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Research Article

Evaluation Index System Construction of High-Quality Development of Chinese Real Enterprises Based on Factor Analysis and AHP

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China's economic development has shifted from high-speed to high-quality. The fundamental of promoting the high-quality development of the real economy lies in real enterprises. Therefore, it is urgent to measure the high-quality development of real enterprises scientifically and reasonably. Herein, we construct a comprehensive evaluation index system for the high-quality development of real enterprises based on the existing research and combined with the characteristics of real enterprises. Then, the high-quality development index for real enterprises is created using factor analysis and AHP. Moreover, we measure and analyze the high-quality development of real enterprises in 2020. The results show that the high-quality development level of Chinese real enterprises remains to be further upgraded. Meanwhile, there are obvious contrasts in the high-quality development index of real enterprises in industries and regions. Finally, we put forward some related policy recommendations, such as enhancing policy relevance, insisting on innovative development, and increasing financial sustainability.

1. Introduction

China's economic development has undergone a historic transformation after the 19th National Congress of the Communist Party of China (CPC) first proposed that China's economic development has shifted from high-speed to high-quality. Achieving the high-quality development of real enterprises is fundamental to promoting the high-quality development of the real economy, which is an important way for China as an economic power to move from large to strong. Then, what is the high-quality development of real enterprises and how to measure it. Hence, the construction of a high-quality development evaluation system for real enterprises is the cornerstone to measuring whether real enterprises have achieved high-quality development and showing how to promote the high-quality development of real enterprises.

The construction of an evaluation system for high-quality development has become a hot research issue since the 2017 China Central Economic Work Conference expressed its importance. However, the existing studies on the evaluation index system of high-quality development focus on the macroeconomics [1–5] and middle-view industry levels [6–9]. Among the few studies at the company level, Wang et al. used AHP to construct high-quality development indicators of enterprises [10] without empirical studies. Besides, the evaluation index system for the high-quality development of state-owned enterprises [11] and local state-owned enterprises [12] was also studied. Nevertheless, the high-quality development of real enterprises cannot be effectively measured in existing studies for the lack of a targeted, systematic, microbased evaluation index system of high-quality development.

Herein, based on the existing research and combined with the characteristics of real enterprises, we construct an evaluation system of high-quality development for real enterprises, which includes 4 primary indicators, 11 secondary indicators, and 23 tertiary indicators. We then calculate the index of high-quality development for real enterprises using the comprehensive weight model of factor analysis and AHP. Last, we measure the high-quality development of real enterprises in 2020 and put forward relevant policy suggestions.

Firstly, most of the existing studies on high-quality development evaluation systems focus on the macro and meso-views. We supplement the construction of high-quality development evaluation indexes of real enterprises with a microview. Secondly, it is significant to maintain a reasonable asset structure for the operation and growth of a company, so we take high-quality financial information as an important factor to measure the high-quality development of real enterprises. In particular, the asset structure is included in the evaluation system. Finally, we use the subjective and objective weight models to construct a high-quality development index for real enterprises. Herein, the research gap of using factor analysis and AHP to construct a high-quality development evaluation system is supplemented.

2. Selection of Evaluation Indicators for High-Quality Development of Real Enterprises

2.1. The Connotation and Characteristics of High-Quality Development of Real Enterprises. The Resolution of the Central Committee of the Communist Party of China on the Major Achievements and Historical Experiences of the Party over the Past Century (hereinafter referred to as the Resolution) emphasizes that achieving high-quality development is the fundamental path to achieving the second 100-year goal and starting a new journey of building a modern socialist country in China. Meanwhile, the resolution points out that competitive enterprises are the foundation of high-quality development. Enterprises are not only the micro-subjects of macroeconomic development but also the basic organizations of meso-industrial development. Furthermore, the high-quality development of enterprises is a key to high-quality economic development [13]. During the visit to Guangxi in April 2021, the general secretary of the CPC Central Committee, Xi Jinping, pointed out that "the development of the real economy is a solid foundation for building a modern economic system and an important support for building future development strategies." The outline of the 14th Five-Year Plan (2021–2025) and the Long-Range Objectives through the year 2035 proposed that "focus on the real economy to boost economic development." Therefore, constructing a high-quality development evaluation system to evaluate the high-quality development of real enterprises scientifically, systematically, and effectively is needed. The real economy, in a broad sense, refers to all industries in the entire national economy, excluding finance and real estate [14]. The real economy is the basis for the development of society and human beings, so the realization of high-quality development of real enterprises is the cornerstone for promoting high-quality economic development. Research shows that the high-quality development of real enterprises is a new paradigm for real enterprises to pursue higher-level economic and social values and a new development state of sustainable development and value creation [13, 15, 16]. This paper holds that high-quality development is a comprehensive target for real enterprises to achieve high-quality innovation development, financial information, benefit creation, as well as green and sharing.

2.1.1. High-Quality Innovative Development. Xi Jinping pointed out that innovation is at the core of Chinese modernization and the primary driving force for high-quality development. However, weak innovation is the "Achilles' heel" of Chinese real economic development. Therefore, innovation is not only a development issue but also a survival issue for real enterprises, and high-quality innovation is the power source of high-quality development for real enterprises. As the core element of sustainable development, innovation is an important engine to cultivate competitive advantages and lead the transformation and upgrading of real enterprises. Unlike the pursuit of high-speed growth in the past, the high-quality development of real enterprises should not only have advantages in quantity but also in the quality of products and services. Only by taking innovation as the power source of development can entity enterprises improve their technological content and gain market competitiveness.

