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Impact of non-R&D Factors on China's Pharmaceutical Company Performance

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Doctor of Management

Supervisors:
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April, 2025

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Declaration

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

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Abstract

China’s pharmaceutical companies have achieved significantly better company performance through relatively less research and development (R&D) investment, than international pharmaceutical juggernauts during the same period. This study aims at understanding the reasons for this phenomenon. First, this study adopts a multiple case study by interviewing the employees of three representative pharmaceutical companies in China. Six core categories affecting the performance of China’s pharmaceutical companies are identified through multi-level data coding. Then, according to the core categories identified from the multiple case study, we define four company internal factors, namely, leadership, operational capability, reputation, and compliance response, as independent variables, being company performance the dependent variable, and two external factors, characteristics of industry and competitive landscape, as moderators. Accordingly, a theoretical model is constructed and theoretical hypotheses are raised. Finally, with a focus on the pharmaceutical industry, questionnaires are distributed, and SmartPLS is used to statistically analyze the acquired data. The main conclusions of this study are as follows: 1) Six core factors related to company performance are identified: leadership, operational capability, reputation, compliance response, characteristics of industry and competitive landscape; 2) four company internal factors, including leadership, operational capability, reputation, and compliance response, as independent variables, are positively associated with the dependent variable, company performance; 3) the two moderators, characteristics of industry and competitive landscape, increase the relationship between operational capability and company performance; 4) characteristics of industry and competitive landscape, as moderators, weaken the relationship between leadership and company performance. This study enriches the current body of knowledge related to performance theories and provides theoretical support for effectively explaining the special phenomenon observed in China's pharmaceutical industry.

Keywords: Company performance, Non-R&D factors, Multiple case study, Questionnaire survey

JEL: L53, O47

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Resumo

Com um investimento relativamente menor em investigação e desenvolvimento (I&D), as empresas farmacêuticas da China alcançaram um desempenho empresarial notável, até mesmo significativamente melhor do que o desempenho de gigantes farmacêuticas internacionais durante o mesmo período. Com o objetivo de explorar as razões para este fenómeno, este estudo realiza análises relevantes. Em primeiro lugar, adota o método de análise de múltiplos casos, realizando entrevistas com empregados de três empresas farmacêuticas representativas na China. Foram identificadas seis categorias que afetam o desempenho das empresas farmacêuticas chinesas através da codificação de dados em múltiplos níveis. Em seguida, com base nas categorias identificadas na análise dos casos de estudo, foram definidos quatro fatores internos da empresa — nomeadamente, liderança, capacidade operacional, reputação e resposta em conformidade — como variáveis independentes, o desempenho empresarial como variável dependente, e dois fatores externos — características da indústria e panorama competitivo — como moderadoras. Assim, é construído um modelo teórico e são propostas hipóteses para serem testadas através de questionários realizados na indústria farmacêutica, sendo os dados recolhidos analisados através de SmartPLS. As principais conclusões deste estudo são as seguintes: 1) foram identificados seis fatores centrais relacionados com o desempenho empresarial: liderança, capacidade operacional, reputação, resposta em conformidade, características da indústria e panorama competitivo; 2) os quatro fatores internos da empresa — liderança, capacidade operacional, reputação e resposta em conformidade — enquanto variáveis independentes, estão positivamente associados à variável dependente, o desempenho empresarial; 3) as duas moderadoras — características da indústria e panorama competitivo — reforçam a relação entre capacidade operacional e desempenho empresarial; 4) as características da indústria e o panorama competitivo, enquanto moderadoras, enfraquecem a relação entre liderança e desempenho empresarial. Este estudo enriquece a literatura no domínio das teorias do desempenho e oferece um contributo teórico para explicar o fenómeno particular observado na indústria farmacêutica chinesa

Palavras-chave: Desempenho empresarial, Fatores não relacionados com I&D, Análise de múltiplos casos, Análise através de questionários

JEL: L53, O47

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摘　要

中国制药企业通过较少的研发投入获得了非常突出的企业绩效，甚至明显好于同时期国际制药巨头的绩效。本研究的目的是理解该现象背后的原因。首先，本文先采用多案例分析的方法，访谈了三家具有代表性的中国制药企业的员工，通过多级数据编码，总结出了六个影响中国制药企业绩效的核心范畴。其次，依据多案例分析总结出的核心范畴，提炼出来领导力、运营能力、声誉、合规响应四个企业内部因素作为自变量，企业绩效作为因变量，行业特性与竞争格局两个企业外部因素作为调节变量，构建了理论模型，提出了理论假设。最后，聚焦在医药行业，发放调查问卷，采用SmartPLS统计分析工具对数据进行统计学分析。本研究得出以下主要结论：1）识别出了6个与企业绩效相关的核心因素，他们分别是：领导力、运营能力、声誉、合规响应、行业特性以及竞争格局；2）领导力、运营能力、声誉和合规响应四个企业内部因素作为自变量，他们均与因变量企业绩效呈正相关关系；3）行业特性和竞争格局两个调节变量，增强了运营能力与企业绩效之间的关系；4）行业特性和竞争格局两个调节变量，弱化了领导力与企业绩效之间的关系。本研究丰富了当前与绩效理论相关的知识体系，并为有效解释中国制药行业的特殊现象提供了理论支持。

关键词：企业绩效；非研发因素；多案例分析；问卷调查

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Contents

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List of Tables

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List of Figures

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List of Abbreviations

CAGR = compound annual growth rate

CDE = Center for Drug Evaluation

CI = characteristics of industry

CL = competitive landscape

CP = company performance

CSR = corporate social responsibility

CR = compliance response

ERP = enterprise resource planning

LE = leadership

NMPA = National Medical Products Administration

OC = operational capability

PLS = Partial Least Squares

RE = reputation

ROA = return on assets

ROCE = return on capital employed

ROE = return on equity

R&D = research and development

SEM = Structural Equation Modeling

SME = medium-sized enterprise

SOE = state-owned enterprise

SRMR = Standardized Root Mean Square Residual

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Chapter 1: Introduction

1.1 Research background and significance

Companies that adopt intensive research and development (R&D) investment strategies often achieve significantly higher financial performance in the following year (Zhu & Huang, 2012). Gerybadze (2010) suggested that only through sustained and substantial investment in R&D, continuous expansion of the technological capability base, and maintaining a leading position across multiple generations of new product launches can companies achieve stable growth and strong financial performance. Falk (2012) analyzed data from companies engaged in R&D activities in Austria between 1995 and 2006. Based on least absolute deviation (LAD) estimation, the results indicated that initial R&D intensity had a positive and significant impact on employment and sales growth over the subsequent two years. Many researchers have reached similar conclusions in their studies, namely, there is a positive relationship between R&D investment and company performance.

According to the data from the *Blue Book of Chinese Generic Drugs*(Institute of Materia Medica et al., 2019), in 2015, generic drugs accounted for 27% of the sales of all prescription drugs in the United States; in 2020, generic drugs (excluding biosimilar drugs) accounted for 53.3% of the drug market in China, and the sales value of generic drugs was 808.7 billion RMB, as shown in Figure 1.1.

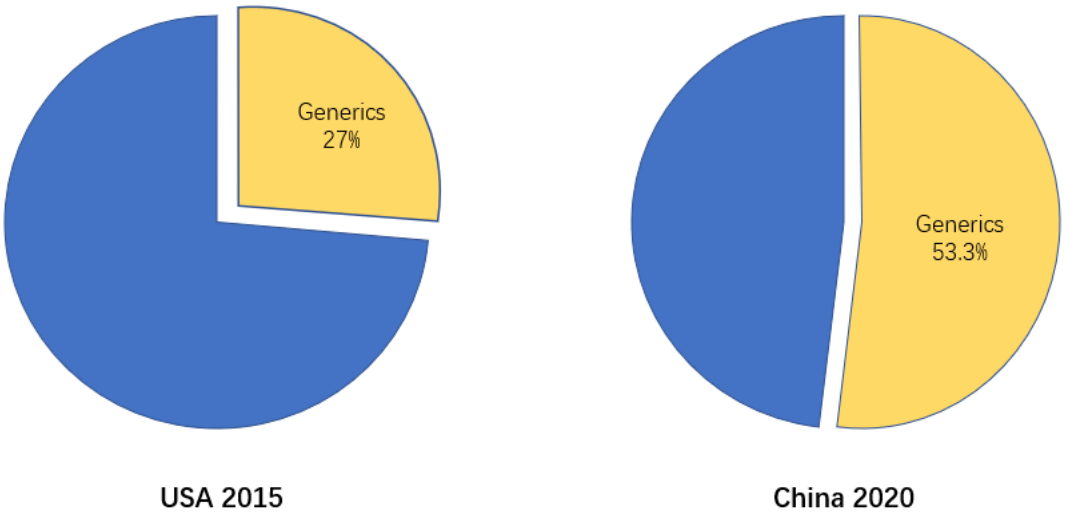

Figure 1.1 Market share of generic drugs in China and USA

Figure 1.1 shows that China is a large country where generic drugs account for over 50% of the market. The basic medical care of the more than 1.4 billion Chinese population mainly depends on generic drugs with expired patents. Comparatively, the absolute number and proportion of novel drugs in the Chinese market are relatively small. According to the data from the Center for Drug Evaluation (CDE), a division of China's National Medical Products Administration (NMPA), in 2017, 239 out of the 278 domestic drugs approved for marketing release were generics, accounting for 86%. Rather than investing resources in novel drug R&D, local Chinese pharmaceutical companies are more willing to develop generic drugs, which are low-risk and require less investment. In developed countries, the pharmaceutical industry usually allocates 10% - 15% of sales on new drug R&D, while this ratio is only 1% - 2% in China (Yuan & Wu, 1998). As a result, the majority of Chinese patients encounter difficulty in accessing high-quality novel and patented drugs, making it difficult to meet their medical needs. Due to the low R&D investment in novel drugs, although China has become the second largest pharmaceutical market in the world, the share of novel drugs with independent intellectual property rights is still very low, only about 18%, far less than that of the United States, Europe, and Japan. Insufficient R&D investment has become a key factor restricting China's pharmaceutical industry. In 2017, Hengrui Pharmaceuticals (600276.SH) and Fosun Pharmaceutical (600196.SH) were the only Chinese pharmaceutical companies that had R&D expenditures exceeding 1 billion RMB, but their R&D investment intensity was only about 10%. In contrast, the R&D investment of internationally renowned pharmaceutical companies such as AstraZeneca, Novartis, and Roche is on the level of billions of USD (above 7 billion RMB), and their R&D investment intensity is about 20%.

This study selected three representative Chinese pharmaceutical companies, namely, Huadong Medicine, Shijiazhuang Pharmaceutical Group, and Hengrui Pharmaceuticals, to compare with international pharmaceutical juggernauts. The rationale for selecting these three is that they are all listed companies whose financial data are publicly accessible, with a market value of no less than 50 billion RMB. We also selected three representative international pharmaceutical juggernauts, namely, Novartis, Merck (MSD), and Pfizer for comparison. The selected international companies are all listed companies whose financial data are publicly available, with a market value of no less than 100 billion USD. We collected and summarized the historical data of financial statements of these pharmaceutical companies' performance from 2013 to 2018, as shown in Table 1.1. The data show that the six-year average return on equity (ROE) of the three Chinese pharmaceutical companies is 28.09% (Huadong Medicine), 19.05% (Shijiazhuang Pharmaceutical Group) and, 22.83% (Hengrui Pharmaceuticals),

respectively, and the average ROE of all three companies is 23.32%. The six-year average ROE of the three international pharmaceutical companies is 14.44% (Novartis), 13.06% (Merck), and 18.55% (Pfizer), respectively, with an average of 15.35%. The ROE level of Chinese pharmaceutical companies is significantly higher than that of international pharmaceutical companies. Table 1.2 shows that that the six-year compound annual growth rate (CAGR) of the net profits of the three Chinese pharmaceutical companies is 26.21% (Huadong Medicine), 25.93% (Shijiazhuang Pharmaceutical Group), and 25.74% (Hengrui Pharmaceuticals), respectively, with an average of 25.96%, and the net profits of these Chinese companies are relatively stable. The six-year CAGR of net profit of the three international pharmaceutical companies is 6.3% (Novartis), 6.33% (Merck), and -12.71% (Pfizer), respectively, with an average of -0.02%. The net profits of these international companies show big fluctuations, which poses a great challenge to accurately calculate the CAGR of net profits. Generally speaking, the CAGR of net profits of international pharmaceutical companies is outperformed by that of Chinese pharmaceutical companies.

Table 1.1 Comparison of ROE between Chinese and international pharmaceutical companies

Region	No.	Company (stock code)	ROE (%)						Company average	Regional average
			2013	2014	2015	2016	2017	2018		
China	1	Huadong (000963)	25.15	30.34	42.98	22.19	23.03	24.87	28.09	23.32
	2	Shijiazhuang (01093)	13.86	16.23	19.8	22.3	21.79	20.29	19.05	
	3	Hengrui (600276)	21.22	21.28	24.37	23.24	23.28	23.6	22.83	
International	1	Novartis (NVS)	12.79	14.07	24.06	8.84	10.34	16.51	14.44	15.35
	2	Merck (MRK)	8.57	24.22	9.52	9.25	6.43	20.38	13.06	
	3	Pfizer (PFE)	27.93	12.38	10.23	11.61	32.57	16.56	18.55	

Table 1.2 Comparison of annual net profit growth rates between Chinese and international pharmaceutical companies

Region	No.	Company (stock code)	Item	Profits						CAGR (profits)	Regional average
				2013	2014	2015	2016	2017	2018		
China	1	Huadong (000963)	Profit in Billion RMB (Billion USD)	0.748 ($0.107)	0.943 ($0.135)	1.152 ($0.165)	1.535 ($0.219)	1.888 ($0.27)	2.395 ($0.342)	26.21%	25.96%
	2	Shijiazhuang (01093)		0.973 ($0.139)	1.268 ($0.181)	1.665 ($0.238)	2.101 ($0.3)	2.771 ($0.396)	3.081 ($0.44)	25.93%	
	3	Hengrui (600276)		1.292 ($0.185)	1.573 ($0.225)	2.224 ($0.318)	2.634 ($0.376)	3.293 ($0.47)	4.061 ($0.58)	25.74%	
International	1	Novartis (NVS)	Profit (Billion USDS)	9.292	10.28	17.794	6.698	7.703	12.614	6.3%	-0.02%
	2	Merck (MRK)		4.517	11.934	4.459	3.941	2.418	6.139	6.33%	
	3	Pfizer (PFE)		22.072	9.168	6.986	7.246	21.355	11.188	-12.71%	

We have observed an interesting phenomenon: Chinese pharmaceutical companies generally invest relatively little in R&D, yet their performance is outstanding. In contrast, international pharmaceutical juggernauts exhibit much higher R&D intensity, but their company performance lags behind that of Chinese pharmaceutical companies. This presents a clear contradiction. If R&D investment is positively associated with company performance, then the phenomenon observed among Chinese pharmaceutical companies cannot be reasonably explained. This is the problem to be studied in this research. Through logical inference, it can be determined that, in addition to R&D factors, there must be some non-R&D factors that significantly affect the performance of Chinese pharmaceutical companies.

1.2 Research objectives

Therefore, the primary objectives of this study are as follows: first, through qualitative research, we aim to identify the potential factors that are most relevant to company performance; then, a theoretical model is proposed accordingly; and finally, theoretical hypotheses are put forward, and an empirical study is conducted to test these hypotheses.

This study also has several secondary objectives. First, through relevant analysis, we attempt to explore which factors can effectively explain the performance differences between Chinese pharmaceutical companies and international pharmaceutical juggernauts; second, we attempt to explore if there are any interesting topics or codes that are repeatedly mentioned by the interviewees.

1.3 Research questions

The key content of this study includes the following:

1) to find out the latent variables highly associated with company performance;

2) to identify the factors contributing to the performance differences between Chinese pharmaceutical companies and international pharmaceutical juggernauts;

3) to determine the structure of the theoretical model.

Specifically, this study aims to address the following specific research questions (RQs):

RQ1. What are the potential factors significantly influencing the performance of Chinese pharmaceutical companies?

RQ2. What are the potential factors contributing to the performance differences between Chinese pharmaceutical companies and international pharmaceutical juggernauts?

RQ3. Which factors serve as the independent variables, dependent variables, moderators, and control variables in the model?

RQ4. To what extent do the independent variables influence the dependent variable?

RQ5. What are the moderating effects of each moderator?

RQ6. To what extent do the control variables influence the dependent variable?

1.4 Research methods

1.4.1 Multiple case study

First, by adopting a qualitative research method, we conducted a multiple case study, in which three representative Chinese pharmaceutical company, namely, Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group and Hualan Biological Engineering, were selected as the case companies. Specifically, we interviewed five on-the-job or former employees of Hengrui Pharmaceuticals, four on-the-job or former employees of Shijiazhuang Pharmaceutical Group, and three on-the-job or former employees of Hualan Biological Engineering. The interviews were conducted via telephone.

Based on the interview content, the researcher compiled interview memos and performed line-by-line coding, using the memos to generate initial codes. These initial codes were then continuously extracted by the researcher to generate higher-level codes with stronger explanatory power—referred to as multi-level coding. Ultimately, from the multiple case study, five levels of codes were obtained.

In general, the higher the level, the fewer the number of codes. At the highest level—the fifth level—there was only one code: "Excellent company performance". At the fourth level, there were six codes, all of which possessed strong explanatory power and could account for nearly all the lower-level codes and initial codes. Furthermore, these six codes were highly associated with company performance and thus constituted the core categories. Finally, when the researcher confirmed that the core categories had reached saturation, the multiple case study phase concluded.

The entire data coding process was assisted by the mind-mapping software MindMaster, which significantly improved the efficiency of coding and allowed the interrelationships among all codes to be more clearly presented to both the researcher and readers.

1.4.2 Questionnaire survey

Based on the research data and results obtained in the multiple case study phase, relevant variables for the empirical study were extracted, including independent variables, a dependent variable, moderators, and control variables. Accordingly, a reasonable theoretical model was constructed. Based on the proposed theoretical model, this study put forward a set of relevant theoretical hypotheses, which were tested using the empirical research method. The empirical tests include:

1) Testing the relationship between the independent variables and the dependent variable;

2) Testing the moderating effect of the moderators;

3) Testing the relationship between the control variables and the dependent variable.

The empirical study employed a questionnaire survey to collect data, focusing on the pharmaceutical industry. A total of 251 valid responses were obtained. Various analyses were performed on the data, including common method bias testing, reliability and validity testing, and multicollinearity testing.

1.5 Thesis structure

This thesis consists of the following chapters: Introduction, Literature Review, Research Methods, Multiple Case Study and Theoretical Model Construction, Empirical Study and Hypothesis Testing, Discussion, and Conclusion and Prospects.

Chapter 1: Introduction

This chapter primarily introduces the research background, research objectives, research questions, research methods, thesis structure, and expected outcomes.

Chapter 2: Literature Review

This chapter provides a detailed overview of the findings of existing literature related to company performance, R&D, and other relevant topics.

Chapter 3: Research Methods

This chapter elaborates on the research methods adopted in this study, including a multiple case study and a questionnaire survey.

Chapter 4: Results of Multiple Case Study and Theoretical Model Construction

This chapter presents the research findings from the multiple case study.

Chapter 5: Results of Questionnaire and Hypothesis Testing

This chapter reports the results of the questionnaire survey.

Chapter 6: Discussion

In this chapter, we systematically discuss the results from both the multiple case study and the empirical study, comparing them with the findings in relevant literature.

Chapter 7: Conclusions

This chapter draws the research conclusions, points out the main contributions and limitations of this study, and presents directions for future research.

1.6 Innovations

First, this research aims to identify the factors highly associated with the performance of China's pharmaceutical companies.

Second, this research aims to construct a theoretical model and put forward hypotheses to further advance performance theories.

Finally, this research enables to identify the core factors, particularly non-R&D factors that may contribute to the performance difference between China's pharmaceutical companies and international pharmaceutical juggernauts.

Chapter 2: Literature Review

2.1 Company performance

2.1.1 Concept of company performance

The concept of company performance has undergone varying degrees of evolution over time. Company performance is often regarded as the equivalent of organizational efficiency. It represents the extent to which an organization, as a social system with limited resources and means, achieves its goals without requiring excessive effort from its members.

The criteria for evaluating company performance include organizational productivity, organizational flexibility, and the absence of intraorganizational strain (Georgopoulos & Tannenbaum, 1957). Seashore and Yuchtman (1967) defined performance as the organization's ability to acquire and use scarce resources, leveraging its environment. Lebas and Euske (2002) considered performance to be a set of financial and non-financial indicators that provide information about the level of achievement of its goals and outcomes. According to Verboncu and Zalman (2005), performance is a special result obtained in management, economics, and marketing, which characterizes the organization and its structural and procedural components in terms of competitiveness, efficiency, and effectiveness.

2.1.2 Methods for evaluating company performance

Some scholars view performance evaluation as a process, in which company performance is quantitatively assessed through the analysis of certain indicators (Najmi & Kehoe, 2001; Neely et al., 2005). A common method for quantitatively evaluating company performance is based on the assessment of the company's ability to achieve expected financial indicators, such as profit, turnover, and market share (Rosova & Balog, 2012, November 7-9). Other scholars argue that the indicators used in company performance evaluation do not necessarily need to be quantitative. Evaluations of non-quantitative indicators, such as management quality, customer value, value created for other stakeholders, disclosures of common business activities, and continuous improvement of organizational goals, are also important components of performance assessment (Choong, 2013; Klovienė, 2012; Moullin, 2007).

2.1.3 Factors affecting company performance

2.1.3.1 Organizational absorptive capacity

Francalanci and Morabito (2008) hypothesized that the degree of integration of a company's information systems is associated with business performance through absorptive capacity, which plays a mediating role in this relationship. This hypothesis was tested using a sample of approximately 466 small and medium-sized enterprises (SMEs) in Italy, whose exports accounted for more than half of their revenues. The results indicated that absorptive capacity had a significant mediating effect. Moreover, alternative models attributing absorptive capacity to roles other than that of a mediator were found to be non-significant.

Based on a merged dataset of the 2001 Community Innovation Survey and the 2000 Annual Respondents Database for the UK, the study of Harris and Li (2009) showed that company size played a fundamental role in explaining exporting. Moreover, alongside other factors, undertaking research and development (R&D) activities and having greater absorptive capacity (for scientific knowledge, international cooperation, and organizational structure) significantly reduced entry barriers into export markets, having controlled for self-selectivity into exporting. Nevertheless, for international markets, only with greater absorptive capacity (associated with scientific knowledge) could companies further boost export performance, whereas spending on R&D no longer had an impact on exporting behavior once its endogenous nature was taken into account.

Rothaermel and Alexandre (2009) found support for the view that the relationship between technology sourcing mix and company performance is an inverted U-shape. Moreover, the results suggested that higher levels of absorptive capacity allow a company to more fully capture the benefits resulting from ambidexterity in technology sourcing.

Liu et al. (2021) investigated the relationship between absorptive capacity and innovation performance of Chinese high-tech companies and focused on the mediating role of innovative culture therein. Using survey data from high-tech companies in China, reliability analysis, factor analysis, correlation analysis, and path analysis (i.e., Structural Equation Modeling, SEM) were performed using SPSS 23 and AMOS. The results showed that intellectual capital, which comprises human capital, structural capital, and relational capital, had a significant impact on companies' acquisition performance; intellectual capital includes human capital; structural capital had a significant influence on innovation performance; and absorptive capital also had a significant impact on innovation performance. In addition, innovative culture partially mediated the relationship between absorptive capacity and innovation performance.

Previous studies have found that learning orientation and market orientation have positive effects on company performance. Zhang (2009) argued that the company's absorptive capacity could facilitate the realization of such effects. According to Zhang, a company must effectively communicate with its stakeholders and disseminate knowledge throughout the company. Without the capacity to assimilate acquired knowledge and exploit market intelligence, companies cannot fully realize the benefits of learning- or market-oriented corporate strategies. A mail survey was conducted among Canadian manufacturing companies. Using SEM, the author tested a theoretical model that specifies absorptive capacity as the mediator that links organizational strategic orientations (such as learning orientation and market orientation) to the performance outcome indicators (such as innovation, customer satisfaction and loyalty, and financial performance). The results indicated that the model fit well with the data, and all hypothesized path coefficients were positive and significant.

Using path analysis on a sample of 461 Greek companies participating in the third Community Innovation Survey, Kostopoulos et al. (2011) demonstrated that external knowledge inflows were directly related to absorptive capacity and indirectly related to innovation; absorptive capacity contributed, directly and indirectly, to innovation and financial performance but in different time spans.

Using the Brazilian Innovation Survey (PINTEC) database, Alves et al. (2016) studied the differences between SMEs and large companies with respect to the relationship between absorptive capacity dimensions and innovation performance. They found that in large companies, potential absorptive capacity and realized absorptive capacity impacted innovation performance, whereas in SMEs, only realized absorptive capacity showed an influence. In addition, SMEs were found to be more effective at converting realized absorptive capacity into innovation performance than large companies, likely due to their flexibility and agility. These findings revealed that organizational sizes influence the impact of dynamic capabilities on performance.

Mamun et al. (2017) adopted a cross-sectional design and stratified sampling methods and collected complete data from 417 micro-entrepreneurs. Their study revealed that the innovativeness and absorptive capacity of women micro-entrepreneurs had a significant positive effect on the innovativeness and performance of micro-companies. Therefore, the authors suggest that the development programs and policies on innovation and SMEs should emphasize on promoting innovativeness and improving the absorptive capacity among women micro-entrepreneurs to improve the performance of micro-companies.

Using a survey of 324 SMEs in the Yangtze River Delta, China, Zhai (2018) explored the relationship between entrepreneurial orientation, absorptive capacity, environmental dynamism, and corporate technological innovation performance. The results based on a moderated mediation model showed that entrepreneurial orientation and innovation performance had a significant and positive relationship, in which the absorptive capacity had a positive moderation effect. When the external environment is in high dynamism, the moderation effect of absorptive capacity tends to be stronger than when the environment is in low dynamism.

The economic growth of developing countries very much depends on the successful performance of entrepreneurial-oriented companies, and entrepreneurial orientation is a valuable predictor of company success. Against this background, Raisal et al. (2021) focused on analyzing the effect of entrepreneurial orientation on company performance with the mediating role of absorptive capacity. To test the hypothetical model, they collected 226 valid responses from senior managers of SMEs and performed SEM. The findings indicated strong causal relations between entrepreneurial orientation, absorptive capacity, and company performance. More specifically, entrepreneurial orientation was found to be a predictor of absorptive capacity, whereas absorptive capacity had a strong positive impact on company performance. Moreover, absorptive capacity was substantiated to be a mediator between entrepreneurial orientation and company performance.

2.1.3.2 Strategic agility

Kale et al. (2019) examined the mediating role of strategic agility in absorptive capacity's effect on the performance of accommodation establishments in Turkey. Data were collected through a survey. Questionnaires were distributed via e-mail, and 190 applicable questionnaires were recovered. From the exploratory factor analyses, absorptive capacity was determined to have two dimensions (acquisition and use). While the acquisition dimension was revealed not to have a direct effect on company performance, the use dimension was found to have a direct effect. The acquisition and use dimensions had a positive effect on strategic agility, and strategic agility positively affected company performance. In addition, the results revealed that the acquisition and use dimensions had an indirect effect on company performance through strategic agility.

2.1.3.3 R&D investment

Hoskisson et al. (1993) carried out a study of 184 major U.S. companies and showed that incentives based on short-term (annual) division financial performance were negatively related to total company R&D intensity after controlling for industry R&D intensity, company diversification, size, and group structure. In addition, an emphasis on long-term financial incentives may mitigate the negative relationship between these incentives and R&D intensity, but it does not promote risk-taking. The results highlighted the importance of emphasizing strategic controls (i.e., based on operational understanding of strategies proposed [strategic criteria]) over the use of financial controls (i.e., based on financial performance [often annual ROI]) for evaluating division managers.

Gerybadze (2010) suggested that only if companies continuously invest considerable amounts in R&D, persistently expand their base of technological capabilities, and remain at the forefront of new product introductions for successive generations can they attain stable growth and strong financial performance. Zhu and Huang (2012) suggested that companies with an intensive investment strategy in R&D tend to have significantly greater financial performance in the following year.

Using a sample of 2676 international Korean small and medium-sized enterprises (SMEs), Lee and Marvel (2009) explored the relationships among SMEs' R&D investment, home region orientation, and financial performance. The results showed that R&D investment had a horizontally inverted S-shaped relationship with performance when reflecting cost leadership, stuck in the middle, or differentiation strategies. They also found that a home region orientation moderated the relationship between R&D investment and performance. Home region orientation accentuates this relationship when R&D investment reflects cost leadership or differentiation but mitigates this relationship when R&D investment reflects a stuck-in-the-middle strategy.

Falk (2012) used a unique data set for companies with R&D activities in Austria during the period 1995-2006. The results based on the least absolute deviation (LAD) estimator showed that initial R&D intensity had a positive and significant impact on both employment and sales growth in the subsequent two years. Quantile regressions for each cross-section revealed that the impact of R&D intensity was significant from 0.3 to the highest quantile of the conditional distribution of employment growth. Furthermore, the elasticity of employment growth with respect to R&D intensity was highest for companies at or slightly below the median of the

distribution of company growth. In addition, the study found that the impact of R&D decreased significantly over time.

Taking 292 listed companies in the equipment manufacturing industry as the research sample, Zhao and Yu (2021) explored the impact of R&D investment intensity and R&D personnel ratio on company performance. The results indicated that the R&D investment intensity of listed companies in China's equipment manufacturing industry was at a medium level, and their competitiveness was not strong. There was a significant negative relationship between the current R&D investment intensity and the current performance of the company, and a significant positive relationship was found between the R&D investment intensity lagging behind the first and second periods and the company's current performance. However, there was no significant relationship between the current R&D personnel ratio and the current company performance.

Yoo et al. (2019) examined whether the effects of R&D expenditures on companies' future performance and earnings uncertainty are different according to company life cycle, which reflects the environment, circumstances, and strategy of the company. In the capital market, investors assess companies' sustainable growth potential, which reflects the future performance and the uncertainty of the company. This implies that R&D investment can affect the capital market through investors' future expectations for the company's sustainable growth. The authors also examined the different effects of R&D expenditures on market response by company life cycle. The results showed that the company life cycle affected the relationship between R&D expenditures and the company's future performance and uncertainty. Furthermore, the results indicated that the market response varied throughout the company life cycle. Based on the results, the authors suggested that R&D investments should be made properly, considering the environment and circumstances of the company.

Nilsen (2020) analyzed all the major sources of direct and indirect R&D support to the business enterprise sector in Norway for the period 2002-2013, treating the financial support for R&D from several instruments as a multivariate dose exposure. The results showed that the output additionality of support to incumbent companies that regularly perform R&D (R&D-incumbents), which obtain about 65% of all R&D support to business enterprises, was insignificant for any instrument or policy mixture. However, the estimated additionality of support to R&D-starters (companies without prior R&D activity), which received about 30% of all R&D support, was generally positive. In this company category, the main instruments for direct R&D support in Norway generate significantly less output and economic activity per NOK 1 million in support than do tax credits, despite the fact that these instruments manage

large project portfolios at considerable administrative costs. The study did not find positive effects of R&D support on labor productivity or the return on assets (ROA) for any of the instruments. The main policy implication is that R&D instruments for the business enterprise sector should be designed in favor of R&D-starters over R&D-incumbents, that is, shifting the focus from the intensive to the extensive margin.

Rao et al. (2013) examined the relationship between R&D investment and company performance in technology-intensive companies in China and Japan. They calculated the lag period and effect period of the relationship and analyzed the investment effect by using the empirical and comparative analysis methods. They found that 1) with a lag period, R&D expense had a significant positive effect on company performance, but the effect only lasted one year and would disappear after the period; 2) the effect period was one year in both China and Japan, but Japan had a shorter lag period, which implies that the innovation environment in Japan is better. They further put forward some suggestions to companies and to the government. Companies are suggested to 1) pay more attention to R&D activities and 2) be rational about R&D investment, whereas the government is advised to 3) improve the innovation environment.

Using the panel data of listed cultural and creative companies in China from 2011 to 2013, Zang et al. (2019) found that R&D investment had positive impacts on financial performance in both the current and the lag periods. However, these positive impacts were moderated by the actual controller. More specifically, the effect on companies' financial performance was accentuated when the central government was the actual controller. However, no moderation effect was evident when the actual controller was a local government or a state-owned company, and a negative moderating effect was found when the actual controller was a natural person. Given these findings, they argued that local governments and state-owned companies should improve the long-term strategies for the cultural and creative companies they control and reduce actions forced by short-term economic goals.

Adeyeye et al. (2013) conducted an analysis based on data obtained from Nigeria's innovation survey in 2008 among 500 companies in the service sector, with a response rate of about 41%. The instrument was guided by the third edition of the *Oslo Manual*, standardized through validation workshops under the NEPAD ASTII initiative. The results showed that technological acquisition, training, and in-house R&D positively influenced technological innovation, while government support and embodied knowledge did not have a significant effect. In addition, they found that technological innovation and R&D positively impacted company performance.

Using a recursive three equation system, Jefferson et al. (2006) investigated the determinants of company-level R&D intensity, the process of knowledge production, and the impact of innovation on company performance among China's large and medium-sized manufacturing companies. They obtained several findings. Overall, the statistical relationships within the model showed robustness, including the contributions of R&D expenditure to new product innovation, productivity, and profitability. The roles of company size, market concentration, and profitability in driving R&D effort were consistent with the findings in the U.S. literature. They found that new product innovation accounted for approximately 12% of the total returns on R&D. In addition, returns to industrial R&D seemed to be at least three to four times the returns on fixed production assets. Aw et al. (2008) found that a larger export market tends to bring higher returns on R&D investment, and the evolution of company profitability could be improved by investments in both R&D and physical capital.

Yao et al. (2014) found that R&D-marketing integration had a positive effect on both business and social performances, and that business performance mediated the relationship between R&D-marketing integration and social performance.

Savrul and Incekara (2015), attempting to address why some countries have better or worse innovation outputs than their inputs, found that positive environmental factors had a significant impact on a country in transforming its innovation investments to innovation performance.

