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Financial Risk Analysis of Company C Based on the Z-Score Model

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Abstract: *This paper takes Company C, a pharmaceutical R&D outsourcing enterprise listed on the Science and Technology Innovation Board (STAR Market), as the research object. It employs a comprehensive methodology including PEST analysis, Porter's Five Forces Model, and financial ratio analysis to systematically evaluate its macro-environment, industry competition, and internal financial condition. The study finds that while the company benefits from policy dividends and industry growth, it faces risks such as high customer concentration, increased occupation of working capital, and rising leverage. The core section introduces the Z-Score model for quantitative measurement of financial risk. The calculation results show that the company's adjusted Z-score consistently falls within the "gray zone," indicating a need for continuous attention to liquidity risk. Based on these findings, this paper proposes targeted response strategies aimed at balancing business expansion and financial stability. These strategies include optimizing the customer structure, strengthening cash flow management, implementing strategic capital allocation, and improving operational efficiency. The paper aims to provide a reference for Company C and similar high-tech service enterprises in financial risk management and sustainable development.*

Keywords: *Pharmaceutical R&D Outsourcing (CRO), Company C, Z-Score Model, Porter's Five Forces Model, Financial Condition*

1. Introduction

With the deepening of global economic integration, the rapid development of pharmaceutical technology, and continuous innovation in business models, the pharmaceutical R&D outsourcing (CRO) industry has shown an accelerating development trend. As a special R&D industry emerging in the United States in the 1970s, CRO developed rapidly in the United States, Europe, and Japan in the late 1980s and had become an indispensable part of the pharmaceutical industry chain by the 1990s[1]. The "14th Five-Year Plan" for Bioeconomic Development sets stage goals for bioeconomic development, laying the foundation for promoting industry growth. Furthermore, the 2025 Government Work Report emphasizes strengthening basic medical and health services, implementing a health-first development strategy, and promoting coordinated development and governance of healthcare, medical insurance, and pharmaceuticals[2]. The Ministry of Industry and Information Technology advocates actively developing models like CRO and CDMO to support cutting-edge fields such as cell and gene therapy. The deepening implementation of the national innovation-driven development strategy, along with reforms in drug review and approval, the Marketing Authorization Holder (MAH) system, among others, has injected strong policy momentum into original innovation in the biopharmaceutical industry. Thus, biopharmaceutical R&D outsourcing has gradually become an indispensable segment of the pharmaceutical industry chain, playing a significant role in the industrial structure[3]. Established in 2009, Company C, an outstanding CRO/CDMO enterprise that grew in China and successfully listed on the STAR Market, has a development trajectory deeply aligned with China's pharmaceutical innovation process. In recent years, while the aforementioned pharmaceutical innovation support policies create demand, they also come with price and payment pressures resulting from medical insurance cost control and industry compliance rectification. Under these conditions, systematic financial risk identification and assessment for Company C is particularly important. Financial risk has become a severe challenge for listed companies, and financial risk evaluation is a key constraint on corporate operational efficiency and costs[4]. Based on the application of the Z-Score model, this paper quantitatively assesses and analyzes financial risk by calculating its Z-scores in recent years, proposing risk response strategies for Company C that combine policy foresight with financial prudence.

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2. Analysis of Company C's Competitive Environment

2.1. PEST Analysis

2.1.1. Political & Legal Environment

Company C's development receives strong support from national policies. The "14th Five-Year Plan" for Bioeconomic Development proposes elevating the bioeconomy to a strategic height, coordinating and promoting major plans, reforms, policies, and projects for bioeconomic development. The 2025 Government Work Report explicitly requires formulating an innovative drug catalog and supporting innovative drug development, providing policy backing for the entire innovative drug industry. Concurrently, reforms in the drug review and approval system and the full implementation of the MAH system have increased market demand for R&D and production outsourcing. The Ministry of Industry and Information Technology has also explicitly stated support for the development of new specialized models like Contract Research Organizations (CRO) and Contract Development and Manufacturing Organizations (CDMO), providing official endorsement for Company C's business expansion. However, the normalization of anti-corruption campaigns and strengthened compliance supervision in the domestic pharmaceutical sector, while promoting healthy industry development, also raises operational compliance requirements. At the international level, the complexity of political relations introduces uncertainty for the stable expansion of its global business, requiring Company C to possess excellent multinational compliance and risk management capabilities.

