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Competitive priorities of enterprises in mainland China

XIANDE ZHAO, JEFF HOI YAN YEUNG & QIANG ZHOU
Chinese University of Hong Kong, Hong Kong, People's Republic of China

ABSTRACT *Fierce competition in today's global markets has forced enterprises to improve their quality, cost, delivery, new product introduction speed, customer services, and the ability to be innovative. These six competitive factors are vital to the success of an enterprise. Enterprises in China are now facing a life and death transition in the dynamic market-driven economy. China's entry to the World Trade Organization (WTO) will create more fierce competition in China's market and will, inevitably, speed up the life and death process of Chinese enterprises. In this paper, we study the competitive priorities of 138 enterprises in mainland China by investigating the importance of these different priorities over the next 5 years, and their perceived strength relative to their primary competitors. We assess the reliability of the competitive priority instrument used in the Boston University Manufacturing Features Survey. The result shows that innovativeness, after-sale services, quality, and flexibility will become the most important competitive priorities among these Chinese enterprises in the next 5 years. Most of the companies also believe that they are stronger than their major competitors in the most important competitive priority areas. However, they believe that they have a lower level of relative strength in the area of innovativeness.*

Introduction

Over the last few years, considerable new knowledge has been gained on the characteristics of high performing manufacturing sites (Minor *et al.*, 1994; Oliver *et al.*, 1994; Schonberger, 1986; Voss *et al.*, 1995). Competitiveness research has identified a set of 'best practices' that are applicable across a wide range of settings, such as lean production, supplier partnerships and total quality management. A developing theory of manufacturing strategy combines this knowledge of good practice with the existing frameworks of manufacturing strategy (Dean & Bowen, 1994; Harrison 1995, Hill 1985, Miller and Roth 1994, Skinner 1969, Voss 1995).

Manufacturing practices in China have also been examined by several studies. Yong *et al*. (1992) examined the manufacturing practices and strategies of China, South Korea, Japan, Western Europe and the US in two industries. The questionnaires were administered to managers in small machine tool industries and non-fashion textile industries. The result showed that the principles of quality and technological innovation that brought the Japanese success in the automobile and electronics industries also existed in both the machines tool and textile industries. The Japanese companies outperformed companies in other countries in production planning, while the US companies lead their international counterparts in the

Correspondence: X. Zhao, Department of Decision Sciences and Managerial Economics, Chinese University of Hong Kong, Shatin, N.T., Hong Kong, People's Republic of China. E-mail: xiande@baf.msmail.cuhk.edu.hk

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use of information systems for production planning. They also classified the two industries in the five countries into the four stages of manufacturing strategy proposed by Hayes and Wheelwright (1984). They found that both machines tool and the textile industries in Japan could be placed in stage 4 (externally supportive) while the Chinese machine tool industry was placed in stage 1 (internally neutral) and the textile industry was placed in stage 3 (internally supportive). They also indicated that national industrial capabilities greatly constrain manufacturing in China while enhancing it in Japan.

Vastag and Whybark (1993) compared Chinese and American manufacturing companies, and found that the differentiating factors between the Chinese and American manufacturing companies could be classified into three groups: (1) Asset management, (2) Market responsiveness; and (3) Manufacturing management. The study results indicated that substantial differences existed between Chinese and American manufacturing companies. In the US, market uncertainties overwhelm supply uncertainties and demand moves production. In China, however, high uncertainty exists on the supply side, but there was virtually no uncertainty on the output side. These differences arise from the underdeveloped status of the Chinese economy and the centrally planned economic system.

Since China opened its door to the world, more companies are learning world class manufacturing practices. DeFilippo (1997) reported how United Technologies' Pratt & Whitney brought elements of the world class manufacturing practices to mainland China, through a joint venture with Chengdu Engine Company. He discussed the Chinese cultural attributes and management practices that may conflict with the philosophies of world class manufacturing and how global companies should confront and minimize such conflicts. It is argued that China can, and does, successfully adopt world-class manufacturing management practices when the global partner is sensitive to the legacy of central planning.

Tseng *et al.* (1999) proposed an integrated manufacturing system implementation model in China based on a case study. They identified several improvement strategies specifically catering for the economic and political environment in China. The centre of the strategy is a vision of an integrated manufacturing strategy. This vision's detailed design and implementation is conducted through the proposed systematic manufacturing strategic analysis.

Although studies have been performed to examine the status of competitiveness of Chinese manufacturing companies, the competitive priorities of Chinese Manufacturing companies have not been studied. This study aims to:

- investigate the importance of different competitive priorities among manufacturing companies in mainland China,
- study the strength of these companies compared with their competitors, and
- identify areas for them to improve in order for them to compete in today's highly competitive environment.

Furthermore, we will also investigate the reliability of the competitive priorities instrument used in the Boston University Manufacturing Features Survey. In the following sections, we first review some of the research in competitive priorities and justify our inclusions of the competitive priority items. We will discuss our research methodology and then present the research results. Finally, we will conclude the paper by summarizing the major findings and contributions.

