

Untangling the strategic orientation and its impact on product innovation performance: An

empirical study on the Chinese enterprises

Yan Yang, Hengyuan Zhu, Guisheng Wu

Research Center for Technological Innovation, Tsinghua University, 100084

Yan Yang, Ph.D candidate, Research Center for Technological Innovation, Tsinghua University.

Email: [yangyan00@mails.tsinghua.edu.cn](mailto:yangyan00@mails.tsinghua.edu.cn); Tel: 86-10-6277-1773.

## **1. Introduction**

In a flat world driven by globalization and ICT technology, understanding how firms can accelerate growth in a product-based business is of fundamental theoretical and managerial interest (Griffin and Page, 1993; Patterson and Fenoglio, 2004). It is especially essential for the academia and practitioners that are absorbed in the huge transitional economy in China to enhance the knowledge about the key factors leading to continuable success of new product development. On the one hand, with the transition from planned economy to market economy, the production capacity surplus has become especially severe both in industrial and consumer markets in China. On the other hand, as the basic living standard improves, the huge and highly diversified and stratified markets have revealed great demand potential. With the open of Chinese markets, many U.S. and European firms are also developing new products in China. Emphasis on the development of new products has increased dramatically (Wei, 2004). However, existing research on the new product success has been mainly done in the North American and European settings and research on the product innovation in China is quite limited even by the local scholars due to the short history of new product development in China.

In the large amount of studies on influencing factors of new product success, strategic orientation is a modestly researched topic as an organization culture resource. It is very important for the new product performance in Chinese enterprises for three reasons. First, as the precursors of capability building, different strategic orientation modes are identified during the in-depth interviews with Chinese managers in new product development enterprises. For example, evolved from a research institute, Hanwang had the state-of-art technology and knew little about marketing at its

foundation. But such a situation changed and it became more market oriented when it realized the limitation of pure technology orientation. The transition of SOEs, research institute and emergence of various market-based or technology-based enterprises have made the strategic orientation in China a rich and meaningful landscape for the academia. Second, as an emerging market which is often the adopter of international innovation diffusion, the local players in the market are often sharp witted enough to follow, to imitate and to innovate speedily in boosting the market growth. In the process of learning by doing, imitation and set the competitors' products as benchmark have become natural. Furthermore, to win in the new product war, many enterprises are very aggressive in monitoring and beating the competitors. Focus on the competitors' action while neglecting the indigenous capability building has actually become a popular phenomenon in the extremely aggressive and myopia enterprises. Third, in the Chinese culture, balance and dynamic are two important principles in conducting business. A single strategic orientation as customer orientation or competitor orientation has shown irrelevant in a long run. The comprehensive perspective on strategic orientation has come into being as there is no one right way for an organization to orient itself (Berthon, Hulbert and Pitt, 1999).

While in the body of strategic orientation literature, the real working mechanism of strategic orientation on new product performance remains unclear and often inconsistent strategic orientations are selected in the empirical studies due to the lack of theoretical foundation. And the mainstream of the existing research is focused on the new product development in manufacturing industry and few empirical studies have reported the comparison of the new product development in manufacturing and service firms. The purposes of this study are to (1) define the strategic orientation in new product development from the capability building perspective; (2) examine the

differential effects of customer, technology, competitor and interfunctional coordination on the overall new product development success at the firm (SBU) level; (3) compare the differences in strategic-orientation relationships across different types of industries.

The article is organized as follows: after a brief literature review, the conceptual framework is developed based on the in-depth interview and hypotheses are proposed based on the strategy, marketing and NPD literature; then, structural equation modeling is used to test the scales and hypothetical model in the Chinese context using data collected from 501 Chinese firms; finally, the model is compared in different settings such as manufacturing vs. service, high-tech vs. low-tech firms.

## **2. Literature Review**

### 2.1 Strategic orientation

There is no definitive view on the nature of strategic orientation. For example, strategic orientation refers to how an organization uses strategy to adapt to and change aspects of its environment for a more favorable alignment (Manu,1996). This orientation has been described as strategic choice, strategic thrust, strategic fit, and strategic predisposition (Chaffee, 1985). Gatignon & Xuereb regards the strategic orientation reflects a firm's focus in terms of creating behaviors that help it achieve superior performance (1997). According to Noble (2002), strategic orientations are the guiding principles that influence a firm's marketing and strategy-making activities. Noble extended the categories of strategic orientations proposed by Morgan and Strong (1997) and summarized the perspectives of strategic orientations into competitive culture, classificatory, narrative and comparative based on two dimensions: determinants (internal priorities and process vs. external actions) and descriptive goal (categorization vs. unique characterization).

The mainstream of quantitative empirical studies of strategic orientation regards the strategic orientation as the competitive culture such as customer orientation, technology orientation, competitor orientation, interfunctional coordination, entrepreneurship orientation and innovation orientation. Customer orientation is the sufficient understanding of one's target buyers to be able to create superior value for them continuously (Narver and Slater, 1990). Technology orientation means the firms are strongly R&D oriented, proactive in acquiring new technologies and use sophisticated technologies in the development of their new products. Competitor orientation can be defined as the ability and the will to identify, analyze, and respond to competitors' actions (Gatignon and Xuereb, 1997). Interfunctional coordination is the coordinated utilization of company resources in creating superior value for target customers. Entrepreneurship orientation is viewed as a learning and selection mechanism that engenders exploratory and risk-taking behavior in NPD (Li, Liu and Zhao, 2006).

