the development of mixed-ownership school-running</b>																		
1) Build practical training bases that meet enterprise production standards to simulate real work scenarios.		√	√	√	√		√	√	√	√		√					9	60.00%
2) Optimize campus hardware facilities, such as the functional layout of classrooms, laboratories, and libraries.		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	14	93.33%
3) Build an information-based resource sharing platform for schools and enterprises to achieve the interconnection of teaching resources and enterprise technical materials.	√	√			√	√	√		√	√	√	√	√	√	√	√	12	80.00%
4) Improve campus logistics services, such as accommodation, catering, and medical care, to meet the needs of enterprise personnel stationed on campus.	√	√	√	√	√	√	√	√	√	√	√	√	√		√		14	93.33%
5) Create an open and inclusive campus atmosphere to encourage enterprise personnel to participate in campus activities.		√	√		√			√			√		√		√		7	46.67%
6) Plan dedicated office areas for school-enterprise cooperation to facilitate communication and coordination between the two parties.			√	√		√	√	√	√	√	√	√	√	√	√		11	73.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
7) Set up a school-enterprise cooperation achievement exhibition area to publicize school-running outcomes and enterprise contributions.	√	√		√	√		√	√	√		√		√		√	10	66.67%
8) Strengthen campus greening and environmental improvement to create a comfortable learning and working environment.	√	√	√	√		√	√	√		√	√	√	√		√	12	80.00%
<b>Q7: How to improve the management environment under mixed-ownership school-running to meet the needs of sustainable teaching management?</b>																	
1) Establish a joint governance structure involving both schools and enterprises, such as decision-making bodies like councils or boards of directors.	√	√		√	√	√	√			√		√			√	9	60.00%
2) Clarify the division of rights and responsibilities between schools and enterprises in teaching management to avoid overlapping or vacant management.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
3) Formulate a flexible personnel management system to attract and motivate outstanding talents from both schools and enterprises.			√	√		√	√	√	√	√	√	√	√	√	√	12	80.00%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
4) Establish an efficient communication and coordination mechanism, such as regular meetings and information sharing platforms.	√	√	√	√		√	√	√		√	√	√	√	√	√	13	86.67%
5) Design a scientific performance appraisal system that balances teaching effectiveness and enterprise satisfaction.		√		√	√		√		√	√	√	√		√	√	11	73.33%
6) Establish a risk prevention and control mechanism to address policy, market, financial, and other risks in the school-running process.	√	√	√	√	√	√	√	√	√	√	√	√	√	√		14	93.33%
7) Optimize administrative management processes to improve the approval and implementation efficiency of school-enterprise cooperation projects.	√	√	√	√		√	√	√		√	√	√	√		√	12	80.00%
8) Formulate a financial management system tailored to the characteristics of mixed-ownership to standardize fund usage.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
9) Establish a management information disclosure system to accept supervision from teachers, students, enterprises, and society.		√	√	√		√	√		√	√	√	√	√	√		11	73.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
10) Design a dynamic adjustment mechanism for management strategies to adapt to changes in school-running scale and the external environment.	√		√				√	√		√			√		√	7	46.67%
<b>Q8: How should we strengthen the construction of the resource environment to support the sustainable development of mixed-ownership school-running?</b>																	
1) Expand diversified funding channels to attract multi-source investment, such as social capital, enterprise investment, and government subsidies.		√	√	√	√	√		√	√		√	√	√	√		11	73.33%
2) Establish a school-enterprise resource sharing mechanism, such as the shared use of equipment, technology, and venues.	√				√	√	√	√		√		√		√	√	9	60.00%
3) Optimize the allocation of teaching resources to reasonably distribute resources according to the needs of different majors and cooperation projects.		√	√	√	√		√	√	√	√			√	√	√	12	80.00%
4) Establish a dynamic resource supplementation mechanism to regularly update practical training equipment and teaching materials.	√	√	√	√		√	√		√		√	√	√	√		11	73.33%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5) Promote in-depth integration of industry, universities, and research, transforming enterprise technical problems into research resources.			√	√	√	√	√		√			√		√		8	53.33%
6) Establish a resource utilization efficiency evaluation system to improve the efficiency of resource use.	√		√	√		√	√	√	√	√	√	√		√	√	12	80.00%
<b>Q9: How did you design and implement the evaluation and feedback mechanism to ensure the effectiveness and continuous improvement of mixed-ownership school-running?</b>																	
1) Establish diversified evaluation subjects, including schools, enterprises, students, parents, and social institutions.		√	√			√	√			√			√	√		7	46.67%
2) Design a comprehensive evaluation index system covering talent cultivation quality, school-enterprise cooperation effectiveness, and school-running benefits.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15	100.00%
3) Conduct regular evaluation activities, such as teaching quality evaluation every semester and school-running effectiveness evaluation every year.	√	√	√	√		√	√		√	√	√	√	√	√	√	13	86.67%

Table 4.13 (Continued)

Responses	Existing Model (including Supporting Strategies)															Freq.	Prop.
	Interviewer																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
4) Adopt multiple evaluation methods, such as questionnaires, interviews, on-site inspections, and data analysis.	√	√	√				√		√					√		6	40.00%
5) Establish an evaluation result feedback mechanism to promptly inform relevant parties of evaluation results and propose improvement suggestions.	√			√	√			√	√	√	√	√		√	√	10	66.67%

## 2.2 Analysis of Focus Group Data for Constructing the Draft Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

The researcher invited 15 group members responsible for mixed-ownership school-running related work, including 5 senior teachers, 5 senior administrators, and 5 senior stakeholders directly in charge of mixed-ownership affairs (3 from each school), to conduct focus group discussions. Through a questionnaire survey on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province, as well as interviews on the problems, pathways, and influencing factors of its sustainable development, SWOT, PEST, and TOWS analyses were adopted for targeted research. Subsequently, the researcher organized relevant personnel to conduct focus group discussions on issues related to constructing the draft model, providing direct basis for the development of the draft sustainable development model (including supporting strategies).

It can be clearly observed that the survey information is fully supported and consistent with the analysis of the thesis. From the current situation, the mixed-ownership school-running of most higher vocational colleges is at a moderate level, and targeted strategies need to be proposed to address these problems. Therefore, the core dimensions of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province can be determined as the following 5 aspects, with corresponding supporting strategies for each dimension: 1) Property Rights Attributes, 2) Educational Environment, 3) Campus Environment, 4) Management Environment, 5) Resource Environment. Based on relevant literature, questionnaires, and interview results, 8 questions were raised around the above 5 aspects to discuss the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies). The discussion results are as follows:

Question 1: What visions and specific goals should we set for the sustainable development of mixed-ownership school-running?

Mixed-ownership school-running in higher vocational colleges in Shandong Province should strive to: 1) Formulate sustainable development strategies for in-depth school-enterprise integration, and establish a school-running community with clear property rights, equal rights and responsibilities, benefit sharing, and risk bearing; 2) Cultivate high-quality technical and skilled talents adapting to regional industrial development, who not only possess solid professional skills but also have good professional quality and innovative capabilities, so as to provide talent support for the conversion of old and new kinetic energy in Shandong Province. Combined with the national vocational education reform goals and the industrial development plan of Shandong Province, mixed-ownership school-running in higher vocational colleges in Shandong Province should formulate scientific and reasonable development goals, covering property rights system innovation, improvement of educational and teaching quality, deepening of school-enterprise cooperation, optimization of management mechanisms, and efficient resource allocation.

Question 2: What core concepts and guiding principles should we follow when constructing a draft sustainable development model for mixed-ownership school-running?

When constructing the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province, we should adhere to the core concept of "integration of production and education, collaborative talent training". We should not only focus on school-running benefits and resource integration but also focus on the accurate connection between talent training quality and industrial needs to ensure the sustainability and public welfare of the school-running model. We must adhere to the principle of clear property rights to clarify the rights, responsibilities, and interests of each investment subject; adhere to the principle of equal cooperation between schools and enterprises to ensure the right to speak of both parties in school-running decision-making; adhere to the principle of dynamic adjustment to optimize the school-running model according to industrial development and policy changes; adhere to the principle of quality priority, taking talent training quality as the core criterion for measuring school-

running effectiveness; encourage multi-party participation to form a synergy of joint promotion by the government, schools, enterprises, and society.

Question 3: What aspects should be included in the formulation of the core property rights attribute plan for the sustainable development of mixed-ownership school-running in higher vocational colleges?

To promote the sustainable development of mixed-ownership school-running in higher vocational colleges, the formulation of the core property rights attribute plan should include: 1) Clarify the composition of property rights, defining the forms and proportions of capital contribution from different subjects such as school capital, social capital, and enterprise capital; 2) Standardize property rights registration, clearly registering various assets such as campus land, teaching equipment, and intellectual property rights to determine their ownership; 3) Design the equity structure, setting different equity types such as common shares and preferred shares according to the proportion of capital contribution and contribution to meet the needs of different investment subjects; 4) Formulate profit distribution rules, taking into account the public welfare attributes of the school and the reasonable return of social capital, and clarifying the method and cycle of profit distribution; 5) Establish a property rights transfer mechanism, specifying the conditions and procedures for operations such as equity transfer, capital increase and share expansion, and withdrawal; 6) Improve the property rights protection system, safeguarding the legitimate rights and interests of each property rights subject through contractual agreements and legal means.

Question 4: What aspects should be focused on in the construction of the educational environment for the sustainable development of mixed-ownership school-running in higher vocational colleges?

To support the sustainable development of mixed-ownership school-running in higher vocational colleges, the construction of the educational environment should focus on: 1) Build a curriculum system aligned with industrial needs, with core courses jointly developed by schools and enterprises, integrating enterprise technical standards and post requirements; 2) Strengthen the construction of a "double-

qualified" teaching team, introducing enterprise technical backbones as part-time teachers and selecting school teachers to practice in enterprises; 3) Innovate teaching models, promoting project-based teaching, case teaching, modern apprenticeship system, etc., to improve students' practical capabilities; 4) Build a practical teaching platform shared by schools and enterprises, constructing training bases that meet enterprise production standards; 5) Create an educational atmosphere integrating campus culture and enterprise culture to cultivate students' professional quality and teamwork spirit; 6) Establish a diversified educational evaluation system, introducing third-party evaluation mechanisms such as enterprise evaluation and industry certification.

Question 5: What suggestions are there for improving the campus environment to enhance the sustainable development effect of mixed-ownership school-running?

Suggestions for improving the campus environment to enhance the sustainable development effect of mixed-ownership school-running include: 1) Build integrated training spaces for enterprises and schools, introducing enterprise production lines and R&D centers into the campus to achieve seamless connection between teaching and production scenarios; 2) Optimize the campus functional layout, setting up special areas such as school-enterprise cooperation office areas, achievement exhibition areas, and technical exchange areas to facilitate communication and coordination between school and enterprise personnel; 3) Improve the construction of an information-based campus, building a shared platform for school-enterprise resources to realize real-time intercommunication of teaching materials, technical documents, and training data; 4) Strengthen the construction of campus safety facilities, formulating special safety norms for enterprise training links to ensure the safety of teachers, students, and enterprise personnel; 5) Create an open and inclusive campus atmosphere, promoting cultural integration between personnel of both parties through activities such as school-enterprise cultural festivals and skill competitions; 6) Improve campus logistics

services, providing accommodation, catering and other conveniences for enterprise stationed personnel to enhance cooperation convenience.

Question 6: How to improve the management environment to meet the needs of the sustainable development of mixed-ownership school-running?

To meet the needs of the sustainable development of mixed-ownership school-running, improving the management environment should: 1) Establish a joint school-enterprise governance structure, setting up a council composed of representatives from schools, enterprises, and the government to be responsible for major decision-making; 2) Clarify the division of powers and responsibilities between schools and enterprises in teaching management, personnel management, financial management, etc., to avoid management overlap or vacuum; 3) Formulate a flexible personnel management system, implementing a two-way flow mechanism for talents between schools and enterprises, and providing special incentives for teachers and enterprise personnel participating in cooperation; 4) Establish an efficient communication and coordination mechanism, holding regular joint school-enterprise meetings to promptly solve problems in cooperation; 5) Improve the risk prevention and control system, formulating emergency plans for capital risks, policy risks, cooperation risks, etc.; 6) Implement open management information, disclosing school-running progress, financial status and other information to each property rights subject and stakeholder regularly.

Question 7: How should we strengthen the construction of the resource environment to support the sustainable development of mixed-ownership school-running?

To strengthen the construction of the resource environment to support the sustainable development of mixed-ownership school-running, we should: 1) Broaden fund-raising channels to ensure school-running funds through special government subsidies, enterprise investment, social donations, project financing, etc.; 2) Co-build and share training resources, with enterprises providing advanced equipment and schools being responsible for maintenance and management to achieve efficient resource utilization; 3) Integrate school-enterprise scientific research resources, jointly

establishing technical R&D centers to apply for scientific research projects and transform scientific research achievements together; 4) Build a digital teaching resource library, collecting enterprise cases, technical manuals, online courses, etc., for teachers, students, and enterprise employees to use; 5) Optimize the resource allocation mechanism, dynamically adjusting resource allocation according to the cooperative needs of different majors to improve utilization efficiency; 6) Establish a resource supplement and update mechanism, investing a certain proportion of funds every year in equipment upgrading and technology introduction to ensure the advanced nature of resources.

Question 8: Are there any other suggestions for the construction of the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province?

To construct the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province, it is necessary to clarify the positioning and core tasks of schools in the integration of production and education, such as "building a regional industrial talent training highland" and "promoting school-enterprise collaborative innovation". Phased development goals should be established. The long-term goals (3-5 years) can be set as "forming a mature mixed-ownership school-running model to become a provincial-level demonstration model" and "achieving 100% coverage of school-enterprise cooperative majors"; the short-term goals (1-2 years) can include "completing 2-3 pilot mixed-ownership secondary colleges" and "introducing 3-5 leading enterprises in the industry for in-depth cooperation", and gradually achieve long-term visions through phased implementation. At the same time, it is necessary to strengthen policy connection with local governments, striving for support in property rights reform and tax incentives to create a good external environment for the implementation of the model.

Through systematic sorting and integration of the opinions from focus group discussions, and full alignment with the five core improvement areas identified in the preliminary research (including the management environment, property rights

attributes, etc.), the Draft Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies) was formulated. The research further clarified the structure of this draft: it takes the five core dimensions as the core framework, and defines five specific goals for each dimension. For each goal, the draft is matched with Key Performance Indicators (KPIs) and strategic issues: KPIs are used to quantify the achievement effect of the goals, ensuring the operability and evaluability of the model; while strategic issues focus on the core pain points and implementation priorities in the process of strategy implementation.

The draft model takes "property right attributes - educational environment - campus environment - management environment - resource environment" as the core logical chain, and forms a systematic framework of "dimension leadership and strategy landing". This framework not only responds to the core problems of sustainable development identified in the previous questionnaire and interview analysis, but also provides a clear logical guide and operational basis for the subsequent revision, verification and practical promotion of the model.

**Table 4.14** Draft Sustainable Development Model (including Implementation Strategies for each dimension)

Strategic 1: Optimize the Design of Property Rights Attributes	
<b>Goal</b>	<ol style="list-style-type: none"> <li>1. Clarify the composition of property rights and the form/proportion of capital contribution of each subject.</li> <li>2. Standardize the property rights registration process for various assets.</li> <li>3. Design a scientific and reasonable equity structure.</li> <li>4. Formulate fair profit distribution rules.</li> <li>5. Establish a sound property rights transfer mechanism.</li> </ol>
<b>KPI</b>	<ol style="list-style-type: none"> <li>1. Approval rate of the property rights composition plan: &gt;90%.</li> <li>2. Completion rate and accuracy rate of asset property rights registration: &gt;95%.</li> <li>3. Satisfaction of each investment subject with the equity structure design: &gt;3.8.</li> <li>4. Implementation rate of the profit distribution plan: &gt;100%.</li> <li>5. Compliance rate of property rights transfer procedures: &gt;98%.</li> </ol>
<b>Strategic Issue</b>	<ol style="list-style-type: none"> <li>1. Balance the proportion of capital contribution between state-owned capital and social capital to ensure the safety of state-owned assets while stimulating the enthusiasm of social capital participation.</li> <li>2. Clarify the evaluation standards for intangible assets to ensure that intellectual property rights are reasonably reflected in property rights registration.</li> <li>3. Design differentiated equity types to meet the diverse needs of different investment subjects in terms of decision-making power and profit rights.</li> <li>4. Balance the public welfare attributes of schools and the profit demands of enterprises when formulating profit distribution rules to avoid interest conflicts.</li> <li>5. Set reasonable thresholds for property rights transfer to prevent malicious acquisition or asset loss and ensure the stability of school-running.</li> </ol>

Table 4.14 (Continued)

Strategic 2: Improve the Construction of the Educational Environment	
<b>Goal</b>	<ol style="list-style-type: none"> <li>1. Build a curriculum system aligned with industrial needs.</li> <li>2. Strengthen the construction of a high-quality teaching staff.</li> <li>3. Innovate practice-oriented teaching models.</li> <li>4. Establish a school-enterprise shared practical training platform.</li> <li>5. Develop a diversified educational evaluation system.</li> </ol>
<b>KPI</b>	<ol style="list-style-type: none"> <li>1. Alignment rate of curriculum content with enterprise technical standards: &gt;85%.</li> <li>2. Proportion of double-qualified teachers among professional teachers: &gt;60%.</li> <li>3. Proportion of courses adopting project-based/case-based teaching: &gt;50%.</li> <li>4. Enterprise utilization rate of practical training platforms and student practical training coverage rate: &gt;90%.</li> <li>5. Proportion of courses involving enterprise evaluation: &gt;70%.</li> </ol>
<b>Strategic Issue</b>	<ol style="list-style-type: none"> <li>1. Establish a dynamic curriculum adjustment mechanism to ensure that curriculum content keeps pace with the iteration of industrial technology.</li> <li>2. Improve the incentive mechanism for enterprise technical backbones to participate in campus teaching to solve the problem of unstable teaching hours of part-time teachers.</li> <li>3. Balance the proportion of theoretical teaching and practical teaching hours to avoid overemphasis on one aspect.</li> <li>4. Coordinate differences between schools and enterprises in the use time and management responsibilities of practical training platforms to improve platform utilization.</li> <li>5. Unify diversified evaluation standards to make school evaluation, enterprise evaluation, and industry certification results comparable.</li> </ol>

Table 4.14 (Continued)

Strategic 3: Upgrade Campus Environment Support	
<b>Goal</b>	<ol style="list-style-type: none"> <li>1. Construct practical training spaces integrating schools and enterprises.</li> <li>2. Optimize the functional layout for school-enterprise collaboration.</li> <li>3. Improve the information-based resource sharing platform.</li> <li>4. Strengthen the campus safety guarantee system.</li> <li>5. Enhance the adaptability of logistics services.</li> </ol>
<b>KPI</b>	<ol style="list-style-type: none"> <li>1. Proportion of productive practical training in the total practical training hours of students: &gt;40%.</li> <li>2. Utilization rate of dedicated school-enterprise cooperation areas: &gt;80%.</li> <li>3. Annual growth rate of the upload volume and access volume of school-enterprise resources on the information platform: &gt;30%.</li> <li>4. Incidence rate of practical training safety accidents: &lt;0.1‰.</li> <li>5. Satisfaction of enterprise stationed personnel with logistics services: &gt;3.7.</li> </ol>
<b>Strategic Issue</b>	<ol style="list-style-type: none"> <li>1. Resolve the time conflict between enterprise mentors' production and operation and teaching arrangements.</li> <li>2. Reasonably plan functional areas within the limited campus space to meet the office, teaching, and production needs of both schools and enterprises.</li> <li>3. Protect the intellectual property rights of enterprise technical materials and teaching resources on the sharing platform.</li> <li>4. Formulate campus safety management standards covering enterprise production safety standards to unify the standards of safety supervision.</li> <li>5. Adjust the logistics service model to adapt to the temporary and mobile characteristics of enterprise personnel staying on campus.</li> </ol>

