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## Navigating Geopolitics and Collaboration: A Triple Helix Analysis of Vocational Education Internationalization via China's Silk Road Institutes

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**Abstract:** Against the backdrop of an accelerating globalization process, the internationalization of vocational education has become a crucial pathway for enhancing national competitiveness and educational quality. To serve the Belt and Road initiative, Zhejiang Province launched the "Silk Road Institutes" project in 2016, which has become a flagship brand of its educational internationalization. This study employs an explanatory sequential mixed-methods approach, integrating quantitative data analysis with qualitative interviews, to systematically examine the current status of 65 Silk Road Institutes established across 39 countries and regions (including 46 led by higher vocational colleges). From theoretical perspectives of internationalization cycle, institutional isomorphism, triple helix, and cross-cultural adaptation, the paper analyzes their developmental stages (from resource export to ecosystem empowerment), mimetic and normative isomorphic mechanisms, government-university-industry collaboration models, and cultural integration strategies. The research summarizes the distinctive features of the Silk Road Institutes in serving national strategies, cross-regional collaboration, platform building, and embedding within overseas economic and trade zones. It also delves into the multiple challenges they face, including international geopolitical risks, sustainability of cooperation, structural misalignment between industry and education, and institutional barriers. Finally, the paper proposes strategies for promoting the high-quality development of Silk Road Institutes across five dimensions: constructing a risk prevention and control system, innovating collaborative mechanisms, deepening industry-education integration, overcoming institutional obstacles, and strengthening digital enablement. This aims to provide theoretical reference and practical models for the internationalization of China's vocational education.

**Keywords:** Silk Road Institutes; internationalization of vocational education; Belt and Road Initiative; higher vocational colleges; industry-education integration

## 1. Introduction

Accelerating globalization has made the internationalization of vocational education a crucial pathway for enhancing national competitiveness and educational quality [1]. Developing countries are increasingly prioritizing the internationalization of education [2-5]. The development of vocational education internationalization is primarily reflected in two aspects: "bringing in" and "going global" [6]. While China has achieved relative maturity in "bringing in," its progress in "going global" remains insufficient. To thoroughly implement the national strategy of high-quality advancement of the Belt and Road Initiative, and in alignment with the goals of Chinese modernization, building a strong educational system, and international industrial capacity cooperation, Zhejiang Province launched the "Belt and Road 'Silk Road Institutes'" initiative in 2016. This effort leverages the province's profound cultural heritage, extensive practical experience, and significant industrial demands. Subsequently, Zhejiang issued guiding documents such as the Guidelines on Promoting the Construction of "Belt and Road 'Silk Road Institutes'" and the Action Plan for High-Quality Development of "Belt and Road 'Silk Road Institutes'" (2024–2027), which clarify the fundamental requirements and primary tasks for establishing these institutes. The term Silk Road Institutes refers collectively to Zhejiang's overseas educational institutions and has become a flagship program of the province's educational services supporting the Belt and Road Initiative [7].

## 2. Methods

This study adopted an explanatory sequential mixed-methods design. Quantitative analysis was first conducted based on publicly available data, including official lists of Silk Road Institutes from the Zhejiang Provincial Department of Education, from which a database of 46 institutes across 33 countries established by higher vocational colleges was constructed. Spatial and temporal

distribution patterns were examined using Excel PivotTables. Subsequently, semi-structured interviews were carried out with 12 administrators from six higher vocational colleges, selected through purposive sampling to cover key regions including Southeast Asia, Africa, and Central and Eastern Europe. Interview questions focused on operational challenges, enterprise participation mechanisms, and quality assurance practices. Thematic analysis was employed to process qualitative data. Quantitative and qualitative results were integrated during the interpretation phase to provide a comprehensive understanding of the development models and constraints of the institutes. All participants provided informed consent.

### 3. Results

#### 3.1. Current Status of Silk Road Institutes Established by Higher Vocational Colleges in Zhejiang Province

As of now, Zhejiang Province has released four batches of “Belt and Road ‘Silk Road Institutes’”, with a total of 65 institutes established across 39 countries and regions. Among these, 46 were founded by higher vocational colleges, accounting for 70.77% of the total. In the first batch of 29 institutes, 22 were established by higher vocational colleges; in the second batch of 10 institutes, 6 were set up by higher vocational colleges; the third batch included 13 institutes, 11 of which were established by higher vocational colleges (including 2 jointly operated with regular universities); and in the fourth batch of 13 institutes, 7 were founded by higher vocational colleges. A detailed breakdown is provided in Tables 1–4. Notably, 4 of the Silk Road Institutes initiated by higher vocational colleges have been designated as Luban Workshop operation projects, representing 8.70% of the total.

**Table 1. The First Batch of Higher Vocational "Belt and Road 'Silk Road Institutes'" in Zhejiang Province**

| No. | Institu-tion                    | Name of Silk Road Institute | Establish-ment Date | Host Country                 | Operational Model         | Major Programs               |
|-----|---------------------------------|-----------------------------|---------------------|------------------------------|---------------------------|------------------------------|
| 1   | Zhejiang Institute of Communica | Zhejiang Communica-tions    | 2017.07             | Cambodia, Thailand, Cameroon | Inter-institutional (I-I) | Road and bridge engineering, |