We can see from the above definitions that there exist various definitions of strategic orientations. One problem related to the strategic orientation is that in the empirical studies, the selection of strategic orientation as the explanatory factors of performance is rather inconsistent and lack of theoretical foundation. For example, interfunctional coordination is regarded as an indispensable dimension of market orientation; while Gatignon and Xuereb (1997) considered the importance of technology orientation together with customer orientation and competitor orientation and proposed that inter-functional coordination was not a component or dimension of market orientation but rather a structural aspect of an organization that facilitates communication and coordination between the firm's different functions (Tyler and Gnyawali, 2002). In Jeong, Pae and Zhou's study on the new product development in Chinese manufactures, they defined the customer and

technology orientation as the strategic orientations (2006). While Li, Liu and Zhao (2006) focused on the customer orientation and entrepreneur orientation, Zhou, Yim and Tse (2005) add the technology orientation in addition to the two orientations. It is understandable that the researchers may have different interest on the strategic orientations so that various combinations are selected (Baker and Sinkula, 2005; Kaya and Seyrek, 2005; Atuahene-Gima, 2005; Salavou, 2005; Im and Workman, 2004). But to study the impact of strategic orientation on the overall new product success at the firm/SBU level, it is time to come to a holistic conceptual framework.

Another problem regarding the strategic orientation is the debate about it is resource or capability. In the majority of literature, the strategic orientations are regarded as the organizational resources rather than capabilities (Hunt and Morgan, 1995; Becker and Homburg, 1999; Wei and Morgan, 2004; Atuahene-Gima, 2005; Menguc B. and Auh S., 2006). Resources are usually tacit, socially complex, and nonsubstitutable; while the capabilities are bundles of more specific skills, procedures, and processes that leverage resources into competitive advantage (Baker and Sinkula, 2005). Strategic orientations are viewed as the precursors to capability building. For example, though customer orientation is the corporate culture, marketing is best viewed as the function that manages connections between the organization and the customer. So the customer orientation helps to facilitate the marketing capability building. In this paper, the strategic orientation is viewed as the resource which is closely related to capability building.

## 2.2 Product innovation: A resource-based review

Following the definitions of the Oslo Manual, product innovation refers to the innovative outputs (goods, services, technologies) that have been introduced to the market. It can also be defined as the transformation of a market opportunity and a set of assumptions about product technology into

a product available for sale (Krishnan and Ulrich, 2001). So there are two important sources of product innovation: the customer demand and technology.

Brown and Eisenhart (1995) reviewed the factors affecting the success of product development projects which include the project leader, senior management, customers, suppliers, team composition, team organization of work, team group process and the market. As a firm's capacity for action resides in its organizational capabilities, it is essential to build the product development capabilities to get an overall and lasting firm-level product innovation success. Verona (1999) proposed a comprehensive resource-based model of product development. It is argued that two important functional capabilities (technological capabilities and marketing capabilities) and two integrative capabilities (external integrative capabilities and internal integrative capabilities) contribute most to the new product development performance. The technological capabilities include the R&D (scientific expertise, manufacturing, design and technological complementaries). The marketing capabilities include the market research tools, strategic marketing management, marketing-mix policies etc. As to the external integrative capabilities, Verona identified the external communication, socialization, empowerment, absorptive structures and culture and values for external absorption as the key capabilities. And he defined the internal communication, integrative strategies, collective brainstorming and culture and values for internal integration as the internal integrative capabilities. While due to the complexity of the model, Verona's resource-based model of product development has not been applied in the large-scale empirical studies.

## **1. Theory Development and Hypotheses**

Before the large scale survey, qualitative in-depth interviews are conducted in six manufacturing

firms and four service firms that cover different backgrounds as SOE, technology-based firms based on the Chinese Academy of Science, new venture and MNC. The interviews typically last around one to two hours. Eleven managers from the department of R&D and marketing or CEO, VP who are familiar with the new product development in the companies participated in the interviews. The interview questions include: (1) What are the internal and external factors that influence the new product success; (2) What functions and how much are they involved in the new product development process; (3) The main driving force and idea sources for new product development in the company.

The interviews reveal an interesting complementary and gradually comprehensive form of strategic orientation. For most of the interviewees, market orientation is regarded as the most important issue for new product development. For example, one manager stated, “It is quite normal that the marketing and R&D department quarrel each other, to solve this bother, we set the marketing as the leading department... understanding market is always the most important.” Another manager in a small software development company said, “Almost all the key staff are technology talents...but low involvement of customer and insufficient sales experience have become the bottleneck of our company”. For some companies, the customer orientation is partly supported by the technology orientation. “We are leading the need of our customers... you see we can introduce so many differentiated cool internal doors economically because we have a strong R&D department which could develop products systematically based on our superior architecture design”. Interfunctional coordination is also a key problem for some companies. “As a traditional huge SOE with some monopoly power, we have comprehensive infrastructures and strong technology platforms...however, the cross functional cooperation is laborious... it’s often the case

that each department would consider more on its own and is reluctant to take on the responsibility". When asked about how they respond to the external dynamics, several managers showed their concern for the competitors. A product manager of leading local company said, "It is too common a phenomenon in our industry to imitate the competitor quickly...we also trace the fashion of the leading foreign company, but we have our systematic platform now to frustrate the imitators proactively". "The competition in our industry should be value-oriented, however, the status in quo is that we are still in the price war. We have decided to charge the annual fee for such a service at the beginning, but since the other competitors exempt the annual fee, we have to exempt it too because it is time to increase the market share now..."After the eleven in-depth interviews, four strategic orientations as technology orientation, customer orientation, interfunctional cooperation and competitor orientation stand out as the important factors influencing the new product process.

