

# Influence of Business Model on Evaluation of Business Development Performance of Chemical Companies

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A suitable business model is an effective way for chemical companies to maintain their market competitiveness. This paper takes chemical companies as research objects to study the relationship between business models and business development performance. Based on the analysis of the literatures on the concept, connotation of business model and the concept of business performance, this paper clarifies the diversity of the business performance indicators of the chemical companies; it constructs a business performance influence model that includes the business models as the intermediate variables, factors that influence the business model as the antecedent variables, and regulatory factors, then it validates the hypothesis through empirical analysis. The conclusion is that the factors that have a significant impact on the business models are corporate resources and technological changes; the resource integration capabilities in the regulatory factors have a significant relationship with the adjustment of the two.

## 1. Introduction

With the progress of economic globalization, the development of the Internet has made the market more transparent and the competition faced by chemical companies has become increasingly fierce. A suitable business model (Christoph, 2009) is one of the important ways for chemical companies to maintain competitiveness and improve performances (Mitchell, 2003). Studies have shown that different business models (Zott, 2011) have significant differences in the influence on the business performance of companies. Some scholars have even pointed out that competition of modern chemical companies (Barney, 1991) is the competition between business models (Aversa, 2015). Due to the complexity and diversity of business models, the mechanism of business models affecting business performance (Capon, 1990; Griffin, 1997) is not yet clear, and how to use business models to guide the practice of corporate development is of great significance. Efficient and appropriate performance management is of great importance to companies in the development stage. It can not only motivate employees and improve work efficiency, but also can closely link the development of employees with the development of the company. The performance management and evaluation systems of early chemical companies were only aimed at financial goals (Largovas, 2008). This method can only motivate employees in the short term, and it is very unfavorable to the long-term development of the company in the long run. This paper takes chemical companies as research objects, further studies the relationship between business models and business performance, and establishes corresponding theoretical models and validates them.

## 2. Business model

### 2.1 Definition of business model

The concept of the business model (Schaltegger, 2012) was first proposed in the 1950s. After decades of development and renewal, due to the different backgrounds, objects, and purposes of the scholars' research, there has been no unified definition yet. At present, several major theoretical schools have defined the business model. These theoretical schools agree that the core of the business model is the logic of an enterprise to create and obtain value, and its essence is the transaction structure of relevant stakeholders.

## 2.2 Elements of business model

Due to the inconsistent definition of business models, for the elements that make up the business models, there are different theories, such as the three-element theory which consists of value proposition, positioning and distribution; the four-element theory which consists of value proposition, key resources, process and profit model; five-element theory and nine-element theory, etc. This paper believes that the business model consists of the following five elements.

## 2.3 Classification of business models

The classification of business models varies according to the purpose of the study and the factors that influence the performance of the company. They can be roughly divided into two categories: one is based on logical reasoning, and the other is based on actual case studies. At present, the classification methods of business models can be categorized into three types: multidimensional compound type, complex one-dimensional type and simple one-dimensional type.

## 3. Chemical company performance evaluation

### 3.1 Performance evaluation methods for chemical companies

Business performance is an indicator that assesses a company's operating conditions (Jean, 1988). Financial indicators can only evaluate the short-term economic benefits of the company; and only comprehensive evaluation of the company can reflect the company's operating conditions in all aspects. The three core functions of an effective business performance evaluation method are communication, motivation, and evaluation. For example, the Balanced Score Card method (Kaplan, 1992) comprehensively evaluates the performance of a company from four aspects: customer, financial, learning and growth, and internal business processes, as shown in Figure (1).