Using a sample of 2735 companies located in Germany from a broad range of manufacturing and service sectors, Hottenrott and Lopes‐Bento (2016) found that increasing the share of collaborative R&D projects in total R&D projects was associated with a higher probability of product innovation and with a higher market success of new products. However, collaboration could decrease or even negatively impact product innovation if its intensity surpasses a certain threshold. Thus, the relationship between collaboration intensity and innovation follows an inverted-U shape; on average, costs start to outweigh benefits if more than about two-thirds of a company's R&D projects are collaborative projects. This result is robust to conditioning market success to the introduction of new products and to accounting for the selection into collaboration. This threshold is, however, contingent on company characteristics. Smaller and younger companies, as well as those with resource constraints, benefit from relatively higher collaboration intensities. For companies with higher collaboration complexities, involving different partners and various stages of the R&D process at which collaboration takes place, returns start to decrease already at lower collaboration intensities.

With 79 companies listed on the energy saving and environmental protection board in the Shenzhen and Shanghai Stock Exchange as the research object, using the disclosed data in their

annual reports from 2011 to 2013, Xu et al. (2016) explored how R&D investment has contributed to the growth of the energy saving and environmental protection industry by examining the effect of R&D investment on company performance and company value. They found that R&D investment had no significant relationship with the current company performance but could improve the current company value; R&D personnel intensity had a positive impact on operating profit margin in one-year and two-year lagged periods, with the impact of the two-year lagged period being more significant; R&D investment had a significant short-term lag effect on company value, with the impact of the one-year lagged period being the most significant; R&D investment had a positive cumulative effect on company performance, but no effect on company value.

In Thailand, the automotive sector is a major driver of the economy. A network of thousands of domestic and international companies contributes significantly to the economic growth of Thailand and Asia. After peaking in 2013 and Thailand becoming one of the top ten automotive nations, there was a slight backward. The competition was fierce, and the pace of change was ever quickening. Therefore, Chamsuk et al. (2017) attempted to find out how to improve the automotive parts sector in terms of capability, skills, and infrastructure to maintain a sustainable competitive advantage. Through a SEM analysis of 220 regional automotive parts sector managers using AMOS, it was found that R&D, combined with innovation, played key roles in the industry's profitability and survivability. Additionally, the authors suggest that there must be full-range support for the economy, involving universities, government agencies, and other relevant institutions.

With a sample of listed manufacturing companies from 2009 to 2019, Wu et al. (2021) conducted multiple regression and hierarchical regression analysis using the proportion of senior executives' shareholding, the ratio of R&D expenditure to operating income, and the ratio of return on total assets. The empirical results showed that executive equity incentive had a significant positive effect on R&D investment; there was a significant positive relationship between the proportion of executives' shareholding and the growth of company performance; R&D investment played a partial mediating role between executive equity incentive and company performance.

Booltink and Saka-Helmhout (2018) found an inverted U-shaped relationship between R&D intensity and company performance among non-high-tech SMEs. Furthermore, increased internationalization leads non-high-tech SMEs to exploit their R&D investment more effectively, which can further enhance company performance, provided that the R&D investment level exceeds a critical threshold.

Guo et al. (2018) found that companies pursuing a product differentiation strategy tend to have more R&D spending than those with a cost leadership strategy. In addition, they reported a positive effect of R&D spending on companies' future performance if a product differentiation strategy is adopted; for companies that adopt a cost leadership strategy, there was an inversed U-shape relationship between R&D spending and company performance resembles. However, this inversed U-shape relationship only existed among non-state-owned companies.

Paula and Silva (2018) intended to understand the relationships among internal and external R&D, innovation performance, and financial performance in Brazilian manufacturing companies through model testing using data from 2,810 companies. They found a positive relationship between external R&D from strategic alliances and innovation performance. Internal R&D, on the other hand, did not directly influence innovation performance; however, it positively moderated the relationship between strategic alliances and innovation performance, corroborating the absorptive capacity theory. Contrary to the authors' expectations, innovation performance had a negative influence on future financial performance. According to the authors, this was caused by the two-year lag between the measurement of the proxies of these two constructs, which was not long enough to allow identifying an increasing in revenues from new products and services; however, it captured the negative effect of redirecting marketing and sales resources for innovation activities (such as internal R&D) and of management costs of strategic alliances. Furthermore, the authors found that internal and external R&D were complementary in companies from high-technology industries, but not in companies from low-technology industries. For the two groups of companies, both internal and external R&D separately had a positive effect on innovation performance. These results suggest that if low-tech companies, which have lower absorptive capacity than high-tech companies, aim to improve their long-term innovation performance, they should prioritize internal R&D to improve their absorptive capacity while achieving a short-term satisfactory innovation outcome. As absorptive capacity increases, more complex strategies that balance internal and external R&D should be adopted.

Chen (2019, October 11-12) examined the impact of R&D investment behavior on company performance in the Taiwanese semiconductor industry, which faced the economic downturn for the period 2005-2016 due to the global financial crisis in 2008. A dynamic panel data model was used to empirically analyze the impact of R&D intensity on company performance. A generalized method of moments estimator was adopted to mitigate endogeneity issues arising from the inclusion of dynamics in the model. Furthermore, the model was used

to explore the lag effect of R&D investments on company performance. It was found that significant R&D investments in a given period may reduce company performance in the same period; in the subsequent few periods, they continue to influence company performance, showing a positive and lagged effect of R&D investments in the high-tech industry. Company size was also found to be positively related to company performance, such that the larger the company size, the greater the use of resources for R&D, which, in turn, leads to more sophisticated technologies and profitable outcomes, forming a positive cycle. This indicates that R&D expenditures affect companies' sustainable management.

Si et al. (2020) employed cluster analysis to classify companies in the energy sector into three types, namely, technology-, capital-, and labor-intensive energy companies. The study examined the interactive endogenous relationship between R&D investment and financially sustainable performance, as well as the moderation effect of executive incentives, through three-stage least squares (3SLS) of the simultaneous equations model. The results showed that for technology-intensive energy companies, an increase in R&D investment in the previous period could improve the company's financially sustainable performance in the current period; financially sustainable performance's improvement in the current period could result in its decline in the next period, which implies a demand for a subsequent increase in R&D investment. In contrast, for capital-intensive energy companies, R&D investment could significantly improve the company's financially sustainable performance in the current period, and such improvement could in turn promote the R&D investment intensity in the next period. For labor-intensive energy companies, R&D investment was related to the company's returns in the previous period and showed no significant effect on the company's financially sustainable performance in the current or next period. In addition, salary incentives for executives had a significant positive moderation effect on the relationship between R&D investment and financially sustainable performance, especially among technology-intensive energy companies, while equity incentives for executives did not show any significant effect in the sample for other types of companies.

Jiang et al. (2019) applied SEM to conduct an empirical analysis based on questionnaire surveys of 12 industries across China. The study found that 1) corporate collaboration R&D networks and technology standard-setting capability had a positive and significant impact on technology innovation performance; 2) technology's standard-setting capability played a full mediating role in the relationship between the breadth of connections and innovation efficiency.

Karbowski (2019) investigated the impacts of R&D strategies (R&D competition, R&D cartelization, and full industry cartelization) on product innovation and company performance.

The study found that in contrast with R&D competition, R&D cartelization entails a loss of the company's product innovation. However, profit-maximizing companies do not prefer the R&D competition strategy. They prefer to pursue either R&D cartelization or full industry cartelization strategies, depending on the elasticity of demand with respect to the company's investment in R&D. The social cost of R&D cartelization is a loss of product innovation, while the social cost of full industry cartelization is both the loss of product innovation and the loss of consumer surplus due to a relatively high price and low output of the final product.

Taking the 269 companies listed on the main board of the electronic information industry from 2010 to 2019 as the sample, using the threshold panel data model, Hao et al. (2020) examined the nonlinear relationship between the knowledge-based network structure hole and companies' short-term and long-term innovation performance and discussed the threshold effect of R&D investment intensity. The results showed that when R&D investment intensity ranged from 1.96% to 15.96%, the knowledge-based network structure hole had a significant positive impact on short-term innovation performance; when R&D investment intensity was between 5.72% and 10.64%, the knowledge-based network structure hole had a significant positive effect on long-term innovation performance. Lower R&D investment intensity could lead to the knowledge-based network structure hole improving short-term innovation performance; however, to make the knowledge-based network structure hole positively impact long-term innovation performance, R&D investment intensity should be increased by more than 5.72%. When R&D investment intensity was not higher than 15.96%, the knowledge-based network structure hole had a significant positive impact on short-term innovation performance; however, to maintain the positive effect of the knowledge-based network structure hole in the long run, R&D investment intensity should not exceed 10.64%.

Kijkasiwat and Phuensane (2020) found that company size and financial capital, respectively, moderated and mediated the relationship between innovation and company performance, positively and negatively.

Based on the panel data of 164 A-share listed companies in the artificial intelligence concept sector of China, using the panel fixed effect regression method, Dong et al. (2021) analyzed the impact of R&D intensity on innovation performance and examined the moderating effect of the three dimensions of the patent portfolio on the relationship. The results showed that R&D intensity and innovation performance had an inverted U-shaped relationship. In addition, the diversity of the patent portfolio had a moderating effect on the relationship between R&D intensity and innovation performance: with a high level of patent portfolio

diversity, the two had a U-shaped flip relationship. Furthermore, the size of the patent portfolio had a positive impact on innovation performance.

Using data from the 2003 World Bank survey of over 2400 companies in 18 Chinese cities, Lin et al. (2010) found that 1) property rights protection was positively and significantly related to corporate R&D activity (for both process and product R&D); 2) government services and helping hand were conducive to corporate R&D, while informal payments to government officials were not; and 3) government ownership and direct appointment of CEOs were negatively associated with corporate R&D activities. They also found that corporate R&D was positively related to company size and access to finance, but negatively related to product market competition and company age.

2.1.3.4 Patent

Eom and Lee (2009) conceptualized the modes of knowledge transfer from PROs and studied the impacts of the modes on company performance. They utilized the Survey on Korean industry-university/PRI relationships to estimate the impacts of its mode in terms of innovation probability, patents, and sales of Korean companies. They found that non-IP modes of knowledge transfer and patent/licensing from PROs facilitated companies' innovation probability or patent filing, while business activity did not. In addition, non-IP modes of knowledge transfer and patent/licensing from PROs could contribute to industrial innovation by creating new knowledge through patents; however, they face limitations in industrializing knowledge through sales. Furthermore, non-IP modes of knowledge transfer facilitated industrial innovation through patent filing only in high-tech industries, but they still face limitations through sales.

According to Hall et al. (2013), only a small number of innovative companies use the patent system. In the UK, the share of companies that patent among those reporting that they have innovated is about 4%. Survey data from these companies supported the idea that they do not consider patents or other forms of registered IP as important as informal IP for protecting inventions. The study provided a number of explanations for these findings: most companies are SMEs; many innovations are new to them but not to the market; and many sectors are not patent-active. Evidence was found to support a positive association between patenting and innovative performance measured as turnover due to innovation, but not between patenting and subsequent employment growth.

Motohashi (2016) conducted a comprehensive analysis of the innovative activities of the entire population of Japanese companies by using a linked dataset from the Establishment and

Enterprise Census and the Institute of Intellectual Property Patent Database (Japan Patent Office patent application data). As of 2006, about 1.4% of around 4.5 million companies filed for patents, and substantial patenting activities were found not only in the manufacturing sector but also in a wider range of fields, such as B2B services and finance. The results also showed that a company's survival and growth were regressed with patenting and open innovation (measured by joint patent applications with other companies and universities), and innovative activities, as measured by patenting were positively correlated with company performance. It was also found that the relationship between patenting and survival rate was stronger among large companies, while that between patenting and company growth was stronger among small companies.

Agostini et al. (2015) used a panel regression model to investigate the relationship between patenting and sales, controlling for company size and age. They employed a purposive sampling technique focusing on a sample of Italian SMEs in the mechanical industry. The results showed that the number of patents had no effect on these SMEs' sales performance, while the number of jurisdictions where protection is extended produced a positive and significant result.

Brem et al. (2017) examined the relationships between open innovation, intellectual property rights, and profitability through random-effects panel regressions on data from the Spanish Community Innovation Survey for 2,873 companies between 2008 and 2013. A key finding of their study is that these SMEs did not benefit from open innovation or patenting in the same way as larger companies did. Furthermore, these SMEs profit from intellectual property rights in varied ways, depending on their size and the corresponding intellectual property rights.

Using the patent applications data of listed companies in China from 2005 to 2014, Hou (2018) examined how the pay gap in the top management team influences company innovation. The results showed that the number of patent applications (especially the number of invention patents) increased significantly when the pay gap enlarged. That means, the enlargement of the pay gap in the top management team could incentivize executives to make innovation decisions, thus promoting outputs of high-quality invention patents and eventually improving the company's innovation quality. In addition, the incentive effect of the pay gap in the top management team was more significant in private companies and companies with strong financing constraints, leading to better innovation behaviors in these companies.

Using multiple-group path analyses on a sample of 358 manufacturing companies, Andries and Faems (2013) studied the impact of patenting on licensing, innovation, and financial performance for both SMEs and large companies. Contrary to the authors' expectations, the

results showed that not only large companies, but also SMEs benefited from patenting in terms of commercializing product innovations; for both SMEs and large companies, such increased innovation performance in turn contributed to higher profit margins. Patenting activities could increase the ability of SMEs and large companies to license out knowledge to external parties, and this positive effect was significantly stronger among large companies. However, these outward licensing activities did not generate short-term financial benefits in either SMEs or large companies.

2.1.3.5 Company location

To examine how location and investment climate characteristics affect performance, Rijkers et al. (2010) compared manufacturing companies in rural and urban Ethiopia and found that companies in remote rural areas were less productive and grew less quickly than urban companies. The results can be partly attributed to differences in the quality of infrastructure, access to credit, and transportation costs between rural and urban areas.

2.1.3.6 Credit constraint

Using primary data collected from 756 micro and small companies in Kelantan, Malaysia, where a large majority of the microcredit recipients under AIM and TEKUN are located, by conducting descriptive and multiple regression analyses, Mahmood (2013) found that microcredit was positively and significantly related to these companies' performance across all microcredit programs under investigation. Other entrepreneur-specific factors, particularly entrepreneurial values and management practices, were also found to significantly and positively affect company performance.

To ascertain the impact of access to formal credit on company performance, Nwosu and Orji (2016) used Nigerian Enterprise Surveys data for 2010 to construct a direct measure of credit constraint. From propensity score estimations, the results showed that access to formal credit had a significant impact on company performance indicators. Compared to companies that are not credit-constrained, credit-constrained companies tend to have significantly lower output per worker, lower capital per worker, lower employment, and lower investment in fixed assets for business expansion.

Fowowe (2017) conducted an empirical investigation of the effect of access to finance on the growth of companies in African countries. The author used a company-level data set from the World Bank's Enterprise Surveys and employed both subjective and objective measures of access to finance. With data for 10,888 companies across 30 African countries, using the subjective measure, the results showed that the access to finance constraint exerted a significant

negative effect on company growth. The results using the objective measure showed that non-credit-constrained companies experienced faster growth than the credit-constrained ones. These findings lent credence to the importance of financing for company growth and justified the numerous measures and initiatives being put in place to increase financial resources available to African companies.

Using the data from three waves of Business Environment and Enterprise performance Survey (BEEPS) between 2005 and 2013 on manufacturing companies from ten Central and Eastern European countries, Männasoo and Meriküll (2020) found that credit constraints had a substantial effect on R&D engagement, as the probability of credit-constrained companies undertaking R&D activities was around 30 % lower than that of other companies. Moreover, the adverse effect of credit constraints on R&D tends to emerge during periods of rapid economic growth.

2.1.3.7 Gender

A study of 176 female managers from several industries across Australia was conducted through a questionnaire battery consisting of the multifactor leadership questionnaire (MLQ), the cognitive style index (CSI), the trait meta-mood scale (TMMS), and the workplace Swinburne University Emotional Intelligence Test (workplace SUEIT). The results indicated that among female managers, those displaying more transformational leadership behaviors were more likely to display higher levels of emotional intelligence and intuition. In addition, the workplace measure of emotional intelligence was found to be a better predictor of transformational leadership behaviors than the general measure, which was attributed to the workplace-specific nature of the workplace SUEIT (Downey et al., 2006).

A commonly held view is that female-owned businesses suffer from many disadvantages compared to male-owned businesses. These disadvantages lead, in turn, to relatively lower levels of efficiency and smaller company size among female-owned businesses, which is referred to as the female-owned companies under-performance hypothesis. Using data on unregistered companies in Argentina and Peru, this hypothesis was confirmed by Amin (2011). The gender-based difference in efficiency and company size held within the full sample, and no more than 25% to 30% of the difference could be explained by variations in company characteristics. The gender-based gap in performance was also held within various sub-samples, although the magnitude of the difference varied across the sub-samples.

Using the sample of 50 entrepreneurs randomly selected from different locations of Hyderabad, which was sorted out based on the monthly turnover above 100,000 INR, Khatoon

(2013) found no significant difference in the scores of emotional intelligence by gender and age. However, there was a significant difference in the scores of emotional intelligence by the growth percentage of the entrepreneurs. Therefore, emotional intelligence was found to have a great impact on the growth of companies.

2.1.3.8 Environmental regulation

Song et al. (2019) analyzed the spatial heterogeneity of environmental regulation on company technology innovation and obtained the following empirical results: 1) formal environmental regulation effectively enhanced companies' technological innovation. However, informal environmental regulation generally can positively drive company technology innovation. 2) The impact of environmental regulation on companies' technological innovation is spatially heterogeneous, showing significant regional differences: while Eastern China generally supports the "Porter hypothesis," Central China and Western China have the opposite performance. In addition, there was a threshold effect between environmental regulation and technological innovation. When the economic development level of the first lagging period was used as the threshold variable, with the gradual increase in the economic development level, companies' technological innovation had an effect of first suppressing and then promoting, thus verifying the threshold characteristics of environmental regulation's effect on technological innovation.

2.1.3.9 Corporate social responsibility (CSR)

Using extensive data over a period of five years, Tsoutsoura (2004) explored the relationship between corporate social responsibility (CSR) and financial performance. The dataset included most of the S&P 500 companies and covered the years 1996-2000. The relationship was examined by using empirical methods. The results indicated a positive and statistically significant relationship, supporting the view that CSR is associated with a series of bottom-line benefits.

Flammer (2015) examined the effect of CSR on financial performance. Specifically, the study analyzed the effect of CSR-related shareholder proposals that pass or fail by a small margin of votes. The passage of such "close-call" proposals is akin to a random assignment of CSR to companies and hence provides a clean causal estimate. Consistent with the view that CSR is a valuable resource, the author found that the adoption of such CSR proposals could lead to positive announcement returns and superior accounting performance. The study also examined the channels through which companies benefit from CSR and found that the adoption of such CSR proposals was associated with an increase in labor productivity and sales growth.

The findings suggested that CSR could improve employee satisfaction and enable companies to better cater to customers who are responsive to sustainable practices.

Wang and Berens (2015) investigated whether and how a company that engages in different kinds of corporate social performance (CSP) can create a favorable corporate reputation among its stakeholders, resulting in a good financial performance. Building on the stakeholder theory, they distinguished two types of reputation: reputation among public stakeholders and reputation among financial stakeholders. They argued that CSP activities affect these two reputations differently. In addition, they empirically tested the relationship among different types of CSP, reputation among public and financial stakeholders, and financial performance. Their results suggested that 1) Carroll's four types of CSP (i.e., economic, legal, ethical, and philanthropic) affected financial performance differently, and 2) their effects were mediated by reputation among public and financial stakeholders.

Agyemang and Ansong (2017) collected primary data from 423 SMEs within the Accra Metropolis and used the PLS estimation technique to analyze the data. The authors documented evidence for a mechanism through which CSR results in companies' improved financial performance: SMEs with improved CSR practices are better positioned to achieve an enhanced reputation, which translates into improved financial performance. Although this study did not document a significant relationship between CSR and access to finance among Ghanaian SMEs, the authors contended that given the positive relationship between them, SMEs could minimize their capital constraints by embarking on CSR practices, which would eventually translate into financial performance.

Drawing on the stakeholder theory and using a large sample of 1021 Asia Pacific companies throughout 2006–2016, through the weighted average of environmental, social, and governance scores (as a proxy of CSR) extracted from DataStream of Thomson Reuters-ASSET4, Naseem et al. (2020) showed that CSR was positively associated with company performance. Their results suggested that CSR is linked to company risk management. In addition, the effect of CSR on company performance was found to be both direct and indirect. They provided evidence that company risk management partially mediates the relationship between CSR and company performance.

Xiangyuan and Tzesan (2021) selected 119 listed companies from 2008 to 2018 in mainland China as samples to explore the impact of environmental CSR on company performance in the long and short term, as well as the mediating role of corporate green marketing performance. The results showed that CSR had a significant impact on ROA and

company value in the short term; in the long term, the adoption of green marketing innovation had a positive impact on company performance.

Heene (2006) analyzed recent theoretical and empirical contributions concerning the relationship between small company size and CSR, examining the influence of company size on four antecedents of business behavior: issue characteristics, personal characteristics, organizational characteristics, and context characteristics. The study concluded that the business context of small companies does indeed pose barriers on undertaking CSR; however, the influence of smaller company size on CSR should be nuanced and differentiated according to a number of conditions.

2.1.3.10 Enterprise resource planning (ERP) system

Economic and industrial organization theories have been employed to predict how enterprise resource planning (ERP) technology should affect company coordination and transaction costs. ERP is expected to 1) reduce costs by improving efficiencies through computerization and 2) enhance decision-making by providing accurate and timely company-wide information. These effects should be associated with improved company performance. Poston and Grabski (2000) empirically examined this issue using archival financial data of COMPUSTAT companies that have implemented ERP systems compared to control company counterparts. Results indicated a significant increase in costs as a percentage of revenue, but a decrease in the number of employees as a percentage of revenue, the year after ERP implementation. However, control companies experienced a greater reduction in employees. The results indicated a paradox where companies having fewer employees supporting more revenue simultaneously experience higher cost-to-revenue ratios after their ERP implementation.

Nicolaou (2004) examined the effect of the adoption of company systems on a company's long-term financial performance. Using a large-scale data identification and collection method, the study compared the financial data of 247 companies that adopted company-wide systems with a matched control group of companies cross-sectionally and longitudinally before and after adoption. A number of implementation characteristics were measured, and their effects were assessed. The results showed that companies adopting such systems exhibited greater differential performance only after two years of continued use. Furthermore, controlling for implementation characteristics (i.e., vendor choice, implementation goal, modules implemented, and implementation time period) helped explain the effects of ERP system use on financial performance.

Hunton et al. (2003) examined the longitudinal impact of ERP adoption on company

performance. The results indicated that, compared with non-adopters, companies that adopted ERP systems experienced significantly better ROA, return on investment (ROI), and asset turnover (ATO) within a three-year period.

Kallunki et al. (2011) extended existing research on ERP systems by exploring the effects of company system adoption on subsequent non-financial and financial performance of a company. Specifically, they investigated the role of formal and informal management control systems as mediators between ERP system adoption and company performance. Their empirical analyses were based on survey data drawn from 70 Finnish business units. Overall, their findings demonstrated that formal types of management control systems mediated the positive lagged effect between company system adoption and non-financial performance; informal types of management control systems, however, did not show similar mediating effects.

2.1.3.11 Company size

Motivated by theories of the firm, classified as "technological" or "organizational", Kumar et al. (1999) analyzed the determinants of company size across industries and countries in a sample of 15 European countries. They found that, on average, companies facing larger markets tend to be larger. At the industry level, companies in the utility sector tend to be large, which, according to the authors, is because they enjoy a natural, or officially sanctioned, monopoly. Larger companies are likely to be found in capital-intensive industries, high-wage industries, and industries with intensive R&D, as well as industries that require little external financing. At the country level, countries with efficient judicial systems adjusted for institutional development tend to have larger companies; however, there is insufficient evidence that richer countries are likely to have larger companies. Interestingly, institutional development, such as greater judicial efficiency, seems to be associated with lower dispersion in company size within an industry.

Calof (1994) examined the direct and indirect effects of company size on three dimensions of export behavior (i.e., propensity to export, countries exporting to, and export attitudes) for 14,072 Canadian manufacturers. The results indicated that while company size was positively related to all dimensions of export behavior, its importance was limited, as the amount of variance explained was modest.

Using a sample of U.S. apparel import intermediary SMEs, Ha‐Brookshire (2009) performed regression analysis on the survey data to examine the moderating role of company size on the relationship between company entrepreneurship and performance. The results

suggested that company size had a significant effect on the relationship between SMEs' entrepreneurship and longevity performance; however, no statistical significance was found in company size's effect on the relationship between SMEs' entrepreneurship and creative contribution or profitability.

Xu et al. (2019) developed a system of equations to investigate the overall relationships among R&D, advertising, and financial performance across company sizes. Using data from Korean listed companies from 2012 to 2016, the study showed that R&D and advertising were complementary in South Korea; among large companies, advertising was positively and significantly associated with financial performance, whereas R&D expenditure had no significant influence.

Kijkasiwat and Phuensane (2020) found that company size and financial capital moderated and mediated the impact of innovation on company performance, positively and negatively, respectively.

2.1.3.12 Labor productivity

Nguyen (2019) utilized a statistical method – multiple regression – to estimate the relationship between labor productivity, foreign ownership, as well as other company-level characteristics, and company performance. They found that increasing labor productivity and increasing foreign ownership rates helped increase company performance.

2.1.3.13 Human resource

Welbourne and Andrews (1996) examined the determinants of structural inertia and developed hypotheses on the relationship between human resource management and organizational performance. The results indicated that two human resource variables, namely, human resource value and organization-based rewards, predicted initial investor reaction and long-term survival. The rewards variable negatively affected initial performance but positively affected survival.

Ding and Cai (2018) found that career development, employee training programs, and performance-based wages positively influenced the positive relationship between strategic human resource management and company performance. Comparing the difference of R^2 between career development, employee training programs, and performance-based wages, they found that the moderation effect of career development and employee training programs was greater than that of performance-based wages. The authors suggested that if a company aims to improve its competitiveness and growth of economic benefits, it needs to combine human resources with company strategies to enhance company performance.

Research has shown that the practice of human resource management has a positive effect on knowledge management orientation; it also positively affects company performance through knowledge management orientation. That is, knowledge management orientation mediates the relationship between human resource management practices and company performance (Liu, 2018, March 9-11). Only by relying on excellent talents can a company achieve its goal of improving performance. Knowledge management can be used as a medium to link human resources to company performance. In the current status of economic development, to achieve good outcomes in knowledge resource innovation, companies should constantly strengthen their management of human resources to improve personnel's information capacity and lifelong learning ability.

2.1.3.14 Leadership

Dahlgaard and Ciavolino (2007) selected a sample of Italian manufacturing companies to verify the abilities and effects (relationships) of the management factors (e.g., human resources, leadership, and strategic planning) on company performance. The Partial Least Squares (PLS) estimation method was employed to analyze the collected data, where the relationships between management factors and company performance were formalized by using a Structural Equation Model (SEM). The analysis of the survey data showed a non-significant direct relationship between leadership and performance; leadership indirectly affected performance through human resources. Leadership and human resources hence were identified as the management factors with the highest impact on the performance of Italian industrial companies.

2.1.3.15 Intangible assets

Gu and Lev (2001) developed an economic approach to estimating the value of intangible assets and documented evidence indicating that the approach could provide economically meaningful estimates. Their study showed that investments in R&D, advertising, brands, information technology, and various human resource practices are important drivers of intangible capital and, in turn, company value. They found that intangibles-based measures could provide more relevant information than conventional performance-based measures, as indicated by the strength of correlation with stock returns. Furthermore, the authors demonstrated the approach's usefulness for investors seeking information on the future performance of valuable intangibles. They documented extensive evidence that intangibles-based measures can effectively distinguish between overvalued and undervalued stocks. The relevance and usefulness of the intangibles measure are most evident in circumstances where existing measures are mostly

inadequate in reflecting the value created by intangible assets, thus attesting to the measure's success in filling an important gap in the current reporting system.

According to Anokhina (2014), in the historical development of the productive forces, their composition and structure underwent changes. Leading positions, among other resources, were held by raw material, logistical, financial, and human resources. Recently, intangible components of the company's activities have acquired great significance as a part of the resources. The company can leverage the latest technologies, commercial designations, human capital, goodwill, and other intangible components in competition. In the leading economies of the world, the value of companies' intangible resources has exceeded that of material resources. Given that the Ukrainian economic lag in comparison with the leading countries is due to a lower level of intangible resources of Ukrainian companies, the author suggested that further research should focus on improving the level of development and efficiency of the use of companies' intangible resources, which can give place to the qualitative development of the Ukrainian economy.

Seo and Kim (2020) suggested that investment in intangible assets (human capital, advertising, R&D) is essential for SMEs pursuing superior company performance. The study analyzed actual data collected from 173 SMEs in Korea employing the hierarchical regression method. The results indicated that all three intangible resources had a positive effect on a company's profitability and value. Interestingly, the study found that investment in advertising had the most significant impact. The study highlighted the value of intangible investment for SMEs and suggested that business managers could strategically leverage these three key contributors (human capital, advertising, R&D) and invest in intangible assets to achieve their managerial goals.

Luca (2014) investigated whether innovative companies with and without superior and sustained performance differ in terms of investments in intangible assets. The sample consisted of 137 companies from innovative sectors listed on the Brazilian stock exchange from 2007 to 2010, as per the Brazilian Innovation Index. Among the companies with profitability above the sector average during the entire study period (four years), only 51 met the criterion of superior and sustained performance. Using ROA as a proxy for company performance, investments in intangible assets were found to be greater in companies without superior and sustained performance, particularly with regard to the categories of intellectual property assets (the predominant category) and infrastructure assets. Due to the lack of evidence for a significant relationship between company performance and investment in intangible assets, the study could

not confirm the positive relationship between the composition of investments in intangible assets and the performance of innovative companies as initially proposed.

In the study of Gamayuni (2015), path analysis was used to find out the relationship between intangible assets, financial policies, financial performance, and company value among listed companies in Indonesia between 2007 and 2009. The study provided empirical evidence that intangible assets, financial policies, and financial performance all had significant effects on company value. Intangible assets had no significant effect on financial policies but positively and significantly influenced financial performance (i.e., ROA) and company value. Moreover, debt policies and financial performance (i.e., ROA) positively and significantly influenced company value. According to the author, the limitation of financial statements in measuring and disclosing intangible assets was the cause of the significant difference between book value equity and market value equity. The author highlighted the importance of accurately measuring and disclosing intangible assets (intellectual capital), given that intangible assets have a positive and significant effect on company value, which has implications for accounting standards.

Ivanov and Mayorova (2015) investigated the ways effective intangible assets management helps the leading Russian food retailers (Magnit and X5 Retail Group) derive ancillary competitive advantages. The results revealed that intangible assets hold significant promise for enhancing the competitiveness of retail companies. More specifically, the study has the following conclusions: 1) Various types of intangible assets in operating activities allow the retailer to increase labor productivity, reduce costs (including personnel costs), and attract and retain customers by providing a unique supply or a higher quality of service. The irreproducibility of intangible assets enables companies to maintain the created advantages in the long run. 2) Private labels are becoming one of the most promising intangible assets for Russian retailers to create competitive advantages. Effective management of private labels contributes to the optimization of assortment, pricing, image, and reputation. It can serve as a tool for increasing emotional involvement and customer loyalty and is conducive to the differentiation of the company. 3) An important use of intangible assets in retail is franchising. Despite the recognized benefits of franchising in business development, in the Russian market, there is an increased risk of deterioration of the franchisor's reputation caused by the franchisee's fraud, which makes reverse franchising reasonable. 4) Intangible assets form a significant part of the company's capitalization. Higher business value helps improve the company's creditworthiness and investment attraction, which is the retailer's most important competitive advantage. 5) The carrying value of intangible assets, as recorded in the retailer's accounting records, has an impact on the company's financial stability, liquidity, taxable

income base, and amortization. The international as well as the Russian accounting standards specify the management of intangible assets in the accounting rules of organizations, which can result in increased efficiency and competitiveness of the retailer.

Teece (2015) outlined a capabilities-enriched economic theory of the company and its sources of competitive advantage. The nature and key categories of intangibles were discussed, with an emphasis on their suitability for providing differentiation in an era when many services and tangible goods are readily available on a global basis. The linkages in the conversion of intangibles into profits were analyzed, including the frequent need for co-specialized complements. Among the key categories of intangibles are organizational capabilities, which can be either ordinary or dynamic. Ordinary capabilities are, generally, those that can be measured against best practice and, with some effort, imitated by rivals. Dynamic capabilities, which reside in both signature processes and management skills, enable the company and its top management to develop conjectures about the evolution of consumer preferences, business problems, markets, and technology; validate them; and realign assets and competences to foster continuous innovation for the creation of competitive advantage. The key concepts of complementarity, entrepreneurial management, and dynamic capabilities were then applied to deepen the economic theory of the company, combining with the dominant transaction cost approach to provide a richer understanding of why companies are needed in the economic system.

Nonprofit organizations promote citizens' participation in community life through various types of organizations: including informal organizations (e.g., associations and volunteering groups) and formal or public organizations (e.g., charities and foundations). This heterogeneity, along with the well-known peculiarities of nonprofit organizations compared to for-profit and public ones, poses new challenges to their management. In the constant need to find a balance between financial constraints and social value, a main resource for nonprofit organizations is the management of intangible assets, such as knowledge, positive relationships within the organization and with users, external image, loyalty, and commitment. Against this background, Buonomo et al. (2020) conducted a systematic literature review on the association between intangible assets and nonprofit organizations' performance.

2.1.3.16 Life cycle

Based on the theory of financial subsidy's influence on company innovation and the theory of corporate life cycle, Yang (2020) demonstrated the different effects of financial subsidy on R&D innovation when companies are in different lifecycle stages. Using data from listed

companies in the A-share market of China from 2013 to 2017, through the fixed effect model and hierarchical multiple regression, the study found significant differences in the impact of financial subsidy on company innovation. Thus, the author highlighted that financial subsidy is important for company innovation and its influence should be differentiated according to companies' life cycle stages.