According to Day (1994), the organizational capabilities can be sorted into three categories depending on the orientation and focus of the defining processes. At one end of the spectrum are those deployed from the inside out such as cost control, technology development and manufacturing/transformation processes. At the other end of the spectrum are those capabilities whose focal point is almost exclusively outside the organization. The purpose of these outside-in capabilities is to connect the other organizational capabilities to external environment and enable the proper competition and relationships with customers, channel members and suppliers. Based on the resource-based view of product development and the external/internal emphasis perspectives on capabilities, we classify the strategic orientations in new product development firms based on two dimensions as strategic focus (organization internal vs. external) and

dominating capabilities orientation (functional capability vs. integrative/dynamic capability). Such an assortment of strategic orientation is also corresponding to the precursor of organizational capabilities in new product development. The customer orientation is an external emphasis orientation which also calls for the customer-centered behavior and especially for the capability of marketing which is the best function that manages connections between the organization and the customer. In contrast, technology orientation is more internal emphasis which focuses on new technology development and application. Competitor orientation emphasizes the monitoring on external dynamics by the competitors and is helpful to build the external integrative capability as it stands for the intelligence collection and flexibility in new product development. While the interfunctional cooperation affects the internal integrative capabilities positively and it allows for bringing together of company capabilities to develop a product that meets customer needs, is technically feasible, and can be effectively delivered by the company (Kahn, 2001).

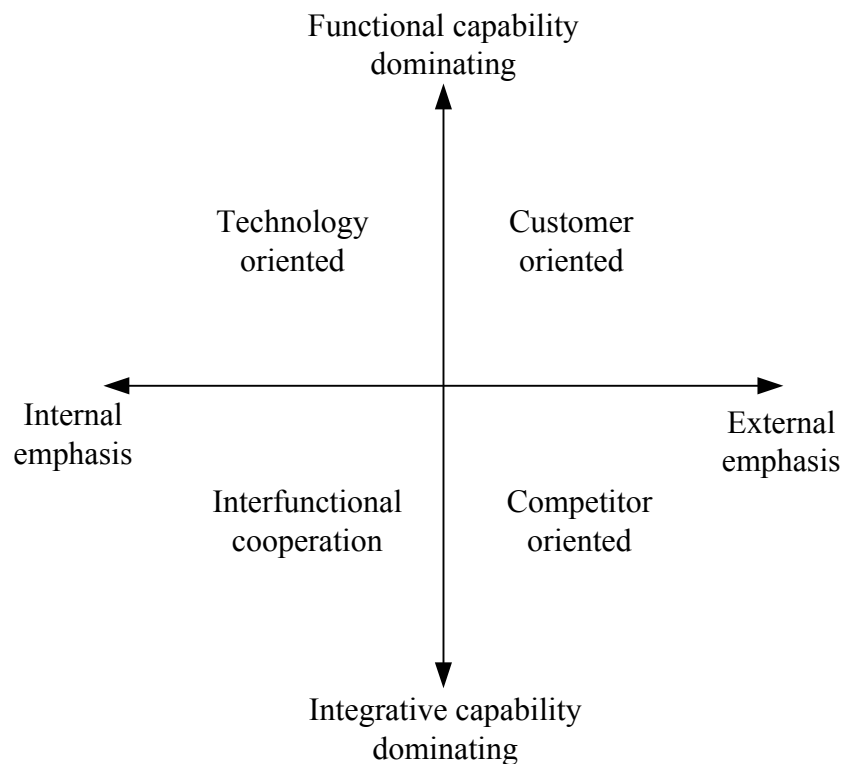


Figure 1. Untangle the strategic orientations in new product development enterprises

As the customers' need is one of the most important sources for innovation, customer orientation is essential in new product development. A general consensus exists in past research, concerning the utility of customer orientation in enhancing the outcome of new product development (Jeong, Pae and Zhou, 2006). Customer oriented firms serve the needs of their customers better. The customer orientation, embodied in the behavior of listening to the customers' voices, thinking for the customers and providing superior products into the market will help a lot in the market acceptance of the new product.

Hypothesis 1: Customer orientation has a positive effect on the new product success.

Technology orientation brings the company heavy investment in R&D and tendency to acquire and apply advanced technologies for the new product. When a new technology is selected from among competing alternatives and the product based on the technology captures a large part of the market share, the result can be substantial financial gain (Das and Van de Ven, 2000). Technology orientations embodied in the new product development activities also leads to stronger technology capability through inter temporal integration (Marsh and Stock, 2003; Danneels, 2002). A firm's technical skills, R&D resources and technological base are central in bringing innovative, better designed products into the market. And technological superiority gives the firm potential for a greater competitive advantage ---- one cannot easily imitated by the competition (Jeong, Pae and Zhou, 2006).

Hypothesis 2: Technology orientation has a positive effect on the new product success.