|   |                                            |                                                              |         |           |                                                         |                                                                                |
|---|--------------------------------------------|--------------------------------------------------------------|---------|-----------|---------------------------------------------------------|--------------------------------------------------------------------------------|
|   | tions                                      | Overseas Silk Road Institute                                 |         |           | collaboration / University-Industry (U-I) collaboration | civil engineering, and related fields                                          |
| 2 |                                            | Laos Champasak Silk Road Transportation College              | 2018.11 | Laos      | I-I collaboration                                       | Road and bridge engineering, civil engineering, and related fields             |
| 3 | Jinhua University of Vocational Technology | Rwanda Musanze International Academy (Luban Workshop Rwanda) | 2017.07 | Rwanda    | I-I collaboration                                       | Electrical automation technology, e-commerce, and related fields               |
| 4 | Ningbo University of Vocational Technology | China-Sri Lanka Silk Road College                            | 2018.11 | Sri Lanka | I-I collaboration                                       | Mechanical manufacturing, tourism management, and related fields               |
| 5 |                                            | China-Benin Silk Road College / Sino-African (Benin)         | 2016.01 | Benin     | I-I collaboration                                       | Electronic information engineering, mechanical manufacturing, modern logistics |

|    |                                 |                                                                   |         |          |                              |                                            |
|----|---------------------------------|-------------------------------------------------------------------|---------|----------|------------------------------|--------------------------------------------|
|    |                                 | Vocational and Technical Education College (Luban Workshop Benin) |         |          |                              | management, e-commerce, and related fields |
| 6  | Wenzhou Polytechnic             | Wenzhou Polytechnic Yalong Silk Road College                      | 2018.07 | Cambodia | Trilateral U-I collaboration | Electrical automation and related fields   |
| 7  | Tourism College of Zhejiang     | China-Russia Tourism College                                      | 2017.11 | Russia   | I-I collaboration            | Tour guiding and related fields            |
| 8  |                                 | China-Serbia Tourism College (Luban Workshop Serbia)              | 2019.07 | Serbia   | I-I collaboration            | Chinese culinary arts and related fields   |
| 9  |                                 | China-Italy Culinary Academy                                      | 2020.11 | Italy    | I-I collaboration            | Chinese culinary arts and related fields   |
| 10 | Hangzhou Vocational & Technical | Sino-African (Nigeria)                                            | 2022.01 | Nigeria  | Trilateral U-I collaboration | Automobile manufacturing and               |

|    |                                           |                                                       |         |                              |                   |                                                                              |
|----|-------------------------------------------|-------------------------------------------------------|---------|------------------------------|-------------------|------------------------------------------------------------------------------|
|    | College                                   | Silk Road Craftsman Academy                           |         |                              |                   | testing, industrial robotics, and related fields                             |
| 11 | Zhejiang Business College                 | Spanish Chinese Cuisine College                       | 2019.12 | Spain                        | I-I collaboration | Chinese culinary arts and related fields                                     |
| 12 |                                           | China-Nepal Business College                          | 2017.09 | Nepal                        | I-I collaboration | Hotel management, culinary arts and nutrition, and related fields            |
| 13 | Zhejiang Financial College                | Zhejiang Financial College · Hua-li Silk Road College | 2021.01 | Thailand, Mexico, Uzbekistan | U-I collaboration | Big data technology, e-commerce, big data and accounting, and related fields |
| 14 | Zhejiang Institute of Economics and Trade | China-Ukraine Economic and Trade Silk Road College    | 2021.06 | Ukraine                      | I-I collaboration | Big data technology, big data and accounting, tourism management, and        |

|    |                                                                                                                     |                                                                              |         |             |                              |                                                                                                  |
|----|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------|-------------|------------------------------|--------------------------------------------------------------------------------------------------|
|    |                                                                                                                     |                                                                              |         |             |                              | related fields                                                                                   |
| 15 |                                                                                                                     | Kompas Silk Road College                                                     | 2021.04 | Malaysia    | I-I collaboration            | E-commerce and related fields                                                                    |
| 16 | Zhejiang Institute of Economics and Trade, Zhejiang Polytechnic University of Mechanical and Electrical Engineering | Thailand-China Rayong Silk Road College                                      | 2019.06 | Thailand    | Trilateral U-I collaboration | Business management, electrical automation, e-commerce, and related fields                       |
| 17 | Zhejiang College of Construction                                                                                    | China-Philippines Belt and Road Construction Skills Talent Silk Road College | 2019.05 | Philippines | I-I collaboration            | Construction engineering technology, civil engineering inspection technology, and related fields |
| 18 | Zhejiang Fashion Institute of Technology                                                                            | China-Romania Silk Road Craftsman                                            | 2019.09 | Romania     | I-I collaboration            | Fashion design, industrial robotics,                                                             |

|    |                                                    |                                                          |         |                  |                              |                                                                         |
|----|----------------------------------------------------|----------------------------------------------------------|---------|------------------|------------------------------|-------------------------------------------------------------------------|
|    |                                                    | Academy                                                  |         |                  |                              | and related fields                                                      |
| 19 | Yiwu Industrial & Commercial College               | Malaysia Yiwu Silk Road College                          | 2021.01 | Malaysia         | U-I collaboration            | International trade, cross-border E-commerce, and related fields        |
| 20 | Zhejiang Technical Institute of Economics          | Luban Workshop Malaysia                                  | 2021.03 | Malaysia         | I-I collaboration            | Cross-border e-commerce                                                 |
| 21 | Zhejiang International Maritime College            | Zhejiang-Papua New Guinea International Maritime College | 2018.07 | Papua New Guinea | I-I collaboration            | Navigation technology, marine engineering technology, and related field |
| 22 | Wenzhou Vocational College of Science & Technology | Uzbekistan Pengsheng Silk Road College                   | 2020.06 | Uzbekistan       | Trilateral U-I collaboration | Modern agricultural technology and related fields                       |