2.1.2. Economic Environment

Fluctuations in the macroeconomy and capital markets directly impact Company C and its industry. The long-term growth trend in R&D investment in biopharmaceuticals in China and globally remains unchanged, indicating a general increase in market demand. Meanwhile, the establishment of the STAR Market provides direct financing channels for innovative service enterprises like Company C. Cyclical changes in capital markets affect the financing capacity and difficulty for biotech companies, influencing their R&D budgets and outsourcing decisions, which may ultimately pressure Company C's order flow. Additionally, as a talent-intensive industry, CRO enterprises face pressure from continuously rising domestic salary levels, potentially gradually eroding their cost advantage relative to European and American counterparts.

2.1.3. Social & Cultural Environment

Long-term social and cultural trends provide a solid growth foundation for Company C. Recent demographic shifts and accelerated population aging have increased the burden of chronic diseases like cancer and neurodegenerative diseases, raising demand for more effective and safer innovative drugs. Simultaneously, the continuous improvement of the multi-level medical security system enhances the accessibility of innovative drugs, lowering usage barriers, and providing a basis for transforming social needs into commercial value. Furthermore, a sufficient talent base underpins industry development. The pool of higher education graduates and researchers in China and globally provides crucial human capital support for knowledge-intensive service enterprises like Company C, enabling the continuous expansion and upgrading of its R&D capabilities.

2.1.4. Technological Environment

Rapid iteration in R&D and production technologies can be a major source of industrial growth for Company C but also poses challenges to its innovation capacity. Breakthroughs in cutting-edge therapeutic technologies continuously open new business directions. Emerging fields like Gene and Cell Therapy (GCT), Antibody-Drug Conjugates (ADC), nucleic acid drugs, and peptides generate substantial demand for specialized R&D and production, requiring Company C to invest in dedicated technology platforms to capture new opportunities. Concurrently, R&D models are undergoing digital transformation, with the deepening penetration of artificial intelligence. Mastering these technologies is not merely a means to reduce costs but key to building core competitiveness. However, the rapid pace of technological iteration increases corporate R&D investment, adding pressure on capital operations. Globally, increasingly stringent standards for data privacy protection and technical regulations are gradually raising the technical compliance threshold for enterprises.

2.2. Porter's Five Forces Model Analysis

According to Porter's Five Forces Model, Company C faces multifaceted challenges in the

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pharmaceutical R&D outsourcing industry from suppliers, buyers, potential entrants, existing competitors, and substitutes.

As shown in Figure 1, Company C's core suppliers mainly include high-end scientific research talent, laboratory equipment, and consumables manufacturers. High-end scientific talent is globally scarce and highly mobile, giving them strong bargaining power, compelling the company to offer high salaries and benefits to attract and retain talent. Simultaneously, markets for high-end scientific instruments, bioreactors, and some specialty chemicals are dominated by a few international suppliers with high switching costs, strengthening supplier bargaining position. On the other hand, pharmaceutical companies as service buyers generally possess strong bargaining power. Large pharmaceutical enterprises are a major revenue source for Company C; they often exert price pressure by comparing multiple suppliers and conducting centralized bidding, and place high importance on data compliance and global service capabilities, giving them strong bargaining power. Furthermore, despite high industry barriers, the vast market potential continues to attract potential entrants like biotech startups with disruptive technologies. Also, in-house R&D teams within pharmaceutical companies are a fundamental substitute for R&D outsourcing services. Although outsourcing has become an irreversible industry trend for cost control, efficiency improvement, and core competency focus, some large pharmaceutical companies still retain core in-house R&D capabilities, posing a potential substitute threat to the full outsourcing model. Within pharmaceutical R&D, the existence of integrated giants like WuXi AppTec leads to exceptionally fierce competition.

