

Study on the Impact of Marketing Expenses on the Operational Performance of Pharmaceutical Companies: A Case Study of CR Sanjiu Pharmaceutical Co., Ltd.

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Abstract: The role of marketing strategies in enterprise operations management has gained increasing attention from business operators and academic experts. In the Chinese pharmaceutical industry, particularly in the field of traditional Chinese medicine, the issue of product homogeneity is prominent. Developing effective marketing strategies helps companies succeed in fierce market competition and steadily increase their market share. Currently, Chinese pharmaceutical companies generally allocate a significant portion of their budget to marketing expenses. Researching the relationship between marketing expenses and business performance helps companies allocate their marketing budget more effectively and achieve better returns. China Resources (CR) Sanjiu Pharmaceutical Co., Ltd., a well-known company in the field of traditional Chinese medicine, has invested more in marketing expenses compared to the industry average. However, in recent years, the company's operational performance has been unsatisfactory. It is worth exploring the reasons why the marketing expenses have not resulted in corresponding improvements in business performance.

Keywords: Marketing expenses, Financial performance, Non-financial performance.

1. Introduction

With the continuous development of scientific and technological applications, an increasing number of companies are entering the pharmaceutical market. In this highly competitive market with significant product homogeneity, companies need to continuously improve their products, enhance marketing capabilities, and establish a strong brand image to maintain their competitive advantage and achieve success. Currently, CR Sanjiu Pharmaceutical Co., Ltd. has 13 product categories with an annual total sales amount exceeding one hundred million RMB. Among them, the sales volume of the 999 Cold Medicine System has consistently ranked first in the cold medicine market for the past five years. As a well-known publicly traded company in the field of traditional Chinese medicine, CR Sanjiu Pharmaceutical Co., Ltd.'s sales strategy is a crucial factor in maintaining market competitiveness and influence. However, after observing the financial accounting statements of CR Sanjiu Pharmaceutical Co., Ltd. over the years, it is evident that despite significant investments in sales costs, the company's financial performance has not shown a corresponding increase. While non-financial performance has shown some growth, it still lacks a competitive advantage compared to peers in the industry, which seems to contradict previous analysis and research conclusions. Therefore, this study takes CR Sanjiu Pharmaceutical Co., Ltd. as an example to investigate the impact of marketing expenses on the operational performance of traditional Chinese medicine enterprises.

1.1. Research Objective

The objective of this study is to analyze and investigate the impact of the company's investment in sales costs on its operational management performance. This research aims to

provide insights, suggestions, and recommendations for the company to scientifically and reasonably allocate sales costs, as well as to determine sales strategies and approaches.

1.2. Research Significance

1.2.1. Theoretical Significance

This study holds theoretical significance by applying relevant theories to systematically investigate the mutual impact relationship between the company's sales costs and its operational management performance. Financially, costs related to marketing activities (such as sales promotion and advertising) are collectively referred to as marketing expenses. Previous studies mainly focused on the impact of marketing expenses on the company's operational management performance. However, in this study, the author categorizes the costs incurred from different sales strategies into advertising and promotion expenses, public relations costs, market promotion expenses, and salesperson-related expenses.

1.3. Research Methods and Content

In this study, CR Sanjiu Pharmaceutical Co., Ltd. is selected as the research subject. Based on empirical research methods, the impact of CR Sanjiu's marketing expenses on its corporate performance will be analyzed. The study will conclude with findings and recommendations.

2. Definition of Related Concepts

2.1. Conceptual Definitions

2.1.1. Marketing Expenses

Marketing expenses refer to the costs incurred by a company to enhance awareness of its products, showcase their functionalities and advantages to consumers, and utilize various communication channels to stimulate consumer interest in purchasing the company's products or to increase

the company's visibility. The total expenses associated with these marketing activities are collectively referred to as marketing expenses.

2.1.2. Components of Marketing Expenses

The composition of marketing expenses may vary among different companies. However, commonly utilized sales methods include advertising, salesperson-related expenses, market promotion and advertising, and public relations. The costs associated with these activities constitute marketing expenses.

2.2. Business Performance

Business performance refers to the measurement of a company's ability and results in achieving its business objectives. It is an important indicator of the company's development. Business performance generally represents the level of work achievements completed by the company during its continuous operation. It primarily assesses the company's financial performance from four perspectives: profitability, comprehensive operational management capabilities, debt repayment capabilities, and development level.

