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Large Firms and Catch-up in a Transitional Economy: The Case of Shougang Group in China^{*}

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ABSTRACT

This study examines the possibility of catch-up of the Chinese steel industry, in particular the Shougang Group, with the leading global steel giants. Shougang is one of the four steel companies that have been selected by the Chinese government to constitute the core of the future Chinese steel industry. The contract system at Shougang, which operated from 1979 to 1995, unleashed an extraordinary entrepreneurial energy in the formerly traditional state-run steel plant. In the post-contract system, Shougang's range of decision-making independence in respect to the purchase of inputs, its production structure and product marketing has increased substantially compared to the contract system, when the government still controlled many of the key decisions. As a result of institutional constraint, the low value-added steel products dominate Shougang's portfolio. To challenge the established giants in the steel industry, Shougang has to divest the loss-making non-core businesses, slowly downsize employment in the core business, raise capital on the stock market and generates the resources for continued upgrading of its steel technology and diversifying its product portfolio.

Keywords: China, globalisation and catch-up, iron and steel industry, state-owned enterprise reform

Lists of abbreviation:

CCP: Chinese Communist Party
DCs: developed countries
IT: information technology
JV: joint venture
LDCs: less developed countries
M&As: mergers and acquisitions
MMI: Ministry of Metallurgy Industry
PLA: People's Liberation Army
SBMI: State Bureau of Metallurgical Industry
SOEs: state-owned enterprises
TNCs: transnational corporations

1 Introduction

The possibility for large Chinese firms to catch up with leading global firms is very limited in high technology sectors, such as aerospace or information technology (IT) hardware. It is also quite limited in branded consumer goods with established global consumption habits. However, it is argued that there are much greater possibilities for large firms in less developed countries (LDCs) to catch up in industries with lower levels of technology, such as steel. This paper examines this issue in relation to a single case, Shougang Group (hereinafter called Shougang).

China's rise has, arguably, been the most important change in the global steel industry in the last two decades. Alongside explosive growth of demand and output, there have occurred important institutional changes in the Chinese steel industry. China intends to build four globally competitive giant steel corporations. Shougang, the subject of this paper, is one of these. Analysis of Shougang has focused almost exclusively on the expanded autonomy given to Shougang as the explanation of its exceptional growth under the contract system, e.g. Steinfeld (1998:167). This paper has argued that a relatively high degree of autonomy compared to other state-owned enterprises (SOEs) is not a sufficient explanation. Many other enterprises adopted the contract system, but few were as successful as Shougang. As a global steel-maker, the experience of Shougang and its ability to catch-up with leading global steel giants have important implications for the development of steel industry.

The changing patterns of the global and Chinese iron and steel industries are reviewed in section 2 briefly. Section 3 analyses Shougang under the contract system, while section 4 analyses the change in direction that Shougang has pursued since the retirement of Zhou Guanwu and the termination of the contract system. Section 5 evaluates the prospect of Shougang and section 6 concludes this paper's findings.

2 The Iron & Steel Industry

Steel is a highly cyclical industry. World-wide steel output grew from 135 million tons in 1947 to a new record high level of 795 million tons in 1997, before declining to 778 million tons in 1998 (IISI, 1999). The outlook for the industry is not optimistic as the Iron and Steel Statistics Bureau estimates that an excess capacity of more than 25% of the world production capacity (or at least 250 million tons) will continue depress the steel price (FT, 23 October 1998:23).

Steel was regarded as a key strategic sector. It received a great deal of government support, and in most of Europe was predominantly state-owned, with over one-half of steel output in the 1980s being produced by SOEs (Cockerill, 1974). A wave of privatisation had transformed the institutional background of the steel industry in Europe. By 1998, the proportion of steel produced in SOEs had fallen to under 5% (MSDW, 1998). Massive downsizing of employment was a major reflection of the change in management practices accompanying privatisation. In Europe, employment in the steel industry fell from 998,000 in 1974 to 287,000 in 1998, while output per worker increased from 190 tons/worker to 557 tons/worker respectively (IISI, 1999). Moreover, large-scale cross-country mergers and acquisitions (M&As), such as the £4.3 billion merger between British Steel and Koninklijke Hoogovens, shift the competitive landscape from “national champions” to the truly multinational steel companies (FT, 3 & 8 June 1998).