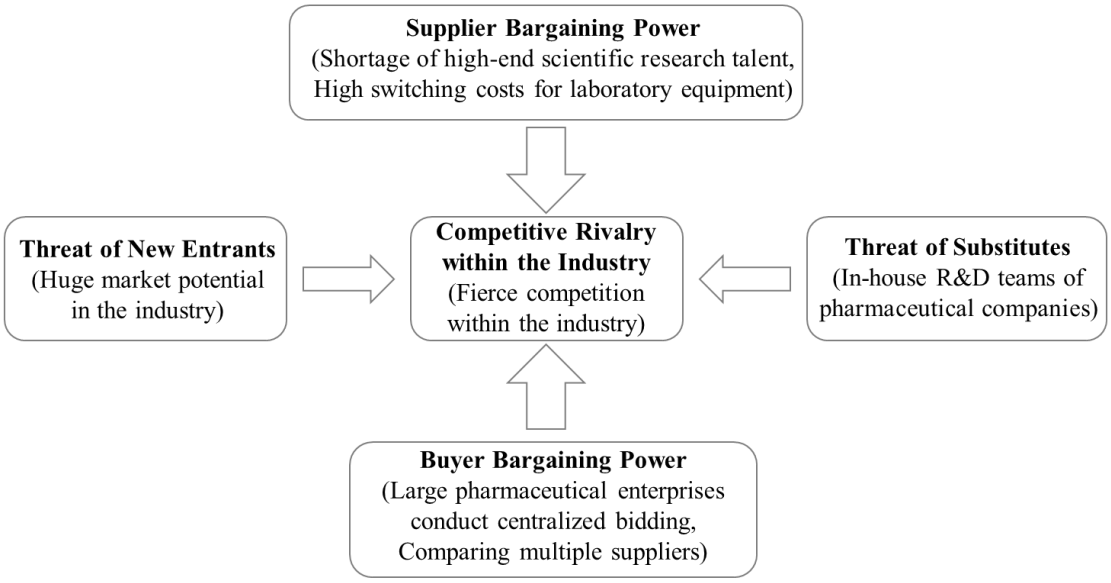

Figure 1: Porter's Five Forces Model.

3. Analysis of Company C's Financial Condition

3.1. Solvency Analysis

Data from Table 1 shows that Company C's current ratio and quick ratio overall declined from 2021 to 2024, indicating deteriorating liquidity and a reduction in liquid funds. Although these ratios decreased, they remained above the common safety threshold of 1, suggesting the company can still cover short-term debts, but the liquidity buffer has significantly narrowed compared to its early listing period. Meanwhile, Company C's asset-liability ratio gradually increased from 38.06% in 2021 to 44.52% in 2024, showing a steady upward trend. This change indicates the company's active use of debt financing to support scale expansion and strategic investment. Notably, the increase in the asset-liability ratio slowed between 2023 and 2024, stabilizing in the 43%-45% range, showing that while continuing to use financial leverage, the company has begun to focus on stabilizing its financing structure to manage long-term financial risk.

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Table 1: Solvency Analysis 2021-2024.

	2021	2022	2023	2024
Current Ratio	2.25	2.01	1.78	1.95
Quick Ratio	2.24	1.98	1.76	1.93
Asset-Liability Ratio (%)	38.06	37.92	43.25	44.52

3.2. Operating Capability Analysis

Operating capability measures a company's efficiency in utilizing its assets and holds significant reference value. Table 2 shows that Company C's accounts receivable turnover rate shows a declining trend, meaning the collection period from customers is lengthening. Meanwhile, the inventory turnover rate significantly improved from 29.33 times in 2021 to 35.71 times in 2024. The increase in inventory turnover suggests gradually improving inventory management efficiency, possibly due to optimized project execution processes, enhanced supply chain management capabilities, or an increased proportion of high-turnover service types in the business mix. The total asset turnover rate shows an upward trend from 0.40 times in 2021 to 0.54 times in 2024. A total asset turnover below 1 is a common feature of capital-intensive industries. Its low level primarily results from the company's large-scale fixed asset investment and mergers & acquisitions financed through IPO and subsequent financing, leading to expanded total assets and preventing a rise in the turnover rate. The trends of these three indicators are illustrated in Figure 2.

Table 2: Operating Capability Analysis 2021-2024.

	2021	2022	2023	2024
Accounts Receivable Turnover (times)	4.51	3.34	3.18	2.44
Inventory Turnover (times)	29.33	24.02	28.02	35.71
Total Asset Turnover (times)	0.40	0.46	0.50	0.54

