CSCanada
Canadian Social Science
Vol. 19, No. 5, 2023, pp. 34-43
DOI:10.3968/14143

ISSN 1712-8056[Print]
ISSN 1923-6697[Online]
www.cscanada.net
www.cscanada.org

The Correlation Study between Business Models and Corporate Performance from the Perspective of Value Network: A Case Study of Listed Manufacturing Companies in Taizhou

WANG Hui[a],*

[a] Taizhou Open University, Taizhou, Zhejiang, China.
*Corresponding author.

Supported by the Zhejiang Provincial Department of Education in 2021, "A Correlation Study between Corporate Business Models and Performance from the Perspective of the Value Network — Taking the Manufacturing Industry as an Example" (Y202146655).

Received 20 August 2023; accepted 27 September 2023
Published online 26 October 2023

Abstract

Strengthening cluster development is conducive to the collective improvement of urban manufacturing, but businesses will become more dependent on the value network. In order to explore the differences in performance between different business models under the value network and to investigate the business models suitable for specific enterprises, this article selects relevant data from the GEM-listed manufacturing companies. It includes an index system for classifying business models, the classification, and characteristics of business models. The relationship between the types of business models and performance is interpreted from the perspective of specific indicators of performance measurement, factor analysis, and variable explanation. Finally, the data suggests that processing-oriented enterprises with concentrated customers and low brand awareness are conducive to rapid development. However, focusing on research and development, innovative investment, and increasing the resilience of the industrial chain are beneficial for later growth and transformation.

Key words: Value network; Business model; Performance; Correlation

Wang, H. (2023). The Correlation Study between Business Models and Corporate Performance from the Perspective of Value Network: A Case Study of Listed Manufacturing Companies in Taizhou. *Canadian Social Science, 19*(5), 34-43. Available from: http://www.cscanada.net/index.php/css/article/view/13143
DOI: http://dx.doi.org/10.3968/13143

In 2023, the Zhejiang Provincial Government Work Report explicitly proposed the implementation of the "415X" Advanced Manufacturing Cluster Cultivation Project, focusing on building a strong manufacturing province and creating four trillion-level advanced industry clusters, fifteen hundred-billion-level characteristic industry clusters, and a batch of ten-billion-level emerging industry clusters. Against this backdrop, Taizhou City has also put forward the goal of strengthening cluster development and striving to become a leader in the national advanced manufacturing city.

In the development process of manufacturing enterprises, their production and operation activities increasingly rely on the value network in which they operate. Based on the value network, enterprises can coordinate with internal and external participants, construct their business models, and complete the process of value creation, delivery, and transfer. Existing research also indicates a positive relationship between the frequency and degree of business model innovation and gross profit and CEO performance.

What needs further exploration is whether there is a difference in performance among different business models in the value network. Are there suitable business models for specific types of enterprises? This project, first and foremost, takes a value network perspective, selecting relevant data from GEM-listed manufacturing companies to study the impact of business models on corporate operational performance. Secondly, using Taizhou enterprises as an example, it summarizes typical business models of manufacturing enterprises and provides recommendations for the development of advanced manufacturing in Taizhou.

1. CLASSIFICATION INDEX SYSTEM OF BUSINESS MODELS BASED ON THE VALUE NETWORK PERSPECTIVE

1.1 Business Model Architecture and Definition Based on the Value Network

How to achieve value creation and value addition is the

central issue in current business model research. Teece (Teece, 2018) considers the business model as the process of designing, constructing, transmitting, and realizing value for the enterprise. Chesbrough and Rosenbloom (Chesbrough & Rosenbloom, 2002) suggest that the business model is a means of commercializing technology and discovering its business value through a series of value elements. Amit and Zott (Amit & Zott, 2001) believe that the business model is designed through dimensions such as structure, governance, and transaction content to explore business opportunities and achieve value creation.

A value network refers to a cooperative alliance system constructed among enterprises, allowing them to enhance resource allocation efficiency and expedite product delivery speed (Pu, 2014). Its components mainly include internal relationship resources within enterprises and relationship networks among enterprises (Wu, et al, 2014). It encompasses multiple organizations and participants, forming a network of resources and capabilities based on certain rules and agreements. On this basis, it provides products and services to end customers, achieving the goal of value co-creation.

In the current business world, the trends of networking and ecosystemization are more pronounced. Therefore, it is necessary, in conjunction with this context, to incorporate business models into the value network and further explore their logic of value creation. In the business model, value creation is the core. According to Rappa (Rappa, 2004) and others, from the perspective of the value network, a business model can be divided into four basic modules, including the architecture of the value network, determination of the value proposition, the basic logic of value creation, and the manner of value acquisition and distribution. Enterprises, within their value networks, discover business opportunities, propose value propositions, design the processes and resources needed for value creation based on these propositions, and simultaneously refine the mechanisms for value acquisition and distribution among stakeholders. In the value network, new value propositions are continually created, acquired, and distributed, forming a closed loop of the business model, as shown in Figure 1.

