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Research on the High-Quality Development Path of Listed Private Education Groups

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Abstract: The rapid growth of the education industry and private education groups has brought the high-quality development of listed private education companies into focus for both the educational sector and the capital market. This study employs the fuzzy-set qualitative comparative analysis (fsQCA) method to explore pathways to high-quality development for these companies. Necessity analysis confirms that no single factor guarantees a company's success, highlighting the importance of multi-factor interactions. Three main paths to high-quality development are identified: human resource optimization, precise market positioning, and comprehensive advantage. Conversely, four development paths for non-high-level companies are identified: dual insufficiency in resources and market, high turnover and over-investment, scale expansion with resource mismatch, and inadequate human resource development. The findings indicate that optimal allocation of educational resources, precise market positioning, rational resource allocation, and staff training are crucial for achieving high-quality development. Robustness tests, which raise the consistency threshold, verify the reliability and stability of the results. These findings provide a reference for policymakers, investors, and managers in the education industry.

Keywords: Private education groups; High-quality development; Fuzzy-set qualitative comparative analysis; Configuration analysis

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1. Introduction

In recent years, private colleges and universities have gained prominence in China's higher education system. According to the 2023 National List of Higher Education Schools and the National Education Development Statistics Bulletin, there are 789 private institutions in China, comprising 391 general undergraduate schools, 22 vocational undergraduate schools, 374 higher vocational schools, and two adult education institutions. These institutions enroll a total of 9,943,800 students, significantly meeting societal demands for higher education. The government is dedicated to fostering a fair educational environment and supporting the healthy development of private institutions to address diverse educational needs. With ongoing improvements in regulatory frameworks, private colleges are now focusing on standardization and internal quality rather than mere expansion. The China Education Modernization 2035 plan emphasizes the need for these institutions to innovate within their non-profit and for-profit frameworks, aligning with

new expectations for high-quality development in the evolving educational landscape.

Despite notable progress, private colleges and universities in China face challenges that hinder their long-term, healthy, and high-quality development. Key issues include financial constraints, uneven faculty quality, unclear institutional direction, inadequate student capabilities, low levels of research and social service, insufficient resources, flawed evaluation mechanisms, and limited social recognition. Unlike public institutions, private colleges lack substantial government funding and social donations, exacerbating their financial difficulties. The Ministry of Education's 2020 policy allows private institutions to go public to raise funds, presenting an opportunity for financial support. With an increasing number of listed private colleges, it is essential to explore strategies for their high-quality development and identify optimal paths forward.

Currently, scholars' research on the high-quality development of listed private university groups can be broadly divided into three categories, as described below.

1.1. Influencing factors and mechanisms of private university effectiveness

Cahyono *et al.* examined how service quality, university image, and student satisfaction influence student loyalty using quantitative methods and Structural Equation Modeling (SEM), which found that both service quality and student satisfaction significantly impact student loyalty [1]. Alam *et al.* highlighted how the shift from a monopoly to an oligopoly and then to an SME model affects private universities' core missions and social responsibilities [2]. Efendi and Rahardja investigated the impact of intellectual capital, intrinsic motivation, and competence on lecturers' service performance in Jakarta's private universities, finding a positive correlation [3]. Hou and Zhao discussed strategies for private colleges to navigate economic and social transitions, emphasizing scientific positioning, governance reform, and innovation [4]. Que developed a model for high-quality private colleges based on mechanisms of power, guidance, development, operation, and assurance [5]. Yu introduced a framework for understanding quality through the lens of multiple stakeholders, advocating for a negotiated quality approach [6]. In summary, these studies offer valuable theoretical insights and practical guidance for the high-quality development of private universities, highlighting their strategic positioning, internal governance, resource allocation, and cultural construction, and suggesting appropriate development paths and strategies.