Koval et al. (2017) investigated the relationship between the company life cycle and investment efficiency in the context of dynamically and rapidly changing conditions of business development.

2.1.3.17 Ownership

Using a unique 2002-2007 panel data of listed Chinese companies, Cao (2010) found that ownership concentration had a significant positive impact on company performance at both the growth stage and decline stage, but not at the mature stage. Ownership control had a significant negative impact on company performance at the growth stage and a significant positive impact at the mature stage, but no significant impact at the decline stage. There was no significant curved relationship between ownership concentration, ownership control, and company performance.

The relationship between ownership structure and company performance has been intensely researched in both transition and market economies. The Czech Republic's mass-privatization program provides a unique opportunity to investigate this relationship (Claessens & Djankov, 1999). It changed companies' ownership in a short period of time, and companies' characteristics had only a limited influence on the resulting ownership structure. For a cross section of 706 Czech companies over the period from 1992 to 1997, Claessens and Djankov (1999) found that a more concentrated ownership would lead to higher company profitability and increased labor productivity.

Filatotchev et al. (2001) provided survey evidence on the effects of concentrated ownership on restructuring and performance in privatized companies in Russia. They found that large-block shareholding was negatively associated with the company's investment and performance, and this relationship was not dependent on the identity of controlling shareholders.

Based on panel data from 1995 to 1997, Kuznetsov and Muravyev (2001) investigated the impact of ownership concentration on the performance of Russian non-financial privatized companies that constitute the group of "blue chips" on the Russian stock market. They found that ownership concentration resulted in companies' higher technical efficiency, but the

benefits from productivity improvements did not adequately materialize in companies' higher profitability or market value.

Hess et al. (2010) investigated the relationship between ownership structure and performance for a comprehensive sample of Chinese listed companies for the period from 2000 to 2004. They found a convex relationship between state ownership and company value, that is, state ownership was beneficial at levels above approximately 35% but had negative effects at lower levels. They examined this issue in both OLS and 2SLS equation frameworks, which account for potential endogeneities in the ownership-performance relationship. They found evidence that the presence of large private shareholders at companies with no significant state holdings is detrimental to these companies' performance.

By recognizing the differences between ownership and ownership concentration and between total ownership concentration and tradable ownership concentration, Ma et al. (2010) found that ownership concentration was more powerful than any category of ownership in determining company performance; tradable ownership concentration had a more significant and positive influence on company performance than total ownership concentration; the highest level of company performance was approached when a company was characterized by both total ownership concentration and tradable ownership concentration.

Using the panel data regression analysis method, Fazlzadeh et al. (2011) examined the role of ownership structure variables, including ownership concentration, institutional ownership, and institutional ownership concentration, for 137 listed companies on Tehran Stock Exchange within the period 2001-2006. It was concluded that ownership concentration had no significant effect on company performance, whereas the effect of two other variables was significant: institutional ownership had a significant positive effect on company performance, while institutional ownership concentration had a negative effect.

Ongore (2011) investigated the effects of ownership structure on the performance of listed companies in Kenya using agency theory as the analytical framework. Using Pearson's product moment correlation and logistic regression, the study found that ownership concentration and government ownership had significant negative relationships with company performance. However, foreign ownership, diffuse ownership, corporation ownership, and manager ownership were found to have significant positive relationships with company performance.

Based on the principal-agent theory, Yin et al. (2017) conducted an empirical study on the process of influencing companies' performance. They employed the "power-decision-performance" analysis, hierarchical regression, and group regression analysis to analyze the diversification strategy of entrepreneurial companies. The results showed that the ownership

concentration of entrepreneurial companies had a positive impact on companies' financial performance but a negative impact on companies' market performance. The increase in ownership concentration could hinder the diversified development of entrepreneurial companies and their related diversification strategy, which can positively affect the financial performance and market performance of the company. The related diversification strategy mediated the relationship between ownership concentration and company performance, while the media's negative report had a negative moderation effect in this process.

Hanousek et al. (2007) suggested that concentrated ownership exerts a positive impact on company performance. The beneficial effects of foreign ownership are primarily reflected in majority holdings and in foreign-owned industrial companies. The state, acting as a holder of golden shares, has a positive influence on employment and, in some cases, also on the output and profitability of companies.

Ownership concentration and ownership identity, in particular foreign investors, prove to have a positive impact on company performance, while employee ownership concentration has a negative one. The higher proportion of external directors and the change in board composition following privatization have a positive effect on company performance (Omran, 2009).

2.1.3.18 Subsidy

Assagaf and Ali (2017) studied the factors that affect the financial performance of state-owned enterprises (SOEs). They used a purposive sampling method and collected data from seven SOEs during the past 11 years. For data analysis, this study performed linear regression using SPSS and Amos 23. The results showed that the government subsidy had a significant negative effect on financial performance. Regression results also indicated that strategic profitability had a significant positive effect on financial performance, which means, the company's management is likely to perform earnings management practices to improve the company's financial performance. Furthermore, capital structure showed a positive but insignificant effect on financial performance.

Using data on Chinese listed companies from 2009 to 2013, Wu (2017) found that receiving R&D subsidies could increase companies' likelihood of raising external finance, and that SOEs tend to receive more subsidies than private companies.

Wang et al. (2019) explored the transformation effect of government R&D subsidies on company performance and its non-linear characteristics using Chinese A-share listed companies' data from 2008 to 2016. The authors used the instrumental variable method to address endogenous problems and conducted a series of robustness tests to support their

findings. The mechanisms of the transformation effect were explored via mediation effect models. The impact of company heterogeneities on the transformation effect was also addressed. The results indicated that R&D subsidies promoted company performance, and the transformation effect was only within a "moderate interval". R&D subsidies played a vital role in enhancing company performance, mainly via signal financing and innovation incentives. Further, the transformation effect was much greater in non-state-owned, young, and large companies.

2.1.3.19 Managerial incentive

By examining a sample of non-listed Chinese companies, Hu and Zhou (2008) provided evidence from China for the effect of managerial ownership on company performance. In matching-sample comparisons, the authors found that companies of significant managerial ownership outperformed those whose managers did not own equity shares. In addition, their results indicated a nonlinear relationship between company performance and managerial ownership, with 50% ownership being a turning point, above which the relationship turned negative.

Lu and Beamish (2004) proposed a theoretical framework for the study of multinationality and performance that includes both benefits and costs of geographic expansion over different phases of internationalization. Data on 1,489 Japanese companies over 12 years showed a consistent horizontal X S-shaped X relationship between multinationality and performance. Further, the results showed that companies investing more heavily in intangible assets, such as technology and advertising, achieved greater profitability gains from growth in foreign direct investment. The framework and findings highlighted complexity and temporal dynamics in the relationship.

Using data from a World Bank survey of 1,088 private manufacturing companies from 18 Chinese cities from 2000 to 2002, Lin et al. (2011) empirically examined the roles of managerial incentives and CEO characteristics in a company's innovation activities. They looked at both innovation effort (R&D intensity) and innovation performance measures (e.g., new product sales). The obtained results are as follows: 1) the presence of CEO incentive schemes could increase both innovation effort and innovation performance of the company; 2) sales-based performance measures in the incentive scheme, as compared with profit-based performance measures, are more conducive to companies' innovation; and 3) the CEO's education level, professional background, and political connection were positively associated with the company's innovation efforts.

Within transition economies, privatization is a popular tactic for revitalizing large and inefficient state-owned companies (SOEs). As the empirical evidence related to this issue is equivocal, Wang and Judge (2012) further explored the relationship between SOEs' privatization efforts and their financial performance in transition economies. Specifically, they sought to better understand whether privatization reforms per se, or other corporate governance mechanisms that complement or substitute for this effort, are most effective. Using a panel sample of Chinese SOEs over an eight-year period from 1999 to 2006, they found that managerial ownership had a more significant impact on company performance than privatization did. This finding suggests that internal incentives to managers may be more effective than external market mechanisms in economies transitioning from centralized planning to market control.

Mizutani and Nakamura (2014) constructed three equations (managerial incentive function, organizational slack formation function, and performance function) and applied 3SLS simultaneously to these functions by using the data sets of 2,791 Japanese companies from the years 2001 to 2006. From the empirical analysis of these companies, they obtained the following results: a company's performance declines as organizational slack increases; organizational slack is affected by the annual change rate of revenues but not by managerial incentive; managerial incentive decreases as a company's performance improves, but it increases as the structure of corporate governance is strengthened.

Fidrmuc (2007) analyzed the effect of the introduction of managerial incentives and new human capital on company performance after privatization in the Czech Republic. They found weak evidence for the presence of managerial incentives as poor performance significantly increased the probability of managerial change three to four years after privatization, only from 1997. Nevertheless, replacing the managing director in a newly privatized company could improve subsequent performance. This indicates that privatized companies operate below their potential under incumbent management.

2.1.3.20 International diversity

Lu and Beamish (2004) proposed a theoretical framework for the study of multinationality and performance that includes both benefits and costs of geographic expansion over different phases of internationalization. Data on 1,489 Japanese companies over 12 years showed a consistent horizontal X S-shaped X relationship between multinationality and performance. Further, the results showed that companies investing more heavily in intangible assets, such as technology

and advertising, achieved greater profitability gains from growth in foreign direct investment. The framework and findings highlighted complexity and temporal dynamics in the relationship.

Belderbos et al. (2020) investigated how international diversity in top management teams contributes to the effectiveness of geographically dispersed R&D strategies in enhancing innovation performance. They posit that both international work experience and nationality diversity may enhance the effectiveness of geographically dispersed R&D when the countries of work experience and the nationalities of top management team members differ from the companies' R&D locations. However, this influence is stronger for international work experience diversity than for nationality diversity, as the former provides more task-related knowledge to assist with R&D activities and is less associated with the risk of social categorization. The study found partial support for these views through a panel analysis of the innovation performance of 165 leading multinational companies based in Europe, Japan, and the United States.

2.1.3.21 Managerial emotional intelligence

To study the level of emotional intelligence among executives in SMEs from the manufacturing sector, the GENOS Emotional Intelligence questionnaire developed by Palmer et al. (2001) was used by Chin et al. (2011) in a survey among 96 employees from different manufacturing sectors. It was found that emotional intelligence did not have a significant relationship with organizational citizenship behavior, and that employees in these SMEs encountered some experiences that affected their working attitudes.

The relevance of emotional intelligence and organizational commitment was tested by Khalili (2011) among 142 employees of SMEs in the private sector in Iran. The results indicated a significant relationship between emotional intelligence as an overall construct and organizational commitment. In addition, the study revealed a strong and positive influence of self-management and social awareness as two competencies of emotional intelligence on employees' obligation to the organization. Meanwhile, a positive but not significant impact of self-awareness and relationship management as two abilities of emotional intelligence on employees' organizational commitment was found.

Using a sample of 50 entrepreneurs randomly selected from various locations in Hyderabad, who were sorted based on monthly turnover above 100,000 INR, Khatoon (2013) found no significant difference in the scores of emotional intelligence by gender and age. However, there was a significant difference in the scores of emotional intelligence by the growth percentage of

the entrepreneurs. Therefore, emotional intelligence was found to have a great impact on the growth of companies.

Oriarewo (2014) investigated the mediating effect of managerial competence on the relationship between the dimensions of emotional intelligence (i.e., self-emotional appraisal, others' emotional appraisal, regulation of emotions, and use of emotions) and entrepreneurial performance. The study employed an ex-post-facto, multi-stage sampling technique and a questionnaire survey to collect data from selected respondents in the hospitality industry in Benue State, Nigeria. Through multiple regression analysis, it was found that managerial competence mediated the relationship between the dimensions of emotional intelligence and entrepreneurial performance. In view of this, the authors suggested that companies' owners should ensure that their managers and employees are emotionally intelligent and managerially competent through a well-planned recruitment and selection process.

Ezzi et al. (2016) reviewed different theoretical studies addressing the impact of emotional intelligence on performance and presented different results extracted from their empirical study of a sample of listed and unlisted Tunisian companies at the Tunis Stock Exchange. The results of the different linear regressions revealed significant effects of emotional intelligence on the financial, social, and environmental performance, in which the company's business scope is expanded to cover.

Kelvin-ILoafu et al. (2019) utilized a survey to gather data from 554 respondents who were staff of ten selected small-scale companies in south west of Nigeria. The data collected through the closed-ended questionnaire were tested with linear regression at a 0.05 level of significance. The results revealed that cognitive ability positively affected employees' achievement of goals in these companies. Based on this finding, the study concluded that emotional intelligence practices could be employed to achieve advanced goals and performance in the Nigerian small-scale business sector. The authors suggested that the management of small-scale companies in Nigeria should be resolute in observing the culture of establishing sound emotional stability on their employees.

2.1.3.22 Customer

Using a panel dataset of annual store-level customer satisfaction data from a supermarket chain for the periods 1998–2001 and a panel dataset of brand-level customer satisfaction ratings from the American Customer Satisfaction Index spanning the periods 1994–2003, Simon and Gómez (2014) found that 1) rivals' customer satisfaction could increase a company's own customer satisfaction; and 2) rivals' customer satisfaction would reduce a company's sales.

2.1.3.23 Competitor

Muchiri et al. (2021) adopted a descriptive-exploratory research design targeting 397 randomly selected small-scale trading companies in Kenya, focusing on Nakuru, Nyandarua, and Kitui Counties, to examine how small-scale trading companies tackle competition to increase sales performance. The study found that competitor behavior had no statistically significant effect on these companies' sales performance, and the entrance of new competitors in Nakuru and Nyandarua Counties was offset by the practice of cooperation.

The above literature review shows that company performance is a relatively well-researched topic and is related to many factors. According to the relevant literature reviewed above, we identified 23 factors or variables related to the performance of non-pharmaceutical companies (see Table 2.1): organizational absorptive capacity, strategic agility, R&D investment, patent, company location, credit constraints, gender, environmental regulation, corporate social responsibility, ERP system, company size, labor productivity, human resource, leadership, intangible assets, corporate life cycle, ownership, subsidy, managerial incentive, international diversity, emotional intelligence, customers, and competitors. The factors are numerous and were obtained based on various industries. Their relationships with company performance can mostly be reasonably explained. However, researchers have not reached a consensus on some of them and may even hold opposite conclusions. Among the 23 variables, the most extensively studied factor is R&D. As shown in Table 2.1, a total of nine studies have investigated the relationship between R&D investment and company performance.

Table 2.1 Summary of factors related to company performance

Variable	Hoskisson et al. (1993)	Poston et al. (2000)	Hunton et al. (2003)	Lu et al. (2004)	Heene et al. (2006)	Dahlgaard et al. (2007)	Hanousek et al. (2007)	Francalanci et al. (2008)	Omran et al. (2009)	Harris et al. (2009)	Lee et al. (2009)	Rijkers et al. (2010)	Cao et al. (2010)	Kallunki et al. (2011)	Khalili et al. (2011)	Nguyen et al. (2011)	Hall et al. (2013)	Khatoon et al. (2013)	Luca et al. (2014)	Oriarewo et al. (2014)	Simon et al. (2014)	Gamayuni et al. (2015)	Agostini et al. (2015)	Nwosu et al. (2016)	Mamun et al. (2017)	Fowowe et al. (2017)	Koval et al. (2017)	Assagaf et al. (2017)	Brem et al. (2017)	Ding et al. (2018)	Junyong et al. (2018)	Kale et al. (2019)	Song et al. (2019)	Yang et al. (2019)	Yoo et al. (2019)	Männasoo et al. (2020)	Shao et al. (2020)	Kijkasiwat et al. (2020)	Seo et al. (2020)	Muchiri et al. (2021)	Liu et al. (2021)	**Total**
Organizational absorptive capacity								X		X															X						X									X	5
Strategic agility																															X										1
R&D investment	X									X	X						X						X						X					X			X			X	9
Patent																	X						X						X											3
Company location											X	X																													2
Credit constraint																								X		X									X						3
Gender																		X						X	X																3

Variable	Hoskisson et al. (1993)	Poston et al. (2000)	Hunton et al. (2003)	Lu et al. (2004)	Heene et al. (2006)	Dahlgaard et al. (2007)	Hanousek et al. (2007)	Francalanci et al. (2008)	Omran et al. (2009)	Harris et al. (2009)	Lee et al. (2009)	Rijkers et al. (2010)	Cao et al. (2010)	Kallunki et al. (2011)	Khalili et al. (2011)	Nguyen et al. (2011)	Hall et al. (2013)	Khatoon et al. (2013)	Luca et al. (2014)	Oriarewo et al. (2014)	Simon et al. (2014)	Gamayuni et al. (2015)	Agostini et al. (2015)	Nwosu et al. (2016)	Mamun et al. (2017)	Fowowe et al. (2017)	Koval et al. (2017)	Assagaf et al. (2017)	Brem et al. (2017)	Ding et al. (2018)	Junyong et al. (2018)	Kale et al. (2019)	Song et al. (2019)	Yang et al. (2019)	Yoo et al. (2019)	Männasoo et al. (2020)	Shao et al. (2020)	Kijkasiwat et al. (2020)	Seo et al. (2020)	Muchiri et al. (2021)	Liu et al. (2021)	**Total**
Environmental regulation																																X				X					2
Corporate social responsibility					X																																				1
ERP system		X	X											X																											3
Company size			X		X									X																								X			4
Labor productivity																X																									1
Human resource						X																							X	X										3
Leadership						X																																		1
Intangible assets				X															X			X							X									X		5

Variable	Hoskisson et al. (1993)	Poston et al. (2000)	Hunton et al. (2003)	Lu et al. (2004)	Heene et al. (2006)	Dahlgaard et al. (2007)	Hanousek et al. (2007)	Francalanci et al. (2008)	Omran et al. (2009)	Harris et al. (2009)	Lee et al. (2009)	Rijkers et al. (2010)	Cao et al. (2010)	Kallunki et al. (2011)	Khalili et al. (2011)	Nguyen et al. (2011)	Hall et al. (2013)	Khatoon et al. (2013)	Luca et al. (2014)	Oriarewo et al. (2014)	Simon et al. (2014)	Gamayuni et al. (2015)	Agostini et al. (2015)	Nwosu et al. (2016)	Mamun et al. (2017)	Fowowe et al. (2017)	Koval et al. (2017)	Assagaf et al. (2017)	Brem et al. (2017)	Ding et al. (2018)	Junyong et al. (2018)	Kale et al. (2019)	Song et al. (2019)	Yang et al. (2019)	Yoo et al. (2019)	Männasoo et al. (2020)	Shao et al. (2020)	Kijkasiwat et al. (2020)	Seo et al. (2020)	Muchiri et al. (2021)	Liu et al. (2021)	**Total**
Life cycle													X														X							X	X							4
Ownership							X		X				X																													3
Subsidy																											X														1
Managerial incentive	X																																								1
International diversity				X																																					1
Emotional intelligence															X			X		X																					3
Customers																					X																				1
Competitors																																						X		1

2.2 Research and development (R&D)

2.2.1 The concept of R&D

R&D investment is regarded as one of the most fundamental drivers of economic growth and development Alam et al. (2019a). R&D is a common operational activity in companies, especially in high-tech companies, which place special emphasis on R&D. Various scholars have provided definitions of R&D. According to Frascati (2002), R&D is a systematic, creative cognitive activity aimed at acquiring new knowledge about humans, culture, and society, as well as applying the newly acquired results. R&D encompasses three main areas of activity: basic research, applied research, and experimental development. The primary goal of basic research is to gain new knowledge about the nature of phenomena and facts, while applied research and experimental development are directed toward specific practical purposes. The task of R&D in companies is to establish a technological foundation to achieve targeted objectives. In many high-tech companies, R&D is conducted according to specific concepts and strategic goals, with planned limitations on time and cost, and it focuses on the development of new or improved products and technologies (Slobodnyak et al., 2020).

2.2.2 Factors influencing companies' R&D investment

The factors that influence R&D investment can be broadly categorized into internal and external factors in relation to the company. Numerous scholars have studied the determinants of R&D investment.

2.2.2.1 Internal factors

During the R&D decision-making process, companies naturally consider their own characteristics, such as total factor productivity levels and expected future output (Bravo-Ortega & Marín, 2011). Lai (2015) explored whether companies' internal strategic resources—such as company size and intangible assets (e.g., goodwill, patents, and human and business resources)—are important factors that influence the overall decision-making process related to investing in R&D activities. Link (1982) analyzed the effects of factors including profits, the extent of product diversification, and ownership form on companies' basic research and applied R&D using a sample of 275 large U.S. companies.

2.2.2.2 External factors

Galende and de la Fuente (2003) suggested that rapid market changes and company-specific internal resources are crucial factors in the decision-making process related to R&D investment. They also emphasized that the controllability of internal factors is far more significant than that of external factors. The study of Alam et al. (2019b) revealed that in emerging economies, among the institutional determinants, corruption had the most significant impact on R&D investment, followed by regulatory quality, government effectiveness, rule of law, and political instability. Barge-Gil and López (2014) employed the "Schumpeterian hypotheses" and considered industry-specific effects to explain the determinants of R&D investment. Cohen and Levin (1989), as well as Levin et al. (1985), followed the Schumpeterian hypotheses and focused their research on the influence of company size and market power on R&D expenditures, as well as the effect of industry factors—such as demand pull, technological opportunity, and appropriability—on R&D expenditures.

2.3 The pharmaceutical industry

2.3.1 Industry characteristics

According to the 2013 EU Industrial R&D Investment Scoreboard published by the European Commission's Joint Research Centre, among the world's top 50 R&D-intensive companies, 15 were from the pharmaceutical industry. These companies included Roche (ranked 6th), Novartis (7th), Merck (8th), Johnson & Johnson (9th), Pfizer (10th), Sanofi-Aventis (15th), GlaxoSmithKline (20th), Eli Lilly (26th), AstraZeneca (33rd), Abbott Laboratories (35th), Bayer (36th), Bristol-Myers Squibb (40th), Takeda (41st), and Boehringer Ingelheim (42nd), Amgen (47th).

Pharmaceuticals represent one of the most research-intensive industries in the world, continuously producing new products that contribute to saving lives and improving quality of life. Over time, the process of new drug discovery has evolved from being largely empirical to one increasingly grounded in fundamental scientific knowledge. In most industrialized countries, the safety and efficacy of new drugs are strictly regulated, which increases the cost of clinical trials. Given the high expenditures on research, development, and clinical trials, as well as the ease with which new products may be imitated once their efficacy is proven, patent protection is particularly crucial in the pharmaceutical industry (Scherer, 2000). The industry exhibits extraordinarily high R&D intensity and overall volume. Over the past decade, research-

based pharmaceutical companies have, on average, invested 15–20% of total sales in R&D, leading to annual R&D costs reaching billions of U.S. dollars for some companies (Schuhmacher et al., 2016). Lakdawalla (2018) found that the total R&D cost per employee in the pharmaceutical industry was more than double that of other sectors, and the pharmaceutical industry's overall R&D volume was second only to that of the computer and electronics industry (see Table 2.2).

Table 2.2 R&D investment in the pharmaceutical industry

Industry	NAICS code	R&D Costs pay by company ($mil)	Worldwide employees (thousands)	R&D Costs per employees ($)
Computer and electronic products	334	$77,887	2,951	$26,393
Pharmaceuticals and medicines	3,254	$75,602	1,003	$75,376
Publishing (including software)	511	$39,323	1,185	$33,184
Professional, scientific, and technical services	541	$34,407	2,799	$12,293
Transportation equipment	336	$31,639	2,596	$12,188
Machinery	333	$19,334	1,805	$10,717
All industries	31-33, 42-82	$365,211	29,327	$12,453

Source: Lakdawalla (2018)

The success rate of new drug development is extremely low. In the high-throughput screening (HTS) phase of drug discovery, only one out of 100,000 compounds ultimately results in a registered new drug. In the preclinical development stage, only about one out of every 100 compounds that pass the preclinical tests eventually reaches the market. For drugs that enter the stage of clinical trials, the probability of final approval and commercialization is around 4% (Paul et al., 2010; Reuters, 2012). According to U.S. Food and Drug Administration (FDA) drug approval data from 2012, most failures in Phase II and Phase III clinical trials were due to lack of efficacy (56%), followed by safety concerns (28%), strategic shifts (7%), commercial reasons (5%), and operational challenges (5%) (Arrowsmith & Miller, 2013).

One major reason for the high failure rate in new drug development is the need to develop new targets and confirm new mechanisms of action, which involve a degree of randomness and have very low success probabilities. Another contributing factor is the increasing complexity of clinical trials and the higher regulatory standards. Lastly, commercial constraints may also negatively impact the success probability of candidate drugs; for instance, some pharmaceutical companies may abandon drug development if the projected annual sales of a candidate drug do not exceed 500 million USD (Schuhmacher et al., 2016).

The cycle for developing a new drug is also quite lengthy. From target identification to candidate compound determination, it takes an average of 4.5 years; preclinical research

requires one year; the three clinical development phases take approximately 1.5, 2.5, and 2.5 years, respectively; and regulatory approval for market entry takes an average of 18 months. In short, the entire drug development process—from target identification to product registration and commercialization—lasts an average of 14 years (Pammolli et al., 2011; Paul et al., 2010; Reuters, 2012).

In summary, the pharmaceutical industry is characterized by high R&D investment, high failure rates, and long development cycles. It is knowledge-intensive, capital-intensive, and time-intensive, with extremely high entry barriers. These characteristics set it apart from most other industries. The demanding nature of the pharmaceutical industry imposes higher standards on the professionals in this industry. At the same time, it also helps to establish formidable barriers to entry, particularly benefiting those companies that manage to succeed within the field.

2.3.2 Factors influencing performance in the pharmaceutical industry

Pradhan (2003) empirically examined the impact of economic liberalization on the R&D behavior of Indian pharmaceutical companies, controlling for the effects of several company-specific characteristics, including company size. Results of the Tobit analysis for a sample of companies over the period 1989-90 to 2000-01 indicated that competitive pressure generated by economic liberalization effectively promoted R&D activities in Indian pharmaceutical companies. Company characteristics such as company age, size, profitability, intangible assets, export orientation, and outward foreign direct investment were also found to be important determinants of innovative activity in the industry. The study suggested several policy measures to foster indigenous technological efforts of pharmaceutical companies, such as removing obstacles that inhibit companies' outward orientation, providing special scheme for small-size companies in the overall technology policy for the industry, intensifying collaborative research efforts between private sectors and government research institution, and utilizing flexibilities in the Agreement on Trade-Related Investment Measures (TRIM) to persuade foreign companies to relocate their R&D units into the country.

Taking 133 pharmaceutical listed companies as the research sample, Liu et al. (2019) empirically studied the relationship between R&D input intensity and company performance. It was concluded that there was a significant positive relationship between R&D expenditure and the operating performance of pharmaceutical companies; the greater the R&D input intensity, the higher the company's operating performance.

Yue et al. (2019) studied the impact of internal R&D on acquisition performance using a sample of 215 acquisitions of Chinese listed pharmaceutical companies from 2012 to 2016. It was found that R&D had a significant negative effect on acquisition performance, and the acquisition motive and the ownership of the acquiring company had a moderating effect on this relationship. Compared to non-technical acquisitions, the negative effect of internal R&D on acquisition performance was reduced for technical acquisitions. Compared with non-SOE acquisition, the negative effect of internal R&D on the acquisition performance of SOEs was weaker.

Nirjar (2018) focused on the Indian pharmaceutical industry and studied the impact of both social and business networks on innovation and the impact of these variables on company performance. The study also considered the impact of company age on the company's networks and innovation capability. Data from 140 companies were retrieved from the Capitaline database. The results showed a positive association between business networks and companies' innovation capabilities. Networks (both social and business), as well as R&D expenditure, were positively associated with company performance. However, the impact of patents was found to be insignificant as the Indian pharmaceutical industry is more focused on developing generic drugs. Moreover, company age was found to have a positive impact on networks, while the impact of R&D expenditure was insignificant, as companies were taking the alliance route.

The medical device industry requires constant innovation and has long-term invested in a substantial amount of R&D expenditure to secure patent rights and drive R&D outcomes, thereby enhancing its competitiveness. R&D expenditure and patent rights are thus the key factors in enabling medical device companies to maintain a competitive advantage. Luo (2018) distributed 300 questionnaires among the management and employees of medical device companies in Shanghai, the research object, and a total of 232 valid responses were recovered, with a recovery rate of 77%. The results showed positive relationships between R&D expenditure and patent rights, between patent rights and operational performance, and between R&D expenditure and operational performance.

Archarungroj and Hoshino (1999) investigated the influence of corporate R&D investment on a company's subsequent profitability and examined the differences in R&D efficiency among companies of different sizes. Based on a regression analysis of 170 Japanese companies in the chemical and pharmaceutical industries, they found that the R&D expenditure and R&D intensity were positively and significantly related to ROA, return on equity (ROE), gross profit margin, operating income margin, and ordinary income margin. Larger companies proved to be more efficient in managing R&D for profit, as indicated by all the above-mentioned profitability

variables. In addition, the findings implied a positive and significant relationship between company size and R&D investment, both in terms of an absolute amount and a ratio to sales.

Focusing on the U.S. pharmaceutical industry, Chen and Chang (2010) examined the relationships between company market value and four patent quality indicators, namely, relative patent position (RPP), revealed technology advantage (RTA), Herfindahl–Hirschman Index of patents (HHI of patents), and patent citations. The results showed that RPP and patent citations were positively associated with company market value, but HHI of patents was negatively associated with it, while RTA was not significantly related to it. Thus, the authors suggested that if pharmaceutical companies want to enhance their market value, they should increase their leading positions in their most important technological fields, cultivate more diversified technological capabilities, and raise the innovative value of their patents. In addition, the study found that the market value of pharmaceutical companies with high patent counts was higher than that of pharmaceutical companies with low patent counts, and suggested that pharmaceutical companies with low patent counts should increase RPP in their most technological fields, decrease HHI of patents, or raise patent citations to further enhance their market value.

Chang (2012) utilized a panel regression model to explore the relationship between company performance and patent performance measured from patent H index, current impact index (CII), and essential patent index (EPI) in pharmaceutical companies. The results demonstrated that the patent H index and EPI positively influenced company performance.

Farhan et al. (2020) sought to evaluate the effect of credit policy on the profitability of pharmaceutical companies listed on the Bombay (India) Stock Exchange (BSE), using a balanced panel data of 82 pharmaceutical companies from 2008 to 2017. The number of days in the collection period and the number of days in the payable deferral period were chosen to measure the companies' credit policy, while ROA was used to measure the companies' profitability. It was found that the collection period in days and the payable deferral period in days negatively and significantly affected the profitability of these pharmaceutical companies, while the control variables, including leverage, company size, and age, also showed a negative impact. The authors suggested that financial managers in pharmaceutical companies should reduce the collection period and increase the payable deferral period to reduce the risk of bad debts; they should also conduct a credit analysis to evaluate potential clients to prevent bad debts.

In the backdrop of increasing product quality and environmental degradation scandals associated with Chinese pharmaceuticals in recent years, Yang et al. (2019) used the data of

125 Chinese pharmaceutical companies between 2010–2016 to investigate the impact of overall CSR performance as well as CSR performance on the five stakeholder dimensions (i.e., shareholders, employees, customers and suppliers, environmental practices, and the society) on the company's financial performance. The Hexun rating system, a widely accepted CSR measurement tool in China, was used to gauge a company's CSR performance on various stakeholder dimensions. Company performance was measured by Tobin's Q, ROA, ROE, and EPS. The results of the panel-based regression revealed that the overall CSR score had a positive and significant influence on a company's financial indicators. Moreover, although all CSR dimensions were positively related to company performance, the environmental aspect of CSR showed the most significant impact, followed by customers and suppliers, and employees. However, the dimensions of shareholders and society had a relatively weaker influence on company performance.

Toole and Czarnitzki (2009) found that biomedical academic entrepreneurs whose human capital is oriented toward exploring scientific opportunities could significantly improve their companies' performance in research-oriented tasks, whereas biomedical academic entrepreneurs whose human capital is oriented toward exploring commercial opportunities could significantly improve their companies' performance in invention-oriented tasks.

Through a survey of 132 top- and middle-level managers from all 15 members of the Jordanian Association of Pharmaceutical Manufacturers, Sharabati et al. (2010) found strong and positive evidence that pharmaceutical companies in Jordan effectively managed intellectual capital, which, in turn, positively influenced company performance.

Saidu et al. (2021) addressed the impact of ownership structure on the financial performance of listed pharmaceutical companies in Nigeria from 2010 to 2019. The sample consisted of seven pharmaceutical companies listed on the Nigerian Stock Exchange as of 31st December, 2019. This study adopted the generalized least square random effect multiple regression technique in analyzing the data. The independent variables used are institutional ownership, block shareholding, and managerial ownership, while financial performance, the dependent variable, was measured by ROA. Institutional ownership was found to positively and significantly impact ROA. Managerial ownership and company size also had a positive impact, but it was not statistically significant. Furthermore, the study found that block shareholding had an insignificant negative impact on ROA.

Xu et al. (2021) investigated the relationship between government subsidies (including R&D and non-R&D subsidies), R&D investment, and innovation performance of Chinese pharmaceutical listed companies over the period 2009–2015. The results showed that

government R&D subsidies could stimulate companies' R&D investment; government subsidies had no significant impact on innovation performance, while R&D investment had a positive impact. In addition, they examined whether company ownership and executives' technological experience affect this relationship. They found a positive relationship between government R&D subsidies and R&D investment only in private companies, while R&D investment was found to positively influence innovation performance in state-owned companies or companies with R&D executives.

To investigate the effect of capital structure on the financial performance of pharmaceutical companies listed on Vietnam's stock market, Pham (2020) built a regression using ROE as the dependent variable and self-financing ratio, financial leverage ratio, long-term assets ratio, and debt-to-assets ratio as independent variables. They also used control variables such as company size, fixed assets ratio, and growth rate. The authors collected data from all 30 pharmaceutical companies listed on Vietnam's stock market for the period from 2015 to 2019. The ordinary least squares regression (OLS) results showed that the financial leverage ratio, long-term assets ratio, and debt-to-assets ratio were positively associated with company performance, while the self-financing ratio negatively affected ROE.

