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Research on the Relationship among Government Regulations, Strategy Preference and Manufacturing Performance

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ABSTRACT

Based on the environment-strategy-performance paradigm, the paper constructs a theoretical framework on the relationship among government regulations, manufacturing strategy and performance. Using structural equation model and a sample of 135 SME of Jiangsu Province, this paper examines the relationship among government regulations, manufacturing strategy and performance, the result of which shows that government regulations have a significant positive effect on cost, quality and innovation; cost, quality and innovation influence financial performance significantly and positively; quality and innovation have a significant positive effect on non-financial performance, whereas cost has not. Finally, suggestions for SME-development promoting policy and manufacturing strategy selection are putting forward.

Keywords: SME; Government Regulation; Manufacturing Strategy; Performance

1. Introduction

SME have already become a vigorous power in the economic development and social progress of China. To further promote the development of SME, China has introduced in succession a series of laws and policies involving financial support, technological innovation and market development. Academic studies regarding the implementation of government regulations and their effects on competition strategies are: Zhang (2010) shows qualitatively that, government policy is the basis of SME development and plays a significant role in corporate strategy-making [1]; Li *et al.* (2010) claim that, supporting policy helps in SME financing not in enhancing their innovation ability [2]. However, there is little research on the impact of government laws and regulations on SME manufacturing strategy selection. Skinner (1969) is the first to advocate that manufacturing strategy is a powerful weapon to gain competitive advantage [3], government regulation is a key external factor of strategic options of SME which has a comparative advantage in manufacturing process.

In addition, although manufacture strategy & performance relationship is the core issue, existing research has no established conclusion [4]. Man *et al.* (2010) argue that there is a positive correlation between manufacturing competitive priorities and business performance [5], while Kwasi *et al.* (2008) prove no relationship between them [4]. Then, how do government regulations affect SME manufacturing strategy in light of the classic environment-strategy-performance paradigm of strategic management? Can manufacturing strategy improve business performance? These questions await further studies.

Jiangsu is China's major manufacturing province, more than 99% of whose enterprises are SME creating 60% of GDP and having a significant role in the economic development of Yangtze River Delta region. Therefore, based on a sample of Jiangsu SME and structural equation model, this paper examines the relationship among government regulations, manufacturing strategy and enterprise performance to provide a theoretic guidance for SME strategic decisions.

2. Theoretical Foundation and Hypotheses

Dangayach *et al.* [6] find a positive relationship between the manufacturing strategy and government's industrial policy in India [7]. Li *et al.* (2008) argue that manufacturing strategy improves continuously competitive priority to improve business performance [8]. On the basis of existing researches, the paper proposes that government regulations will affect SME manufacturing strategy choices, and the implementation of manufacturing strategy will play an important role in corporate financial and non-financial performance. Thus, combining the environment-strategy-performance paradigm with theories of strategic management and institutional school, this paper proposes

a theoretical model, shown in **Figure 1**, which studies the relationship among government regulations, manufacturing strategy selection and financial as well as non-financial performances.

2.1. Correlation between Government Regulations and Manufacturing Strategy

The institutional school, which derived from the environment-strategy-performance paradigm, contends that a variety of external (including institutional) factors should be taken into account when companies develop and implement strategies. Institutional constraints and government intervention are particularly important for SME development (Olive, 1997; Zapalska, 2001). SME development relies on government support policies, while enhancing competitiveness is the fundamental guarantee for SME survival. Therefore, the key assignment of government support is for SME to develop competitive advantages. Skinner (1969) points out that manufacturing strategy is a powerful weapon for a company to gain competitive advantage [3]; Badri *et al.* (2000), through a survey on UAE manufacturing companies, state that government regulations have a positive impact on manufacturing strategy formulation [8]. Thence the following hypothesis can be advanced:

Hypothesis 1. Government regulations are positively related to the selection of manufacturing strategy.

Key elements of manufacturing strategy include cost, quality, flexibility, delivery and innovation [9], among which flexibility means quick response to the market fluctuation, while fast delivery is to satisfy customer requirements by speeding delivery and increasing reliability. According to existing theories and preliminary interviews, we find that flexibility and delivery is primarily related to company operation instead of government regulations. So, we will not go further analyzing the relationship between delivery & flexible and government regulations. China has in recent years launched SME supporting policies as regards loan advancing, technology and tax incentives, which have greatly improved SME financing environment and innovation ability, and stimulated companies in gaining competitive advantage through low cost, high quality and innovation. Therefore, this article studies the manufacturing strategy from three dimensions: cost, quality and innovation.