In China, the Ministry of Metallurgy controlled the overall development (including steel prices and product mix) of the steel industry until the late 1980s. The government continued to fix “guidance” prices for the main steel products, even it freed all steel prices in 1994. In 1997, the Ministry of Metallurgy Industry (MMI) was abolished, and replaced by the State Bureau of Metallurgical Industry (SBMI). With the exception of Shougang (which reports directly to the Beijing municipal government), the other largest Chinese steel-makers, such as Anshan Iron and Steel (Angang), Baoshan Iron and Steel (Baogang or Baosteel) and Wuhan Iron and Steel (Wugang), all report directly to the SBMI.

China’s steel output tripled from 37 million tons in 1980 to 114.3 million tons in 1998. China rose from the world’s fifth largest steel maker in 1980 to

become the number one producer in 1996, accounting for 14% of total world production. Due to the long gestation period for building a large integrated steel plant, many small steel plants were established to facilitate the excess demand since the 1980s. There were around 1,600 iron and steel enterprises “within the system”. Of these, only 28 of them with annual output of one million tons or higher. Another 1,500-odd plants were truly small-scale, with annual output below 0.5 million tons (ISIC, 1997; CMISI, 1998; SBMI, 1998; IISI, 1999). These typically had low technical efficiency, used old techniques and were often highly polluting.

Large improvements have taken place in Chinese steel industry technology since the 1970s. The ratio of steel made by continuous-casting increased from just 4% in 1975 to 68% in 1998. The share of open-hearth production fell from 28% in 1984 to 5% in 1998, the share of converters rose from 51% to 61%, and the share of electric arc furnaces rose from 9% to 20%, respectively (CMISI, 1997; IISI, 1999). The improvements in steel industry technology are reflected in the fall in energy consumption per unit of steel produced: specific energy consumed per ton fell from 2.04 tons in 1980 to 1.39 tons in 1996 (ISIC, 1997:91).

Under the wider industrial policy of “grasping the large and letting go of the small” (*zhua da, fang xiao*), the Chinese government has determined to develop the four leading steel enterprises – Baogang, Shougang, Angang, and Wugang – into world-class companies. Each of them had an annual output of over six million tons in 1997, and account for 28% of China’s total steel output. Their aggregate pre-tax profits in 1996 amounted to 4.4 billion *yuan*, equal to the total profits for the entire Chinese steel industry (CMISI, 1998). However, they were still not in the front ranks of the world’s steel producers. China’s highest ranking steel enterprise in 1998 was Baogang, which ranked thirteenth. Angang ranked twenty and Shougang twenty-one (IISI, 1999).

3 Shougang under the Contract System

Shougang was run by a former People’s Liberation Army (PLA) commander and senior figure in the Chinese Communist Party (CCP), Zhou

Guanwu, until 1995.¹ A 15-year contract (1981-1995) was struck with the Beijing city government, the direct administrative superior of Shougang. The contract system adopted at Shougang consisted of four elements:

- Profits handed-over to the state were to **increase by 7.2% annually**, based on the profit submitted in 1981.
- Of the retained profit, 60% was to be used as development funds, 20% as collective welfare funds, and 20% as bonuses for the employees: this was the **6:2:2 system**.
- No financial assistance from the state.
- The size of the wage-bill was linked to the enterprise's profits: for every 1% increase in profits there was to be a 0.8% rise in the payroll.

The contract system hardened the immediate financial pressure on Shougang. Each year, Shougang paid a state infrastructure tax, amounting to 15% of retained profits (Table 1). Being proportionate to the enterprise's retained profits, these payments rose at a much faster rate than did the contracted profits hand-over.