Using the unit level panel data (2000 to 2005) of the Indian pharmaceutical industry, Neogi et al. (2012) performed Stochastic Frontier Analysis (SFA) and estimated Total Factor Productivities (TFP) to measure these companies' performance. Additional analyses were arried out to identify the forces of variation in the efficiency and productivity of these companies. It was observed that companies with low efficiency and low TFP could not survive – either they ended up merging with other companies or were compelled to discontinue their operation. Moreover, managerial skills and wage rates had a significant positive effect on the performance of these companies, and some of the newly identified areas with special facilities were found to be conducive to improving the performance of the pharmaceutical industry.

Gulia (2014) lighted on the impact of working capital management on profits after tax and cash profits of leading pharmaceutical companies. Through correlation and multiple regression analysis, the results of the study showed that the company's net working capital and debt significantly impacted its profits. Karim et al. (2017) examined the effect of working capital management efficiency on the profitability of two leading pharmaceutical companies, namely, Bangladesh Square Pharmaceuticals Limited and Beximco Pharmaceuticals Limited. The secondary data for a period of ten years (2006-2015) were analyzed using correlation, t-tests, and various profitability, liquidity, and solvency ratios. The results of their study showed a

significant relationship between working capital management efficiency and profitability in both companies.

Ouyang (2019) studied the impact of social capital on company performance in Chinese pharmaceutical companies. By constructing a theoretical model and testing the hypotheses, the study had the following findings: 1) External social capital was conducive to exploratory learning of pharmaceutical companies, while internal social capital was favorable for exploitative learning. 2) Exploratory learning of pharmaceutical companies played a positive role in improving the ability of exploitative learning; however, exploratory learning and exploitative learning had different impacts on different aspects of company performance. 3) Organizational learning mediated the relationship between social capital and business performance in pharmaceutical companies.

Yameen (2019) investigated the impact of liquidity on the profitability of pharmaceutical companies listed on Bombay (India) Stock Exchange (BSE). Based on a balanced panel data of 82 pharmaceutical companies for the period of ten years from 2008 to 2017 retrieved from ProwessIQ database, the findings revealed that current liquidity ratio and quick ratio had a positive and significant impact on the profitability of pharmaceutical companies measured by ROA, while control variables such as leverage, company size, and age had a negative impact.

2.4 Research gap

Through a literature review on the factors influencing the performance of pharmaceutical companies globally, we found that relevant literature is limited. According to the literature, the factors related to the performance of pharmaceutical companies include R&D, patent, company size, company age, ownership structure, social capital, credit, corporate social responsibility, liquidity, and subsidy, among others, the vast majority of which are also applicable to non-pharmaceutical companies. Among these factors, the most studied is the impact of R&D on the performance of pharmaceutical companies. R&D factors have received the most attention from researchers. However, the author of this thesis, as a senior practitioner in the pharmaceutical industry, found that R&D factors could not adequately explain the unique phenomenon observed in China's pharmaceutical industry. In addition, the 22 non-R&D factors identified from the literature review could not effectively explain this special phenomenon either. There should be some non-R&D factors that significantly influence the performance of China's pharmaceutical companies, which requires further exploration in the context of China's pharmaceutical industry.

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Chapter 3: Research Methods

3.1 Multiple case study

This multiple case study is a qualitative research method that explores or tests theories through the systematic analysis of multiple real-world cases (usually two or more). Its core lies in uncovering the complex mechanisms or patterns underlying a phenomenon by analyzing the commonalities and differences across cases. Researchers are typically guided by theoretical objectives and purposefully select cases that are comparative, representative, or complementary in nature (e.g., successful vs. failed cases, cases from different industries or cultural backgrounds), rather than relying on random sampling (Stake, 2013).

During the research process, each case must be independently analyzed in an in-depth manner using multiple sources of data, such as interviews, archival records, and observations, with data reliability ensured through triangulation. Subsequently, cross-case comparison is conducted to identify causal relationships or patterns among the key variables, for example, how certain conditions lead to different outcomes.

Compared with single case studies, the multiple case design can significantly enhance the external validity of conclusions, making it more suitable for theory validation or modification after the theory has been constructed. However, it also presents challenges in terms of higher resource consumption and analytical complexity (Greene & David, 1984).

This method is widely applied in fields such as management, sociology, and policy evaluation, such as comparing innovation strategies across companies or examining the implementation effectiveness of policies in different regions. Its strength lies in the ability to ensure the depth of detail inherent in case studies, while also enhancing explanatory power through replication logic between cases (e.g., "literal replication" for expected similar results or "theoretical replication" for contrasting outcomes), ultimately facilitating theories' broader applicability.

3.1.1 Sample selection

The selected samples should be as representative as possible. Non-representative samples can lead to deviations from the core focus of the research, resulting in less prominent core categories

and ultimately reducing the efficiency and quality of the research. This study selected the samples for the case study based on the following criteria:

1) Listed company: This ensures that researchers can access reliable data.

2) Consistently being one of the pharmaceutical companies with the highest market capitalization in China.

3) Large-scale pharmaceutical company: As of the end of 2020, the company must had no fewer than 3,000 employees, an annual revenue of no less than 5 billion RMB (approximately 694 million USD), and a net profit of no less than 1 billion RMB (approximately 139 million USD).

4) Experienced rapid growth: From 2011 to 2020, the company's operating revenue must have grown by no less than three times.

5) Strong core competitiveness: From 2011 to 2020, the company's average return on equity (ROE) must have been at least 15%.

Through sampling, we selected three representative Chinese pharmaceutical companies as the research sample: Jiangsu Hengrui Pharmaceuticals Co., Ltd., Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering. They are highly representative Chinese pharmaceutical companies and meet the criteria mentioned above. The operating data of the three Chinese pharmaceutical companies in 2020 are shown in Table 3.1. From 2011 to 2020, the revenue of each of the three companies increased by at least three times, as detailed in Table 3.2. Moreover, the average ROE over the ten-year period from 2011 to 2020 for each company was at least 15%, as shown in Table 3.3.

Table 3.1 Operating data of the three Chinese pharmaceutical companies in 2020

Company name	Revenue (Billion RMB)	Net Profit (Billion RMB)	Number of Employees
Hengrui Pharmaceuticals	27.735 (Approx. 3.962 USD)	6.328 (Approx. 0.904 USD)	>3000
Shijiazhuang Pharmaceutical Group	24.942 (Approx. 3.563 USD)	5.16 (Approx. 0.737 USD)	>3000
Hualan Biological Engineering	5.023 (Approx. 0.718 USD)	1.613 (Approx. 0.23 USD)	>3000

Table 3.2 Revenue growth multiples (2011–2020)

Company Name	Revenue in 2011 (Billion RMB)	Revenue in 2020 (Billion RMB)	Growth Multiple
Hengrui Pharmaceuticals	4.55 (Approx. 0.65 USD)	27.735 (Approx. 3.962 USD)	6.1
Shijiazhuang Pharmaceutical Group	2.435 (Approx. 0.348 USD)	24.942 (Approx. 3.563 USD)	10.24
Hualan Biological Engineering	0.961 (Approx. 0.137 USD)	5.023 (Approx. 0.718 USD)	5.23

Table 3.3 Average ROE (2011–2020)

Year	Hengrui Pharmaceuticals	Shijiazhuang Pharmaceutical Group	Hualan Biological Engineering
2011	23.11%	44.08%	16.34%
2012	22.91%	57.38%	12.05%
2013	21.22%	13.86%	16.85%
2014	21.28%	16.33%	16.66%
2015	24.37%	19.80%	16.72%
2016	23.24%	22.30%	19.85%
2017	23.28%	21.79%	18.48%
2018	23.60%	20.29%	22.36%
2019	24.02%	22.16%	19.89%
2020	22.51%	25.30%	23.39%
Average	22.95%	26.33%	18.26%

3.1.2 Interviewee selection

The interviewees were either on-the-job employees or former employees of the sample companies. They were required to meet the following criteria:

1) with the title of manager or above during their tenure;

2) ⩾30 years old;

3) with at least two years of work experience at the company selected through purposive sampling;

4) with at least five years of experience in the pharmaceutical industry.

These criteria (see Table 3.4) aimed to guarantee that the selected employees were able to provide relatively rich, comprehensive, and accurate information about their company. In addition, such interviewees are likely to possess strong problem-solving and logical reasoning abilities, which enables better interaction with the researcher during the interviews and an effective exploration of the discussion topics, enabling the researcher to obtain more valuable information.

Table 3.4 Interviewee selection criteria

Title	Age	Years working in Jiangsu Hengrui Pharmaceuticals	Years working in the pharmaceutical industry
Manager or above	≥ 30 years old	≥ 2 years	≥ 5 years

The demographic information of the interviewees from Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering is detailed in Tables 3.5, 3.6, and 3.7, including five interviewees from Hengrui Pharmaceuticals, four from Shijiazhuang Pharmaceutical Group, and three from Hualan Biological Engineering. Due to considerations such as interviewees' privacy protection, other information about these interviewees is not detailed in this thesis.

Table 3.5 Demographic information of the interviewees from Hengrui Pharmaceuticals

Interviewee	Gender	Age (years)	Title	Function	Years working at Hengrui pharmaceuticals	Years working in the pharmaceutical industry
1	Female	37	Senior project manager	R&D (clinical operation)	5	13
2	Male	38	Manager	R&D (Chemical Manufacturing and Control, CMC)	2	13
3	Male	39	Director	Regulation affairs	11	14
4	Female	36	Senior manager	Sale and regulation affairs	11	13
5	Male	40	Senior director	Medical affairs	5	14

Table 3.6 Demographic information of the interviewees from Shijiazhuang Pharmaceutical Group

Interviewee	Gender	Age (years)	Title	Function	Years working in Shijiazhuang Pharmaceutical Group	Years working in the pharmaceutical industry
1	Male	42	Manager	R&D (Chemical Manufacturing and Control, CMC)	4	16
2	Male	42	Manager	Manufacturing	5	19
3	Male	37	Manager	Medical affairs	2	10
4	Male	40	Director	Sale	2	13

Table 3.7 Demographic information of the interviewees from Hualan Biological Engineering

Interviewee	Gender	Age (years)	Title	Function	Years working in Hualan Biological Engineering	Years working in the pharmaceutical industry
1	Male	43	Manager	Manufacturing	21	21
2	Male	41	Manager	R&D	15	17
3	Female	39	Manager	R&D	16	16

The common characteristics of these interviewees include the following:

1) They have worked in the respective pharmaceutical company for many years.

2) Their job positions are at the middle or senior levels, and they have a good knowledge of the respective pharmaceutical company.

3) They have been long working in the pharmaceutical industry, which allows them to view the companies in the context of a larger industry environment and objectively compare these

companies with other Chinese pharmaceutical companies to identify similarities and differences.

3.1.3 Data collection

This study conducted in-depth interviews with each interviewee. The final exact number of interviewees was determined by data saturation, that is, when information gathered during interviews no longer enhances or further illuminates the previous data (Cochran, 2019).

The main forms of interviews are telephone interviews and face-to-face interviews, among which telephone interviews are more commonly used, mainly because of their higher efficiency. For countries like China with a vast geographic area, undoubtedly, telephone interviews can improve the efficiency of information collection. In addition, in order to motivate some interviewees to participate and make them more willing to share their opinions, this study did not exclude the possibility of providing a certain amount of remuneration to some interviewees. The duration of each interview was about 30 minutes.

The entire interview process was recorded, so that all interview information could be stored for future analysis and consultation, preventing any information loss. Prior to recording, we first sought consent from the interviewees; when necessary, a confidentiality agreement was signed to guarantee their information security and dispel their concerns. After the interviews, the researcher wrote interview memos based on the interview contents and the recordings. These memos were not simply transcriptions of the recordings, but rather descriptions of the main contents of the interviews. They are more like portraits than photos.

As the interviews progressed, we gradually focused on more specific and relevant topics, while the topics that were not of much concern to us gradually faded out in subsequent interviews. That is because after some interviews and data processing, the researcher gradually streamlined and clarified the research directions and themes, although these directions and themes could not be immediately and clearly described yet. By doing so, the scope of interview topics gradually narrowed down, and the efficiency and purposefulness of the interviews were gradually improved. The interview process is presented in Figure 3.1.

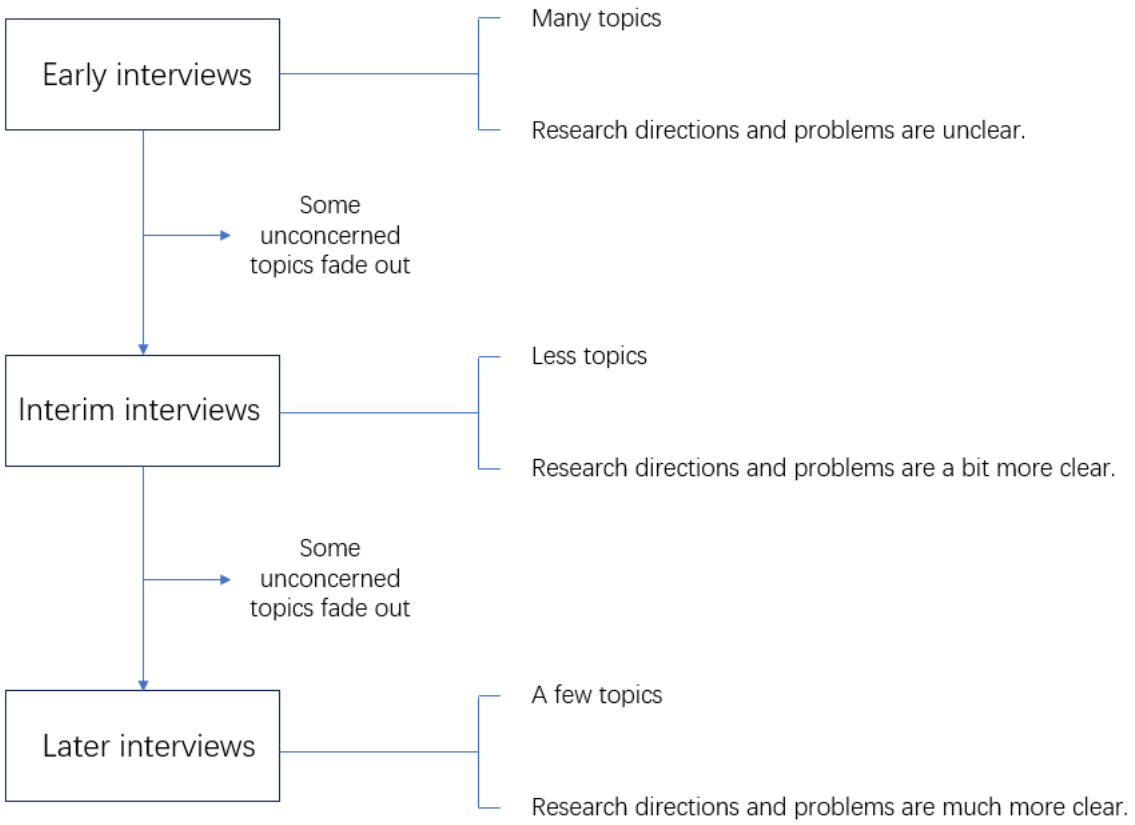

Figure 3.1 Interview process

3.1.4 Data coding

After one interview was completed, the researcher immediately wrote a memo and then encoded it line by line or paragraph by paragraph to extract the concepts or categories with strong explanatory power. Coding was conducted hierarchically. After completing the line-by-line coding (original coding), subsequent data analysis continuously produced explanatory and general concepts and categories, which are called first-level, second-level, third-level, fourth-level, or fifth-level codes, respectively. As the level of codes increased, the number of resulted concepts and categories decreased. The entire data coding process is also referred to as multi-level coding (Jia, 2010).

During data encoding, in order to improve the visualization of the encoding process and improve research efficiency, we used mind mapping software, MindMaster, which greatly improved the coding efficiency, while allowing the interrelationships between all codes to be more clearly presented to readers,.

In addition, the coding work was completed by the researcher himself independently without the assistance of anyone else. As we mentioned earlier, as individuals have different

theoretical sensitivities, using the same data, different individuals may obtain different concepts, categories, and theories, which would seriously affect the inherent logic and quality of the research. An example to illustrate the original coding process based on memos is shown in Table 3.8.

Table 3.8 Example of original coding process

Memo	Original codes	Levels of codes
Hengrui Pharmaceuticals' employees always adjust themselves to the most proactive state, and their work pressure is high. The KPI assessment indicators are very clear for each employee. The company leader allocates appropriate work tasks based on the characteristics of each employee.	Employees are proactive	First-level code
	High working pressure	First-level code
	Clear KPI	First-level code
	Discover capable people and put them at suitable posts	Second-level code

As the level of codes increased, the number of resulting concepts and categories decreased. Eventually, the most explanatory concepts or categories would appear, which is the so-called emergence of core categories.

Not all categories are considered core categories. Core categories should have at least the following characteristics:

1) Core categories or their subordinate categories should appear frequently in data analysis;

2) Core categories should have extensive connections with other categories, and such connections are often obvious and are rich in contents and forms;

3) Core categories are at the center of all categories, being associated with the most diverse categories and having the greatest explanatory power among all categories.

During data collection and analysis, the researcher continuously reflected on and compared between the concepts, categories, and cases, striving to find out the relationships between them. Eventually, core categories emerged naturally (Jia, 2010).

3.2 Questionnaire survey

3.2.1 Questionnaire design

From the multiple case study, we obtained six core categories that are highly associated with company performance. Subsequently, based on those six core categories, we determined six latent variables: leadership, operational capability, reputation, compliance response, characteristics of industry, and competitive landscape. Focusing on these latent variables, we designed a questionnaire consisting of measurement items for each variable. All items are from well-established relevant scales in the literature and have been validated to be related to these

latent variables. Table 3.9 presents the latent variables and their corresponding measurement items.

Table 3.9 Latent variables and measurement item

Latent variables	Measurement items	Source
Leadership (LE)	LE1: Our company's leader often comes up with radical improvement ideas for the products /services we are selling. LE2: Our company's leader takes risks. LE3: Our company's leader has creative solutions to problems. LE4: Our company's leader demonstrates passion for his/her work. LE5: Our company's leader has a vision of the future of our business. LE6: Our company's leader challenges and pushes employees to act in a more innovative way. LE7: Our company's leader is patient in management. LE8: Our company's leader is flexible in decision-making.	Renko et al. (2015); Mehmood et al. (2021); Yang and Bentein (2023)
Operational capability (OC)	OC1: There is a constant generation of new service ideas in this firm. OC2: We are constantly searching for new ways of doing things. OC3: There is creativity in our methods of operation. OC4: This enterprise is usually a pioneer in the market. OC5: This firm is able to introduce new products/ services every five years.	Al Azzani et al. (2024)
Reputation (RE)	RE1: We are seen by customers as being a very professional organization. RE2: Our firm is viewed by customers as one that is successful. RE3: Our firm's reputation is highly regarded. RE4: Customers view our firm as one that is stable. RE5: Our firm is viewed as well-established by customers.	Saeidi et al. (2015)
Compliance response (CR)	CR1: In my organization, we have a hotline for complaints about our compliance. CR2: My organization has a written compliance policy. CR3: In my organization, managers are asked to report regularly on compliance. CR4: Compliance performance indicators are among the individual performance indicators for our employees.	Parker & Nielsen (2009)
Characteristics of industry (CI)	CI1: The government places great emphasis on the R&D of emerging technologies and provides considerable policy guidance. CI2: Government funding support for emerging technology R&D helps to accelerate breakthroughs in emerging technologies. CI3: Favorable loan policies from financial institutions help to promote the R&D of emerging	Cao et al. (2014)

Latent variables	Measurement items	Source
	technologies.	
Competitive landscape (CL)	CL1: This industry is expanding at a rapid pace. CL2: Competition is very fierce in the industry. CL3: Our organizational unit has relatively strong competitors.	Jansen et al. (2006); Jin and Cho (2018)
Company performance (CP)	CP1: Firm's profitability CP2: Sales growth CP3: Firm's economic results CP4: Profit before tax CP5: Markets share	Papadas et al (2019)

All measurement items were measured on a 5-point scale , where 1 = "Strongly disagree", 2 = "Disagree", 3 = "Neutral", 4 = "Agree", and 5 = "Strongly agree". For the detailed contents of the questionnaire, please refer to Annex A.

3.2.2 Survey participant selection

This survey targeted professionals working in the pharmaceutical industry, while ensuring diversity in both demographic characteristics and occupational attributes.

- In terms of age, the sample included young professionals (under 30 years old), middle-aged individuals (30-50 years old), and senior professionals (over 50 years old).
- Gender distribution was kept as balanced as possible to avoid biases from a single-gender perspective.
- Regarding job positions, participants from various positions within the organizational hierarchy were included.
- In terms of functions, the survey covered key roles such as R&D, production, and sales to capture experiential differences across different work contexts.

3.2.3 Data collection procedure

A standard questionnaire collection process typically begins with clearly defining the research objectives and designing a well-structured questionnaire, ensuring that the questions are logically coherent and unambiguous. Moreover, the questionnaire should be distributed to the defined target population.

In this study, the questionnaire was imported into the Sojump website (a survey platform) and distributed via WeChat by sharing a link or QR code. Upon collection, the data were cleaned by removing invalid responses, such as those with identical answers throughout or excessively short completion times. The final dataset was anonymized and archived for analysis. The entire process required a balance between efficiency and rigor. In addition, the response rate was

enhanced through incentive mechanisms (e.g., lotteries, digital red packets), and sufficient time was reserved for follow-up to ensure the representativeness and reliability of the data.

3.2.4 Improvement of participation willingness

Improving the participation willingness of respondents is critical to ensure the research quality. To this end, we adopted four strategies in this research:

1) The researcher of this thesis is a senior executive of a Chinese pharmaceutical company, with many friends serving in other pharmaceutical companies. Therefore, the questionnaires were conveniently and primarily distributed to people working in the researcher's or his friend's companies.

2) When the participation willingness of a respondent was not strong, the researcher might give some reward (e.g., monetary) to motivate them to complete the questionnaires.

3) During the invitation phase, the significance of the survey to the industry was clearly communicated (e.g., "to improve the working environment of pharmaceutical professionals") in order to enhance respondents' willingness to participate.

4) The questionnaire was designed to be concise and mobile-friendly (to be completed within 5-10 minutes), incorporating features such as progress indicators and the ability to resume from where one left off, thereby reducing respondent burden.

High participation willingness is conducive to reducing the possibility of collecting low-quality data, thereby improving the research reliability and validity.

3.2.5 Criteria for questionnaire validity

In order to avoid interference from respondents who are not professionals from the pharmaceutical industry and to prevent participants from completing the questionnaire carelessly or inattentively, the content and sequence of the items were carefully designed. When a collected questionnaire has the following characteristics, it will be considered invalid:

1) the respondent is not employed in the pharmaceutical industry;

2) the answers follow a noticeable pattern, such as "1-2-3-4-5-1-2-3-4-5", or all items were scored "5". Invalid responses were excluded from subsequent data analysis.

3.2.6 Statistical analysis of questionnaire data

When received all valid responses, this study conducted related statistical analysis, including: descriptive statistics, common method bias test, reliability and validity analysis, Multicollinearity test.

3.3 Structural Equation Modeling (SEM)

3.3.1 Overview of SEM and method selection

Structural Equation Modeling (SEM) is a multivariate statistical analysis method used to examine complex causal relationships between variables. It is particularly well-suited for handling latent variables (i.e., abstract concepts that cannot be directly measured, such as "patient satisfaction" and "organizational trust") and observed variables (e.g., questionnaire items). The core of SEM consists of two sub-models: the measurement model (which verifies how latent variables are reflected by observed indicators) and the structural model (which analyzes the path relationships among latent variables) (Maruyama, 1997).

The advantages of SEM lie in its ability to simultaneously evaluate the overall model fit, quantify direct and indirect effects, and allow for measurement error, making it especially suitable for hypothesis testing involving multiple variables and hierarchical levels in fields such as social sciences, psychology, and management. Compared to traditional regression analysis, SEM emphasizes the integrity of the theoretical model and supports systematic testing of complex mediating and moderating effects.

Smart PLS is a modeling tool based on Partial Least Squares SEM (PLS-SEM), which complements traditional Covariance-Based SEM (CB-SEM) in terms of application contexts. The reasons for choosing Smart PLS in this study include the following:

1) Suitability for small samples: The PLS algorithm requires relatively small sample sizes (typically ten times the maximum number of paths), making it suitable for fields like the pharmaceutical industry, where large samples are difficult to obtain;

2) Prediction-orientation and flexibility: PLS focuses on the model's predictive power rather than goodness of fit, making it more appropriate for exploratory theory construction or analysis of formative indicators;

3) Nonparametric assumptions: It does not require data to conform strictly to normal distributions and can handle skewed or categorical data, which are commonly found in practical research;

4) Visualization and user-friendliness: The software provides a drag-and-drop interface and enables generation of path coefficients and significance results with just one click, facilitating rapid model iteration.

3.3.2 Applicability of PLS-SEM

Smart PLS is primarily applicable for research contexts where the data characteristics or theoretical requirements do not align with those of traditional CB-SEM. Its core applicability conditions include the following:

1) Small sample sizes or non-normal data

When sample sizes are limited or data distributions significantly deviate from normality (e.g., skewed data or a high proportion of categorical variables), the PLS algorithm, which estimates parameters iteratively and makes fewer assumptions about data distribution, can yield stable results.

2) Prediction-oriented or exploratory theory construction

When the predictive model is at an early stage of theoretical development and requires flexible adjustments in variable relationships, the predictive weight calculations in PLS are more appropriate.

3) Formative indicator models

When latent variables are "formed" by observed variables rather than "reflected" by them, PLS handles formative indicators more directly and without the need for strictly meeting model fit criteria.

4) Complex model structures

When multiple mediating and moderating effects, or higher-order latent variables need to be analyzed simultaneously, PLS's lower algorithmic complexity and support for multi-stage path analysis make it advantageous.

3.4 Summary

This chapter elaborates in detail on the research methods adopted in this study, which combines both qualitative and quantitative approaches.

First, a multiple case study was conducted. Following the criteria of sample selection, three representative Chinese pharmaceutical companies were selected as the research samples: Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering. 12 interviewees met the selection criteria and participated interviews conducted

by the researcher. Among them, five interviewees were from Hengrui Pharmaceuticals, four from Shijiazhuang Pharmaceutical Group, and three from Hualan Biological Engineering. Through telephone interviews with the interviewees, interview memos were compiled and then coded in a level-by-level manner to identify the core categories.

Subsequently, based on the results of the multiple case study, especially based on obtained six core categories, we determined six latent variables: leadership, operational capability, reputation, compliance response, characteristics of industry, and competitive landscape. Focusing on these latent variables, we designed a questionnaire consisting of measurement items for each variable. The questionnaire was imported into the Sojump website (a survey platform) and distributed via WeChat by sharing a link or QR code. And, all participants should work in the pharmaceutical industry. The questionnaire was designed by referencing the well-established scales in existing literature. On this basis, SEM was selected as the quantitative analysis method, and SmartPLS was used to test the relationships among variables.

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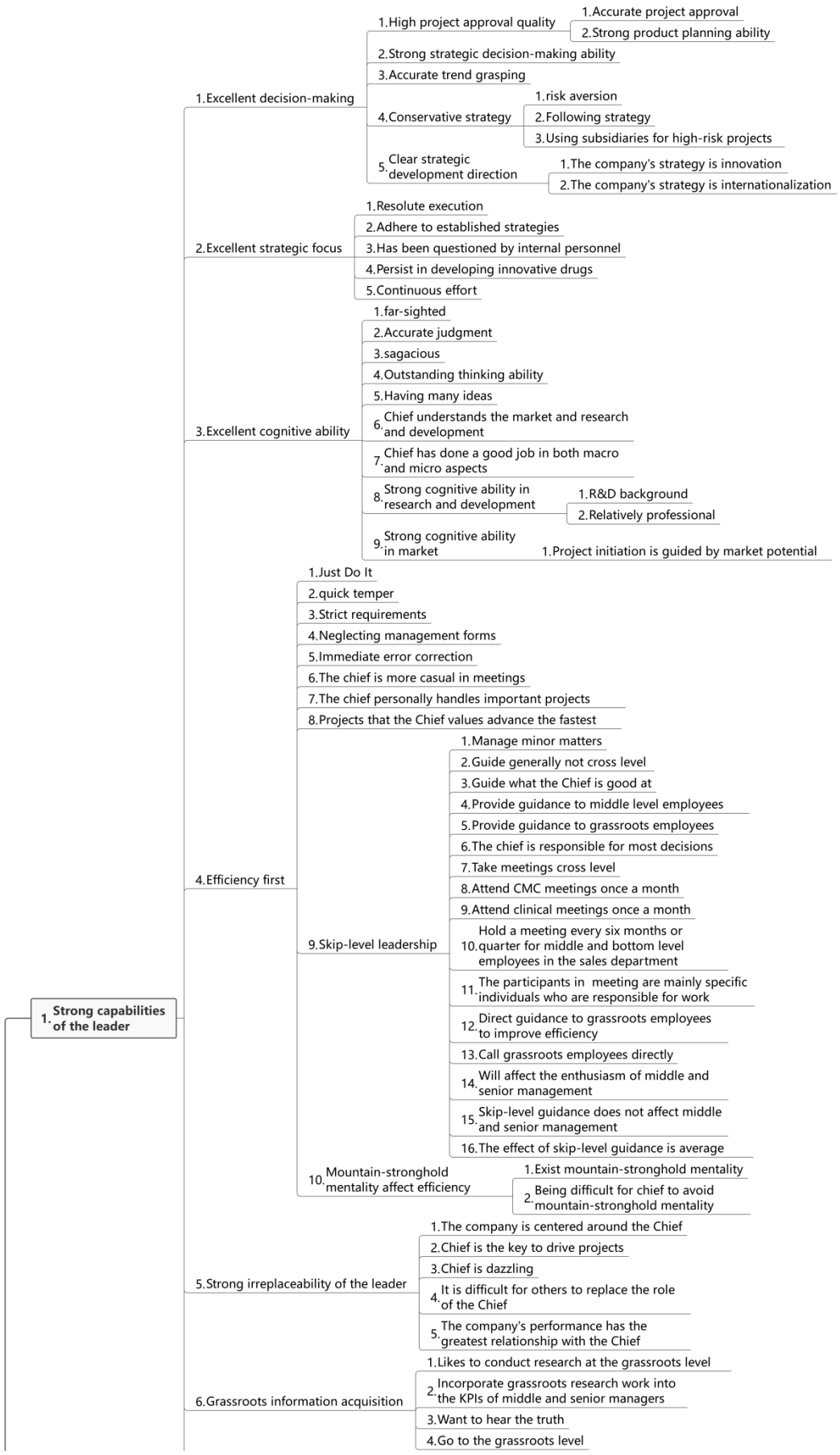
Chapter 4: Results of Multiple Case Study and Theoretical Model Construction

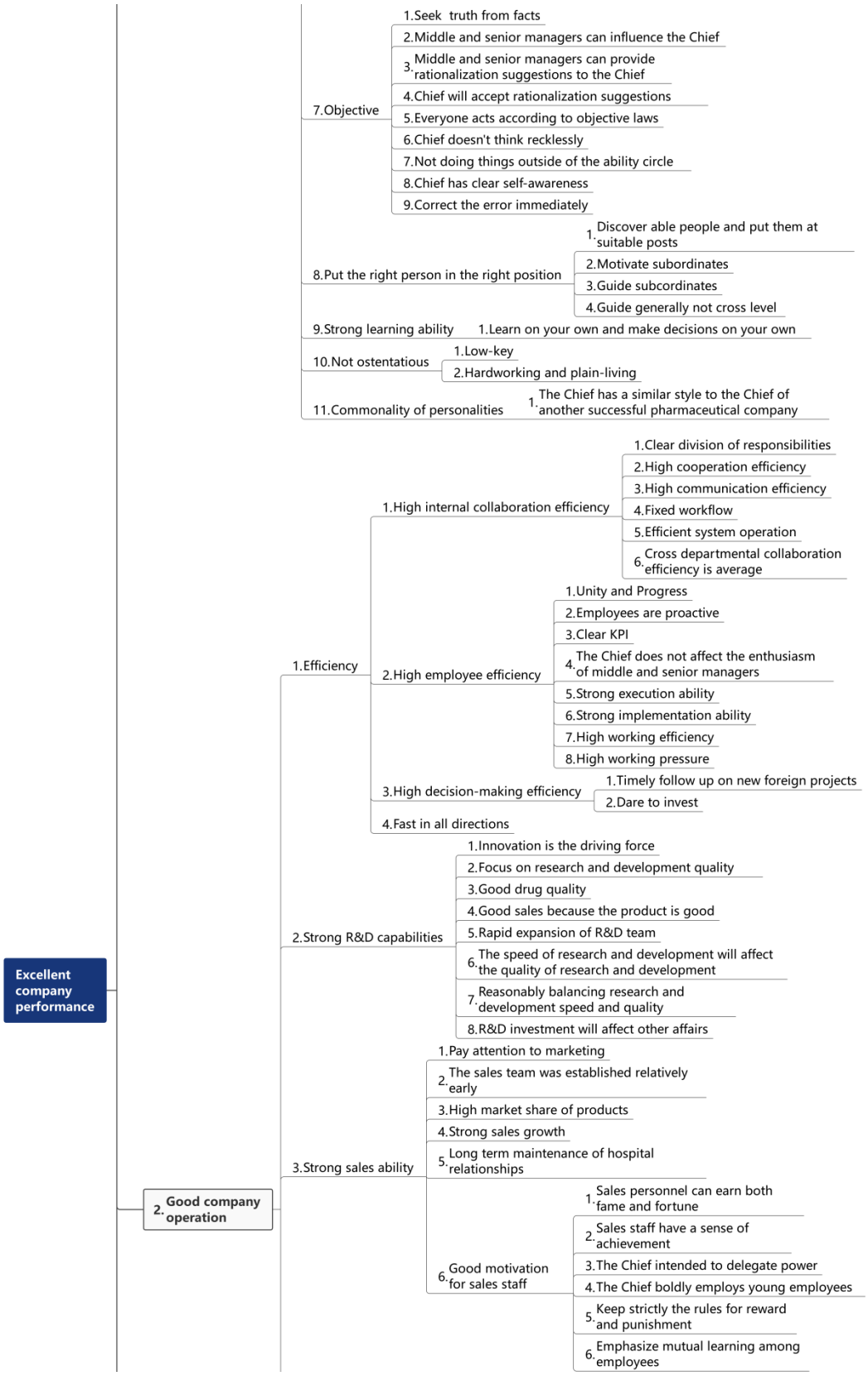
4.1 Data encoding

In the process of textual data coding for the multiple case study, an in-depth analysis and individual coding were first conducted for the data of each of the three case companies. In the second round, cross-case comparisons and clustering were carried out to generate higher-order themes (e.g., categorizing various scattered intervention behaviors under the theme of "non-conventional intervention mechanisms"). Subsequently, key distinctions and relationships among the core constructs were identified through cross-case comparison. This approach ensured both contextual sensitivity to each individual case and the theoretical development across cases.