1.2. Establishment of quality private tertiary institutions: Strategies and countermeasures

Ajadi examined the rise of private colleges and universities in Nigeria within the context of market reforms, deregulation, and fiscal crises, addressing how these institutions have addressed the deficiencies in public higher education [7]. Nethravathi and Aithal investigated how private higher education institutions (HEIs) have redefined their Internal Quality Assurance Systems (IQAS) to enhance teaching and learning quality through a case study [8]. Mahdi *et al.* demonstrated a significant relationship between Knowledge Management Practices (KMP) and Strategic Competitive Advantage (SCA) using Structural Equation Modeling (SEM), highlighting how private universities can leverage KMP for strategic benefits [9]. Xu *et al.* explored high-quality development in private colleges, identifying challenges in operational models, governance, faculty, and information transparency, and suggested development pathways [10]. Hou and Wang analyzed the composite capabilities of private HEIs in resource management and the impact of core decision-makers and institutional flexibility through a case study approach [11]. Collectively, these studies address the legal, quality, and cost challenges faced by private HEIs and offer insights into improving educational quality and competitiveness through internal quality assurance and knowledge management.

1.3. Funding paths and strategies for private colleges and universities

Kane and Orszag identified that reduced funding for public universities relative to private institutions can

degrade educational quality, providing an empirical analysis of the impact of financial pressures on public universities [12]. Shaturaev explored management and financing issues in Indonesia's Islamic education system, offering recommendations for improving quality and management [13]. Eaton *et al.* found that private equity can enhance school profits through higher tuition and government aid, often at the expense of students [14]. Wang and Wang observed that listing financing expands funding channels and resource integration for private colleges, though it introduces policy risks with the variable interest entity (VIE) structure [15]. Zhong *et al.* highlighted that group schooling enhances efficiency but presents legal and regulatory risks [16]. Hou and Wang noted that group listing impacts universities' external relationships, resources, and management systems [17]. Dong analyzed the sustainability of listing educational assets on the Hong Kong Stock Exchange, emphasizing potential problems and risks [18]. Collectively, these studies offer insights into the challenges and benefits of various development models for private higher education, providing theoretical support and policy recommendations for their high-quality development.

1.4. Literature review

The literature offers valuable insights into the quality, financing, and management of higher education, highlighting factors that impact the effectiveness of private institutions. Proposed strategies include optimizing resource allocation, enhancing teaching quality, and strengthening faculty. These studies guide higher education research and offer a theoretical and practical basis for policymakers. However, further research in the following areas is needed.

(1) Deepening empirical analyses: While various strategies for high-quality private colleges have been proposed, most studies are theoretical. Future research should employ quantitative and qualitative methods to assess the practical impacts of these strategies and explore regional, size, and type-based differences in effectiveness.

(2) Analyzing synergistic development paths: Current research lacks depth in exploring how funding channels and operational levels interact. Analyzing multiple synergistic paths for developing high-quality private colleges will help identify effective factor combinations, optimize resource allocation, and enhance educational quality.

2. The path of high-quality development of private education group-listed companies based on the analysis of complex factor configurations

This paper develops an analytical framework for the high-quality development of private education groups listed on the Hong Kong Stock Exchange, considering factors such as education quality, innovation, market reputation, corporate governance, and sustainability. By examining twenty listed private higher education groups, the study explores how these dimensions interact and affect development pathways, providing a clearer understanding of high-quality development. The comprehensive research framework is illustrated in **Figure 1**.