**Table 2. The Second Batch of Higher Vocational "Belt and Road 'Silk Road Institutes'" in Zhejiang Province**

| No. | Institution | Name of Silk Road Institute | Establishment Date | Host Country | Operational Model | Major Programs |
|-----|-------------|-----------------------------|--------------------|--------------|-------------------|----------------|
| 1   | Huzhou      | Sino-Africa                 | 2021.12            | Angola       | U-I               | Electrical     |



|   |                                                       |                                                                        |         |                  |                                 |                                                                                     |
|---|-------------------------------------------------------|------------------------------------------------------------------------|---------|------------------|---------------------------------|-------------------------------------------------------------------------------------|
|   | Vocational<br>& Technical<br>College                  | (Angola)<br>Silk Road<br>College                                       |         |                  | collaboration                   | automation,<br>civil<br>engineering,<br>and related<br>fields                       |
| 2 | Ningbo City<br>College of<br>Vocational<br>Technology | Sino-Thai<br>Siam Silk<br>Road<br>Craftsman<br>Academy                 | 2019.04 | Thailand         | I-I<br>collaboration            | Hotel<br>manage-<br>ment, cross-<br>border e-<br>commerce,<br>and related<br>fields |
| 3 | Quzhou<br>College of<br>Technology                    | Tongtian-<br>xing · Qu-<br>zhou<br>College Silk<br>Road<br>College     | 2022.04 | Cambodia         | U-I<br>collaboration            | Electrical<br>automation<br>technology<br>and related<br>fields                     |
| 4 | Zhejiang<br>Institute of<br>Economics<br>and Trade    | Sino-<br>Philippines<br>Economic &<br>Trade Silk<br>Road<br>College    | 2022.04 | Philip-<br>pines | Trilateral U-I<br>collaboration | Cross-<br>border e-<br>commerce<br>and related<br>fields                            |
| 5 | Jiaxing<br>Nanyang<br>Polytechnic<br>Institute        | Sino-Kyrgyz<br>Cross-<br>Border E-<br>Commerce<br>Silk Road<br>College | 2019.04 | Kyrgyz-<br>stan  | I-I<br>collaboration            | Cross-<br>border e-<br>commerce<br>and related<br>fields                            |
| 6 | Jiaxing                                               | Jiaxin Sino-                                                           | 2020.05 | Myanmar          | U-I                             | Modern                                                                              |

|  |                                      |                               |  |  |               |                                                                       |
|--|--------------------------------------|-------------------------------|--|--|---------------|-----------------------------------------------------------------------|
|  | Vocational<br>& Technical<br>College | Myanmar<br>Garment<br>College |  |  | collaboration | textile<br>technology,<br>textile<br>design, and<br>related<br>fields |
|--|--------------------------------------|-------------------------------|--|--|---------------|-----------------------------------------------------------------------|

**Table 3. The Third Batch of Higher Vocational "Belt and Road 'Silk Road Institutes'" in Zhejiang Province**

| No. | Institution                                                                                                                           | Name of<br>Silk Road<br>Institute                                  | Establish-<br>ment<br>Date | Host<br>Country | Operational<br>Model | Major<br>Programs                                                                                                      |
|-----|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------|-----------------|----------------------|------------------------------------------------------------------------------------------------------------------------|
| 1   | Zhejiang<br>Gongshang<br>University,<br>Zhejiang<br>Polytechnic<br>University<br>of<br>Mechanical<br>and<br>Electrical<br>Engineering | Sino-<br>Indonesia<br>Zhenshi<br>Huabao<br>Silk Road<br>College    | 2023.11                    | Indonesia       | U-I<br>collaboration | Materials<br>forming and<br>control<br>engineering,<br>intelligent<br>manufactur-<br>ing, and<br>related fields        |
| 2   | Zhejiang<br>University<br>of<br>Resources<br>and Electric<br>Power,<br>Zhejiang<br>Institute of<br>Communi-<br>cations                | Luban<br>Workshop<br>at Kyrgyz<br>State<br>Technical<br>University | 2023.08                    | Kyrgyz-<br>stan | U-I<br>collaboration | Water<br>conservancy<br>and<br>hydropower<br>engineering,<br>road and<br>bridge<br>engineering<br>technology,<br>smart |

|   |                                         |                                                                     |         |             |                              |                                                                            |
|---|-----------------------------------------|---------------------------------------------------------------------|---------|-------------|------------------------------|----------------------------------------------------------------------------|
|   |                                         |                                                                     |         |             |                              | construction, and related fields                                           |
| 3 | Zhejiang Business Technology Institute  | Indonesia Silk Road College, Zhejiang Business Technology Institute | 2022.06 | Indonesia   | Trilateral U-I collaboration | Cross-border e-commerce, mold design and manufacturing, and related fields |
| 4 | Shaoxing Vocational & Technical College | Sino-Malaysia-Vietnam Medical Academy                               | 2021.11 | Malaysia    | I-I collaboration            | Traditional Chinese medicine, Chinese pharmacy, and related fields         |
| 5 | Zhejiang Industrial Polytechnic College | China-Nigeria Silk Road College                                     | 2022.08 | Nigeria     | Trilateral U-I collaboration | Construction engineering, smart construction, and related fields           |
| 6 | Yiwu Industrial & Commercial College    | Morocco Yiwu Silk Road College                                      | 2023.09 | Morocco     | I-I collaboration            | International trade, cross-border e-commerce, and related fields           |
| 7 | Taizhou Vocational                      | Taizhou Vocational                                                  | 2021.06 | Bangladesh, | U-I collaboration            | Mechatronics                                                               |