Table 4.14 (Continued)

Strategic 4: Optimize the Management Environment Mechanism	
<b>Goal</b>	<ol style="list-style-type: none"> <li>1. Establish a joint governance structure involving both schools and enterprises.</li> <li>2. Clarify the boundary of rights and responsibilities between schools and enterprises.</li> <li>3. Implement a flexible personnel management system.</li> <li>4. Improve the efficient communication and coordination mechanism.</li> <li>5. Strengthen the risk prevention and control system.</li> </ol>
<b>KPI</b>	<ol style="list-style-type: none"> <li>1. Implementation efficiency of council decisions (issue resolution rate): &gt;95%.</li> <li>2. Incidence rate of disputes over rights and responsibilities between schools and enterprises: &lt;5%.</li> <li>3. Annual number of two-way flows of school-enterprise talents: &gt;20 people.</li> <li>4. Problem resolution rate of school-enterprise joint meetings: &gt;85%.</li> <li>5. Frequency and effectiveness of risk plan drills (annual drills: &gt;2 times; plan applicability rate: &gt;90%).</li> </ol>
<b>Strategic Issue</b>	<ol style="list-style-type: none"> <li>1. Balance the proportion of seats of schools, enterprises, and the government in the council to avoid one party dominating decision-making.</li> <li>2. Refine the list of rights and responsibilities in areas such as teaching management and financial management to prevent management vacuums.</li> <li>3. Break through the restrictions of the personnel system of public institutions to realize the flexibility of the staffing of enterprise talents participating in school-running.</li> <li>4. Establish cross-departmental and cross-organizational communication channels to shorten the response and solution cycle of problems.</li> <li>5. Identify core risk points such as property rights, funds, and cooperation stability, and formulate operable prevention and control measures.</li> </ol>

Table 4.14 (Continued)

Strategic 5: Strengthen Resource Environment Guarantees	
<b>Goal</b>	<ol style="list-style-type: none"> <li>1. Expand diversified funding channels.</li> <li>2. Jointly build and share practical training equipment resources.</li> <li>3. Integrate school-enterprise scientific research and innovation resources.</li> <li>4. Construct a digital teaching resource database.</li> <li>5. Establish a dynamic resource renewal mechanism.</li> </ol>
<b>KPI</b>	<ol style="list-style-type: none"> <li>1. Proportion of social capital investment in total school-running investment: &gt;30%.</li> <li>2. School-enterprise sharing rate of practical training equipment: &gt;70%.</li> <li>3. Annual number of school-enterprise joint research projects approved: &gt;5 projects.</li> <li>4. Annual growth rate of the total amount of curriculum resources in the digital resource database: &gt;40%.</li> <li>5. Proportion of annual investment in equipment update and technology introduction: &gt;15%.</li> </ol>
<b>Strategic Issue</b>	<ol style="list-style-type: none"> <li>1. Design an exit channel for social capital to reduce investment risks and attract long-term funds.</li> <li>2. Coordinate the maintenance responsibilities and cost sharing of practical training equipment to extend the service life of equipment.</li> <li>3. Balance the commercial value of enterprises and the teaching value of schools in scientific research projects to avoid utilitarian tendencies.</li> <li>4. Resolve the contradiction between the confidentiality of enterprise technical materials and the sharing of teaching resources.</li> <li>5. Establish evaluation standards for resource updates, giving priority to eliminating outdated resources to ensure the advancement of resources.</li> </ol>

### 2.3 Analysis of Focus Group Data on the Feasibility and suitability of the Draft Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)

In this part, the focus group discussion method is adopted to conduct the feasibility and suitability evaluation, and the relevant data are quantitatively presented in the form of mean values and standard deviations. The study specially invites 5 experts with authoritative qualifications in the fields of mixed-ownership school-running research, model construction, and vocational education management to form a focus group, which conducts in-depth demonstration specifically on the draft model (including supporting strategies).

Centering on the two core dimensions of "feasibility" and "suitability", the focus group designs 10 targeted questions (for example, the suitability dimension covers the alignment of the draft with the actual development of vocational education in Shandong Province, the consideration of the interests of multiple subjects, etc.; the feasibility dimension includes the resource matching for strategy implementation, operational difficulty, etc.) and conducts systematic discussions. The evaluation adopts a Likert five-point scale (scores 1-5 correspond to "extremely inappropriate/infeasible" to "extremely appropriate/feasible" respectively), requiring each expert to independently select the corresponding level for each question to ensure the objectivity of the scoring. Combining the statistical analysis results of experts' scoring data and the optimization suggestions put forward in the discussions, the draft is further improved, and finally, a scientific, rigorous, and practice-aligned sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province is constructed.

**Table 4.15** Feasibility of the Draft Model

(n = 5)					
Contents	$\bar{x}$	S.D.	Level	Rank	
1. The property rights attribute plan in the model is feasible for implementation	4.200	0.447	high	4	
2. The construction of the educational environment in the model is feasible for implementation	4.200	0.447	high	4	
3. The construction of the campus environment in the model is feasible for implementation	4.400	0.548	high	2	
4. The construction of the management environment in the model is feasible for implementation	4.600	0.548	highest	1	
5. The construction of the resource environment in the model is feasible for implementation	4.400	0.548	high	2	
<b>Total</b>	<b>4.360</b>	<b>0.508</b>	<b>high</b>		

Note: Scale division standards: 1.00-1.49=Lowest level, 1.50-2.49=Low level, 2.50-3.49=Moderate level, 3.50-4.49=High level, 4.50-5.00=Highest level

According to Table 4.16, based on the initial assessment conducted by a panel of experts during the focus group sessions, the overall feasibility of the draft sustainable development model (with supporting strategies) for mixed-ownership school-running in higher vocational colleges in Shandong Province is at a high level ( $\bar{x}$ =4.360). Based on the research results, the rankings from highest to lowest are as follows: “The management environment construction in the strategies is feasible for implementation” ( $\bar{x}$ =4.600), “The campus environment construction in the strategies is feasible for implementation” ( $\bar{x}$ =4.400), “The resource environment construction in the strategies is feasible for implementation” ( $\bar{x}$ =4.400), “The property rights attribute scheme in the strategies is feasible for implementation” ( $\bar{x}$ =4.200), and

“The educational environment construction in the strategies is feasible for implementation” ( $\bar{x}$ =4.200). Each of these items falls into the high level category.

**Table 4.16** Suitability of the Draft Model

(n = 5)					
Contents	$\bar{x}$	S.D.	Level	Rank	
1. The model fully considers the current situation and development needs of mixed-ownership school-running in higher vocational colleges in Shandong Province	4.200	0.837	high	3	
2. The model content fully considers the characteristics and needs of students, teachers, and administrators in higher vocational colleges	4.200	0.837	high	3	
3. The model can effectively respond to the challenges faced by the sustainable development of mixed-ownership school-running currently and in the future	4.400	0.548	high	1	
4. The model fully considers the interests of stakeholders such as the government, schools, and enterprises	4.000	0.548	high	5	
5. The model helps improve the educational quality and school-running level of higher vocational colleges	4.400	0.894	high	1	
<b>Total</b>	<b>4.240</b>	<b>0.733</b>	<b>high</b>		

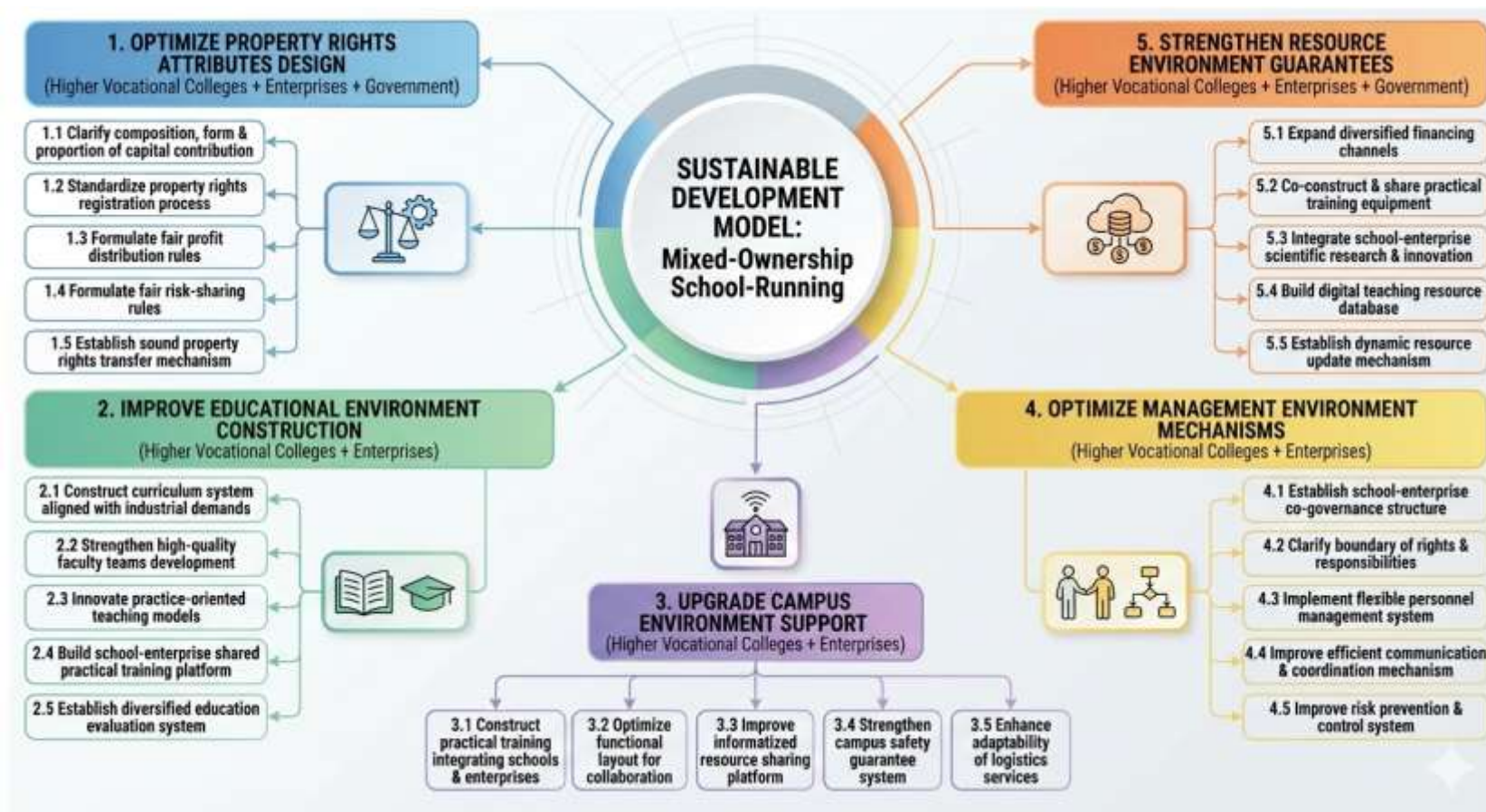
Note: Scale division standards: 1.00-1.49=Lowest level, 1.50-2.49=Low level, 2.50-3.49=Moderate level, 3.50-4.49=High level, 4.50-5.00=Highest level

According to Table 4.15, based on the initial assessment conducted by a panel of experts during the focus group sessions, the overall suitability of the draft sustainable development model of mixed-ownership school-running in higher

vocational colleges in Shandong Province (including supporting strategies) is at a high level ( $\bar{x}=4.360$ ). According to the research results, ranked from high to low: "The model can effectively respond to the challenges faced by the sustainable development of mixed-ownership school-running currently and in the future" ( $\bar{x}=4.400$ ), "The model helps improve the educational quality and school-running level of higher vocational colleges" ( $\bar{x}=4.400$ ), "The model fully considers the current situation and development needs of mixed-ownership school-running in higher vocational colleges in Shandong Province" ( $\bar{x}=4.200$ ), and "The model content fully considers the characteristics and needs of students, teachers, and administrators in higher vocational colleges" ( $\bar{x}=4.200$ ), "The model fully considers the interests of stakeholders such as the government, schools, and enterprises" ( $\bar{x}=4.000$ ), each of which is at a high level.

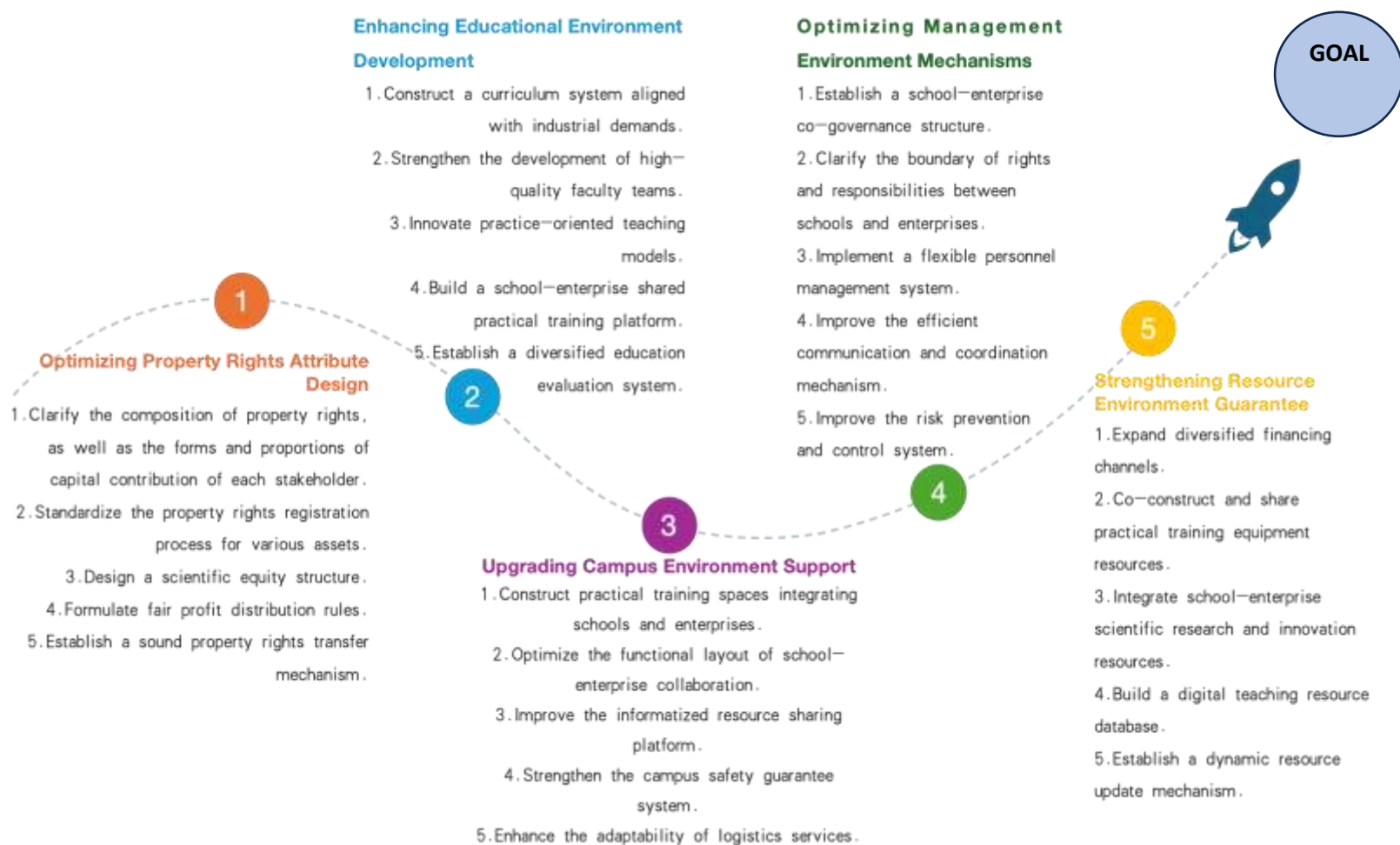
In summary, it can be clearly observed from Tables 4.15 and 4.16 that the draft sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province (including supporting strategies) demonstrates remarkably high feasibility and suitability.

Based on the quantitative results of the questionnaire survey, the in-depth insights from interviews, and the professional suggestions of experts in the focus group discussions, the researcher conducted multiple rounds of iterative revisions and improvements to the draft model. Each revision was supplemented by rigorous demonstration and verification to ensure that every core dimension and supporting strategy of the model aligns with the actual development needs of higher vocational education in Shandong Province. To further enhance the intuitiveness and applicability of the model, the final version has been systematically organized and converted into a set of visual charts, including: the complete framework of the sustainable development model (including supporting strategies), the hierarchical structure of the model, and the standardized implementation process. These are detailed in Figures 4.2, 4.3, and 4.4 respectively, so as to facilitate reference and application in subsequent academic research and practical promotion.