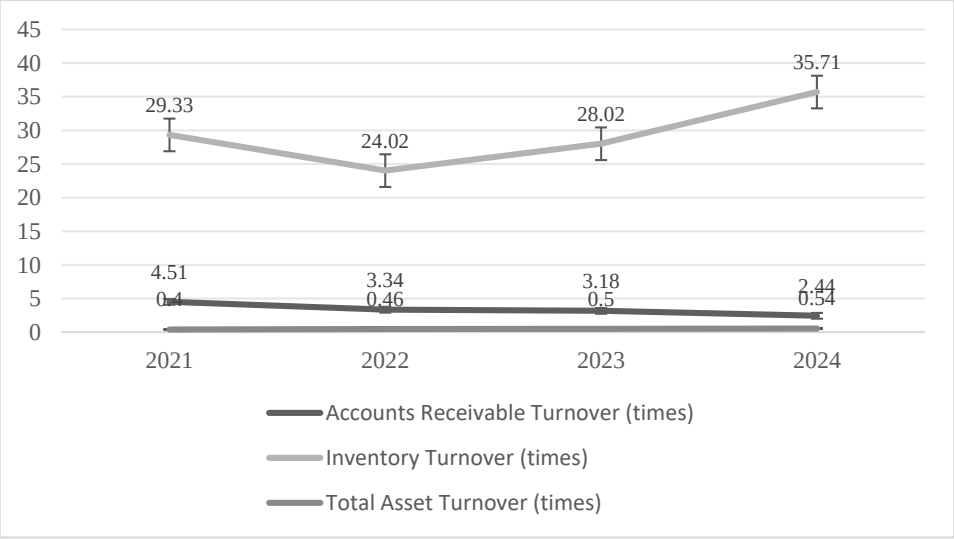

Figure 2: Trend of Company C's Operating Capability.

3.3. Profitability Analysis

This paper selects Return on Assets (ROA), Return on Equity (ROE), and operating gross margin as key indicators to analyze profitability. According to Table 3, ROA increased from 8.75% in 2021 to 10.80% in 2022, then generally declined thereafter. This indicates that the company's total assets expanded rapidly, and these newly added assets could not immediately generate proportional profits in

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the initial investment phase, lowering overall asset return efficiency. ROE fluctuated considerably but was largely maintained at a relatively high level of 15%-18% after 2021, mainly benefiting from increased financial leverage, but also implying that the current ROE level relies to some extent on a higher debt ratio. Additionally, the company's operating gross margin remained stable within the high range of 50%-57% over the four years, reflecting a very positive situation. This demonstrates the high technical barriers of its R&D and production services, with clients willing to pay a premium for quality and efficiency, leading to high operating profits.

Table 3: Profitability Analysis 2021-2024.

	2021	2022	2023	2024
ROA (%)	8.75	10.80	9.82	8.50
ROE(%)	14.14	17.40	17.30	15.33
Operating Gross Margin (%)	53.41	55.49	56.68	50.18

3.4. Growth Capability Analysis

Based on Company C's growth capability data from 2018 to 2024 in Table 4, its total assets achieved explosive growth of 222.89% in 2021, illustrating the capital boost from its listing. However, the revenue growth rate slowed year by year after 2021, dropping to only 6.67% in 2023, reflecting the time needed for newly built capacity and acquired businesses to integrate and generate revenue. In contrast, profit and income indicators declined significantly. The revenue growth rate plummeted from 30.40% in 2021 to -54.27% in 2024, indicating major bottlenecks in market development or project delivery, with core business growth momentum failing. The ROE growth rate was negative for four consecutive years with expanding declines, dropping to -152.63% in 2024. This suggests that scale expansion did not bring corresponding shareholder value creation; instead, due to declining profitability and potentially high financial costs from leverage, the return efficiency on equity capital systematically decreased.

Table 4: Growth Capability Analysis 2021-2024.

	2021	2022	2023	2024
Total Asset Growth Rate (%)	222.89	17.74	27.28	6.67
Net Profit Growth Rate (%)	-18.01	-36.07	-80.79	-155.70
Operating Profit Growth Rate (%)	-22.29	-24.20	-80.53	-167.54
Revenue Growth Rate (%)	30.40	6.10	3.97	-54.27
ROE Growth Rate (%)	-23.66	-36.83	-74.73	-152.63

4. Financial Risk Analysis of Company C Based on the Z-Score Model

4.1. Introduction to the Z-Score Model

The Z-Score model, also known as the multiple discriminant analysis model, was first proposed by American scholar Edward Altman in 1968[5]. Based on a study sample of 33 bankrupt and 33 non-bankrupt firms from 1946 to 1965, this model constructs a multivariate linear function through statistical methods. The Z-index is inversely related to company risk; a higher Z-index indicates lower risk and vice versa[6]. Since market stock prices can fluctuate violently in the short term due to market sentiment, sector rotation, macroeconomic news, or irrational speculation—fluctuations not directly related to a company's own solvency and financial fundamentals—this study adopts the adjusted model proposed by Altman, replacing X_4 with X_4'which measures the coverage of book value to liabilities, to eliminate the interference of market valuation. As shown in Table 5, its core principle is to select several key financial indicators, assign different weights, and comprehensively calculate a total

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discriminant score (the Z-score) to quantitatively assess and warn of a company's financial distress. As shown in Table 6, companies can judge their overall financial risk based on the Z-score and make forward-looking predictions about bankruptcy probability. This model overcomes the limitations of single financial indicators, providing a relatively stable and scientific discriminant standard for assessing a company's financial health.