Competitive priorities

Identifying a manufacturer's competitive priorities has long been considered a key element in manufacturing strategy research. However, relatively little effort has been devoted to the

measurement of these constructs in published research. Ward *et al.* (1995) studied 319 firms in Singapore; they identified a strong relationship between environmental factors (munificence & dynamism) and the competitive priorities. Their study indicates that high performers choose to emphasize different competitive priorities than low performers, when faced with the same environmental concerns. Based on the findings observed in Singapore, Amoako-Gyampah and Boye (2001) conducted a similar study among 78 manufacturing firms in Ghana. Their study shows different findings from Singapore. Environmental dynamism does not appear to play any role in deciding which operations strategy to adopt. It appears that competitive hostility has the most influence in selecting the operations strategy.

Ward *et al.* (1998) developed scales for commonly accepted competitive priorities. They also assessed how well the scales captured the constructs that they represent using data collected from 114 manufacturing plants in the United States. They found that the instrument that they developed had higher internal and external validity. Although they found that their instrument is reliable and valid in the United States, it has not been widely used and tested outside the US.

It has been widely accepted that competitive priorities in manufacturing can be expressed by at least four basic factors: cost, quality, delivery, and flexibility (Fine & Hax, 1985; Hayes & Wheelwright, 1984). With the severe competition in the marketplace, product life cycle is becoming increasingly shorter; so a fifth factor, innovativeness, is now a critical factor in determining the success of a company (Leong *et al.*, 1990). It is commonly known that the first innovative product available in the marketplace can usually be sold at a higher profit margin. The shorter the new product introduction cycle time, the earlier the product is available in the market, thereby creating a longer period for the first launcher to enjoy a higher profit. That is why many research and development departments in leading manufacturing companies are racing against time. Today, customers have more choices and a better bargaining position with their suppliers by using the internet. They can demand lower cost, better quality and delivery, and higher flexibility in meeting their design specifications and delivery schedule. They are also demanding better customer services, which include new product information, quotation, sales order status, product availability and after sales services. More value-added services for customers are now becoming one of the key factors in determining competitive priorities. To achieve higher customer services, many companies have installed a customer relationship management (CRM) system, which is integrated with their enterprise resources planning (ERP) systems. The aim is to provide real time information to their customers. Furthermore, applications of intelligent information technology make it possible to perform one-to-one marketing and to predict individual customer's needs. Therefore, in this research, we also include the service dimension in the list of competitive priorities.

The items included in this study are basically adopted from the questionnaires used in the Boston Manufacturing Futures Survey, and are listed in the tables in the Results section. The six major dimensions in the competitive priority instruments are described below.

(1) *Quality*. Quality has undoubtedly become very important in today's global competition. Any companies not paying attention to quality run the danger of losing market share and declining profits. In this research, we included not only some of the common dimensions of quality, such as reliability, durability, performance, conformance and design characteristics (Garvin 1987), but also two related factors: the ability to reduce environmental damages, and the ability to improve working conditions and safety. Both of these aspects are becoming increasingly important in today's quality improvement efforts.
(2) *Cost and price*. Most manufacturing companies are highly conscious of cost control.

Manufacturing-related costs include production costs, efficiency, overhead and inventory costs. In this research, we focus more on the ability to reduce product cost by reducing overheads, labour, raw materials costs, and production cycle time. In addition to these, the ability to maintain a profitable margin is included as one of the factors.

(3) *Flexibility*. In this competitive manufacturing environment, customers are looking not only for high quality and lower cost, but they are also looking for flexibility. Several dimensions of flexibility are studied in this research. These include the ability to make rapid changes in product design, product mix and production volumes. The ability to offer a broad product line and introduce new products quickly is also considered.

(4) *Delivery*. On-time delivery is also one of the basic requirements to fulfil customers' needs. Today, customers are not only asking for on-time delivery, but are also demanding speedy delivery. Therefore, fast delivery is also one of the important competitive priorities that can help a company to win orders in today's highly competitive environment.

(5) *Innovativeness*. Today, innovativeness is not limited to physical products but also applies to intellectual products. Although innovation has traditionally been used to create new production processes, innovativeness in developing or acquiring new markets for the company's product has been put on high priority.

(6) *Service*. Services are becoming increasingly important in today's competition. With the aid of computer technology, it is possible to enhance the customer relationship by providing more value-added services. These include after sales services, product support, product availability, and products designed to meet different customers' needs.

