



# INTER-INDUSTRY STUDY OF

The objective of this study is to investigate the interplay among competitive strategies and use of financial and nonfinancial performance measures in Chinese firms' performance measurement systems.

# COMPETITIVE STRATEGY AND PERFORMANCE MEASURES

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**T**he recent introduction of competitive markets, and the growth of foreign investment and private ownership of firms, has led Chinese enterprises to consider the adoption of various management practices originating in Western countries.<sup>1</sup> In this article, we chose to focus on the major role played by performance measurement systems (PMS) in strategy communication and implementation.<sup>2</sup> Performance measurement is an important management

control tool for business firms. It is directly related to the formation and maintenance of a firm's core competency and has impact on the firm's subsistence and growth.

Western practitioners and academics have come to the realization that, since firms face different industry environments and use differing strategies to compete in the marketplace,<sup>3</sup> the purely financial assessments used in traditional management accounting measures are no longer sufficient to

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### EXHIBIT 1 Use Of Performance Measures

Variable	N	Mean	SD <sup>a</sup>
Annual sales in millions of Yuan	72	702	1,006
Number of specific financial measures	72	9.81	3.83
Number of specific internal process measures	72	9.19	5.12
Number of specific customer measures	72	7.69	2.97
Number of specific innovation measures	72	5.73	2.26
Number of specific employee measures	72	7.11	3.52
Percentage of financial measures	72	25.3%	6.60%
Percentage of internal process measures	72	22.2%	5.98%
Percentage of customer measures	72	20.0%	5.24%
Percentage of innovation measures	72	14.9%	3.44%
Percentage of employee measures	72	17.7%	4.30%

a = Standard Deviation

determine performance.<sup>4</sup> Contingency theory maintains that the optimal functioning of a PMS in a firm depends on the particular elements of a firm's context, including the related characteristics of the industry in which it operates, the general competitive strategy it is following, and the specific internal operating strategy adopted to support its competitive positioning. Contingency theory would predict that, to achieve optimal performance, firms must carefully tailor PMS to specific industry and competitive strategies.

Our objective in this study is to investigate the interplay among competitive strategies and the use of financial and nonfinancial performance measures in the performance measurement systems of Chinese firms. To do this, we first had to identify the industries from which we would be collecting data. To ensure diversity among the types of industries studied, we chose to select them based on their use of technology. The Organisation for Economic Co-operation and Development (OECD) 2005 classification of manufacturing industries based on technology identifies several industries as belonging to low technology, medium-to-low technology, medium-to-high technology, and high

technology groups.<sup>5</sup> Given the choices in our center of data collection, Nanjing, in Jiangsu province, we chose the textile industry as representative of low-technology industries; the machinery industry as representative of medium-technology industries; and the electronics industries as representative of high-technology industries. It is well-known that levels of labor intensity and research and development investment vary among these industries; therefore, we would expect differing competitive positioning and strategies, as well as supporting performance measures, in their PMS.

Using Porter's widely accepted terminology, we chose to measure the intensity of competition across these industries through the bargaining power of buyers, the bargaining power of sellers, the threat of substitutes, threats from new entrants, and threats from rivals.<sup>6</sup> For competitive strategy, we used Treacy and Wiersema's classification, with its three strategies of cost leadership, product differentiation, and customer intimacy.<sup>7</sup> To tie all these together with PMS, we relied heavily on a mature performance measurement survey questionnaire used in Van der Stede et al., in which financial measures as well as customer-oriented,

innovation-and-new product-development-oriented, internal process-oriented, and employee-oriented measures are included.<sup>8</sup>

### Survey techniques and sample characteristics

Given the lack of publicly available data on the strategies and operating characteristics of Chinese firms, we used a survey questionnaire to collect data. The survey instrument included questions on competitive strategies and specific performance measures used. In addition to strategies and PMS, we also asked a number of questions about the characteristics of the respondents and firms.

To increase the response rate, we limited our sample to firms in the Nanjing area, where one of the co-authors serves as a dean of the Nanjing University Business School and has strong business/alumni contacts, as well as goodwill. Given our interest in manufacturing strategy, we targeted managers or directors of manufacturing in manufacturing firms. We focused on firms in three industries — electronics, machinery, and textiles — which, as explained earlier, fall neatly into different categories of technology use (high tech, medium tech, and low tech, respectively), as catalogued by OECD. The sample firms were chosen from a list of companies that had sent their executives to attend executive education programs at the School of Management in Nanjing University over the course of the last several years. We sent out 150 questionnaires to deputy general managers in charge of manufacturing and received 72 replies, all of which were usable (a response rate of 48 percent).