**Note:** The model takes forming a systematic framework of "dimension leadership + strategy implementation"

**Figure 4.2** Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province



**Figure 4.3** Structure of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)-1

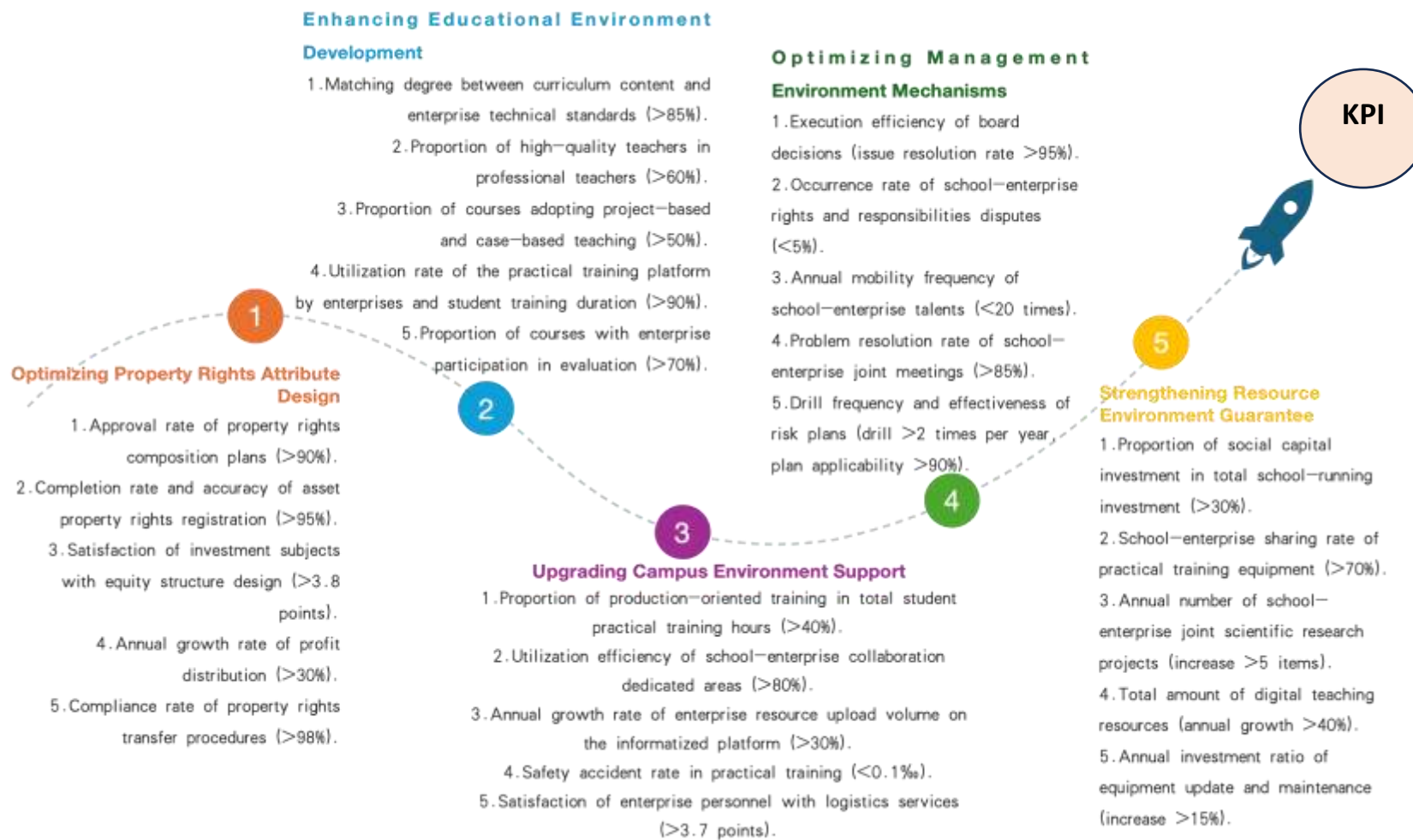


Figure 4.3 Structure of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)-2

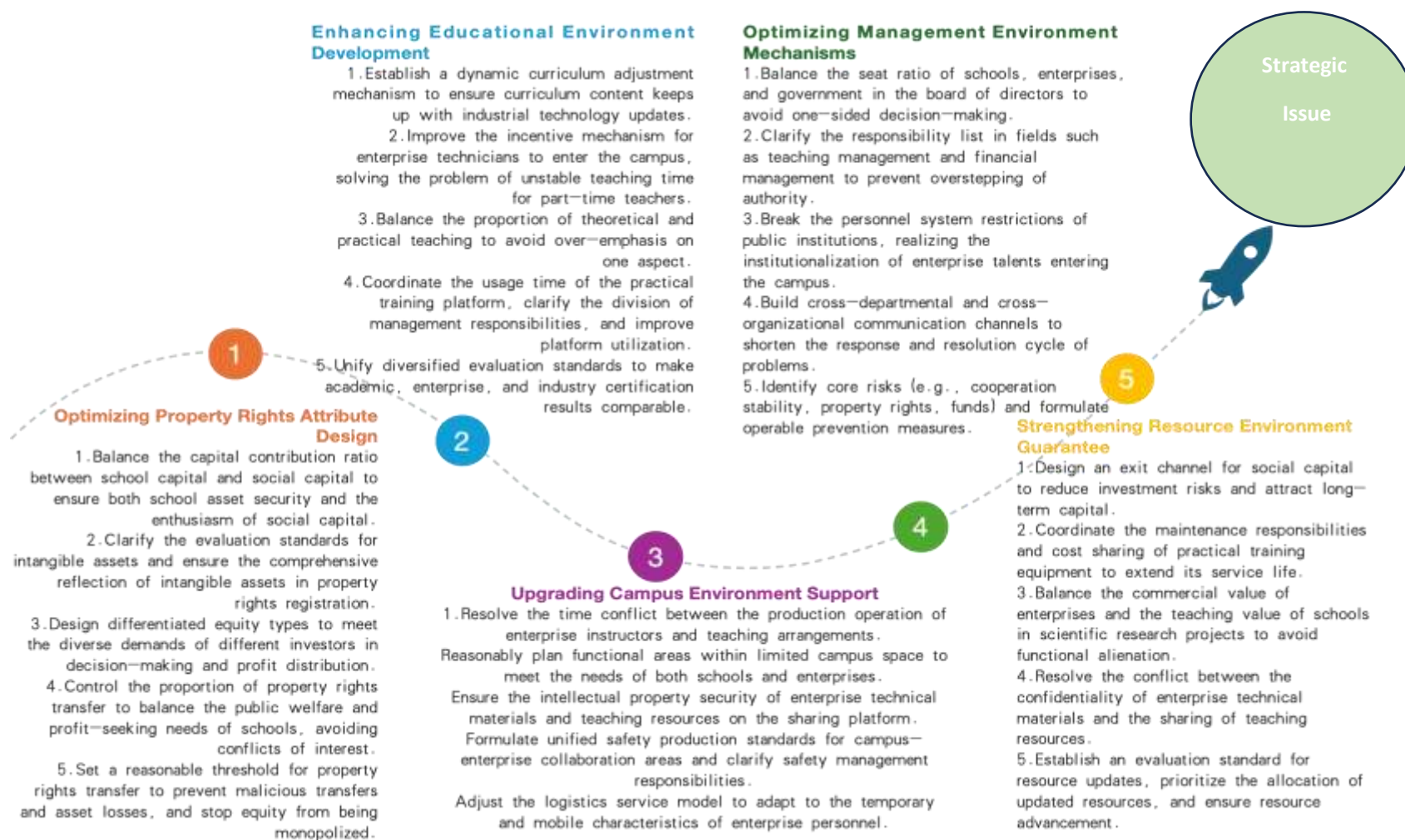


Figure 4.3 Structure of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)-3

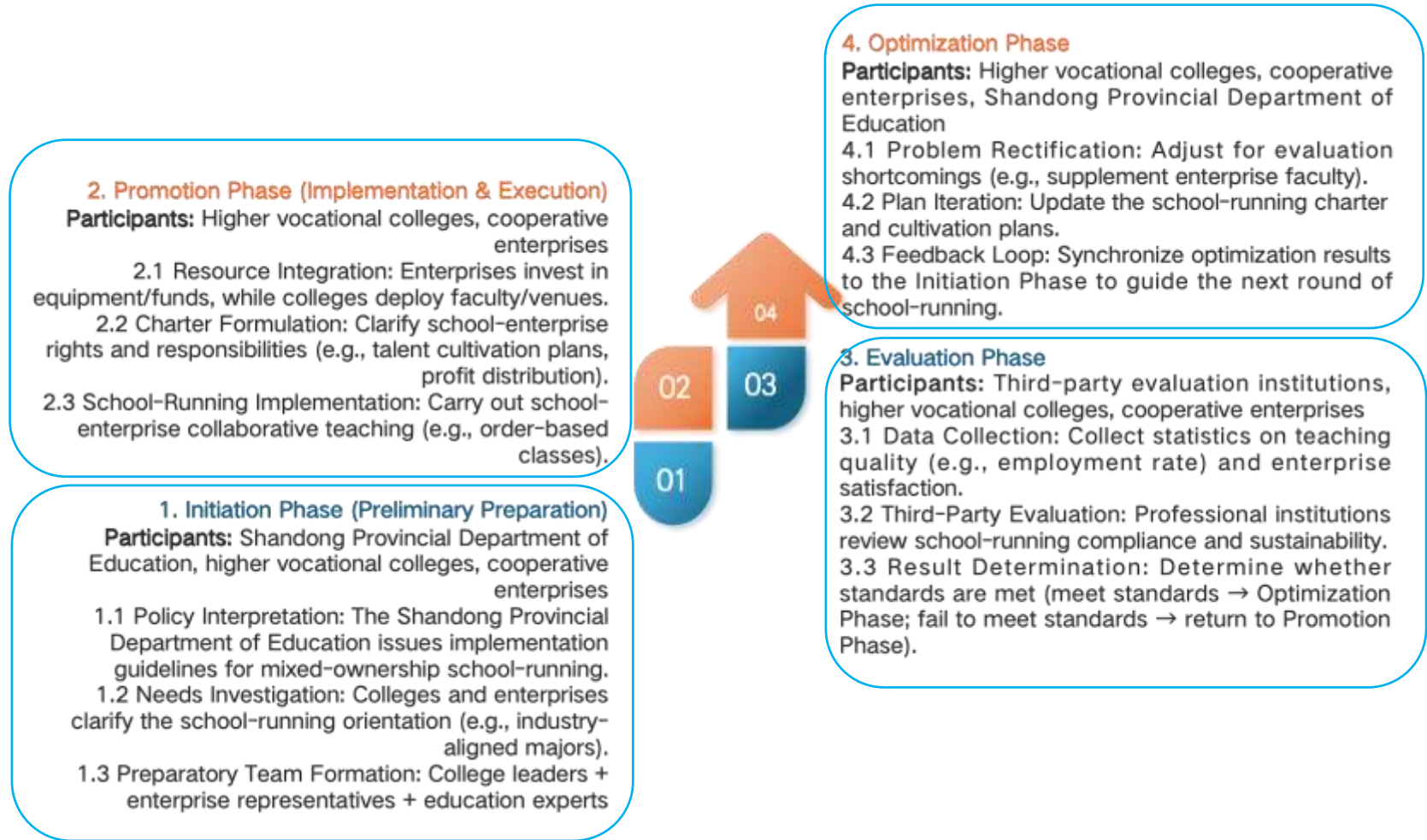


Figure 4.4 Implementation Flow Chart of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

It is noteworthy that the draft sustainable development model constructed in this study is a comprehensive large-scale model suitable for large-sample applications. The model is founded on empirical data from 586 valid samples (365 students, 115 teachers, and 106 administrators) across 5 representative mixed-ownership higher vocational colleges, ensuring sufficient data breadth and statistical representativeness. Additionally, the five core dimensions and 25 supporting strategies fully cover the universal key factors affecting mixed-ownership school-running, with no over-reliance on the specific characteristics of individual institutions. This design enables the model to maintain stability and validity when extended to large-scale samples involving more institutions, regions, or stakeholder groups, laying a solid foundation for its wide promotion in Shandong's mixed-ownership vocational education sector.

To further enhance the policy compliance, empirical foundation, and practical operability of the constructed sustainable development model, this section clarifies the affiliation of each core dimension with national, provincial, and school-level institutional plans/projects. Practical application examples are exclusively selected from the 5 representative mixed-ownership higher vocational colleges in the study, ensuring consistency with the empirical research objects of this paper.

**Table 4.17** Application of 5 core dimensions

Core Dimensions	Affiliated Institutional Plans/Projects	Practical Application Example
1. Optimize the Design of Property Rights Attributes	<ul style="list-style-type: none"> <li>- National: Implementation Plan for the Pilot Program of Mixed-Ownership Vocational Colleges (Ministry of Education, 2019); National Vocational Education Reform Implementation Plan (State Council, 2019)</li> <li>- Shandong Provincial: Guiding Opinions on Promoting Mixed-Ownership School-Running in Vocational Colleges (Shandong Provincial Department of Education, 2020)</li> <li>- School-specific: Shandong Chemical Engineering Vocational College's "Whole-Institution Mixed-Ownership Reform Project"</li> </ul>	<p>Shandong Chemical Engineering Vocational College, the first public higher vocational college in Shandong to implement overall mixed-ownership reform, was included in Shandong's mixed-ownership pilot. It clearly defined that state-owned capital accounts for 51% and social capital (from local leading chemical enterprises) accounts for 49%, with capital contribution forms including monetary capital (60%), technical resources (25%), and venue equipment (15%). The plan was filed with the Shandong Provincial Department of Education and Department of Finance, realizing standardized property rights operation for 3 consecutive years without asset disputes.</p>

Table 4.17 (Continued)

Core Dimensions	Affiliated Institutional Plans/Projects	Practical Application Example
2. Improve the Construction of the Educational Environment	<ul style="list-style-type: none"> <li>- National: "Double High-Level Plan" for Vocational Education (Ministry of Education, 2019); Implementation Plan for the Industry-Education Integration Empowerment Action in Vocational Education (2023-2025)</li> <li>- Shandong Provincial: Shandong Provincial Vocational Education Curriculum Reform Project (2022)</li> <li>- School-specific: Binzhou Vocational College's "Industry-Education Integrated Curriculum Construction Project for Nursing Major"</li> </ul>	<p>Binzhou Vocational College's nursing major (a key construction major under the national "Double High-Level Plan") collaborated with Binzhou Medical University Hospital to establish a curriculum committee. It integrated 12 industrial technical standards (e.g., nurse-patient communication norms, medical record writing standards) into 8 core courses, and updated curriculum content quarterly based on industry technological iterations. After implementation, the graduate professional counterpart employment rate increased from 65% to 88%, and the curriculum alignment rate with enterprise needs reached 88%.</p>
3. Upgrade Campus Environment Support	<ul style="list-style-type: none"> <li>- National: Project for Constructing Production-Oriented Training Bases for Vocational Education (Ministry of Education &amp; Ministry of Finance,</li> </ul>	<p>Shandong Maritime Vocational College (a national mixed-ownership pilot) reconstructed its campus functional layout into teaching zones, training zones, and school-enterprise cooperation zones. The cooperation</p>

Table 4.17 (Continued)

Core Dimensions	Affiliated Institutional Plans/Projects	Practical Application Example
	2022); Digital Transformation Plan for Vocational Education (Ministry of Education, 2023) - Shandong Provincial: Shandong Provincial Vocational Education Digital Transformation Action Plan (2023) - School-specific: Shandong Maritime Vocational College's "Campus Collaborative Functional Zone Renovation Project"	zone includes 10 enterprise offices, 5 technical exchange rooms, and 1 achievement exhibition hall. It also built a digital resource sharing platform with 500+ enterprise technical manuals and 80+ online courses, with an annual access volume exceeding 10,000 person-times and a dedicated cooperation zone utilization rate of 83%.
4. Optimize the Management Environment Mechanism	- National: Guidelines for the Construction of Governance Structures in Mixed-Ownership Vocational Colleges (Ministry of Education, 2020) - Shandong Provincial: Operating Rules for the Council of Mixed-Ownership Vocational	Jinan Engineering Vocational and Technical College established a joint governance council with 15 members: 6 from the school (40%), 6 from cooperative enterprises (40%), and 3 from government/industry associations (20%). It formulated a detailed list of rights and responsibilities, clarifying the division of labor in teaching management, financial management, and project

Table 4.17 (Continued)

Core Dimensions	Affiliated Institutional Plans/Projects	Practical Application Example
	<p>Colleges in Shandong Province (2021)</p> <p>- School-specific: Jinan Engineering Vocational and Technical College's "School-Enterprise Joint Governance Project"</p>	<p>approval. The council holds quarterly meetings, with a decision implementation rate of 96% and a dispute rate over rights and responsibilities of only 3%.</p>
<p>5. Strengthen Resource Environment Guarantees</p>	<p>- National: Multi-Channel Funding Mechanism for Vocational Education (Ministry of Finance, 2020)</p> <p>- Shandong Provincial: Shandong Provincial Vocational Education Resource Sharing Platform Construction Project (2022)</p> <p>- School-specific: Shandong Vocational Animal Science and Veterinary College's "Co-construction and Sharing Project of Practical Training Equipment"</p>	<p>Shandong Vocational Animal Science and Veterinary College jointly invested 15 million yuan with Shandong Xinhe Animal Husbandry Co., Ltd. in pharmaceutical analysis and animal disease diagnosis equipment. The school is responsible for daily maintenance, and enterprises have priority in using the equipment during off-peak training periods. The equipment sharing rate reaches 75%, extending its service life by 3 years. The two parties also jointly applied for 6 provincial scientific research projects, with research results integrated into teaching materials and enterprise production, increasing the enterprise's annual output value by 8%.</p>

### Part III: Evaluative Analysis of the Feasibility and Suitability of the Model

This part focuses on conducting a specialized evaluation and analysis of the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province (including all supporting strategies). The evaluation data are presented through quantitative statistical methods of mean values and standard deviations, so as to intuitively reflect the suitability and implementability of the model in practical application. Among them, the suitability evaluation focuses on "whether the model aligns with the regional policy orientation, industrial docking needs, and school-running resource endowments of higher vocational colleges in Shandong Province"; the feasibility evaluation focuses on "the completeness of the model structure, the operability of supporting strategies, and the collaborative implementation capabilities of multiple subjects". The two form a complementary verification system to jointly measure the practical application value of the model.

The evaluation data in this part are jointly evaluated by 5 experts with recognized authority in the field of mixed-ownership school-running in higher vocational colleges. The expert selection strictly follows high-standard admission criteria: all members have more than 10 years of research or practical experience in the field of vocational education, hold doctoral degrees, and have accumulated profound theoretical achievements and practical experience in higher vocational college operation and management, mixed-ownership mechanism innovation, etc.; in terms of professional backgrounds, the expert group includes 2 practical experts with experience in strategic planning and policy formulation, 2 academic administrators of colleges and universities with associate professor or above titles, and 1 administrator of educational competent authorities with associate professor or above title. The diverse professional backgrounds of the members ensure the comprehensiveness and professionalism of the evaluation perspective. The evaluation adopts a standardized Likert five-point scale, requiring each expert to independently score each evaluation indicator, and only one scoring level can be selected for each

indicator, so as to ensure the objectivity and rigor of the scoring results. Finally, a scientific determination of the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province is formed.