Research methodology

The methodology in this study is the use of a survey. A short survey form was distributed to 142 executives who attended an executive training programme in Hong Kong. These executives are mainly from the moulding and machine tool industry in various provinces of mainland China. Their positions in the company are, in general, president, vice president or senior managers in manufacturing or a quality related department or divisions. The questionnaire was distributed to participants in the class and all of them filled out and returned the questionnaire. However, four of the 142 questionnaires were not completed properly and therefore were not used in the analysis. Therefore, we used a total of 138 responses for statistical analyses. Respondents were asked to indicate the degree of importance of the competitive priorities over the next five years. They were also asked to indicate the degree of strength relative to their current primary competitors. For the degree of importance, they were asked to respond to the questions using scales from 1 to 7 with '1' indicating the 'least important' and '7' indicating the 'most important'. For the relative strength question, '1' indicates 'much weaker' and ' 7' indicates 'much stronger' than their primary competitors.

The data collected were analysed using SPSS. The mean scores of importance and relative strength for the different priority items are first computed and the priority items are ranked according to their importance and relative strength scores. This is followed by factor analyses on both the importance scores and the relative strength scores, to examine the factor structure of the Operations Priorities and the reliability of the Operations Priorities instrument. Descriptive statistics of the importance and relative strength are also computed to examine the relative priorities of these companies and their relative position over their competitors.

Table 1. *Importance and relative strength of priorities scores in quality*

Competitive priorities	Importance over next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to provide reliable products	6.29 (1)	5.17 (1)
Ability to improve product design quality	5.92 (2)	4.88 (5)
Ability to provide high performance products	5.81 (3)	4.95 (3)
Ability to offer consistent quality with low defects	5.68 (4)	4.97 (2)
Ability to improve working conditions and safety	5.05 (5)	4.75 (7)
Ability to provide durable products	5.04 (6)	4.89 (4)
Ability to reduce environment damage	4.99 (7)	4.79 (6)
Average	5.54	4.91

Results

Descriptive results

To help us understand what are the most important competitive priorities for these Chinese companies and what are their relative strengths or weaknesses in different areas, we ranked the responses to different ideas within each category according to mean score. In the following sections, we first discuss the descriptive results for each of the six categories. Then we will look at the overall results across different categories.

Quality

To examine the relative importance and relative strength of the items in the area of quality, the average importance and relative strength scores are shown in Table 1. Regarding the importance over the next five years, the average score on quality is 5.54, which is very high. It implies most companies are aware of the importance of quality. Among the seven different aspects of quality, the ability to provide reliable products is the most important, followed by the ability to improve product design quality, the ability to provide higher performance products and the ability to offer consistent quality with low defects. Not surprisingly, reducing environmental damage has received the lowest importance ranking because Chinese companies have not paid much attention to the environment.

The average degree of strength relative to current primary competitors is 4.91 regarding quality. The ability to provide a reliable product receives the highest average score (5.17), followed by the ability to offer consistent quality. It indicates that most companies have a good quality assurance programme to support their manufacturing systems. However, the ability to improve working conditions and safety gets the lowest average score (4.75) in relative strength, while it receives the third lowest score regarding importance. This indicates that most of these companies must improve their abilities to improve working conditions and safety. Furthermore, the ability to improve product design receives the second highest rating in importance, but it received the third lowest ranking regarding the relative strength to primary competitors. Therefore, this is also a priority area for these companies to improve.

Cost and Price

Table 2 shows the results of the competitive priorities scores in the area of cost/price. First, we can notice that the overall average importance score of 5.37 for all the cost/price items is

Table 2. *Importance and relative strength of competitive priorities in cost/price*

Competitive priorities	Importance over the next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to make profit in price competitive market	5.93 (1)	5.05 (1)
Ability to reduce product cost by lowering material cost	5.50 (2)	4.64 (4)
Ability to reduce product cost by cutting production cycle time	5.47 (3)	4.91 (2)
Ability to reduce product cost by lowering overhead cost	5.21 (4)	4.74 (3)
Ability to lower product cost by reducing labour cost	4.74 (5)	4.63 (5)
Average	5.37	4.79

much lower than that for all the quality items. This indicates that these companies think that quality is much more important than cost in today's competitive environment. Among the five items in the cost/price category, most companies believe that the ability to profit in a price competitive market is the most important among all cost/price items. This item also received the highest score (5.05) in relative strength. The figure indicates that most companies are very optimistic on making a profit even in a price-competitive marketplace.

The ability to reduce product cost by lowering material cost received the second highest importance score among all cost items. It also received the second-lowest relative strength score of 4.64. This result indicates that most of these companies feel that they do not have better capability than their competitors in this area, even though they believe that this ability is important for their competitive capabilities. In the past decade, because of the increasing fierce competition, many companies had performed various types of re-engineering to reduce various costs. One of the significant cost-reduction activities is cutting raw material costs, which includes reducing the costs of product redesign, procurement and the component. Most companies realized that a further reduction in material cost is very difficult. The ability to lower product cost by reducing labour cost received the lowest importance score of 4.74 among all five items studied. It also received the lowest relative strength score of 4.63. It is well known that labour cost in China is rather low and therefore there is little room for cost reduction in that regard. Furthermore, the high social costs of reducing the labour force make it an unattractive option for the company.