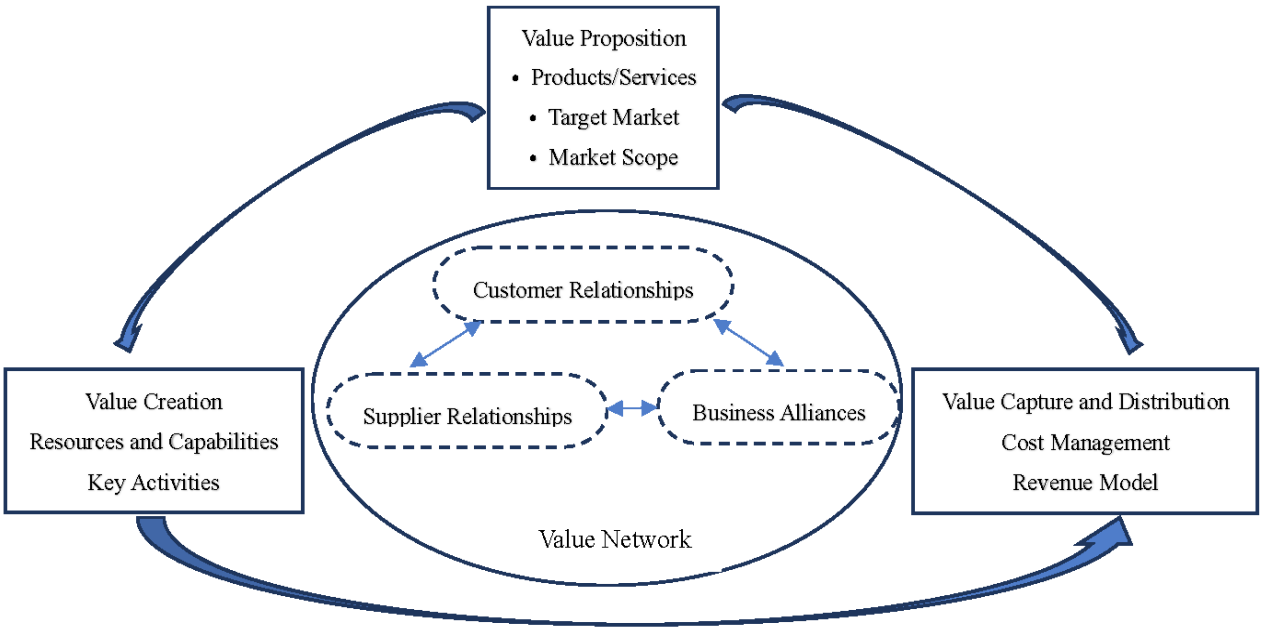

Figure 1
Conceptual Model of Business Model

Firstly, from the perspective of the value network, enterprises need to have a clear understanding of their value proposition and network relationships. This includes awareness of the business environment, competitive or business relationships with industry peers, upstream and downstream enterprises, service targets, etc. This is essential to determine for which customers and what kind of value proposition to provide (Rappa, 2004). Secondly, based on the value network, it is crucial to fully integrate the resources and capabilities of suppliers and partners in the process of value creation, offering customers more attractive and distinctive value propositions (Snihur, Zott, & Amit, 2021). Finally, the closed loop is achieved through a rational value acquisition and distribution mechanism (Sinthupundaja, et al, 2020).

1.2 Indicator System for Business Model Classification

In the study of business model classification, constituent elements are a crucial consideration. Here, based on the conceptual model of the business model, ten core elements were extracted from the four classification dimensions, as shown in Table 1.

Table 1
Dimensions and Indicators of Business Model from the Perspective of the Value Network

Classification dimension	Classification indicator	Indicator content
Architecture of the Value Network	Customer relationship	Customer capital
	Supplier relationship	Scale of suppliers
	Alliance relationship with other enterprises	Scale of enterprise alliances
Determination of value proposition	Products and services	Types of offered products and services
	Target customers	Customer Concentration
	Business market scope	Market Coverage
Basic logic of value creation	Resources and capabilities	Categories and distribution of core assets
	Key value chain activities	Proportion of investment in activities such as R&D
Modes of value acquisition and distribution	Revenue model	Proportion of marketing expenses
	Cost management	Proportion of human and management costs

2. CLASSIFICATION OF BUSINESS MODELS IN THE GROWTH ENTERPRISE MARKET (GEM) MANUFACTURING COMPANIES

The project classified the business models of manufacturing companies listed on the Growth Enterprise Market (GEM). A total of 304 companies were selected, taking into consideration the completeness of data and the stability of the business environment. The sample data used in the study, sourced from the Guotai An database, is up to the year 2018.