The new product development requires cooperation among various functions throughout the entire process, such as marketing, R&D, manufacturing. The responsibilities of the different functions are neither independent nor static (Griifrin and Hauser, 1996). The interaction process of

information sharing, and supportive of to each other as communication, cooperation and integration enhance the success of new product.

Hypothesis 3: Interfunctional cooperation has a positive effect on the new product success.

Competitor orientation enhances organizational intelligence. In a highly dynamic emerging market, unexpected entry of rivalries and competition behavior sometimes beats all. As indicated in the old Chinese saying “Know the enemy and know yourself, and you can fight a hundred battles with no danger of defeat”, for the companies in a dynamic emerging market, familiar with the competitors are helpful to position their products precisely and launch the products at the right time. According to Im and Workman (2004), a competitor-oriented firm tends to monitor progress against rival firms continuously, which can lead to opportunities to create products or programs that are differentiated from those of competitors. For many young Chinese firms good at imitation, competitor-orientation have another important role, that is, competitors have also become an important source for product ideas and benchmark for further improvement in new product development.

Hypothesis 4: Competitor orientation has a positive effect on the new product success.

## **2. Research Method**

Administered collective surveys and network/email surveys were sent to the managers (single respondent in one firm) in around 2500 NPD firms based on the database provided by a business training center and the clients of a consultant firm. The respondents include the CEO/VP, department managers including marketing, R&D, product and engineering managers and project managers. The on-site administered questionnaire collection is done in around forty minutes including the foreword and explanation. The network/email surveys are finished in two months

under the supervision of the consultant firm. Finally 580 questionnaires were returned and 501 with little deformity were usable representing an effective response rate of 20%. The effective samples involved the firms in 31 provinces/cities under direct jurisdiction of central government. The top ten provinces/cities are all in east China with the top two (Beijing and Guangdong) occupying 25% of the samples number each. Thirty percent of the samples are SOE or SOE holding companies, fifteen percent are the foreign invested firms and about half are the local private enterprises. Among the 501 firms, 134 are service firms and 365 are manufacturing firms. The service industries include the finance and banking, telecom and software development and logistics and transportation. The manufacture industries include the electric and electronic equipments, vehicle, stationery and sports things, clothing, chemical, food, pharmaceutical and bio products, and metal and nonmetal goods.

Multi-item scales were used to measure all constructs. The final item sets, response scales and descriptive statistics are shown in Table 1 and Table 2. The scales of customer orientation, technology orientation and competitor orientation referred to scales used by Gatignon & Xuereb (1997) and were translated into Chinese and modified with the back translation and two professionals from academia and enterprises. The interfunctional cooperation referred to Narver and Slater (1990) and was simplified. New product success scale was assessed using the scale in Wei's study on the Chinese firms and added some additional items. In the east culture background, when the odd point Likert scales are applied, the respondents tend to choose the middle point if they can not decide which one to choose. In this survey, the six-point Likert scales with anchors of "strongly disagree" and "strongly agree" were used.

Table 1. Confirmatory Factor Analysis of the Constructs

Constructs and Items	Standardized coefficient	t-value
Please indicate the extent of agreement between the following statements and the actual norms in your business		
<i>Customer orientation</i> $\alpha = 0.75$		
Meet with the customers frequently to find out what products or services they will need in the future	0.65	14.89
Do a lot market research about customer needs	0.72	16.80
Poll end users frequently for satisfaction survey	0.77	18.30
<i>Technology orientation</i> $\alpha = 0.83$		
Compared to the competitor, we take the lead in using sophisticated technologies in new product development	0.82	20.88
Our new products are always at the state of the art of the technology	0.86	22.48
Compared to the competitor, our input in R&D is more aggressive	0.71	17.33
<i>Interfunctional cooperation</i> $\alpha = 0.82$		
Different functional departments often share the experiences in new product development	0.63	15.00
There is a lot of team spirit among the functional departments involved in the new product development	0.92	24.45
All the functional departments work together to meet the market demand	0.80	20.24
<i>Competitor orientation</i> $\alpha = 0.80$		
We usually consider the competitors' actions before determining the action plan	0.76	18.02
Collect the competitors' information systematically	0.78	18.72
Respond to the competitors' actions in time	0.74	17.47
<i>New product success</i> $\alpha = 0.88$		
The overall new product development is quite successful	0.83	22.01
The market strength attributable to new products is substantive	0.88	24.17
New products bring considerable profit for the company	0.78	20.30
Customers are satisfied with the new products as a whole	0.70	17.29

Table 2. Descriptive Statistics and Correlations of the Constructs

Constructs	1	2	3	4	5
1. Customer orientation	1.00**				

2. Technology orientation	0.55**	1.00			
3. Interfunctional cooperation	0.65**	0.43**	1.00		
4. Competitor orientation	0.68**	0.51**	0.44**	1.00	
5. New product success	0.65**	0.76**	0.52**	0.54**	1.00
Mean	4.30	3.95	4.16	3.98	4.20
Standard Deviation	1.12	1.17	1.09	1.08	1.02

Note: sample size=501, \*\*p<0.05

To test the common variance method problem, Harman's one-factor method was used (Podsakoff and Organ, 1986). It turned out all the scales in this survey account for 70.6% of the total variance, while the first factor only occupy 28.2% which means there is no single dominant factor. So the common variance method problem is not a serious problem for this research.