Delivery

Table 3 shows the most important dimension of delivery is dependability. Fast delivery is slightly less important than dependable delivery. Manufacturers also believe that they are slightly better than their competitors for both dimensions of delivery. The ability to provide dependable delivery relies on capabilities in production and planning. It is quite common that a third party, a Logistics Company, handles the delivery of goods from the factory to

Table 3. *Importance and relative strength of competitive priorities in delivery*

Competitive priorities	Importance over the next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to provide dependable delivery	5.48 (1)	5.39 (1)
Ability to provide fast delivery	5.42 (2)	5.12 (2)
Average	5.45	5.25

Table 4. *Importance and relative strength of priorities scores in flexibility*

Competitive priorities	Importance over the next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to introduce new products quickly	6.09 (1)	4.91 (4)
Ability to make rapid design changes	5.91 (2)	5.06 (2)
Ability to offer a broad product line	5.85 (3)	5.24 (1)
Ability to make rapid product mix changes	5.62 (4)	4.93 (3)
Ability to make rapid volume changes	5.33 (5)	4.74 (5)
Average	5.76	4.98

customers overseas. Nowadays, most leading logistics companies are presently able to provide a very good logistic support by applying information technology.

It is also important to notice that the average importance score for the delivery items (5.45) is also significantly higher than that for the cost/price items (5.37), but lower than that for the quality items (5.54). Therefore, these companies believe that delivery is more important than cost/price, but not as important as quality.

Flexibility

One of the biggest challenges faced by most manufacturers is how to maintain flexibility. With the ever-increasing demand from customers, manufacturers must be more dynamic to meet customers' requirements via various manufacturing strategies, such as customization, postponement and rapid response. Table 4 shows that most companies consider that the ability to introduce new products quickly is the most important flexibility dimension, followed by the ability to make design changes quickly and the ability to offer a broad product line. Regarding relative strength, companies are relatively stronger than their competitors in providing a broad product line while feeling less strong in their abilities to introduce new products quickly and to make rapid volume changes. It seems that most of these companies must improve their ability to introduce new products quickly to the market.

The average importance score for all the flexibility items is 5.76, a significantly higher score than that for the quality items. We can see that flexibility is a key priority among these Chinese companies in today's competitive market.

Service

Table 5 shows the competitive priority scores in service. The importance scores show that the ability to offer effective after-sales services is the most important priority for these

Table 5. *Importance and relative strength of priorities scores in services*

Competitive priorities	Importance over the next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to offer effective after sales services	6.01 (1)	5.06 (2)
Ability to customize products to customer's needs	5.87 (2)	5.25 (1)
Ability to provide effective product support	5.83 (3)	5.06 (2)
Ability to allow customer to access product easily	5.55 (4)	5.02 (3)
Average	5.81	5.10

Table 6. *Importance and relative strength of priorities scores in innovation*

Competitive priorities	Importance over the next 5 years Mean (rank)	Strength relative to competitors Mean (rank)
Ability to create new domestic markets	6.19 (1)	4.85 (3)
Ability to develop new technologies	6.09 (2)	5.04 (2)
Ability to implement new technologies	6.08 (3)	5.12 (1)
Ability to develop or expand foreign markets	5.50 (4)	3.94 (5)
Ability to create intellectual property	5.26 (5)	4.09 (4)
Average	5.82	4.61

companies, followed by the ability to customize products according to customer's needs, and the ability to provide effective product support. The ability to allow the customer to access products easily, received the lowest average importance ranking among all the items.

Regarding strength compared to their competitors, most companies believe that they are strong in providing customized products to customer's needs, followed by the ability to offer effective after-sales services, and the ability to provide effective product support.

These results clearly show that after-sales service and effective product support have become very important in today's competitive market in China. Furthermore, the ability to customize products according to the customer's needs is also very important. The average score of 5.81 for this category is even higher than that for flexibility (5.76), indicating that service is even more important, on average, than flexibility and quality.

Innovativeness

Table 6 shows that three out of the five items will exceed 6.0 in importance over the next five years. This clearly indicates that most companies realize that innovativeness is very important to their business. The abilities to create a new domestic market, to implement new technologies and to develop new technologies are the most important priorities. The average importance score of 5.82 is even slightly higher than that for the service items (5.81). It is very interesting to notice that innovativeness has become the most important priority areas for these Chinese companies.

Although these companies believe that innovativeness is very important, they also know that they are not innovative enough in this competitive marketplace. The scores of comparative strength to their competitors are very low compared with the average scores given to other priority areas. For example, the ability to create a new domestic market received the highest importance ranking (6.19). But the relative strength ranking is only 4.85, the third lowest among these items. Therefore, it is an area of greatest concern to most companies.