Poter (1985) initiates cost-leadership strategy. He believes that the implementation of cost strategy depends on structural factors including government regulations, tax and financial incentives [10]. According to the new institutional theory, sound policy and legal environment can protect corporate property right, reduce business transaction costs, and stimulate the implementation of cost strategy. Thus, the following hypothesis can be advanced.

H1a: Government regulations will reduce product cost.

Quality management of SME products has been a focus of the Chinese government. Since 1978, China has been proposing total quality management activities on a large scale and implementing quality management systems such as ISO9000 and ISO14000. As a result, our quality management level has been greatly improved. Nevertheless, quite a lot SME still have weak quality consciousness and only focus on economic benefits. Food safety problems exposed recently highlight the severe situation. To improve product quality needs strengthening government supervision. Thus the following hypothesis:

H1b: Government regulations help improve product quality.

There is a great deal of risk for SME to implement time-consuming technological innovation which requires both adequate funding and strong R&D capability, so government support of extreme importance [2]. China has issued a series of policies to encourage technological innovation, e.g. tax incentives, subsidies for speeding up commercialization of high-tech achievements and policies encouraging the establishment of SME technology centers. Cheng *et al.* (2010) suggest that, by increasing governmental subsidies and R&D investments, enterprise innovation can be enhanced effectively [11]. Therefore the following hypothesis:

H1c: Government regulations can promote technological innovation.

2.2. Manufacturing Strategy and Corporate Performance

Although present researches show no conclusive relationship between manufacturing strategy and performance [5], manufacturing strategy is decisive for gaining competitive advantage. Production cost controlling can save business spending; quality products provision may increase

Figure 1. Theoretical model.

market share and customer satisfaction; innovation will meet individualized customer needs, improve productivity and profitability [12]. Jorn-Henrik (2008) finds that in an environment of fierce competition, performance of enterprises that take advantage of manufacturing strategy show apparent improvement [13]. Li *et al.* (2006) propose, through an empirical study of SME, that competitive priorities of manufacturing strategies can increase sales profits and return on investment [14]. Therefore the following hypotheses:

H2: Manufacturing strategy is positively related to financial performance.

H3: Manufacturing strategy is positively related to non-financial performance.

Ward *et al.* (1995) argue that production cost reduction helps products to gain competitive advantage in the target markets [15]. Petros (2008) points out that low-cost strategy enables SME to get more profit than their competitors and improve financial performance [16]. As for SME with competitiveness at the manufacturing stage, lower production costs can lower product prices and satisfy customer demand. Therefore the following hypotheses:

H2a: Product cost is positively related to financial performance.

H3a: Product cost is positively related to non-financial performance.

With the implementation of total quality management and the promotion of quality management system, the level of product quality management keeps rising. Deming (1950) finds that quality improvement can reduce costs in product repairing, material waste, and increase business revenues. Fynes (2001) shows that quality strategy can obviously enlarge market share and satisfy customer needs [17]. With increasing consumer awareness of quality, SME who continuously improve product quality can improve corporate reputation and market share, and ultimately gain a sustainable competitive advantage. Thus, the following hypotheses are advanced.

H2b: Product quality is positively related to financial performance.

H3b: Product quality is positively related to non-financial performance.

Technological innovation is the life spring of enterprise core competitiveness [18]. The ability of technological innovation and brand building grows with the accumulation of capital and technical factors. Li *et al.* (2006) prove, through an empirical research on SME, that the greatest impact on business performance is innovation [14]. Through technological innovation, SME can improve production process and methods which enhance product quality and cut down on product cost. Therefore, the following hypotheses are advanced.

H2c: Product innovation can improve financial performance.

H3c: Product innovation can improve non-financial performance.

3. Research Methodology

3.1. Questionnaire Design

Combining research purposes with literature analysis, the article designs a set of corresponding indicators for government regulations, manufacturing strategy and business performance. Initial questionnaire comes mainly from Badri's (2000) [8], and was amended in line with feedbacks from some experts and SME managers and through a small sample pre-test. In the revised scale, there are five items of government regulations, nine items of three dimensions of manufacturing strategy, 6 items of two dimensions of performance. The scoring uses Likert 5 point scale, the subjects assess the situation according to the company's actual conditions.

3.2. Sample

Through random sampling, twice survey sets out 320 questionnaires totally. 120 questionnaires were distributed in the first on-site interview in December 2008, out which 82 valid questionnaires were retrieved in March 2009. 200 formal questionnaires were mailed in April 2009, and 53 valid questionnaires were returned in May-June 2009. Differentiating analysis reveals no significant difference in the valid questionnaires collected twice, combining which produces 135 valid questionnaires, the recovery rate of which was 42.2%.