|    |                                                           |                                                            |         |                 |                                                                     |                                                                                       |
|----|-----------------------------------------------------------|------------------------------------------------------------|---------|-----------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    | &Technical<br>College                                     | College ·<br>Weixing<br>Shares<br>Silk Road<br>College     |         | Vietnam         |                                                                     | engineering<br>and related<br>fields                                                  |
| 8  | Zhejiang<br>Yuying<br>College<br>Vocational<br>Technology | Sino-Laos<br>Yuying<br>Silk Road<br>College                | 2023.12 | Laos            | I-I<br>collaboration                                                | Tourism<br>management,<br>hotel<br>management,<br>and related<br>fields               |
| 9  | Zhejiang<br>Dongfang<br>Polytechnic                       | Sino-<br>Thailand<br>New<br>Energy<br>Silk Road<br>Academy | 2023.12 | Thailand        | Trilateral U-I<br>collaboration                                     | Intelligent<br>manufactur-<br>ing<br>equipment<br>technology<br>and related<br>fields |
| 10 | Jiaxing<br>Vocational<br>& Technical<br>College           | Sino-<br>Vietnam<br>Industrial<br>Internet<br>College      | 2021.05 | Vietnam         | U-I<br>collaboration                                                | Intelligent<br>manufactur-<br>ing, industrial<br>internet, and<br>related fields      |
| 11 | Hangzhou<br>Polytechnic                                   | Sino-<br>South<br>Africa<br>Silk Road<br>College           | 2020.10 | South<br>Africa | Government-<br>University-<br>Industry (G-<br>U-I)<br>collaboration | Intelligent<br>manufactur-<br>ing, smart<br>construction,<br>and related<br>fields    |

**Table 4. The Fourth Batch of Higher Vocational "Belt and Road 'Silk Road Institutes'" in Zhejiang Province**

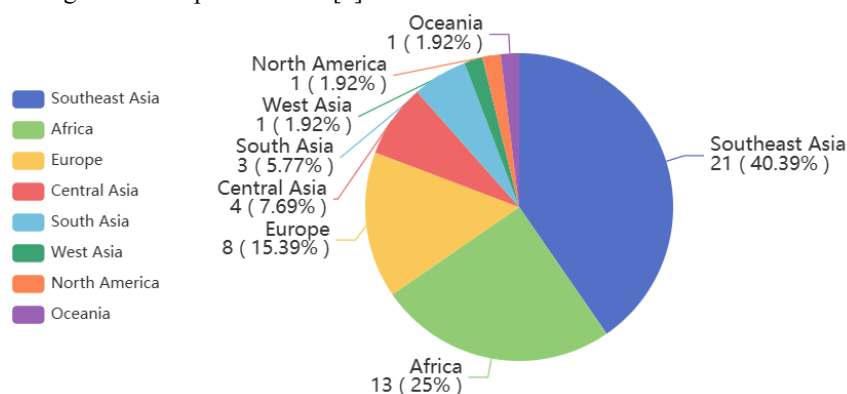
| No. | Institution                                                        | Name of Silk Road Institute                                             | Establishment Date | Host Country                              | Operational Model            | Major Programs                                                            |
|-----|--------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------|-------------------------------------------|------------------------------|---------------------------------------------------------------------------|
| 1   | Zhejiang Pharmaceutical University                                 | Zhejiang-Austria Pharmaceutical Silk Road Institute                     | 2023.11            | Austria                                   | U-I collaboration            | Pharmacy services and management, international trade, and related fields |
| 2   | Zhejiang Guangsha Vocational and Technical University Construction | Zhejiang Guangsha University Congo-Brazzaville Silk Road Institute      | 2023.03            | Republic of the Congo (Congo-Brazzaville) | I-I collaboration            | Construction engineering management and related fields                    |
| 3   | Jinhua University of Vocational Technology                         | Jinhua Polytechnic China-Turkey Culture and Tourism Silk Road Institute | /                  | Turkey                                    | I-I collaboration            | Tourism management and related fields                                     |
| 4   | Wenzhou Polytechnic                                                | Angola Wenzhou Polytechnic Silk Road Institute                          | 2025.01            | Angola                                    | Trilateral U-I collaboration | Mechanics and related fields                                              |

|   |                                                                         |                                                                    |         |                 |                                 |                                                                                           |
|---|-------------------------------------------------------------------------|--------------------------------------------------------------------|---------|-----------------|---------------------------------|-------------------------------------------------------------------------------------------|
| 5 | Zhejiang<br>Industry<br>&Trade<br>Vocational<br>College                 | ZJMT<br>South<br>Africa Silk<br>Road<br>Institute                  | 2024.04 | South<br>Africa | Trilateral U-I<br>collaboration | Industrial<br>robotics<br>technology<br>and related<br>fields                             |
| 6 | Taizhou<br>Vocational<br>College of<br>Science<br>&Technolo-<br>gy      | Zhejiang-<br>Uganda<br>Hehe<br>Craftsman<br>Silk Road<br>Institute | 2024.06 | Uganda          | Trilateral U-I<br>collaboration | Mold design<br>and<br>manufactur-<br>ing, e-<br>commerce,<br>and related<br>fields        |
| 7 | Zhejiang<br>Tongji<br>Vocational<br>College of<br>Science<br>Technology | Zambia<br>Kafue<br>Hydro-<br>electric Silk<br>Road<br>Institute    | /       | Zambia          | U-I<br>collaboration            | Hydraulic<br>engineering,<br>power plant<br>and power<br>system, and<br>related<br>fields |