Average importance and competitive strength of the six competitive dimensions

The average scores for each of the six competitive dimensions are summarized in Table 7 for comparison. For the importance over the next 5 years, the average score is 5.59. It appears that most companies believe the competitive priorities studied are very important, particularly innovativeness and services. The average importance scores for these two priority areas are over 5.80. Flexibility and delivery have the next highest average importance rankings with scores of 5.76 and 5.54 respectively. Cost/price has the lowest ranking of importance among the six categories. It is very interesting to observe that innovation and services are the most

Table 7. *Average scores for different competitive priority areas*

Competitive priorities	Importance over the next 5 years	Strength relative to competitors
Innovationess	5.82 (1)	4.61 (6)
Services	5.81 (2)	5.10 (2)
Flexibility	5.76 (3)	4.98 (3)
Quality	5.54 (4)	4.91 (4)
Delivery	5.45 (5)	5.25 (1)
Cost & Price	5.37 (6)	4.79 (5)
Average	5.59	4.94

important priorities while cost has the lowest importance ranking. This clearly shows that these Chinese companies have realized that cost alone will not help to win customer orders. They must be innovative and provide good quality services in addition to providing a good quality product at relatively low cost. While China has been known to be a place of low manufacturing cost, Chinese companies have shifted their focus from being lower cost producers to other important priority areas, such as innovation and services.

Table 7 also shows the average strength relative to the primary competitors in each of the six competitive priority areas. The overall average score of 4.94 for all categories shows that most companies believe that they are stronger than their major competitors in their competitive priority areas. However, most companies do not feel that they are much stronger than their competitors regarding innovativeness. The average relative strength in innovativeness is the lowest among the six priority areas while it has the highest importance score. Therefore, these companies must enhance their ability to be innovative in order for them to compete well in the market place. Surprisingly, delivery has the highest score (5.25), which indicates that most companies believe that they are able to provide dependable and fast delivery. Services and flexibility also received relatively higher competitive strength scores of 5.10 and 4.98 respectively, indicating that these companies are confident about their capabilities in these two important priority areas.

The most important and the least important competitive priority items

Table 8 summarizes the most important and the least important competitive priority items and their relative strengths. The six most important items all have an importance score above 6.0 out of a possible score of 7.0. Out of these six most important items, three of them are related to innovativeness. The abilities to create new domestic markets, to develop new technologies and to implement new technologies are all very important for these companies. One of the quality dimensions, the ability to provide reliable products, is listed as the most important priority item among all the items considered. The ability to introduce new products to the market quickly (an item of flexibility) and the ability to offer effective after-sales services (an item of services) also received importance scores of above 6.0. From these most important priority items we can see that quality, innovativeness, flexibility and after-sale services are all included. However, none of the items related to cost/price appear on the list of most important items. Actually, one of the cost items, the ability to reduce product cost by lowering the material cost, received the lowest importance ranking among all items considered. The result clearly indicates that these companies are shifting their attention and focus from cost to quality, innovation, flexibility and services. This shift will assist these companies to compete better in the increasingly competitive market.

Table 8. *The most important and the least important priority items*

Competitive priorities items	Factors	Importance over the next 5 years	Relative strength
Most Important Priority items			
Quality	Ability to provide reliable products	6.29 (1)	5.17 (1)
Innovativeness	Ability to create new domestic markets	6.19 (2)	4.85 (6)
Innovativeness	Ability to develop new technologies	6.09 (3)	5.04 (4)
Flexibility	Ability to introduce new products quickly	6.09 (4)	4.91 (5)
Innovativeness	Ability to implement new technologies	6.08 (5)	5.12 (2)
Services	Ability to offer effective after sales services	6.01 (6)	5.06 (3)
Least Important Priority Items			
Cost & Price	Ability to reduce product cost by lowering labour cost	4.74 (1)	4.63 (4)
Quality	Ability to reduce environment damage	4.99 (2)	4.79 (2)
Quality	Ability to provide durable products	5.04 (3)	4.89 (1)
Quality	Ability to improve working conditions and safety	5.05 (4)	4.75 (3)

The ability to reduce environmental damage, and the ability to improve working conditions and safety, were also ranked as among the least important items. It seems that these companies in mainland China have paid little attention to the environment and to the working conditions and safety in their businesses. However, ignorance of these important issues may cause them to lose competitive advantages in the long term; therefore, there is a need to increase their attention on these issues. It is also very interesting to notice that the ability to provide durable products also received one of the lowest importance rankings. Apparently, durability is not one of the important quality dimensions in the industry included in this survey. The result may vary in different industries.

The relative strength figures indicate that most companies perceived that they have higher relative strength in the areas that they think are more important. The relative strength scores for the most important items appear to be generally higher than those for the least important items, meaning that these companies have been working hard to enhance their capabilities in their priority areas. However, their relative strength is relatively low in some of the most important areas. For example, although they attach higher importance to the ability to create new domestic markets and the ability to introduce new products quickly, their perceived relative strength scores for these two items are both below 5.00. Therefore, to gain competitive advantages in the market place, these companies must enhance their capabilities in these two areas.