3.3. Validity and Reliability Analysis

Variable reliability is tested with Cronbach's α coefficient. It is generally believed that, an α-value ranging from 0.7 to 0.8 represents high validity, and an α-value lower than 0.35 means that the variable should be rejected. **Table 1** shows variables reliability, Cronbach's α value of which are all greater than 0.7 and combination reliability in the confirmatory factor analysis (CFA) are above 0.8, which indicate that the variables have good reliability. Data collected are using closed questionnaire, and most of the observed variables of government regulations, manufacturing strategy and business performance are borrowed from domestic & foreign researches, so the questionnaires used in this research are in accordance with the requirements of content validity.

To ensure effectiveness, construct validity of each variable is verified using confirmatory factor analysis (CFA). According to Bogozzi and Yi (1988), the factor load between latent variables and corresponding measurement index should range from 0.5 to 0.95 [19]. As **Table 1** shows, the factor loads of 20 questions are all greater

Table 1. Reliability and validity analysis.

Variable		Question	Mean Value	Standard Deviation	Factor Loading	Cronbach's α	CFA Measurement
Government Regulation		A1	4.01	0.815	0.762	0.778	RMR = 0.020, CFI = 0.972, GFI = 0.973, RMSEA = 0.072, $\chi^2(5) = 9.530$
		A2	4.24	0.735	0.798		
		A3	4.43	0.567	0.744		
		A4	4.20	0.827	0.755		
		A5	4.23	0.657	0.536		
Manufacturing Strategy	Cost	A6	4.09	0.777	0.839	0.800	
		A7	4.13	0.786	0.780		
		A8	4.04	0.781	0.769		
	Quality	A9	4.04	0.711	0.878	0.817	RMR = 0.050 CFI = 0.921, GFI = 0.920, RMSEA = 0.074, $\chi^2(24) = 45.581$
		A10	4.05	0.705	0.828		
		A11	3.92	0.820	0.763		
	Innovation	A12	3.90	0.866	0.849	0.879	
		A13	4.01	0.828	0.842		
		A14	3.73	0.988	0.646		
Firm Performance	Financial Performance	A15	3.78	0.878	0.670	0.729	RMR = 0.025, CFI = 0.966, GFI = 0.962, RMSEA = 0.069, $\chi^2(8) = 17.448$
		A16	3.99	0.652	0.804		
		A17	4.04	0.717	0.853		
	Non-financial Performance	A18	3.87	0.832	0.855	0.843	
		A19	4.02	0.796	0.874		
		A20	3.83	0.833	0.796		

than 0.5, indicating that each variable in this research has good construct validity.

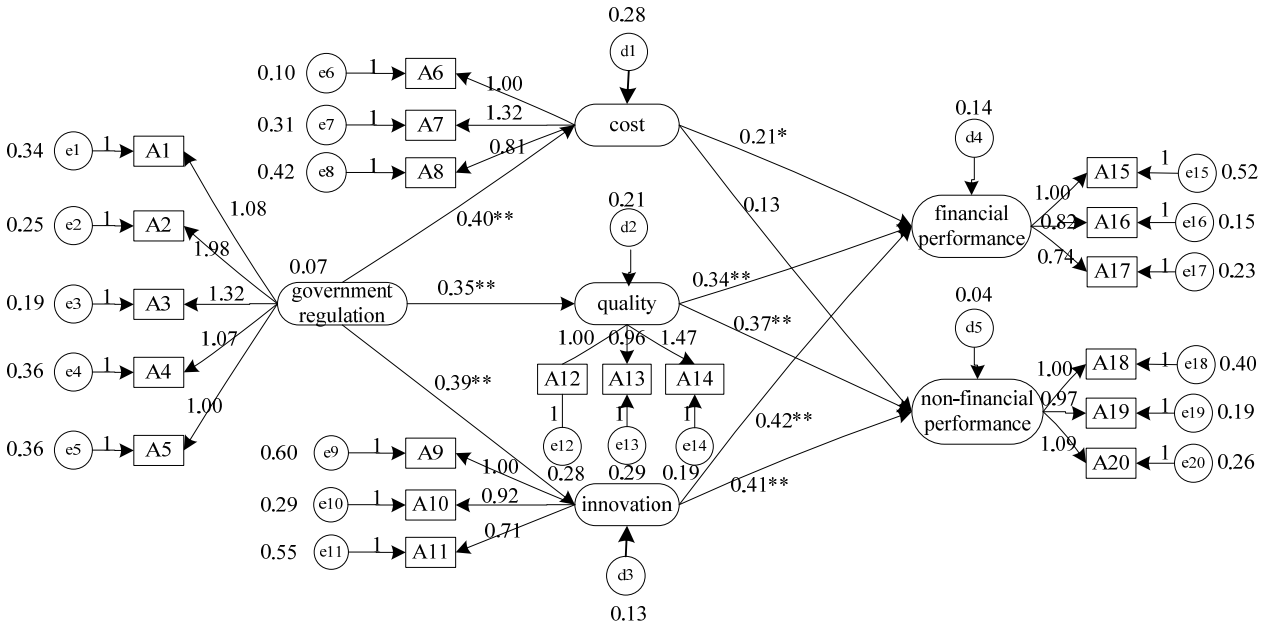
4. Structural Equation Analysis and Hypothesis Testing