3. Research Hypothesis and Design

3.1. Research Hypotheses

3.1.1. Hypothesis on the Relationship between Marketing Expenses and Profitability

Under the premise of well-controlled sales and management expenses, an increase in cost expenses will enhance profitability. Investment in advertising will contribute positively to the company's value and have a favorable impact on its performance.

Based on the above analysis, this study proposes Hypothesis 1:

H1: There is a positive correlation between marketing expenses and profitability of the company.

3.1.2. Hypothesis on the Relationship between Marketing Expenses and Business Development Capability

Research conducted by many experts and scholars in China indicates that a company's sales cost expenses play a positive role in improving its operational management performance. The investment in increased sales cost expenses can lead to favorable performance outcomes. Hypothesis H2 suggests that the increase in marketing expenses can promote improvements across various dimensions of the company, leading to a virtuous cycle and positive impacts on public relations, financial performance, operational management, and more.

Based on this, the study proposes Hypothesis 2:

H2: There is a positive correlation between marketing expenses and business development capability of the company.

3.1.3. Hypothesis on the Relationship between Marketing Expenses and Debt Repayment Capability

Since marketing expenses are also part of the overall costs of a company, they impact the overall cash flow operation of the company. When the company's revenue remains constant over a certain period, an increase in marketing expenses will inevitably weaken the cash flow available for debt repayment. As the decision-making body responsible for resource allocation, management will allocate funds in the direction most beneficial to the company's development. Therefore, further verification of this hypothesis is required.

Based on this, the study proposes Hypothesis 3:

H3: There is a negative correlation between marketing expenses and the debt repayment capability of the company.

3.1.4. Hypothesis on the Relationship between Marketing Expenses and Operational Capability of the Company

The investment in sales cost expenses by a company can have an impact on its operational management performance. However, this impact may not be fully reflected in the current period but may exhibit certain lag effects. The branding effects brought by advertising and promotional expenses are not realized in the current period's economic revenue. Moreover, uncontrolled growth in sales expenses can directly interfere with the company's marketing efficiency and may have a negative impact on the company's current profitability.

Based on the above analysis, the study proposes Hypothesis 4:

H4: There is a negative correlation between marketing expenses and operational capability of the company.

Based on the analysis presented earlier, the study suggests that marketing expenses significantly influence the company's abilities in terms of profitability, development, debt repayment, and operations. The study further presents these four hypotheses. In the following sections, the hypotheses will be empirically tested to validate their validity.

3.2. Conceptual Model Diagram

Taking into consideration the aforementioned factors, changes in marketing expenses not only affect short-term revenue but also impact factors such as net profit. This study aims to conduct empirical research in this regard. The diagram below illustrates the conceptual model of this study:

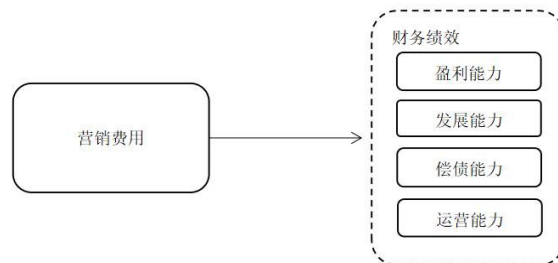


Figure 1. Conceptual Model of the Impact of Marketing Expenses on Business Performance

4. Sample Selection and Model Setting

4.1. Sample Selection and Data Sources

In this study, CR Sanjiu Pharmaceutical Co., Ltd., a company listed on the Shanghai and Shenzhen stock exchanges, is selected as the research sample. The sample data is collected for the period from 2012 to 2021. The data used in the study is obtained from the Guotai An database and the RESET database. The data analysis is conducted using STATA.17 software.

4.2. Measurement and Definition of Main Variables

The model includes the explanatory variable of marketing expense ratio for financial performance and the dependent variables of profitability, development capability, debt repayment capability, and operational capability. Additionally,

control variables such as firm size, capital structure, inventory scale, equity concentration, total asset turnover, and annual dummy variables are considered.

First, explanatory variable: marketing expense ratio. Marketing expenses, as an important expenditure for pharmaceutical companies, play a significant role in their development, especially in the context of pharmaceutical homogeneity. The marketing expenses of pharmaceutical companies have important and complex effects on their overall development. The article represents it using the ratio of marketing expenses to operating revenue.