The adjusted Z-Score model discriminant function is:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4' + 0.999X_5. \quad (1)$$

Table 5: Model Indicators and Their Meanings.

Variable Symbol	Calculation Formula	Financial Meaning
X_1	Working Capital / Total Assets	Measures short-term solvency and net liquid asset proportion
X_2	Retained Earnings / Total Assets	Measures the proportion of reinvestment from retained earnings
X_3	EBIT / Total Assets	Core operating efficiency indicator, excluding tax and leverage effects
X_4'	Book Value of Equity / Total Liabilities	Measures the coverage of book value over liabilities
X_5	Revenue / Total Assets	Measures the company's operating capability

Table 6: Z-Score Judgment Criteria.

Z-Score Range	Risk Discrimination	Risk Assessment
$Z \leq 1.1$	Distress Zone	High Risk
$1.1 < Z \leq 2.7$	Gray Zone	Medium Risk
$Z > 2.7$	Safe Zone	Low Risk

4.2. Establishment of the Z-Score Model for Company C

Table 7: Relevant Data of Company C 2021-2024.

	2021	2022	2023	2024
Working Capital	5.24	5.22	5.96	7.36
Retained Earnings	1.82	3.17	4.54	6.13
EBIT	1.25	1.73	1.98	1.86
Book Value of Equity	7.70	9.08	10.57	11.03
Total Liabilities	4.73	5.55	8.06	8.85
Revenue	4.94	6.77	9.32	10.78
Total Assets	12.43	14.63	18.63	19.87

Unit: Billion CNY

Based on the relevant financial data indicators from Company C's financial statements from 2021 to 2024 in Table 7, substituting them into the Z-Score model for calculation yields the model's prediction results, as shown in Table 8.

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Table 8: Z-Score Analysis of Company C.

	2021	2022	2023	2024
X_1	0.42	0.35	0.31	0.37
X_2	0.14	0.21	0.24	0.30
X_3	0.10	0.11	0.10	0.09
X_4’	1.63	1.64	1.31	1.25
X_5	0.40	0.46	0.50	0.54
Z	2.42	2.57	2.36	2.48

According to Table 8 data, the adjusted Z-score fluctuates within a narrow range of 2.36 to 2.57, consistently falling within the gray zone of 1.1 to 2.7. This indicates the company is not in financial distress but has not reached an absolutely safe state; overall risk is controllable but uncertain. Looking at specific financial indicators, X_1 declined from 2021 to 2023, implying relative insufficiency of working capital, rebounding to 0.37 in 2024, reminding the company to continuously monitor liquidity risk. X_2 steadily increased, possibly due to increased current liabilities from expansion. X_3 and X_4’overall showed a declining trend, indicating fluctuations in EBIT relative to total assets and a clear downward trend in equity coverage of liabilities. X_5 steadily increased from 0.40 to 0.54, showing the company's asset operational efficiency is continuously improving, with faster turnover of total assets, allowing revenue growth to effectively offset asset scale expansion—a positive operational signal.

5. Financial Risk Response Strategies for Company C

5.1. Optimize Customer Structure and Expand Business Areas

Judging from Company C's business structure, large pharmaceutical enterprises account for a high proportion of its revenue, making it susceptible to national economic fluctuations. In recent years, reduced financing for biotech has led to decreased payment capabilities among small and medium-sized clients, directly impacting the cash flow of the pharmaceutical R&D outsourcing industry.

Company C should break this situation by leveraging national specialized loans for biopharmaceuticals and STAR Market green channel policies to provide "service + financing connection" solutions for small and medium-sized clients. For example, it could collaborate with local government industry funds to offer flexible payment terms for high-quality startups. Simultaneously, it could reference the leading company WuXi AppTec's "long-tail client" strategy by strengthening cooperation with small and medium-sized pharmaceutical companies and providing modularized services. This involves splitting an industry chain into different stage modules, allowing clients to pay per module, lowering the cooperation threshold.