4.1.1 Coding results of Hengrui Pharmaceuticals

From the sample of Hengrui Pharmaceuticals, we obtained a total of 152 original codes, which were directly generated by coding the original data in the memos. Through the level-by-level coding process, we obtained codes of five levels, including 59 first-level codes, 100 second-level codes, 28 third-level codes, six fourth-level codes, and one fifth-level code, as shown in Figure 4.1. In general, a higher level contains a smaller number of codes and shows greater generality and representativeness. Here, we would like to clarify that the original codes are not necessarily first-level codes. They can be first-level codes, second-level codes, or even third-level codes. That is because some original codes were placed at the second-level or third-level position during the level-by-level coding process (multi-level coding), and no lower-level codes were found on their right side.


1. Strong capabilities of the leader
1.Excellent decision-making
1.High project approval quality
1.Accurate project approval
2.Strong product planning ability
2.Strong strategic decision-making ability
3.Accurate trend grasping
4.Conservative strategy
1.risk aversion
2.Following strategy
3.Using subsidiaries for high-risk projects
5.Clear strategic development direction
1.The company's strategy is innovation
2.The company's strategy is internationalization
2.Excellent strategic focus
1.Resolute execution
2.Adhere to established strategies
3.Has been questioned by internal personnel
4.Persist in developing innovative drugs
5.Continuous effort
3.Excellent cognitive ability
1.far-sighted
2.Accurate judgment
3.sagacious
4.Outstanding thinking ability
5.Having many ideas
6.Chief understands the market and research and development
7.Chief has done a good job in both macro and micro aspects
8.Strong cognitive ability in research and development
1.R&D background
2.Relatively professional
9.Strong cognitive ability in market
1.Project initiation is guided by market potential
4.Efficiency first
1.Just Do It
2.quick temper
3.Strict requirements
4.Neglecting management forms
5.Immediate error correction
6.The chief is more casual in meetings
7.The chief personally handles important projects
8.Projects that the Chief values advance the fastest
9.Skip-level leadership
1.Manage minor matters
2.Guide generally not cross level
3.Guide what the Chief is good at
4.Provide guidance to middle level employees
5.Provide guidance to grassroots employees
6.The chief is responsible for most decisions
7.Take meetings cross level
8.Attend CMC meetings once a month
9.Attend clinical meetings once a month
10.Hold a meeting every six months or quarter for middle and bottom level employees in the sales department
11.The participants in meeting are mainly specific individuals who are responsible for work
12.Direct guidance to grassroots employees to improve efficiency
13.Call grassroots employees directly
14.Will affect the enthusiasm of middle and senior management
15.Skip-level guidance does not affect middle and senior management
16.The effect of skip-level guidance is average
10.Mountain-stronghold mentality affect efficiency
1.Exist mountain-stronghold mentality
2.Being difficult for chief to avoid mountain-stronghold mentality
5.Strong irreplaceability of the leader
1.The company is centered around the Chief
2.Chief is the key to drive projects
3.Chief is dazzling
4.It is difficult for others to replace the role of the Chief
5.The company's performance has the greatest relationship with the Chief
6.Grassroots information acquisition
1.Likes to conduct research at the grassroots level
2.Incorporate grassroots research work into the KPIs of middle and senior managers
3.Want to hear the truth
4.Go to the grassroots level


Excellent company performance
2. Good company operation
1.Efficiency
2.Strong R&D capabilities
3.Strong sales ability
7.Objective
1.Seek truth from facts
2.Middle and senior managers can influence the Chief
3.Middle and senior managers can provide rationalization suggestions to the Chief
4.Chief will accept rationalization suggestions
5.Everyone acts according to objective laws
6.Chief doesn't think recklessly
7.Not doing things outside of the ability circle
8.Chief has clear self-awareness
9.Correct the error immediately
8.Put the right person in the right position
1.Discover able people and put them at suitable posts
2.Motivate subordinates
3.Guide subcordinates
4.Guide generally not cross level
9.Strong learning ability
1.Learn on your own and make decisions on your own
10.Not ostentatious
1.Low-key
2.Hardworking and plain-living
11.Commonality of personalities
1.The Chief has a similar style to the Chief of another successful pharmaceutical company
1.High internal collaboration efficiency
1.Clear division of responsibilities
2.High cooperation efficiency
3.High communication efficiency
4.Fixed workflow
5.Efficient system operation
6.Cross departmental collaboration efficiency is average
2.High employee efficiency
1.Unity and Progress
2.Employees are proactive
3.Clear KPI
4.The Chief does not affect the enthusiasm of middle and senior managers
5.Strong execution ability
6.Strong implementation ability
7.High working efficiency
8.High working pressure
3.High decision-making efficiency
1.Timely follow up on new foreign projects
2.Dare to invest
4.Fast in all directions
1.Innovation is the driving force
2.Focus on research and development quality
3.Good drug quality
4.Good sales because the product is good
5.Rapid expansion of R&D team
6.The speed of research and development will affect the quality of research and development
7.Reasonably balancing research and development speed and quality
8.R&D investment will affect other affairs
1.Pay attention to marketing
2.The sales team was established relatively early
3.High market share of products
4.Strong sales growth
5.Long term maintenance of hospital relationships
6.Good motivation for sales staff
1.Sales personnel can earn both fame and fortune
2.Sales staff have a sense of achievement
3.The Chief intended to delegate power
4.The Chief boldly employs young employees
5.Keep strictly the rules for reward and punishment
6.Emphasize mutual learning among employees

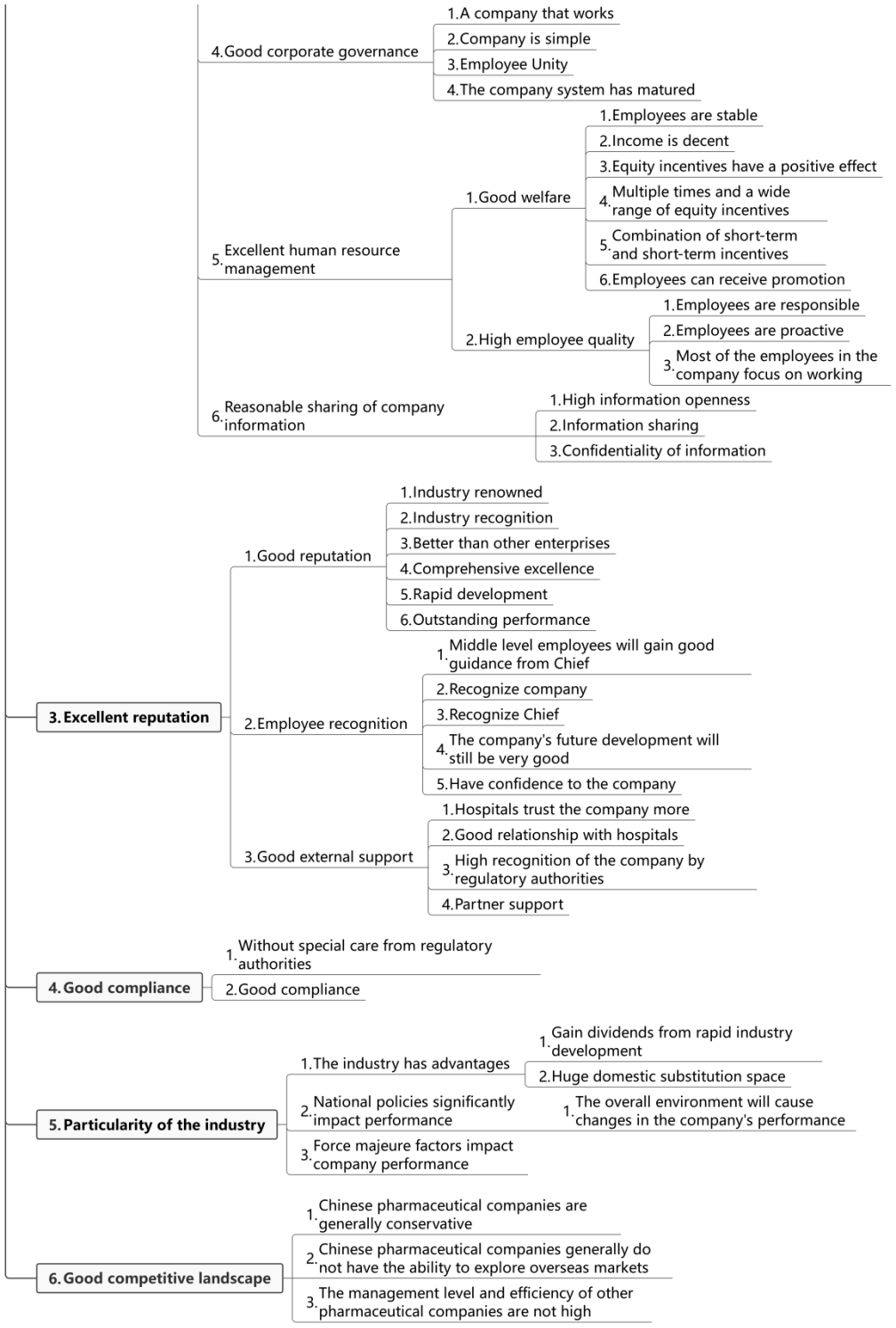


Figure 4.1 Coding results (Hengrui Pharmaceuticals)

The highest level, namely, the fifth level, contains only one code, "Excellent company performance", which precisely coincides with the research topic of this thesis. As shown in Figure 4.1, lower-level codes can be found to the right of this fifth-level code. The fourth level contains a total of six codes, including "Strong capabilities of the leader", "Good company

operation", "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape".

Among these six fourth-level codes, the ones with the highest number of subcodes are "Strong capabilities of the leader" and "Good company operation".

In particular, "Strong capabilities of the leader" was surprisingly consistently mentioned by the five interviewees multiple times. This fourth-level code contains 76 original codes, 28 first-level codes, 55 second-level codes, and 11 third-level codes. The number of original codes under "Strong capabilities of the leader" accounted for 50% of the total number of original codes in this sample. The fourth-level code "Good company operation" contains 52 original codes, 39 first-level codes, 27 second-level codes, and six third-level codes. The number of original codes under "Good company operation" exceeded one-third of the total number of all original codes.

We can clearly see that these two fourth-level codes, "Strong capabilities of the leader" and "Good company operation", contain the vast majority of the original codes. Interviewees were very concerned about these two aspects, which implies that Hengrui Pharmaceuticals' outstanding performance is likely to be highly related to these two.

The other four fourth-level codes, namely, "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape", will also be discussed later in this thesis.

It should be pointed out that the second-level code "Skip-level leadership" contains the largest number of first-level codes and original codes. It has as many as 16 first-level codes, far exceeding that of other second-level codes. Moreover, this second-level code is a subcode of "Strong capabilities of the leader", which is the fourth-level code with the greatest number of subcodes. Therefore, we would pay special attention to this second-level code in subsequent research.

4.1.2 Coding results of Shijiazhuang Pharmaceutical Group

From the sample of Shijiazhuang Pharmaceutical Group, we obtained a total of 50 original codes, which were directly extracted from the data in memos. Here, we would like to emphasize that original codes are not necessarily first-level codes; they can be first-level, second-level, or even third-level codes. That is because some original codes were placed at the position of second-level or third-level codes during the level-by-level coding process, and no lower-level codes were found on their right side, as shown in Figure 4.2. After level-by-level coding, we obtained five levels of codes, including five first-level codes, 44 second-level codes, 21 third-

level codes, five fourth-level codes, and one fifth-level code. Generally, a higher level contains a smaller number of codes, and the codes show greater generality and representativeness.

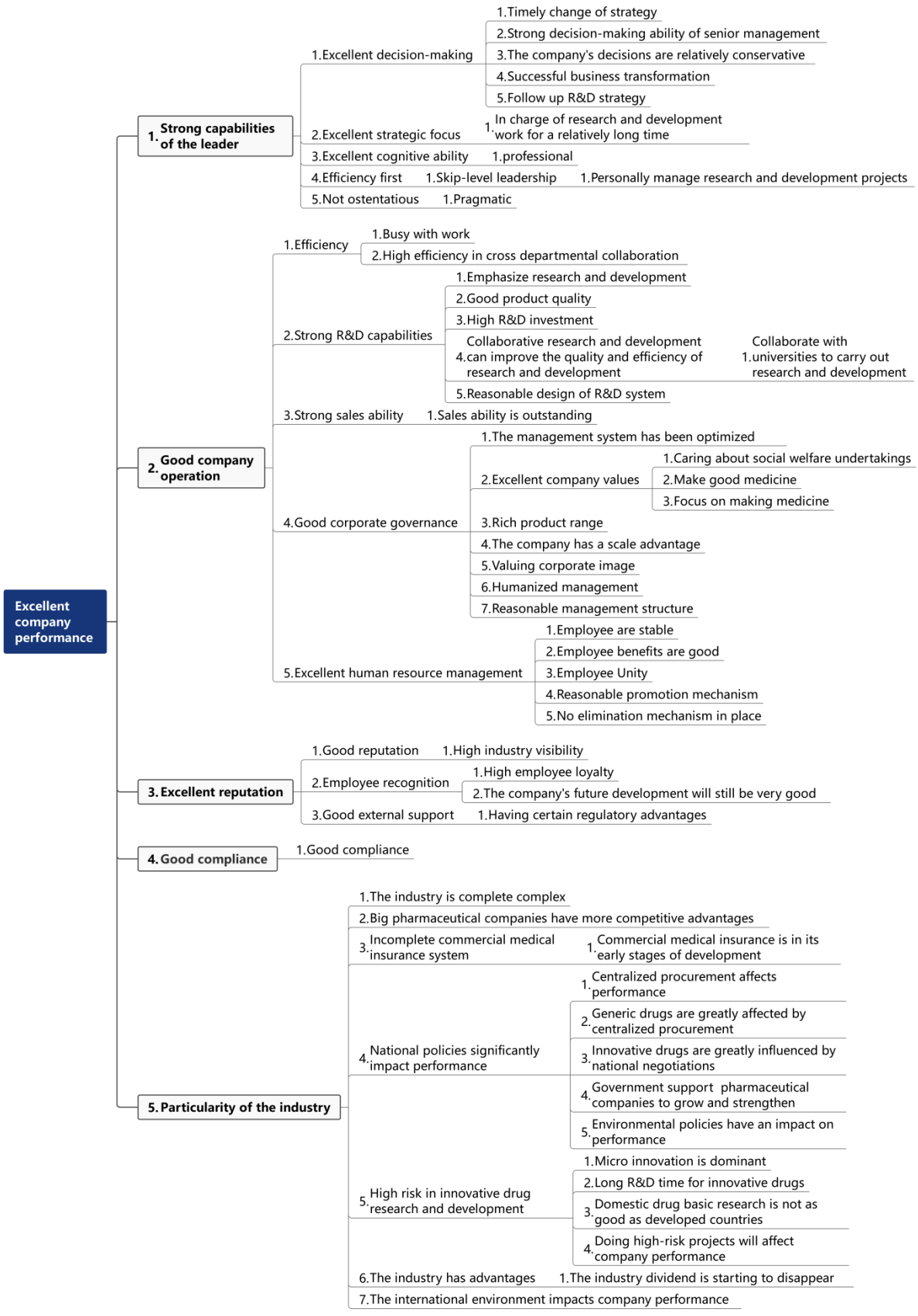


Figure 4.2 Coding results (Shijiazhuang Pharmaceutical Group)

As shown in Figure 4.2, for the sample of Shijiazhuang Pharmaceutical Group, the highest level, namely, the fifth level, contains only one code, "Excellent company performance", which precisely coincides with the research topic of this thesis. Additionally, five fourth-level codes were obtained, including "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Low regulatory risk", and "Particularity of the industry".

Among these fourth-level codes, the ones with the highest number of subcodes are "Strong capabilities of the leader", "Good company operation", and "Particularity of the industry". In particular, "Good company operation" and "Particularity of the industry" contain a lot of subcodes and received many mentions from the interviewees.

The fourth-level code "Strong capabilities of the leader" includes nine original codes, one first-level code, nine second-level codes, and five third-level codes. The fourth-level code "Good company operation" includes 22 original codes, zero first-level code, 22 second-level codes, and four third-level codes. The fourth-level code "Particularity of the industry" includes 14 original codes, zero first-level code, 11 second-level codes, and seven third-level codes. "Excellent reputation" and "Low regulatory risk" include very few codes on all levels.

Compared with Hengrui Pharmaceuticals, which obtained six fourth-level codes, the sample of Shijiazhuang Pharmaceutical Group generated fewer fourth-level codes – only five. However, these five codes are within the scope of Hengrui Pharmaceuticals' six fourth-level codes. Furthermore, no additional core categories were identified.

4.1.3 Coding results of Hualan Biological Engineering

From the sample of Hualan Biological Engineering, we obtained a total of 57 original codes, which were directly extracted from the data in memos. After level-by-level coding, we obtained five levels of codes, including four first-level codes, 53 second-level codes, 16 third-level codes, six fourth-level codes, and one fifth-level code, as shown in Figure 4.3. Usually, a higher level contains fewer codes and shows greater generality and representativeness.

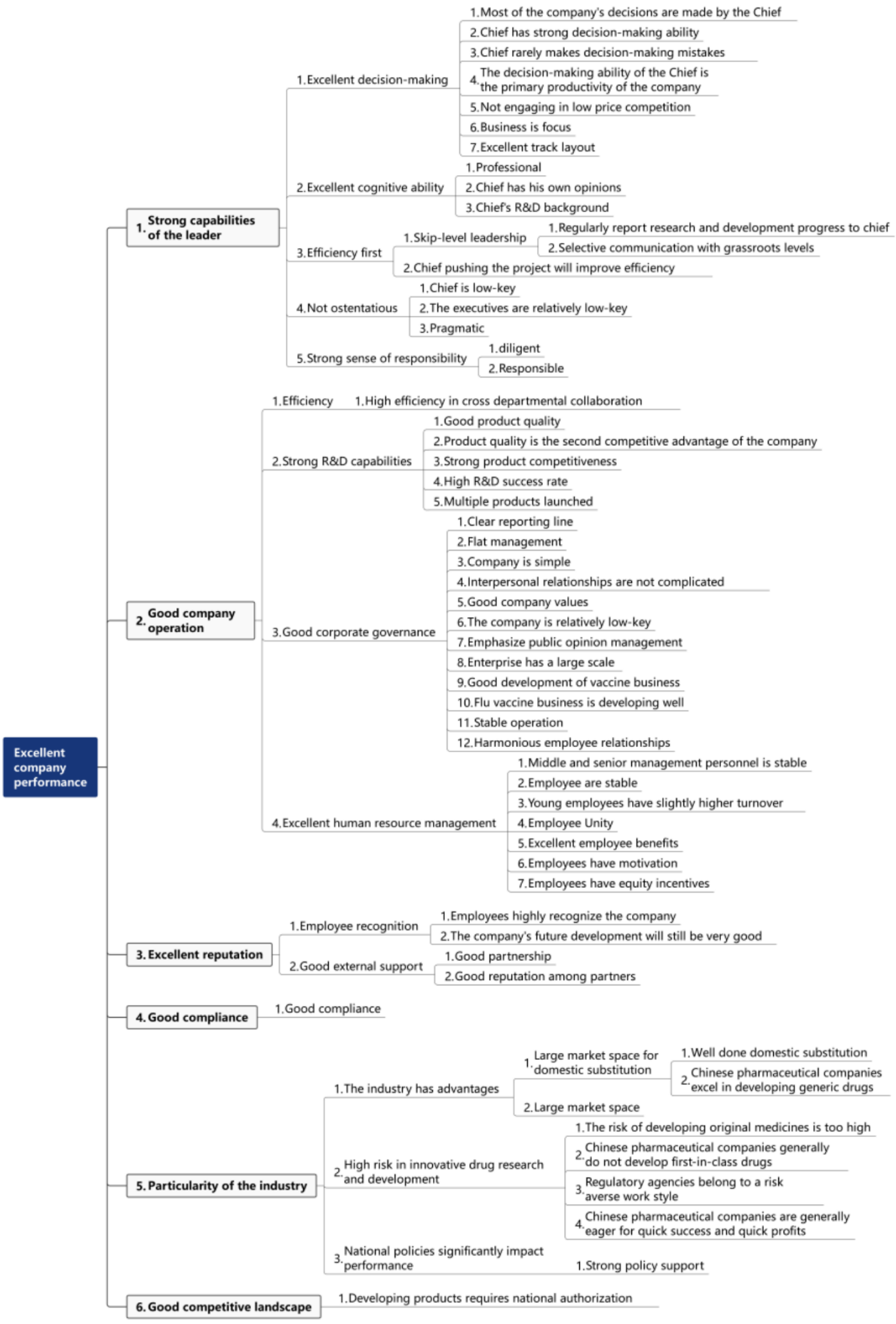


Figure 4.3 Coding results (Hualan Biological Engineering)

As shown in Figure 4.3, for the sample of Hualan Biological Engineering, the highest level is also the fifth level, only containing the code "Excellent company performance", which precisely coincides with the research topic of this thesis. Additionally, we obtained six fourth-level codes, namely, "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape".

Among these fourth-level codes, the ones with the highest number of subcodes are "Strong capabilities of the leader", "Good company operation", and "Particularity of the industry". The subcodes of these three fourth-level codes constitute the majority of all subcodes, indicating that the interviewees paid more attention to these three aspects.

The fourth-level code "Strong capabilities of the leader" contains 18 original codes, two first-level codes, 17 second-level codes, and five third-level codes. The fourth-level code "Good company operation" contains 25 original codes, four first-level codes, 20 second-level codes, and five third-level codes. The fourth-level code "Particularity of the industry" contains nine original codes, two first-level codes, seven second-level codes, and three third-level codes. "Excellent reputation" and "Low regulatory risk" contain very few codes on all levels.

Similar to Hengrui Pharmaceuticals, we obtained six fourth-level codes from the sample of Hualan Biological Engineering. Moreover, the codes from the sample of Hualan Biological Engineering are consistent with those in Hengrui Pharmaceuticals. No additional core categories were found in this research process.

4.2 Saturation test

Based on the multiple case study, this research selected two additional cases according to the same case selection criteria to conduct a saturation test. After rigorous data analysis, no additional core categories were identified, and the core categories obtained were consistent with those derived from the initial three case companies. In other words, the saturation test showed that the core categories were preliminarily saturated. There are a total of six core categories, including "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape".

4.3 Research hypotheses

Based on the constructs extracted from the multiple case study and referring to relevant literature, this study proposed a set of theoretical hypotheses, which were subsequently tested through an empirical study.

4.3.1 Positive impact of leadership on company performance

The influence of leadership on company performance has been a popular topic of research and has been explored by numerous scholars. For instance, Semuel et al. (2017) showed that leadership, through innovation and differentiation as mediators, directly or indirectly influenced hotel performance. Ibrahim and Daniel (2019) found that the leadership style of managers directly affected employees' organizational performance.

This study contends that exploring the relationship between leadership and company performance is essential, as leadership constitutes one of the core factors influencing company performance, specifically reflected in the following aspects:

First, strategic decision-making is critically important for a company. Bluntly speaking, erroneous strategies may plunge a company into a dire predicament, while sound strategies can help it stand out. It is notable that the decision-making ability of company leaders is of great significance. Leaders are responsible for setting the direction for the company, and their ability to make accurate and prompt decisions greatly contributes to the company's development. Rapid strategic decisions indicate future growth and profitability for companies (Robert Baum & Wally, 2003). All execution activities of a company are carried out within the defined strategic framework, making strategy the prerequisite for execution.

Second, an outstanding leader can fully motivate employees' enthusiasm and creativity, thereby generating greater value for the company. Participative leadership and delegation of power can enhance employee performance and contribute to the achievement of corporate goals (Semuel et al., 2017). The essence of management lies in achieving goals through others. A leader cannot handle everything personally; one of their core competencies is to mobilize employee initiative to accomplish tasks, which is also a vital pathway to achieving strategic goals.

Third, certain tasks within a company require sufficient attention and even direct guidance from leaders, especially when these tasks or projects are critical to the company. In such situations, the leader's personal capabilities become particularly important. Otherwise,

ineffective guidance may result, potentially negatively impacting the work. Leaders' personal capabilities include professional expertise, innovation capability, cognitive abilities, and managerial competencies.

Hence, this study proposes the following hypothesis:

H1: *Leadership has a positive impact on company performance*.

4.3.2 Positive impact of operational capability on company performance

Operational capability is an internal competency of a company. Its impact on company performance has been studied by numerous scholars. For example, Yu et al. (2018) found that operational capability, as a key dynamic capability, significantly influenced productivity, thereby enhancing business performance. Huo (2012) suggested that internal integration could facilitate external integration, and internal and external integration could directly or indirectly enhance company performance.

Operational capability primarily reflects the cooperation cost and efficiency within the company or between the company and its external partners. Internal operational capability involves the cooperation cost and efficiency among employees, between employees and departments, and among departments. Improving internal operational capability is achievable by relying on the company's internal forces and is considered a foundational capability of the company. Reducing internal operational costs, while maintaining constant value output, naturally leads to improved financial performance.

Additionally, a company's coordination and external cooperation capability is also critical. For instance, Frohlich and Westbrook (2001) suggested that supply chain integration, which can be defined as a company's strategic collaboration with supply chain partners to manage internal and inter-organizational processes, can help the company to achieve effective and efficient flows of products, services, information, capital, and decisions, thereby delivering maximum value to end customers at low cost and high speed.

Thus, this study proposes the following hypothesis:

H2: *Operational capability has a positive impact on company performance*.

4.3.3 Positive impact of reputation on company performance

Reputation is a crucial intangible asset for a company. Some studies have explored its relationship with company performance. For example, Herremans et al. (1993) found that during the period of 1982-1987, large U.S. manufacturing companies with higher corporate

social responsibility reputations outperformed their counterparts with lower reputations, offering greater stock returns and lower risk to investors. Rose and Thomsen (2004) posit that reputation is vital to a company's long-term survival and suggested that reputation could affect stock performance through profitability and growth rather than directly impacting the stock market.

Intangible assets often significantly affect company performance and may even constitute a company's most valuable asset (Hasprová et al., 2019). As a critical component of intangible assets, reputation warrants thorough exploration regarding its effect on company performance, manifested in the following aspects:

First, reputation may be a core consideration for customers in selecting products or services. If a company has a good social reputation, it can enhance customers' confidence in the company's products or services, thus increasing their purchase intention. Conversely, a poor reputation may reduce customers' purchase intention (Jung & Seock, 2016; Lienland et al., 2013).

Second, reputation may influence upstream suppliers' willingness to cooperate with the company. If a company has a poor reputation, its suppliers may face higher risks, such as delayed payments or even defaults, resulting in substantial bad debts.

Third, reputation may be a key consideration for potential employees in deciding whether to join the company. Alniacik et al. (2012) showed that a company's reputation affected potential employees' job application intentions.

Therefore, this study proposes the following hypothesis:

H3: *Reputation has a positive impact on company performance*.

4.3.4 Positive impact of compliance response on company performance

Tariq and Abbas (2013) found that compliance had a significant positive effect on company performance metrics such as return on assets (ROA), return on equity (ROE), and Return on capital employed (ROCE). Outa and Waweru (2016) revealed that a company's governance guidelines compliance was positively and significantly related to company performance and company value. Compliance refers to the degree to which a company's operations adhere to legal regulations and guidelines. Higher compliance levels are associated with lower operational risks, and vice versa. However, efforts to meet high compliance standards may in turn affect company performance. Hence, it is necessary to examine the relationship between compliance and company performance in depth.

Thus, this study proposes the following hypothesis:

H4: *Compliance response has a positive impact on company performance*.

4.3.5 Moderating effect of characteristics of industry

Adetunji and Owolabi (2016) demonstrated that the industry sector is the most influential industry-level determinant of a company's market performance. The findings of Hull and Rothenberg (2008) supported the moderating role of innovation and industry differentiation in the positive relationship between a company's social performance and financial performance. Characteristics of industry constitute an important external factor that influences company performance. They are objective and largely beyond the company's influence.

In the theoretical model constructed in this study, characteristics of industry are treated as a key moderator affecting the relationship between the independent and dependent variables. In this study, characteristics of industry refer to the characteristics and influence of industry stakeholders, such as the government.

Specifically, this study proposes the following hypotheses related to the moderating effect of characteristics of industry.

H5: *Characteristics of industry increase the relationship between leadership and company performance*.

H6: *Characteristics of industry increase the relationship between operational capability and company performance*.

H7: *Characteristics of industry increase the relationship between reputation and company performance*.

H8: *Characteristics of industry increase the relationship between compliance and company performance*.

4.3.6 Moderating effect of competitive landscape

According to Hitt et al. (1998), new competitive landscapes require companies to have new types of organizations and leaders to ensure survival and maintain leadership. Cho (2024) suggested that companies pursuing competitiveness and complexity in emerging markets are more likely to achieve longevity, particularly those operating in highly competitive industries shaped by industry globalization. The competitive landscape is another critical external factor influencing company performance. A company's success in achieving outstanding sales and financial performance is not solely determined by the company's internal efforts and

capabilities, but also by its competitors and customers. The dynamic competitive landscape formed by the company, its competitors, and customers significantly affects company performance.

In the theoretical model of this study, the competitive landscape is considered as another important moderator influencing the relationship between the independent and dependent variables.

Specifically, this study proposes the following hypotheses, aiming to explore the moderating effect of the competitive landscape.

H9: *Competitive landscape increases the relationship between leadership and company performance*.

H10: *Competitive landscape increases the relationship between operational capability and company performance*.

H11: *Competitive landscape increases the relationship between reputation and company performance*.

H12: *Competitive landscape increases the relationship between compliance and company performance*.

4.4 Theoretical model construction

Based on the research data and findings from the multiple case study, we identified six core categories highly related to company performance. Through a relevant literature review and hypothesis development, a theoretical model was constructed (see Figure 4.4). The model includes 12 hypotheses encompassing both direct and moderating effects. Specifically, the model incorporates four internal factors as the independent variables (i.e., leadership, operational capability, reputation, and compliance response), company performance as the dependent variable, and two external factors as moderators (i.e., characteristics of industry and competitive landscape).

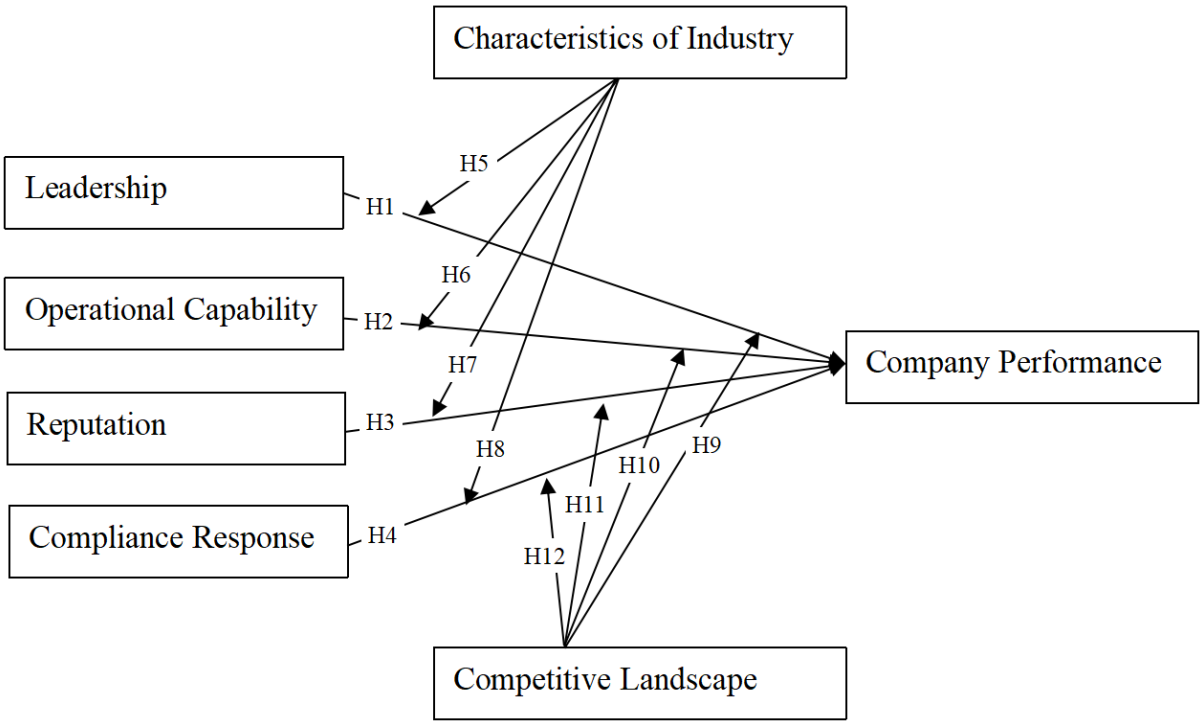


Figure 4.4 Theoretical model

Chapter 5: Results of Questionnaire and Hypothesis Testing

5.1 Demographic characteristics of the sample

A total of 274 valid responses were collected in this study. After excluding 23 responses that were not from the pharmaceutical industry, the remaining 251 responses were used as the sample for hypothesis testing. Detailed demographic characteristics of the respondents are presented in Table 5.1. Among the respondents, 95.33% were from the pharmaceutical industry, which was expected, as the focus of this study is the pharmaceutical industry; 99.33% respondents held Bachelor's degree or above, showing that the respondents possessed good comprehension ability. Male and female each accounted for about half. 96.7% respondents were over 30 years old. More than 75% of respondents had academic backgrounds related to pharmaceutical or medical. About two-thirds of respondents came from R&D departments and had the titles of manager or above. 8% respondents had international work experience and 96% were on job when they answered the questionnaire.