[PLACED TABLE 1 ABOUT HERE]

3.1 Autonomy within constraints

Although there was no official representative on the Board of Directors of Shougang, the Party Secretary, Factory Manager, General Manager, their deputies and other comparable positions were appointed by the government. It may be more accurate to describe the "Board of Directors" (*lishihui*) as the "management team" or the executive directors. Shougang's real "Board of Directors" was the Beijing government, to whom the "preferred dividend" (in forms of profits hand-over) was paid.

Government control over Shougang's production structure gradually atrophied, only finally disappearing in the late 1990s. Subsequently, Shougang was, and still is, China's leading producer mainly at the lower value-added of steel products, e.g. small section steel and wire rods (Table 2). The competition was

¹ Some of the ideas in section 4 is elaborated in greater length in Nolan (1998).

strongest from emerging small-scale producers. In 1997, local and “non-system” (i.e. outside the planning framework) plants accounted for 69% of output of small section steel and 53% of the output of wire rods. These products benefited much less from economies of scale, often required less complex, lumpy equipment, and needed less attention to product quality.

[PLACED TABLE 2 ABOUT HERE]

The government still set the wage structure and the rights to make workers redundant. Unlike Western steel firms, Shougang was forced to look towards growth rather than redundancy as the main path to solving the problem of surplus employees. In 1996, average annual wages (including bonuses and subsidies) in Chinese keypoint steel plants stood at 10,507 *yuan*, compared to 10,136 *yuan* at Shougang, 10,230 *yuan* at Angang and 12,232 *yuan* at Wugang (Table 3). Baogang alone among the large steel plants had substantially higher average wages at 25,000 *yuan* (ISIC, 1997:122).

[PLACED TABLE 3 ABOUT HERE]

3.2 Modernisation

Shougang’s output of crude steel rose from 1.8 million tons in 1978 to 8.3 million tons in 1994, around 10% per annum. By 1996, it was the top three China’s largest steel producer (CMISI, 1998).

Shougang’s approach to modernisation was: “Shougang first, China second, imports third”. It make careful comparisons of the costs of repair and replacement, and not hesitate to combine them if this reduced costs and speeded up improvement with minimum interruption to production. Foreign equipment was only bought if it was suitable, and was combined as far as possible with Shougang’s own technology. Shougang intentionally purchased equipment that was in good condition but was not highly automated, and itself automated the equipment. From 1980 to 1990, Shougang spent 4.27 billion *yuan* for technical renovation and capital construction on 108 key projects, all of them earned sufficient profits to recoup their investment outlays within two years (CDBW, 28 July 1991:4; Li, *et al.*, 1992:226). The returns per *yuan* of fixed investment at

Shougang were the highest of the eight largest steel-makers in China (RCMED, 1992:143).

By 1997, almost all the steel at Shougang was produced with oxygen converters, and 78% of its steel products was produced by the continuous-casting method. The share of electric furnaces at Shougang (50%) was high compared to other large SOEs. Electric furnaces are typically necessary for the production of high quality alloy steel. By 1997, Shougang produced 312,000 tons of alloy steel, the largest producer of such steel product in China. Its output per worker was 50% above that at old integrated steel plants such as Panzihua, Benxi and Angang (CMISI, 1998).

3.3 Merger, diversification, transnationalisation

Shougang was in the vanguard of M&As within China, most were administrative co-ordinated. Shougang's 14 second-tier companies (*erji gongsi*) were tightly managed by Shougang's headquarters, operating under a strict contract system. By the early 1990s, it owned 157 large and medium-sized plants and 65 joint ventures (JVs). It had risen to be the fourth largest company in China in terms of total sales value (DRC, 1993:2-3). Shougang also rapidly expanded its international operations. By 1994, Shougang had 26 overseas enterprises and offices scattered in 13 countries and regions including America, Europe, Southeast Asia, the Middle East and the former USSR (SG, 1995).

Much of Shougang's diversification and transnationalisation in the later phase of the contract system was related to the new 10 million-ton plant, Qilu Iron and Steel in Shandong.