The results of factor analysis

Principal component analysis

Principal components factor analysis in SPSS 10.0 was used to explore the underlying dimensions of the questionnaire items for each competitive priority scale. First, a factor loading value of 0.45 was used as the minimum critical value. Second, Cronbach's alpha coefficient is used (Nunnally, 1994) to measure the internal consistency of the items included in each of the six competitive priority constructs. The generally agreed lower limit for Cronbach's alpha is 0.50 to 0.60 in exploratory research (Flynn *et al*. 1990; Nunnally, 1994).

As mentioned earlier, each subject answered the degree of strength relative to current primary competitors and the degree of importance over the next five years. Therefore, the

factor analyses are based on the two parts. For the degree of importance over the next five years, the eigenvalues for each factor are relatively large, ranging from 9.036 (factor 1) to 1.155 (factor 6), with the six factors explaining 61.74% of the variance, cumulatively. Alpha values are 0.78, 0.64, 0.91, 0.83, 0.81, 0.80, respectively. This shows that the internal consistency for the construct is situated at an acceptable level. For the degree of strength relative to current primary competitors, the eigenvalues for each factor are 8.678, 3.172, 2.444, 1.508, 1.407 and 1.209. These factors cumulatively explained 65.78% of the total variance. Alpha values are 0.83, 0.84, 0.88, 0.84, 0.84, 0.80, respectively. This also indicates an acceptable internal consistency.

Tables 9 and 10 show, respectively, the equamax rotated factor loadings for a six-factor solution on importance and relative strength. At first glance, the factor loading patterns in the two tables are plausible: the scales capture six competitive priorities and most of the individual items contribute to the expected dimensions. We must note that, in table 9, the highest factor loading of 'ability to provide high performance products' in 'Quality' is 0.411, lower than the minimum critical value 0.45, and this item also has a high factor loading on factor 2. This means subjects believe 'ability to provide high performance products' is highly correlated to quality, cost and price. Similarly, factor loadings of 'ability to make rapid volume changes' in 'flexibility' are almost equally distributed over factor 4 (flexibility), 5 (services) and 6 (innovativeness). In fact, 'flexibility', 'services' and 'innovativeness' are essentially correlated. It is not surprising that Chinese executives cannot effectively distinguish between them. Another similar situation appears to be the fourth item in 'service'. Chinese executives may realize that customizing products to different customer's needs may cost a lot, especially in such a broad domestic market. Meanwhile, it is worth noting that the first three items in 'services' are not only significantly related to factor 5 (services), but also have a rather high loading at factor 2 (cost and price). Generally, improving services in the Chinese market requires heavy expenditure or capital outlay, which increases cost and price.

From table 10, we first note that there are no significant factor loadings of 'Ability to reduce environment damage' on any factors, meaning that Chinese executives are still paying little attention to the environmental impacts of their products. Contrary to what happens in table 9, many items have fairly high loadings on two or more factors. For example, 'the ability to develop and implement new technologies' in 'innovativeness' has a significant loading on factors 2 (cost and price) and 6 (innovativeness), signifying that Chinese executives recognize that 'being innovative' may, at the same time, significantly influence cost and price. 'Ability to customize products to customer's needs' is an important aspect of 'service', but it also has significant implications regarding cost. Therefore, this item has high loadings on both dimensions.

Reliability assessment

Reliability is an assessment of the degree of consistency between multiple measurements of a variable (Hair *et al*., 1998). The most commonly used measure of reliability is internal consistency. In the study by Ward *et al*. (1998), Cronbach's alpha values are 0.80, 0.72, 0.79 and 0.70 for cost, quality, delivery time, and flexibility importance, respectively. In this research, only the alpha value (0.64) of the cost construct in future importance is lower than the corresponding value (0.80) in Ward's study. The other two constructs, innovativeness and service, which were not included in Ward's study, have rather significant values (over 0.80) of reliability, both in the future importance part and relative strength part. After closely examining the alpha values obtained in this study, we found that alpha values of different constructs in relative strength are all distributed evenly, but for those in future importance

Table 9. *Factor analysis results for the degree of importance over the next five years*