**Table 4.18** Evaluation of the Feasibility and suitability of the Final Model

(n = 5)

Strategy	Feasibility			Suitability		
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level
<b>Strategic 1: Optimize the Design of Property Rights Attributes</b>						
1. Clarify the composition of property rights and the forms and proportions of capital contribution of each subject.	4.600	0.548	highest	4.200	0.837	high
2. Standardize the property rights registration process for various assets.	4.600	0.548	highest	4.200	0.837	high
3. Design a scientific and reasonable equity structure.	3.600	0.894	high	4.400	0.548	high
4. Formulate fair profit distribution rules.	3.200	0.447	Moderate	4.600	0.548	highest
5. Establish a sound property rights transfer mechanism.	3.400	0.548	Moderate	4.400	0.894	high
Total	3.880	0.597	high	4.360	0.733	High
<b>Strategic 2: Improve the Construction of the Educational Environment</b>						
1. Build a curriculum system aligned with industrial needs.	4.400	0.548	high	4.800	0.447	highest
2. Strengthen the construction of a high - quality teaching staff.	3.800	0.837	High	4.800	0.447	highest
3. Innovate practice - oriented teaching models.	3.800	0.837	high	4.400	0.548	High
4. Establish a school - enterprise shared practical training platform.	4.600	0.548	highest	4.600	0.548	highest
5. Develop a diversified educational evaluation system.	4.600	0.548	highest	4.600	0.548	highest

Table 4.18 (Continued)

(n = 5)

Strategy	Feasibility			Suitability		
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level
<b>Strategic 3: Upgrade Campus Environment Support</b>						
1. Construct practical training spaces integrating schools and enterprises.	4.000	0.707	high	3.800	0.837	high
2. Optimize the functional layout for school - enterprise collaboration.	4.200	0.837	high	4.200	0.837	high
3. Improve the information - based resource sharing platform.	4.600	0.548	highest	4.400	0.548	high
4. Strengthen the campus safety guarantee system.	4.400	0.894	high	4.600	0.548	Highest
5. Enhance the suitability of logistics services.	4.200	0.837	high	4.600	0.548	highest
Total	4.280	0.765	high	4.320	0.664	High
<b>Strategic 4: Optimize the Management Environment Mechanism</b>						
1. Establish a school - enterprise co - governance structure.	4.200	0.837	high	4.600	0.548	highest
2. Clarify the boundary for dividing rights and responsibilities between schools and enterprises.	4.000	1.000	high	4.600	0.548	highest
3. Implement flexible personnel management systems.	4.000	0.707	high	4.400	0.548	high
4. Improve efficient communication and coordination mechanisms.	4.200	0.447	high	4.800	0.447	highest

Table 4.18 (Continued)

(n = 5)

Strategy	Feasibility			Suitability		
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level
5. Improve the risk prevention and control system.	4.400	0.548	high	4.400	0.548	high
Total	4.160	0.708	high	4.560	0.528	highest
<b>Strategic 5: Strengthen Resource Environment Guarantees</b>						
1. Expand diversified fund - raising channels.	4.000	0.707	high	4.800	0.447	highest
2. Jointly build and share practical training equipment resources.	4.200	0.837	high	4.200	0.447	high
3. Integrate school - enterprise scientific research and innovation resources.	4.400	0.548	high	4.000	0.707	high
4. Build a digital teaching resource database.	4.200	0.447	high	4.400	0.894	high
5. Establish a dynamic resource update mechanism.	4.000	1.000	high	4.800	0.447	highest
<b>Total</b>	<b>4.160</b>	<b>0.708</b>	<b>high</b>	<b>4.440</b>	<b>0.588</b>	<b>high</b>
<b>Totally</b>	<b>4.144</b>	<b>0.688</b>	<b>high</b>	<b>4.464</b>	<b>0.604</b>	<b>high</b>

**Note:** Scale division standards: 1.00-1.49 = Lowest level, 1.50-2.49 = Low level, 2.50-3.49 = Moderate level, 3.50-4.49 = High level, 4.50-5.00 = Highest level

The feasibility scores of "Formulate fair profit distribution rules" and "Establish a sound property rights transfer mechanism" are relatively low, at 3.200 and 3.400 respectively. This indicates that "profit distribution" and "property rights transfer" are the core pain points in optimizing the design of property rights attributes, and the existing practical mechanisms have not yet adapted to the needs of mixed-ownership school-running. From a practical perspective, the low scores reflect two major shortcomings in the current property rights operations of higher vocational colleges: first, the lack of quantifiable and enforceable standards for profit distribution makes it difficult to balance the interests of multiple stakeholders such as the government, schools, and enterprises, which may trigger a cooperative trust crisis; second, the unsmooth property rights transfer channels not only increase the investment risks of social capital (e.g., no clear exit path) but also restrict the flexible allocation of state-owned assets. This further confirms the previous research finding that "the current status of property rights attributes ranks the lowest" (Table 4.4), indicating that it is necessary to remove practical obstacles for the optimization of property rights attributes through the refinement of policy details (such as clarifying the proportion threshold between public welfare and profitability in profit distribution and simplifying the approval process for property rights transfer).

Based on the five-core-dimension model of "Property Rights Attributes - Educational Environment - Campus Environment - Management Environment - Resource Environment" constructed through cross-validation via multiple methods (including questionnaire surveys, in-depth interviews, focus group discussions, SWOT-PEST combined analysis, and TOWS matrix) targeting 5 representative mixed-ownership higher vocational colleges in Shandong Province, the expert evaluation results in Table 4.17 show that: the average suitability mean value of the model's five core dimensions is 4.464 (range: 4.320-4.640), the average feasibility mean value is 9.604 (range: 3.880-4.280), and the average standard deviation of the scores for each dimension is 0.688 (range: 0.508-0.765), indicating that the expert evaluation opinions exhibit high consistency. In accordance with the Likert scale classification criteria specified in Chapter 3 (3.50-4.49=High level; 4.50-5.00=Highest level), both the

suitability and feasibility of the model fall within the high-level range. Among them, the suitability mean values of dimensions such as the Educational Environment and Management Environment reach 4.560-4.640, approaching the highest level. This result forms an in-depth echo with the problem-oriented and strategy-implementation logic derived from empirical data in the preceding sections, fully verifying the scientificity and systematicness of the entire research process from "problem identification - model construction - expert verification". It indicates that the model not only accurately aligns with the actual needs of mixed-ownership school-running in higher vocational colleges in Shandong Province but also possesses strong practical operability and promotion value.

## Chapter 5

### Conclusion Discussion and Recommendations

The purposes of this study include three aspects: 1) To investigate the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province. 2) To construct a sustainable development model (including supporting strategies) for mixed-ownership school-running in higher vocational colleges in Shandong Province. 3) To verify the appropriateness and feasibility of the sustainable development model for mixed-ownership school-running in higher vocational colleges in Shandong Province.

On this basis, the researcher took mixed-ownership school-running in higher vocational colleges, sustainable development of higher vocational colleges, and sustainable development strategies for mixed-ownership school-running in higher vocational colleges as the theoretical basis. Through a questionnaire survey on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province, and interviews focusing on the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running, SWOT and PEST analyses were adopted for data processing. This laid a solid foundation for constructing a scientific and reasonable model draft (including supporting strategies). Subsequently, based on re-interviews with relevant personnel from 5 successfully mixed-ownership higher vocational colleges in Shandong Province (i.e., Shandong Maritime Vocational College, Jinan Engineering Vocational and Technical College, Binzhou Vocational College, Shandong Vocational Animal Science and Veterinary College, and Shandong Chemical Engineering Vocational College), references were provided for refining the model draft (including supporting strategies). Eventually, a sustainable development model for mixed-ownership school-running with 5 core dimensions was proposed, namely optimizing the design of property rights attribute, improving the construction of educational environment, upgrading the support of campus environment, optimizing the mechanism of

management environment, and strengthening the guarantee of resource environment. This model is expected to promote the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

The details are as follows:

## Conclusions

This study focuses on the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province. The researcher summarizes the conclusions into three parts, as follows:

Part 1: The current status of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Part 2: The sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Part 3: The feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

### **Part 1: The current status of mixed-ownership school-running in higher vocational colleges in Shandong Province**

Currently, the mixed-ownership school-running in higher vocational colleges in Shandong Province reaches a moderate level in five aspects: property rights attributes, educational environment, campus environment, management environment, and resource environment. Among them, the educational environment has the highest average level, while the property rights attributes have the lowest.

The current status of the educational environment is at a moderate level. According to the results of this study, the order of the current status level of the educational environment from high to low is as follows: "The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development" has the highest average level, followed by "The diversification of property rights has a positive impact on the teaching and management activities of the school", "The equity structure of each

investment subject of the school is conducive to the rational allocation and efficient utilization of school resources", "The property rights attributes of the school are clear and the legal protection is sound", and "The school has attracted more social investment and can balance the profit needs of each investment subject with long-term development goals". "Many investors have strengthened the school's reputation through sharing resources and coordinating developers" has the lowest average level.

The current status of the resource environment is at a moderate level. According to the results of this study, the order of the current status level of the resource environment from high to low is as follows: "The allocation of school resources is reasonable and can meet the needs of different majors and courses" has the highest average level, followed by "The school is rich in personal development resources, providing community activities, internship opportunities, scientific research projects, international exchange and learning opportunities" and "The school is rich in educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained". Subsequently, "The school is rich in digital resources, providing sufficient online open courses and online school-enterprise resources", "The school has more opportunities for industry-university-research cooperation, actively provides social services, and promotes regional economic and social development", and "The cooperation between the school and other higher education institutions or enterprises jointly promotes educational innovation". Finally, "The school has sufficient funds to cover the needs of school development" has the lowest average level.

The current status of the campus environment is at a moderate level. According to the results of this study, the order of the current status level of the campus environment from high to low is as follows: "The campus hardware facilities are convenient, and the learning and teaching environments are comfortable" has the highest average level, followed by "Satisfied with the logistics services such as catering, accommodation, and medical care provided by the school" and "The school can protect the legitimate rights and interests of teachers and students and create a good teaching and learning environment". Subsequently, "Learning resources and

teaching resources are easily accessible, and it is easy to access library resources, digital learning tools and platforms", "mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure", and "The school has a good campus cultural atmosphere and rich campus activities". Finally, "mixed-ownership school-running supports policies that promote educational equity and inclusive student services" has the lowest average level.

The current status of the management environment is at a moderate level. According to the results of this study, the order of the current status level of the management environment from high to low is as follows: "The information management of the school covers the core business system" has the highest average level, followed by "The school can promptly respond to and handle risk management and control such as safety issues, public opinion management, and legal issues" and "The school has improved management systems, efficient management, safety and order". Subsequently, "The school has high administrative efficiency and service quality", "The school has good teachers and mature training and promotion channels", and "The school has a high degree of democratic participation, a good cultural atmosphere, and has the right to participate in school decision-making and the temperature of organizational culture". Finally, "The transparency of school decision-making, the soundness of systems, and the efficiency of processes" has the lowest average level.

The current status of property rights attributes is at a moderate level. According to the results of this study, the order of the current status level of property rights attributes from high to low is as follows: "The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development" has the highest average level, followed by "The diversification of property rights has a positive impact on the teaching and management activities of the school", "The equity structure of each investment subject of the school is conducive to the rational allocation and efficient utilization of school resources", "The property rights attributes of the school are clear and the legal protection is sound", and "The school has attracted more social

investment and can balance the profit needs of each investment subject with long-term development goals". "Many investors have strengthened the school's reputation through sharing resources and coordinating developers" has the lowest average level.

## **Part 2: The sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province**

The sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province includes 5 core dimensions, each with 5 supporting implementation strategies, totaling 25 strategies, forming a systematic framework of "dimension leadership + strategy implementation":

Core Dimension 1: Optimize the design of property rights attributes (the foundation of the model), with 5 supporting implementation strategies: 1) Clarify the composition of property rights and the form and proportion of capital contribution of each subject. 2) Standardize the property rights registration process for various assets. 3) Design a scientific and reasonable equity structure. 4) Formulate fair profit distribution rules. 5) Establish a sound property rights transfer mechanism.

Core Dimension 2: Improve the construction of educational environment (the core of the model), with 5 supporting implementation strategies: 1) Build a curriculum system aligned with industrial needs. 2) Strengthen the construction of a high-quality teaching team. 3) Innovate practical-oriented teaching models. 4) Build a shared practical training platform for schools and enterprises. 5) Establish a diversified educational evaluation system.

Core Dimension 3: Upgrade campus environment support (the carrier of the model), with 5 supporting implementation strategies: 1) Construct integrated training spaces for schools and enterprises. 2) Optimize the functional layout for school-enterprise collaboration. 3) Improve the information-based resource sharing platform. 4) Strengthen the campus safety guarantee system. 5) Enhance the suitability of logistics services.

Core Dimension 4: Optimize management environment mechanisms (the guarantee of the model), with 5 supporting implementation strategies: 1) Establish a joint school-enterprise governance structure. 2) Clarify the boundary of power and

responsibility division between schools and enterprises. 3) Implement a flexible personnel management system. 4) Improve the efficient communication and coordination mechanism. 5) Improve the risk prevention and control system.

Core Dimension 5: Strengthen resource environment guarantee (the driving force of the model), with 5 supporting implementation strategies: 1) Broaden diversified fund-raising channels. 2) Co-build and share practical training equipment resources. 3) Integrate school-enterprise scientific research and innovation resources. 4) Build a digital teaching resource library. 5) Establish a dynamic resource update mechanism.

### **Part 3: The feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province**

The feasibility and suitability of the 5 core dimensions in the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province are at a high level, with their average values ranging from 4.360 to 4.640 and 3.880 to 4.280 respectively. The sustainable development model of mixed-ownership school-running (including supporting strategies) constructed in this study has high feasibility and suitability.

The feasibility and suitability of optimizing the design of property rights attributes are at a high level.

The suitability of improving the construction of educational environment is at the highest level, and the feasibility is at a high level.

The feasibility and suitability of upgrading campus environment support are at a high level.

The suitability of optimizing management environment mechanisms is at the highest level, and the feasibility is at a high level.

The feasibility and suitability of strengthening resource environment guarantee are at a high level.

Furthermore, the proposed sustainable development model possesses distinct large-scale model attributes, making it well-suited for large-sample

application scenarios. Unlike small-scale models tailored to specific institutions, this model is refined from large-scale empirical data covering 5 representative mixed-ownership higher vocational colleges in Shandong Province and multi-stakeholder perspectives (including students, teachers, administrators, and enterprise stakeholders), with core dimensions and strategies generalized from the common laws of mixed-ownership school-running. It also integrates key insights from systematic analytical methods such as SWOT-PEST combined analysis and TOWS matrix, enhancing its adaptability to complex regional and institutional contexts. When applied to large-sample research involving more higher vocational colleges or expanded to broader regional scope, the model can effectively capture the inherent logic of sustainable development without losing accuracy. This large-sample adaptability enhances the model's practical value, providing reliable theoretical and operational support for the large-scale advancement of mixed-ownership reforms in China's vocational education.

## Discussion

This study focuses on the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province. The researcher summarizes the discussion into three parts, as follows:

Part 1: The current status of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Part 2: The sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Part 3: The feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

### **Part 1: The current status of mixed-ownership school-running in higher vocational colleges in Shandong Province**

Through investigating the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province in five aspects—property rights

attributes, educational environment, campus environment, management environment, and resource environment—and analyzing the average values and standard values of the five variables, it is found that the total average value of property rights attributes, educational environment, campus environment, management environment, and resource environment is 3.272, all at a moderate level, requiring further improvement.

In terms of the educational environment, "The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development" and "The diversification of property rights has a positive impact on the teaching and management activities of the school" are at a moderate level, which is consistent with the research view of Zou et al. (2025) that the diversification of property rights can stimulate school-running vitality, and multi-subject participation can enrich the forms of educational supply. "The equity structure of each investment subject of the school is conducive to the rational allocation and efficient utilization of school resources", "The property rights attributes of the school are clear and the legal protection is sound", "The school has attracted more social investment and can balance the profit needs of each investment subject with long-term development goals", and "Many investors have strengthened the school's reputation through sharing resources and coordinating developers" are at a moderate level, which is consistent with the research conclusion of Luo and Lertamornsak (2022) that unclear property rights will restrict the efficiency of resource allocation.

In terms of the resource environment, "The allocation of school resources is reasonable and can meet the needs of different majors and courses", "The school is rich in personal development resources, providing community activities, internship opportunities, scientific research projects, international exchange and learning opportunities", and "The school is rich in educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained" are at a moderate level, which is consistent with the view of Wang et al. (2024) that the optimal allocation of resources is the foundation of school-

running, and appropriate resource supply provides a guarantee for school-running quality. "The school is rich in digital resources, providing sufficient online open courses and online school-enterprise resources", "The school has more opportunities for industry-university-research cooperation, actively provides social services, and promotes regional economic and social development", "The cooperation between the school and other higher education institutions or enterprises jointly promotes educational innovation", and "The school has sufficient funds to cover the needs of school development" are at a moderate level, which is consistent with the conclusion of Zhao et al. (2022) that in the early stage of mixed-ownership school-running, schools generally face the problem of fund shortage, which is a common problem in mixed-ownership school-running.

In terms of the campus environment, "The campus hardware facilities are convenient, and the learning and teaching environments are comfortable", "Satisfied with the logistics services such as catering, accommodation, and medical care provided by the school", and "The school can protect the legitimate rights and interests of teachers and students and create a good teaching and learning environment" are at a moderate level, which is consistent with the cognition that campus hardware is the foundation of school-enterprise cooperation, and backward facilities will affect the development of cooperation. "Learning resources and teaching resources are easily accessible, and it is easy to access library resources, digital learning tools and platforms", "mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure", "The school has a good campus cultural atmosphere and rich campus activities", and "mixed-ownership school-running supports policies that promote educational equity and inclusive student services" are at a moderate level, which is consistent with the view of Xin et al. (2019) that the integration of campus culture helps strengthen in-depth school-enterprise cooperation.

In terms of the management environment, "The information management of the school covers the core business system", "The school can promptly respond to and handle risk management and control such as safety issues, public opinion

management, and legal issues", and "The school has improved management systems, efficient management, safety and order" are at a moderate level, which is consistent with the view of Jin and Jin (2022) that an efficient operation mechanism can improve school-running efficiency, and management lag will restrict the advantages of mixed ownership. "The school has high administrative efficiency and service quality", "The school has good teachers and mature training and promotion channels", "The school has a high degree of democratic participation, a good cultural atmosphere, and has the right to participate in school decision-making and the temperature of organizational culture", and "The transparency of school decision-making, the soundness of systems, and the efficiency of processes" are at a moderate level, which is consistent with the research conclusion of Scott (2009) that an imperfect governance structure will increase management costs.

In terms of property rights attributes, "The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development" and "The diversification of property rights has a positive impact on the teaching and management activities of the school" are at a moderate level. Huang (2025) points out that the diversification of property rights is the core feature of mixed ownership, and multi-property rights can introduce a competitive mechanism. "The equity structure of each investment subject of the school is conducive to the rational allocation and efficient utilization of school resources", "The property rights attributes of the school are clear and the legal protection is sound", "The school has attracted more social investment and can balance the profit needs of each investment subject with long-term development goals", and "Many investors have strengthened the school's reputation through sharing resources and coordinating developers" are at a moderate level, which is consistent with the research result of Zhao et al. (2022) that vague definition of property rights will lead to interest conflicts.

## **Part 2: The sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province**

Through the questionnaire survey on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province and the interviews on the problems, approaches, and influencing factors of its sustainable development in Step 1, SWOT and PEST analyses were adopted to lay a foundation for constructing a scientific and reasonable model draft (including supporting strategies). Then, in Step 2, through re-interviewing relevant personnel from 5 successfully running mixed-ownership higher vocational colleges in Shandong Province, references were provided for constructing the model draft (including supporting strategies). Subsequently, through focus group discussions, a model draft (including supporting strategies) with 25 measures in 5 aspects was proposed. Finally, through focus group discussions with experts, the sustainable development strategy of mixed-ownership school-running in higher vocational colleges in Shandong Province was obtained. The difference between this model and existing studies is that it does not simply list strategies, but constructs a systematic framework with five dimensions, and the strategies are the implementation support for each dimension, which is more in line with the systematic needs of the sustainable development of mixed-ownership school-running.

Model Core Dimension 1: Optimize the design of property rights attributes (with 5 supporting implementation strategies). The two measures of "Clarify the composition of property rights and the form and proportion of capital contribution of each subject" and "Standardize the property rights registration process for various assets" are consistent with the view of Gong et al. (2025) that clear property rights are the premise of mixed-ownership reform, and clear property rights can reduce interest conflicts. The three measures of "Design a scientific and reasonable equity structure", "Formulate fair profit distribution rules", and "Establish a sound property rights transfer mechanism" are consistent with the research view of Wang et al. (2024) that reasonable equity design can balance the interests of all parties, which helps attract social capital participation.