- **Machine-building capability:** After the mergers of 20 large machinery enterprises and 13 military factories in 1988, the Shougang Heavy Machinery Corporation (with 60,000 workers) was established to design and build machinery to meet the urgent metallurgical and mining needs generated by Shougang's growth (SG, 1995:8; 1998:2).²

² Unlike other enterprises that Shougang had acquired, it was not allowed to return the 13 military enterprises to their previous owners, even though they were losing heavily and unable to fulfil the contracts (SG, 1998:38-39).

- **Construction capacity:** By 1992, Shougang had ten construction companies, comprising the Shougang Construction Corporation, with a total of 80,000 employees. They were engaged in the construction, installation and commissioning of blast furnaces, steel-making factories and power stations, etc.
- **Design and electronic control capability:** Shougang's technical capability was greatly extended after it acquired 70% of the Mesta Engineering Company in Pittsburgh for US\$3.4 million in 1988. By 1994, Shougang Electronics Corporation employed 3,000 technicians and professionals experienced in electronics design, programming, engineering and manufacturing.
- **Mining capability:** By the 1990s, Qian'an had 26,000 employees. In 1992, Shougang purchased the Hierro iron mine in Peru for US\$120 million, intended to guarantee the supply of raw material for Qilu (Liu *et al.*, 1994).
- **Shipping capability:** The high price of freight – accounted for up to one-half of the total purchase price of second-hand equipment – led Shougang to set up a shipping JV with Hong Kong Hongda Shipping Company. By 1994, it had a total transportation capacity of 2.4 million tons.
- **Export capability:** By 1993, Shougang controlled seven listed companies in Hong Kong, with US\$1.54 billion worth of assets (CDBW, 20 February 1994:2). In 1995, Shougang Southeast Asia Holdings was registered in Singapore to further facilitate steel exports in Southeast Asia.

3.4 Military-style organisation

Renovation of any single substantial segment of Shougang had profound implication in other parts of the enterprise. Limited funds and constraints of space in Beijing meant that Shougang had to rely heavily on upgrading existing facilities, impelled them to carry out technological transformation as quickly as possible. Time spent in renovation meant income foregone from having segments of the plant shut down. It was from this income that the resources for further renovation came. In this sense, the contract system imposed the hardest of budget constraints upon Shougang.

Each of the major technological renovations was treated as a battle, with the Corporation organised like an army.³ From 1992 to 1995 alone, Shougang carried out more than ten large technological renovation projects. The renovation of the No. 2 Blast Furnace involved the investment of 130 million *yuan* in dismantling 13,000 tons of material and installing 25,000 tons of material. Over 7,000 workers were assigned to work day and night in a 100m³ area. It was completed within 55 days rather than the 104 days that originally scheduled (BR, 13-19 January 1992:16).

4 Shougang since the Contract System

After 1995, Shougang continued to organise financial data around “hand-overs” and retained profits (Table 1). The Beijing government directly reimburses Shougang all of its profits tax, which amounted to around 70 million *yuan* in 1997 (on pre-tax profits of 351 million *yuan*). However, Shougang has to pay 10% of its total sales revenue as turnover tax to the Beijing government (around 1.7 billion *yuan* in 1996 and 1.8 billion *yuan* in 1997), which is much higher than the profits tax reimbursement, and several times higher than the total retained profits, which were officially recorded as only 180-200 million *yuan* in 1995 and 1996.⁴ It appears that the turnover tax has replaced the hand-overs of the contract system as the “preferred dividend” to the sole shareholder, the Beijing City government.

A number of businesses have been sold or substantially restructured and a number of expansion plans have been dropped since 1995. Much of the change stemmed from the failure of Shougang to obtain approval from the central government to expand steel production outside Beijing. e.g. the Qilu and Liuzhou projects have been dropped. After restructuring, the Heavy Machinery Corporation still have 50,000 employees, mainly in former military enterprises. Shougang’s shipping fleet has been placed into a JV with P&O (SG, 1998:5-14).