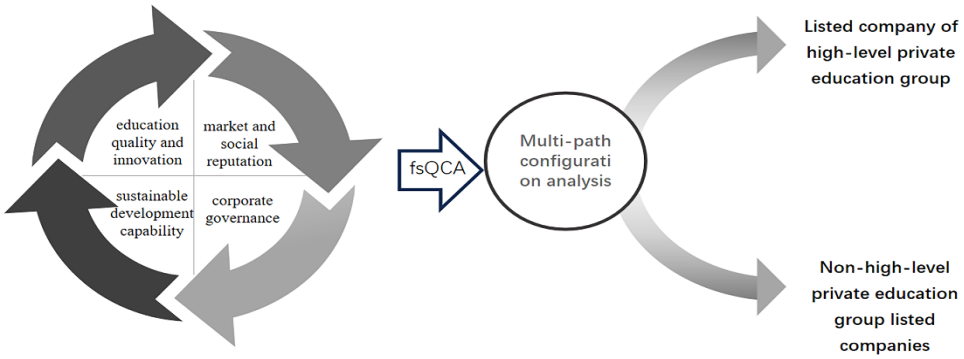

Figure 1. Integrated research framework

3. Research design

3.1. Research methodology

QCA (Qualitative Comparative Analysis) is a methodology suited for complex systems, examining how multiple conditions collectively impact an outcome. Unlike single-variable analysis, QCA focuses on different combinations of conditions and their effects on the outcome. It integrates qualitative and quantitative approaches. fsQCA (fuzzy-set QCA) extends this by using fuzzy set theory to explore how combinations of condition variables influence an outcome variable [19]. In fsQCA, each condition variable is binary (present or absent), and each combination of conditions is represented as an *n*-tuple of 0s and 1s.

$$A \subseteq \{0.1\}^n \quad (1)$$

The frequency of each conditional combination A observed in the sample is noted as N(A). A truth table listing the value of the outcome variable Y for each conditional combination A and its corresponding frequency is constructed. This helps to understand the contribution of each combination to the outcome. Additionally, in fsQCA, a threshold is set to distinguish between "presence" and "absence."

Next, by analyzing the truth table, logical operations in fuzzy set theory are applied to identify the combinations of conditions affecting the outcome variable Y, i.e., the relationships A⇒Y and A⇐Y. This means that certain combinations of conditions are sufficient to lead to Y, while others are necessary for Y. Meanwhile, the model's quality and applicability can be further assessed by calculating formulas such as consistency and coverage.

The consistency formula is:

$$inclN_{X \Leftarrow Y} = \frac{\sum min(X,Y)}{\sum Y} \quad (2)$$

The coverage formula is:

$$cov\,N_{X \Leftarrow Y} = \frac{\sum min(X,Y)}{\sum X} \quad (3)$$

Sufficient conditions for a particular grouping: A⇒Y means that A is sufficient to lead to Y. The consistency formula is:

$$inclS_{X \Rightarrow Y} = \frac{\sum min(X,Y)}{\sum X} \quad (4)$$

The fsQCA method, combining logical analysis and fuzzy set theory, allows for examining complex effects of multiple conditions on outcomes. This study used fsQCA to analyze how synergies among educational quality, market reputation, corporate governance, and sustainability impact the high-quality development of listed private education companies, exploring the condition groupings that influence this development.

3.2. Research cases and description of variables

This study examined 20 private education groups listed on the Hong Kong stock market, excluding those with significant missing data. Hong Kong's stringent listing standards and continuous disclosure requirements ensure the representativeness and reliability of the data. The regular publication of financial reports and a stable policy environment provide a robust data source and valuable insights into how policy impacts development. Additionally, the large market scale and influence of these listed companies offer perspectives on scale effects, operational modes, and management strategies. This research sheds light on the challenges and opportunities these groups face in achieving high-quality, sustainable growth.

Regarding conditional variables, and considering data availability, this study selects variables related to education quality and innovation, market and social reputation, corporate governance, and sustainable development. The selection of variables is detailed in **Table 1**.

Table 1. Selection of research variables

	Indicator layer	Description of the methodology for measuring specific indicators	Source
Outcome variable	Total factor productivity	Semi-parametric method	CSMAR database
Conditional variables	Education quality and innovation	Employee training ratio	Annual report of the company
		Number of training hours per capita	
	Market and social reputation	Total number of students enrolled	
		Employment rate	
	Internal governance	Employee turnover	
		Remuneration of directors, chief executives, and employees	
	Sustainability	Cash paid for acquisition of fixed assets, intangible assets, and other long-term assets	

4. Analysis of empirical results

In fsQCA, assessing the necessity of individual conditions is crucial, with consistency indicating if a condition is essential for an outcome. A consistency value over 0.9 suggests a necessary condition. Using fsQCA 4.0, this study found no single variable exceeded this threshold, indicating that no single factor fully explains high-quality development in private education groups. This underscores the importance of interactions among multiple factors. The study explores how combinations of conditions impact outcomes, using fsQCA to reveal complex causal mechanisms driving the high-quality development of listed private education groups.