To refine the measures and assess their construct validity, exploratory factor analysis was run which resulted in factor solutions as expected. Then the confirmatory factor analyses were conducted for some iterations during which some items that possessed low factor loadings or high cross-loadings. Then the convergent and discriminant validity of the constructs were assessed by estimating a five factor confirmatory measurement model. The measurement model fit well with the data as indicated by the following statistics:  $\chi^2_{(94)} = 184.64$ , GFI=0.96, CFI=0.98, NNFI=0.97, RMSEA=0.044.

### 3. Analysis and Results

#### 5.1 The basic model

The impact of strategic orientation on new product success was first examined. It is shown in Table 3 that customer orientation and technology orientation has significant effect on the new product success, the interfunctional cooperation has weak impact while the competitor orientation does not have significant influence on new product success. It is somehow surprising that

compared with customer orientation, technology orientation seems to exert greater influence on the new product success.

Table 3 Structural Equation Modeling Results

	Standardized Coefficient	t-value
H1: Customer orientation →New product success	0.25	3.11**
H2: Technology orientation →New product success	0.55	10.51***
H3: Interfunctional cooperation →New product success	0.10	1.85*
H4: Competitor orientation →New product success	0.05	0.85

\*p<0.1, \*\*p<0.05, \*\*\*p<0.01

## 5.2 Comparison of the model application in the manufacturing and service firms

Then the strategic orientations and their impacts on new product success between the manufacture and service firms are compared. As shown in table 4, the customer orientation of the manufacturing firms is significantly higher than that of the service firms in China. It can also be seen that the technology orientation, competitor orientation and new product success are all higher in the manufacturing firms than in the service firms. While no significant difference of the interfunctional cooperation exists between the manufacturing and service firms. One possible explanation is that compared to the manufacturing industries, the history of new product development in the service industries in this survey (finance and banking, telecom, software development and logistics and transportation service) are quite short and competition in these industries is not as intense as in the manufacturing industries as a whole. From the learning and capability building perspective, such a process has just begun .

Table 4 Comparison of the strategic orientations and new product success in the manufacturing and service firms

	Firm Type	N	Mean	Std. Deviation
Customer orientation**	Service	134	4.122	1.106
	Manufacture	365	4.377	1.094
Technology orientation**	Service	134	3.731	1.151
	Manufacture	365	4.048	1.157
Interfunctional cooperation	Service	134	4.137	1.032
	Manufacture	365	4.170	1.113
Competitor orientation**	Service	134	3.771	1.086
	Manufacture	365	4.061	1.063
New product success**	Service	134	3.944	1.078
	Manufacture	365	4.301	0.973

Note: \*\*means that the two groups are significantly different at the level of 0.05

Then the impacts of these strategic orientations between these two groups are compared as shown in table 5. The initial model (model 1) without constraints across groups provided a baseline chi-square. The results showed a good model fit (RMSEA=0.056). The second step (model 2) was to constrain the factor loadings and covariance of the factors equal. The non significant difference in the chi-square between model 2 and model 1 ( $\Delta=16.05$ , n.s. at 0.05) indicates that the factor loadings and covariance of the factors are equal. The similar steps continue with model 3 in which the factor loadings, covariance of the factors and the error variances were set equal and model 4 adds to model 3 in that the path coefficients were also set equal. It was shown in table 5 that the factor loadings, the covariance of the factors, the error variances and the path coefficients are all equal between these groups. It indicates that there are no significant differences in the impacts of strategic orientations on the new product success and the model is equally applied to the manufacturing and service firms. It means the four elements of strategic orientations make sense in both industry settings.

Table 5 Multi-group model fitness (manufacturing and service groups)

Model	Chi-square	DF	NCP	RMSEA	NNFI	CFI	GFI
Model 1	334.91	188	146.91	0.056	0.95	0.96	0.89
Model 2	350.96	209	141.96	0.052	0.95	0.96	0.88
	$\Delta = 16.05(p > 0.05)$	$\Delta = 21$					
Model 3	368.65	225	143.65	0.051	0.95	0.96	0.86
	$\Delta = 17.69(p > 0.05)$	$\Delta = 16$					
Model 4	375.95	230	145.95	0.051	0.95	0.96	0.86
	$\Delta = 7.3(p > 0.05)$	$\Delta = 5$					

### 5.3 Comparison of the model application in the high-tech and low-tech firms

The samples are split into two groups, one is the high-tech and the other is low-tech. The criterion is based on the industry category defined by the Chinese government originating from the OECD definition which is concerned with the R&D intensity. In this survey, the telecom equipment, computer and other electronics, pharmaceutical and bioproducts is grouped into high-tech (272) and the other industries are grouped into low-tech (229). To examine whether these industries are really high-tech in the context of China, the R&D intensity (R&D input/sales) distribution of the two groups is checked. It can be seen from table 6 that the R&D intensity is obviously higher in the high-tech group.