The firms participating are evenly distributed across the three industries (22 electronics manufactures; 25 machinery manufactures; and 25 from the textiles sector). Descriptive statistics on the sample firms are provided in Exhibit 1. These firms had average sales of 702 million Yuan (1 U.S. \$ = 6.22 Yuan). The managers who responded had, on average, been working for their current employers for about nine years and had a total of 14 years' work experience.

Exhibit 1 shows that responding firms use more financial measures (25.3 percent). For nonfinancial measures, responding firms use more internal process measures (22.2 percent), followed by customer measures (20.0 percent), employee measures (17.7 percent), and innovation measures (14.9 percent), respectively.

### Analysis of competition intensity and competitive strategy

Contingency theory maintains that the optimal functioning of a firm depends on its adoption of competitive strategies/positioning appropriate to its environmental factors, as well as internal functional strategies and performance management systems consistent with its competitive positioning/strategies. In this study, we consider three important and related characteristics: industry, competitive strategy, and manufacturing strategy. Contingency theory would predict that, to achieve optimal performance, firms must carefully tailor PMS to specific industry and competitive needs.

**Competition intensity.** Our survey questionnaire includes several questions about the level of competition intensity. We measure competition intensity based on Porter's five forces:

1. threats from rivals;
2. the bargaining power of buyers;
3. threats from new entrants;
4. the threat of substitutes; and
5. the bargaining power of suppliers.<sup>9</sup>

For instance, one question asks the respondents to rate the bargaining power of buyers on a scale of 1–5. Exhibit 2 shows the level of competition intensity across industries.

We conducted Kruskal–Wallis tests, which indicated that there is no statistically significant difference in competition intensity in terms of buyer, supplier, substitute, and entrant. However, there is a significant difference in rivalry. It appears that the electronics and textile industries have a higher average competition-intensity score than firms in the machinery industry.

**CONTINGENCY THEORY MAINTAINS THAT THE OPTIMAL FUNCTIONING OF A FIRM DEPENDS ON ITS ADOPTION OF COMPETITIVE STRATEGIES/POSITIONING APPROPRIATE TO ITS ENVIRONMENTAL FACTORS.**

## EXHIBIT 2 Competition Intensity and Industry

Competition Intensity	Overall (N = 72)	Electronics (N = 22)	Machinery (N = 25)	Textile (N = 25)
Bargaining power of buyers (Buyer)	3.76	3.77	3.72	3.80
Bargaining power of suppliers (Supplier)	3.250	3.14	3.20	3.40
Threat of substitutes (Substitute)	3.23	3.41	2.96	3.48
Threat from new entrants (Entrant)	3.36	3.27	3.28	3.52
Threat from rivals (Rivalry)	3.82	4.00	3.44	4.04

Note: 1 = Least Intensity; 5 = Greatest Intensity

## EXHIBIT 3 Competitive Strategy and Industry

Competitive strategy	Overall	Electronics	Machinery	Textiles
Cost leadership	26	4	4	18
Product differentiation	30	15	10	5
Customer intimacy	16	3	11	2

**Competitive strategy.** We asked respondents to pick any of three competitive strategies — cost leadership, product differentiation, or customer intimacy — that best described their company's competitive strategy. The distribution of competitive strategies across industries is reported in Exhibit 3.

A Chi-square test result indicates that there is a statistically significant relationship between competitive strategy and industry. It appears that textile firms make considerable use of the cost leadership strategy, most likely because that is a relatively low-skill, labor-intensive industry subject to severe competitive rivalry (see Exhibit 2). On the other hand, both electronics and machinery industry firms use product differentiation strategy more often than textile industry firms, with machinery industry firms favoring customer intimacy as well.

### Analysis of performance measures application

This section contains one subsection on financial measures and four on nonfinancial measures (internal process, customer, innovation, and employee measures). Participants were asked to

check off, from a list provided, the specific performance measures used in their evaluations.

**Financial measures.** We provided a number of specific financial performance measures on the list given to respondents. These measures include: return on assets, return on equity, net income, operating income, return on sales, cash flow, product sales, product cost, product margin, area sales, area cost, area margin, customer sales, customer cost, customer margin, percent of research and development to sales, earning per share, percentage of sales growth, and percentage of profit growth.

For the purpose of data analysis, we counted the number of financial measures checked off by respondents, tabulated in Exhibit 4. Next, to test the difference across industries, we conducted ANOVA (Analysis of Variance) analysis on the data.

We found that there are significant differences in the use of financial performance measures across industries; it appears that firms in the electronics industry use the greatest number of financial measures.