2.1 Classification Indicators

In the classification indicator system for business models, factors such as scale and industry can have an impact. Therefore, ratio indicators are employed here to mitigate these effects. Refer to Table 2 for details.

Table 2
Classification Dimensions and Measurements of Business Models

Dimension	Element	Measurement content	Measurement indicator	Source
Value network	Customer Relations	Customer Capital	Market Share	Luo Qian et al. (Luo, Li, & Cai, 2012)
	Supplier Relations	Supplier Concentration	Proportion of Total Purchases from Top 5 Suppliers	
	Collaboration and Alliances	Collaboration and Alliance Scale	Number of Participating Companies*	
Value proposition	Key Customers	Customer Concentration	Proportion of Total Sales from Top 5 Customers	Li Honglei (Li, 2019)
	Market Scope	Business Coverage in Regions	Proportion of Sales in Respective Regions	
Value creation	Resources and Capabilities	Major Asset Types	Proportion of Tangible and Intangible Assets	
	Key Activities	Research and Development Intensity	Proportion of Research and Development Expenditure	
Value distribution	Revenue Sources	Marketing Expenditure	Sales Expense Ratio	Kotha and Vadlamani (Kotha & Vadlamani, 1995)
	Cost Management	Cost Control Capability	Operating Cost Ratio	

Note: For domestic sales, a proportion greater than 50% is defined as local dominance; for overseas sales, a proportion less than 20% and a domestic sales proportion less than 50% are defined as domestic dominance; for overseas sales exceeding 60%, it is considered overseas dominance; others are considered diversified.

The number of participating companies includes subsidiaries and other subsidiaries within the same parent company or joint venture.

2.2 Classification and Characteristics of Business Models

In the process of classifying business models, a combination of cluster analysis and expert scoring was employed.

In cluster analysis, K-means analysis was conducted, and the results are presented in Table 3. The clustering results indicate that the selected samples were divided into six categories, with sample sizes of 14, 60, 59, 67, 30, and 74 for each category, respectively.

Table 3
Results of Cluster Analysis

	No.	Sample size
Clustering	1	14.000
	2	60.000
	3	59.000
	4	67.000
	5	30.000
	6	74.000
Valid		304.000
Missing		0.000

Table 4 presents the centroid values for the selected variables. For instance, the centroid value for the proportion of fixed assets is 0.13021. After comparing it with the original data, the original value was determined to be 21.04%.

Table 4
Final Cluster Centers

Variables	Clustering					
	1	2	3	4	5	6
Zscore (Top 5 customers)	0.750 31	-0.651 02	-0.120 31	1.201 23	-0.550 03	-0.342 02
Zscore (Market scope)	0.398 76	0.098 56	0.249 01	0.049 78	-0.710 98	-0.111 03
Zscore (Fixed assets)	0.130 21	-0.306 01	1.059 8	-0.650 98	0.062 01	-0.076 03
Zscore (Intangible assets)	-0.349 86	-0.350 12	-0.302 31	-0.500 01	0.240 21	0.943 12
Zscore (R&D investment ratio)	-0.629 54	0.004 99	0.460 92	0.180 21	1.230 34	0.180 02
Zscore (Sales expense ratio)	-0.793 65	0.303 01	-0.604 98	-0.450 01	2.240 01	-0.104 32
Zscore (Operating cost ratio)	1.102 43	-0.108 79	0.801 02	-0.012 50	-1.805 12	-0.040 50
Zscore (Market share)	3.296 59	0.171 03	0.076 30	-0.390 27	-0.436 05	-0.313 37
Zscore (Top 5 suppliers)	-0.399 79	-0.498 79	0.830 21	0.406 31	-0.139 60	-0.470 12
Zscore (Affiliated companies)	0.980 12	1.180 35	-0.412 31	-0.399 78	-0.330 84	-0.315 13

At the same time, in this project, the sample companies participating in the clustering were evaluated by several scholars engaged in business model research based on the measurement indicators in Table 2, using the method of independent expert scoring. The classification of business models was obtained. On this basis, the intersection of the two was taken to obtain the classification, characteristics, and typical companies as shown in Table 5.