Second, dependent variables: The article includes four dependent variables. (1) Profitability, represented by return on net assets. (2) Development capability, represented by the growth rate of net profit. (3) Debt repayment capability, represented by long-term liabilities to equity ratio. (4) Operational capability, represented by the growth rate of operating cash flow per share.

Third, control variables: Since the profitability, development capability, debt repayment capability, and operational capability of a company are influenced not only by the marketing expense ratio but also by other factors, the article selects the following control variables: (1) Firm size, as firm size reflects historical performance and serves as the

foundation for future competition, it can impact firm performance. It is represented by the natural logarithm of total assets at the end of the year. (2) Capital structure, as the debt level directly indicates the business situation and risk level, and it also affects financing costs and firm performance. Capital structure management and adjustments are essential factors for the survival and development of a company. It is represented by the ratio of total liabilities at the end of the year to total assets at the end of the year. (3) Inventory scale, the efficiency of managing accounts receivable and inventory has a positive correlation with firm performance. It is represented by the logarithm of inventory value. (4) Equity concentration, equity concentration implies different decision-making processes for a company and can impact its operations. The article uses the shareholding ratio of the largest shareholder as a representation. (5) Total asset turnover, asset turnover is an important indicator of firm operational efficiency and directly measures the overall agency efficiency. It is represented by the ratio of total sales revenue to the average total assets. (6) Annual dummy variables, the article includes dummy variables based on sample years in the model to control for time-fixed effects.

The specific definitions of the variables are shown in the table below:

Variable Type	Variable Name	Variable Symbol	Measurement Method
Explanatory Variable	Marketing Expense Ratio	RE	Marketing Expenses / Operating Revenue
Dependent Variables	Profitability	EARN	Return on Net Assets
	Development Capability	GROW	Net Profit Growth Rate
	Debt Repayment Capability	PAY	Long-term Liabilities to Equity Ratio
	Operational Capability	RUN	Growth Rate of Operating Cash Flow per Share
Control Variables	Firm Size	SIZE	Natural Logarithm of Total Assets at the End of the Year
	Capital Structure	LEV	Ratio of Total Liabilities at the End of the Year to Total Assets at the End of the Year
	Inventory Scale	STOCK	Natural Logarithm of Inventory Value
	Total Asset Turnover	TURN	Ratio of Total Sales Revenue to Average Total Assets
	Ownership Concentration	TOP1	Shareholding Ratio of the Largest Shareholder
	Year	YEAR	Annual Dummy Variables

4.3. Model Construction

In order to study the impact of marketing on performance, the article constructs the following fixed-effects model for analysis:

$$EARN_t = \alpha_0 + \alpha_1 RE_t + \alpha_2 control + \eta_t + \varepsilon_t \quad (1)$$

$$GROW_t = \beta_0 + \beta_1 RE_t + \beta_2 control + \eta_t + \varepsilon_t \quad (2)$$

$$PAY_t = \gamma_0 + \gamma_1 RE_t + \gamma_2 control + \eta_t + \varepsilon_t \quad (3)$$

$$RUN_t = \delta_0 + \delta_1 RE_t + \delta_2 control + \eta_t + \varepsilon_t \quad (4)$$

$$TBQ_t = \rho_0 + \rho_1 RE_t + \rho_2 control + \eta_t + \varepsilon_t \quad (5)$$

Where $EARN_t$, $GROW_t$, PAY_t , and RUN_t represent the firm's profitability, development capability, debt repayment capability, and operational capability, respectively, in year t . RE_t represents the marketing expense ratio for the firm in year t . $control$ represents the set of control variables in the article, including firm size, capital structure, inventory scale, total asset turnover, and equity concentration. η_t represents the annual dummy variables. ε_t represents the random disturbance term. The coefficients of interest in this study are α_1 , β_1 , γ_1 , δ_1 , and ρ_1 and their signs and significance levels are closely examined.