From the perspective of the number of higher vocational institutions, 33 have been selected to establish Silk Road Institutes, accounting for 63.46% of the 52 higher vocational colleges in the province. Among these 33 institutions, 5 are private, representing 15.15%, while 14 are national-level "Double High" institutions, accounting for 93.33% of such designated colleges in Zhejiang Province. By institution, Zhejiang Institute of Economics and Trade leads with 4 institutes, followed by Tourism College of Zhejiang and Zhejiang Institute of Communications with 3 each. Jiaxing Vocational & Technical College, Jinhua University of Vocational Technology, Ningbo University of Vocational Technology, Wenzhou Polytechnic, Yiwu Industrial & Commercial College, Zhejiang Business College and Zhejiang Polytechnic University of Mechanical and Electrical Engineering have each established 2 institutes, while the remaining institutions have established one each. Geographically within the province, Hangzhou hosts 12

institutions involved, Ningbo has 5, Wenzhou has 4, and Jinhua has 3. Shaoxing, Jiaxing, and Taizhou each have 2, while Huzhou, Quzhou, and Zhoushan each have 1.

From a regional and country distribution perspective, a total of 46 higher vocational Silk Road Institutes has been established across 33 countries spanning five continents. These countries are primarily those along the Belt and Road initiative with which China has a long history and solid foundation of exchange and cooperation. The regional distribution shows a gradient pattern (see Figure 1). Notably, the significant concentration in Thailand (5 institutes) exhibits a spatial coupling with Zhejiang Province's stock of foreign direct investment in the country (in 2024, Zhejiang's investment in Thailand ranked second [8]). This synergy between investment and institutional establishment validates the concept of "efficiency-driven mimicry" from institutional isomorphism theory—where subsequently established institutions tend to replicate the successful location strategies of their predecessors [9].



**Figure 1. Regional Distribution of Host Countries for Silk Road Institutes**

**Note:** Some Silk Road Institutes are located in multiple countries.

In terms of operational models, I-I collaboration, U-I collaboration, and trilateral U-I collaboration constitute the dominant frameworks for establishing Silk Road Institutes, as illustrated in Figure 2. Most of the participating Chinese higher vocational institutions are members of national or provincial-level Double High programs, underscoring their leading and exemplary role in the internationalization

of vocational education. The overseas partner institutions are primarily local universities of applied sciences, vocational and technical colleges, and training schools. A notable example is the China-Benin Silk Road College, established through collaboration between Ningbo University of Vocational Technology and Benin's CERCO College, which represents Zhejiang Province's first overseas vocational education initiative. Furthermore, an innovative multi-party collaboration model—termed "Chinese and foreign institutions +Chinese enterprises +Confucius Institute (Classroom)"—has been proposed and implemented [8]. A representative case is the China-Romania Silk Road Craftsman Institute, jointly launched by Zhejiang Fashion Institute of Technology and Romania's National Iancu School. Under the primary framework of I-I collaboration, additional entities such as the Confucius Institute at Lucian Blaga University of Sibiu, the University of Timișoara, and Petroșani Company have joined the collaborative partnership. This integrated approach has received widespread recognition and positive feedback from local governments, educational institutions, enterprises, parents, and students.

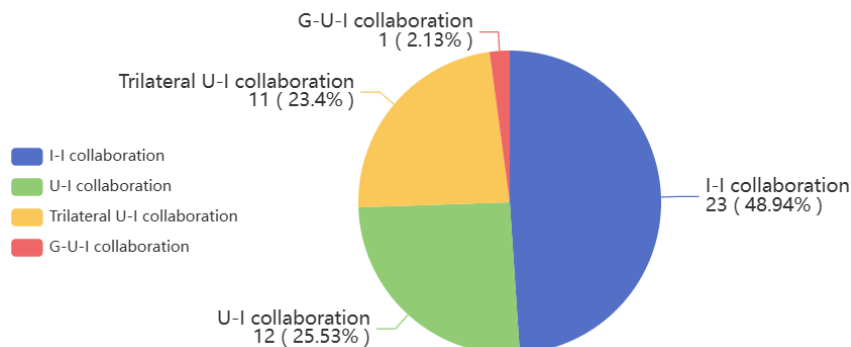


Figure 2. Statistics on the Operational Models of Silk Road Institutes

### 3.2. Analysis of the Characteristics of Silk Road Institutes Construction Based on a Mixed-Methods Approach

#### 3.2.1. Phased Characteristics Based on the Internationalization Cycle Theory

According to the internationalization cycle theory proposed by Knight (2004) [6], the development of vocational education internationalization undergoes an evolution from "program mobility" to "capacity building." The construction



practice of Zhejiang's Silk Road Institutes fully reflects the three stages of this theoretical model: (1) Resource Export Phase (2016–2018): Primarily focused on curriculum export and faculty dispatch; (2) Standard Co-Development Phase (2019–2021): Marked by the joint development of specialized teaching standards; (3) Ecological Empowerment Phase (2022–present): Characterized by the formation of an integrated service system combining technical training and industrial incubation. This developmental trajectory aligns with Marginson's (2016) [10] theoretical perspective on the restructuring of the "core-periphery" structure in global education service trade. Through the establishment of 39 offshore educational sites, Zhejiang's higher vocational institutions are breaking the traditional pattern of vocational education resource flows dominated by Western developed countries and constructing a new model of international educational cooperation based on South-South collaboration.