**Internal process measures.** Our survey included a number of specific inter-

#### EXHIBIT 4 Financial Measures Across Industries

Industry	N	Mean	SD
Electronics	22	11.68	4.39
Machinery	25	8.72	2.99
Textile	25	9.24	3.57

Note: The maximum number of measures respondents can check is 25

#### EXHIBIT 5 Specific Internal Process Measures Across Industries

Industry	N	Mean	SD
Electronics	22	11.09	6.22
Machinery	25	7.44	3.92
Textile	25	9.28	4.68

Note: The maximum number of measures respondents can check is 25

#### EXHIBIT 6 Specific Internal Process Measures Across Industries

Industry	N	Mean	SD
Electronics	22	8.91	3.16
Machinery	25	6.92	2.29
Textile	25	7.4	3.18

Note: The maximum number of measures respondents can check is 16

nal process performance measures for respondents to check off. These measures include: production volume, labor productivity, overtime, machine productivity, material usage variance, percentage of material waste, setup time, number of setups, manufacturing cycle time, inventory turnover rate, inventory cost, number of product defects, rework, scrap, percentage of overhead to sales, and total cost of poor quality. Exhibit 5 shows mean values of a number of specific internal process measures across industries.

Using ANOVA, we found that there are significant differences across industries. It appears that firms in the electronics

industry use the highest number of internal process measures.

**Customer-related measures.** We also provided the following list of specific customer-related performance measures for the respondents to check off: customer satisfaction survey results, number of customer complaints, flexibility/responsiveness, number of new customers, percentage of sales from new customers, number of repeat customers, time taken to fill customer orders, on-time delivery, warranty claims, and time to respond to customer problems. Exhibit 6 presents the average number of specific customer-related measures across industries.

### EXHIBIT 7 Innovation Measures Across Industries

Industry	N	Mean	SD
Electronics	22	6.68	2.98
Machinery	25	5.28	1.48
Textile	25	5.36	2.02

Note: The maximum number of measures respondents can check is 16

### EXHIBIT 8 Employee-Related Measures Across Industries

Industry	N	Mean	SD
Electronics	22	8.59	4.02
Machinery	25	6.72	3.20
Textile	25	6.20	3.07

Note: The maximum number of measures respondents can check is 18

Using ANOVA, we found that there are significant differences in the use of customer-performance measures across industries. It appears that firms in the electronics industry use the greatest number of customer-related measures.

**Innovation measures.** To assess innovation measures, we provided the following list of specific innovation performance measures for the respondents to check off: new product revenue as a percentage of sales, time to develop new product, new product development time relative to the competition, number of new products, number of the firm's new products relative to the competition's, number of patents, number of the firm's patents relative to the competition's, number of new product ideas, new product on-time schedule, new product on-budget, and the number of problems in new product introductions. Exhibit 7 indicates the mean number of specific innovation measures across industries.

Again, using ANOVA, we found that there are significant differences in the use of specific innovation measures across different industries. It appears that firms in the electronics industry implement the highest number of innovation measures.

**Employee-related measures.** Finally, we provided the following list of specific employee-related performance measures for the respondents to check off: employee satisfaction survey results, number of grievances filed, level of employee education, level of employee experience, number of suggestions submitted, percentage of employees on improvement teams, number of accidents, number of injuries, percentage of employees' time allowed for training, average number of years in job, average numbers of years with firm, and absenteeism. Exhibit 8 provides the mean number of employee-related measures across industries.

Use of ANOVA reveals that there are significant differences in the use of employee-related performance measures across industries. Again, it appears that firms in the electronics industry use the greatest number of employee-related measures.

In summary, as far as performance measures are concerned, firms in the electronics industry use greater numbers of both financial measures and each of the four categories of nonfinancial measures.

## Conclusion and recommendations

Since China opened its doors in December of 1978, it has moved steadily toward a more profit-oriented market economy. The recent introduction of competitive markets and the growth of foreign investment and private ownership of firms have led Chinese enterprises to consider the adoption of various management control concepts used in capitalist societies. In this study we empirically examined competitive strategies and the use of financial and nonfinancial measures in PMS across three selected industries.

Using survey data from 72 manufacturing companies in the Nanjing area, we can observe several interesting features within the Chinese manufacturing industry:

- As we would expect, industry rivalry is markedly different between the three types of industries surveyed, with the textile and electronics industries (which usually serve mass-manufacturing consumer markets) having higher competition intensity scores than the machinery industry;
- We find that competitive strategy between the industries is significantly different, with the textile industry favoring cost leadership and the electronics industry favoring product differentiation, while the machinery industry is split between product differentiation and customer intimacy;
- When it comes to the use of financial and nonfinancial performance measures, we find that firms in the electronics industry use greater numbers of both financial measures as well as each of the four categories of nonfinancial measures; and
- Overall, we find a lack of fit between the competitive strategy and performance measures (financial and nonfinancial) that would be advocated by Western strategic management theory and practice.