Table 5
Business Model Classification, Features, Typical Companies, and Number of Companies

Business Model	Features	Typical Companies	Number of Companies
H-L-M	High customer concentration + Low brand promotion expenses + Processing type	Taifu Pump, Sunshine Power	10
H-L-RD	High customer concentration + Low brand promotion expenses + High R&D investment	Liansheng Chemical, Benli Technology, Zhongguang Lightning	50
L-L-M	Low customer concentration + Low brand promotion expenses + Processing type	Tiantie Shares, Huacan Optoelectronics	43
L-L-RD	Low customer concentration + Low brand promotion expenses + High R&D investment	Yonggui Electric, Yanpai Shares, Ruilin Shares	45
H-H-RD	High customer concentration + High brand promotion expenses + High R&D investment	Wansheng Intelligent, Kaishan Shares	60
L-H-RD	Low customer concentration + High brand promotion expenses + High R&D investment	Tianyu Shares, Dirui Medical	24

Note: H indicates high customer concentration and high brand promotion expenses; L indicates low customer concentration and low brand promotion expenses; M indicates processing type; RD indicates high R&D investment.

Currently, Taizhou has 31 major industrial categories, 21 industrial clusters with output value exceeding 10 billion yuan, and 68 national-level industrial bases. The city has a total of 307 product sub-market shares, ranking first domestically and internationally. In our study, we take typical companies in different business models in Taizhou as examples to describe their different characteristics.

H-L-M Type

Sales are mainly focused on several major customers, with high manufacturing costs. There is minimal investment in research and development, and brand promotion expenses are relatively low. This type belongs to low-profit processing and manufacturing enterprises.

Case Study: Taifu Pump Industry Co., Ltd. (300992)

Taifu Pump Industry specializes in the research, development, production, and sales of civil water pumps. After years of development, the company has formed a comprehensive product system. The company's products are mainly exported, and it has established long-term and stable cooperation relationships with distributors and brand manufacturers in various countries in Asia, America, Europe, Africa, Oceania, etc. According to statistics from the Pump Industry Branch of the China General Machinery Industry Association, Taifu Pump Industry ranked fifth in export delivery value from 2019 to 2021 and ranked first in the domestic market share of solar water pumps (based on sales quantity).

The pump products are widely used in industrial, agricultural, and residential fields, with a wide range of applications and various models to meet the needs of different application areas. The gross profit margin for pump and vacuum equipment manufacturing is 20.48%, and the proportion of direct materials in operating costs is as high as 73.12%.

H-L-RD Type

Sales are mainly focused on several major customers, with relatively low brand promotion expenses and a high proportion of investment in research and development. This type belongs to companies that prioritize research and development.

Case Study: Liansheng Chemical Co., Ltd. (301212)

Liansheng Chemical is mainly engaged in the research, production, sales, and import-export trade of fine chemicals, mainly pharmaceutical intermediates, pesticide intermediates, and electronic chemicals. Its products are mainly used in the fields of pharmaceuticals, pesticides, electronic chemicals, cosmetics, etc. Relying on stable production technology, a strict environmental safety assurance system, and a quality control system, Liansheng Chemical's products have been recognized by many well-known domestic and foreign companies. The company has established long-term and stable cooperation relationships with international well-known companies such as Bayer, Lonza, and Syngenta, as well as domestic well-known companies such as Xinhecheng, Brother Technology, and Lianhua Technology.

Leveraging years of technical accumulation and mastering the tricks of engineering amplification, Liansheng Chemical can skillfully apply the technical means and process concepts of large-scale continuous chemical engineering to the production process of fine chemicals. With a focus on green, low-carbon, and digital transformation, the company promotes the full-process automation transformation of the workshop, using a DCS control system across the entire line. It is currently the first domestic enterprise to use a continuous sodium liquid metal reaction device to produce ABL products. The proportion of research and development personnel is 11.68%.

L-L-M Type

Sales concentration is relatively low, with low investment in research and development and brand promotion, and a certain market share. These companies are mostly heavy asset processing enterprises with higher fixed asset investments, such as equipment.

Case Study: Tiantie Corporation (300587)

Tiantie Corporation's main products in the vibration and shock absorption business are rubber products. The company has mastered multiple core technologies related to rail structure noise and vibration control. In the field of noise reduction and vibration control in domestic rail transportation, Tiantie Corporation's rubber vibration reduction and noise reduction product formulations and production processes are technologically advanced and widely used in the field of rail transportation. Tiantie has accumulated a large number of high-quality customer resources and maintained stable and win-win cooperation relationships in the long-term business development. Currently, it has established good and in-depth cooperative relationships with design and construction units under China Railway and China Railway Construction, as well as rail transit construction, maintenance, or industrial companies.

Through a combination of independent research and development and introduction, digestion, and absorption, Tiantie Corporation has developed a variety of rail structure vibration reduction products represented by isolated rubber vibration reduction pads. These products cover multiple parts of rail structures such as track beds, rail ties, fasteners, and steel rails. As one of the domestic rubber-type rail structure vibration reduction manufacturers with a relatively complete range of vibration reduction products, Tiantie Corporation's products are widely used in rail transit lines, making it one of the domestic producers with rich application cases of rail structure vibration reduction products.