Table 6 Distribution of the R&D intensity

R&D input/sales	High-tech firms	Low-tech firms
-----------------	-----------------	----------------

	Number	Proportion	Number	Proportion
<1%	15	5.7%	53	23.8%
1~5%	87	33.2%	101	45.3%
5~10%	87	33.2%	42	18.8%
>10%	73	27.9%	27	12.1%
Missing	10		6	
Total	272		229	

Table 7 Cross table of the firm size, high/low tech industry and R&D intensity

Enterprise Size		R&D intensity				In sum
		<1%	1~5%	5~10%	>10%	
SME	Low-tech	53	32	14	8	107
	High-tech	15	50	41	42	148
	In sum	68	82	55	50	255
Large enterprises	Low-tech	0	69	28	19	116
	High-tech	0	37	46	31	114
	In sum	0	106	74	50	230

The strategic orientations and new product success are compared in the high-tech and low-tech firms as shown in table 7. It is found that the customer orientation in the low-tech firms is significantly higher than that in the high-tech firms. While there is no significant difference of the technology orientation, interfunctional cooperation, competitor orientation and new product success between these two groups.

Table 8 Comparison of the strategic orientations and new product success in the high-tech and low-tech firms

	Firm type	N	Mean	Std. Deviation
Customer orientation**	High-tech	272	4.203	1.097
	Low-tech	229	4.408	1.131
Technology orientation	High-tech	272	3.935	1.156
	Low-tech	229	3.977	1.189
Interfunctional cooperation	High-tech	272	4.161	1.063
	Low-tech	229	4.149	1.129
Competitor orientation	High-tech	272	3.911	1.047
	Low-tech	229	4.061	1.110
New product success	High-tech	272	4.162	0.994
	Low-tech	229	4.245	1.041

Note: \*\*means that the two groups are significantly different at the level of 0.05

Then the impacts of these strategic orientations on new product success between the high-tech and low-tech firms are compared as shown in table 9. The initial model (model 1) without constraints across groups provided a baseline chi-square. The results showed a good model fit (RMSEA=0.047). The second step (model 2) was to constrain the factor loadings and covariance of the factors equal. The non significant difference in the chi-square between model 2 and model 1 ( $\Delta = 32.16$ , n.s. at 0.05) indicates that the factor loadings and covariance of the factors are equal. The third step (model 3) was to constrain the factor loadings, covariance of the factors and error variances equal. The significant difference in the chi-square between model 3 and model 2 ( $\Delta = 31.14$ , s. at 0.05) indicates that the error variances are unequal.

Table 9 Multi-group model fitness (high-tech and low-tech groups)

Model	Chi-square	DF	NCP	RMSEA	NNFI	CFI	GFI
Model 1	291.56	188	103.56	0.047	0.96	0.97	0.93
Model 2	323.72	209	114.72	0.047	0.97	0.97	0.92
	$\Delta = 32.16(p > 0.05)$	$\Delta = 21$					
Model 3	354.86	225	129.86	0.048	0.96	0.97	0.91
	$\Delta = 31.14(p < 0.05)$	$\Delta = 16$					

Based on the analysis in table 10, equalities of the relationship between the strategic orientations and the performance are examined. Model 1 with the factor loadings invariant is the baseline model and the chi-square changes of model 2, model 3, model 4 and model 5 compared to model 1 are shown in table 10. The path coefficients of customer orientation, technology orientation, interfunctional cooperation and competitor orientation on performance are set invariant between the two groups in model 2, model 3, model 4 and model 5 respectively. It turns out that the impacts of technology orientation on the new product success in the two groups are significantly different at the level of 0.05 with the  $\Delta\chi^2 = 5.75$  (Song, Droge and Hanvanich et. al., 2005). And it is interesting to find that the technology orientation has a larger positive effect (0.65) on the new product success in the low-tech firms than that (0.47) in the high-tech firms. Such a finding corresponds to the argument that “The most promising strategies are actually those that aim at promoting the STI-mode in low-tech sectors and at promoting the DUI in high-tech sectors”. It implies that in the low-tech firms, “science, technology and innovation” mode really contributes the new product performance.

Table 10 Two groups analysis: hypotheses testing (high-tech and low-tech)

Model	Chi-square	DF	RMSEA	NNFI	CFI	GFI
Model 1: factor loadings invariant	307.33	199	.047	0.96	0.97	0.92
Model 2: Cuo →New product success	308.01	200	.047	0.97	0.97	0.92
Factor loadings and $\gamma_{cuo \rightarrow per}$ invariant	$\Delta\chi^2=0.68$	$\Delta df=1$				
Model 3: Teo →New product success	313.08	200	.048	0.96	0.97	0.92
Factor loadings and $\gamma_{teo \rightarrow per}$ invariant	$\Delta\chi^2=5.75, P<0.05$	$\Delta df=1$				
Model 4: Ico →New product success	307.32	200	.046	0.97	0.97	0.92
Factor loadings and $\gamma_{ico \rightarrow per}$ invariant	$\Delta\chi^2=-0.01$	$\Delta df=1$				
Model 5: Coo →New product success	307.94	200	.047	0.96	0.97	0.92
Factor loadings and $\gamma_{coo \rightarrow per}$ invariant	$\Delta\chi^2=0.61$	$\Delta df=1$				

Taking the food processing industry for example, Tunzelmann and Acha (2005) pointed out that the spread of technologies from high- tech sectors to the adopting low-tech sectors is of great significance, and firms in low- tech industries are basically using rather than selling technology.