Model Core Dimension 2: Improve the construction of educational environment (with 5 supporting implementation strategies). The two measures of "Build a curriculum system aligned with industrial needs" and "Strengthen the construction of a high-quality teaching team" are consistent with the view of Lü (2025) that the connection between courses and industries is the core of vocational education, which can improve the matching degree between talent training and market demand. The three measures of "Innovate practical-oriented teaching models", "Build a shared practical training platform for schools and enterprises", and "Establish a diversified educational evaluation system" are consistent with the research conclusion of Feng and Wang (2024), who emphasize that practical teaching and multi-evaluation can comprehensively improve teaching quality.

Model Core Dimension 3: Upgrade campus environment support (with 5 supporting implementation strategies). The two measures of "Construct integrated training spaces for schools and enterprises" and "Optimize the functional layout for school-enterprise collaboration" are consistent with the view in the study of Shi et al. (2021) that the simulation of training environment is the key to practical teaching, which can improve students' practical ability. The three measures of "Improve the information-based resource sharing platform", "Strengthen the campus safety guarantee system", and "Enhance the adaptability of logistics services" reflect that informatization and logistics support can improve the convenience of cooperation, which is consistent with the research view of Huang and Deng (2024), and helps in-depth school-enterprise integration.

Model Core Dimension 4: Optimize management environment mechanisms (with 5 supporting implementation strategies). The two measures of "Establish a joint school-enterprise governance structure" and "Clarify the boundary of power and responsibility division between schools and enterprises"—the diversification of governance structure is a feature of mixed ownership, which can improve the scientificity of decision-making. The three measures of "Implement a flexible personnel management system", "Improve the efficient communication and coordination mechanism", and "Improve the risk prevention and control system" are

consistent with the research conclusion of Guo et al. (2024), who believe that flexible management and risk prevention and control can ensure the stability of school-running and improve operational efficiency.

Model Core Dimension 5: Strengthen resource environment guarantee (with 5 supporting implementation strategies). The two measures of "Broaden diversified fund-raising channels" and "Co-build and share practical training equipment resources" are consistent with the view of Zheng (2024) that the diversification of resources is the foundation of sustainable development, which can solve the bottleneck of school-running funds. The three measures of "Integrate school-enterprise scientific research and innovation resources", "Build a digital teaching resource library", and "Establish a dynamic resource update mechanism" are consistent with the research view emphasizing resource integration and dynamic update, which can improve the efficiency of resource utilization.

### **Part 3: The feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province**

The analysis results in this part were evaluated by 5 experts, all of whom hold doctoral degrees, including 2 experts with knowledge and experience in strategy formulation, 2 academic administrators with associate professor or above titles, and 1 educational institution administrator with associate professor or above title. A five-point rating scale was adopted, and respondents could only select one level to evaluate the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

The feasibility and suitability of the 5 core dimensions in the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province are at a high level, with their average values ranging from 4.360 to 4.640 and 3.880 to 4.280 respectively, indicating that the model in this study has high feasibility and suitability.

## Recommendations

### Implications

The research results show that the recommendations for the implementation of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province are as follows:

#### **1. Implement the Dimension of "Optimizing the Design of Property Rights Attributes" and Fully Promote Its 5 Supporting Implementation Strategies**

Given that property rights attributes rank the lowest in the current status (mean = 3.197), priority should be given to optimizing property rights design. As the foundation of mixed-ownership school-running, property rights attributes provide an institutional framework for balancing the interests of all parties. Optimizing the design of property rights attributes should address the following issues: 1) Balance the proportion of state-owned capital and social capital contribution. Higher vocational colleges, cooperative enterprises, and educational administrative departments shall negotiate to clarify evaluation standards, determine the equity structure, and file for record, standardize the forms of capital contribution, ensure the safety of state-owned assets, and stimulate the enthusiasm of social capital participation; 2) Clarify the evaluation standards for intangible assets. The three parties (higher vocational colleges, enterprises, and educational administrative departments) shall jointly engage a third-party evaluation institution to quantitatively evaluate brands, intellectual property rights, etc., and incorporate them into property rights registration to ensure their reasonable reflection; 3) Design differentiated equity types. The council and the legal advisor team shall set up decision-making shares and profit shares, clarify their rights and responsibilities, so as to meet the diversified needs of investment subjects; 4) Formulate profit distribution while considering both public welfare and profitability. The financial departments of both parties (colleges and enterprises) shall specify the proportion and usage of profits in the school-running charter to avoid interest conflicts and achieve win-win results; 5) Set thresholds for property rights transfer. Educational administrative departments and

the council shall standardize the processes of transfer, withdrawal, and transferee review to prevent asset loss and ensure the stability of school-running.

## **2. Improve the Dimension of "Enhancing the Construction of the Educational Environment"**

The educational environment is the core guarantee for the quality of talent cultivation. Enhancing the construction of the educational environment can improve teaching standards and promote industry-education integration, including: 1) Establish a dynamic curriculum adjustment mechanism. The academic affairs office, program leaders, and enterprise technical backbones shall form a curriculum committee to update curriculum content in accordance with industrial iteration, ensuring that curricula keep pace with industrial technologies; 2) Improve the incentive mechanism for enterprise technical backbones to participate in campus teaching. The human resources departments of both parties shall strengthen incentives through performance appraisal, subsidies, and flexible working hours to solve the problem of unstable teaching hours of part-time teachers; 3) Balance the proportion of theoretical and practical teaching hours. The academic affairs office and the training program team shall optimize the training program and clarify the proportion of practical teaching to enhance the comprehensive capabilities of talents; 4) Coordinate differences in the use and management of practical training platforms. The practical training center and the production department of enterprises shall formulate detailed rules for sharing, specifying time periods, responsibilities, and costs to improve platform utilization; 5) Unify diversified evaluation standards. Industry associations, the quality control department of colleges, and enterprises shall establish a unified indicator system to realize the comparability of evaluation results from colleges, enterprises, and industries.

## **3. Upgrade the Dimension of "Strengthening Campus Environment Support"**

The campus environment is the physical carrier of school-enterprise cooperation. Upgrading campus environment support helps improve the convenience of cooperation. By optimizing spatial layout and facility configuration,

favorable cooperation conditions can be provided for both schools and enterprises. The issues to be addressed in upgrading campus environment support are: 1) Resolve the time conflict of enterprise mentors. The academic affairs office and the human resources department of enterprises shall adopt flexible teaching, online tutoring, and teaching assistant collaboration models to improve the participation of mentors; 2) Reasonably plan campus functional areas. The logistics department and the planning department shall divide functional areas such as teaching and practical training and adopt a modular layout to meet the diverse needs of both parties; 3) Ensure the intellectual property safety of shared platforms. The information center and the technical department of enterprises shall protect intellectual property through authority classification and confidentiality agreements to promote the safe sharing of resources; 4) Formulate campus safety norms covering enterprise standards. The safety departments of both parties shall integrate enterprise standards into campus management systems and jointly conduct training and drills to unify supervision standards and reduce risks; 5) Adjust the logistics service model. The logistics center and on-campus enterprise teams shall provide flexible supporting services to adapt to the characteristics of enterprise personnel staying on campus and enhance their sense of belonging.

#### **4. Optimize the Dimension of "Improving Management Environment Mechanisms"**

The management environment is the key to the efficient operation of school-running. Optimizing management environment mechanisms can coordinate relationships among all parties and improve decision-making efficiency. By improving the governance structure and system design, institutional guarantees can be provided for mixed-ownership school-running. Therefore, the implementation of strategies to optimize management environment mechanisms shall: 1) Balance the proportion of seats in the council. The council and educational administrative departments shall reasonably allocate seats for colleges, enterprises, and the government, and standardize the rules of procedure to ensure fair and scientific decision-making; 2) Refine the list of rights and responsibilities. The council, the administrative

department of colleges, and the enterprise management team shall clarify the rights and responsibilities in fields such as teaching and finance to prevent management vacuums; 3) Break through the restrictions of the personnel system. The relevant departments of the three parties (colleges, enterprises, and government) shall adopt a dual-appointment and concurrent-position model to realize the flexibility of staffing for enterprise talents participating in school-running and enhance the vitality of the teaching staff; 4) Establish cross-organizational communication channels. The council and collaborative departments shall assign special personnel and build online platforms to shorten the problem-solving cycle; 5) Prevent and control core risks. The council, the financial department, and the risk control team shall identify risks, establish reserve funds and auditing mechanisms to ensure the continuous and stable operation of school-running.

#### **5. Strengthen the Dimension of "Consolidating Resource Environment Guarantees"**

The resource environment is the material foundation for the sustainability of school-running. Strengthening resource environment guarantees can solve the problem of resource shortage and improve the efficiency of resource utilization. Through diversified resource raising and sharing, continuous support can be provided for mixed-ownership school-running. Therefore, strengthening resource environment guarantees shall address the following issues: 1) Design an exit channel for social capital. The council, the financial department, and the enterprise investment department shall clarify the exit path and set a lock-up period to reduce risks and attract long-term funds; 2) Coordinate the maintenance of practical training equipment and cost sharing. The practical training center and the production department of enterprises shall clarify responsibilities and cost proportions, and establish a maintenance system to extend the service life of equipment; 3) Balance the dual value of scientific research projects. The scientific research departments of both parties shall clarify the weight of teaching value when approving projects to avoid utilitarian tendencies and realize the mutual promotion of scientific research and talent cultivation; 4) Resolve the contradiction between technical confidentiality

and resource sharing. The information center and the technical department of enterprises shall adopt data desensitization and confidentiality agreements to meet the needs of both parties; 5) Establish evaluation standards for resource updates. The academic affairs office, the practical training center, and the technical department of enterprises shall conduct regular evaluations to eliminate outdated resources and ensure that resources are suitable for the school-running model.

### **Future Research**

This study focuses on the sustainable development strategy of mixed-ownership school-running in higher vocational colleges in Shandong Province. Through theoretical research, questionnaire surveys, in-depth interviews, and statistical analysis, preliminary research results and conclusions have been obtained, which are basically consistent with previous high-level literature. However, these results and conclusions need to be tested in practice.

Future research on the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province can be carried out from the following aspects:

1. Regional differentiated development of mixed-ownership school-running: There are differences in industrial structure and vocational education foundation among various cities in Shandong Province. Explore the adaptability of mixed-ownership school-running models in different regions, such as the differences between models in manufacturing-intensive areas and service industry-developed areas, to provide references for regional characteristic development.

2. Dynamic mechanism of social capital participation: Social capital plays an important role in mixed-ownership school-running. Study how to improve the enthusiasm of social capital participation through policy incentives, risk sharing, benefit guarantee, etc., and analyze the participation preferences and behavioral characteristics of different types of capital (state-owned enterprises, private enterprises, industry associations).

3. The impact of digital transformation on mixed-ownership school-running: Digital technologies (such as big data and artificial intelligence) are reshaping the

educational model. Explore how to use digital means to optimize links such as property rights management, resource allocation, and teaching evaluation to improve school-running efficiency and quality.

4. Evaluation of governance effectiveness of mixed-ownership school-running: The governance structure is the core of mixed ownership. Study how to construct a scientific evaluation system of governance effectiveness to measure governance effects from dimensions such as decision-making efficiency, interest balance, and risk prevention and control, so as to provide a basis for optimizing the governance structure.

5. Mixed ownership and the internationalization of vocational education: In the context of globalization, explore how mixed-ownership higher vocational colleges can introduce international high-quality resources, carry out international cooperative school-running, cultivate technical and skilled talents with an international perspective, and enhance the international influence of school-running.

These research directions will help continuously promote the sustainable development of mixed-ownership school-running, optimize the school-running model, improve the quality of talent training, adapt to the needs of the conversion of old and new kinetic energy and industrial upgrading in Shandong Province, and provide more powerful talent support for regional economic and social development.

## References

- Chen, J. P., & Zhu, H. B. (2021). Construction of higher vocational industrial colleges based on mixed-ownership reform: Value, problems and solutions. *Chinese Vocational and Technical Education*, (25), 28-34.
- Chen, X. Z. (2022). Connotative logic, operational constraints and development paths of modern industrial colleges in higher vocational education. *Education and Vocation*, (12), 28-35.
- Deng, X. H., & Fu, C. (2023). Research on industrial colleges in China: Evolutionary process, thematic spectrum and future prospects. *Journal of Higher Continuing Education*, 36(02), 27-34.
- Deng, Z. M., & Li, X. (2021). Exploration on the basic connotation and definition requirements of industrial colleges in vocational education. *Vocational Education Forum*, 37(04), 44-50.
- Duan, M. (2021). Governance model, problems and paths of higher vocational industrial colleges based on industry-education integration. *Education and Vocation*, (16), 28-35.
- Fan, L., & Deng, Z. B. (2021). Practical exploration on the construction mode of higher vocational industrial colleges in the new era. *Vocational Education Forum*, 37(09), 38-43.
- Fan, W. L. (2023). Research on the sustainable development mechanism of curriculum construction in Higher Vocational Colleges. *Education and Teaching Forum*, (33), 33-36.
- Fang, Y. M., & Dai, S. M. (2021). Exploration and reflection on mixed-ownership industrial colleges in Higher Vocational Colleges—A case study of Nantong Vocational University. *Continued Education Research*, (07), 118-123.
- Feng, C. J., & Wang, X. Y. (2024). Research on the mechanism of mixed-ownership school-running reform in vocational education in China. *Vocational Education Development Research*, (04), 25-33.

- Gong, W. L., Qi, H. D., & Zhu, W. (2025). Construction of a long-term mechanism for state-controlled mixed-ownership enterprises from the perspective of property rights. *Research on Financial and Economic Issues*, (01), 59-71.
- Guo, J. C. (2022). Combination of effective market and capable government—The necessary requirement for the high-quality development of higher vocational education in China. *Journal of Shandong Institute of Commerce and Technology*, 22(06), 26-30.
- Guo, S. S., Wu, Y., Li, S. H., Zhang, C. K., & Zheng, M. Y. (2024). Development process, basic consensus and coping strategies of mixed-ownership reform practice in vocational education. *Chinese Vocational and Technical Education*, (33), 44-49.
- Han, X. M., Wang, S. B., Pan, H. S., & Yu, H. H. (2017). Practical dilemmas and promotion strategies of mixed-ownership school-running in Higher Vocational Colleges—From the perspective of literature analysis. *Research in Higher Education of Engineering*, (05), 187-191+201.
- Huang, J. L. (2025). Dilemmas and optimization paths of the development of mixed-ownership industrial colleges from the perspective of property rights theory. *Education and Vocation*, (14), 49-56.
- Huang, L. (2020). Discussion on higher vocational education reform and the sustainable development of students' professional abilities. *Science & Technology Information*, 18(25), 118-120.
- Huang, Y. Y., & Deng, Y. (2024). Construction of an evaluation index system for measuring the school-running level of mixed-ownership industrial colleges in vocational colleges. *Vocational and Technical Education*, 45(35), 75-80.
- Li, L., & Zhang, Y. X. (2018). Discussion on the mixed-ownership school-running mode of Higher Vocational Colleges. *Modern Vocational Education*, (26), 241.
- Li, Y. H., & Guo, Z. Q. (2021). Where do high-quality workers for invigorating the country through vocational education come from? *China Economic Weekly*, (20), 14-22.

- Li, Y. (2021). Dilemmas and solutions of mixed-ownership secondary colleges in Higher Vocational Colleges. *Journal of Shandong Institute of Commerce and Technology*, 21(04), 52-55.
- Li, Y. L., Huang, W., Zhao, X. Q., & Ke, X. (2022). Construction logic and path of industrial colleges in vocational education. *Journal of Qingdao Technical College*, 35(05), 15-19.
- Li, Z. J., Li, J. G., & Zhang, L. Y. (2021). Analysis on mixed-ownership school-running in Higher Vocational Colleges. *Education and Vocation*, (24), 34-38.
- Liu, Q. Y., & Chen, Z. F. (2020). Research on the sustainable development of professional town industrial colleges based on multi-subject school-running—A case study of professional town industrial colleges of Zhongshan Polytechnic. *Education Science Forum*, (36), 29-33.
- Liu, X. J., & Sun, R. (2023). Goal orientation, practical dilemmas and path optimization of mixed-ownership reform in Higher Vocational Colleges. *Education and Vocation*, (16), 55-60.
- Lu, W. X. (2021). Shareholding operation and performance of the "shared factory" mode under mixed ownership in higher vocational education—From the cost-benefit perspective of educational investment. *Higher Education Exploration*, (04), 105-112.
- Lü, J. K. (2025). Research on the talent cultivation mode of mixed-ownership tourism and transportation service industrial colleges under the perspective of industry-education integration. *Forestry Science and Technology Information*, 57(02), 251-253.
- Luo, J., & Zhang, Z. (2024). Reconstruction of the sustainable development of human resources in Higher Vocational Colleges: From the perspective of social skills ecosystem. *Business Economy*, (03), 104-107.
- Luo, Q., Gan, H. Y., Xiang, D., Zhao, J., & Zhang, Q. (2021). Research and practice of the "1+X" certificate system under the mixed-ownership school-running mode. *China Management Informationization*, 24(02), 228-229.

- Luo, R. Z., Li, X. Q., & Tang, X. Y. (2022). Regional comparative study on the effectiveness of industry-education integration in vocational education from the perspective of the main role of enterprises. *Vocational and Technical Education*, 43(18), 61-66.
- Ma, S. E. (2021). A literature review on the theoretical research of the operation mechanism of mixed-ownership Higher Vocational Colleges. *Popular Standardization*, (04), 89-91.
- Peng, Y. J. (2021). Research on the multi-subject collaborative education mechanism in Higher Vocational Colleges. *Modern Vocational Education*, (49), 214-215.
- Ping, X. B., & Yi, Z. H. (2022). Value implication, practical dilemmas and path selection of collaborative governance of mixed ownership in Higher Vocational Colleges. *Vocational and Technical Education*, 43(15), 44-47.
- Qin, F. (2021). Practice and research on the mixed-ownership talent cultivation mode in Higher Vocational Colleges—A case study of the "one-body, three-double" mode of Hebi Polytechnic. *Employment and Security*, (22), 140-142.
- Sheng, F. X., & Pan, J. F. (2023). How to implement mixed-ownership school-running: Practical exploration based on case studies. *Chinese Vocational and Technical Education*, (10), 90-96.
- Shi, M. Q., Jiang, Y. L., & Zhu, X. (2021). A brief discussion on the reform of the industry-education integration school-running mode of agricultural productive training bases. *Anhui Agricultural Science Bulletin*, 27(20), 168-169+177.
- Tao, R., & Wang, S. L. (2021). Exploration on school-enterprise cooperation under the mixed-ownership school-running mode of Higher Vocational Colleges. *Modern Business Trade Industry*, 42(10), 47-48.
- Tian, W. N., & Zhang, Y. F. (2021). Research on the construction of internal quality assurance system for talent cultivation under the mixed-ownership school-running mode of Higher Vocational Colleges. *Modern Vocational Education*, (49), 38-39.