L-L-RD Type

Sales concentration is relatively low, with a low proportion of intangible assets. Research and development (R&D) investment and brand promotion investment are high, while fixed asset investment is not high. This type belongs to a growing R&D-oriented enterprise.

Case Study: Yonggui Electric (300351)

Yonggui Electric has developed three major business segments: rail transportation and industry, vehicle-mounted and energy information, and special equipment. With a strong foothold in the rail transportation market for many years, the rail transportation segment has multiple products certified by China Railway Rolling Stock Corporation (CRRC) and has passed supplier qualification audits by multiple rail transit vehicle manufacturing enterprises. It is qualified to supply connectors and other rail transit products to major domestic rail transit vehicle manufacturing enterprises. In the field of vehicle-mounted and energy information, the company holds supplier qualifications for major new energy vehicle and charging equipment manufacturers in China, with a solid customer base. The total sales amount of the top five customers' accounts for 30.24% of the annual sales, indicating relatively low sales concentration.

In recent years, Yonggui Electric has consistently increased R&D investment to enhance core technology and product competitiveness. As of 2022, R&D investment accounts for 7.08% of operating income, with 592 technical staff. The company has a number of high-end core technical talents in the industry, independent design

and development capabilities, widely used design and development software, and the ability to conduct various connector type tests and routine tests comprehensively. Yonggui Electric places a high emphasis on intellectual property work, gradually implementing incentive mechanisms while strengthening the construction of the intellectual property team, maintaining the foundation of project and product innovation. The company has applied for a total of 133 patents, including 25 invention patents.

H-H-RD Type

Sales concentration is relatively high, with a focus on major clients. The proportion of intangible assets is relatively high, with high investments in both research and development (R&D) and marketing. This type relies heavily on intangible assets such as brands and patented technologies, while the dependence on fixed assets such as machinery and equipment is not high. It belongs to a brand-oriented manufacturing enterprise.

Case Study: Wansheng Intelligent (300882)

Wansheng Intelligent is primarily engaged in the research, development, production, and sales of products such as smart meters and electricity information collection systems. Its main business covers four major segments: smart metering, smart IoT (Internet of Things), smart grid, and smart energy. Wansheng Intelligent provides specialized metering products to domestic and international clients in the power industry, selling smart meters and electricity information collection system products to state-owned large-scale grid companies such as State Grid, Southern Power Grid, and Mengdian Group through bidding. Over the years of market operations in the industry, Wansheng Intelligent has established a stable marketing network, possesses an excellent marketing team, continuously explores the markets of State Grid, Southern Power Grid, and provincial power grids, and has established long-term stable cooperative relationships with major clients. The total sales amount of the top five customers accounts for 57.93% of the annual sales.

Wansheng Intelligent has accumulated a total of 117 patents (including 22 invention patents and 95 utility model patents) and obtained 114 software copyrights. The company actively participates in new product pre-research and discussion activities organized by organizations such as the State Grid Electric Power Research Institute and the Intelligent Measurement Alliance. It is also actively involved in the formulation of national and industry standards, conducts pilot work for new products and technical solutions in the developed areas of the Yangtze River Delta, and strives to gain a market advantage through product and technological innovation.

L-H-RD Type

Sales concentration is low, with high investments in research and development (R&D) and brand promotion. The proportion of intangible assets is high. These enterprises mostly belong to the brand-oriented R&D type.

Case Study: Tianyu Pharmaceutical Co., Ltd. (300702)

Tianyu Pharmaceutical Co., Ltd. is primarily engaged in the research, development, production, and sales of multi-dose generic drugs, focusing on pharmaceutical formulation business. The company has developed a product series primarily comprising drugs for lowering blood pressure, lowering blood lipids, lowering blood sugar, anti-thrombosis, anti-asthma, lowering uric acid, and nutritional supplements. It has established long-term cooperative relationships with many domestic pharmaceutical companies, and its product sales cover all provinces in China through various channels, including medical, retail, the third terminal, and e-commerce. Tianyu Pharmaceutical Co., Ltd. continues to deepen its domestic sales system.

The company currently operates three research and development centers located in Zhejiang, Jiangsu, and Shanghai, with a total of approximately 8,000 square meters of research and development space. Each of the three research and development centers has a fully functional professional team covering process development, quality analysis, registration, project management, and technology transfer. As of 2022, Tianyu Pharmaceutical Co., Ltd. has around 799 research and development personnel, obtained 46 granted patents for the invention of active pharmaceutical ingredients and intermediates, with 20 invention patents publicly disclosed; and obtained 5 granted patents for the invention of pharmaceutical formulations, with 25 invention patents publicly disclosed.

3. ASSOCIATION BETWEEN BUSINESS MODEL TYPES AND PERFORMANCE

Is there a correlation between business models and performance? This is a debated topic. In this study, beyond indicators like profit or sales revenue, a broader range of financial indicators is selected to examine whether there are differences in these indicators among different business models.