### **3.2.2. Isomorphic Mechanisms from the Perspective of Institutional Isomorphism Theory**

Drawing on institutional isomorphism theory advanced by DiMaggio and Powell (1983) [11], the development process of the Silk Road Institutes exhibits three typical isomorphic mechanisms: (1) Mimetic Isomorphism: Emulating the EPIP teaching model of the Luban Workshop [12] to reduce exploration costs; (2) Normative Isomorphism: Adhering to standards such as the Guidelines on Promoting the Construction of Belt and Road Silk Road Institutes and the Construction Guide for Vocational Schools with High Internationalization Levels, driven by industry associations; (3) Coercive Isomorphism: Aligning with host countries' vocational skill certification requirements under policy and regulatory constraints. Notably, unlike Shandong Province's Ban-Mo Institutes, which emphasize traditional craftsmanship [12], Zhejiang's Silk Road Institutes leverage the advantages of its local digital economy industries. By introducing training courses in emerging fields such as cross-border e-commerce, digital marketing, and smart logistics, they have established a differentiated development path integrating "technical inheritance and digital innovation."

### **3.2.3. Collaborative Mechanism Based on the Triple Helix Theory**

Using the triple helix model proposed by Etzkowitz (2008) [13], a distinctive

collaborative mechanism for Zhejiang's Silk Road Institutes can be constructed: (1) Government Dimension: Providing macro-level guidance and support through policy documents such as the Guidelines on Promoting the Construction of "Belt and Road 'Silk Road Institutes'" and the Action Plan for High-Quality Development of "Belt and Road 'Silk Road Institutes'" (2024–2027); (2) Institutional Dimension: A technology export alliance formed by 13 national "Double High" colleges; (3) Enterprise Dimension: Private enterprises represented by Holley Group and Yalong Intelligent. The synergistic interaction among these three actors has given rise to a "hybrid organization"—such as the Thailand-China Rayong Silk Road Institute—which essentially represents an institutional innovation in the context of cross-border educational cooperation.

#### **3.2.4. Integration Strategies Based on Cross-Cultural Adaptation Theory**

Grounding in Berry's (1997) acculturation theory[14], the China-Italy Culinary Academy established by Tourism College of Zhejiang adopted typical integration strategies in curriculum development: (1) Cultural Retention: adhering to the eight fundamental techniques of Chinese cooking and incorporating elements of Chinese culinary culture into teaching; (2) Cultural Integration: substituting local ingredients (e.g., using olive oil instead of rapeseed oil); (3) Cultural Innovation: developing fusion dishes such as a "seafood version" of Dongpo pork.

### **3.3. Challenges Facing the Silk Road Institutes of Higher Vocational Colleges in Zhejiang Province**

#### **3.3.1. Uncertainty Arising from International Geopolitical Risks**

Amidst unprecedented global changes, the high-quality development of Zhejiang's Silk Road Institutes faces challenges from a complex international environment. Some countries along the Belt and Road are experiencing a resurgence of religious extremism, ethnic separatism, and terrorist violence, accompanied by political instability, threats of terrorism, and border conflicts. Examples include religious extremist forces in Southeast Asia, the risk of color revolutions in Central Asian and some Southern European countries, and the ongoing Russia-Ukraine conflict—all of which directly impact the safe implementation of the Silk Road Institutes. Furthermore, Western-led countries, particularly the United States, have persistently propagated unfounded claims such

as "vocational education infiltration" and "technological colonialism". They have encouraged certain non-governmental organizations to exploit issues such as environmental standards, labor rights, ethnicity, and religion to obstruct and undermine related cooperation projects. The demonstrative effect of the Baltic states' successive withdrawal from the China-CEEC cooperation mechanism at China's behest warrants vigilance. Currently, increased global economic instability and uncertainty have led to reduced vocational education budgets in some host countries, undermining the sustainability of Silk Road Institutes.

### **3.3.2. Challenges to the Sustainability of Cross-Regional Cooperation**

As a major province with a highly developed export-oriented economy, Zhejiang encounters unique difficulties in advancing the Silk Road Institutes initiative. Significant disparities exist between the vocational education systems of ASEAN countries—key economic partners of Zhejiang—and that of China. For instance, Vietnam's three-track system and Indonesia's dual system create obstacles to aligning curriculum structures. Zhejiang is also a powerhouse for the private sector. By the end of 2024, the number of private enterprises and individual businesses in the province reached 10.601 million, accounting for 96.8% of all market entities. Nevertheless, participation from private enterprises in the development of Silk Road Institutes remains limited. Additionally, many institutes lack robust graduate tracking mechanisms, and a quantitative evaluation system for assessing the skill enhancement of local employees in Chinese-invested enterprises has yet to be established.

### **3.3.3. Structural Misalignment Between Vocational Education Supply and Industrial Demand**

According to statistics, in 2024, Zhejiang Province invested in 861 enterprises in countries along the Belt and Road, a year-on-year increase of 37.54%, with a recorded investment value of USD 10.322 billion, up 4.35% year-on-year, accounting for 57.38% of the province's total outbound investment [8]. However, there remains a shortage of localized skilled talent. Most countries along the Belt and Road are developing economies with weak foundational vocational education systems, insufficient cultivation of industrial technical talent, and inadequate provision of training equipment, teaching materials, and qualified instructors. The

quality of human resources often fails to meet the talent demands of Zhejiang enterprises expanding overseas. As an economically developed province, Zhejiang's per-student funding allocation for higher vocational colleges ranks among the highest nationally. Nevertheless, disparities persist compared to funding for undergraduate institutions at the same level, and significant regional imbalances in investment have led to pronounced spatial variations. These limitations constrain the capacity to export high-quality vocational education resources [15].