4.1. Construction of Structural Equation Model

The purpose of this study is to explore the relationship among government regulations, manufacturing strategy and business performance. As required by structural equation model construction, government regulation is taken as the latent variable composing of five observation variables (A1, A2, A3, A4, and A5). As regards manufacturing strategy, three latent variables（cost, quality and innovation) are established composing of observation variables (A6 - A14). Two latent variables including financial and non-financial performance are constructed for performance, each having three observed variables (A15 - A20). Measurement errors (e1 - e20) are taken for observation variables, while measurement errors (d1 - d5) taken for the latent variables. The overall theoretical model is shown in **Figure 2**.

4.2. Test of Overall Theoretical Model

Bogozzi and Yi (1988) claim to test the overall theoretical model from aspects of basic fitness, inherent fit and overall fit [19]. Firstly, identify model error and problems by use of the basic fit. No negative value of measurement error is required, and factor loadings should range between 0.5 and 0.95 to be significant. Secondly, estimate significant level of the model parameters, the reliability of each indicator and latent variables by the inherent fit. It is widely acknowledged that the measurement standards include: combination reliability of potential variables should be greater than 0.7, the average variance extracted (AVE) value should be greater than 0.5, and the absolute value of t should be greater than 1.96. Finally, the fitness of the observed data and the overall model are tested by overall fitness and the model evaluated by absolute & relative fitness index. Evaluation criteria include: the value of χ^2/df between 1 and 3; goodness of fit index (GFI), comparative fit index (CFI) and norm fit index (NFI) are greater than 0.9; frugal norm fit index (PNFI) is greater than 0.5; root mean



where: ** is $p < 0.01$; * is $p < 0.05$.

Figure 2. Overall theoretical mode.

square of estimation error (RMSEA) is less than 0.08, RMR is smaller than 0.05. The model fit indexes are shown in **Table 2**, which shows that all fit indexes are up to the standards.

4.3. Hypothesis Testing

Standard path coefficients got from AMOS7.0 statistical analysis software are shown in **Figure 3**, which shows support of hypothesis1, hypothesis 2, and hypothesis 3.

4.4. The Results

Results obtained from empirical analysis are as follows.

1) Government regulations have a significant positive effect on cost, quality and innovation ($p < 0.01$), from which we can conclude that hypothesis 1a, 1b, and 1c are supported.

2) Quality and innovation have a significant positive effect on financial performance ($p < 0.01$), product cost has a significant positive effect on financial performance ($p < 0.05$), from which we can see that hypothesis 2a, 2b, and 2c are supported.

3) Quality and innovation has a significant positive impact on non-financial performance ($p < 0.01$) while cost has not, which support hypothesis 3a & 3b, not hypothesis 3c.

4) The path model shows that the government regulation has a significant positive impact on the manufacturing strategy, manufacturing strategy has a significant positive influence on both financial and non-financial performances, thus hypothesis 1, hypothesis 2, hypothesis 3 are established.

5. Conclusions and Recommendation

The article explores the relationship among government regulations, manufacturing strategy choices and corporate performance, the main conclusions are:

1) Government regulations have a significant positive impact on manufacturing strategy, and is positively related to cost, quality, and innovation, which is consistent with conclusions of foreign studies [8,11]. This indicates that government regulations play an important role in SME manufacturing strategy choices, and can help SME enhance their competitive advantage.