3.1 Selection of Performance Measurement Indicators

Enterprise performance can be assessed from various perspectives. Based on comprehensive research (Luo, et al, 2017; Wu, He, & Wu, 2021), this project identifies the following four dimensions and selects specific indicators from each dimension.

Profitability:

Profitability is the core of enterprise operational objectives and a fundamental dimension for measuring overall performance.

Debt-paying Ability:

Debt-paying ability measures the capacity and extent

of an enterprise to repay short-term and long-term debts. A stable debt-paying ability forms the foundation for the healthy development of the enterprise.

Operational Capability:

Operational capability gauges an enterprise's comprehensive ability to operate various resources to generate profits.

Development Capability:

Also known as growth capability, development capability refers to an enterprise's potential operational expansion ability to scale up and enhance its strength.

The specific indicators selected for the study are outlined in Table 6.

Table 6
Specific Performance Measurement Indicators

Indicator Name	Variable	Indicator Name	Variable	Indicator Name	Variable
Return on Assets (ROA)	X1	Cost-to-Revenue Ratio	X13	Total Asset Turnover	X25
Return on Net Assets (RONA)	X2	Quick Ratio	X14	Equity Turnover	X26
Return on Current Assets (ROCA)	X3	Current Ratio	X15	Capital Accumulation Rate	X27
Return on Fixed Assets (ROFA)	X4	Debt-to-Asset Ratio	X16	Fixed Asset Growth Rate	X28
Return on Equity (ROE)	X5	Accounts Receivable Turnover	X17	Total Asset Growth Rate	X29
Net Profit Margin	X6	Inventory Turnover	X18	ROE Growth Rate	X30
Return on Investment (ROI)	X7	Operating Cycle	X19	Earnings per Share (EPS) Growth Rate	X31
Operating Cost Ratio	X8	Accounts Payable Turnover	X20	Net Profit Growth Rate	X32
Operating Profit Margin	X9	Working Capital Turnover	X21	Operating Profit Growth Rate	X33
Net Profit Margin on Sales	X10	Current Asset Turnover	X22	Owners' Equity Growth Rate	X34
Selling Expense Ratio	X11	Fixed Asset Turnover	X23	—	—
Administrative Expense Ratio	X12	Capital Intensity	X24	—	—

3.2 Data Preprocessing

Before conducting factor analysis, data preprocessing is essential. This involves aligning indicators with the same directional trends, especially for financial indicators with moderate and inverse trends. Moderate indicators include debt-to-asset ratio, capital intensity, and liquidity ratios (current ratio and quick ratio). Inverse indicators are primarily cost-related, encompassing expense ratios (selling, operating, and administrative), sales expense ratio, and business cycle. Following the approach suggested by relevant scholars (Chen, 2021), inverse indicators are transformed to align with the overall directional trend.

$$f(x_i) = a - x_i \qquad (1)$$

Where, a can take any value, select

$$f(x_i) = -x_i \quad (2)$$

For moderate indicators, adopt the common practice of reciprocation (Fan & Feng, 2013).

Subsequently, perform non-dimensional processing on the data, transforming it into dimensionless standardized data to eliminate dimensional effects. The standardization (Z-score) formula is given by:

$$x_i' = \frac{x_i - \bar{x}}{s} \qquad (3)$$

Where

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n}} \qquad (4)$$

3.3 Adaptability Testing for Factor Analysis

To assess whether the selected 34 performance indicators are suitable for principal component analysis, the Bartlett sphericity test and Kaiser-Meyer-Olkin (KMO) test are employed. The results indicate that the KMO value exceeds 0.6, and the Sig value is less than 0.01, enabling the execution of principal component analysis.

3.4 Factor Extraction

Using SPSS, factor analysis is conducted on the selected 33 variables, extracting 11 common factors with a cumulative contribution rate exceeding 80% (80.718%), as shown in Table 7.