- Wang, S. B., & Liu, H. P. (2015). Mixed ownership: A "market-oriented" exploration of higher vocational education reform. *Education and Vocation, (04)*, 22-28.
- Wu, H. X., Wang, X., & Liang, L. (2023). Discussion on the implementation path of mixed-ownership reform in Higher Vocational Colleges. *Journal of Beijing Vocational College of Labour and Social Security, 17(04)*, 48-53.
- Wu, W. (2023). Research and exploration on the construction of mixed-ownership training bases jointly built by schools and enterprises. *Journal of Liaoning Higher Vocational, 25(04)*, 70-74.
- Xia, L. Y. (2021). Research on strategies for cultivating the craftsman spirit of higher vocational colleges students based on industry-education integration. *Journal of Taiyuan Urban Vocational College, (07)*, 57-59.
- Xie, D. X., & Liu, J. J. (2021). Mixed ownership of Higher Vocational Colleges in the Guangdong-Hong Kong-Macao Greater Bay Area: School-running dilemmas and governance paths. *Vocational and Technical Education, 42(19)*, 40-45.
- Xie, Z. X., & Gong, L. F. (2022). Governance logic and path of higher vocational industrial colleges. *Higher Education Forum, (09)*, 78-80.
- Yang, Y. (2021). Research on the problems and countermeasures of mixed-ownership reform in public Higher Vocational Colleges. *Chinese Vocational and Technical Education, (22)*, 72-75+96.
- Yuan, M. S., & Zhang, Z. K. (2021). Research on financial and asset management of mixed ownership in vocational colleges. *Economic Research Guide, (09)*, 89-91.
- Zhang, C. Y., & Bian, Y. W. (2022). Dilemmas and breakthroughs in the construction of mixed-ownership secondary colleges in Higher Vocational Colleges. *Vocational and Technical Education, 43(17)*, 12-16.
- Zhang, J. R. (2023). Research on the development dilemmas and realization paths of mixed-ownership school-running in Higher Vocational Colleges—A case study of Yunnan Agricultural Vocational and Technical College. *Modern Vocational Education, (17)*, 149-152.

- Zhang, Q. (2023). Current situation and countermeasures of professional talent cultivation in private higher vocational mixed-ownership colleges. *Sichuan Labor and Social Security*, (09), 49-50.
- Zhang, Y., & Wang, W. (2022). Key points, operation mechanism and implementation path of the construction of mixed-ownership industrial colleges in higher vocational education. *Education and Vocation*, (09), 44-51.
- Zhang, Z. Q. (2022). Reform and countermeasures of the teaching staff construction in higher vocational education—A review of Theory and Practice of Mixed-Ownership Reform in Higher Vocational Education. *Journal of the Chinese Society of Education*, (12), 112.
- Zheng, R. Y., & Jiang, X. G. (2021). Construction of modern industrial colleges: Development process, organizational characteristics and reform paths. *Vocational and Technical Education*, 42(30), 14-19.
- Zheng, Y. H. (2024). Research on the path of mixed-ownership school-running in Higher Vocational Colleges from the perspective of resource dependence theory. *Vocational Education*, 23(26), 31-34+52.
- Zheng, Y., & Qu, C. X. (2022). Practical dilemmas and implementation paths of the construction of high-level professional groups in Higher Vocational Colleges. *Education and Vocation*, (16), 51-55.
- Zhou, B. (2021). Research on the evaluation mechanism of development quality of Higher Vocational Colleges based on the balanced scorecard. *Automotive Maintenance & Repair*, (20), 28-32.
- Zhou, H. L., & Wu, S. G. (2021). A review of the evolution of industrial colleges in Higher Vocational Colleges. *Chinese Vocational and Technical Education*, (18), 65-69+74.
- Zhou, J. M. (2021). Exploration on the school-enterprise collaborative education mode in Higher Vocational Colleges under the background of the "Double High-Level Plan". *The Theory and Practice of Innovation and Entrepreneurship*, 4(18), 116-118.

- Zhu, H. Q., & Li, Y. H. (2024). Research and countermeasures on the mixed-ownership school-running mode of higher vocational education. *Journal of Liaoning Higher Vocational*, 26(01), 27-29.
- Zhu, H. X. (2021a). Research on the selection of social capital participating in the mixed-ownership reform of Higher Vocational Colleges. *Vocational Education (Mid-term)*, 20(05), 3-6.
- Zhu, H. X. (2021b). From asset evaluation to property rights transfer: The interest concerns of social capital participating in the mixed-ownership reform of Higher Vocational Colleges. *Mechanical Vocational Education*, (02), 18-21+28.
- Zhu, Q. Q. (2021). Conflict between public and private nature of mixed-ownership school-running in Higher Vocational Colleges and its resolution. *China Higher Education Research*, (11), 103-108.
- Zou, F., Qiao, M., & Xu, L. R. (2025). Research on the operation mechanism of mixed-ownership industrial colleges under the background of industry-education integration. *Manager's Journal*, (07), 100-101.
- Cochran, W. G. (1977). Sampling techniques. *John Wiley & Sons*.
- Guo, C. (2018). The Dilemmas and the Way out of the Reform of Mixed Ownership in Higher Vocational Colleges. In *2018 International Conference on Education, Psychology, and Management Science (ICEPMS 2018)*.
- Hardy, I., & Liu, S. (2022). Complex connectivities: Policy networks, data infrastructures and vocational education reform in China. *International Journal of Educational Research*, 115, 102045.
- Jin, S., & Jin, J. (2022). Practice of the operating mechanism and talent cultivation of mixed ownership in Higher Vocational Colleges. *International Journal of Learning and Teaching*, 8(3), 168-173.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*.

- Liu, Y. (2019). Vocational Education under Mixed System.
- Luo, X. (2022). Dilemma and Outlet of Mixed Ownership in Higher Vocational Colleges. *Frontiers in Educational Research*, 5(7).
- Luo, X., & Lertamornsak, G. (2022). Dilemma and outlet of mixed ownership in Higher Vocational Colleges. *Frontiers in Educational Research*, 5(7), 1-5.
- Regel, J., Ramasamy, M., & Pilz, M. (2022). Ownership in international vocational education and training transfer: The example of quality development in India. *International Journal of Training and Development*, 26(4), 664-685.
- Scott, J. (2009). Student ownership of education: Practicing democracy in schools. *Education Canada*, 49(2), 36-38.
- UNESCO. (2022). Strategy for Technical and Vocational Education and Training (2022-2029). Paris: UNESCO Publishing.
- Wang, J., He, J. A., Cebula, R., Foley, M., & Peng, F. (2024). Mixed ownership reform, political connections, and overinvestment. *American Journal of Economics and Sociology*, 83(2), 407-425.
- Wu, J., & Liang, Y. (2023). Research on the Path of Adaptive Transformation of Vocational Education by SOEs under the Background of High-quality Development. *Journal of Education and Educational Research*, 5(1), 73-76.
- Xin, L., Huilei, G., & Guang, C. (2019). Mixed Ownership of employee inventions in China's universities: Progress, issues and suggestions. *Queen Mary Journal of Intellectual Property*, 9(1), 42-60.
- Xin, X. (2016). Study on the Development Path of the Mixed Ownership Vocational Colleges. In *2016 2nd International Conference on Economy, Management, Law and Education (EMLE 2016)*.
- Zhao, Y., Lin, L., & Li, T. (2022). A Study on the Mixed Ownership Reform in Vocational Colleges in China. *Journal of Digital Convergence*, 20(1).

## Appendices

## Appendix A

List of Specialists and Letters of Specialists Invitation  
for IOC Verification

### List of Experts for Evaluating Research Instruments

	<b>Name-Surname</b>	<b>Position/Workplace</b>
1.	Associate Professor Dr. Thayata Rattanaphinyowanich	Bansomdejchaopraya Rajabhat University
2.	Associate Professor Dr. Narongwat Mingmit	Bansomdejchaopraya Rajabhat University
3.	Assistant Professor Dr. Phadet Kakham	Bansomdejchaopraya Rajabhat University
4.	Dr. Li Fang	Shandong Vocational Animal Science and Veterinary College
5.	Associate Professor QiShouquan	Jinan Engineering Vocational and Technical College

MHESI 0643.14/ ๐. ๗๑



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

5 March 2025

Subject: Invitation to validate research instrument  
Dear Associate Professor Dr. Thayata Rattanaphinyowanich  
Attachment 1) Questionnaire (for students, teachers, and administrators)  
2) Interview Outlines (for teachers, school administrators and stakeholders).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

With your specialized knowledge, we kindly request your assistance in validating the attached research instrument. We believe that your recommendations would be invaluable for the further refinement of this research instrument. We would like to take this opportunity to express our deepest gratitude and appreciation for your support.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)  
Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
www.bsru.ac.th  
E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ว.๗๑



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

5 March 2025

Subject: Invitation to validate research instrument  
Dear Associate Professor Dr. Narongwat Mingmit  
Attachment 1) Questionnaire (for students, teachers, and administrators)  
2) Interview Outlines (for teachers, school administrators and stakeholders).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

With your specialized knowledge, we kindly request your assistance in validating the attached research instrument. We believe that your recommendations would be invaluable for the further refinement of this research instrument. We would like to take this opportunity to express our deepest gratitude and appreciation for your support.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)  
Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
www.bsru.ac.th  
E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ก. ๗๑



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

5 March 2025

Subject: Invitation to validate research instrument  
Dear Assistant Professor Dr. Phadet Kakham  
Attachment: 1) Questionnaire (for students, teachers, and administrators)  
2) Interview Outlines (for teachers, school administrators and stakeholders).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |  |               |
|--|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanyothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat  | Co-Advisor    |

With your specialized knowledge, we kindly request your assistance in validating the attached research instrument. We believe that your recommendations would be invaluable for the further refinement of this research instrument. We would like to take this opportunity to express our deepest gratitude and appreciation for your support.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ 1.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

5 March 2025

Subject: Invitation to validate research instrument  
Dear Dr. LiFang  
Attachment 1) Questionnaire (for students, teachers, and administrators)  
2) Interview Outlines (for teachers, school administrators and stakeholders).

Mrs. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

With your specialized knowledge, we kindly request your assistance in validating the attached research instrument. We believe that your recommendations would be invaluable for the further refinement of this research instrument. We would like to take this opportunity to express our deepest gratitude and appreciation for your support.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic\\_grad@bsru.ac.th](mailto:academic_grad@bsru.ac.th)

MHESI 0643.14/ 2.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

5 March 2025

Subject: Invitation to validate research instrument  
Dear Associate Professor QiShouquan  
Attachment 1) Questionnaire (for students, teachers, and administrators)  
2) Interview Outlines (for teachers, school administrators and stakeholders).

Mrs. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

With your specialized knowledge, we kindly request your assistance in validating the attached research instrument. We believe that your recommendations would be invaluable for the further refinement of this research instrument. We would like to take this opportunity to express our deepest gratitude and appreciation for your support.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

### List of Experts for Evaluating the Final Model

	<b>Name-Surnam</b>	<b>Position/Workplace</b>
1.	Associate Professor Dr.Tayawan Kakham	Vice President of Dhonburi Rajabhat University
2.	Assistant Professor Dr. Phisanu Bangkheow	Head of Educational Management for Sustainable Development Program, BSRU
3.	Professor Dr. Achara Niyamabha	Professor in Educational Administration Program, BSRU
4.	Associate Professor Dr.Xiao Minghe	Jinan Engineering Vocational and Technical College
5.	Associate Professor Dr.LiZhi qiang	Binzhou Vocational College

MHESI 0643.14/2.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand  
10600

8 October 2025

Subject: Invitation to Serve as an Expert for Model (Including Supporting Strategies)  
Evaluation

Dear Associate Professor Dr.Tayawan Kakham

Attachment 1) Evaluation Form for Model Effectiveness and Feasibility  
2) Structure of the Sustainable Development Model of Mixed-Ownership School-  
Running in Higher Vocational Colleges (Including Supporting Strategies).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

The core focus of this research is the evaluation of the sustainable development model for mixed-ownership school-running. In light of your professional accomplishments in this field, the Graduate School cordially invites you to serve as an expert reviewer to conduct an in-depth review of the relevant strategies involved and provide feedback. We sincerely value your time and consideration dedicated to this matter.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaen)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic\\_grad@bsru.ac.th](mailto:academic_grad@bsru.ac.th)

MHESI 0643.14/2.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand  
10600

8 October 2025

Subject: Invitation to Serve as an Expert for Model (Including Supporting Strategies)  
Evaluation

Dear Assistant Professor Dr. Phisanu Bangkheow

Attachment 1) Evaluation Form for Model Effectiveness and Feasibility  
2) Structure of the Sustainable Development Model of Mixed-Ownership School-  
Running in Higher Vocational Colleges (Including Supporting Strategies).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

The core focus of this research is the evaluation of the sustainable development model for mixed-ownership school-running. In light of your professional accomplishments in this field, the Graduate School cordially invites you to serve as an expert reviewer to conduct an in-depth review of the relevant strategies involved and provide feedback. We sincerely value your time and consideration dedicated to this matter.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๓.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand  
10600

8 October 2025

Subject: Invitation to Serve as an Expert for Model (Including Supporting Strategies)  
Evaluation

Dear Professor Dr. Achara Niyamabha

Attachment 1) Evaluation Form for Model Effectiveness and Feasibility  
2) Structure of the Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges (Including Supporting Strategies).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

The core focus of this research is the evaluation of the sustainable development model for mixed-ownership school-running. In light of your professional accomplishments in this field, the Graduate School cordially invites you to serve as an expert reviewer to conduct an in-depth review of the relevant strategies involved and provide feedback. We sincerely value your time and consideration dedicated to this matter.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ว.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand  
10600

8 October 2025

Subject: Invitation to Serve as an Expert for Model (Including Supporting Strategies)  
Evaluation

Dear Associate Professor Dr.Xiao Minghe

Attachment 1) Evaluation Form for Model Effectiveness and Feasibility  
2) Structure of the Sustainable Development Model of Mixed-Ownership School-  
Running in Higher Vocational Colleges (Including Supporting Strategies).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

The core focus of this research is the evaluation of the sustainable development model for mixed-ownership school-running. In light of your professional accomplishments in this field, the Graduate School cordially invites you to serve as an expert reviewer to conduct an in-depth review of the relevant strategies involved and provide feedback. We sincerely value your time and consideration dedicated to this matter.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel:+662-473-7000

[www.bsru.ac.th](http://www.bsru.ac.th)

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๓.79



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand  
10600

8 October 2025

Subject: Invitation to Serve as an Expert for Model (Including Supporting Strategies)  
Evaluation

Dear Associate Professor Dr.Li Zhiqiang

Attachment 1) Evaluation Form for Model Effectiveness and Feasibility  
2) Structure of the Sustainable Development Model of Mixed-Ownership School-  
Running in Higher Vocational Colleges (Including Supporting Strategies).

Ms. Qi Shuzhan is a graduate student in the Doctor of Philosophy Program in Educational Management for Sustainable Development at Bansomdejchaopraya Rajabhat University. She is conducting research entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" under the supervision of the following thesis advisory committee:

- |   |               |
|---|---------------|
| 1. Associate Professor Dr. Chollada Pongpattanayothin | Major Advisor |
| 2. Assistant Professor Dr. Phatchareephone Bangkheow  | Co-Advisor    |
| 3. Assistant Professor Dr. Sunet Thaweethawornsawat   | Co-Advisor    |

The core focus of this research is the evaluation of the sustainable development model for mixed-ownership school-running. In light of your professional accomplishments in this field, the Graduate School cordially invites you to serve as an expert reviewer to conduct an in-depth review of the relevant strategies involved and provide feedback. We sincerely value your time and consideration dedicated to this matter.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel:+662-473-7000

www.bsru.ac.th

E-mail: academic.grad@bsru.ac.th

## Appendix B

Official Letter

### List of Focus Group Members for Drafting the Draft Model

	Name-Surnam	Position/Workplace
1.	Associate Professor Dr.Zhu Nini	Shandong Maritime Vocation College
2.	Song Zhigang	
3.	Professor MaJi	
4.	Associate Professor QiShouquan	Jinan Engineering Vocational and
5.	WuXuejun	Technical College
6	Li Tao	
7	Li Xin	Binzhou Vocational College
8	Dr.Fu Zhiduan	
9	Wang Junhua	
10	Associate Professor Li Fang	Shandong Vocational Animal Science
11	Zhang Naiqing	and Veterinary College
12	Li Hui	
13	Ge Caixia	Shandong Chemical Engineering
14	Dr.Feng Xicheng	Vocational College
15	Li Xue	

MHESI 0643.14/1 106



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Associate Professor Dr.Zhu Nini

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๑.1๐6



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Song Zhigang

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ป. (06



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Professor Ma Ji

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel:+662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๗.10๕



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Associate Professor Qi Shouquan

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ร. 106



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Wu Xuejun

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๗. 10๖



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Li Tao

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๑.1๐๖



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Li Xin

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkeow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel:+662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๗, 10๕



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Dr. Fu Zhiduan

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ Q. 106



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Wang Junhua

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaen)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ ๗. 1๐๕



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Associate Professor Li Fang

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ (2) to 6 -



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Zhang Naiqing

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ ๓. ๑๐๕



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Li Hui

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ ๑. 1๐๖



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Ge Caixia

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaen)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic\\_grad@bsru.ac.th](mailto:academic_grad@bsru.ac.th)

MHESI 0643.14/ ( ). 10 6



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear Dr. Feng Xicheng

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ ๑ ๑๐๖



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

13 May 2025

Subject: Invitation to Participate in the Focus Group Discussion on Model Draft Construction  
Dear LI Xue

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan (student ID number: 6473139022) – a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand – who is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, and Assistant Professors Dr. Phatchareephone Bangkheow and Dr. Sunet Thaweethawornsawat as Co-Advisors. The development and construction of the model will be discussed in this study. Given your extensive experience in Educational Management for Sustainable Development, I request that you participate in the focus group discussion to help formulate the development strategy.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the development of this model draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)  
Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
www.bsru.ac.th  
E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

### List of Experts in the Focus Group for Evaluating the Draft Model

	<b>Name-Surnam</b>	<b>Position/Workplace</b>
1.	Professor Dr. Zhou Qihu	Shandong Vocational Animal Science and Veterinary College
2.	Associate Professor Zhao Chunhai	Binzhou Vocational College
3.	Associate Professor Meng Xiangyun	Shandong Chemical Engineering Vocational College
4.	Associate Professor Liu Jinyan	Shandong Maritime Vocation College
5.	Associate Professor Dr. Hu Xingpeng	Jinan Engineering Vocational and Technical College

MHESI 0643.14/ ๓.๑๖๓



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

9 June 2025

Subject: Invitation to Participate in the Focus Group Discussion on Evaluation the Model Draft  
Dear Professor Dr. Zhou Qihu

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan, a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand, with code number 6473139022. She is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, Assistant Professor Dr. Phatchareephone Bangkheow and Assistant Professor Dr. Sunet Thaweethawornsawat as Co-Advisors. The Evaluation and construction of the model will be discussed in this study, Given your extensive experience in Educational Management for Sustainable Development, I sincerely invite you to participate in this focus group discussion to assist in the evaluation of the Model Draft.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the evaluation of the Model Draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/ ๑. 163



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

9 June 2025

Subject: Invitation to Participate in the Focus Group Discussion on Evaluation the Model Draft  
Dear Associate Professor Zhao Chunhai