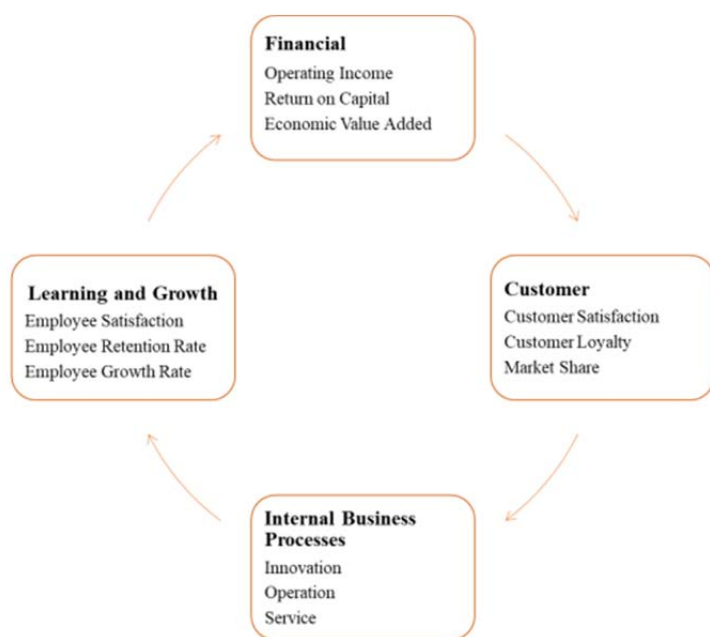


Figure 1: Model of Balanced Score Card

### 3.2 Performance evaluation indicators of chemical companies

The performance evaluation indicators of chemical companies generally do not use a single indicator. Using multi-dimensional evaluation indicators can reflect the overall situation of the enterprise more scientifically, making it possible to compare objectively between different companies or between different departments within a company. In order to avoid the influence of firm size on the business performance, the selected indicators are all ratios, as shown in the following Table (1). They are mainly divided into four aspects: profitability, debt repayment ability, operational ability, and growth ability of chemical companies.

Table 1: Indicators of business performance

Aspect	Index
Profitability Indicator Information	ROE
	OPE
	Profit rate
	ROA
Operational Performance Indicators	Inventory turnover
	Fixed asset turnover rate
	Total asset turnover
	Revenue Growth Rate
Growth Ability Indicator	Total asset growth rate
	Net profit growth rate
	Current Ratio
Repayment Indicator	Ability
	Assets and liabilities
	Property Ratio

### 3.3 The influence of business model on the business performance of chemical companies

The business model of chemical companies varies greatly depending on the size of the company. Large-scale chemical companies link other industrial chains while extending their upstream and downstream value chain, and the business model that most small and medium-sized chemical companies use is a single model with production as the center. The core of the business model is the logic of value creation in chemical companies, and the influence on business performance is the application and embodiment of this logic in the actual operation of chemical companies. A large number of studies have shown that the business model has direct and indirect influence on the performance of chemical companies: the business model selected by the company has a direct influence on the company's performance, only when companies continuously improve and adjust their business models in practice can they gain advantages in the fierce market competition; at the same time, the business model will affect the company's innovation, growth, profitability and other aspects, and then will have an indirect influence on the company's business performance.

## 4. Evaluation model of influence of business models on business performance of chemical companies and its verification

### 4.1 Models and assumptions

A large number of studies simply study the relationship between business models and business performance, while there are few models consider the factors that affect the business model, and how these factors affect business performance through business models. Therefore, this paper uses the business model as an intermediate variable to fully study the influence of internal and external factors on the business model and business performance, taking into account the adjustment function of the company's specific strategies or marketing capabilities and other dynamic capabilities to the business performance.