5.2. Strengthen Working Capital Meticulous Management with Cash Flow as the Core

As an R&D-driven CRO enterprise, Company C's business expansion inevitably accompanies significant working capital shortages, leading to growing accounts receivable scale and increasing collection days as revenue scales up. Meanwhile, to ensure the parallel advancement of multiple R&D projects, the occupation of working capital by inventory and project costs remains high.

To reverse this situation, Company C should implement differentiated credit and collection strategies based on client qualifications and project types. Different payment methods and contract terms should be applied to large pharmaceutical companies with high credit ratings and small/medium clients with uncertain financing status.

In management execution, Company C can clarify collection responsibilities for business teams and project managers. Simultaneously, the finance department should establish a dynamic aging warning and tiered collection mechanism, directly linking collection performance to incentive bonuses. This ensures business teams bear direct responsibility for fund recovery while pursuing contract value.

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5.3. Conduct Strategic Pivoting and Control the Debt Ratio

In the early development stage of the medical outsourcing R&D industry, substantial capital influx led large pharmaceutical companies to heavily consider delivery capability and capacity stability when choosing partners. This drove Company C to significantly expand capacity to secure large orders, consequently increasing its debt ratio.

To prevent the continued deterioration of this situation, Company C needs to conduct dynamic assessments of global capacity utilization. Decisions on building new general-purpose capacity should be based on utilization rates rather than blind acquisition of construction-in-progress. For underutilized capacity, it can explore converting to shared models in cooperation with local governments or enterprises, or cross-industry leasing to other needy companies.

Additionally, exploring new asset operation models is advisable. For instance, in clinical research, adopting more cooperative models like co-building with hospitals and revenue sharing can reduce fixed asset investment.

5.4. Consolidate Customer Loyalty and Expand Brand Influence

In today's business environment, consolidating customer loyalty and expanding brand influence are crucial. This goes beyond merely providing quality service; it requires building deep trust, creating unique company value, and elevating transactional relationships to partnerships.

To consolidate customer loyalty, Company C must first demonstrate absolute reliability and professionalism, delivering results on time and with high quality. It should not just passively execute order requirements but proactively predict risks, point out issues clients may not notice, and provide good solutions. When unexpected situations occur, transparency is key—communicate proactively at the first instance with contingency plans, allowing clients to feel the company's efficiency and capability. Building on this, Company C can conduct in-depth market research to understand clients' latent needs. Tailoring services to these needs, emphasizing the brand's irreplaceable advantages, can meet client expectations and enhance their experience.

To expand brand influence, Company C should select key cutting-edge fields, not only providing services but also investing resources to build its own branded solutions and platforms. Subsequently, it should mine success cases and transform them into documentaries or other media for dissemination, telling the brand story. This not only attracts similar clients but also wins market attention. Finally, hosting competitions in biomedicine can increase exposure, allowing more stakeholders in scientific research to learn about the brand the company is building.

6. Conclusion

The technology-intensive, capital-intensive, and globally collaborative nature of the pharmaceutical R&D outsourcing industry makes financial risk management a core issue for achieving stable growth amidst fierce competition. Using Company C as an example, this paper employs PEST analysis, Porter's Five Forces Model, and the Z-Score model to conduct an in-depth analysis of its financial structure. Combined with qualitative assessment of industry characteristics, it systematically reveals the composite risks and challenges it faces in terms of solvency, profitability, operating capability, and growth capability.

Company C has established significant advantages in the industry through its full-process integrated service platform, continuously deepening technological accumulation, and global capacity network. However, the analysis results of the Z-Score model clearly show that the company overall remains in the gray zone, with particular pressure signals in indicators like working capital adequacy (X_1) and the coverage of market value over liabilities (X_4'). This warns Company C to pay higher attention to asset efficiency, debt structure, and liquidity management.

Addressing the identified risks, this study proposes a multi-dimensional set of response strategies. Specific pathways include: alleviating revenue volatility by optimizing the customer structure and expanding into emerging business areas; resisting working capital shortages by strengthening meticulous working capital management with cash flow as the core; optimizing asset returns and controlling debt levels through strategic capital allocation and efficiency improvements; and building sustainable competitiveness that can weather industry cycles by enhancing brand trust and customer

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loyalty through operational excellence. By implementing these actionable strategies, Company C is expected to effectively manage financial risks while consolidating its industry-leading position, achieving more resilient and higher-quality long-term development. This study also provides a useful reference for Chinese high-tech service enterprises at similar development stages in terms of financial risk identification and management frameworks.

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