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan, a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand, with code number 6473139022. She is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, Assistant Professor Dr. Phatchareephone Bangkheow and Assistant Professor Dr. Sunet Thaweethawornsawat as Co-Advisors. The Evaluation and construction of the model will be discussed in this study, Given your extensive experience in Educational Management for Sustainable Development, I sincerely invite you to participate in this focus group discussion to assist in the evaluation of the Model Draft.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the evaluation of the Model Draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000

www.bsru.ac.th

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

MHESI 0643.14/๗.1๕๓



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

9 June 2025

Subject: Invitation to Participate in the Focus Group Discussion on Evaluation the Model Draft  
Dear Associate Professor Meng Xiangyun

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan, a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand, with code number 6473139022. She is under the guidance of Associate Professor Dr. Chollada Pongpattanyothin as Major Advisor, Assistant Professor Dr. Phatchareephone Bangkheow and Assistant Professor Dr. Sunet Thaweethawornsawat as Co-Advisors. The Evaluation and construction of the model will be discussed in this study, Given your extensive experience in Educational Management for Sustainable Development, I sincerely invite you to participate in this focus group discussion to assist in the evaluation of the Model Draft.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the evaluation of the Model Draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
www.bsru.ac.th

E-mail: [academic\\_grad@bsru.ac.th](mailto:academic_grad@bsru.ac.th)  
MHESI 0643.14/๑. (๖๔)



Bansomdejchaopraya  
Rajabhat University  
1061 Soi Itsaraphap 15,  
Itsaraphap Road, Hiranruchi,  
Thonburi, Bangkok, Thailand 10600

9 June 2025

Subject: Invitation to Participate in the Focus Group Discussion on Evaluation the Model Draft  
Dear Associate Professor Liu Jinyan

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan, a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand, with code number 6473139022. She is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, Assistant Professor Dr. Phatchareephone Bangkheow and Assistant Professor Dr. Sunet Thaweethawornsawat as Co-Advisors. The Evaluation and construction of the model will be discussed in this study, Given your extensive experience in Educational Management for Sustainable Development, I sincerely invite you to participate in this focus group discussion to assist in the evaluation of the Model Draft.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the evaluation of the Model Draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)

Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
[www.bsru.ac.th](http://www.bsru.ac.th)

E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)  
 MHESI 0643.14/๗.1๖3



Bansomdejchaopraya  
 Rajabhat University  
 1061 Soi Itsaraphap 15,  
 Itsaraphap Road, Hiranruchi,  
 Thonburi, Bangkok, Thailand 10600

9 June 2025

Subject: Invitation to Participate in the Focus Group Discussion on Evaluation the Model Draft  
 Dear Associate Professor Dr. Hu Xingpeng

Regarding the thesis entitled "The Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province" by Mrs. Qi Shuzhan, a Ph.D. student majoring in Education Management for Sustainable Development at Bansomdejchaopraya Rajabhat University, Thailand, with code number 6473139022. She is under the guidance of Associate Professor Dr. Chollada Pongpattanayothin as Major Advisor, Assistant Professor Dr. Phatchareephone Bangkheow and Assistant Professor Dr. Sunet Thaweethawornsawat as Co-Advisors. The Evaluation and construction of the model will be discussed in this study, Given your extensive experience in Educational Management for Sustainable Development, I sincerely invite you to participate in this focus group discussion to assist in the evaluation of the Model Draft.

Thank you for your consideration. We look forward to your participation and would highly appreciate your suggestions and insights on advancing the evaluation of the Model Draft.

Yours faithfully

(Asst. Prof. Dr. Tanaput Chanchaoren)  
 Vice Dean of Graduate School for Dean of Graduate School

Tel: +662-473-7000  
[www.bsru.ac.th](http://www.bsru.ac.th)  
 E-mail: [academic.grad@bsru.ac.th](mailto:academic.grad@bsru.ac.th)

Appendix C  
Research Instrument

## Questionnaire on the Current Status of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

(For Students)

### Directions:

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for the following research purpose: 1) To identify the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Respondents: Students from 5 mixed-ownership higher vocational colleges in Shandong Province.

3. Questionnaire type: Closed-ended questions, divided into 2 parts. The first part is the respondent's personal information, and the second part is the questionnaire on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province. Please select the corresponding level number from the 5-point rating scale according to the actual situation to answer.

Thank you for your cooperation in answering this questionnaire. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential. You do not need to provide your personal name when filling out the questionnaire, so please answer with confidence.

**Part 1:** Respondent's Personal Information

1. Gender:

 Male  Female

2. Age:

 20 years old or below  21 - 30 years old  31 - 45 years old 46 - 60 years old  61 years old or above

3. Grade:

 First grade  Second grade  Third grade  Fourth grade  Fifth grade

4. Expected Career Plan:

 Further study  Employment**Part 2:** Questionnaire on the Current Situation of Sustainable Development of Mixed - ownership School-running in Higher Vocational Colleges in Shandong Province

**Instructions:** Please carefully read the following items (Questions 1 - 35), and select one of the five levels based on the actual situation, with the details as follows:

1 = Lowest level (Strongly disagree), 2 = Low level (Disagree), 3 = Moderate level (Neutral), 4 = High level (Agree), 5 = Highest level (Strongly agree)

NO.	Question	Rating Level				
		5	4	3	2	1
<b>Property Rights Attributes</b>						
1	Diversified property rights have a positive impact on the school's teaching and management activities					
2	The equity structure of various investment entities in the school is conducive to the rational allocation and efficient use of school resources					
3	The school's decision - making mechanism fully considers the opinions and interests of various investment entities					
4	The school's property rights attributes are clear and legal protection is sound					
5	The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development					
6	The school has attracted more social investment and can balance the profit needs of various investment entities with long - term development goals					
7	Many investors have strengthened the school's reputation through sharing resources and coordinating developers					
<b>Educational Environment</b>						
8	More practical and forward - looking teaching content					
9	More innovative curriculum design and teaching methods					
10	More diversified teaching methods and distinct educational characteristics					
11	The current teaching content is attractive and can stimulate					

NO.	Question	Rating Level				
		5	4	3	2	1
	students' learning interest					
12	The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals					
13	Under the mixed - ownership school-running model, the school's major setting and curriculum update are more in line with industry needs and student development					
14	Mixed - ownership Higher Vocational Colleges have good educational quality and can improve students' comprehensive quality and employability					
15	The campus hardware facilities are convenient, and the learning environment and teaching environment are comfortable					
<b>Campus Environment</b>						
16	Learning resources and teaching resources are easily accessible, and it is easy to access library resources, digital learning tools and platforms					
17	Satisfied with the logistics services provided by the school, such as catering services, accommodation conditions and medical care					
18	Mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure					
19	The school has a good campus cultural atmosphere and rich campus activities					
20	Mixed-ownership school-running supports policies that promote					

NO.	Question	Rating Level				
		5	4	3	2	1
	educational equity and inclusive student services					
21	The school can protect the rights and interests of teachers and students and create a good teaching and learning environment					
<b>Management Environment</b>						
22	The school has a sound management system, efficient management, safety and order					
23	The school has high administrative efficiency and service quality					
24	The school has transparent decision - making, sound systems and efficient processes					
25	The school can timely respond to and handle risk management and control such as safety issues, public opinion management and legal issues					
26	The school's information - based management covers the core business system					
27	The school has a good teaching staff and a mature training and promotion channel					
28	The school has a high degree of democratic participation, a good cultural atmosphere, and the right to participate in school decision - making and the warmth of organizational culture					
<b>Resource Environment</b>						
29	The school has rich educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained					
30	The school has rich digital resources and provides sufficient					

NO.	Question	Rating Level				
		5	4	3	2	1
	online open courses and online school - enterprise resources					
31	The school has rich personal development resources, providing club activities, internship opportunities, scientific research projects, and international exchange and learning opportunities					
32	The school has more industry - university - research cooperation opportunities, actively provides social services, and promotes regional economic and social development					
33	The school has sufficient funds to cover the school's development needs					
34	The school's resource allocation is reasonable and can meet the needs of different majors and courses					
35	The school cooperates with other higher education institutions or enterprises to jointly promote educational innovation					

Thank you again for your participation, and wish you all the best!

## Questionnaire on the Current Status of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

(For Teachers)

### Directions:

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for the following research purpose: 1) To identify the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Respondents: Teachers from 5 mixed-ownership higher vocational colleges in Shandong Province.

3. Questionnaire type: Closed-ended questions, divided into 2 parts. The first part is the respondent's personal information, and the second part is the questionnaire on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province. Please select the corresponding level number from the 5-point rating scale according to the actual situation to answer.

Thank you for your cooperation in answering this questionnaire. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential. You do not need to provide your personal name when filling out the questionnaire, so please answer with confidence.

**Part 1:** Respondent's Personal Information

1. Gender:

Male  Female

2. Age:

25 years old or below  26 - 35 years old  36 - 45 years old

46 - 60 years old  61 years old or above

3. Educational Background:

Bachelor's degree  Master's degree  Doctoral degree  Others

4. Professional Title:

Teaching Assistant  Lecturer or Assistant Professor

Associate Professor

Professor

5. Work Experience:

Less than 5 years  5 - 10 years  11 - 15 years  16 - 20 years

More than 20 years

**Part 2:** Questionnaire on the Current Situation of Sustainable Development of Mixed - ownership School-running in Higher Vocational Colleges in Shandong Province

**Instructions:** Please carefully read the following items (Questions 1 - 35), and select one of the five levels based on the actual situation, with the details as follows:

1 = Lowest level (Strongly disagree), 2 = Low level (Disagree), 3 = Moderate level (Neutral), 4 = High level (Agree), 5 = Highest level (Strongly agree)

NO.	Question	Rating Level				
		5	4	3	2	1
<b>Property Rights Attributes</b>						
1	Diversified property rights have a positive impact on the school's teaching and management activities					
2	The equity structure of various investment entities in the school is conducive to the rational allocation and efficient use of school resources					
3	The school's decision - making mechanism fully considers the opinions and interests of various investment entities					
4	The school's property rights attributes are clear and legal protection is sound					
5	The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development					
6	The school has attracted more social investment and can balance the profit needs of various investment entities with long - term development goals					
7	Many investors have strengthened the school's reputation through sharing resources and coordinating developers					
<b>Educational Environment</b>						
8	More practical and forward - looking teaching content					
9	More innovative curriculum design and teaching methods					
10	More diversified teaching methods and distinct educational characteristics					

NO.	Question	Rating Level				
		5	4	3	2	1
11	The current teaching content is attractive and can stimulate students' learning interest					
12	The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals					
13	Under the mixed - ownership school-running model, the school's major setting and curriculum update are more in line with industry needs and student development					
14	Mixed - ownership Higher Vocational Colleges have good educational quality and can improve students' comprehensive quality and employability					
<b>Campus Environment</b>						
15	The campus hardware facilities are convenient, and the learning environment and teaching environment are comfortable					
16	Learning resources and teaching resources are easily accessible, and it is easy to access library resources, digital learning tools and platforms					
17	Satisfied with the logistics services provided by the school, such as catering services, accommodation conditions and medical care					
18	Mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure					
19	The school has a good campus cultural atmosphere and rich campus activities					
20	Mixed-ownership school-running supports policies that promote educational equity and inclusive student services					

NO.	Question	Rating Level				
		5	4	3	2	1
21	The school can protect the rights and interests of teachers and students and create a good teaching and learning environment					
<b>Management Environment</b>						
22	The school has a sound management system, efficient management, safety and order					
23	The school has high administrative efficiency and service quality					
24	The school has transparent decision - making, sound systems and efficient processes					
25	The school can timely respond to and handle risk management and control such as safety issues, public opinion management and legal issues					
26	The school's information - based management covers the core business system					
27	The school has a good teaching staff and a mature training and promotion channel					
28	The school has a high degree of democratic participation, a good cultural atmosphere, and the right to participate in school decision - making and the warmth of organizational culture					
<b>Resource Environment</b>						
29	The school has rich educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained					
30	The school has rich digital resources and provides sufficient online open courses and online school - enterprise resources					
31	The school has rich personal development resources, providing club activities, internship opportunities, scientific research					

NO.	Question	Rating Level				
		5	4	3	2	1
	projects, and international exchange and learning opportunities					
32	The school has more industry - university - research cooperation opportunities, actively provides social services, and promotes regional economic and social development					
33	The school has sufficient funds to cover the school's development needs					
34	The school's resource allocation is reasonable and can meet the needs of different majors and courses					
35	The school cooperates with other higher education institutions or enterprises to jointly promote educational innovation					

Thank you again for your participation, and wish you all the best!

## Questionnaire on the Current Status of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

(For School Administrators)

### Directions:

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornswat. The research data will be used for the following research purpose: 1) To identify the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Respondents: Administrators from 5 mixed-ownership higher vocational colleges in Shandong Province.

3. Questionnaire type: Closed-ended questions, divided into 2 parts. The first part is the respondent's personal information, and the second part is the questionnaire on the current status of mixed-ownership school-running in higher vocational colleges in Shandong Province. Please select the corresponding level number from the 5-point rating scale according to the actual situation to answer.

Thank you for your cooperation in answering this questionnaire. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential. You do not need to provide your personal name when filling out the questionnaire, so please answer with confidence.

**Part 1:** Respondent's Personal Information

1. Gender:

 Male  Female

2. Age:

 25 years old or below  26 - 35 years old  36 - 45 years old 46 - 60 years old  61 years old or above

3. Educational Background:

 Bachelor's degree  Master's degree  Doctoral degree  Others

4. Position:

 Educational Administrator  Educational and Teaching Administrator School Leader above the Vice Principal Level

5. Work Experience:

 Less than 5 years  5 - 10 years  11 - 15 years  16 - 20 years More than 20 years**Part 2:** Questionnaire on the Current Situation of Sustainable Development of Mixed - ownership School-running in Higher Vocational Colleges in Shandong Province

**Instructions:** Please carefully read the following items (Questions 1 - 35), and select one of the five levels based on the actual situation, with the details as follows:

1 = Lowest level (Strongly disagree), 2 = Low level (Disagree), 3 = Moderate level (Neutral), 4 = High level (Agree), 5 = Highest level (Strongly agree)

NO.	Question	Rating Level				
		5	4	3	2	1
<b>Property Rights Attributes</b>						
1	Diversified property rights have a positive impact on the school's teaching and management activities					
2	The equity structure of various investment entities in the school is conducive to the rational allocation and efficient use of school resources					
3	The school's decision - making mechanism fully considers the opinions and interests of various investment entities					
4	The school's property rights attributes are clear and legal protection is sound					
5	The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development					
6	The school has attracted more social investment and can balance the profit needs of various investment entities with long - term development goals					
7	Many investors have strengthened the school's reputation through sharing resources and coordinating developers					
<b>Educational Environment</b>						
8	More practical and forward - looking teaching content					
9	More innovative curriculum design and teaching methods					
10	More diversified teaching methods and distinct educational characteristics					
11	The current teaching content is attractive and can stimulate students' learning interest					

NO.	Question	Rating Level				
		5	4	3	2	1
12	The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals					
13	Under the mixed - ownership school-running model, the school's major setting and curriculum update are more in line with industry needs and student development					
14	Mixed - ownership Higher Vocational Colleges have good educational quality and can improve students' comprehensive quality and employability					
<b>Campus Environment</b>						
15	The campus hardware facilities are convenient, and the learning environment and teaching environment are comfortable					
16	Learning resources and teaching resources are easily accessible, and it is easy to access library resources, digital learning tools and platforms					
17	Satisfied with the logistics services provided by the school, such as catering services, accommodation conditions and medical care					
18	Mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure					
19	The school has a good campus cultural atmosphere and rich campus activities					
20	Mixed-ownership school-running supports policies that promote educational equity and inclusive student services					
21	The school can protect the rights and interests of teachers and students and create a good teaching and learning environment					

NO.	Question	Rating Level				
		5	4	3	2	1
<b>Management Environment</b>						
22	The school has a sound management system, efficient management, safety and order					
23	The school has high administrative efficiency and service quality					
24	The school has transparent decision - making, sound systems and efficient processes					
25	The school can timely respond to and handle risk management and control such as safety issues, public opinion management and legal issues					
26	The school's information - based management covers the core business system					
27	The school has a good teaching staff and a mature training and promotion channel					
28	The school has a high degree of democratic participation, a good cultural atmosphere, and the right to participate in school decision - making and the warmth of organizational culture					
<b>Resource Environment</b>						
29	The school has rich educational and teaching resources, and the facilities and activity arrangements meet the needs of teachers and students and are well maintained					
30	The school has rich digital resources and provides sufficient online open courses and online school - enterprise resources					
31	The school has rich personal development resources, providing club activities, internship opportunities, scientific research projects, and international exchange and learning opportunities					

NO.	Question	Rating Level				
		5	4	3	2	1
32	The school has more industry - university - research cooperation opportunities, actively provides social services, and promotes regional economic and social development					
33	The school has sufficient funds to cover the school's development needs					
34	The school's resource allocation is reasonable and can meet the needs of different majors and courses					
35	The school cooperates with other higher education institutions or enterprises to jointly promote educational innovation					

Thank you again for your participation, and wish you all the best!

**Interview Outline (Problems, Approaches, and Influencing Factors)**  
**Problems, Approaches, and Influencing Factors of the Sustainable  
Development of mixed-ownership school-running in Higher Vocational  
Colleges in Shandong Province**  
(For Teachers, School Administrators and Stakeholders)

**Directions:**

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for Research Objective 1 : To identify the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Interviewees: Teachers, administrators, and stakeholders with more than 5 years of work experience from 5 higher vocational colleges with mixed-ownership school-running.

3. Interview type: Open-ended questions, divided into 2 parts. The first part is the respondent's personal information; the second part is the interview outline on the problems, approaches, and influencing factors of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Thank you for your cooperation in the interview. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential, so please answer with confidence.

**Part 1:** Interviewee's Personal Information

1. Name (Interviewee):
2. School:
3. Position:  Teacher  Administrator  Stakeholder
4. Interview Date:
5. Interview Duration:

**Part 2:** Interview outline on Problems, Approaches, and Influencing Factors of the Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

1. What problems do you think exist in terms of property rights attributes, educational environment, campus environment, management environment, and resource environment in the sustainable development of mixed-ownership higher vocational colleges?

.....

.....

.....

2. What problems exist in the sustainable development of mixed - ownership school-running in your current school?

.....

.....

.....

3. What distinctive measures has your current school taken in terms of property rights attributes, educational environment, campus environment, management environment, and resource environment to promote the sustainable development of mixed-ownership school-running?

.....

.....

.....

4. What do you think are the strengths and weaknesses affecting the sustainable development of mixed - ownership school-running in Higher Vocational Colleges in Shandong Province?

.....

.....

.....

5. What do you think are the opportunities and threats affecting the sustainable development of mixed - ownership school-running in Higher Vocational Colleges in Shandong Province?

.....

.....

.....

6. What aspects do you think Higher Vocational Colleges need to improve most in the sustainable development of mixed - ownership school-running?

.....

.....

.....

## Interview Outline (Existing Models)

### Existing Models of the Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)

(For Teachers, School Administrators and Stakeholders)

#### Directions:

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for Research Objective 2: To construct a sustainable development model (including supporting strategies) for mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Interviewees: Senior teachers, senior administrators, and senior stakeholders from 5 mixed-ownership higher vocational colleges.