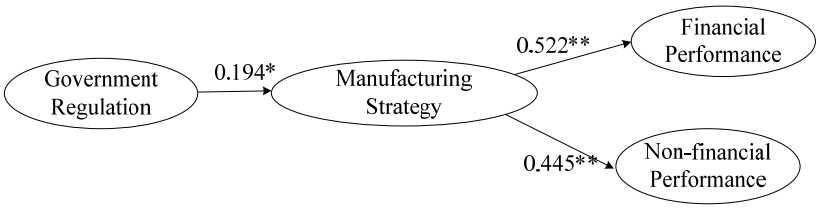
2) Each dimension of manufacturing strategy has a significant positive correlation with financial and non-financial performances, which can be further analyzed as follows.

a) Reducing product cost can improve SME financial performance, which is consistent with the conclusions of relevant study [15,17], but SME tend to pay too much attention to cost at the expense of quality and other factors, which results in lowering customer satisfaction and losing some market share. So, pursuit low cost overly can't remarkably improve corporate non-financial performance [20].

b) Product quality improvement has a significant positive correlation with SME performance, which has been supported by relevant researches [14,15], which means that product quality improvement remains a key competitive advantage for small and medium enterprises.

Table 2. Examination and analysis of the overall theoretical model.

Variable		Observation Variable	Standard Deviation	t	*p*	Factor Loading	Combination Reliability	AVE
Government Regulation		A1	-	-	-	0.760	0.847	0.627
		A2	0.513	4.003	<0.01	0.738		
		A3	0.327	4.038	<0.01	0.724		
		A4	0.463	4.287	<0.01	0.750		
		A5	0.510	4.078	<0.01	0.556		
Manufacturing Strategy	Cost	A6	-	-	-	0.822	0.822	0.616
		A7	0.156	7.089	<0.01	0.831		
		A8	0.136	5.664	<0.01	0.583		
	Quality	A9	-	-	<0.01	0.671		
		A10	0.148	6.257	<0.01	0.625		
		A11	0.191	7.645	-	0.849		
	Innovation	A12	-	-	<0.01	0.844		
		A13	0.277	5.550	<0.01	0.738		
		A14	0.286	5.063	-	0.640		
Firm Performance	Financial Performance	A15	-	-	-	0.866	0.866	0.659
		A16	0.143	5.731	<0.01	0.763		
		A17	0.098	7.524	<0.01	0.681		
	Non-financial Performance	A18	-	-	-	0.786		
		A19	0.150	6.469	<0.01	0.651		
		A20	0.138	7.901	<0.01	0.768		
Overall Fitting Index		χ^2/df = 1.98, GFI = 0.960, CFI = 0.886, NFI = 0.908, RMSEA = 0.067, RMR = 0.041, PNFI = 0.623						



where: ** is $p < 0.01$; * is $p < 0.05$.

Figure 3. Path model.

c) Product innovation exerts the greatest effect on financial and non-financial performance of SME, the correlation coefficients of which are 0.42 ($p < 0.01$), 0.41 ($p < 0.01$) respectively. A reasonable explanation is that, although SME capital as well as R&D strength can't compete with large enterprises, SME may maintain a competitive advantage in price, product differentiation through secondary product development [14].

The results of empirical research reveal a management revelation for SME development in two main aspects: First, government regulations play an important role in making strategic choices for SME, which affect the performance ultimately. To promote SME development, the government needs to be a good supervisor and service provider. Our government support for SME is much lower than developed countries, and whose effect on the development of SME is not obvious, thus foreign experience is needed in promoting SME development [21]. Second, with the changes in the environment, SME competitive strategy has transformed from singly low-cost to a comprehensive one which will create more value. Therefore, SME should, in compliance with its goals, take a varied mix of strategic priorities, and consistently enhance the technological content of products provided that

its cost and quality is ensured.

The sample of this study comes mainly from Jiangsu province, which can be expanded in future studies. Fang (2010) thinks that the development of Yangtze River Delta is related with the construction of a world manufacturing center in China, and Jiangsu is the most promising in Yangtze River Delta [22]. The conclusion drawn from a sample of Jiangsu SME on government regulations, manufacturing strategy and firm performance can act as a guide for SME growth.

REFERENCES

[1] B. Zhang, "Research on SMEs Transformation and Upgrading Strategies," *Science and Technology Management Research*, Vol. 12, 2010, pp. 147-149.

[2] P. Li and C. H. Wang, "The Nonlinear Study of Public S$T Subsides to Business Innovation: A Threshold Regression Analysis Based on Panel Data in 2001-2008," *China Soft Science*, Vol. 8, 2010, pp. 138-147.