Table 5.1 Demographic characteristics of the sample

No.	Characteristics	Frequencies							
1	**Gender**	Male 49.33%	Female 50.67%						
2	**Age (years)**	<30 9.33%	30-40 64%	40-50 21.33%	50-60 4.67%	>60 0.67%			
3	**Education level**	High School 0.67%	Bachelor 25.33%	Post-Graduate 11.33%	Master 43.33%	Doctor 19.33%			
4	**Academic background**	Business & management 4%	Pharmaceutical 54%	Medical sciences 21.33%	IT 0%	Engineering 3.33%	Math & physics 0.67%	Social sciences 1.33%	Others 15.33%
5	**Title**	Bellow manager 32%	Manager 27.33%	Director 28%	Vice president 4%	President 1.33%	Others 7.33%		
6	**Department**	R&D 66.67%	Manufacturing 8.67%	Sales 1.33%	Management 11.33%	Others 12%			
7	**Are you on the job now?**	Yes 96%	No 4%						
8	**Do you work in the pharmaceutical industry?**	Yes 95.33%	No 4.67%						
9	**Do you have International work experience?**	Yes 8%	No 92%						

5.2 Descriptive statistics

The descriptive statistics of each measurement item are presented in Table 5.2. Each item has 251 responses, and the rating for each item ranges from 1 to 5. Each item counts Mean, Skewness and Kurtosis.

Table 5.2 Descriptive statistics

Item	N	Min	Max	Mean		SD	Skewness		Kurtosis	
	Stats	Stats	Stats	Stats	S.E.	Stats	Stats	S.E.	Stats	S.E.
LE 1	251	1	5	3.53	0.067	1.056	-0.45	0.154	-0.046	0.306
LE 2	251	1	5	3.83	0.069	1.091	-0.754	0.154	0.022	0.306
LE 3	251	1	5	3.45	0.065	1.024	-0.305	0.154	-0.21	0.306
LE 4	251	1	5	3.99	0.068	1.071	-1.117	0.154	0.79	0.306
LE 5	251	1	5	3.73	0.064	1.015	-0.662	0.154	0.342	0.306
LE 6	251	1	5	3.47	0.074	1.171	-0.556	0.154	-0.376	0.306
LE 7	251	1	5	3.39	0.073	1.155	-0.428	0.154	-0.377	0.306
LE 8	251	1	5	4.11	0.063	0.998	-1.151	0.154	1.032	0.306
OC1	251	1	5	3.56	0.069	1.088	-0.347	0.154	-0.52	0.306
OC2	251	1	5	4.02	0.064	1.008	-1.041	0.154	0.74	0.306
OC3	251	1	5	3.49	0.067	1.063	-0.235	0.154	-0.388	0.306
OC4	251	1	5	4.07	0.061	0.969	-1.049	0.154	0.797	0.306
OC5	251	1	5	3.73	0.069	1.099	-0.622	0.154	-0.225	0.306
RE1	251	1	5	3.94	0.066	1.045	-0.826	0.154	0.028	0.306
RE2	251	1	5	3.68	0.074	1.167	-0.833	0.154	0.121	0.306
RE3	251	1	5	3.77	0.058	0.926	-0.589	0.154	0.384	0.306
RE4	251	1	5	3.71	0.058	0.912	-0.413	0.154	-0.002	0.306
RE5	251	1	5	3.79	0.058	0.915	-0.62	0.154	0.24	0.306
CR1	251	1	5	3.95	0.071	1.132	-0.815	0.154	-0.333	0.306
CR2	251	1	5	3.62	0.062	0.982	-0.396	0.154	-0.228	0.306
CR3	251	1	5	3.93	0.058	0.922	-0.843	0.154	0.724	0.306
CR4	251	1	5	4.06	0.068	1.077	-0.913	0.154	-0.102	0.306
CI1	251	1	5	4.08	0.047	0.752	-0.537	0.154	0.352	0.306
CI2	251	1	5	4.15	0.051	0.801	-0.61	0.154	-0.056	0.306
CI3	251	1	5	4.16	0.047	0.751	-0.549	0.154	0.138	0.306
CL1	251	1	5	4.09	0.052	0.817	-0.614	0.154	0.044	0.306
CL2	251	1	5	4.08	0.05	0.794	-0.813	0.154	1.091	0.306
CL3	251	1	5	3.91	0.055	0.869	-0.742	0.154	0.79	0.306
CP1	251	1	5	3.96	0.066	1.052	-0.78	0.154	-0.178	0.306
CP2	251	1	5	4.2	0.067	1.066	-1.244	0.154	0.835	0.306
CP3	251	1	5	3.85	0.07	1.114	-0.817	0.154	-0.015	0.306
CP4	251	1	5	3.99	0.068	1.084	-0.971	0.154	0.223	0.306
CP5	251	1	5	3.93	0.075	1.193	-0.937	0.154	-0.051	0.306

Note: CI = Characteristics of Industry, CL = Competitive Landscape, CP = Company Performance, CR = Compliance Response, LE = Leadership, OC = Operational capability, RE = Reputation.

5.3 Common method bias test

According to the results of Harman's single-factor test, as shown in Table 5.3, the first factor

explained 45.3% of the total variance, which might be some common method bias. Typically, if the variance explained by the first factor does not exceed 50%, the results are still acceptable(Aguirre-Urreta & Hu, 2019). In addition, other components also explained a certain percentage of the variance, suggesting the presence of multiple factors rather than a single common factor. This further reduces the possibility of common method bias. The first five components cumulatively explained 66.9% of the total variance, indicating that the majority of the variance in the data could be accounted for by these five components.

Table 5.3 Harman's single-factor test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15	45.3	45.3	15	45.3	45.3
2	2.52	7.64	52.9	2.52	7.64	52.9
3	2.07	6.29	59.2	2.07	6.29	59.2
4	1.48	4.47	63.7	1.48	4.47	63.7
5	1.05	3.19	66.9	1.05	3.19	66.9
6	0.97	2.94	69.8			
7	0.83	2.51	72.4			
8	0.7	2.11	74.5			
9	0.65	1.97	76.4			
10	0.62	1.87	78.3			
11	0.58	1.76	80.1			
12	0.51	1.55	81.6			
13	0.5	1.53	83.1			
14	0.48	1.46	84.6			
15	0.45	1.37	86			
…						
33	0.09	0.26	100			

Note: The extraction method is principal component analysis.

5.4 Reliability and validity analysis

5.4.1 Reliability test

The reliability test is used to measure the stability and internal consistency of the measurement items. Stability refers to that the respondents use the same evaluation criteria when completing the questionnaire, while internal consistency refers to the correlation between items and whether they represent the same construct (Revelle & Zinbarg, 2009). This study employed Cronbach's α coefficient to assess reliability. When Cronbach's α exceeds 0.7, it indicates that the measurement scale has good reliability (Fornell & Larcker, 1981). Additionally, the Corrected Item-Total Correlation (CITC) value can also be used to evaluate the reliability of individual items. When the CITC value is greater than 0.4, it suggests a relatively high internal

consistency between the item and the overall construct, indicating good reliability (Kerlinger, 1973). As shown in Table 5.4, the Cronbach's α coefficients of all variables were above 0.7, and all CITC values exceeded 0.4, indicating the scale's acceptable reliability.

Table 5.4 Reliability resting results

Variable	Item	CITC	Cronbach's α if item deleted	Cronbach's α
Leadership	LE 1	0.686	0.880	0.894
	LE 2	0.659	0.882	
	LE 3	0.658	0.882	
	LE 4	0.671	0.881	
	LE 5	0.590	0.888	
	LE 6	0.688	0.880	
	LE 7	0.712	0.877	
	LE 8	0.725	0.876	
Operational Capability	OC1	0.665	0.840	0.864
	OC2	0.668	0.839	
	OC3	0.721	0.826	
	OC4	0.668	0.839	
	OC5	0.699	0.831	
Reputation	RE1	0.659	0.818	0.849
	RE2	0.716	0.804	
	RE3	0.652	0.820	
	RE4	0.625	0.827	
	RE5	0.659	0.819	
Compliance Response	CR1	0.701	0.811	0.852
	CR2	0.627	0.839	
	CR3	0.724	0.803	
	CR4	0.735	0.794	
Characteristics of Industry	CI1	0.610	0.817	0.821
	CI2	0.696	0.734	
	CI3	0.726	0.704	
Competitive Landscape	CL1	0.655	0.763	0.817
	CL2	0.672	0.747	
	CL3	0.684	0.735	
Company Performance	CP1	0.788	0.905	0.921
	CP2	0.753	0.911	
	CP3	0.770	0.908	
	CP4	0.835	0.895	
	CP5	0.836	0.895	

5.4.2 Validity test

This study employed three indicators—factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR)—to assess the validity of the scale. Using Smart PLS for data analysis, the results showed that all standardized factor loadings were greater than 0.5, the AVE values were greater than 0.5, and the CR values exceeded 0.6, all meeting the acceptable criteria (see Table 5.5).

Table 5.5 Validity testing results

Variable	Item	Standardized Factor Loading	T	CR	AVE
Leadership	LE1	0.772***	28.502	0.916	0.576
	LE2	0.752***	27.458		
	LE3	0.739***	26.19		
	LE4	0.759***	25.15		
	LE5	0.677***	18.961		
	LE6	0.773***	29.024		
	LE7	0.794***	32.042		
	LE8	0.8***	33.954		
Operational Capability	OC1	0.795***	33.775	0.902	0.648
	OC2	0.791***	29.913		
	OC3	0.829***	42.59		
	OC4	0.793***	34.581		
	OC5	0.817***	34.609		
Reputation	RE1	0.782***	26.29	0.893	0.627
	RE2	0.836***	42.151		
	RE3	0.785***	27.507		
	RE4	0.762***	24.09		
	RE5	0.791***	31.556		
Compliance Response	CR1	0.841***	42.199	0.902	0.697
	CR2	0.782***	27.198		
	CR3	0.849***	39.549		
	CR4	0.865***	51.584		
Characteristics of Industry	CI1	0.785***	3.913	0.876	0.702
	CI2	0.805***	4.293		
	CI3	0.918***	5.03		
Competitive Landscape	CL1	0.854***	5.368	0.880	0.712
	CL2	0.751***	3.573		
	CL3	0.918***	5.886		
Company Performance	CP1	0.87***	55.611	0.941	0.761
	CP2	0.846***	37.152		
	CP3	0.849***	44.453		
	CP4	0.898***	69.936		
	CP5	0.897***	69.773		

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

5.5 Multicollinearity test

In a multiple linear regression model, the phenomenon of linear correlation among independent variables (X) is referred to as multicollinearity. Generally, if the Variance Inflation Factor (VIF) exceeds 10, it is considered indicative of serious multicollinearity. In this study, as shown in Table 5.6, all VIF values were lower than 5, indicating that there was no serious multicollinearity problem.

Table 5.6 Multicollinearity test results

Variable	VIF
Leadership	2.1514
Operational Capability	2.3094
Reputation	2.1032
Compliance Response	2.1698
Characteristics of Industry	1.7303
Competitive Landscape	1.82
Company Performance	3.2924

5.6 Hypothesis testing

5.6.1 Structural model evaluation

Using SmartPLS, we employed the PLS algorithm and the Blindfolding procedure to calculate the R^2 and Q^2 values of the model. According to conventional thresholds, R^2 values of 0.19, 0.33, and 0.67 indicate weak, moderate, and strong explanatory power, respectively. Q^2 values of 0.02, 0.15, and 0.35 represent weak, moderate, and strong predictive relevance. As shown in the results in Table 5.7, in this study, the R^2 value was 0.627, which is greater than 0.33, indicating moderate explanatory power of the model. The Q^2 value was 0.314, which is above 0.15, suggesting moderate predictive relevance of the model.

Table 5.7 Overall structural model evaluation results

Variable	R^2	Adjusted R^2	Q^2	SRMR
Leadership	—	—	—	0.059
Operational Capability	—	—	—	
Reputation	—	—	—	
Compliance Response	—	—	—	
Characteristics of Industry	—	—	—	
Competitive Landscape	—	—	—	
Company Performance	0.627	0.613	0.314	

The overall structural equation model generated from SmartPLS is shown in Figure 5.1. This model includes four independent variables, one dependent variable, two moderators, and two control variables.

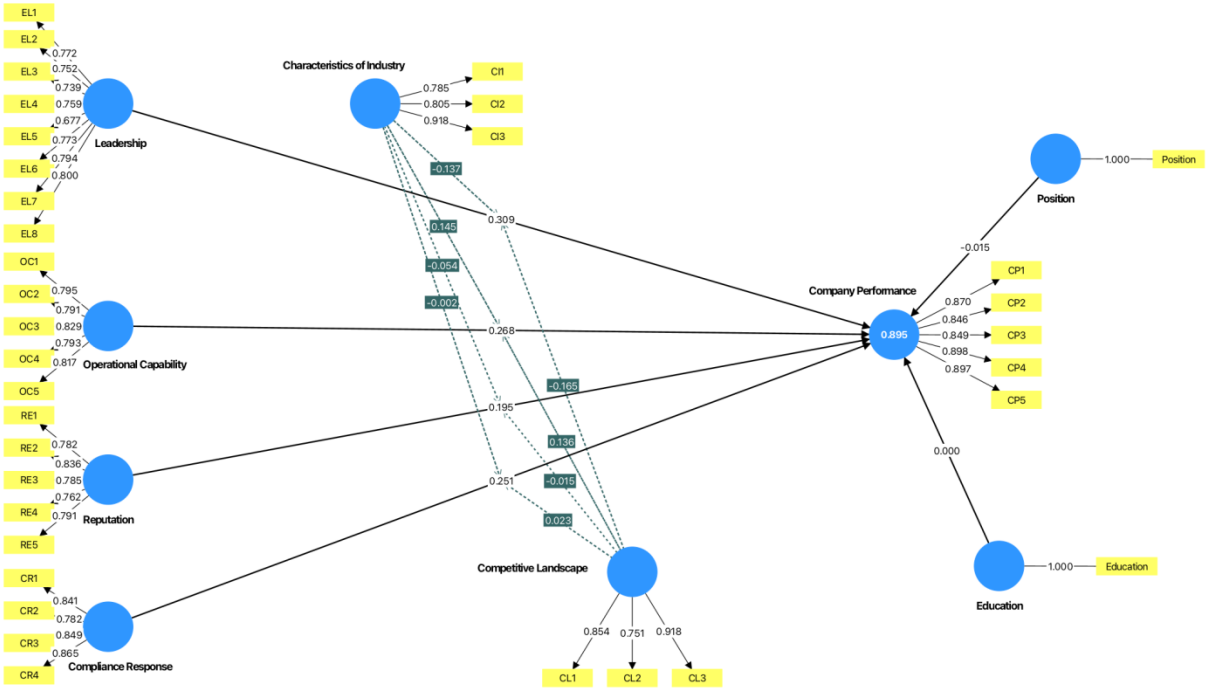


Figure 5.1 Structural equation model in SmartPLS

5.6.2 Impact of internal factors on company performance

As shown in the results reported in Table 5.8. The *p*-values for all four paths were 0.000 (<0.001), indicating statistical significance. Therefore, hypotheses H1, H2, H3, and H4 were supported. That is to say, leadership, operational capability, reputation, and compliance response all had a positive effect on company performance.

Table 5.8 Hypothesis testing results for the impact of internal factors on company performance

Path	Path Coefficient	T	*p*
H1: Leadership→Company performance	0.309	5.098	0.000
H2: Operational Capability→Company performance	0.268	5.511	0.000
H3: Reputation→Company performance	0.195	4.407	0.000
H4: Compliance Response→Company performance	0.251	6.075	0.000

5.6.3 Moderating effect of external factors

The results for the moderating effects are shown in Table 5.9.

Table 5.9 Testing results for the moderating effect of external factors

Path	Path Coefficient	T	*p*
H5: Leadership*CI→Company performance	-0.137	2.173	0.030
H6: Operational Capability*CI→Company performance	0.145	2.564	0.010
H7: Reputation*CI→Company performance	-0.054	1.254	0.210
H8: Compliance Response*CI→Company performance	-0.002	0.048	0.962
H9: Leadership*CL→Company performance	-0.165	2.700	0.007
H10: Operational Capability*CL→Company performance	0.136	2.748	0.006
H11: Reputation*CL→Company performance	-0.015	0.376	0.707
H12: Compliance Response*CL→Company performance	0.023	0.587	0.557

Note: CI = Characteristics of industry; CL = Competitive Landscape.

1) Leadership * Characteristics of industry:

The path coefficient for its impact on company performance was -0.137, with a *p*-value of 0.030. This indicates that characteristics of industry significantly moderated the relationship between leadership and company performance by weakening this relationship. Thus, H5 was not supported.

2) Operational capability * Characteristics of industry:

The path coefficient for its impact on company performance was 0.145, with a *p*-value of 0.010 (<0.05). This indicates that characteristics of industry significantly moderated the relationship between operational capability and company performance by increasing this relationship. Therefore, H6 was supported.

3) Reputation * Characteristics of industry:

The path coefficient for its impact on company performance was -0.054, with a *p*-value of 0.210 (>0.05). This indicates that the moderating effect of characteristics of industry on the relationship between reputation and company performance was not significant. Thus, H7 was not supported.

4) Compliance response * Characteristics of industry:

The path coefficient for its impact on company performance was -0.002, with a *p*-value of 0.962 (>0.05). This indicates that the moderating effect of characteristics of industry on the relationship between compliance response and company performance was not significant. Therefore, H8 was not supported.

5) Leadership * Competitive landscape:

The path coefficient for its impact on company performance was -0.165, with a *p*-value of 0.007. This indicates that the competitive landscape significantly moderated the relationship between leadership and company performance by weakening this relationship. Hence, H9 was not supported.

6) Operational capability * Competitive landscape:

The path coefficient for its impact on company performance was 0.136, with a *p*-value of 0.006 (<0.01). This indicates that the competitive landscape significantly moderated the relationship between operational capability and company performance by increasing this relationship. Thus, H10 was supported.

7) Reputation * Competitive landscape:

The path coefficient for its impact on company performance was -0.015, with a *p*-value of 0.707 (>0.05). This indicates that the moderating effect of the competitive landscape on the

relationship between reputation and company performance was not significant. Thus, H11 was not supported.

8) Compliance response * Competitive landscape:

The path coefficient for its impact on company performance was 0.023, with a *p*-value of 0.557 (>0.05). This indicates that the moderating effect of the competitive landscape on the relationship between compliance response and company performance was not significant. Therefore, H12 was not supported.

5.6.4 Control variables and company performance

The correlation coefficients between the two control variables—education level and job title—and company performance were 0.000 and -0.015, respectively. The *p*-values were 0.993 and 0.535, both greater than 0.05, indicating that there was no significant relationship between the control variables and company performance in this study.

5.6.5 Summary of hypothesis testing results

Based on the analysis above, out of the 12 research hypotheses proposed in this study, 6 were supported by the tests, and 6 were not supported. The specific results of the hypothesis tests are summarized in Table 5.10. Four independent variable were all positively associated with company performance. Two moderators all increased the relationship between operational capability and company performance, and weakened the relationship between leadership and company performance.

Table 5.10 Summary of research hypotheses testing results

No.	Hypotheses	Results
H1	*Leadership has a positive impact on company performance.*	Supported
H2	*Operational capability has a positive impact on company performance.*	Supported
H3	*Reputation has a positive impact on company performance.*	Supported
H4	*Compliance response has a positive impact on company performance.*	Supported
H5	*Characteristics of industry increase the relationship between leadership and company performance.*	Not supported
H6	*Characteristics of industry increase the relationship between operational capability and company performance.*	Supported
H7	*Characteristics of industry increase the relationship between reputation and company performance.*	Not supported
H8	*Characteristics of industry increase the relationship between compliance and company performance.*	Not supported
H9	*Competitive landscape* increase*s the relationship between leadership and company performance.*	Not supported
H10	*Competitive landscape increases the relationship between operational capability and company performance.*	Supported
H11	*Competitive landscape increases the relationship between reputation and*	Not supported

	company performance.	
H12	*Competitive landscape increases the relationship between compliance and company performance*	Not supported

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Chapter 6: Discussion

6.1 Multiple case study

6.1.1 Non-R&D factors impacting company performance

Through a literature review, we identified a total 23 variables related to company performance (see Table 2.1), including organizational absorptive capacity, strategic agility, research and development (R&D) investment, patent, company location, credit constraint, gender, environmental regulation, corporate social responsibility, enterprise resource planning (ERP) system, company size, labor productivity, human resource, leadership, intangible assets, life cycle, ownership, subsidy, managerial incentive, international diversity, emotional intelligence, customers, and competitors. Many researchers have studied the relationship between these variables and company performance, drawing relevant conclusions and putting forward their suggestions accordingly. Now, it is interesting to find out the relationship between these 23 variables and the six core categories obtained through the multiple case study in this thesis. Specifically, we attempt to find out whether these 23 variables can all be classified into these six core categories, and whether any core category falls outside the scope of the six core categories obtained in our research. Ultimately, we aim to verify the comprehensiveness and definition accuracy of these six core categories.

The results are shown in Table 6.1. We can clearly see that the 23 variables can all be covered by these six core categories. Specifically, they fall into five different core categories, including "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Particularity of the industry", and "Good competitive landscape". Among these 23 variables, 12 emerged in this research, and 11 did not. The 12 variables that emerged are located on various code levels, including the first, second, and third levels; however, none of them is a fourth-level code, which means, they are not core categories. It should be pointed out that these 12 variables may be named differently in our codes; as long as the meanings are similar, we would consider them as the same variable.

Table 6.1 Classification of the 23 variables identified in the literature

No.	Variable	Whether it emerged in this research	Which core category it belongs to
1	Strategic agility	No	Strong capabilities of the leader
2	Gender	No	
3	Leadership	Yes	
4	Emotional intelligence	No	
5	Organizational absorptive capacity	No	
6	R&D investment	Yes	Good company operation
7	Patent	No	
8	ERP system	No	
9	Labor productivity	Yes	
10	Human resource	Yes	
11	Ownership	No	
12	Managerial incentive	Yes	
13	International diversity	No	
14	Credit constraint	No	
15	Corporate social responsibility	Yes	Excellent reputation
16	Intangible assets	Yes	
17	Company location	No	
18	Environmental regulation	Yes	Particularity of the industry
19	Company size	Yes	
20	Life cycle	Yes	
21	Subsidy	No	
22	Customers	Yes	Good competitive landscape
23	Competitors	Yes	

At the same time, we can see that the core category "Low regulatory risk" is not found in Table 6.1. There are two possible reasons for that: 1) The relationship between this core category and company performance has indeed rarely or never been studied in previous research; 2) Some researchers have studied the relationship between this core category and company performance, but it was not found in our literature review. Thus , we modified the keyword and conducted further literature search, replacing "Low regulatory risk" with "Compliance," as their meanings are similar. The results showed that the relationship between "Compliance" and company performance has been explored in previous studies (Rose, 2016; Tariq & Abbas, 2013).

It is notable that these six core categories have excellent explanatory power, as they can explain almost all the codes obtained in this research and all the variables identified in the literature (as listed in Table 2.1). Excellent explanatory power is one of typical characteristics of core categories.

6.1.2 Stakeholders impacting company performance

After confirming the strong relationships between the six core categories and the performance of Chinese pharmaceutical companies, we further analyzed which stakeholders are influencing

company performance behind these relationships. Through analysis, we recognize that these relationships are essentially the impact of company-related individuals, organizations, or industrial factors on the company's performance, as illustrated in Figure 6.1.

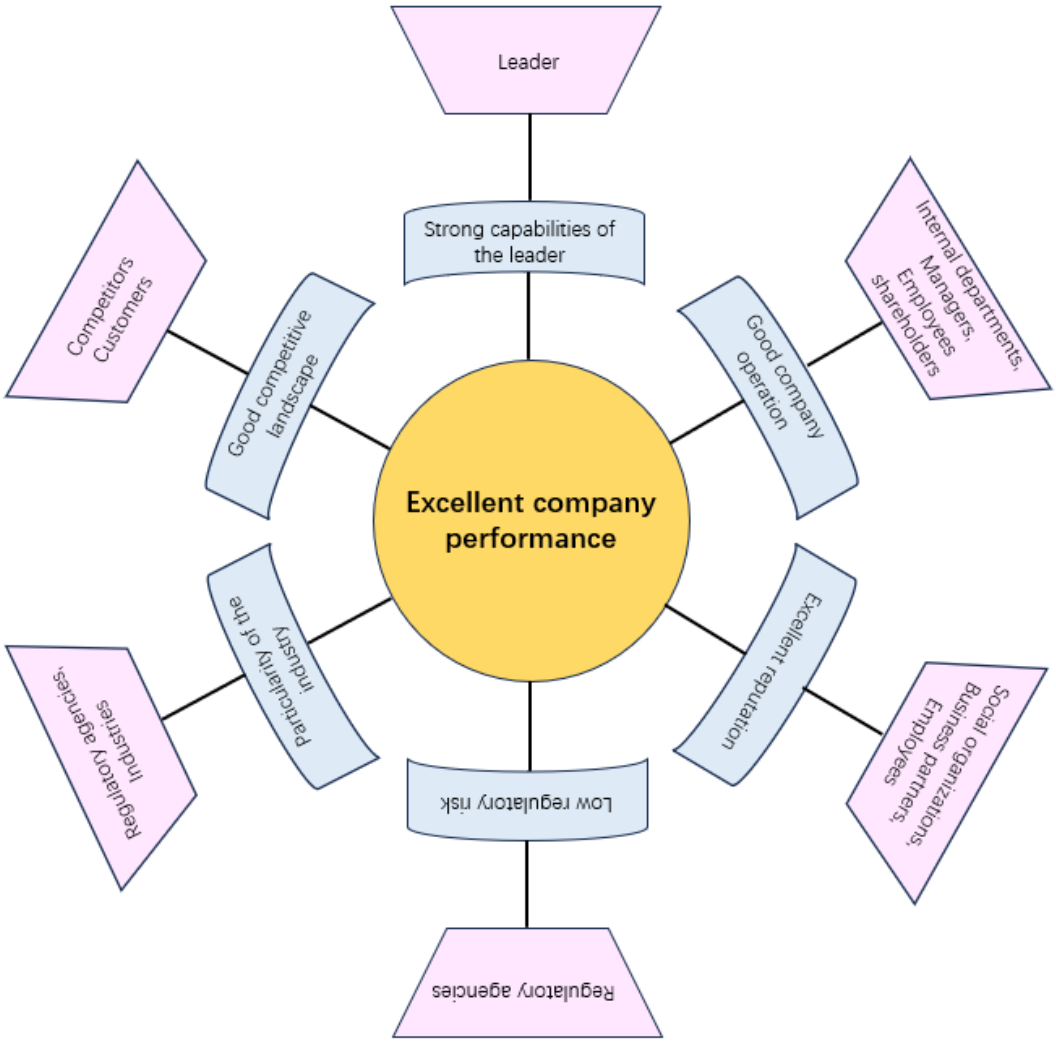

Figure 6.1 Stakeholders behind the core categories

For example, the core category "Strong capabilities of the leader" means that leader will affect company performance; "Good company operation" implies that a company's internal departments, managers, employees, and shareholders affect the company's performance; "Excellent reputation" means that business partners, employees, and social organizations can affect company performance; "Low regulatory risk" implies that regulatory agencies may affect company performance; "Particularity of the industry" means industries and regulatory agencies may affect company performance; "Good competitive landscape" implies that competitors and customers can affect company performance. The individuals, organizations, and industrial factors behind these core categories cover a quite broad range of stakeholders and are

diversified. However, although these factors can affect company performance, their explanatory power is not as significant as that of the core categories.

6.1.3 Distinctiveness of core categories between Chinese and international pharmaceutical companies

Based on the content of the interviews, this study analyzed the differences in the six core categories between Chinese pharmaceutical companies and international pharmaceutical juggernauts. The results are shown in Table 6.2. We found that "Strong capabilities of the leader" and "Particularity of the industry" are the two core categories with the greatest distinctiveness between Chinese pharmaceutical companies and international pharmaceutical juggernauts.

Table 6.2 Distinctiveness of core categories between leading Chinese and international pharmaceutical companies

Core categories	Distinctiveness
Strong capabilities of the leader	+++
Good company operation	+
Excellent reputation	++
Low regulatory risk	+
Particularity of the industry	+++
Good competitive landscape	++

In some Chinese companies, the main shareholder and the primary leader are often the same person, and this person has a strong motivation to grow his/her company, which is quite different from the situation in international pharmaceutical juggernauts. In those international companies, the managers and the major shareholders are typically not the same persons; instead, it is more common for professional managers to handle the management and operations of the company.

Additionally, over the past two or three decades, there has been a significant generational gap between domestically produced drugs in China and imported drugs. Chinese pharmaceutical companies often capitalize on their low-cost and high-efficiency advantages to rapidly imitate or make minor innovations based on similar foreign products, quickly capturing market share and achieving domestic substitution of imported products. This approach does not require significant R&D investment but can still yield considerable market share and performance outcomes. However, this factor will gradually diminish as the generational gap in drugs disappears, which may have a negative impact on the performance of Chinese pharmaceutical companies.

6.1.4 Discussion on key codes

6.1.4.1 Strong capabilities of the leader

In the purposive sampling phase of this study, two fourth-level codes (core categories)—"Strong capabilities of the leader" and "Good company operation"—received support from the greatest number of subcodes. In particular, content related to "Strong capabilities of the leader" was repeatedly mentioned by all five interviewees. This fourth-level code, "Strong capabilities of the leader", includes 76 original codes, 28 first-level codes, 55 second-level codes, and 11 third-level codes. These 76 original codes accounted for 50% of the original codes obtained from the sample. These results indicate that "Strong capabilities of the leader" is closely related to the performance of Hengrui Pharmaceuticals. It is highly likely that the company's leadership has had a significant impact on this company's performance.

Moreover, the core category "Strong capabilities of the leader" emerged in both the purposive sampling and theoretical sampling phases and received support from substantial subcodes in both stages.

In the sample of Hengrui Pharmaceuticals, the fourth-level code "Strong capabilities of the leader" received support from a total of 11 third-level codes, including "Excellent decision-making", "Excellent strategic focus", "Excellent cognitive ability", "Efficiency first", "Strong irreplaceability of the leader", "Grassroots information acquisition", "Objective", "Put the right person in the right position", "Strong learning ability", "Not ostentatious", and "Commonality of personalities".

In the sample of Shijiazhuang Pharmaceutical Group, the fourth-level code "Strong capabilities of the leader" received support from five third-level codes, including "Excellent decision-making", "Excellent strategic focus", "Excellent cognitive ability", "Efficiency first", and "Not ostentatious".

In the sample of Hualan Biological Engineering, this fourth-level code received support from five third-level codes, including "Excellent decision-making", "Excellent cognitive ability", "Efficiency first", "Not ostentatious", and "Strong sense of responsibility".

We can see that there are four third-level codes that emerged in all three samples, namely, "Excellent decision-making", "Excellent cognitive ability", "Efficiency first", and "Not ostentatious". These four are the common characteristics among the leaders of the three companies, who have led their respective companies to achieve excellent business performance.

From these characteristics, we can create a profile of an excellent leader, or an outstanding business leader, who should have the following characteristics: 1) strong cognitive and thinking

abilities, profound understanding of the laws of occurrence and development of things, and ability to make correct decisions; 2) they advocate efficiency, are result-oriented and diligent, and dislike overmanning and formalism; 3) for important projects that may affect the future development of the company, they tend to personally guide the work; 4) they are low-key and humble, do not like to show off, and enjoy doing practical things.

The above profile is a bit similar to the description of Level 5 leaders in Jim Collins's book *Good to Great: Why Some Companies Make the Leap and Others Don't* (Collins, 2009):

Characteristics of Level 5 leaders:

- Embody a paradoxical mix of personal humility and professional will;
- Set up their successors for even greater success in the next generation;
- Display a compelling modesty, are self-effacing, and understated;
- Are fanatically driven, infected with an incurable need to produce sustained results;
- Display a workmanlike diligence;
- Look out of the window to attribute success to factors other than themselves.

In addition, we found that although the second-level code "skip-level leadership" was not ranked highly in the coding hierarchy, it received support from the largest number of first-level codes and original codes in this study. For example, in the sample of Hengrui Pharmaceuticals, this second-level code, "skip-level leadership", includes 16 first-level codes, far more than any other second-level code in this sample. It is also noteworthy that "skip-level leadership" is a subcode under the most prominent fourth-level code, "Strong capabilities of the leader". Therefore, it is reasonable to believe that "skip-level leadership" is likely one of the most important aspects of a leader's capability.

We further conducted a literature review attempting to find out whether the relationship between "skip-level leadership" and efficiency improvement or between "skip-level leadership" and company performance has been studied in previous research. Matsunaga (2018) explored how "big boss" (direct supervisor's superior)'s showing commitment to innovations affects supervisors' and organizational members' psychological safety, supervisors' support, and members' innovative work behaviors, which is related to our research topic. However, in Matsunaga' article, the core variable is "commitment" rather than "skip-level leadership", and they are different. During our interviews, the interviewees held dividing views about "skip-level leadership". Some believed that "skip-level leadership" could be conducive to improving their work, while others argued that "skip-level leadership" could reduce their work efficiency,

especially the middle manager's efficiency. The variable of " skip-level leadership" is worth further in-depth exploration in future research.