Table 7
Explained Total Variance in Factor Analysis

Component	Initial eigenvalue			Extracted loadings squared			Rotated loadings sum		
	Total	Percentage of variance (%)	Cumulative %	Total	Percentage of variance%	Cumulative %	Total	Variance percentage%	Cumulative %
1	6.060	18.362	18.362	6.060	18.362	18.362	4.901	14.842	14.842
2	5.098	15.531	33.893	5.098	15.531	33.893	4.698	14.191	29.033
3	3.571	10.458	44.351	3.571	10.458	44.351	3.297	9.986	39.019
4	2.502	7.441	51.792	2.502	7.441	51.792	2.691	8.231	47.250
5	1.739	5.301	57.093	1.739	5.301	57.093	2.049	6.185	53.435
6	1.501	4.626	61.720	1.501	4.626	61.720	2.012	5.798	59.233
7	1.503	4.576	66.296	1.503	4.576	66.296	1.901	5.501	64.734
8	1.399	4.392	70.688	1.399	4.392	70.688	1.686	5.149	69.883
9	1.301	3.901	74.589	1.301	3.901	74.589	1.391	4.301	74.184
10	1.039	3.213	77.802	1.039	3.213	77.802	1.328	3.393	77.577
11	0.995	2.916	80.718	0.995	2.916	80.718	1.036	3.141	80.718
12	0.941	2.821	83.539						
13	0.920	2.801	86.340						
14	0.839	2.603	88.943						
15	0.710	2.139	91.082						
16	0.598	1.798	92.880						
17	0.519	1.601	94.481						
18	0.501	1.383	95.964						
19	0.334	0.998	96.862						
20	0.302	0.853	97.715						
21	0.231	0.716	98.431						
22	0.139	0.438	98.869						
23	0.109	0.341	99.210						
24	0.069	0.245	99.455						
25	0.043	0.157	99.612						
26	0.041	0.114	99.726						
27	0.029	0.101	99.827						
28	0.021	0.068	99.895						
29	0.021	0.055	99.950						
30	0.011	0.031	99.981						
31	0.004	0.013	99.994						
32	0.002	0.004	99.998						
33	0.001	0.002	100.000						

3.5 Factor Variable Explanation

Utilizing the maximum variance orthogonal rotation method for factor rotation, a rotated factor loading matrix is obtained. Based on this, 11 common factors are derived, forming 5 capability factors: Profitability Factor, Solvency Factor, Development Factor, Operating Factor, and Mixed Capability Factor.

Subsequently, using the rotated factor variance contribution rate as weights, the comprehensive performance score F for the enterprise is calculated.

$$F = (F1 \times 18.362 + F2 \times 15.531 + F3 \times 10.458 + \cdots\cdots + F11 \times 2.916)/80.718 \quad (5)$$

In the performance score table obtained for each enterprise, there are 163 companies with scores below the industry average, resulting in an overall negative score. Among the 14 H-L-M type enterprises in the first category, 11 are ranked in the top 150, indicating higher performance rankings. The proportion of other types of top 100 enterprises is roughly one-third, with scores being relatively close and no significant differences. Among the top ten scoring companies, there are 4 from the sixth category, 2 each from the first and fifth categories, and

1 each from the second and fourth categories. After calculating the average score of sample enterprises for different types of business models, the results are presented in Table 8.

Table 8
Average Scores for Enterprises of Different Business Model Types

No.	Business model	Average enterprise score	Number of selected samples
1	H-L-M Type	0.1200	10
2	H-L-RD Type	-0.0521	50
3	L-L-M Type	-0.0367	43
4	L-L-RD Type	-0.0141	45
5	H-H-RD Type	-0.0155	60
6	L-H-RD Type	-0.0239	24

4. CONCLUSION AND OUTLOOK

The existing sample data indicates that the overall performance level of China's manufacturing industry is relatively low, with insufficient investment in research and development (R&D) and brand effects. Possible reasons include the relatively short operating time of manufacturing enterprises listed on the Growth Enterprise Market (GEM), placing them in a growth phase where sustained R&D investment may be challenging, and the cultivation of brand effects also requires time.

Examining Different Business Models. Examining different business models, the sample companies also demonstrate that enterprises with a more concentrated customer base have higher overall scores than those with a dispersed customer base. Companies that place a higher emphasis on brand influence score higher than those with lower brand investments. Enterprises whose business model is primarily focused on processing and manufacturing have higher overall scores compared to research and development (R&D) oriented enterprises.

However, the business model with the highest comprehensive performance level is not the H-H-RD type, which represents processing-oriented enterprises with a high focus on brand effects and a concentrated customer base. Instead, it is the H-L-M type, representing processing-oriented enterprises with a high customer concentration but relatively low brand visibility. This result aligns with the current state of manufacturing enterprises in China. Overall, Chinese manufacturing is still predominantly centered around processing, with low brand premiums. Enterprises tend to neglect brand building, lacking the willingness to invest, which in turn reduces marketing costs.

The insight from this phenomenon is that manufacturing enterprises in China, including those in cities like Taizhou, have traditionally relied on the rapid growth of downstream market demand, capturing the low-end market with low costs. They initiate development by catching up in traditional areas and imitating advanced technologies or business models from more developed countries, with insufficient investment in brand and R&D. This development path has both advantages and disadvantages. On one hand, this business model facilitates rapid growth and scalability. On the other hand, it lacks a solid foundation, making it difficult to achieve sustained high-quality development. As a result, China, particularly in the manufacturing and high-tech sectors, faces a significant bottleneck.

