

# A Survey of Manufacturing Strategy and Technology in the Chinese Furniture Industry

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We investigate the manufacturing strategy of 72 Chinese furniture companies based on a nationwide survey conducted in mid-2001, just prior to WTO accession. We provide an overview of the industry and its context before reporting on the operations objectives of the firms — focusing on their relationship to financial performance and technology. We report on the current status of, and future plans for, manufacturing technology implementation and initiatives (such as computer-aided design, safety improvement, new product introduction, and reducing changeover times). We make comparisons with other studies, in particular in the US — where Chinese furniture imports are increasingly viewed as a competitive threat.

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## Introduction

With increasing attention focused on the Chinese economy, it is useful to consider the state of manufacturing (which comprises half of China's GDP), particularly in industries where exports are growing rapidly. This paper presents the results of a survey of the practices and performance of 72 furniture manufacturers located throughout China. The survey, con-

ducted just prior to China's WTO accession in late 2001, considers both manufacturing strategy (with a particular interest in manufacturing technology) and performance (including financial).

There are currently some 30,000 furniture manufacturers in China, employing a total of 3 million people (Volpe, 2002). While the industry constitutes only 1.6 per cent of total Chinese manufacturing and Chinese exports, some of its features render it particularly interesting. For instance, its very rapid growth, in both domestic and export markets, and its relatively low labour productivity are worth noting.

The remainder of the paper provides a review of manufacturing strategy in the furniture industry and in China, and characteristics of Chinese furniture manufacturing. Following a discussion of the survey instrument and administration, we present the results of the survey, which focuses on competitive objectives and financial performance, and their relationship to manufacturing, technology, and human resource management practice.

## Literature Review

### Manufacturing Strategy and Technology

Numerous studies conducted during the past two decades demonstrate the importance of manufactur-

ing strategy in relation to firm performance (Demeter, 2003). This stream of research includes work highlighting the connection between performance and manufacturing technology (Beaumont and Schroder, 1997; Das and Narasimhan, 2001), and quality management practices (related to both people and systems/assets) (Dow *et al.*, 1999).

In the context of this research, single industry, single-country studies provide a useful contribution by controlling for industry and national effects and distinctions.

#### *The Furniture Industry and Manufacturing Strategy*

Studies of the furniture industry in the United Kingdom (Deeks, 1976) and the United States (Skinner and Rogers, 1968; Moorman and Montgomery, 1998) show an industry comprised largely of small, privately-owned firms (the majority employing less than 100), with many operating in a 'craft' production mode and very labour intensive. Cost structures are dominated by high material (average 40–48 per cent) and direct labour (average 19–27 per cent) costs, with average profitability in all three studies stated as 4–5 per cent after tax.

Raw materials have had a strong bearing on the industry's development — in terms of plant location, efforts to secure overseas supply (e.g. shortages of hardwoods), and product design (e.g. use of veneered woods, metals, and plastics).

With processes such as assembly and finishing notoriously difficult to automate, the furniture industry in general is not known for highly advanced manufacturing technology — the level is 'reasonable but not overwhelming' (Vickery *et al.*, 1994).

In the US, sales are cyclical and closely related to discretionary income, consumer credit, and house sales, lagging new-home sales by 1–2 years (Moorman and Montgomery, 1998). Products can be classified according to primary material (wood, upholstered, metal, other), use (case goods [dining room and bedroom furniture], occasional furniture [coffee and end tables]), as well as style, finish, quality, and price. Generally only the largest firms target more than one segment of the market.

A 1990 study of 65 US furniture firms with sales above US\$ 10 million showed that manufacturing strategy, expressed in terms of 'production competence', was strongly associated with business strategy and firm performance (Vickery *et al.*, 1993).

#### *Manufacturing Strategy and Technology in China*

A 1997 survey of 46 companies in the Beijing area (Robb and Xie, 2001) compared the manufacturing practices and performance of foreign-invested with Chinese-owned firms. The authors found strong evidence that Chinese-owned firms were lagging behind Foreign-Invested Enterprises when it came to com-

peting on time. A similar survey conducted with 120 firms predominantly in the Shanghai region (Pyke *et al.*, 2002) found few differences related to ownership.

In another survey of 72 Chinese manufacturing firms (predominantly textiles, consumer goods and electronics) (Li, 2000) showed manufacturing initiatives to be strongly correlated with sales volume, market share, and return on investment, but did not have any significant predictive relationship with profit after tax.

A study of eight companies during the 1990s (Forrester and Hassard, 2000) concluded that concepts and frameworks of contemporary Western manufacturing strategy and quality management are applicable in China, but that they 'only provide a partial explanation for manufacturing management practice.' A focus on technological advancement and productivity improvement (through economies of scale), and the political context are more influential than the market.

#### **Furniture Manufacturing in China**

Buoyed by a strong domestic economy and construction sector along with a booming export business, furniture manufacturing has grown rapidly — with a doubling of production in the second half of the 1990s, and subsequent double-digit annual growth (see Table 1). Mirroring many industries in China, a capacity glut emerged, leading to vicious price competition, with wholesale prices halving over the second half of the 1990s (Anon, 2001).

Initial estimates by the *China National Furniture Association* (Zhang, 2003) suggest total Chinese furniture production in 2002 was US\$20 billion, up 17 per cent from 2001. US furniture production in 2000 was US\$75.5 billion (US Census Bureau, 2002).

Double digit annual growth is expected during this decade (Sun and Bean, 2001), driven both by export markets and increases in per capita furniture consumption. The latter is still relatively low for emerging markets, but is increasing as both disposable income and home ownership, which became possible in 1998, continue to rise. Joint ventures, which currently number one thousand and supply some 30 per cent of the domestic market (Anon, 2001), are expected to increase.

With entry costs to the industry relatively low (perhaps 300,000 RMB), the typical firm is small in scale. However, there are some very large manufacturers such *Tiantan*, a public company founded in 1956. The largest furniture company in China, it has 22 factories (5 Joint Ventures), 3600 employees, 1998 sales of US\$100 million and 400 sales outlets in more than 150 cities (Anon, 2001).

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