2.1.2. High-Quality Financial Information. Accounting information is an important basis for evaluating the quality of economic operation and development [17], and high-quality financial information is the embodiment of real enterprises to achieve high-quality development. It is more accurate to portray the quality of corporate development than the microaccounting information because financial indicators can intuitively reflect the degree of development of an enterprise. Moreover, enterprise development often interacts with financial information. The development of business management activities promotes the demand for financial information, while the improvement of accounting information timeliness continuously promotes business management. Hence, high-quality financial information is the reflected result of high-quality development for real enterprises, which can further promote high-quality development for real enterprises.

2.1.3. High-Quality Benefit Creation. Only competitive enterprises can achieve long-term development in the fierce market competition. Improving the quality of benefit creation of real enterprises is an effective means to gain competitiveness and achieve high-quality development. High-quality benefit creation means that companies possess high-quality products and services, a high percentage of market share, a high degree of open development, and a bright prospect of market development. Only by continuing to improve the quality of products and services and promoting open development can real enterprises form stronger competitive advantages, unique brand value, and sustainable development capabilities.

Table 1: The original high-quality development evaluation index system.

Primary indicators	Secondary indicators	Tertiary indicators	Formula
High-quality innovative development	Innovation input	The intensity of R&D investment Q1	R&D investment/Operating income
		R&D personnel ratio Q2	R&D staff/Total employees
		Capitalization rates Q3	Capitalized R&D investment/R&D investment
	Innovation output	Patent per capita Q4	Number of patents granted/Number of employees
		Patent authorization Q5	The logarithm of patents authorization
High-quality financial information	The rationalization of asset structure	Operating asset structure Q6	(Fixed assets + construction in progress)/total assets
		The proportion of financial assets Q7	Financial assets/total assets
		Intangible asset density Q8	Net intangible assets/net fixed assets
	Solvency	Current ratio Q9	Current assets/current liabilities
		Gearing ratio Q10	Total liabilities/total assets
	Operation capability	Total asset turnover ratio Q11	Operating income/average total assets
		Gross profit ratio Q12	(Operating income – operating costs)/operating income
	Profitability	ROA Q13	Net profit/average total assets
		ROE Q14	Net profit/average net assets
	Development capabilities	Revenue growth Q15	Δ operating income/operating income for the previous period
		Capital accumulation ratio Q16	Δ shareholder equity/shareholder equity at the beginning of the year
High-quality benefit creation	Products and services	ROS Q17	Net profit/operating income
	Open development	Overseas income growth ratio Q18	Overseas income/overseas income for the previous period
		Overseas income Q19	The logarithm of overseas income
		Foreign investment Q20	The logarithm of the net profit of overseas affiliates
High-quality green sharing	Green development	Environmental protection awareness Q21	Logarithm of the environmental protection investment
	Socially shared	Payroll payable Q22	Employee salaries payable/employee salaries payable for the previous year
		Social donations Q23	The logarithm of the total social donation

2.1.4. High-Quality Green and Sharing. Green is the bottom color of high-quality development, and sharing is the purpose of high-quality development. On the one hand, "lucid waters and lush mountains are invaluable assets." High-quality development should be a green development with ecological priority. Enterprises should be more imperious to seek the quality of economic growth instead of speed, which is at the expense of environmental pollution and unsustainability. To achieve green development, enterprises should enhance the awareness and responsibility of energy conservation and emission reduction, as well as environmental protection, and further accelerate the formation of resource-saving production modes. On the other hand, value sharing and win-win cooperation are the goals for the high-quality development of real enterprises. Society sharing means that real enterprises undertake more social responsibilities to achieve high-quality development and create social benefits while creating economic benefits.

2.2. Selection of Evaluation Indicators for High-Quality Development of Real Enterprises. The selection of the basic index set is the basis for constructing the high-quality development evaluation index system for real enterprises. Referring to the "Enterprise High-quality Development Rating Indicators" of the China Enterprise Reform and Development Research Association and the existing work [10], combining with development practices and the characteristics of real enterprises and following the principles of scientific, systematic, dynamic, and data availability, we put forward the high-quality development evaluation index system of real enterprises, which consists of 4 primary indicators, 11 secondary indicators, and 23 tertiary indicators related to high-quality development and innovation, high-quality financial information, high-quality benefit creation, and high-quality green sharing (The calculation formula of each index is shown in Table 1).

2.2.1. Innovative Development Indicators. Enterprise innovation capacity is mainly measured by innovation input and output. Innovation input refers to the investment in new products, new processes, and the transformation of fixed assets. Here, three indicators are selected to measure innovation input, including intensity of R&D investment, R&D personnel ratio, and capitalization rates. The intensity of R&D investment reflects the number of R&D funds an enterprise invested in that year. R&D personnel ratio reflects the proportion of research personnel to all employees of an enterprise. Capitalization rates refer to the proportion of the amount of R&D investment that may generate revenue in the future, reflecting the possibility of getting output from R&D inputs in the future. High innovation input does not mean high innovation output, and the degree of innovation development also needs to be measured by innovation output. The innovation output of enterprises is represented by the new products, technologies, and processes resulting from innovation. Hence, it is reflected as patented technologies of enterprises, which are measured by the two indicators of patent per capita and patent authorization.