Next, we will discuss the two third-level codes "Excellent decision-making" and "Excellent cognitive ability" together because we consider them highly related to each other, as "Excellent decision-making" derives from "Excellent cognitive ability", and "Excellent cognitive ability" is the foundation of "Excellent decision-making". It would be hard to imagine how a person without excellent deep thinking and cognitive abilities can always make the right choices to ensure the long-term stable and rapid development of the company over a span of 10 to 20 years. In the book *Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets*, Taleb (2016) stated that for many successful individuals, their success is often dominated by luck, and personal ability is not the most important factor. We agree with Taleb's viewpoint, but not fully. Luck can indeed dominate success and failure in a relatively short period of time, perhaps within five years; however, if a person can maintain his/her success over a period of 20 years, luck should not be the main factor. As luck has its ups and downs, both good and bad luck will occur within a 20-year timeframe, with a high probability of mean reversion. People who succeed by luck often have short-term success only and can hardly maintain their success in the long run. They are likely to end up wasting their good luck due to foolish decisions. In contrast, people who rely on cognitive and decision-making abilities to succeed often have a very different path. Their success tends to last for a longer time; even in the face of bad luck, they can quickly adjust their strategies and continue to lead the company forward. This is manifested in the Chinese pharmaceutical industry. Many Chinese pharmaceutical companies face the same environments and opportunities as Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering do. However, in fact, the latter three companies achieved better long-term success, which is unlikely to be caused by luck only.

The third-level code "Not ostentatious" actually was a surprise to us, as it unexpectedly emerged as one of the leader's core competencies. Many interviewees mentioned that their leaders were very low-key, not ostentatious; rather than show themselves in many meetings, they prefer spending time on their own work. "Not ostentatious" is a personality or temperament that allows those who possess it to minimize the impact of external interference and focus on what is truly important, making it more likely for them to do things well and achieve success.

6.1.4.2 Good company operation

In the sample of Hengrui Pharmaceuticals, the fourth-level code "Good company operation" received support from six third-level codes, including "Efficiency", "Strong R&D capabilities",

"Strong sales ability", "Good corporate governance", "Excellent human resource management", and "Reasonable sharing of company information". In the sample of Shijiazhuang Pharmaceutical Group, the fourth-level code "Good company operation" received support from five third-level codes, namely, "Efficiency", "Strong R&D capabilities", "Strong sales ability", "Good corporate governance", and "Excellent human resource management". In the sample of Hualan Biological Engineering, this fourth-level code received support from four third-level codes, namely, "Efficiency", "Strong R&D capabilities", "Good corporate governance", and "Excellent human resource management". We can see that there are four third-level codes that emerged in all three samples: "Efficiency", "Strong R&D capabilities", "Good corporate governance", and "Excellent human resource management". These four should be common features of these three Chinese pharmaceutical companies, while other third-level codes are characteristics of individual companies. For example, the third-level code "Strong sales ability" emerged in the samples of Hengrui Pharmaceuticals and Shijiazhuang Pharmaceutical Group, but not in the sample of Hualan Biological Engineering. That seems to indicate that the success of Hualan Biological Engineering does not primarily rely on outstanding sales capabilities. We will focus on "Efficiency", "Strong R&D capabilities", "Good corporate governance", and "Excellent human resource management", as we believe that these four core sub codes should make the greatest contribution to supporting the fourth-level code "Good company operation".

The third-level code, "Efficiency", is not directly found in Table 6.1, but there are two variables identified in the literature that are highly related to "Efficiency", namely "ERP system" and "labor productivity", indicating that this topic has received much attention in previous studies. During the interviews, we also acknowledged that Chinese pharmaceutical companies generally attach great importance to efficiency, which was repeatedly mentioned by multiple interviewees. From the collected data in this research, we can see that improving efficiency can enhance a company's performance; in other words, efficiency is positively related to company performance.

The third-level code "Strong R&D capabilities" has been extensively studied in the literature, and we will not devote much attention to it as this thesis intends to focus on non-R&D factors.

"Good corporate governance", a third-level code, mainly reflects the ability to collaborate between departments, between employees, between departments and employees, and between leaders and employees within the company. It reflects the company's internal management abilities and values. Companies with this characteristic often have a sound institutional system and excellent values. The company's internal operations are mostly carried out according to

this institutional system, with clearly and effectively defined responsibilities, rights, and interests. The intracompany conflict is very unlikely, and employees can concentrate on their own work, without the need to think too much about others. Office struggles are commonly less than other companies. During the research process, we found that the internal relationships of Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering, are all relatively simple. Most employees can focus on their respective responsibilities and rarely devote much energy to non-work activities.

The third-level code "Excellent human resource management" is found in Table 6.1 and is related to many variables identified in the literature, including "Human resource", "Ownership", "Managerial incentive", and "International diversity". Among them, the variables "Human resource", "Ownership", and "Managerial incentive" emerged in the codes obtained in this research (these variables express the same or similar meanings as our codes). Both previous research and this research have found the importance of "Excellent human resource management" to the company performance.

6.1.4.3 Particularity of the industry

In the sample of Hengrui Pharmaceuticals, the fourth-level code "Particularity of the industry" received support from three third-level codes, including "The industry has advantages", "National policies significantly impact performance", and "Force majeure factors impact company performance". In the sample of Shijiazhuang Pharmaceutical Group, the fourth-level code "Particularity of the industry" received support from a total of seven third-level codes, including "The industry is complete and complex", "Big pharmaceutical companies have more competitive advantages", "Incomplete commercial medical insurance system", "National policies significantly impact performance", "High risk in innovative drug research and development", "The industry has advantages", and "The international environment impacts company performance". In the sample of Hualan Biological Engineering, this fourth-level code received support from three third-level codes, namely, "The industry has advantages", "High risk in innovative drug research and development", and "National policies significantly impact performance". There are two third-level codes that emerged in all three samples, namely, "The industry has advantages" and "National policies significantly impact performance", which will our focus in subsequent discussion. The third-level code "High risk in innovative drug research and development" did not emerge in the sample of Hengrui Pharmaceuticals, but received significant sub codes support in the other two samples, Shijiazhuang Pharmaceutical Group and

Hualan Biological Engineering, each with support from four second-level codes. Therefore, we paid special attention to this topic.

The third-level code "National policies significantly impact performance" emerged in the samples of all three pharmaceutical companies, providing strong support to the fourth-level code "Particularity of the industry". Nevertheless, there is a problem here. During the interviews, the interviewees mentioned many national policies issued in recent years. For example, the centralized drug procurement policy was implemented in 2019, while the collected performance data of the three pharmaceutical companies started as early as 2001, with the latest starting in 2011. As recent national policies would not be able to impact pharmaceutical companies' performance of earlier years, the relationship between the two remains unclear. Therefore, we decided not to discuss further on this code in this study.

The third-level code "The industry has advantages" emerged in the codes of all three pharmaceutical companies. For instance, in the sample of Hualan Biological Engineering, it was supported by three original codes. By summarizing the interviewee's words, we found that the industry's advantages are mainly embodied in the following aspects: 1) There is a huge market for domestic substitution of imported drugs; 2) The domestic substitution of imported drugs is doing well; 3) Chinese pharmaceutical industry is developing rapidly. As shown in Table 6.1, a similar variable has been mentioned in the literature, namely, the "life cycle", which refers to different stages of an industry's development. In the past two to three decades, there has been a significant generation gap between domestic and imported drugs in China, as well as between drugs sold in the Chinese market and drugs sold in international markets. Chinese pharmaceutical companies can leverage their advantages of low cost and high efficiency to quickly replicate foreign drugs. When facing patent protection issues, Chinese pharmaceutical companies can make some micro innovations to break patent barriers and ultimately achieve rapid replication and substitution of foreign drugs. By doing so, they do no need to invest much in R&D but yet can achieve considerable market share and excellent performance. However, this advantage would disappear simultaneously with the disappearance of drug generation gap, thereby having a negative impact on the performance of pharmaceutical companies.

In the samples of Shijiazhuang Pharmaceutical Group and Hualan Biological Engineering, many interviewees repeatedly mentioned topics related to the third-level code "High risk in innovative drug research and development". Chinese pharmaceutical companies invested very little in novel drugs and are unwilling to develop high-risk products. Based on the analysis of the interview recordings and memos, the reasons can be summarized as follows: 1) The domestic drug substitution market is huge, enabling companies to quickly gain profits, whereas

the opportunity cost of developing novel drugs is very high. 2) Developing novel drugs is highly demanding as it requires long-term high investment with high risk. 3) Regulatory agencies tend to evaluate novel drugs in a risk-averse manner. 4) China's commercial medical insurance system is not mature yet, leaving pricy novel drugs uncovered. Due to these four possible reasons, the three typical Chinese pharmaceutical companies, namely, Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering, made similar strategic choices: to avoid developing novel drugs. From the final results, it can be said that their strategic decisions were correct. They did not invest much in R&D and did not dedicate themselves into developing novel drugs, but still achieved good performance while avoiding unpredictable risks. Many interviewees expressed that novel drug R&D is characterized with high investment, high risk, and long term, and that their companies were unwilling to spend much on that. According to them, the main reason is that the commercial price of a novel drug is not decided solely by the companies themselves, and that novel drug R&D has high risk, with low internal certainty and high failure probability – therefore, it requires an external environment with excellent certainty to offset internal uncertainty of drug R&D. The interviewees expressed that if they were not sure about financial returns and certainty of the external environment, they would not invest too much on it.

6.1.4.4 Other codes

The three core categories, "Excellent reputation", "Low regulatory risk", and "Good competitive landscape", received fewer subcodes compared to the other three core categories, namely "Strong capabilities of the leader", "Good company operation", and "Particularity of the industry". This phenomenon is particularly evident in the samples of Shijiazhuang Pharmaceutical Group and Hualan Biological Engineering. Therefore, their impact may not be as significant as that of the latter three core categories, and thus they will not be discussed in further detail here.

6.2 Questionnaire survey

6.2.1 Relationship between internal factors and company performance

The four internal factors of companies include leadership, operational capability, reputation, and compliance response. In this study, these four internal factors were regarded as independent variables, and their respective relationships with the dependent variable, Chinese pharmaceutical companies' performance, were explored.

6.2.1.1 Leadership and company performance

Leadership is defined as the ability to influence, motivate, and enable others to contribute to the effectiveness and success of the organizations to which they belong (House et al., 2002). Over the decades, research on leadership has examined the relationship between the leadership styles of top management teams and organizational performance. Meta-analyses have shown that leadership is significantly associated with expected organizational outcomes (Lowe et al., 1996; Waldman et al., 2004).

This is highly consistent with the findings of this study: leadership is indeed positively associated with company performance, at least within the pharmaceutical industry context addressed in this study. During the interviews, many respondents expressed similar views, stating that their company leaders possessed strong personal capabilities, playing a crucial role in the company's excellent performance. Particularly in Hengrui Pharmaceuticals, a representative Chinese pharmaceutical company, all five respondents agreed that their leader possessed strong personal capabilities and that the company's outstanding performance would not have been possible without the exceptionally capable leadership.

6.2.1.2 Operational capability and company performance

Operational capability entails quality, flexibility, and delivery capability, which are essential for companies in strategic competition (Vanpoucke et al., 2017). Some researchers have identified various factors in operational strategies (Jinhui Wu et al., 2012), have integrated a set of company-level operational tactics (Teece, 2019; Zhang et al., 2013), and put forward suggestions to enhance output through more effective utilization of production capacity, technology, and logistics (Zhang et al., 2013).

The results of the empirical study in this thesis confirmed that operational capability is positively associated with company performance, aligning with previous research conclusions. Operational capability is very important, especially when the products or services offered by companies are not highly differentiated. Companies with stronger operational capabilities are often able to provide customers with higher-quality and lower-cost products or services, thus gaining a relative advantage in a highly competitive market.

Many interviewees in this study noted that their companies had relatively high operational efficiency, with a corporate culture that emphasizes efficiency, allowing employees to focus on their responsibilities without distraction and promoting good coordination between departments. These factors often contribute to enhancing the company's external delivery capacity and help build trust and gain support from customers.

6.2.1.3 Reputation and company performance

Lee and James (2012) found that variables such as company reputation were significantly positively associated with most indicators for company performance, while debt leverage negatively impacted the company's profitability. Company reputation, as an intangible asset, distinguishes a company from its competitors, helps to attract repeat customers, and makes the customers willing to pay higher prices for the company's products (Eberl & Schwaiger, 2005; Roberts & Dowling, 2002). Moreover. a higher company reputation can help a company reduce costs, as employees are more willing to work for reputable companies, enabling companies to recruit and retain qualified employees at lower hiring and monitoring costs (Bergh et al., 2010; Boyd et al., 2010; Roberts & Dowling, 2002).

The results of this study also indicate that reputation is a core competitive advantage strongly associated with company performance. For a company's stakeholders, including customers, suppliers, employees, and shareholders, company reputation is a crucial consideration in deciding whether to cooperate with this company. A good reputation makes it easier for a company to secure business partnerships while reducing costs, ultimately enabling it to achieve excellent performance outcomes.

6.2.1.4 Compliance response and company performance

Previous studies generally found a positive relationship between compliance and company performance. For instance, Rose (2016) demonstrated that there was a positive relationship between ROE/ROA and the overall scores of compliance or explain disclosure in corporate governance among Danish companies. Tariq and Abbas (2013) found that compliance had a significant positive impact on company performance (ROA, ROE, and ROCE) and a weak positive relationship with technical efficiency.

The findings of previous research are consistent with those of this study, indicating that strong company compliance positively impacts company performance.

When studying the relationship between compliance and company performance, the main focus has been on the regulatory relationship between regulatory agencies and companies, including enforcement and compliance, and their impact on company performance. Regulatory agencies are among the core stakeholders of companies. An excellent company should effectively manage its relationship with regulatory agencies and fully comply with the regulations and guidelines issued by these agencies, thereby creating a favorable external regulatory environment for its healthy and sustainable development.

6.2.2 Moderating effect of external factors

In this study, external factors are regarded as moderators, including characteristics of industry and competitive landscape. Their respective moderating effects were explored.

6.2.2.1 Moderating effect of characteristics of industry

Adetunji and Owolabi (2016) demonstrated that the industry sector to which a company belongs is the most significant industry-level determinant of the company's market performance. The results of Hull and Rothenberg (2008) indicated that innovation and industry differentiation levels moderated the positive relationship between a company's social performance and financial performance; moreover, a company's social performance had a greater impact on the performance of less innovation-oriented companies and companies in low-differentiation industries.

This study explored the moderating effect of characteristics of industry on the following hypotheses:

H5: *Characteristics of industry increase the relationship between leadership and company performance*.

H6: *Characteristics of industry increase the relationship between operational capability and company performance*.

H7: *Characteristics of industry increase the relationship between reputation and company performance*.

H8: *Characteristics of industry increase the relationship between compliance and company performance*.

The results supported H6, while H5, H7, and H8 were not supported. Characteristics of industry played a significant moderating role in the relationship between operational capability and company performance by increasing this relationship.

This study focuses on the pharmaceutical industry, and the characteristics of industry can significantly boost the performance of pharmaceutical companies with strong operational capabilities. Within this industry, companies with stronger operational capabilities tend to exhibit more outstanding performance.

6.2.2.2 Moderating effect of competitive landscape

Simon and Gómez (2014) conducted two empirical studies and concluded that 1) rivals' customer satisfaction could increase a company's own customer satisfaction; and 2) rivals' customer satisfaction would reduce a company's sales. The research by Ritala et al. (2008)

indicated that a relatively high number of strategic alliances among a company's key competitors could have a negative impact on this company's company performance.

This study explored the moderating effect of competitive landscape on the following hypotheses:

H9: *Competitive landscape increases the relationship between leadership and company performance*.

H10: *Competitive landscape increases the relationship between operational capability and company performance*.

H11: *Competitive landscape increases the relationship between reputation and company performance*.

H12: *Competitive landscape increases the relationship between compliance and company performance*.

The results supported H10, while H9, H11, and H12 were not. Competitive landscape significantly moderated the relationship between operational capability and company performance by increasing this relationship.

In the pharmaceutical industry, pharmaceutical companies with stronger operational capabilities tend to achieve more outstanding performance when they are in a relatively advantageous position within the triadic relationship involving customers and competitors, compared to those lacking prominent advantages. This is often true even when the latter may also possess reasonable levels of operational capability. Therefore, pharmaceutical companies must place great emphasis on competitive strategies, especially in areas such as product development strategy and marketing strategy. The greater the advantage, the better the performance tends to be.

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Chapter 7: Conclusions

We observed an interesting phenomenon: China's pharmaceutical companies are able to good performance despite little research and development (R&D) investment. In order to find out the true reasons, we conducted systematic research by combining qualitative and quantitative research methods. In order to find out the true underlying causes, we first adopted a qualitative research approach to identify the latent variables most relevant to company performance. Based on this, we constructed a theoretical model and proposed theoretical hypotheses. Finally, we employed an empirical research method—a quantitative approach—to test the proposed hypotheses.

7.1 Main findings

The researcher of this study works in the pharmaceutical industry in China. He observed a very interesting phenomenon: comparing with international pharmaceutical juggernauts, some Chinese pharmaceutical companies achieved better company performance with very little R&D investment, which is obviously different with the current theory. Generally, it has been found in the literature that company performance is positively associated with R&D investment, such that the more the R&D investment, the better the company performance, and vice versa (Gerybadze, 2010; Yao et al., 2014; Zang et al., 2019). It is notable that the phenomenon observed in China is not consistent with the existing findings. There should be some special factors that play a role therein.

In response to the unique phenomenon in Chinese pharmaceutical industry, this study first adopted a qualitative research approach through a multiple case study. We selected three highly representative Chinese pharmaceutical companies as the research samples for the case study, aiming to identify the core variables strongly associated with company performance in Chinese pharmaceutical industry. Based on the findings from the qualitative study, a theoretical model was constructed, and 12 research hypotheses were proposed. These hypotheses were then empirically tested.

Essentially, this study employed a mixed-methods approach that integrates both qualitative research and quantitative empirical research. This strategy leveraged the respective strengths of both methods, thereby maximizing the accuracy of variable selection, the rationality of the

theoretical model, and the reliability of the research conclusions. As noted by Creswell and Creswell (2017), the adoption of mixed methods—combining quantitative and qualitative approaches—has become increasingly popular. With the continuous evolution and development of research methods, the mixed-methods approach represents a progressive step forward by fully leveraging the advantages of both methods. We believe that employing both qualitative and quantitative methods in research can enhance research comprehensiveness, providing more data and theoretical support for subsequent studies, and guiding future research to make more appropriate methodological choices, thereby improving research efficiency. This is especially valuable when researchers are uncertain about variable selection or theoretical model construction. In such cases, qualitative methods such as interviews and case studies can be employed first to more accurately identify variables and model structure, based on which, empirical research can be subsequently carried out.

In the phase of qualitative research, we selected three representative Chinese pharmaceutical companies as samples for the case study: Hengrui Pharmaceuticals, Shijiazhuang Pharmaceutical Group, and Hualan Biological Engineering. Interviews were conducted with 12 participants who were either currently employed at or had previously worked for these companies.

In the quantitative research phase, we collected a total of 251 valid questionnaire responses and conducted systematic statistical analyses on the data. Before, this research had put forward 6 research questions, and combining with which, we introduce the 6 main findings of this research, as follows:

RQ1. What are the potential factors significantly influencing the performance of Chinese pharmaceutical companies?

1) Six core categories were identified as being directly related to the performance of Chinese pharmaceutical companies: "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape"

RQ2. What are the potential factors contributing to the performance differences between Chinese pharmaceutical companies and international pharmaceutical juggernauts?

2) Among these six core categories directly related to company performance, the two categories that most distinctly differentiate Chinese pharmaceutical companies from international pharmaceutical juggernauts are "Strong capabilities of the leader" and "Particularity of the industry". They are the main contributors to the performance difference.

RQ3. Which factors serve as the independent variables, dependent variables, moderators, and control variables in the model?

3) A theoretical model was constructed. It includes four internal factors of the company—leadership, operational capability, reputation, and compliance response—as independent variables, with company performance as the dependent variable. In addition, characteristics of industry and competitive landscape are incorporated as moderators, while education level and job title are regarded as control variables.

RQ4. To what extent do the independent variables influence the dependent variable?

4) The four independent variables—leadership, operational capability, reputation, and compliance response—were all positively associated with company performance.

RQ5. What are the moderating effects of each moderator?

5) The two moderators—characteristics of industry and competitive landscape—all increased the relationship between operational capability and company performance, and weakened the relationship between leadership and company performance.

RQ6. To what extent do the control variables influence the dependent variable?

6) The two control variables — education level and job title — were not significantly associated with company performance.

7.2 Theoretical contributions

Through the two research phases, including qualitative and quantitative studies, we obtained several valuable findings. The main theoretical contributions and innovations of this study are reflected in the following aspects:

1) We identified six core categories that are directly associated with company performance: "Strong capabilities of the leader", "Good company operation", "Excellent reputation", "Low regulatory risk", "Particularity of the industry", and "Good competitive landscape". These six core categories possess strong explanatory power, and the variables identified in the literature as related to company performance can all be categorized under these six categories.

2) This study enriched the existing research on performance theory by constructing a theoretical model. It incorporates four internal factors of companies—leadership, operational capability, reputation, and compliance response—as independent variables, with company performance as the dependent variable. In addition, characteristics of industry and competitive landscape are incorporated as moderators, while education level and job title are regarded as control variables. The results of this study demonstrated that leadership, operational capability,

reputation, and compliance response all exhibited a positive relationship with company performance. Moreover, the two moderators—characteristics of industry and competitive landscape—were found to accentuate the relationship between operational capability and company performance, but weaken the relationship between leadership and company performance.

3) "Low regulatory risk" is a newly identified core category in this research, as we did not find any previous research studying the impact of "low regulatory risk" on company performance, including the pharmaceutical industry and non-pharmaceutical industries. This finding contributes to the advancement of performance theories.

4) Our analysis revealed that "Strong capabilities of the leader" and "Particularity of the industry" may be two core factors contributing to the distinctive phenomenon observed in China' pharmaceutical industry (i.e., Chinese pharmaceutical companies can achieve good performance with relatively low R&D investment). This provides theoretical support for effectively explaining this unique phenomenon observed in China's pharmaceutical industry.

5) We analyzed the underlying stakeholders behind the relationships between the six core categories and the performance of Chinese pharmaceutical companies. Through our analysis, we recognized that these relationships essentially refer to the impact of individuals, organizations, or industrial factors related to a company on the company's performance. Individuals include leaders, managers, employees, shareholders, and customers; organizations include internal departments, shareholders, business partners, social organizations, regulatory agencies, and competitors. These individuals, organizations, and industrial factors behind these core categories encompass a wide range of stakeholders and are highly diverse. However, although these factors influence company performance, they do not possess the same level of explanatory power as the core categories.

6) This study also contributes to the literature on leadership theory. It demonstrates that the phenomenon of "skip-level leadership" does not necessarily impede work efficiency. When the leaders possess strong capabilities, grassroots employees often support skip-level leadership, as it helps enhance their work efficiency.

7) Through our analysis, we found that excellent decision-making ability and cognitive ability are very important competencies of a leader. These competencies can provide a strong guarantee for the company's long-term and stable development, helping to avoid situations where poor leadership decisions could plunge the company into difficulties or even complete failure.

8) "Not ostentatious" unexpectedly emerged as one of the core competencies of leaders.

Leaders who are "Not ostentatious" prefer to spend their time on their own work, focusing on truly important matters, making them more likely to achieve successful outcomes, thereby driving substantial development and success for their companies.

9) This study found that there were significant generational gaps between domestic drugs and imported drugs in China, as well as between the drugs sold in the Chinese market and those sold in foreign markets. These generational gaps allow Chinese pharmaceutical companies to quickly and cost-effectively replicate or make minor innovations based on foreign products, thereby achieving outstanding company performance.

7.3 Practical implications

The findings of this study offer several practical implications that are particularly relevant for companies in the pharmaceutical industry:

1) Companies aiming for strong performance should first tap into their internal potential and focus on strengthening what can be controlled internally—primarily in the areas of leadership, operational capability, reputation, and compliance response. A company's leaders, especially senior leaders, should be individuals with strong capabilities. Such capabilities include cognitive ability, decision-making ability, innovation ability, and managerial ability. The company should focus on improving the efficiency of internal operations by establishing mechanisms that continuously reduce operational costs and frictional losses, thereby enhancing profit margins and reducing output prices. A company should also work on enhancing its evaluation by stakeholders (e.g., customers, suppliers, employees, shareholders, and regulatory agencies), continuously increasing their willingness to cooperate. Furthermore, companies must pay close attention to compliance, adhering to legal regulations and guidelines to maintain a favorable external regulatory environment, which is conducive to sustainable and healthy development of the company.

2) Companies should also be aware of external factors such as industrial factors and the competitive landscape. Characteristics of industry constitute a significant external factor influencing a company's development. Companies should aim to enter emerging industries or those where there is a visible developmental gap compared to foreign counterparts, so as to ensure growth potential and speed. At the same time, they should avoid entering declining industries. When crafting product or service strategies, they should try to stay away from intense, homogenized competition. Instead, companies should strive to build advantageous positions and sound business models in relation to competitors and customers, thereby establishing strong

barriers to secure long-term competitive advantages.

3) The phenomenon of "skip-level leadership" is not necessarily negative. When grassroots employees are engaged in work critical to the company's success and senior leaders have strong capabilities, skip-level leadership may be beneficial, provided that middle managers are informed. In this case, senior leaders skip the middle managers and directly guide grassroots employees, which can improve work efficiency and output quality.

4) If a company seeks long-term and stable development, it should make efforts to select outstanding leaders to guide the growth of the company. Outstanding leaders should resemble "Level 5 leaders" (Collins, 2009) and possess the following key characteristics: strong decision-making and cognitive abilities, low-profile and humble, not ostentatious, a focus on efficiency, results-oriented, a diligent work ethic, and avoidance of superficiality and formalism. In addition, when it comes to important projects that may influence the company's future development, they are inclined to personally supervise and guide the related work.

5) In situations where significant generational gaps exist in terms of product innovation between domestic and international markets, companies might consider allocating more resources to developing generic or incrementally innovative products rather than pursuing highly innovative products with higher uncertainty. This strategy can improve company performance and reduce development risk.

6) Competitive landscape has impacts on company performance, which can enhance the positive effect of company operational capability on company performance. This has a good practical guiding significance for companies. When making strategic decisions, companies should fully consider the variable of competitive landscape, such as the situation of competitors, the advantages and disadvantages of competing with competitors, and the difference in customer recognition of themselves and competitors. Companies should choose such areas for important business development: their competitive advantages with competitors are obvious enough, and customers recognize their products or services much more than their competitors.

7.4 Limitations and prospects

This research has been completed, but it has a few limitations.

First, this thesis mainly studied the pharmaceutical industry, and the samples all came from the pharmaceutical industry, including most of the interviewees and questionnaire respondents. The conclusions obtained in this study may not be applicable to other industries. It is hoped that future studies can investigate other industries to further explore the research topic.

Second, in the qualitative research phase, this study selected three representative Chinese pharmaceutical companies as the sample for the case study. Future research could consider expanding the scope and number of research samples to further enhance the quality of research.

Third, During data coding process, the coding work was completed by the researcher himself independently without the assistance of anyone else. To some extent, it is an objective process. Individuals always have different theoretical sensitivities, using the same data, different individuals may obtain different codes. Theoretical sensitivity of the researcher may affect the quality of this research.

Fourth, this research acquired 251 valid questionnaire responses, only a very small portion came from the three pharmaceutical companies involved in the multiple case study, and most responses were from other Chinese pharmaceutical companies, which to some extent may affect the quality of this research.

Fifth, this study proposed several theoretical hypotheses, some of which were empirically supported while others were not. It is hoped that future research can test these hypotheses using samples in a broader scope to further supplement and validate the findings of this study.

Finally, during the qualitative research phase, this study observed some interesting themes and phenomena, which we hope can be thoroughly studied in future research.

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Bibliography

Adetunji, O. M., & Owolabi, A. A. (2016). Firm performance and its drivers: How important are the industry and firm-level factors. *International Journal of Economics and Finance, 8*(11), 60-77.

Adeyeye, A. D., Jegede, O. O., & Akinwale, Y. O. (2013). The impact of technology innovation and R&D on firms' performance: An empirical analysis of Nigeria's service sector. *International Journal of Technological Learning, Innovation and Development, 6*(4), 374-395.

Agostini, L., Caviggioli, F., Filippini, R., & Nosella, A. (2015). Does patenting influence SME sales performance? A quantity and quality analysis of patents in Northern Italy. *European Journal of Innovation Management, 18*(2), 238-257.

Aguirre-Urreta, M. I., & Hu, J. (2019). Detecting common method bias: Performance of the Harman's single-factor test. *ACM SIGMIS database: the DATABASE for Advances in Information Systems, 50*(2), 45-70.

Agyemang, O. S., & Ansong, A. (2017). Corporate social responsibility and firm performance of Ghanaian SMEs: Mediating role of access to capital and firm reputation. *Journal of Global Responsibility, 8*(1), 47-62.

Alam, A., Uddin, M., & Yazdifar, H. (2019a). Financing behaviour of R&D investment in the emerging markets: The role of alliance and financial system. *R&D Management, 49*(1), 21-32.

Alam, A., Uddin, M., & Yazdifar, H. (2019b). Institutional determinants of R&D investment: Evidence from emerging markets. *Technological Forecasting and Social Change, 138*, 34-44.

Alniacik, E., Alniacik, U., & Erdogmus, N. (2012). How do the dimensions of corporate reputation affect employment intentions? *Corporate Reputation Review, 15*, 3-19.

Alves, M. F. R., Salvini, J. T. S., Bansi, A. C., Neto, E. G., & Galina, S. V. R. (2016). Does the size matter for dynamics capabilities?: A study on absorptive capacity. *Journal of Technology Management & Innovation, 11*(3), 84-93.

Amin, M. (2011). *Labor productivity, firm-size and gender: the case of informal firms in Argentina and Peru. Enterprise note series, No. 22.*: World Bank Group Enterprise Note.

Andries, P., & Faems, D. (2013). Patenting activities and firm performance: Does firm size matter? *Journal of Product Innovation Management, 30*(6), 1089-1098.

Anokhina, K. J. S.-e. r. b. (2014). Structure and classification of intangible assets in industrial enterprises. (4), 13-17.

Archarungroj, P., & Hoshino, Y. (1999). Firm size and R&D on profitability: An empirical analysis on Japanese chemical and pharmaceutical industry. *Japanese Journal of Administrative Science, 13*(2), 71-86.

Arrowsmith, J., & Miller, P. (2013). Phase II and Phase III attrition rates 2011-2012. *Nature reviews Drug discovery, 12*(8), 569-570.

Assagaf, A., & Ali, H. (2017). Determinants of financial performance of state-owned enterprises with government subsidy as moderator. *International Journal of Economics and Financial Issues, 7*(4), 330-342.

Aw, B. Y., Roberts, M. J., & Xu, D. Y. (2008). R&D investments, exporting, and the evolution of firm productivity. *American Economic Review, 98*(2), 451-456.

Barge-Gil, A., & López, A. (2014). R&D determinants: Accounting for the differences between research and development. *Research Policy, 43*(9), 1634-1648.

Belderbos, R., Lokshin, B., Boone, C., & Jacob, J. (2020). Top management team international diversity and the performance of international R&D. *Global Strategy Journal, 12*(1), 108-133.

Bergh, D. D., Ketchen Jr, D. J., Boyd, B. K., & Bergh, J. (2010). New frontiers of the reputation—Performance relationship: Insights from multiple theories. *Journal of management, 36*(3), 620-632.

Booltink, L. W., & Saka-Helmhout, A. (2018). The effects of R&D intensity and internationalization on the performance of non-high-tech SMEs. *International Small Business Journal, 36*(1), 81-103.

Boyd, B. K., Bergh, D. D., & Ketchen Jr, D. J. (2010). Reconsidering the reputation—performance relationship: A resource-based view. *Journal of management, 36*(3), 588-609.

Bravo-Ortega, C., & Marín, Á. G. (2011). R&D and productivity: A two way avenue? *World Development, 39*(7), 1090-1107.

Brem, A., Nylund, P. A., & Hitchen, E. L. (2017). Open innovation and intellectual property rights: How do SMEs benefit from patents, industrial designs, trademarks and copyrights? *Management Decision, 55*(6), 1285-1306.

Buonomo, I., Benevene, P., Barbieri, B., & Cortini, M. (2020). Intangible assets and performance in nonprofit organizations: A systematic literature review. *Frontiers in Psychology, 11*, 729.

Calof, J. L. (1994). The relationship between firm size and export behavior revisited. *Journal of International Business Studies, 25*(2), 367-387.

Cao, Y. (2010). Ownership concentration, ownership control and enterprise performance: Based on the perspective of enterprise life cycle. *African Journal of Business Management, 4*(11), 2309-2322.

Chamsuk, W., Fongsuwan, W., & Takala, J. (2017). The effects of R&D and innovation capabilities on the Thai automotive industry part's competitive advantage: A SEM approach. *Management and Production Engineering Review, 8*(1), 101-112.

Chang, K. C., Chen, D. Z., & Huang, M. H. (2012). The relationships between the patent performance and corporation performance. *Journal of Informetrics, 6*(1), 131-139.

Chen, G. (2019, October 11-12). *Research on Social Responsibility Information Disclosure and Performance of Pharmaceutical Companies.* Paper presented at the 5th International Conference on Economics, Management, Law and Education (EMLE 2019), Krasnodar, Russia.

Chen, Y. S., & Chang, K. C. (2010). The relationship between a firm's patent quality and its market value—The case of US pharmaceutical industry. *Technological Forecasting and Social Change, 77*(1), 20-33.

Chin, S. T. S., Anantharaman, R., & Tong, D. Y. K. (2011). Analysis of the level of emotional intelligence among executives in small and medium sized enterprises. *Journal of Human Resources Management Research, 2*, 1-13.

Cho, J. (2024). Thriving in the global competitive landscape: Competitive dynamics and longevity of emerging market firms. *Asian Business & Management, 23*(1), 82-109.

Choong, K. K. (2013). Understanding the features of performance measurement system: a literature review. *Measuring business excellence, 17*(4), 102-121.

Claessens, S., & Djankov, S. (1999). Ownership concentration and corporate performance in the Czech Republic. *Journal of Comparative Economics, 27*(3), 498-513.

Cochran, A., Neumayer, L. A., & Elder, W. B. (2019). Barriers to careers identified by women in academic surgery: A grounded theory model. *The American Journal of Surgery, 218*(4), 780-785.

Cohen, W. M., & Levin, R. C. (1989). Empirical studies of innovation and market structure. *Handbook of industrial organization, 2*, 1059-1107.