What is surprising is that the machinery industry, which follows a significantly more active customer-intimacy competitive strategy, does not use more customer-related performance or inno-

vation measures. The data show that they apply these measures at the same rate as the textile industry — and at a significantly lower rate than the electronics industry.

In sum, we got mixed results concerning competitive strategy and performance measures in the three Chinese manufacturing industries we investigated. While we do see differences in competitive intensity, competitive strategy, and performance measures used across these three industries, we do not see a tight correlation between competitive strategy and performance measures. A key reason, we suspect, is the fact that Chinese firms, in general, lack exposure to Western principles of strategic management and their connection to performance measurement.<sup>10</sup>

As we all know, the core of the balanced scorecard measurement is a company's vision and mission, based on which the company can balance its long- and short-term performance objectives. Without these, all we have is just a checklist of all objectives and measures for these — we suspect that the electronics industry is one such example, using more financial and nonfinancial measures than the other industries surveyed. Another reason for the lack of fit between strategy and performance measures could be the organization of Chinese enterprises — strategy and performance control are in separate departments in most Chinese firms.<sup>11</sup> This may explain why the machinery industry, which emphasizes customer intimacy and product differentiation strategy, still has the lowest mean scores in both innovation measures and customer-related measures used.

Since China joined the WTO in December 2001, Chinese firms have realized that they need effective management accounting and control techniques to provide management with relevant, timely, and accurate information to improve enterprise performance. For the most part, our study shows that managers from all three industries have emphasized the finan-

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**IN ORDER TO COMPETE IN CURRENT AND FUTURE GLOBAL MARKETS, CHINESE FIRMS' PERFORMANCE MEASUREMENT SYSTEMS SHOULD MATCH MODERN BUSINESS AND MANAGEMENT TECHNIQUES, INTEGRATE WITH OVERALL FIRM STRATEGIES, AND USE SHORT-TERM FINANCIAL MEASURES AS WELL AS LONG-TERM NONFINANCIAL MEASURES.**

cial dimension of management accounting and control information, with the electronics industry using more non-financial measures. There is no indication that a strategy-focused PMS, emphasizing the cause-and-effect link between performance measurement and firms' competitive strategies, has been well-implemented. Even in the case of the electronics industry, we suspect that the performance measurement system may be more akin to a checklist of measures for managers to keep track of. We believe that this may be due to the limited exposure to Western strategic management philosophy, performance measurement philosophy, and related training at all levels of the Chinese manufacturing industry. We propose the following two recommendations for Chinese manufacturing firms.

**Chinese firms should focus on, and use more, learning and innovation performance measures.** Chinese firms' performance measurement systems still need to improve. Only 30.8 percent of our respondents thought performance measurement should focus on the long-term aspects of learning and innovation measures. Nowadays, competition is becoming increasingly fierce, and firms must focus on learning and innovation to keep their competitive advantage. Only through continuous learning and innovation, and adoption of the most advanced and most suitable management methods and techniques, can firms produce the newest and most customer-oriented products, as well as maintain their competitive positions. The low 30.8 percent response rate indicates that Chinese firms still do not recognize the importance of learning and innovation for a firm's long-term profitability. For long-term sustainability, it is in their best interests to make learning and innovation performance measures a priority.

**Chinese firms should pay more attention to their employees.** The Chinese firms' survey results on the effects of performance measures still do not meet the

expectations that non-Chinese firms have in focusing on improving employee satisfaction and loyalty, keeping key employees, motivating innovation, and avoiding short-term actions and myopic behaviors. Employees are important resources to firms' subsistence and growth, since improving employee satisfaction can motivate employees and promote long-term growth. Key employees are the driving force to any firm's growth, and only by keeping them can firms maintain their vitality. Therefore, Chinese firms should emphasize improving employees' learning and innovation capabilities in order to focus on their own long-term interests and reduce short-term activities.

Overall, we believe that in order to compete in current and future global markets, Chinese firms' performance measurement systems should match modern business and management techniques, integrate with overall firm strategies, and use short-term financial measures as well as long-term non-financial measures. Furthermore, Chinese firms' performance measurement systems should expand and improve continuously based on fluctuating market situations and the needs of specific firms.<sup>12</sup> ■

#### NOTES

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