2.2.2. Financial Information Indicators. The high-quality development of real enterprises should be manifested in the rationalization of asset structure and the continuous optimization of solvency, operation capability, profitability, and development capabilities.

Firstly, maintaining a reasonable capital structure is one of the important financial decisions of an enterprise, which is of great significance to its production, operation, and sustainable development [18]. A reasonable asset structure can improve business performance and prevent risks. On the contrary, it will reduce the efficiency of corporate resource utilization, lead to a decline in performance, and eventually fall into financial distress [19, 20]. Here, the operating asset structure, the proportion of financial assets, and the intangible asset density are chosen to measure the asset structure of enterprises. Operating asset structure refers to the allocation structure of enterprise assets, which is the choice of enterprise strategic decision-making. Generally, enterprises can be divided into heavy-asset enterprises and light-asset enterprises according to the structure of operating assets [21]. Assets can be classified into operating assets and financial assets according to the nature of enterprise activities, which reflects the sensitivity of assets to changes in the external environment and the ability of different assets to create wealth [18]. Here, the degree of financialization of enterprises is measured by the proportion of financial assets. The total financial assets are represented by the sum of trading securities, loans and advances, financial derivatives, available-for-sale securities, held-to-maturity securities, and investment properties [22–24]. Intangible asset density refers to the ratio between intangible and tangible assets, which affects the enterprise's production, technology, investment structure, and market value [25]. Asset-light enterprises can obtain higher profits according to the "smile curve" [26]. Hence, the lower the operating asset structure and the higher the intangible assets density, the better. Besides, it showed that the deepening of financialization would reduce real investment, harm the future core business performance, and inhibit the innovation of real enterprises [27–29], leading to a negative financial asset ratio indicator.

Secondly, the solvency of an enterprise reflects its ability to repay debts and resolve risks. Stronger solvency means lower financial risk and a lower possibility of falling into financial distress [10]. Here, the current and gearing ratios are chosen to measure the enterprises' short-term solvency and long-term solvency, respectively.

Thirdly, improving operating capacity is the basis for enterprises to improve their profitability and long-term development capability. Here, the total asset turnover ratio and gross profit ratio are selected to measure the operation capability of enterprises. The total asset turnover ratio, one of the important indicators to examine the efficiency of asset operation, reflects the efficiency and utilization of asset management and the flow rate of assets from input to output during the period of continuous operation. The gross profit ratio affects the profit of sales revenue while also determining the room for companies to invest in research and development, advertising, and sales. The higher the gross profit margin, the more high-end products the company provides, which is more conducive to promoting sustainable development.

Fourthly, this paper selects return on total assets (ROA) and return on equity (ROE) as the tertiary indicators for profitability. ROA reflects the relationship between the efficiency of capital utilization and the efficiency of asset utilization, determines the stability and durability of corporate earnings, and reflects the level of comprehensive business management. ROE measures the efficiency of capital invested by shareholders. Analyzing the difference between ROA and ROE can reflect the level of operational risk of a company.

Finally, development capabilities, measured by the revenue growth and capital accumulation ratio, are the necessary conditions for an enterprise to be able to establish sustainable development. Among them, revenue growth is an important indicator to evaluate the development ability and growth status of an enterprise, which reflects its operation and market share and predicts its ability for future business expansion. The capital accumulation rate can characterize the growth of an enterprise and reflect the value preservation and appreciation of the capital invested by investors.

2.2.3. Benefit Creation Indicators. High-quality benefit creation can be reflected in the good quality of enterprise products and services as well as excellent open development capability. Return on sales (ROS) characterizes the quality of products and services and reflects the level of revenue generated from sales. Meanwhile, the degree of open development is measured by overseas income, overseas income growth ratio, and foreign investment.

2.2.4. Green Sharing Indicators. Achieving green development and sharing operating results with society is a sure way to ensure the sustainable development of enterprises. Therefore, environmental protection awareness is used here as a tertiary indicator of green development. Meanwhile, payroll payable and social donations are used to measure whether the enterprise is socially shared.

3. Construction of an Evaluation System for High-Quality Development of Real Enterprises

3.1. Selection of Evaluation Methods. Based on the selection of high-quality development indicators for real enterprises, the appropriate method to comprehensively process the indicators is further selected, the core content of which is to calculate the weight. The index weight methods of the comprehensive evaluation indicators include the subjective weighting method and the objective weighting method. The subjective weighting method sets index weights according to subjective experience, which is a qualitative evaluation method and commonly includes AHP, experts grading method, and such. The advantage is that experts can rank the indicators more reasonably according to the actual situation and can effectively determine the importance of the indicators to a certain extent, but it is highly subjective and arbitrary. The objective weighting method, including factor analysis, the entropy weight method, and gray relational analysis, is a quantitative evaluation method that uses statistical and mathematical methods to determine the weights of indicators based on their intrinsic links. Compared with the subjective weighting method, the objective weighting method can avoid the subjectivity of the evaluation subject.