In fsQCA, solutions are classified as complex, simple, or intermediate, based on the management of "logical residuals." The intermediate solution is often preferred for aligning with theoretical and practical knowledge. This study used Ragin and Fiss's [20] group analysis framework to examine 20 private education groups listed on the Hong Kong Stock Exchange. Conditions with a frequency greater than 1 and consistency above 0.8 revealed two high-level digital economy development paths. These paths have a solution consistency of 0.843, showing that 84.3% of cases align with these paths, and a solution coverage of 0.705, indicating strong explanatory power. Higher education levels, economic development, and marketization emerged as core conditions. Conversely, other conditions were marginal. Additionally, five paths for non-high-level companies were identified, with a consistency of 0.883 and coverage of 0.736, indicating 88.3% alignment and significant explanatory power. The sufficiency analysis results are detailed in Table 2.

Table 2. Conditional Sufficiency Analysis of Configurations

Conditional Variables	The grouping that produces high-level private education group-listed companies			Grouping that produces non-high-level private education group-listed companies			
	H1	H2	H3	NH1	NH2	NH3	NH4
Employee training ratio		☆	★	★	☆	☆	○
Number of training hours per capita							
Total number of students enrolled	★	●	★	☆		★	☆
Employment rate				○	●		○

Table 2. (Continued)

Conditional Variables	The grouping that produces high-level private education group-listed companies			Grouping that produces non-high-level private education group-listed companies			
	H1	H2	H3	NH1	NH2	NH3	NH4
Employee turnover rate	○	☆	●	○	★	●	★
Remuneration of directors, chief executives and employees	★	★	☆		○	★	●
Purchase and construction of fixed assets Intangible assets	☆		●	☆	★	★	☆
Consistency	0.771	0.816	0.766	0.784	0.76	0.715	0.716
Original coverage	0.185	0.166	0.226	0.169	0.113	0.077	0.101
Unique coverage	0.054	0.025	0.155	0.137	0.054	0.014	0.015
Typical companies	1525. HK, 6913. HK	00382. HK, 1525. HK, 01981. HK	06169. HK, 00839. HK, 01969. HK, 09616. HK, 01756. HK	01890. HK, 01851. HK	01449. HK, 01565. HK, 01765. HK	01565. HK, 01765. HK	02779.HK
Total consistency		0.764			0.784		
Total coverage		0.553			0.535		

Note: ● indicates that the edge condition exists,○ indicates that the edge condition does not exist, ★ indicates that the core condition exists, ☆ indicates that the core condition does not exist, and blank indicates that the condition exists or not.

4.1. Analysis of the development path of high-level private education group listed companies

Grouping 1 (Human Resource Optimization): This grouping pattern has a consistency of 0.771 and raw coverage of 0.185, indicating strong alignment with 18.5% of the sample data. Core factors include student size and high salary inputs, suggesting that a large student body and competitive salaries for management and employees are crucial for success. Companies following this model, such as 1525.HK and 6913.HK focus on attracting top talent, improving teaching quality, and enhancing market competitiveness through efficient human resource allocation rather than physical asset expansion.

Grouping 2 (Precise Market Positioning): With a consistency of 0.816 and coverage of 0.166, this grouping accounts for 16.6% of the sample data. High salary investment is the core factor, indicating effective compensation systems to attract and retain key talent. Despite low investment in employee training, moderate student enrollment and high compensation enable these companies, including 00382.HK, 1525.HK, and 01981. HK, to target specific market needs with high-quality educational services. They focus on market research and customer feedback to tailor their offerings.

Grouping 3 (Comprehensive Advantage Type): This grouping has a consistency of 0.766 and coverage of 0.226, covering 22.6% of the sample data. Core factors include staff training and school population size, indicating strengths in these areas. Reasonable employee turnover and moderate fixed asset investment reflect optimized human resource management, asset allocation, and marketing strategies. Companies like 06169. HK, 00839.HK, 01969.HK, 09616.HK, and 01756.HK excel in instruction quality, employee development, and innovation, building strong brands in the competitive education market.