5. Experimental Test and Analysis

5.1. Descriptive Statistics

VarName	Mean	Standard Deviation	Minimum	Maximum
EARN	0.100	0.534	-0.934	0.984
GROW	15.197	2.581	11.637	19.209
PAY	0.084	0.043	0.041	0.143
RUN	0.106	0.129	-0.193	0.269
RE	0.371	0.059	0.309	0.482
LEV	0.362	0.012	0.344	0.381
SIZE	23.420	0.361	22.876	23.914
TOP1	0.169	0.030	0.125	0.314
STOCK	20.900	0.353	20.529	21.560
TURN	0.119	0.048	0.028	0.195

The table above presents the descriptive statistics of variables in the article. Looking at the dependent variables, for profitability, CR Sanjiu has a mean value of 0.1, a standard deviation of 0.534, and a minimum value of -0.934, indicating significant variations in profitability over the past decade. In terms of development capability, the difference between the maximum and minimum values is not substantial, but the standard deviation is 15.197, suggesting an uneven distribution of development capability across different years. Regarding debt repayment capability, the mean and standard deviation are 0.043 and 0.041, respectively, indicating a stable development in debt repayment capability for the company. Turning to the explanatory variable, the mean marketing expense ratio is 0.371, with a minimum of 0.309 and a maximum of 0.482. The standard deviation is 0.059, suggesting a relatively balanced expenditure on marketing expenses by the company over the past decade, with little variation across years. Finally, regarding the control variables, apart from capital structure, equity concentration, and total asset turnover ratio, both firm size and inventory scale have undergone significant adjustments over the past ten years.

5.2. Correlation Analysis

The correlation analysis table below reveals that the correlation coefficients between the marketing expense ratio and EARN, GROW are 0.146 and 0.465, respectively, significant at the 10% level. On the other hand, the correlation coefficients between the marketing expense ratio and PAY, RUN are -0.578 and -0.102, respectively, indicating a positive correlation between the marketing expense ratio and profitability and development capability, and a negative correlation between the marketing expense ratio and debt repayment capability and operational capability. These findings provide preliminary support for the four hypotheses proposed in the article. Furthermore, examining the control variables, significant correlations are observed between capital structure and equity concentration, inventory scale and firm size, while no significant correlation is found among the other control variables. This suggests that the selection of control variables in the article is reasonable, and there is no issue of multicollinearity.

	EARN	GROW	PAY	RUN	RE	LEV	SIZE	TOP1	STOCK	TURN
EARN	1									
GROW	0.293	1								
PAY	0.622*	0.411	1							
RUN	-0.173	0.181	-0.398	1						
RE	0.146*	0.465*	-0.578*	-0.102	1					
LEV	0.015	-0.043	-0.166	0.588*	0.486	1				
SIZE	-0.600*	-0.739**	-0.685**	-0.041	0.528	0.118	1			
TOP1	0.019	-0.040	-0.161	0.583*	0.485	1.000***	0.111	1		
STOCK	-0.689**	-0.592*	-0.691**	0.121	0.327	0.138	0.917***	0.135	1	
TURN	0.530	0.449	0.147	0.398	0.053	0.538	-0.355	0.538	-0.374	1

*, **, and *** represent the significance levels of 10%, 5%, and 1%, respectively.

5.3. Regression Analysis

According to the table below, in column (1), the regression coefficient of RE is 0.073, significant at the 5% level. This indicates that a higher marketing expense ratio is associated with better profitability, supporting hypothesis 1. In column (2), the regression coefficient of RE is 0.163, significant at the 1% level, suggesting that a higher marketing expense ratio is associated with better development capability, confirming hypothesis 2. In column (3), the regression coefficient of RE is -0.071, significant at the 1% level, indicating that a higher marketing expense ratio is associated with weaker debt repayment capability, supporting hypothesis 3. In column (4), the regression coefficient of RE is -1.118, significant at the 1% level, indicating that a higher marketing expense ratio is associated with better profitability, confirming hypothesis 4.

5.4. Stability Test

However, considering the potential issues related to model specification and measurement errors of variables in the baseline regression, the article conducted the following robustness tests.

1) Alternative Estimation Model

In the previous analysis, a fixed effects model based on OLS regression was used. In this section, the fixed effects model will be replaced with a logit model. The specific approach is as follows: First, the dependent variables EARN, GROW, PAY, and RUN will be transformed into binary dummy variables (D_EARN, D_GROW, D_PAY, D_RUN) based on their mean values. A value of 1 will be assigned if the variable is greater than the mean, and 0 otherwise.