Both the subjective and objective weighting methods have one-sidedness. Therefore, the use of the combined evaluation method can reduce the bias resulting from the single method so that the constructed index system is not only more in line with the actual situation but also helps to improve the objectivity of the evaluation results [30]. The combination of factor analysis and AHP as the weighting method is used here to comprehensively evaluate the high-quality development of real enterprises according to the studies [31–34]. Among them, the factor analysis method integrates indicators by using the correlation between variables [31]. AHP can fully consider the practical significance of the indicators by decomposing the evaluation objectives layer by layer and judging the weights of each indicator by experts [35]. The factor analysis method makes up for the lack of objectivity of the AHP and ensures that the evaluation results are more reasonable, scientific, and effective [34]. Finally, the arithmetic mean of the weights calculated by the two methods is used as the final combined weight [35, 36].

3.2. Steps to Build an Evaluation System. First, the factor analysis method is used to reduce the dimension and eliminate the repeated information between the indicators of the evaluation index system constructed above. Then the common factors are named and hierarchical structure models are established for the evaluation index system. After obtaining the three-level structure model, the factor analysis and AHP are further used for weighting. Finally, the arithmetic mean of the weights obtained by the two methods is taken as the weight coefficient of the final high-quality development index of real enterprises.

3.2.1. Factor Analysis

(1) Index Positive Processing. Most indicators selected in this paper are positive, except for the operating asset structure (*Q*6), the proportion of financial assets (*Q*7), and the gearing ratio (*Q*10), which need to be positively processed.

(2) Standardization of Indicator Data. Factor analysis was conducted using SPSS 26.0 software, and indicators were automatically standardized during factor analysis.

(3) Correlation Test between Variables. The KMO test and Bartlett's test of sphericity are usually selected for the correlation test between variables. The closer the KMO value is to 1, the stronger the correlation between the variables. It is generally believed that the original variable is suitable for factor analysis when the KMO value is greater than 0.5. If the *P*value corresponding to the Bartlett's test is less than the given significance level, the null hypothesis that the correlation coefficient matrix is a unit matrix is rejected, and the original variables are suitable for factor analysis.

(4) Establishing a Component Matrix to Extract Common Factors. The most common method of the component matrix is principal component analysis, which determines the number of factors according to the characteristic root and the cumulative variance contribution rate. Firstly, establish an original factor component matrix for the extracted common factors. Then rotate the original matrix by the varimax-rotation method to obtain the rotated component matrix and rename the common factors according to the rotated factor component matrix. Finally, establish a hierarchy model M for high-quality development evaluation of real enterprises.

(5) Calculation of Factor Scores and Overall Evaluation Scores. The least squares regression estimation method is used to derive the factor score coefficient matrix, and the information contribution of each factor is used as the weight.

3.2.2. Analytic Hierarchy Process

(1) Construction of Hierarchical Structure Model. The model M, constructed in the fourth step of the factor analysis method above, is a hierarchical structure model for the high-quality development evaluation of real enterprises.

(2) Building a Comparison Judgment Matrix. A group of five university professors was selected to set the weights and compare the importance of each level of indicator through a pairwise comparison between the indicators. According to the 1–9 scale method, the comparison and assignment are carried out. The relationship between the indicators is shown in Table 2, in which the intermediate values between the scales shown in the table are 2, 4, 6, and 8, and the importance of indicator j compared with indicator i should be the reciprocal of the importance of indicator i compared with indicator j, i.e., $A_{ji} = 1/A_{ij.}$

Table 2: Judgment matrix comparison scale.

Indicator importance	A_{ij} assign
Indicator i and j are equally important	1
Indicator i is slightly more important than j	3
Indicator i is more important than j	5
Indicator i is deeply more important than j	7
Indicator i is definitely more important than j	9

If it contains n indicators, a comparative judgment matrix $A = (A_{ij})_{n\times n}$ can be obtained, where A_{ij} indicates the importance ratio of indicator i to indicator j.

(3) Consistency Test and Calculation of Weights. The formula for calculating the degree of the comparison matrix consistency is $CR = CI/RI$, where $CI = \lambda_{\max} - n/n - 1$, and RI is the random consistency index of the comparison matrix, which can be obtained by looking up the table. The consistency degree of the judgment matrix A is considered acceptable if $CR < 0.1$. While the consistency degree of matrix A is unacceptable when $CR \geq 0.1$, and the importance degree between the two indicators needs to be adjusted until the criterion $CR < 0.1$ is satisfied.

(4) Comprehensive Scoring Based on Hierarchy Structure. From top to bottom, each level is calculated separately to obtain the weight of each indicator toward the upper level, and then the weight value of the bottom indicator toward the uppermost level is finally determined.

4. Empirical Research on High-Quality Development of Real Enterprises

4.1. Data. Here, the financial annual reports of 2020 Chinese A-share real enterprises from the China Stock Market and Accounting Research (CSMAR) database were selected. According to Huang's (2017) research on the real economy and the industry classification of the China Securities Regulatory Commission in 2012 [13], the financial industry and real estate industry were excluded as the original data set of real enterprises for empirical analysis. Some observations, including ST companies, outliers, and missing samples, were removed. The descriptive statistics of the variables are shown in Table 3. SPSS 26.0 and Yaahp 10.0 were used to conduct factor analysis and AHP, respectively.

4.2. Building Hierarchical Structure Models. Table 4 shows the KMO test and Bartlett's test of sphericity before factor analysis, indicating that the data in this paper are suitable for factor analysis, where the KMO value is 0.691 greater than 0.5 and the Bartlett's sphericity test Sig value = 0.000 < 0.05.