[3] W. Skinner, "Manufacturing: Missing Link in Corporate Strategy," *Harvard Business Review*, Vol. 47, No. 3, 1969, pp. 136-145.

[4] K. Amoako-Gyampah and Moses Acquaah, "Manufacturing Strategy, Competitive Strategy and Firm Performance: An Empirical Study in a Developing Economy Environment," *International Journal of Production Economics*, Vol. 111, No. 2, 2008, pp. 575-592. doi:10.1016/j.ijpe.2007.02.030

[5] X. L. Man and X. L. Pei, "Research on Relationship between Competitive Priorities and Manufacturing Performance Based on Modular Customization," *Operations Research and Management Science*, Vol. 19, No. 1, 2010, pp. 162-169.

[6] G. S. Dangayacha and S. G. Deshmukhb, "An Exploratory Study of Manufacturing Strategy Practices of Machinery Manufacturing Companies in India," *International Journal of Management Science*, Vol. 34, No. 3, 2006, pp. 254-273.

[7] G. Li and L. Y. Sun, "Manufacturing Strategy: Literature Survey and Research Prospect for Chinese Problem," *Scientific Management*, Vol. 29, No. 3, 2008, pp. 131-158.

[8] A. Masood and D. Davis, "Operations Strategy, Environmental Uncertainty and Performance: A Path Analytic Model of Industries in Developing Countries," *Omega*, Vol. 28, No. 2, 2000, pp. 155-173. doi:10.1016/S0305-0483(99)00041-9

[9] F. X. Cheng, Y. P. Zhao and S. W. Li, "Analyzing a Questionnaire Research of the Competitive Factors in Chinese Manufacturing Companies," *Industrial Engineering and Management*, Vol. 5, 2007, pp. 101-104.

[10] M. Porter, "Competitive Strategy," Huaxia Publishing Press, Beijing, 1997.

[11] P. Cheng, "The Government of a Strategy to Promote Innovation Evaluation," *Science of Science and Technology Management*, Vol. 31, No. 11, 2010, pp. 19-26.

[12] X. L. Liu and J. H. Ji, "An Empirical Study of Competitive Priorities and Manufacturing Performance," *Journal of Shanghai Jiaotong University*, Vol. 41, No. 7, 2007, pp. 1049-1057.

[13] J. Henrik, "Empirical Analysis of Manufacturing Strategy Implementation," *Production Economic*, Vol. 113, No. 1, 2008, pp. 370-382. doi:10.1016/j.ijpe.2007.09.005

[14] P. Li and M. Liang, "Empirical Study on the Relationship of Competitive Priorities in Small and Medium Manufacturing Enterprises," *Chinese Journal of Management Science*, Vol. 4, No. 14, 2006, pp. 622-626.

[15] P. Ward, R. Duray, G. Leong and C. Sum, "Business Environment, Operations Strategy and Performance: An Empirical Study of Singapore Manufacturers," *Journal of Operations Management*, Vol. 13, No. 2, 1995, pp. 99-115. doi:10.1016/0272-6963(95)00021-J

[16] P. Theodorou and G. Florou, "Manufacturing Strategies and Financial Performance—The Effect of Advanced Information Technology: CAD/CAM Systems," *Omega*, Vol. 36, No. 1, 2008, pp. 107-121. doi:10.1016/j.omega.2005.10.005

[17] B. Fynes and C. Voss, "A Path Analytic Model of Quality Practices, Quality Performance and Business Performance," *Production and Operations Management*, Vol. 10, No. 4, 2001, pp. 494-513. doi:10.1111/j.1937-5956.2001.tb00089.x

[18] S. K. Ren, "Game Analysis on the Technological Choices and Government System Innovation," *Statistics and Decision*, Vol. 13, 2010, pp. 167-170.

[19] M. L. Wu, "Structural Equation Model—The Operating and Application of AMOS," Chongqing University Press, Chongqing, 2009.

[20] F. X. Cheng and Y. J. Huang, "Research on the Relationship between Competitive Priorities and Performance Based on OEM mode," *Journal of Management*, Vol. 9, No. 1, 2011, p. 45.

[21] H. C. Lin and H. X. Guan, "The Analysis of Status and Countermeasures on SME Financing," *Quantitative and Technical Economics*, Vol. 2, 2002, pp. 107-110.

[22] H. S. Fang, "The Most Potential Economic Growth Pole in Jiangsu Yangtze River Delta," 2010. http://www.cqn.com.cn/news/xfpd/szcj/cj/328820.html