3. Interview type: Open-ended questions, divided into 2 parts. The first part is the respondent's personal information; the second part is the interview outline on the existing models (including supporting strategies) of the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Thank you for your cooperation in the interview. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential, so please answer with confidence.

**Part 1:** Interviewee's Personal Information

1. Name (Interviewee):
2. School:
3. Position:  Teacher  Administrator  Stakeholder
4. Interview Date:
5. Interview Duration:

**Part 2:** Interview outline on Existing Models of the Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)

1. Please briefly introduce the main achievements and landmark outcomes of your school in the sustainable development of mixed - ownership school-running.

.....

.....

.....

2. What do you think are the core factors contributing to your school's success in the sustainable development of mixed - ownership school-running?

.....

.....

.....

3. What core concepts and guiding principles should we follow when constructing a draft sustainable development model for mixed-ownership school-running?

.....

.....

.....

4. What core content and supporting strategies do you think should be included in the "design of property rights attributes" dimension to promote the implementation of the mixed-ownership school-running model?

.....  
.....  
.....

5. What aspects should be focused on in the educational environment for mixed - ownership school-running?

.....  
.....  
.....

6. How to improve the campus environment to support the development of mixed - ownership school-running?

.....  
.....  
.....

7. How to improve the management environment under mixed - ownership school-running to meet the needs of sustainable teaching management?

.....  
.....  
.....

8. How should we strengthen the construction of the resource environment to support the sustainable development of mixed - ownership school-running?

.....

.....

.....

9. How did you design and implement the evaluation and feedback mechanism to ensure the effectiveness and continuous improvement of mixed-ownership school-running?

.....

.....

.....

**Focus group discussion (Construct the Draft Model)**  
**Draft Construction of the Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)**

(For Teachers, School Administrators and Stakeholders)

**Directions:**

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for Research Objective 2 : To construct a sustainable development model (including supporting strategies) for mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Focus group members: Senior Teachers, Senior Administrators, and Senior Stakeholders from 5 mixed-ownership higher vocational colleges.

3. Type: Open - ended questions, divided into 2 parts. The first part is the respondent's personal information; the second part is the interview outline for exploring the draft construction of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

Thank you for your cooperation in the interview. Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential, so please answer with confidence.

**Part 1:** Interviewee's Personal Information

1. Name (Interviewee):
2. School:
3. Position:  Teacher  Administrator  Stakeholder
4. Interview Date:
5. Interview Duration:

**Part 2:** Interview outline for Draft Construction of the Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)

1. What visions and specific goals should we set for the sustainable development of mixed - ownership school-running?

.....

.....

.....

2. What core concepts and guiding principles should we follow when constructing a draft sustainable development model for mixed-ownership school-running?

.....

.....

.....

3. What aspects should be included in the formulation of the core property rights attribute plan for the sustainable development of mixed - ownership school-running in Higher Vocational Colleges?

.....

.....

.....

4. What aspects should be focused on in the construction of the educational environment for the sustainable development of mixed - ownership school-running in Higher Vocational Colleges?

.....

.....

.....

5. What suggestions are there for improving the campus environment to enhance the sustainable development effect of mixed - ownership school-running?

.....

.....

.....

6. How to improve the management environment to meet the needs of the sustainable development of mixed - ownership school-running?

.....

.....

.....

7. How should we strengthen the construction of the resource environment to support the sustainable development of mixed - ownership school-running?

.....

.....

.....

8. Are there any other suggestions for the draft construction of the sustainable development model (including supporting strategies) of mixed-ownership school-running in higher vocational colleges in Shandong Province?

.....

.....

.....

**Focus Group Evaluation Form (Draft Model)**  
**Feasibility and Suitability of the Draft Sustainable Development Model**  
**of mixed-ownership school-running in Higher Vocational Colleges in**  
**Shandong Province (Including Supporting Strategies)**  
(For Experts)

**Directions:**

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for the following research purpose: 2) To construct a sustainable development model (including supporting strategies) for mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Focus group of Expert members: 5 experts in the field of mixed-ownership school-running development in Higher Vocational Colleges.

3. Type: The interview consists of closed-ended questions, please select the corresponding rating number on the overall rating scale based on actual situations to answer.

The answers you provide will only be used for overall statistical analysis, and will never be processed individually or publicly released, so please answer with confidence.

**Part 1: Personal Information**

1. Name (Interviewee):

2. Educational Background:

Bachelor's degree  Master's degree  Doctoral degree

3. Employer:

Higher vocational colleges  Enterprise

4. Work Experience:

Less than 5 years  5 - 10 years  11 - 15 years  16 - 20 years

More than 20 years

5. Interview Date:

6. Interview Duration:

**Part 2: Evaluation Questionnaire on the Feasibility and Suitability of the Draft Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)**

Instructions: Please select one of the 5 levels based on the actual situation, with the details as follows:

1 = Lowest level (Strongly disagree), 2 = Low level (Disagree), 3 = Moderate level (Neutral), 4 = High level (Agree), 5 = Highest level (Strongly agree)

Factors	Questions	Evaluation Result				
		5	4	3	2	1
Suitability Assessment	1. The strategy fully considers the current situation and development needs of mixed-ownership school-running in higher vocational colleges in Shandong Province					
	2. The content of the strategy fully considers the characteristics and needs of students, teachers and administrators in Higher vocational colleges					
Suitability Assessment	3. The strategy can effectively respond to the challenges faced by the sustainable development of mixed-ownership school-running at present and in the future					
	4. The strategy fully considers the interests of stakeholders such as the government, schools and enterprises					
	5. The strategy is conducive to improving the educational quality and school-running level of Higher vocational colleges					
Feasibility Assessment	6. The property rights attribute plan in the strategy is feasible for implementation					
	7. The construction of the educational environment in the strategy is feasible for implementation					
	8. The construction of the campus environment in the strategy is feasible for implementation					
	9. The construction of the management environment in the strategy is feasible for implementation					

Factors	Questions	Evaluation Result				
		5	4	3	2	1
	10. The construction of the resource environment in the strategy is feasible for implementation					

**Feasibility and Suitability Evaluation Form (Final Model)**  
**Evaluation on the Feasibility and Suitability of the Sustainable**  
**Development Model of mixed-ownership school-running in Higher**  
**Vocational Colleges in Shandong Province**  
**(Including Supporting Strategies)**

(For Experts)

**Directions:**

1. The study is conducted by Mrs. Qi Shuzhan, under the joint guidance of Associate Professor Dr. Chollada Pongpattanayothin (Major Advisor), Assistant Professor Dr. Phatchareephorn Bangkheow and Associate Professor Dr. Sunate Thaveethavornsawat. The research data will be used for the following research purpose: 3) To verify the feasibility and suitability of the sustainable development model of mixed-ownership school-running in higher vocational colleges in Shandong Province.

2. Expert members: 5 experts in the field of mixed-ownership school-running development in higher vocational colleges.

3. Type: Closed-ended questions. To examine the feasibility and suitability of the sustainable development strategy of mixed-ownership school-running in higher vocational colleges in Shandong Province, please select the corresponding level number from the total rating scale according to the actual situation to answer.

Your answers will only be used for overall statistical analysis and will never be processed individually or publicly released. Information will be kept strictly confidential, so please answer with confidence.

**Part 1: Personal Information**

Interviewee's Name: \_\_\_\_\_

Educational Background:

 Bachelor's Degree    Master's Degree    Doctoral Degree

Affiliation:

 Higher vocational colleges    Enterprise

Work Experience:

 Less than 5 years    5-10 years    11-15 years    16-20 years

 More than 20 years

Interview Date: \_\_\_\_\_

Interview Duration: \_\_\_\_\_

**Part 2:** Evaluation and Analysis Form on the Feasibility and Suitability of the Sustainable Development Model of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)

Instructions: Please select one of the five levels based on the actual situation.

The specific standards are as follows:

1 = Lowest level (Strongly disagree), 2 = Low level (Disagree), 3 = Moderate level (Neutral), 4 = High level (Agree), 5 = Highest level (Strongly agree)







## Appendix D

The Results of the Quality Analysis of Research Instruments

## Questionnaire IOC Value Test

**Table Appendix 1:** Questionnaire Validity Evaluation Form "The Current Status of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province"

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
<b>Property Rights Attribute</b>								
1	Diversified property rights have a positive impact on the school's teaching and management activities	1	1	1	1	1	1.00	Valid
2	The equity structure of the school's various investors is conducive to the rational allocation and efficient utilization of school resources	1	1	1	1	1	1.00	Valid
3	The school's decision-making mechanism fully considers the opinions and interests of various investors	1	1	1	1	1	1.00	Valid
4	The school's property rights attributes are clear and legal protection is sound	1	1	1	1	1	1.00	Valid
5	The diversified investment structure has increased learning resources and facilities, thereby directly enhancing students' learning opportunities and academic development	1	1	0	1	1	0.80	Valid
6	The school has attracted more social investment and can balance the profit demands of various investors with long-term development goals	1	0	1	1	1	0.80	Valid
7	Many investors have strengthened the school's reputation through sharing resources and coordinating developers	1	1	0	1	1	0.80	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
<b>Educational Environment</b>								
8	Teaching content is more practical and forward-looking	1	1	1	1	1	1.00	Valid
9	Curriculum design and teaching methods are more innovative	1	1	1	1	1	1.00	Valid
10	Teaching methods are more diversified and educational characteristics are more distinctive	1	1	1	1	1	1.00	Valid
11	The current teaching content is attractive and can stimulate students' learning interest	1	1	1	1	1	1.00	Valid
12	The school has established a more scientific and comprehensive educational quality evaluation system to ensure the achievement of educational goals	1	1	1	1	1	1.00	Valid
13	Under the mixed-ownership model, the school's professional setting and curriculum update are more in line with industry needs and student development	1	1	1	1	1	1.00	Valid
14	Higher vocational colleges with mixed-ownership school-running have good educational quality and can improve students' comprehensive quality and employability	1	1	1	1	1	1.00	Valid
<b>Campus Environment</b>								
15	Campus hardware facilities are convenient, and the learning and teaching environments are comfortable	1	1	1	1	1	1.00	Valid
16	Learning resources and teaching resources are easily accessible, and it is convenient to access library resources, digital learning tools and platforms	1	1	1	1	1	1.00	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
17	Satisfaction with the school's logistics services such as catering, accommodation and medical care	1	1	1	1	1	1.00	Valid
18	Mixed-ownership school-running supports the construction of environment-friendly campus facilities and sustainable infrastructure	1	1	0	1	1	0.80	Valid
19	The school has a strong campus cultural atmosphere and rich campus activities	1	1	1	1	1	1.00	Valid
20	Mixed-ownership school-running supports policies that promote educational equity and inclusive student services	1	1	0	1	1	0.80	Valid
21	The school can protect the rights and interests of teachers and students and create a good teaching and learning environment	1	1	1	1	1	1.00	Valid
<b>Management Environment</b>								
22	The school has a sound management system, efficient management, and is safe and orderly	1	1	1	1	1	1.00	Valid
23	The school has high administrative efficiency and good service quality	1	1	1	1	1	0.80	Valid
24	The school has high decision-making transparency, sound systems and efficient processes	1	1	1	1	1	1.00	Valid
25	The school can promptly respond to and handle risk prevention and control work such as safety issues, public opinion management and legal issues	1	1	1	1	1	1.00	Valid
26	The school's information-based management covers core business systems	1	1	1	1	1	1.00	Valid
27	The school has a good teaching staff and a mature teacher training and promotion channel	1	1	1	1	1	1.00	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
28	The school has a high degree of democratic participation and a good cultural atmosphere; teachers and students have the right to participate in school decision-making, and the organizational culture is full of humanistic warmth	1	1	1	1	1	1.00	Valid
<b>Resource Environment</b>								
29	The school has rich educational and teaching resources, and the facilities and activity arrangements can meet the needs of teachers and students and are well maintained	1	1	1	1	1	1.00	Valid
30	The school has rich digital resources and provides sufficient open online courses and online school-enterprise cooperation resources	1	1	1	1	1	1.00	Valid
31	The school has rich personal development resources, providing club activities, internship opportunities, research projects, and international exchange and learning opportunities	1	1	1	1	1	1.00	Valid
32	The school has more industry-university-research cooperation opportunities, actively provides social services, and promotes regional economic and social development	1	1	1	1	1	1.00	Valid
33	The school has sufficient funds to meet the school's development needs	1	1	1	1	1	1.00	Valid
34	The school's resource allocation is reasonable and can meet the needs of different majors and Courses	1	1	1	1	1	1.00	Valid
35	The school cooperates with other higher education	1	1	1	1	1	1.00	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
	institutions or enterprises to jointly promote educational innovation							
<b>Total</b>							<b>0.97</b>	<b>Valid</b>

## Interview outline form IOC value detection

**Table Appendix 2:** Interview Validity Evaluation Form "Problems, Approaches, and Influencing Factors of the Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province"

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
1	What problems do you think exist in terms of property rights attributes, educational environment, campus environment, management environment, and resource environment in the sustainable development of mixed-ownership higher vocational colleges?	1	1	1	1	1	1.00	Valid
2	What problems exist in the sustainable development of mixed-ownership school-running in your current school?	1	1	1	1	1	1.00	Valid
3	What distinctive measures has your current school taken in terms of property rights attributes, educational environment, campus environment, management environment, and resource environment to promote the sustainable development of mixed-ownership school-running?	1	1	0	1	1	0.80	Valid
4	What do you think are the strengths and weaknesses affecting the sustainable development of mixed-ownership school-running in higher vocational colleges in Shandong Province?	1	1	1	1	1	1.00	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
5	What do you think are the opportunities and threats affecting the sustainable development of mixed-ownership school-running in Higher vocational colleges in Shandong Province?	1	1	1	1	1	1.00	Valid
6	What aspects do you think Higher vocational colleges need to improve most in the sustainable development of mixed-ownership school-running?	1	1	1	1	1	1.00	Valid
<b>Total</b>							<b>0.97</b>	<b>Valid</b>

**Table Appendix 3:** Interview Validity Evaluation Form "Existing Models of the Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province (Including Supporting Strategies)"

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
1	Please briefly introduce the main achievements and landmark results of your school in the sustainable development of mixed-ownership school-running.	1	1	1	1	1	1.00	Valid
2	What do you think are the core factors contributing to your school's success in the sustainable development of mixed-ownership school-running?	1	1	1	1	1	1.00	Valid
3	What core concepts and guiding principles should we follow when constructing a draft sustainable development model for mixed-ownership school-running?	1	1	1	1	0	0.80	Valid
4	For the talent training system under the mixed-ownership model, how do you think it should be designed to not only meet enterprises' demand for skilled talents but also conform to the educational laws of vocational education?	1	1	1	1	1	1.00	Valid
5	From the perspective of sustainable development, what dynamic adjustment mechanisms (such as curriculum update, resource supplement, partner replacement, etc.) need to be established in the mixed-ownership model to respond to changes in the external environment?	1	1	1	1	1	1.00	Valid

NO.	Contents	Expert Rating					IOC	Validity
		1	2	3	4	5		
6	In the operation process of the mixed-ownership model, how to protect the legitimate rights and interests of teachers, students, enterprise employees and other relevant groups and stimulate their enthusiasm for participation?	1	1	1	1	1	1.00	Valid
6	In the operation process of the mixed-ownership model, how to protect the legitimate rights and interests of teachers, students, enterprise employees and other relevant groups and stimulate their enthusiasm for participation?	1	1	1	1	1	1.00	Valid
7	How to improve the management environment under mixed-ownership school-running to meet the needs of sustainable teaching management?	1	1	1	1	1	1.00	Valid
8	How should we strengthen the construction of the resource environment to support the sustainable development of mixed-ownership school-running?	1	1	1	1	1	1.00	Valid
9	How did you design and implement the evaluation and feedback mechanism to ensure the effectiveness and continuous improvement of mixed-ownership school-running?	1	1	1	0	1	0.80	Valid
<b>Total</b>							<b>0.96</b>	<b>Valid</b>

## Reliability and Validity Analysis of Research Instruments

Validity Evaluation Form of the Questionnaire on the Current Situation of Sustainable Development of mixed-ownership school-running in Higher Vocational Colleges in Shandong Province

Questionnaire Reliability and Validity Test Results

### 1. Reliability Analysis

Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of terms
0.978	0.978	35

### 2. KMO & Bartlett Test

KMO Measure of Sampling Adequacy		0.990
	Approx. Chi-Square	14888.156
Bartlett's Sphericity Test	df	595
	Sig.	.000

Appendix E  
Certificate of English



This is to certify that

***Mrs. Shuzhan Qi***

Achieved BSRU English Proficiency Test (BSRU-TEP) level

**C2**

Given on 12<sup>th</sup> February 2022

A handwritten signature in blue ink, which appears to read 'Kulsirin', is positioned below the date.

(Assistant Professor Dr Kulsirin Aphiratvoradej)

Director

## Appendix F

The Document for Acceptance Research

**World Journal of Education**

1595 Sixteenth Ave, Suite 301  
Richmond Hill, Ontario, L4B 3N9, Canada  
Tel: 1-416-479-0028  
E-mail: [info@sciedupress.com](mailto:info@sciedupress.com)  
Website: [www.sciedupress.com](http://www.sciedupress.com)

January 24, 2026

Educational Management for Sustainable Development  
Bansomdejchaopraya Rajabhat University  
Bangkok, Thailand

**Dear** Qi Shuzhan,

Thanks for your submission to *World Journal of Education*.

We have the pleasure to inform you that your manuscript has been accepted for publication. It will be published on the Vol. 16, No. 1, in March 2026.

Title: Sustainable Development Model of Mixed-Ownership School-Running in Higher Vocational Colleges in Shandong Province

Authors: Qi Shuzhan, Chollada Pongpattanayothin, Patchareephorn Bangkheow & Sunate Thaveethavornsawat

If you have any questions, please do not hesitate to contact with us.

Sincerely,

A handwritten signature in black ink, appearing to read "Sara M. Lee".

**SCIEDU PRESS**  
[www.sciedupress.com](http://www.sciedupress.com)

Sara M. Lee

On behalf of,  
The Editorial Board of *World Journal of Education*  
Sciedu Press

## Research Profile

**Name-Surname:** Mrs.Qi Shuzhan  
**Birthday:** December 2, 1986  
**Place of Birth:** Yishui, Shandong, China

### **Educational background:**

- Doctoral of Educational Management for Sustainable Development, Bansomdejchaopraya Rajabhat University, 2025
- Master of Ocean University of China, 2014
- Undergraduate study at Chengdu College of Sichuan Normal University, 2009

### **Work experience:**

- From 2021 to 2025, Linyi Hongyuan Engineering Testing & Appraisal Co., Ltd. Served as Deputy Manager
- From 2010 to 2021, Shandong Baolong Biodegradable Materials Co., Ltd. Successively served as Human Resources Specialist, Office Administrator and General Manager Assistant

### **Office Location:**

Linyi Hongyuan Engineering Testing & Appraisal Co., Ltd., Linyi City, Shandong Province, China

### **Current Contact Location:**

No. 3 Tianmu Mountain Road, Yishui County, Linyi City, Shandong Province, China