The factors were extracted using principal component analysis, and the number of factors was determined based on the post-rotation eigenvalues and the cumulative variance contribution of the factors. Table 5 shows that there are 8 factors with eigenvalues greater than 1 after rotation, and the cumulative variance contribution rate is 66%. While the 9th common factor has an eigenvalue of 0.935 close to 1 after rotation, and the cumulative variance contribution rate is 70.5%. As a result, 9 common factors are extracted in this paper, and the cumulative variance contribution rate is 70.5%, which can represent most of the information from the original data.

The influencing factors of the extracted 9 common factors can be classified and named by analyzing Table 6. Factor $F1$, named as the "profitability and development factor," has a higher load in ROE, ROA, ROS, and capital accumulation ratio. Factor $F2$, named as the "solvency factor," has a high load to current ratio, gearing ratio, and proportion of financial assets. Factor $F3$, named as the "innovation and operational factor," has a high load on the intensity of R&D investment, R&D personnel ratio, total asset turnover ratio, and gross profit ratio. Factor $F4$, named as the "overseas income factor," has a higher load in the overseas income growth ratio and overseas income. Factor $F5$, named as the "innovation output factor," has a higher load of patents granted and patents per capita. Factor $F6$, named as the "asset structure factor," has a higher load in the operating asset structure and intangible asset density. Factor $F7$, named as the "shared growth factor," has a higher load in payroll payable and revenue growth. Factor $F8$, named as the "social responsibility factor," has a higher load in environmental protection awareness and social donations. Factor $F9$, named as the "innovation input factor," has a higher load in capitalization rates and foreign investment.

Table 3: Descriptive statistics of variables.

Variables	N	Mean	Sd	Min	Max
Q1	1969	0.05	0.03	0.00	0.24
Q2	1969	0.14	0.10	0.00	0.59
Q3	1969	0.05	0.13	0.00	0.90
Q4	1969	0.00	0.01	0.00	0.06
Q5	1969	0.57	1.35	0.00	5.46
Q6	1969	0.26	0.15	0.02	0.73
Q7	1969	0.04	0.06	0.00	0.32
Q8	1969	0.31	0.42	0.01	4.20
Q9	1969	2.16	1.59	0.37	14.20
Q10	1969	0.42	0.17	0.06	0.89
Q11	1969	0.63	0.33	0.12	2.52
Q12	1969	0.28	0.15	0.01	0.82
Q13	1969	0.04	0.06	−0.22	0.22
Q14	1969	0.07	0.10	−0.60	0.36
Q15	1969	0.08	0.25	−0.49	1.71
Q16	1969	0.12	0.23	−0.44	2.13
Q17	1969	0.07	0.11	−0.72	0.44
Q18	1969	0.64	0.83	0.00	8.88
Q19	1969	11.23	9.78	0.00	23.60
Q20	1969	1.79	5.18	0.00	19.54
Q21	1969	0.18	1.17	0.00	9.65
Q22	1969	1.22	0.52	0.30	7.66
Q23	1969	1.24	2.22	0.00	7.60

Table 4: KMO and Bartlett's test of sphericity.

KMO sampling suitability quantity		0.691
Bartlett's test	Approx. Chi-square	17964.122
	Degree of freedom (df)	253
	Significance	0.000

Table 5: Total variance explained.

	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Variance	Cumulative (%)	Total	Variance	Cumulative (%)	Total	Variance	Cumulative (%)
1	3.897	16.945	16.945	3.897	16.945	16.945	3.302	14.356	14.356
2	2.531	11.005	27.950	2.531	11.005	27.950	2.076	9.027	23.383
3	2.208	9.600	37.550	2.208	9.600	37.550	2.073	9.013	32.396
4	1.679	7.301	44.851	1.679	7.301	44.851	1.866	8.112	40.508
5	1.443	6.272	51.123	1.443	6.272	51.123	1.778	7.729	48.237
6	1.272	5.532	56.656	1.272	5.532	56.656	1.501	6.528	54.765
7	1.152	5.008	61.663	1.152	5.008	61.663	1.364	5.928	60.694
8	1.090	4.738	66.402	1.090	4.738	66.402	1.139	4.953	65.646
9	.935	4.064	70.465	.935	4.064	70.465	1.108	4.819	70.465

Table 6: Rotated component matrix.