Competitive Priorities	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Quality						
Ability to provide reliable products	**0.765**	0.043	0.112	0.063	0.155	−0.007
Ability to provide high performance products	**0.411**	0.323	0.138	0.214	0.086	0.075
Ability to improve product design quality	**0.555**	0.048	−0.033	0.378	0.356	0.191
Ability to offer consistent quality with low defects	**0.548**	0.119	−0.045	0.210	0.415	0.111
Ability to improve working conditions and safety	**0.696**	0.128	0.268	0.045	0.182	0.263
Ability to reduce environment damage	**0.781**	0.265	0.211	0.026	0.023	−0.002
Ability to provide durable products.	**0.591**	0.031	0.371	−0.282	0.235	0.053
Cost & Price						
Ability to reduce product cost by lowering overhead cost	0.028	**0.521**	−0.013	0.269	0.431	0.115
Ability to reduce product cost by cutting production cycle time	−0.103	**0.474**	−0.073	0.385	0.051	0.407
Ability to make profit in price competitive market	−0.071	**0.548**	−0.030	0.093	0.333	0.354
Ability to reduce product cost by lowering material cost	0.147	**0.603**	0.155	−0.040	0.114	−0.160
Ability to lower product cost by reducing labour cost.	0.055	**0.743**	0.138	0.018	−0.011	0.178
Delivery						
Ability to provide dependable delivery	−0.011	0.056	**0.836**	0.220	0.040	0.267
Ability to provide fast delivery	0.070	0.132	**0.843**	0.101	0.027	0.233
Flexibility						
Ability to make rapid design changes	0.241	0.189	0.154	**0.720**	0.210	0.200
Ability to offer a broad product line	0.137	0.134	0.087	**0.668**	0.309	0.175
Ability to introduce new products quickly	0.410	0.248	−0.069	**0.604**	0.230	0.156
Ability to make rapid product mix changes	0.213	0.419	0.027	**0.606**	0.073	0.162
Ability to make rapid volume changes	0.106	0.275	0.148	**0.365**	0.301	0.343
Services						
Ability to offer effective after sales services	0.111	0.422	−0.032	0.409	**0.520**	−0.052
Ability to provide effective product support	0.193	0.401	0.096	0.353	**0.565**	−0.115
Ability to allow customer to access product easily.	0.257	0.385	0.354	0.062	**0.516**	0.057
Ability to customize products to customer's needs.	0.276	0.330	0.184	0.188	**0.380**	−0.085
Innovativeness						
Ability to create new domestic markets	0.374	0.049	0.122	−0.164	0.446	**0.511**
Ability to develop new technologies	0.172	0.287	0.014	0.188	0.077	**0.773**
Ability to implement new technologies	0.077	0.129	0.103	0.256	0.071	**0.789**
Ability to develop or expand foreign markets	0.040	0.250	0.402	−0.066	0.165	**0.524**
Ability to create intellectual property	0.178	0.157	0.251	−0.044	0.121	**0.726**
Eigenvalue	9.036	2.220	1.941	1.529	1.407	1.155
Percent of variance explained	32.27	7.93	6.93	5.46	5.02	4.12
Cumulative percent	32.27	40.20	47.13	52.59	57.61	61.74

Table 10. *Factor analysis results for the degree of strength relative to current primary competitors*

Competitive Priorities	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Quality						
Ability to provide reliable products	**0.781**	0.039	0.175	0.078	−0.066	0.152
Ability to provide high performance products	**0.578**	0.090	0.325	0.265	0.106	0.117
Ability to improve product design quality	**0.515**	0.022	0.383	0.253	0.183	0.107
Ability to offer consistent quality with low defects	**0.665**	0.134	−0.015	0.114	0.370	0.002
Ability to improve working conditions and safety	**0.633**	−0.142	0.112	0.053	0.435	0.021
Ability to reduce environment damage	**0.439**	−0.273	0.003	0.413	0.231	0.319
Ability to provide durable products.	**0.552**	−0.153	0.071	0.171	0.213	0.409
Cost & Price						
Ability to reduce product cost by lowering overhead cost	0.039	**0.732**	−0.075	0.265	0.003	0.289
Ability to reduce product cost by cutting production cycle time	0.126	**0.783**	0.135	0.059	0.008	0.135
Ability to make profit in price competitive market	0.135	**0.669**	0.142	0.147	−0.078	0.134
Ability to reduce product cost by lowering material cost	0.217	**0.729**	−0.007	−0.040	0.053	0.050
Ability to lower product cost by reducing labour cost.	0.068	**0.727**	−0.131	−0.027	0.278	0.080
Delivery						
Ability to provide dependable delivery.	0.211	0.027	**0.820**	0.180	−0.141	0.098
Ability to provide fast delivery.	0.265	0.034	**0.772**	0.115	−0.095	0.131
Flexibility						
Ability to make rapid design changes	0.138	0.245	0.089	**0.772**	0.092	0.194
Ability to offer a broad product line	0.123	0.350	0.127	**0.655**	0.157	0.123
Ability to introduce new products quickly	0.311	0.121	0.313	**0.720**	0.197	0.045
Ability to make rapid product mix changes	0.204	0.043	0.076	**0.763**	0.290	0.144
Ability to make rapid volume changes	0.447	0.104	0.083	**0.664**	0.086	−0.035
Services						
Ability to offer effective after sales services	0.014	0.234	0.064	0.081	**0.661**	0.429
Ability to provide effective product support	0.006	0.190	0.010	0.112	**0.771**	0.372
Ability to allow customer to access product easily.	0.190	0.183	−0.084	0.323	**0.489**	0.434
Ability to customize products to customer's needs.	−0.022	0.481	0.047	0.213	**0.562**	0.191
Innovativeness						
Ability to create new domestic markets	0.295	0.170	0.353	0.146	0.145	**0.464**
Ability to develop new technologies	−0.014	0.537	0.286	0.098	0.009	**0.645**
Ability to implement new technologies	0.059	0.475	0.233	0.029	0.089	**0.637**
Ability to develop or expand foreign markets	0.239	−0.141	0.128	0.118	−0.132	**0.723**
Ability to create intellectual property	−0.053	0.127	0.085	0.093	0.044	**0.849**
Eigenvalue	8.678	3.172	2.444	1.508	1.407	1.209
Percent of variance explained	30.99	11.33	8.73	5.39	5.03	4.32
Cumulative percent	30.99	42.32	51.05	56.44	61.46	65.78