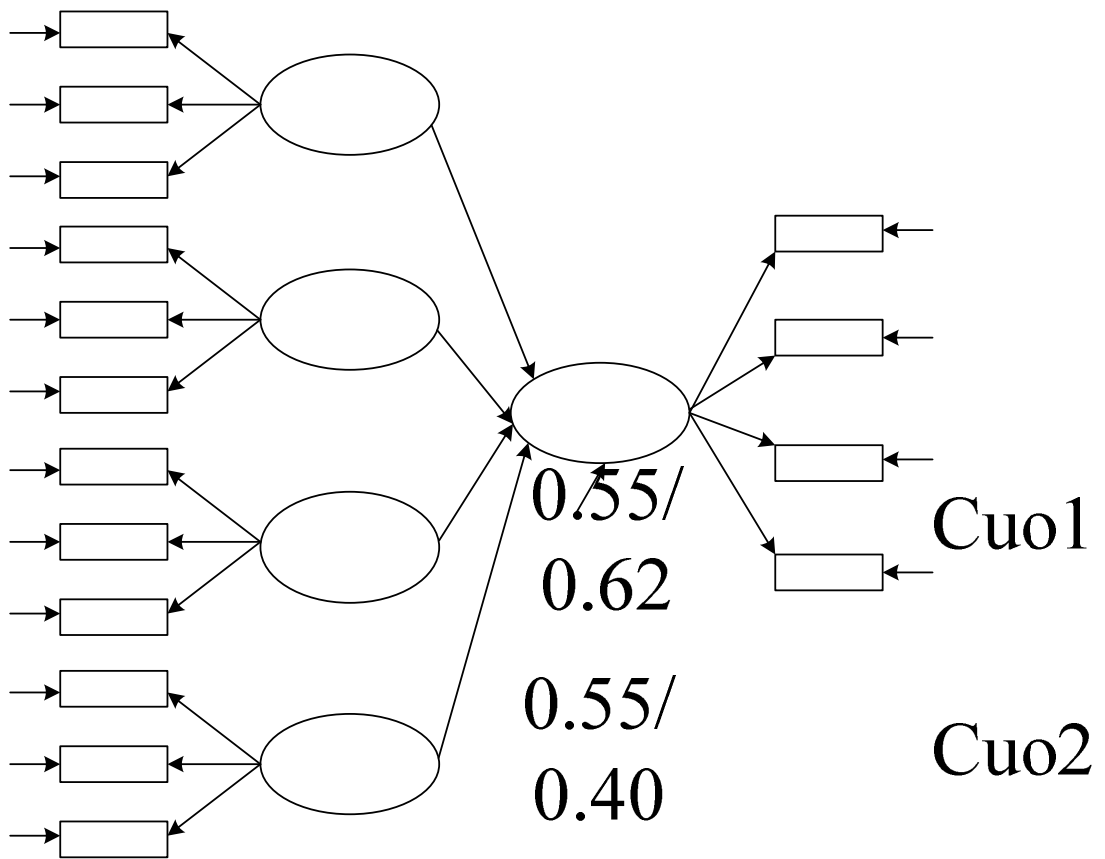


Figure 2 Path coefficients in the structural equation model (high tech/low-tech)

#### 4. Implications for Theory and Practice

Based on a large scale data set in the Chinese firms, this study has three implications for theory

and practice with regard to the new product performance. First, four important strategic

orientations are identified and the roles of different strategic orientations on the final performance

of new product development are examined based on the resource-based review of new product

development. It is found that technology orientation has the largest positive impact on the new

product success now in China. It fits well with the fact that the companies which have the core

technologies or the ability to apply the sophisticated technologies, often have the non-imitable

competitive advantage. And their products are more successful as a whole. Customer orientation also plays a significant role in the new product success. Compared to the two functional capability orientated factors, the interfunctional cooperation only has a minor impact on the performance; and the competitor orientation, which has been studied long in the mixed forms of market orientation, turns out to have no direct effect on the performance. Second, the strategic orientations play equal roles on the new product performance in the service firms and the manufacturing firms. This means technology orientation is also important in the service firms. Third, the technology orientation has a larger impact on the new product performance in the low-tech firms than in the high-tech firms.

The present study also holds some important insights for the managers. While the previous studies have paid much attention on the market orientation or customer orientation, it seems that technology is an irrelevant factor. This study finds that both technology and customer orientation contribute much to the new product success; while the competitor orientation itself does not affect the performance. It reminds the managers that the internal capabilities to acquire the customers need and turn them into products effectively and efficiently are of the most importance. Only by turning imitation to innovation could the firms get the long-standing competitive advantages.

Some limitations exist in this study. First, though the common variance method problem caused by single-informants is not effective in this study, the potential respondent bias still exists to affect the observation. For example, Tyler and Gnyawali (2002) found that the senior managers are likely to have a more balanced and integrated market orientations than junior managers. Second,

as the research is done at the firm (SBU) level, the new product success is somehow too abstract. It is suggested to decompose the performance into market effectiveness and process efficiency or long-term or short-term performance to have a thorough understanding of the influence of the strategic orientations.