	*F*1	*F*2	*F*3	*F*4	*F*5	*F*6	*F*7	*F*8	*F*9
Q14	0.940	0.041	−0.091	0.032	0.001	0.028	0.052	0.067	−0.037
Q13	0.934	0.219	−0.030	0.021	−0.006	0.018	0.045	0.059	−0.060
Q17	0.883	0.249	0.116	−0.036	0.000	−0.058	−0.039	0.034	0.013
Q16	0.554	−0.067	0.033	0.064	0.008	−0.026	0.362	−0.021	−0.030
Q9	0.152	0.804	0.187	−0.067	0.013	0.056	−0.004	−0.015	−0.145
Q10	0.231	0.791	0.219	−0.080	−0.015	−0.112	−0.031	−0.014	−0.068
Q7	−0.011	−0.668	0.112	−0.092	0.052	−0.190	0.005	−0.016	−0.045
Q1	0.018	0.075	0.814	0.159	0.063	0.247	0.082	−0.034	0.020
Q2	−0.006	−0.044	0.669	0.148	0.073	0.450	0.133	−0.024	−0.137
Q11	0.171	−0.148	−0.640	0.150	−0.026	0.291	0.167	0.036	−0.198
Q12	0.395	0.330	0.555	−0.119	−0.033	−0.018	−0.039	0.000	0.204
Q19	−0.011	−0.044	0.023	0.898	0.018	0.004	−0.024	0.053	−0.008
Q18	0.072	−0.003	0.100	0.839	0.030	−0.021	0.170	0.019	−0.020
Q5	0.012	−0.056	0.002	0.068	0.938	−0.012	−0.009	0.021	0.000
Q4	−0.011	0.002	0.087	−0.010	0.936	0.067	0.013	−0.019	−0.023
Q6	−0.018	0.221	0.062	0.041	0.034	0.815	0.028	−0.049	−0.074
Q8	−0.008	−0.054	0.132	−0.108	0.014	0.634	−0.119	−0.009	0.282
Q22	−0.003	0.054	0.038	0.025	−0.012	−0.083	0.857	0.039	0.049
Q15	0.413	−0.125	−0.030	0.135	0.024	0.082	0.611	−0.054	−0.105
Q21	−0.018	0.028	−0.071	−0.059	0.014	−0.028	0.095	0.767	0.263
Q23	0.130	−0.034	0.005	0.094	−0.010	−0.031	−0.094	0.690	−0.269
Q3	−0.062	−0.151	0.192	−0.051	−0.041	0.102	0.001	0.081	0.702
Q20	−0.002	0.057	−0.209	0.440	0.041	−0.003	−0.037	−0.211	0.492

The evaluation index system for high-quality development of real enterprises was initially constructed by extracting, analyzing, and naming the public factors, which contains 9 public factors as secondary indicators and 23 variables as tertiary indicators as shown in Table 7.

4.3. Calculation of Index Weights

4.3.1. Weight of Factors Analysis. Table 8 shows the score coefficient matrix of high-quality development factors for real enterprises obtained using the least squares regression, and the expressions of 9 common factors can be obtained.

The weights of calculating the high-quality development index of real enterprises $(F-1)$ are the information contribution rate of each public factor. The formula is as follows:

$$\begin{aligned} F-1 = {} & 0.204F_1 + 0.128F_2 + 0.128F_3 + 0.115F_4 \\ & + 0.110F_5 + 0.093F_6 + 0.084F_7 + 0.070F_8 + 0.068F_9. \end{aligned} \tag{1}$$

4.3.2. Weight of AHP. Each of the five professors in the expert group set the weights of each layer of indicators, which are compared in pairs and assigned according to the 1–9 scale method. Finally, the weighted arithmetic mean method is used to aggregate the ranking vectors of each expert. Here, the Yaahp 10.0 software is used to perform a comprehensive evaluation.

The corresponding comparison matrix is constructed according to the index weight comparison values set by 5 experts, and the consistency test on the comparison matrix is carried out. The CR values are all less than 0.1, indicating that the matrix composed of the indicators set by the expert group

Table 7: Evaluation hierarchy model.

Primary indicators	Secondary indicators	Tertiary indicators
High-quality development of real enterprises (HDQ)	Profitability and development $F1$	ROE ROA ROS Capital accumulation ratio
	Solvency $F2$	Current ratio Gearing ratio The proportion of financial assets
	Innovation and operational $F3$	The intensity of R&D investment R&D personnel ratio Total asset turnover ratio Gross profit ratio
	Overseas income $F4$	Overseas income growth ratio Overseas income
	Innovation output $F5$	Patents granted Patent per capita
	Asset structure $F6$	The operating asset structure Intangible asset density
	Shared growth $F7$	Payroll payable The revenue growth
	Social responsibility $F8$	Environmental protection awareness Social donations
	Innovation input $F9$	Capitalization rates Foreign investment

Table 8: Component score coefficient matrix.

	1	2	3	4	5	6	7	8	9
Q1	−0.012	−0.067	0.405	0.072	−0.018	0.056	0.026	−0.001	−0.056
Q2	−0.015	−0.123	0.328	0.049	−0.021	0.226	0.051	0.012	−0.200
Q3	0.025	−0.062	0.051	−0.045	−0.016	0.042	0.039	0.086	0.626
Q4	−0.007	0.025	−0.011	−0.044	0.532	0.005	0.013	−0.009	0.002
Q5	0.009	0.005	−0.040	0.003	0.535	−0.040	−0.017	0.019	0.029
Q6	−0.034	0.103	−0.100	−0.008	−0.006	0.564	0.019	0.002	−0.077
Q7	0.092	−0.410	0.186	−0.069	0.005	−0.131	−0.054	−0.040	−0.094
Q8	0.043	−0.062	−0.026	−0.081	−0.009	0.437	−0.090	0.023	0.228
Q9	−0.066	0.412	−0.007	−0.010	0.025	0.002	0.048	0.004	−0.091
Q10	−0.030	0.393	0.029	−0.008	0.015	−0.121	0.022	−0.008	−0.018
Q11	0.052	−0.018	−0.358	0.047	−0.008	0.295	0.081	0.021	−0.126
Q12	0.112	0.061	0.248	−0.055	−0.026	−0.086	−0.045	−0.005	0.175
Q13	0.298	−0.002	−0.044	0.002	0.001	0.025	−0.079	0.004	0.002
Q14	0.326	−0.096	−0.057	−0.001	0.002	0.044	−0.090	0.005	0.017
Q15	0.081	−0.074	−0.019	−0.008	0.001	0.051	0.409	−0.066	−0.052
Q16	0.160	−0.089	0.024	−0.015	−0.002	−0.025	0.203	−0.050	0.009
Q17	0.291	−0.002	0.037	−0.017	0.005	−0.048	−0.130	−0.017	0.054
Q18	−0.012	0.022	0.058	0.453	−0.018	−0.067	0.030	0.023	−0.026
Q19	−0.011	0.005	0.024	0.507	−0.026	−0.036	−0.126	0.056	−0.027
Q20	0.021	0.108	−0.176	0.243	0.038	−0.018	−0.038	−0.181	0.478
Q21	−0.060	0.079	−0.056	−0.039	0.028	0.017	0.120	0.687	0.271
Q22	−0.133	0.121	−0.005	−0.078	0.002	−0.084	0.715	0.043	0.104
Q23	0.012	−0.046	0.055	0.073	−0.018	0.016	−0.120	0.604	−0.251