were mixed with high and low values. This indicates that the instrument reliability in the latter case may not be completely stable despite being acceptable. Further investigations using other samples are recommended. Additionally, the competitive priorities instrument used in this study was developed in the US environment. The cultural difference between Chinese and American executives may somewhat influence the understanding of competitive priorities items. Measures rectifying culture differences should be developed in future research. In fact, assessing the applicability of frameworks developed in one country to another country is essential to establishing a generalized model.

Discussion

In this research, we studied the importance and strengths relative to primary competitors among 138 manufacturing companies in mainland China, through a survey among senior executives of these companies. Although the study is preliminary, it does reveal some very important findings. The major findings are as follows.

(1) Among the six competitive dimensions studied, quality, services, innovativeness, and flexibility are ranked as the most important dimensions over the next five years. Cost/price is ranked as the lowest in importance among the six major dimensions. This result clearly indicates that even in mainland China, the competitive priorities are increasingly being shifted toward services and innovation. The traditional mindset of competition based on lower cost and price is no longer effective in today's market-driven economy. The result also complements the findings observed by Ward *et al.* (1995) that good performers would differentiate themselves from their competitors by emphasizing operations capability such as delivery, flexibility and services.

(2) Most companies believe they are stronger than their major competitors in the most important competitive priority areas. Compared with their competitors, most manufacturers in this study perceive that they are stronger in providing dependable and fast delivery, while also admitting they are not innovative enough. Since innovativeness is very important in today's global competition, Chinese companies must improve their capabilities to innovate their products or processes. As China enters the WTO, these companies will face more challenges from overseas manufacturers. They must be creative to sustain in this global marketplace. This contrasts with the results obtained from Ghana (Amoako-Gyampah & Boye, 2001) where local firms are greatly concerned with cost reduction.

(3) Among the individual items studied, it appears that companies are paying less attention to reducing product cost by lowering material cost, reducing environmental damage, improving working conditions and safety and providing durable products. The abilities to provide reliable products, create new domestic markets, develop and implement new technologies, introduce new products quickly and offer effective after-sale services, are the most important priorities for these companies. Ward *et al.* (1995), in a study conducted in Singapore, also found that the ability to provide reliable products, to create new markets, and to develop and implement new technology are the greatest concerns facing firms over the next five years.

(4) The factor analysis results reveal that the competitive priority instrument used in the Boston University Manufacturing Futures Survey roughly captures six competitive priorities and most of the individual items contribute to the expected dimensions. However, some items in the 'service', 'flexibility' and 'innovativeness' scale may require modification to render the instrument more valid and reliable.

Conclusions and implications

This paper has presented the relative strengths of different competitive priorities, and the importance of these priority items, over the next five years facing enterprises in China. These study results shed some light on the priorities and relative strengths and weaknesses of Chinese manufacturing companies. These findings can help these and other companies enhance their competitiveness in the global marketplace. This study is the first step towards exploring competitive priorities in mainland China. Further studies with larger sample sizes are required to gain a thorough understanding of competitive priorities in different industries of China.

Compared with the findings observed by Ward *et al.* (1995) in Singapore and Amoako-Gyampah & Boye (2001) in Ghana, we found the enterprises studied in this paper have a similar perception regarding competitive priority to those in Singapore. However, significant differences exist between the findings in this study and those in Ghana. In Ghana's manufacturing environment, many companies still operate under government subsidies and price control; therefore, production efficiency is not a major concern. The situation was quite similar to China's situation in the late 1970s and early 1980s. With increased marketization and the resulting competition, more Chinese companies are no longer able to enjoy the benefits of subsidy or protection stipulated by the government. Consequently, many manufacturing companies have transformed their management styles to face the tough challenges of the increasingly competitive market place. These enterprises must catch up with the outside world regarding technology and management. Such phenomena can be seen in many developed cities in China. However, some companies in the relatively less developed northwestern part of China are still in the situation more or less similar to Ghana. Further research is recommended to study the manufacturers in the underdeveloped provinces in China. It will be very interesting to compare the competitive priorities of companies in different social, political and competitive environments.

The managerial implications of this study are clear. Most of the firms studied are already aware of the importance of competitive priorities. To remain competitive in this volatile and highly competitive global market place, companies must identify their competitive priorities, understand their weaknesses and strengths, and enhance their core competencies in the most important priority areas.

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