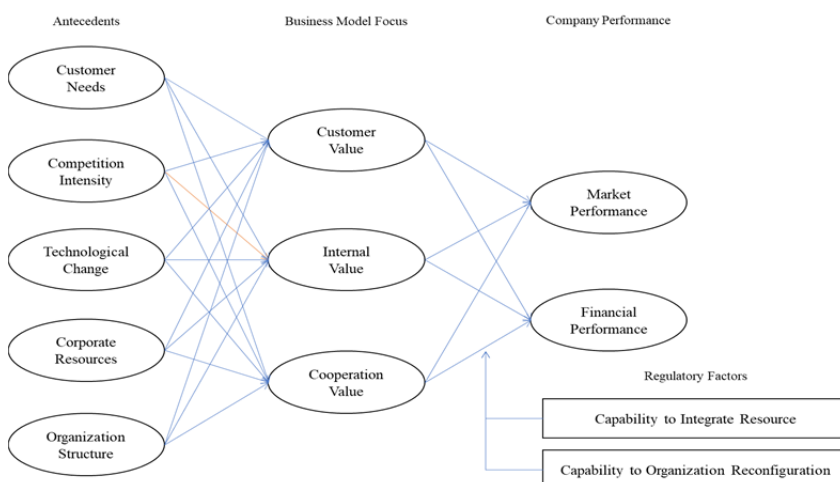


Figure 2: Extended business models and business performance

By discussing the basic concepts of business model and business performance and related influencing factors, the basic model is extended to the model shown in Figure (2) according to the dimensions of the business model, the factors that affect the business model, and the performance evaluation of chemical companies. Assume that the intensity of competition has a negative influence on the internal value of the company, and all other assumptions have positive influences.

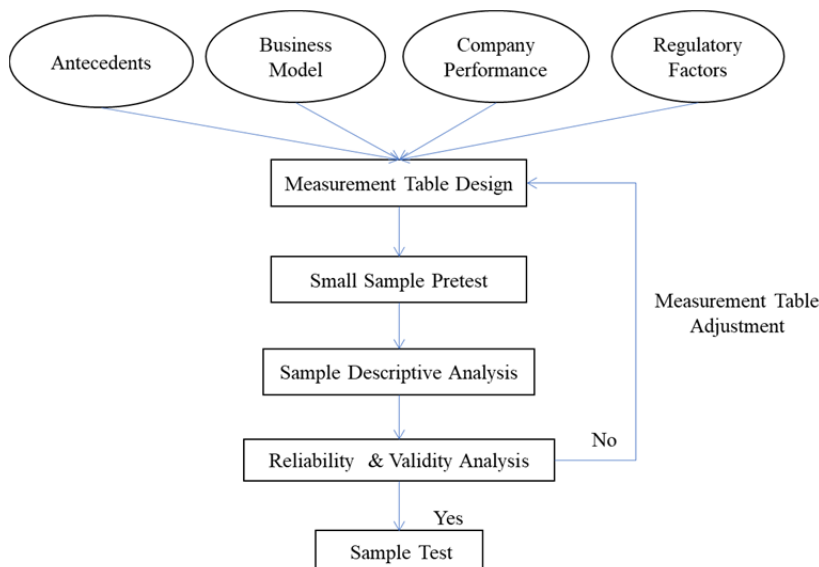
#### 4.2 Research design

The first is to design measurement scales for all the factors involved in the model, including the business model antecedent measurement scale, business model measurement scale, business performance measurement scale, resource integration capability measurement scale and organizational reorganization capability measurement scale. The contents of the measurement scales are designed based on reference literatures or experts' opinions. Take the measurement scale of business performance as an example, which is shown as following Table (2).

Table 2: Items of business performance

Aspect	Item Description
Market Performance	The company has continuously introduced new products in the past three years
	The company's market share has grown faster in the past three years
	Compared with its peers, corporate products have a stronger market competitiveness
Financial Performance	Compared with peers, corporate profitability is higher
	Compared with their peers, corporate ROI increases
	Compared with their peers, the company's sales have grown faster

Then, the designed measurement scale is pre-tested in the form of small sample questionnaires, and the collected data is tested for reliability and validity, and the problems in the measurement scales are corrected and improved. The overall flow of research design is shown as figure (3). For the reliability test, the consistency of the influencing factors is tested by the Cronbach's  $\alpha$  coefficient and the CITC coefficient. When the test result exceeds the minimum standard of 0.70, it indicates that the measurement scale has a good internal consistency. The validity test is to test the validity of the research questions, and is divided into construct validity test and content validity test, which determines whether the measurement scale has a good validity through professionals' analysis and reviews.



Figures 3: Research design process

**4.3 Empirical analysis and model validation**

**4.3.1 Sample description**

In this study, 400 questionnaires were sent out to 80 chemical companies across the country, and a total of 352 valid questionnaires were returned, with an effective rate of 88%. The research goal of this paper is the influence of the business model on the business performance development of chemical companies. Therefore, the focus of the study is on chemical companies. We used the random sampling method to send out questionnaires to the chemical companies. In order to fully reflect the actual situation of the companies, the questionnaires were sent to senior managers of these chemical companies. The number of questionnaires for each company was controlled at 5-7.