is relatively consistent, and the calculated weights are valid. According to the calculation results of Yaahp 10.0 software, the high-quality development index of real enterprises $(F-2)$ based on AHP is obtained. The formula is as follows:

$$F-2 = 0.205F_1 + 0.177F_2 + 0.164F_3 + 0.108F_4 + 0.113F_5 + 0.073F_6 + 0.062F_7 + 0.056F_8 + 0.044F_9. \quad (2)$$

4.3.3. Final Calculation of Factor Weights. The weights of the influencing factors affecting the high-quality development of real enterprises are determined using the comprehensive weight model of factor analysis and AHP, and the final factor weights are obtained by calculating the arithmetic mean of the two methods, as shown in Table 9.

The Kendall-W coordination coefficient is used for consistency testing to ensure the consistency of the weights calculated by the factor analysis and AHP. The results

Table 9: Factor weights.

Factor	Weights under factors analysis	Weights under AHP	Final weights
*F*1	0.204	0.205	0.204
*F*2	0.128	0.177	0.153
*F*3	0.128	0.164	0.146
*F*4	0.115	0.108	0.111
*F*5	0.110	0.113	0.111
*F*6	0.093	0.073	0.083
*F*7	0.084	0.062	0.073
*F*8	0.070	0.056	0.063
*F*9	0.068	0.044	0.056
Total	1.000	1.000	1.000

Table 10: Indicator descriptive statistics.

	N	Mean	Sd	Min	Max
*F*1	1969	−0.21	0.21	−1.26	0.44
*F*2	1969	1.03	0.89	−0.36	5.94
*F*3	1969	−0.09	0.92	−4.00	1.15
*F*4	1969	6.39	5.66	−0.50	17.59
*F*5	1969	0.09	0.77	−0.76	3.21
*F*6	1969	−0.33	0.49	−1.54	1.73
*F*7	1969	−0.57	1.37	−3.53	4.67
*F*8	1969	1.28	1.97	−3.44	11.91
*F*9	1969	0.30	2.54	−2.91	10.69
HQD	1969	0.85	0.57	−0.03	2.34

Table 11: Top 10 enterprises.

Company	HQD
Juhua Co., Ltd	2.34
Intretech	2.33
ESTUN	2.26
Bright dairy	2.25
Xin'an Co., Ltd	2.23
Topstar	2.23
SJ environmental protection	2.33
Hytera	2.20
Runtu Co., Ltd	2.19
Joincare	2.18

obtained from SPSS 26.0 show that the asymptotic 2-sided significance p value $= 0.044 < 0.05$. Hence, the null hypothesis that the Kendall-W is 0 does not hold, and the weighting results calculated by the two methods are consistent. Meanwhile, Kendall-W is 0.992, greater than 0.8 and close to 1, indicating a high level of consistency between the weight results calculated by the two methods and that the data results are credible. The final factor weights are the arithmetic average of the weights obtained from the two methods, thus the formula for the high-quality development index of real enterprises (HQD) is

$$\begin{aligned}\text{HQD} = {} & 0.204F_1 + 0.153F_2 + 0.146F_3 + 0.111F_4 \\ & + 0.111F_5 + 0.083F_6 + 0.073F_7 + 0.063F_8 + 0.056F_9.\end{aligned} \tag{3}$$

4.4. Analysis of the Current Situation Based on the HQD

4.4.1. Descriptive Analysis. The 2020 China Shanghai and Shenzhen A-share real enterprises HQD index is obtained based on formula (3), which is positively correlated with the degree of high-quality development of the enterprises. Table 10 presents the results of descriptive statistics of each factor and the HQD index for the 1969 real enterprises. In 2020, the mean of the high-quality development index of real enterprises in the range of −0.03 to 2.34 is 0.85, indicating that there are differences in the HQD index among them. Although the average value of the HQD index of these 1969 enterprises is greater than 0, which reflects the overall good development status of Chinese real enterprises, it can be seen that the HQD index is at a lower level, so the high-quality development of Chinese real enterprises needs to be further promoted. Analysis of the descriptive statistics of factors reveals that the standard deviation of "overseas income *F*4" is the largest, indicating that the differences in the high-quality development of Chinese 2020 real enterprises mainly stem from the differences in overseas income. Meanwhile, the standard deviations of "innovation investment *F*9," "social responsibility *F*8" and "shared growth *F*7" also indicate some differences among Chinese real enterprises in these three aspects.