### **3.3.4. Institutional Barriers to Specialized Development**

The distinctive development of the Silk Road Institutes continues to encounter multiple institutional obstacles. There is a lack of cooperative mechanisms that incentivize deep engagement from enterprises, and misalignment with industrial needs remains evident in areas such as program design, talent cultivation, and outcomes translation, which undermines the sustainable development of the institutes. Moreover, interdepartmental coordination among education, development and reform, commerce, and foreign affairs authorities requires further optimization. prolonged filing and approval processes impede the efficiency of project implementation. Currently, funding for the Silk Road Institutes relies heavily on fiscal allocations, while market-oriented financing mechanisms are underdeveloped. Corporate sponsorship accounts for a relatively small proportion, reflecting a misalignment with Zhejiang's economic development model, which emphasizes "market leadership and multi-stakeholder collaboration."

### **3.4. Qualitative Findings and Insights**

Semi-structured interviews with functional heads from six higher vocational institutions provided deeper insights into the operational realities of the Silk Road Institutes. Key themes emerged regarding challenges and enablers.

#### **3.4.1. Enterprise Engagement Dilemmas**

Interviews confirmed that low private sector participation stems primarily from mismatched expectations regarding investment returns. One interviewee noted, "Enterprises seek tangible production benefits and localized talent in the short term, while educational outcomes are inherently long-term."

#### **3.4.2. Curricular and Pedagogical Adaptation**

A significant operational challenge involves adapting Chinese vocational standards to local contexts. Respondents emphasized difficulties in "translating practical skill requirements into measurable learning outcomes acceptable to both partners."

#### **3.4.3. Hidden Institutional Barriers**

Beyond formal approval processes, participants highlighted bureaucratic inertia and "frequent rotation of counterpart officials in host countries" as major impediments to project continuity.

#### **3.4.4. Hybridization as Strategy**

Despite digital ambitions, most institutions rely on blended learning models due to infrastructure limitations in partner countries. As one administrator stated, "High-touch onsite support remains irreplaceable for technical skill transmission."

#### **3.4.5. Emerging Quality Assurance Models**

Pilot programs involving joint assessment committees (with industry and academic representatives from both countries) show promise in creating credible skill certification systems.

These qualitative findings enrich the quantitative data by revealing the nuanced mechanisms behind observed patterns, particularly regarding implementation gaps and contextual adaptation strategies.

### **4. Discussion**

#### **4.1. Building a Risk Prevention and Control System to Enhance the Resilience of International Cooperation**

To strengthen the resilience of international cooperation in the Silk Road Institutes established by higher vocational colleges, it is essential to construct a comprehensive risk prevention and control system. Firstly, a dynamic monitoring platform for political security in partner countries should be established with the participation of provincial university think tanks, the Foreign Affairs Office of the People's Government of Zhejiang Province, and other relevant institutions. A three-tier early warning and response mechanism should be implemented, focusing on preventing security risks in regions such as the Middle East and Central Asia. Simultaneously, mechanisms for guiding public opinion and enhancing international communication should be improved. An expert database for the

international dissemination of vocational education shall be established, along with a rapid-response public opinion team and standardized procedures for addressing emerging issues. A multilingual online "Digital Silk Road Institute" platform should be developed, complemented by a social media matrix (e.g., Facebook, Twitter), to comprehensively strengthen risk management and international communication capabilities.

#### **4.2. Innovating Collaborative Mechanisms to Enhance Sustainable Development**

While Zhejiang's economic development and vocational education advancement have formed a mutually reinforcing and interdependent relationship, there remains a need to refine the tripartite collaborative mechanism of "government guidance, institutional leadership, and enterprise participation." In terms of organizational structure, a Silk Road Institute Construction Coordination Office led by the responsible Vice Governor could be established to develop and improve institutionalized operational mechanisms. Regarding incentive measures, preferential policies for cooperating enterprises should be further refined, with participation incorporated into corporate social responsibility evaluation systems. Awards such as the Silk Road Education Contribution Award could be introduced to honor exemplary involvement. Furthermore, a robust quality assurance system should be established. This includes developing transnational certification standards for several professional fields with reference to the European Qualifications Framework, introducing third-party evaluation mechanisms, and creating a lifelong skills tracking system for graduates. Regular graduate employment quality surveys should be conducted, and talent cultivation quality reports should be published to form a closed-loop quality monitoring system.

#### **4.3. Deepening Industry-Education Integration to Resolve Structural Contradictions**

A demand-driven program development mechanism shall be established. Efforts to align education with industrial output ("teaching follows production") will be intensified through the implementation of an annual enterprise demand survey system and a dynamic program adjustment mechanism. A modular curriculum system will be developed, along with jointly formulated industry-

institution professional standards. Regarding resource provision, a modular bilingual digital teaching resource repository will be created, and a transnational practical training base network will be co-built and shared to enable cross-border availability of high-quality educational resources. Concurrently, faculty capacity will be strengthened through overseas training programs for teachers, the formation of multinational teaching teams, and the development of a dual-qualified internationalized teaching workforce.