#### Reference

1. Atuahene-Gima K. (2005). Resolving the capability-rigidity paradox in new product innovation. *Journal of Marketing*. 69: 61-83.
2. Baker W. E. and Sinkula J. M. (2005). Market orientation and the new product paradox. *Journal of Product Innovation Management*. 22: 483-502.
3. Becker J. and Homburg C. (1999). Market-oriented management: A systems-based perspective. *Journal of Market-focused Management*. 4: 1-17.
4. Berthon P., Hulbert J. M. and Pitt L. F. (1999). To serve or create? Strategic orientations towards customers and innovation. *California Management Review*. 42(1): 37-58
5. Brown S. L. and Eisenhardt K. M. (1995). Product development: past research, present findings and future directions. *Academy of Management Review*. 20(2): 343-379.
6. Buzzell R.D. (1999). Market functions and market evolution. *Journal of Marketing*. 63 (special issue): 61-63.
7. Chaffee E. E. (1985). Three models of strategy. *Academy of Management Review*. 10(1): 89-98.
8. Danneels E. (2002). The dynamics of product innovation and firm competences. *Strategic*

- Management Journal. 23: 1095-1121.
9. Das S. S. and Van de Ven A. H. (2000). Competing with new product technologies: A process model of strategy. *Management Science*. 46 (10): 1300-1316.
  10. Day G. S. (1994). The capabilities of market-driven organizations. *Journal of Marketing*. 58: 37-52
  11. Gatignon H. and Xuereb J. M. (1997). Strategic orientation of the firm and new product performance. *Journal of Marketing Research*,34(1): 77-90
  12. Griffin A. and Hauser R. J. (1996). Integrating R&D and marketing: a review and analysis of the literature. *Journal of Product Innovation Management*, 13: 191-215.
  13. Griffin A. and Page A. L. (1993). An interim report on measuring product development success and failure. *Journal of Product Innovation Management*. 10 (4): 291-308.
  14. Hunt S. and Morgan R.M. (1995). The comparative advantage theory of competition. *Journal of Marketing*, 59(2): 1-15.
  15. Hurley R. F. and Hult G. T. M. (1998). Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination. *Journal of Marketing*. 62: 42-54
  16. Im S. and Workman J. P. Jr. (2004). Market orientation, creativity, and new product performance in high-technology firms. *Journal of Marketing*. 68: 114-132.
  17. Jeong I. Pae J. H. and Zhou D. (2006). Antecedents and consequences of the strategic orientations in new product development: The case of Chinese manufacturers. *Industrial Marketing Management*. 35: 348-358.
  18. Kahn K. B. (2001). Market orientation, interdepartmental integration, and product development performance. *Journal of Product Innovation Management* 18: 314-323

19. Kaya N. and Seyrek I. H. (2005). Performance impacts of strategic orientations: Evidence from Turkish manufacturing firms. *The Journal of American Academy of Business*. 68-71.
20. Krishnan V. and Ulrich T. K. (2001). Product development decisions: a review of the literature. *Management Science*, 47(1): 1-21.
21. Li Y., Liu Y. and Zhao Y. (2006). The role of market and entrepreneurship orientation and internal control in the new product development activities of Chinese firms. *Industrial Marketing Management*. 35: 336-347.
22. Manu F. A. and Sriram V. (1996). Innovation, marketing strategy, environment, and performance. *Journal of Business Research*. 35: 79-91.
23. Marsh J. S. and Stock N. G. (2003). Building dynamic capabilities in new product development through intertemporal integration. *Journal of Product Innovation Management*. 20: 136-148.
24. Menguc B. and Auh S. (2006). Creating a firm-level dynamic capability through capitalizing on market orientation and innovativeness. *Journal of the Academy of Marketing Science*. 34(1): 63-73.
25. Morgan R. E. and Strong C. A. (1997). Market orientation and dimensions of strategic orientation. *European Journal of Marketing*. 32(11/12): 1051-1073.
26. Narver J. C. and Slater S. F. (1990). The Effect of a Market Orientation on Business Profitability. *Journal of Marketing*. 54: 20-35
27. Noble C. H., Sinha R. K. and Kumar A. (2002). Market orientation and alternative strategic orientations: A longitudinal assessment of performance implications. *Journal of Marketing*. 66: 25-39.

28. Podsakoff, P. M. and Organ, D.W. (1986). Self-reports in organizational research: problems and prospects. *Journal of Management*. 12(4): 531–544.
29. Salavou H. (2005). Do customer and technology orientations influence product innovativeness in SMEs? Some new evidence from Greece. *Journal of Marketing Management*. 21: 307-338.
30. Salavou H. (2005). Do customer and technology orientations influence product innovativeness in SMEs? Some new evidence from Greece. *Journal of Marketing Management*. 21: 307-338.
31. Song M., Droge C., Hanvanich S. and Calantone R. (2005). Marketing and Technology Resource Complementarity: An analysis of their interaction effect in two environmental contexts. *Strategic Management Journal*. 26: 259-276.
32. Tunzelmann N. V. and AcHa V. (2005). Innovation in “low-tech” industries, in Fagerberg J., Mowery D. D. and Nelson R. R.(ed.), *The Oxford Handbook of Innovation*. Oxford University Press Inc., New York.
33. Tyler B. B. and Gnyawali D. R. (2002). Mapping managers’ market orientations regarding new product success. *Journal of Product Innovation Management*. 19: 259-276/
34. Verona G. (1999). A resource-based view of product development. *Academy of Management Review*. 24(1): 132-142.
35. Wei Y. and Morgan N. A. (2004). Supportiveness of organizational climate, market orientation, and new product performance in Chinese Firms. *Journal of Product Innovation Management*, 21(6): 375-388.
36. Zhou K. Z., Yim C. K. and Tse D. K. (2005). The effects of strategic orientations on

technology- and market-based breakthrough innovations. *Journal of Marketing*. 69: 42-60.