In February 2023, during an investigation in Taizhou, Zhejiang Province, Secretary Yi Lianhong of the Provincial Party Committee emphasized the need for Taizhou to nurture more influential private enterprises, build stronger industrial clusters that are recognized, and establish larger first-class platforms that are sustainable. Under this new development context, the typical manufacturing enterprises in Taizhou have a clear growth and transformation path – emphasizing investment in R&D and innovation, focusing on specific segments of the value chain in their business, promoting deep integration of the innovation chain, industry chain, fund chain, and talent chain. This involves strengthening the leading enterprises in the chain, enhancing the resilience of the industrial chain, and accelerating the aggregation and cultivation of advantageous industries.

Today, manufacturing enterprises in Taizhou are making efforts in this direction, cultivating 90 "specialized, refined, and innovative" small giant enterprises and 10 "single-item champion" enterprises, achieving remarkable results. Insisting on the path of specialization, refinement, and innovation to become "small giant" and "single-item champion" enterprises is a reasonable path for many manufacturing enterprises in Taizhou to grow and upgrade. It is also an important foundation for the resilient growth of Taizhou's economy.

5. ACKNOWLEDGMENTS

This paper was completed under the careful guidance of Professor Wang Hecheng, Professor Xu Jianxin, and Associate Professor Zhu Yang. Over the past year, the professors' profound expertise, rigorous academic attitude, meticulous work style, tireless noble moral character, strict self-discipline, and generous treatment of others have had a profound impact on me. From topic selection to completion, every step was completed under the careful guidance of the teachers, who invested a great deal of effort. During the writing process, we encountered many challenges, all of which were resolved with the patient guidance and assistance of our colleagues in the research group. I express my profound respect and heartfelt thanks to all the teachers!

REFERENCES

Amit, R., & Zott, C. (2001). Value Creation in E-business. *Strategic Management Journal, 22*(6-7), 493-520.

Bovet, D., & Martha, J. (2000). *Value nets: Breaking the supply chain to unlock hidden profits*. New York: John Wiley & Sons.

Chen, P. Y. (2021). Comparison and Reverse Indexing Method for Linear Dimensionlessization in Factor Analysis. *Operations Research and Management, 30*(10), 95-101.

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change, 11*(3), 529-555.

Fan, K., & Feng, C. H. (2013). How to Correctly Preprocess Indicator Data in Factor Analysis. *Finance and Accounting Monthly*, (6), 85-88.

Feng, L. J., Li, K., Wang, X., et al. (2019). Research on the Evolution Mechanism of Business Model Innovation of Latecomer Enterprises from the Perspective of RPV Theory. *Modern Management, 39*(4), 50-53.

Kotha, S., & Vadlamani, B. L. (1995). Assessing generic strategies: An empirical investigation of two competing typologies in discrete manufacturing industries. *Strategic Management Journal, 16*(1), 75-83.

Li, H. L. (2019). Business Model Design: A Modular Combinatorial Perspective. *Economic Management, 41*(12), 158-176.

Luo, Q., Li, D., & Cai, M. (2012). How Does Business Model Innovation Affect the Performance of High-tech Enterprises? - An Improved Study of the Zott Model. *Science Research Management, 33*(7), 40-47.

Luo, X. W., Xiang, G. P., Ning, P., et al. (2017). How Does Business Model Innovation Affect the Performance of New Start-ups? - The Role of Legitimacy and Policy Guidance. *Scientific Research, 35*(7), 1073-1084.

Pu, G. Y. (2014). *Research on the Mechanism of Action of Value Networks on Innovation Performance*. (Doctoral dissertation). Zhejiang University, Hangzhou.

Rappa, M. A. (2004). The utility business model and the future of computing services. *IBM Systems Journal, 43*(1), 32-42.

Sinthupundaja, J., Kohda, Y., Chiadamrong, N., et al. (2020). Investigating business model innovation for sustainability: Cases from Thailand. *International Journal of Innovation and Sustainable Development, 14*(3), 313.

Snihur, Y., Zott, C., & Amit, R. (2021). Managing the Value Appropriation Dilemma in Business Model Innovation. *Strategy Science, 6*(1), 22-38.

Teece, D. J. (2018). Business models and dynamic capabilities. *Long Range Planning, 51*(1), 40-49.

Wu, J. J.,, He, Z. C., & Wu, Y. (2021). Research on the Impact of Comprehensive Business Models of New Energy Vehicles on Enterprise Performance. *Finance and Economics Theory and Practice, 42*(4), 116-122.

Wu, X. B., Yao, M. M., Wu, Z, H., et al. (2014). Research on Business Model Classification Based on the Perspective of Value Network: A Case Study of Modern Service Industry. *Journal of Zhejiang University (Humanities and Social Sciences), 44*(2), 64-77.