#### **4.4. Breaking Institutional Mechanisms Barriers to Stimulate Operational Vitality**

The further advancement of the Silk Road Institutes requires scientifically sound, standardized, and effective internal and external operational mechanisms and support systems to provide guidance and ensure smooth development. To address current challenges, management and service mechanisms could be optimized in the following ways: (1) streamlining the application and approval procedures for establishing Silk Road Institutes; (2) establishing a blockchain-based platform for mutual recognition of electronic certificates and credentials to enable cross-border authentication of academic diplomas and vocational qualifications; (3) implementing a credit bank system and developing a quantifiable conversion framework for credit recognition with partner countries; (4) simplifying entry and exit procedures for faculty and students. Meanwhile, innovative funding mechanisms should be introduced, such as: Creating a Silk Road Vocational Education Development Fund; Adopting a "government-guided, market-operated" model that allows enterprises to sponsor and name institutes they invest in; improving incentives for social donations, including implementing pre-tax deduction policies.

#### **4.5. Strengthening Digital Enablement and Enhancing Brand Building**

Progress shall be made in two dimensions: smart education platform construction and brand system development. For the smart education platform, priority will be given to developing a multilingual Silk Road Cloud Classroom system, establishing a cross-border credit recognition mechanism through a credit bank, and creating digital twin training centers with virtual-physical integration capabilities to provide digital teaching support for the institutes. In terms of brand

system development, drawing on the example of the Luban Workshop model, standards for operating conditions, professional programs, talent cultivation, and vocational qualification certification shall be introduced for the Silk Road Institutes. Active integration into the national education systems of partner countries will help polish the distinctively Zhejiang-branded overseas education model. Brand quality control must be strengthened by treating these overseas initiatives as extensions of the home institutions' brands. Through these efforts, a replicable, referable, and scalable model for cultivating technical and skilled talent overseas will be formed.

### 5. Conclusion

The Silk Road Institutes initiative, as a pivotal practice of vocational education internationalization under the Belt and Road framework, reflects Zhejiang Province's proactive response to national strategy and its capacity to leverage regional advantages. This study, through a mixed-methods approach combining quantitative spatial analysis and qualitative institutional interviews, systematically examines the establishment models, operational mechanisms, and developmental characteristics of these institutes. The findings indicate that Zhejiang's Silk Road Institutes have formed a distinctive development path characterized by multi-stakeholder participation, demand-driven training, and culturally integrated education. They not only facilitate technical and vocational skill transfers but also enhance mutual understanding and economic cooperation between China and partner countries. The institutes serve as practical exemplars of China's commitment to high-level educational openness and South-South cooperation. However, challenges remain, including geopolitical uncertainties, structural misalignment between training supply and industrial demand, insufficient private sector engagement, and institutional constraints. To achieve sustainable and high-quality development, it is essential to strengthen risk management systems, deepen industry-education integration, optimize cross-departmental coordination, and establish robust digital and quality assurance infrastructures.

Looking forward, the Silk Road Institutes should further emphasize digitalization, standard development, and brand building to form a replicable, scalable, and influential model of international vocational education. By doing so,



they will contribute significantly to global vocational education governance and the construction of a shared community with a common future for mankind.

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## References

- [1] Wang, F., Su, X., & Huang, Z. (2024). "Maritime Silk Road Institutes": An innovative practice in the internationalization of vocational education. *Fujian Education*, (4), 22–27.
- [2] Ubaydullaeva, D. (2024). The internationalisation of higher education in Uzbekistan: Staff perspectives on a top-down process. *Europe-Asia Studies*, 76(10), 1644–1667.
- [3] Mondal, A. (2024). Internationalization of Indian higher education in the light of pre-within-post-National Education Policy 2020: a reality check. *Higher Education*. Advance online publication. <https://doi.org/10.1007/s10734-024-01377-w>.
- [4] Ndunge, G. M., Castro, G., Liu, Z., & Shan, X. (2025). An investigation on the rationales to internationalize higher education in public universities in Kenya. *Journal of Applied Research in Higher Education*. 17(3), 948–961.

- [5] Mariam, F., El Bassiouny, N. M., & Hagar, A. (2025). Country branding through the internationalization of higher education: the case of Egypt. *International Journal of Educational Management*, 39(3), 588–616.
- [6] Knight, J. (2004). Internationalization remodeled: Definition, approaches, and rationales. *Journal of Studies in International Education*, 8(1), 5–31.
- [7] Liu, Y., & Yang, D. (2025). High-quality joint construction of the Belt and Road in a new golden decade: achievements, models, and prospects of "Vocational Education Going Global". *Youth Development Forum*, 35(1), 79–87.
- [8] Zhejiang Provincial Department of Commerce. (2025, January 17). 2024 provincial outbound investment statistical bulletin. Retrieved August 1, 2025, from [http://www.zcom.gov.cn/art/2025/1/17/art\\_1385140\\_58947028.html](http://www.zcom.gov.cn/art/2025/1/17/art_1385140_58947028.html).
- [9] Zheng, J., & Kapoor, D. (2021). State-directed hybridity in China's vocational education cooperation in Africa. *Journal of Vocational Education & Training*, 73(3), 402–420.
- [10] Marginson, S. (2016). The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems. *Higher Education*, 72(4), 413–434.
- [11] DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.
- [12] Jiang, W., Di, Q., & Han, J. (2025). Lu Ban and Mozi College: Shandong practice of "Vocational Education Going Abroad" in the new era. *Journal of Vocational and Technical Education*, 46(9), 74–80.
- [13] Etzkowitz, H. (2008). *The Triple Helix: University-Industry-Government Innovation in Action*. New York: Routledge.
- [14] Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology*, 46(1), 5–34.
- [15] Liu, W. (2022). A review of research on educational funding in higher vocational institutions in China. *International Journal of Education*, 4(1), 6–9.