**4.3.2 Model analysis and hypothesis testing**

Before using the structural equation to analyze the model, the factors within the model need to be analyzed for correlation to study the relationship between the variables, so that the variables could be put into the structural equation for further verification and analysis. Structural equation is a method for analyzing complex causal relationships between variables through multiple regression analysis and path analysis. The general form of the structural equation is as follows:

$$C = B\theta + \aleph\delta + \xi \tag{1}$$

Where,  $\theta$  represents the potential endogenous variables, namely the business model and business performance,  $\delta$  represents the potential independent variables, namely the factors affecting the business model,  $\xi$  represents random errors, and  $B$  and  $\aleph$  are the correlation coefficients of the corresponding variables respectively.

Use the above equation to validate and analyze the influence of business models on the evaluation of business performance of chemical companies, so that the final fitting results meet the evaluation criteria shown as Table (3).

Table 3: Standard of business model goodness-fit

$\chi^2/df$	GFI	AGFI	NFI	CFI	RMSEA	RMR
2~5	0.9<X<1	0.9<X<1	0.9<X<1	0.9<X<1	<0.08	<0.08

**4.3.3 Result analysis**

After several times of fitting and constant modifications to the model, the results of the verification factor of the business model are in accordance with Table (3). The final results are shown as Figure (4) below.

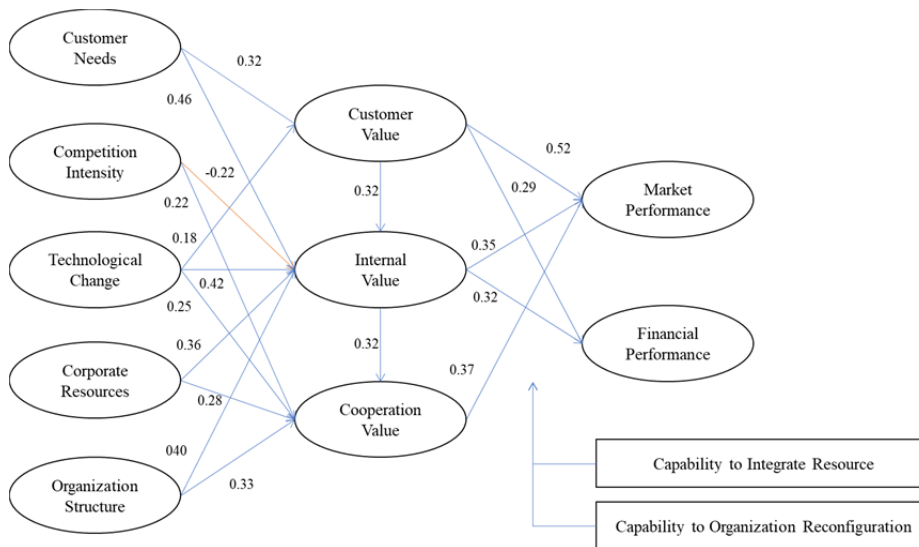


Figure 4: Revised structural model

In the model, there are a total of 33 model assumptions, of which 6 assumptions have not been supported and verified, and the remaining 27 have been verified. The assumptions that have not been verified include: the influence of customer demand and organizational structure on the value of cooperation; the influence of

competition intensity and organizational structure on customer value and the influence of cooperation value on market performance; in addition, in the adjustment mechanism, the results of the organizational reorganizing capability to regulate the relationship between cooperation value and financial performance have not been verified. Factors that have a significant influence on business models include corporate resources and technological change; the business model has a partial influence on the performance of chemical companies in terms of customer value, cooperation value and internal value;

## 5. Conclusion

This paper took chemical companies as research objects and studied the relationship between business models and business development performance. The specific findings are as follows:

(1) This paper analyzed the concept, connotation and elements of business model and the concept of business performance, and clearly clarified the diversity of business performance indicators of chemical companies.

(2) This paper constructed a business performance influence model that includes the business model as the intermediate variables, factors that influence the business model as the antecedent variables, and regulatory factors, and then it validated the hypothesis through empirical analysis. Factors that have significant influences on business models include corporate resources and technological change, and the resource integration capability has a significant relationship in the adjustment of the two.

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