4.4.2. Analysis of the Top 10. Table 11 shows the top 10 companies in the HQD Index. Among them, four companies, including Juhua Co., Ltd (600160), Xin'an Co., Ltd (600596), SJ Environmental Protection (300072), and Runtu Co., Ltd (002440), belong to the chemical industry. Intretech (002925) and Hytera (002583) belong to the industry of computer, communications, and other electronic equipment manufacturing. The ranking of each factor corresponding to different entity enterprises is not completely consistent with the final ranking. The development of these enterprises is unbalanced in each factor affected, which in turn affects the comprehensive ranking.

4.4.3. Subindustry Analysis of HQD Index. After calculating the mean value of the HQD index of real enterprises according to the industry classification, the top 5 industries in 2020 are the research and development industry (M73), mining auxiliary activities industry (B11), Internet and related services industry (I64), cultural and educational, industrial, sports and entertainment supplies manufacturing industry (C24), as well as the textile industry (C17). The bottom rankings are the accommodation industry (H61), broadcast, television, film, and video recording production industry (R86), public facilities management industry (N78), press and publishing houses (R85), and road transportation (G54). There are differences in the development status among industries, with maximum and minimum mean values of 1.55 and 0.10, respectively. At the same time, it can be seen that the average of HQD index of each industry is greater than 0, indicating the steady development of the Chinese real industry in 2020 and a bright future for the real economy. Under the crisis of the US-China trade war and Covid-19, the Chinese real economy withstood the heavy pressure and still achieved notable results.

4.4.4. Regional Analysis of HQD Index. The 31 provincial-level regions in the Chinese mainland are divided into three major regions, including the eastern, central, and western regions. Among them, the eastern region has the largest HQD index with an average of 0.91, the lowest in the western region is 0.63, and the central region is 0.71. Therefore, there are differences in the average HQD index in different regions, which is consistent with the current situation of Chinese regional development. The uneven distribution of Chinese geographical resources has caused different development conditions in each region, manifesting as the most developed in the eastern regions, followed by the central regions, and more backward in the western regions.

5. Conclusion

High-quality development is a new paradigm of entity enterprise development, a model for real enterprises to pursue higher-level economic and social value creation, as well as a new development state of continuous growth. Thus, high-quality development is a comprehensive target for real enterprises to achieve high-quality innovation development, financial information, benefit creation, and green sharing. Following the principles of science, systems, dynamics, and data availability, the evaluation index system for the high-quality development of real enterprises is constructed by selecting the basic indicators. These include 4 primary indicators, 11 secondary indicators, and 23 tertiary indicators. Firstly, the common factors are extracted and named by the factor analysis method, and the hierarchical structure model for high-quality development evaluation of real enterprises is reconstructed. Secondly, the weight of each common factor is calculated using the factor analysis and AHP, followed by taking the arithmetic average of the two as the final common factor weight to obtain the HQD index. Finally, the HQD index of Chinese in 2020 is calculated and analyzed.

The empirical results show that the factors of profitability, solvency, innovation, and operations have a greater impact on the HQD than others. High-quality financial information is an important manifestation of the high-quality development of real enterprises. Meanwhile, innovation is the power source for the high-quality development of real enterprises, and only innovation-driven development is provided with vitality. The HQD index of 1,969 Chinese real enterprises in 2020 is further calculated with a mean value greater than 0, indicating that the development of real enterprises is in good condition. However, the generally low indices also indicate that the high-quality development of Chinese real enterprises remains to be further promoted. Moreover, the development status varies among different enterprises, industries, and regions.

The following policy recommendations are proposed to promote high-quality development and give full play to the role of government.

The first is to strengthen policy pertinence, focus on targeted regulation, and increase support for the real economy. For enterprises with disadvantaged development status, the government can appropriately strengthen financial and tax support. For the western and central regions with relatively backward development, the government can increase resource adjustment. In this way, the rich-poor gap between real enterprises in different industries and regions will be narrowed, and high-quality development will be steadily promoted.

The second is to insist that "innovation is the primary force guiding development" and that "talent is the first resource" and adhere to an innovation-driven development strategy. The innovation capacity of real enterprises should be enhanced to support and lead high-quality economic development with high-tech innovation. Innovation-driven is actually talent-driven, so further improvement of the mechanism for cultivating and motivating talent is needed. Meanwhile, enterprises are the main body of innovation, whose innovation incentives, policy guidance, and development environment should be optimized.

The last is to take financial sustainability as the basic requirement for sustainable and healthy development. The quality of financial information is mainly evaluated on asset structure, solvency, operating ability, profitability, and development ability. Timely and high-quality financial information reporting will further promote the healthy development of enterprises. Hence, it is of great significance in the evaluation of the high-quality development of real enterprises.

Data Availability

The company-level data in this paper are from the CSMAR database (https://www.gtarsc.com/csmar).

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of the paper.

Authors' Contributions

J.W. and L.Z conceptualized the study; J.W. was in charge of methodology, validation, investigation, data curation, and analysis; J.W., X.G., and R.J were in charge of software and resources; J.W. prepared the original draft; J.W. and X.G reviewed, edited, and visualized the paper; L.Z. supervised the work and acquired the funds; and J.W. and L.Z. handled project administration. All authors have read and agreed to the published version of the manuscript.

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