Overall, these groupings reveal diverse strategies for success in the education market. Analyzing these patterns provides insights into the diversity and complexity within the industry and helps companies develop

strategies based on their strengths and market conditions.

4.2. Analysis of the development paths of non-high-level private education group listed companies

Grouping 1 (Dual Insufficiency of Resources and Market): This group exhibits a consistency of 0.784 and coverage of 0.169, accounting for 16.9% of the sample. Key issues include inadequate student enrollment and employment rates alongside suboptimal resource investment. Despite some investment in staff training, the lack of sufficient resources and market appeal limits competitiveness. Low investment in fixed and intangible assets further restricts growth and innovation potential. Firms like 01890.HK and 01851.HK may need to reassess their market positioning and resource allocation to enhance competitiveness and growth.

Grouping 2 (High Churn and Overinvestment): With a consistency of 0.76 and coverage of 0.113, this group comprises 11.3% of the sample. Core issues include high employee turnover and poor resource investment and training. This indicates weaknesses in human resource management, resulting in low employee satisfaction and retention. Overinvestment in fixed and intangible assets without corresponding market returns suggests poor investment strategies or market analysis. Companies such as 01449.HK, 01565.HK, and 01765.HK need to refine human resource strategies and reassess investments to boost efficiency and returns.

Grouping 3 (Scale Expansion and Resource Mismatch): This group has a consistency of 0.715 and coverage of 0.077, covering 7.7% of the sample. Core challenges involve expanding student numbers and high asset investment while neglecting staff training, leading to resource misallocation. This suggests a focus on growth over internal management, potentially harming long-term performance. Companies like 01565.HK and 01765.HK should rebalance resources and enhance training and management to ensure sustainable development.

Grouping 4: (Insufficient Talent Development): With a consistency of 0.716 and coverage of 0.101, representing 10.1% of the sample, this group faces high turnover and inadequate scale and resource investment. The lack of employee training and development, along with low asset investment, restricts growth potential. Companies such as 02779.HK should enhance training and compensation to reduce turnover and boost competitiveness.

5. Robustness test

To enhance the reliability and robustness of the analysis, this study increased the consistency threshold for the conditional histogram analysis from 0.8 to 0.85. This adjustment aimed to test the stability of the results under more stringent criteria. Despite the higher threshold, the overall consistency level remained stable, confirming the reliability of the findings. For developmental paths of non-high-level private education groups, the raised threshold did not significantly alter the results, indicating stability across thresholds. Minor adjustments were observed in the conditions for high-level groups, but core conditions remained influential, validating their generalizability and stability across different settings.

6. Conclusions

This study investigated the high-quality development paths of listed private education groups using fuzzy-set qualitative comparative analysis (fsQCA). It revealed that no single factor is sufficient to ensure success in complex systems; rather, the interactions of multiple factors are crucial. None of the single variables exceeded a consistency threshold of 0.9, underscoring the need for a multi-faceted approach in developing listed private

education groups.

The analysis categorized high-level development paths into two types: human resources optimization and market positioning precision. The former emphasizes a large student body and high salary inputs, while the latter focuses on precise market targeting through high salary inputs and moderate student enrollment. These core conditions highlight the importance of optimal resource allocation and precise market positioning for achieving high-quality development.

For non-high-level groups, five development paths were identified: dual resource and market insufficiency, high attrition and over-investment, scale expansion with resource mismatch, and talent development insufficiency. These paths reveal challenges such as resource misallocation, low market attractiveness, high employee turnover, and inadequate training.

The study's robustness was tested by raising the consistency threshold to 0.85, confirming the reliability of the findings. Despite stricter criteria, core conditions significantly impacted development, enhancing understanding of the universality and applicability of these paths. The results offer valuable insights for policymakers, investors, and managers, providing a robust theoretical and empirical basis for further research and practice in the education sector.

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