Reference regression

Variable	Profitability	Development Capability	Debt Repayment Capability	Operational Capability
	(1)	(2)	(3)	(4)
RE	0.073** (0.035)	0.163*** (0.171)	-0.071*** (0.099)	-1.118*** (0.080)
LEV	-5.001 (0.008)	4.151 (0.107)	1.667*** (0.036)	5.499*** (0.051)
STOCK	-0.037*** (0.001)	0.034*** (0.006)	0.011*** (0.002)	0.004 (0.004)
TURN	1.022*** (0.003)	1.515*** (0.031)	2.360*** (0.012)	3.509*** (0.017)
SIZE	0.175*** (0.020)	-14.092 (0.146)	0.249*** (0.039)	0.961*** (0.061)
TOP1	-0.239*** (0.018)	0.339*** (0.094)	0.227*** (0.047)	-0.028 (0.046)
YEAR	Control	Control	Control	Control
R2	0.635	0.573	0.752	0.874

Within parentheses are robust standard errors. *, **, and *** represent the significance levels of 10%, 5%, and 1%, respectively.

The logit model used in this study is as follows:

$$P(D_Y_t = 1 | RE_t, X_t^k) = \frac{\exp(\beta_0 + \beta_1 RE_t + \sum_k \gamma_k X_t^k + \sum_k \delta_k Z_{i,t-1}^k + \delta_t + \varepsilon_t)}{1 + \exp(\beta_0 + \beta_1 DE_t + \sum_k \gamma_k X_t^k + \delta_t + \varepsilon_t)} \quad (2)$$

where subscript t represents the year. D_Y_t represents

the dummy variable indicating whether the performance (EARN, GROW, PAY, RUN) of the firm in year t is greater than the mean. X_t^k represents the firm-level control variables, δ_t represents year fixed effects, and ε_t represents the error term.

From the table below, it can be observed that even after changing the model specification, hypotheses 1-4 of the study still hold, indicating the robustness of the research findings.

Robustness Test

Variables	Profitability	Development Capability	Debt Repayment Capability	Operational Capability
RE	0.047*** (0.024)	-1.242*** (0.171)	-0.112** (0.056)	-1.099*** (0.101)
LEV	0.022*** (0.003)	0.515*** (0.031)	0.360*** (0.012)	0.509*** (0.017)
STOCK	-0.176*** (0.021)	0.091 (0.146)	-0.248*** (0.039)	-0.162*** (0.061)
TURN	-0.239*** (0.018)	0.340*** (0.095)	0.226*** (0.047)	-0.028 (0.046)
SIZE	-2.033** (0.793)	-4.925 (4.148)	6.651*** (1.710)	0.896 (1.818)
TOP1	-4.212 (2.895)	-25.561 (17.756)	-26.388 (22.939)	1.316 (3.289)
YEAR	Control	Control	Control	Control
Pseudo R2	0.035	0.173	0.152	0.174

5.5. Research Results and Discussion

Through data collection, model design, and empirical regression, this study has verified the four hypotheses and obtained the following conclusions for CR Sanjiu Pharmaceutical Co., Ltd.:

(1) There is a positive correlation between the company's marketing expense ratio and profitability. An increase in the marketing expense ratio corresponds to an increase in profitability.

(2) There is a positive correlation between the company's marketing expense ratio and development capability. A higher marketing expense ratio indicates better development capability.

(3) There is a negative correlation between the company's

marketing expense ratio and debt repayment ability. A higher marketing expense ratio can reduce the company's ability to repay its outstanding debts.

(4) There is a negative correlation between the company's marketing expense ratio and operational capability. The growth of marketing expenses can have a detrimental effect on the company's long-term operational funding.

6. Limitations and Prospects

Currently, there is no unified disclosure of sales cost expenses in the financial accounting statements of listed companies in China. In examining the marketing cost expenses of CR Sanjiu Pharmaceutical Co., Ltd., the detailed items under marketing cost expenses and comprehensive management cost expenses were considered. Therefore, there

may be significant deviations in calculating the total sales cost expenses and the expenses related to each sales activity, resulting in some degree of bias and subjective judgment in the research findings. In the future, it is necessary to further refine and expand the dimensions and indicators of marketing cost expenses.

The impact of different sales activities on the operational management performance of CR Sanjiu Pharmaceutical Co., Ltd. may also have a lagging effect. Future research on the company's operational performance should consider factors related to lagging effects.

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