Collins, J. (2009). *Good to great-(Why some companies make the leap and others don't)*: SAGE Publications.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches.*: Sage publications.

Dahlgaard, J. J., & Ciavolino, E. (2007). Analyzing management factors on enterprise performance. *Asian Journal on Quality, 8*(3), 1-10.

Ding, J., & Cai, X. (2018). Study on the impact of strategic human resource management on enterprise performance. *International Journal of Human Resource Studies, 8*(3), 6068-6068.

Dong, Y., Wei, Z., Liu, T., & Xing, X. (2021). The impact of R&D intensity on the innovation performance of artificial intelligence enterprises-based on the moderating effect of patent portfolio. *Sustainability, 13*(1), 328.

Downey, L., Papageorgiou, V., & Stough, C. (2006). Examining the relationship between leadership, emotional intelligence and intuition in senior female managers. *Leadership & Organization Development Journal, 27*(4), 250-264.

Eberl, M., & Schwaiger, M. (2005). Corporate reputation: Disentangling the effects on financial performance. *European Journal of marketing, 39*(7/8), 838-854.

Eom, B.-Y., & Lee, K. (2009). Modes of knowledge transfer from PROs and firm performance: The case of Korea. *Seoul Journal of Economics, 22*(4), 499-528.

Ezzi, F., Azouzi, M. A., & Jarboui, A. (2016). Does CEO emotional intelligence affect the performance of the diversifiable companies? *Cogent Economics & Finance, 4*(1), 1230958.

Falk, M. (2012). Quantile estimates of the impact of R&D intensity on firm performance. *Small Business Economics, 39*(1), 19-37.

Farhan, N. H., Tabash, M. I., & Yameen, M. (2020). The relationship between credit policy and firms' profitability: Empirical evidence from Indian pharmaceutical sector. *Investment Management and Financial Innovations, 17*(2), 146-156.

Fazlzadeh, A., Hendi, A. T., & Mahboubi, K. (2011). The examination of the effect of ownership structure on firm performance in listed firms of Tehran stock exchange based on the type of the industry. *International Journal of Business and Management, 6*(3), 249-266.

Fidrmuc, J. P., & Fidrmuc, J. (2007). Fire the manager to improve performance? Managerial turnover and incentives after privatization in the Czech Republic. *Economics of Transition, 15*(3), 505-533.

Filatotchev, I., Kapelyushnikov, R., Dyomina, N., & Aukutsionek, S. (2001). The effects of ownership concentration on investment and performance in privatized firms in Russia. *Managerial and decision economics, 22*(6), 299-313.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management science, 61*(11), 2549-2568.

Fowowe, B. (2017). Access to finance and firm performance: Evidence from African countries. *Review of Development Finance, 7*(1), 6-17.

Francalanci, C., & Morabito, V. (2008). IS integration and business performance: The mediation effect of organizational absorptive capacity in SMEs. *Journal of Information Technology, 23*(4), 297-312.

Frascati, M. (2002). *Proposed standard practice for surveys on research and experimental development*: OCDE Publishing.

Frohlich, M. T., & Westbrook, R. (2001). Arcs of integration: An international study of supply chain strategies. *Journal of operations management, 19*(2), 185-200.

Galende, J., & de la Fuente, J. M. (2003). Internal factors determining a firm's innovative behaviour. *Research Policy, 32*(5), 715-736.

Gamayuni, R. R. (2015). The effect of intangible asset, financial performance and financial policies on the firm value. *International Journal of Scientific and Technology Research, 4*(1), 202-212.

Georgopoulos, B. S., & Tannenbaum, A. S. (1957). A study of organizational effectiveness. *American sociological review, 22*(5), 534-540.

Gerybadze, A. (2010). R&D, innovation and growth: Performance of the world's leading technology corporations. In U. H. A. Gerybadze, H. Reiners, & D. Thomaschewski (Ed.), *Innovation and international corporate growth* (pp. 11-30): Springer.

Greene, D., & David, J. L. (1984). A research design for generalizing from multiple case studies. *Evaluation and program planning, 7*(1), 73-85.

Gu, F., & Lev, B. (2001). Intangible assets: Measurement, drivers, and usefulness. In G. Schiuma (Ed.), *Managing knowledge assets and business value creation in organizations: Measures and dynamics* (pp. 110-124): IGI Global.

Gulia, R. (2014). Effects of working capital management on firms profits-evidence from the pharmaceutical sector. *International Journal of Management and Social Sciences Research, IJMSSR, 3*(1), 103-107.

Guo, B., Wang, J., & Wei, S. X. (2018). R&D spending, strategic position and firm performance. *Frontiers of Business Research in China, 12*(1), 1-19.

Ha-Brookshire, J. E. (2009). Does the firm size matter on firm entrepreneurship and performance? US apparel import intermediary case. *Journal of Small Business and Enterprise Development, 16*(1), 132-146.

Hall, B. H., Helmers, C., Rogers, M., & Sena, V. (2013). The importance (or not) of patents to UK firms. *Oxford Economic Papers, 65*(3), 603-629.

Hanousek, J., Kočenda, E., & Svejnar, J. (2007). Origin and concentration: Corporate ownership, control and performance in firms after privatization. *Economics of Transition, 15*(1), 1-31.

Hao, J., Li, C., Yuan, R., Ahmed, M., Khan, M. A., & Oláh, J. (2020). The influence of the knowledge-based network structure hole on enterprise innovation performance: The threshold effect of R&D investment intensity. *Sustainability, 12*(15), 6155.

Harris, R., & Li, Q. C. (2009). Exporting, R&D, and absorptive capacity in UK establishments. *Oxford Economic Papers, 61*(1), 74-103.

Hasprová, O., Brabec, Z., & Rozkovec, J. (2019). The influence of intangible assets on company performance. *Acta academica karviniensia, 19*(1), 34-46.

Heene, A. (2006). Investigating the impact of firm size on small business social responsibility: A critical review. *Journal of Business Ethics, 67*, 257-273.

Herremans, I. M., Akathaporn, P., & McInnes, M. (1993). An investigation of corporate social responsibility reputation and economic performance. *Accounting, organizations and society, 18*(7-8), 587-604.

Hess, K., Gunasekarage, A., & Hovey, M. (2010). State-dominant and non-state-dominant ownership concentration and firm performance: Evidence from China. *International Journal of Managerial Finance, 6*(4), 264-289.

Hitt, M. A., Keats, B. W., & DeMarie, S. M. (1998). Navigating in the new competitive landscape: Building strategic flexibility and competitive advantage in the 21st century. *Academy of Management Perspectives, 12*(4), 22-42.

Hoskisson, R. E., Hitt, M. A., & Hill, C. W. (1993). Managerial incentives and investment in R&D in large multiproduct firms. *Organization Science, 4*(2), 325-341.

Hottenrott, H., & Lopes-Bento, C. (2016). R&D partnerships and innovation performance: Can there be too much of a good thing? *Journal of Product Innovation Management, 33*(6), 773-794.

Hou, J. (2018). Does the pay gap in the top management team incent enterprise innovation?—Based on property rights and financing constraints. *American Journal of Industrial and Business Management, 8*(05), 1290-1307.

Hu, Y., & Zhou, X. (2008). The performance effect of managerial ownership: Evidence from China. *Journal of Banking & Finance, 32*(10), 2099-2110.

Hull, C. E., & Rothenberg, S. (2008). Firm performance: The interactions of corporate social performance with innovation and industry differentiation. *Strategic management journal, 29*(7), 781-789.

Hunton, J. E., Lippincott, B., & Reck, J. L. (2003). Enterprise resource planning systems: Comparing firm performance of adopters and nonadopters. *International Journal of Accounting Information Systems, 4*(3), 165-184.

Huo, B. (2012). The impact of supply chain integration on company performance: An organizational capability perspective. *Supply Chain Management: An International Journal, 17*(6), 596-610.

Ibrahim, A. U., & Daniel, C. O. (2019). Impact of leadership on organisational performance. *International Journal of Business, Management and Social Research, 6*(2), 367-374.

Institute of Materia Medica, C. A. o. M. S., Center, C. P. I. I., & Control, C. N. I. f. F. a. D. (2019). *Blue Book of Chinese Generic Drugs*: China Union Medical College Press.

Ivanov, G., & Mayorova, E. (2015). Intangible assets and competitive advantage in retail: Case study from Russia. *Asian Social Science, 11*(12), 38-45.

Jefferson, G. H., Huamao, B., Xiaojing, G., & Xiaoyun, Y. (2006). R&D performance in Chinese industry. *Economics of Innovation and New Technology, 15*(4-5), 345-366.

Jia, X. (2010). A study based on Grounded Theory about the public service outsourcing of Chinese city's basic government] [Doctoral dissertation]. Lanzhou University.

Jiang, H., Gao, S., Song, Y., Sheng, K., & Amaratunga, G. A. (2019). An empirical study on the impact of collaborative R&D networks on enterprise innovation performance based on the mediating effect of technology standard setting. *Sustainability, 11*(24), 7249.

Jinhui Wu, S., Melnyk, S. A., & Swink, M. (2012). An empirical investigation of the combinatorial nature of operational practices and operational capabilities: Compensatory or additive? *International Journal of Operations & Production Management, 32*(2), 121-155.

Jung, N. Y., & Seock, Y. K. (2016). The impact of corporate reputation on brand attitude and purchase intention. *Fashion and Textiles, 3*, 1-15.

Kale, E., Aknar, A., & Başar, Ö. (2019). Absorptive capacity and firm performance: The mediating role of strategic agility. *International Journal of Hospitality Management, 78*, 276-283.

Kallunki, J. P., Laitinen, E. K., & Silvola, H. (2011). Impact of enterprise resource planning systems on management control systems and firm performance. *International Journal of Accounting Information Systems, 12*(1), 20-39.

Karbowski, A. (2019). Cooperative and non-cooperative R&D in product innovation and firm performance. *Journal of Business Economics and Management, 20*(6), 1121-1142.

Karim, R., Al-Mamun, M. A., & Miah, M. T. (2017). Relationship between working capital management efficiency and profitability: A comparative study on square Pharmaceuticals Limited and Beximco Pharmaceuticals Limited. *Bangladesh. International Journal of Economics, Finance and Management Sciences, 5*(2), 121-128.

Kelvin-ILoafu, L. E., Adeleke, B. S., Adekitan, R. A., Nwonye, A. J. C., & Ngwu, M. C. (2019). Does emotional intelligence affect attainment of strategic goals of small scale enterprises (SCEs) in developing economies? *International Journal of Entrepreneurship, 23*(3), 1-10.

Kerlinger, F. N. (1973). *Foundations of behavioral research*: Holt, Rinehart and Winston.

Khalili, A. (2011). Examining the relevance of emotional intelligence and organizational commitment among employees of small and medium enterprise in private sector. *International Journal of Business and Management, 6*(12), 180-194.

Khatoon, N. (2013). The impact of emotional intelligence on the growth of entrepreneurship. *International Journal of Business Management and Research, 3*(3), 1-8.

Kijkasiwat, P., & Phuensane, P. (2020). Innovation and firm performance: The moderating and mediating roles of firm size and small and medium enterprise finance. *Journal of Risk and Financial Management, 13*(5), 97.

Klovienė, L. (2012). Veiklos vertinimo sistemos adekvatumas verslo aplinkai [Doctoral dissertation]. Kauno Technologijos Universitetas.

Kostopoulos, K., Papalexandris, A., Papachroni, M., & Ioannou, G. (2011). Absorptive capacity, innovation, and financial performance. *Journal of Business Research, 64*(12), 1335-1343.

Koval, V., Prymush, Y., & Popova, V. (2017). The influence of the enterprise life cycle on the efficiency of investment. *Baltic Journal of Economic Studies, 3*(5), 183-187.

Kumar, K., Rajan, R., & Zingales, L. (1999). What determines firm size? *National Bureau of Economic Research Working Papers*, 7208.

Kuznetsov, P., & Muravyev, A. (2001). Ownership concentration and firm performance in Russia: The case of blue chips of the stock market. *Acta Oeconomica, 51*(4), 469-488.

Lai, Y. L., Lin, F. J., & Lin, Y. H. (2015). Factors affecting firm's R&D investment decisions. *Journal of Business Research, 68*(4), 840-844.

Lakdawalla, D. N. (2018). Economics of the pharmaceutical industry. *Journal of Economic Literature, 56*(2), 397-449.

Lee, I. H., & Marvel, M. R. (2009). The moderating effects of home region orientation on R&D investment and international SME performance: Lessons from Korea. *European Management Journal, 27*(5), 316-326.

Lee, J., & James, J., Roh. (2012). Revisiting corporate reputation and firm performance link. *Benchmarking: An International Journal, 19*(4/5), 649-664.

Levin, R. C., Cohen, W. M., & Mowery, D. C. (1985). R & D appropriability, opportunity, and market structure: New evidence on some Schumpeterian hypotheses. *The American economic review, 75*(2), 20-24.

Lienland, B., Baumgartner, A., & Knubben, E. (2013). The undervaluation of corporate reputation as a supplier selection factor: An analysis of ingredient branding of complex products in the manufacturing industry. *Journal of purchasing and supply management, 19*(2), 84-97.

Lin, C., Lin, P., & Song, F. (2010). Property rights protection and corporate R&D: Evidence from China. *Journal of Development Economics, 93*(1), 49-62.

Lin, C., Lin, P., Song, F. M., & Li, C. (2011). Managerial incentives, CEO characteristics and corporate innovation in China's private sector. *Journal of Comparative Economics, 39*(2), 176-190.

Link, A. N. (1982). An analysis of the composition of R&D spending. *Southern Economic Journal, 49*(2), 342-349.

Liu, C., Guo, X., & Wang, Z. (2019). R&D expenses and operating performance in pharmaceutical industry. *Journal of Social Sciences Studies, 2*, 214-219.

Liu, J. (2018, March 9-11). *Human resource management practice, knowledge management guidance and enterprise performance.* Paper presented at the 2018 International Conference on Computer, Civil Engineering and Management Science, Lanzhou, China.

Liu, S. M., Hu, R., & Kang, T. W. (2021). The effects of absorptive capability and innovative culture on innovation performance: Evidence from Chinese high-tech firms. *The Journal of Asian Finance, Economics and Business, 8*(3), 1153-1162.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *The leadership quarterly, 7*(3), 385-425.

Lu, J. W., & Beamish, P. W. (2004). International diversification and firm performance: The S-curve hypothesis. *Academy of management journal, 47*(4), 598-609.

Luca, M. M. M. D., Maia, A. B. G. R., Cardoso, V. I. D. C., Vasconcelos, A. C. D., & Cunha, J. V. A. D. (2014). Intangible Assets and Superior and Sustained Performance of Innovative Brazilian Firms. *BAR-Brazilian Administration Review, 11*(4), 407-440.

Luo, Y., Hu, Z., & Yu, K. (2018). The impact of the R&D expenditure and patent rights towards operating Performance in medical device Industry–An empirical study. *Revista de Cercetare si Interventie Sociala, 61*, 187-197.

Ma, S., Naughton, T., & Tian, G. (2010). Ownership and ownership concentration: Which is important in determining the performance of China's listed firms? *Accounting & Finance, 50*(4), 871-897.

Mahmood, R., & Mohd Rosli, M. (2013). Microcredit position in micro and small enterprise performance: the Malaysian case. *Management Research Review, 36*(5), 436-453.

Mamun, A. A., Muhammad, N. M. N., & Ismail, M. B. (2017). Absorptive capacity, innovativeness and the performance of micro-enterprises in Malaysia. *Vision, 21*(3), 243-249.

Männasoo, K., & Meriküll, J. (2020). Credit constraints and R&D over the boom and bust: Firm-level evidence from Central and Eastern Europe. *Economic Systems, 44*(2), 100747.

Maruyama, G. (1997). *Basics of structural equation modeling*: Sage.

Matsunaga, M. (2018). *Big Boss's Move Matters: Impact of the Intervention by Skip-Level Leaders on Members' Innovative Work Behaviors and Their Direct Supervisor's Support.* Paper presented at the ISPIM Innovation Symposium.

Mizutani, F., & Nakamura, E. (2014). Managerial incentive, organizational slack, and performance: Empirical analysis of Japanese firms' behavior. *Journal of Management & Governance, 18*(1), 245-284.

Motohashi, K. (2016). Innovation and entrepreneurship: A first look at the linkage data of Japanese patent and enterprise census. *Seoul Journal of Economics, 29*(1), 69-94.

Moullin, M. (2007). Performance measurement definitions: Linking performance measurement and organisational excellence. *International journal of health care quality assurance, 20*(3), 181-183.

Muchiri, G., Kibati, P., & Mwaura, P. (2021). Analysis of competitor factors affecting sales performance of small-scale trading enterprises in Kenya. *International Journal of Business Management and Processes, 5*(5), 23-41.

Najmi, M., & Kehoe, F. D. (2001). The role of performance measurement systems in promoting quality development beyond ISO 9000. *International Journal of Operations & Production Management, 21*(1/2), 159-172.

Naseem, T., Shahzad, F., Asim, G. A., Rehman, I. U., & Nawaz, F. (2020). Corporate social responsibility engagement and firm performance in Asia Pacific: The role of enterprise risk management. *Corporate Social Responsibility and Environmental Management, 27*(2), 501-513.

Neely, A., Gregory, M., & Platts, K. (2005). Performance measurement system design: A literature review and research agenda. *International Journal of Operations & Production Management, 25*(12), 1228-1263.

Neogi, C., Kamiike, A., & Sato, T. (2012). Identification of factors behind performance of pharmaceutical industries in India. *Discussion Paper Series RIEB Kobe University*, 23.

Nguyen, P. A., Nguyen, A. H., Ngo, T. P., Nguyen, P. V. (2019). The relationship between productivity and firm's performance: Evidence from listed firms in Vietnam stock exchange. *The Journal of Asian Finance, Economics and Business, 6*(3), 131-140.

Nicolaou, A. I. (2004). Firm performance effects in relation to the implementation and use of enterprise resource planning systems. *Journal of information systems, 18*(2), 79-105.

Nilsen, Ø. A., Raknerud, A., & Iancu, D. C. (2020). Public R&D support and firm performance: A multivariate dose-response analysis. *Research Policy, 49*(7), 104067.

Nirjar, A., Acharya, M., & Aniruddha. (2018). The networks-innovation-firm performance relationship: Does it hold good in Indian pharmaceutical industry? *International Journal of Business Innovation and Research, 16*(4), 399-423.

Nwosu, E. O., & Orji, A. (2016). Access to formal credit and enterprise performance in Nigeria: A gender perspective. *Argumenta Oeconomica, 36*(1), 191-224.

Omran, M. (2009). Post-privatization corporate governance and firm performance: The role of private ownership concentration, identity and board composition. *Journal of Comparative Economics, 37*(4), 658-673.

Ongore, V. O. (2011). The relationship between ownership structure and firm performance: An empirical analysis of listed companies in Kenya. *African Journal of Business Management, 5*(6), 2120-2128.

Oriarewo, G. O., Agbim, K. C., & Zever, T. A. (2014). Relationship between emotional intelligence and entrepreneurial performance: The mediating effect of managerial competence. *International Journal of Economics, Commerce and Management, 2*(10), 1-16.

Outa, E. R., & Waweru, N. M. (2016). Corporate governance guidelines compliance and firm financial performance: Kenya listed companies. *Managerial Auditing Journal, 31*(8/9), 891-914.

Ouyang, J. (2019). Social capital, organizational learning and enterprise performance: an empirical study on pharmaceutical companies in China [Doctoral dissertation]. ISCTE-Instituto Universitario de Lisboa.

Palmer, B., Walls, M., Burgess, Z., & Stough, C. (2001). Emotional intelligence and effective leadership. *Leadership & Organization Development Journal, 22*(1), 5-10.

Pammolli, F., Magazzini, L., & Riccaboni, M. (2011). The productivity crisis in pharmaceutical R&D. *Nature reviews Drug discovery, 10*(6), 428-438.

Paul, S. M., Mytelka, D. S., Dunwiddie, C. T., Persinger, C. C., Munos, B. H., Lindborg, S. R., & Schacht, A. L. (2010). How to improve R&D productivity: The pharmaceutical industry's grand challenge. *Nature reviews Drug discovery, 9*(3), 203-214.

Paula, F. D. O., & Silva, J. F. D. (2018). The impact of alliances and internal R&D on the firm's innovation and financial performance. *BBR. Brazilian Business Review, 15*(6), 533-550.

Pham, C. D. (2020). The effect of capital structure on financial performance of Vietnamese listing pharmaceutical enterprises. *The Journal of Asian Finance, Economics, and Business, 7*(9), 329-340.

Poston, R., & Grabski, S. (2000). *The impact of enterprise resource planning systems on firm performance.* Paper presented at the Proceedings of the twenty first international conference on Information systems.

Pradhan, J. P. (2003). Liberalization, firm size and R&D performance: A firm level study of Indian pharmaceutical industry. *Journal of Indian School of Political Economy, 14*(4), 647-666.

Raisal, I., Tarofder, A. K., & Ilmudeen, A. (2021). The nexus between entrepreneurial orientation and performance: Enabling roles of absorptive capacity. *World Journal of Entrepreneurship, Management and Sustainable Development, 17*(2), 153-166.

Rao, J., Yu, Y., & Cao, Y. (2013). The effect that R&D has on company performance: Comparative analysis based on listed companies of technique intensive industry in China and Japan. *International Journal of Education and Research, 1*(4), 1-8.

Reuters, T. (2012). *CMR international pharmaceutical R&D factbook*: Thomson Reuters.

Revelle, W., & Zinbarg, R. E. (2009). Coefficients alpha, beta, omega, and the glb: Comments on Sijtsma. *Psychometrika, 74*(1), 145-154.

Rijkers, B., Söderbom, M., & Loening, J. L. (2010). A rural–urban comparison of manufacturing enterprise performance in Ethiopia. *World Development, 38*(9), 1278-1296.

Ritala, P., Hallikas, J., & Sissonen, H. (2008). The effect of strategic alliances between key competitors on firm performance. *Management Research: Journal of the Iberoamerican Academy of Management, 6*(3), 179-187.

Robert Baum, J., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic management journal, 24*(11), 1107-1129.

Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic management journal, 23*(12), 1077-1093.

Rose, C. (2016). Firm performance and comply or explain disclosure in corporate governance. *European Management Journal, 34*(3), 202-222.

Rose, C., & Thomsen, S. (2004). The impact of corporate reputation on performance: Some Danish evidence. *European Management Journal, 22*(2), 201-210.

Rosova, A., & Balog, M. (2012, November 7-9). *Traditional and modern methods and approaches to the evaluation of company performance.* Paper presented at the Carpathian Logistics Congress, Jesenik, Czech Republic.

Rothaermel, F. T., & Alexandre, M. T. (2009). Ambidexterity in technology sourcing: The moderating role of absorptive capacity. *Organization Science, 20*(4), 759-780.

Saidu, D., Miko, N. U., & Zubairu, A. A. (2021). Impact of ownership structure on financial performance of listed pharmaceutical firms in Nigeria. *Journal of Conflict Resolution and Social Issues, 2*(1), 69-88.

Savrul, M., & Incekara, A. (2015). The effect of R&D intensity on innovation performance: A country level evaluation. *Procedia-Social and Behavioral Sciences, 210*, 388-396.

Scherer, F. M. (2000). The pharmaceutical industry. In J. P. N. A. J. Culyer (Ed.), *Handbook of health economics* (Vol. 1, pp. 1297-1336): Elsevier.

Schuhmacher, A., Gassmann, O., & Hinder, M. (2016). A review of the pharmaceutical R&D efficiency: Costs, timelines, and probabilities In M. H. A. Schuhmacher, & O. Gassmann (Ed.), *Value creation in the pharmaceutical industry: the critical path to innovation* (pp. 60-79): Wiley.

Seashore, S. E., & Yuchtman, E. (1967). Factorial analysis of organizational performance. *Administrative science quarterly, 12*(3), 377-395.

Semuel, H., Siagian, H., & Octavia, S. (2017). The effect of leadership and innovation on differentiation strategy and company performance. *Procedia-Social and Behavioral Sciences, 237*, 1152-1159.

Seo, H. S., & Kim, Y. (2020). Intangible assets investment and firms' performance: Evidence from small and medium-sized enterprises in Korea. *Journal of Business Economics and Management, 21*(2), 421-445.

Sharabati, A. A. A., Jawad, S. N., & Bontis, N. J. M. d. (2010). Intellectual capital and business performance in the pharmaceutical sector of Jordan. *48*(1), 105-131.

Si, K., Xu, X. L., & Chen, H. H. (2020). Examining the interactive endogeneity relationship between R&D investment and financially sustainable performance: Comparison from different types of energy enterprises. *Energies, 13*(9), 2332.

Simon, D. H., & Gómez, M. I. (2014). Customer satisfaction, competition, and firm performance: An empirical investigation. *Managerial and decision economics, 35*(6), 371-386.

Slobodnyak, I. A., Sosedova, E. V., A Slobodnyak, I., & V Sosedova, E. (2020). The concept and analysis of innovation and R&D. In V. I. B. A. S. Nechaev, G. M. Beregova, P. A. Lontsikh, & A. S. Bovkun (Ed.), *European Proceedings of Social and Behavioural Sciences* (Vol. 96, pp. 586-595): European Publisher.

Song, Y., Yang, T., & Zhang, M. (2019). Research on the impact of environmental regulation on enterprise technology innovation—An empirical analysis based on Chinese provincial panel data. *Environmental Science and Pollution Research, 26*(21), 21835-21848.

Stake, R. E. (2013). *Multiple case study analysis*: Guilford press.

Taleb, N. N. (2016). *Fooled by randomness: The hidden role of chance in life and in the markets*: Penguin.

Tariq, Y. B., & Abbas, Z. (2013). Compliance and multidimensional firm performance: Evaluating the efficacy of rule-based code of corporate governance. *Economic Modelling, 35*, 565-575.

Teece, D. J. (2015). Intangible assets and a theory of heterogeneous firms. In T. M. A. Bounfour (Ed.), *Intangibles, Market Failure and Innovation Performance* (pp. 217-239): Springer.

Teece, D. J. (2019). A capability theory of the firm: An economics and (strategic) management perspective. *New zealand economic papers, 53*(1), 1-43.

Toole, A. A., & Czarnitzki, D. (2009). Exploring the relationship between scientist human capital and firm performance: The case of biomedical academic entrepreneurs in the SBIR program. *Management science, 55*(1), 101-114.

Tsoutsoura, M. (2004). Corporate social responsibility and financial performance. *UC Berkeley Working Paper Series*.

Vanpoucke, E., Vereecke, A., & Muylle, S. (2017). Leveraging the impact of supply chain integration through information technology. *International Journal of Operations & Production Management, 37*(4), 510-530.

Verboncu, I., & Zalman, M. (2005). *Management şi performanţe*: Editura Universitară.

Waldman, D. A., Javidan, M., & Varella, P. (2004). Charismatic leadership at the strategic level: A new application of upper echelons theory. *The leadership quarterly, 15*(3), 355-380.

Wang, F., Li, Y., & Sun, J. (2019). The transformation effect of R&D subsidies on firm performance: An empirical study based on signal financing and innovation incentives. *Chinese Management Studies, 14*(2), 373-390.

Wang, L., & Judge, W. Q. (2012). Managerial ownership and the role of privatization in transition economies: The case of China. *Asia Pacific Journal of Management, 29*(2), 479-498.

Wang, Y., & Berens, G. (2015). The impact of four types of corporate social performance on reputation and financial performance. *Journal of Business Ethics, 131*(2), 337-359.

Welbourne, T. M., & Andrews, A. O. (1996). Predicting the performance of initial public offerings: Should human resource management be in the equation? *Academy of Management Journal, 39*(4), 891-919.

Wu, A. (2017). The signal effect of government R&D subsidies in China: Does ownership matter? *Technological Forecasting and Social Change, 117*, 339-345.

Wu, X., Zhang, D., & Liu, J. (2021). Executive equity incentive, R&D investment and enterprise performance - Empirical research based on economic innovation. *E3S Web of Conferences, 275*, 03069.

Xiangyuan, A., & Tzesan, O. (2021). The Impact of Environmental Corporate Social Responsibility on Enterprise Performance——Implications for Sustainable Development Strategy. *E3S Web of Conferences, 251*, 02072.

Xu, J., Liu, F., & Chen, Y. H. (2019). R&D, advertising and firms' financial performance in South Korea: does firm size matter? *Sustainability, 11*(14), 3764.

Xu, J., Sim, J. W., & Jin, Z. (2016). Research on the impact of R&D investment on firm performance and enterprise value based on multiple linear regression model and data mining. *International Journal of Database Theory and Application, 9*(11), 305-316.

Xu, J., Wang, X., & Liu, F. (2021). Government subsidies, R&D investment and innovation performance: Analysis from pharmaceutical sector in China. *Technology Analysis & Strategic Management, 33*(5), 535-553.

Yameen, M., Farhan, N. H., & Tabash, M. I. (2019). The impact of liquidity on firms' performance: Empirical investigation from Indian pharmaceutical companies. *Academic Journal of Interdisciplinary Studies, 8*(3), 212-212.

Yang, K. (2020). Financial subsidy, corporate lifecycle and R&D innovation. *Modern Economy, 11*(03), 657-668.

Yang, M., Bento, P., & Akbar, A. (2019). Does CSR influence firm performance indicators? Evidence from Chinese pharmaceutical enterprises. *Sustainability, 11*(20), 5656.

Yao, Q., Xu, M., Song, H., Jiang, W., & Zhang, Y. (2014). R&D-marketing integration and performance—Evidence provided by agricultural science and technology enterprises. *Journal of Service Science and Management, 7*(1), 18-29.

Yin, H., Zhang, L., & Zhang, Y. (2017). The effect of ownership concentration and related diversification strategy of entrepreneurial enterprises on enterprise performance. *Eurasia Journal of Mathematics, Science and Technology Education, 13*(12), 8073-8087.

Yoo, J., Lee, S., & Park, S. (2019). The effect of firm life cycle on the relationship between R&D expenditures and future performance, earnings uncertainty, and sustainable growth. *Sustainability, 11*(8), 2371.

Yu, W., Ramanathan, R., Wang, X., & Yang, J. (2018). Operations capability, productivity and business performance: The moderating effect of environmental dynamism. *Industrial Management & Data Systems, 118*(1), 126-143.

Yuan, B. J., & Wu, H. (1998). 我国新药研究与开发的现状，问题和对策[The current situation, problems, and countermeasures of research and development of new drugs in China]. *Chinese Journal of New Drugs, 7(2)*, 81-83.

Yue, Q., Hua, X., & Li, J. (2019). Internal R&D and Acquisition Performance of Chinese Pharmaceutical Firms: Moderation Effect of Acquisition Motive and Corporate Ownership. *Processes, 7*(5), 292.

Zang, Z., Zhu, Q., & Mogorrón-Guerrero, H. (2019). How does R&D investment affect the financial performance of cultural and creative enterprises? The moderating effect of actual controller. *Sustainability, 11*(2), 297.

Zhai, Y. M., Sun, W. Q., Tsai, S. B. (2018). An empirical study on entrepreneurial orientation, absorptive capacity, and SMEs' innovation performance: A sustainable perspective. *Sustainability, 10*(2), 314.

Zhang, D. D. (2009). Absorptive capability and its mediating effect on the learning and market orientations' influences on performance. *International Journal of Technology Marketing, 4*(2-3), 275-288.

Zhang, M., S. Pawar, K., Shah, J., & Mehta, P. (2013). Evaluating outsourcing partners' capability: A case study from the pharmaceutical supply chain. *Journal of Manufacturing Technology Management, 24*(8), 1080-1101.

Zhao, X., & Yu, Z. (2021). *Research on the impact of R&D investment on the performance of equipment manufacturing enterprises.* Paper presented at the The 4th International Symposium on Big Data and Applied Statistics (ISBDAS 2021), Dali, China.

Zhu, Z., & Huang, F. (2012). The effect of R&D investment on firms' financial performance: Evidence from the Chinese listed IT firms. *Modern Economy, 3*(8), 915-919.

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Annex A: Questionnaire

1. Leadership

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	LE1: Our company's leader often comes up with radical improvement ideas for the products /services we are selling.					
2	LE2: Our company's leader takes risks.					
3	LE3: Our company's leader has creative solutions to problems.					
4	LE4: Our company's leader demonstrates passion for his/her work.					
5	LE5: Our company's leader has a vision of the future of our business.					
6	LE6: Our company's leader challenges and pushes employees to act in a more innovative way.					
7	LE7: Our company's leader is patient in management.					
8	LE8: Our company's leader is flexible in decision-making.					

2. Operational capability

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	OC1: There is a constant generation of new service ideas in this firm.					
2	OC2: We are constantly searching for new ways of doing things.					
3	OC3: There is creativity in our methods of operation.					
4	OC4: This enterprise is usually a pioneer in the market.					
5	OC5: This firm is able to introduce new products/ services every five years.					

3. Reputation

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	RE1: We are seen by customers as being a very professional organization.					
2	RE2: Our firm is viewed by customers as one that is successful.					
3	RE3: Our firm's reputation is highly regarded.					
4	RE4: Customers view our firm as one					

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
	that is stable.					
5	RE5: Our firm is viewed as well-established by customers.					

4. Compliance response

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	CR1: In my organization, we have a hotline for complaints about our compliance.					
2	CR2: My organization has a written compliance policy.					
3	CR3: In my organization, managers are asked to report regularly on compliance.					
4	CR4: Compliance performance indicators are among the individual performance indicators for our employees.					

5. Characteristics of industry

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	CI1: The government places great emphasis on the R&D of emerging technologies and provides considerable policy guidance.					
2	CI2: Government funding support for emerging technology R&D helps to accelerate breakthroughs in emerging technologies.					
3	CI3: Favorable loan policies from financial institutions help to promote the R&D of emerging technologies.					

6. Competitive landscape

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	CL1: This industry is expanding at a rapid pace.					
2	CL2: Competition is very fierce in the industry.					
3	CL3: Our organizational unit has relatively strong competitors.					

7. Company performance

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1	CP1: Firm's profitability					
2	CP2: Sales growth					

No.	Item	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
3	CP3: Firm's economic results					
4	CP4: Profit before tax					
5	CP5: Markets share					