In June 1998, a **reassessment of Shougang’s strategy** recognised that the Corporation’s development was limited by the poor products mix, low

³ The four necessary conditions for successful military-style organisation are a unified command system, strict discipline, full mobilisation and a strong supporting service.

profitability of second-tier companies, a heavy debt burden, and a large amount of surplus workers. Subsequently, five development strategies were outlined by the Shougang's Board of Directors.

4.1 Establishment of a modern management system

After 1995, Shougang began slowly to transform itself toward a limited company. From 1998 onward, this transformation process will be accelerated. The following are the main features of this transformation (*Ibid.*:5-32):

[PLACED FIGURE 1 ABOUT HERE]

- Shougang Corporation (the core company) was renamed as Beijing Shougang (Group) Company Limited, and was re-registered (Figure 1). The Beijing government designated Beijing Shougang (Group) Company Limited as the core company with the authority to enforce its shareholder's rights upon second-tier companies within the Shougang Group.
- Shougang will separate off seven production units to form the Beijing Shougang Stock Holding Company Limited and listed as an A-share company in the Chinese stock market. Other second-tier companies will be restructured into either stock-holding limited companies or limited companies.
- The second-tier companies have been turned into "legal persons", with all the associated rights and responsibilities. Economic transactions between the core and second-tier companies (or among second-tier companies) must be based at market prices.
- A hierarchical managerial system with the Board of Directors, Managers and a Monitoring Committee in the core and second-tier companies has been established (Figure 1).
- Shougang is establishing throughout the Group a system of professional recruitment. Employees must undertake routine tests and those failed must receive re-training or accept re-assignment to subsidiaries. Each individual constituent company within the Group has the right to establish its own remuneration system (tied to productivity).

⁴ The "tax" payments from Shougang still account for around one-fifth of Beijing's total revenues generated from industry.

4.2 Integrated development of IT and electronic industries

By 2000, Shougang aims to develop integrated IT and electronics industries, and increase the sector's revenues from 1.6 billion *yuan* to 3.2 billion *yuan*. To achieve this goal, Shougang has established the Shougang High Technology Development Office to co-ordinate the development of this branch of the Group. In addition, Shougang will inject another one billion *yuan* to import technology through establishing Sino-foreign JVs, to cultivate domestic R&D capability, and to accelerate the transformation of technological advances into commercially applicable products (*Ibid.*:7-9).

Shougang NEC is the centrepiece in the development of Shougang's electronics capability. Shougang and NEC (Japan) together will invest a further US\$150 million in the JV that established in 1990. This will raise the technological manufacturing capability to 0.35 micrometers, increase the production capacity of integrated circuits to 120 million units, and production capacity of chips to 96,000 units. This technological advancement will assist the development of the newly established robots manufacturing firm ("Motorman" Robotics), a Sino-Japanese JV started in 1997. Shougang hopes these two major projects can act as the catalyst for the development of an integrated IT and electronics industry and increases the share of non-steel industry to account for more than 50% of total Group revenues (*Ibid.*:6-8; SCMP, 9 March 1999).

4.3 Development of the tertiary sector

In the absence of a social safety net, Shougang cannot radically downsize employment as it would create a severe social problem in Beijing. The alternative strategy has been to re-assign redundant employees to the newly-developed real estate and service sectors (SG, 1998:34).

Shougang Real Estates Stock Holding Company has been established to expand Shougang's real estate activities. Shougang has several advantages in developing its real estate business. It owns about two million m² of property in the centre of Beijing. It is China's largest manufacturer of construction steel products. It has a huge construction company employing around 50,000 people. Shougang

Real Estates Stock Holding Company has a total targeted capital of 10 billion *yuan*. Shougang's aim is that the Company generate revenues of 600 million *yuan* by the year 2000. Other small-scale welfare units within the Group will be allowed to merge, to form joint-stock companies, to contract out their services, to re-organise and even to go bankrupt. The ultimate goal is to transform them all into financially self-sufficient companies (*Ibid.*:9-31).

4.4 Restructuring and technological upgrading of steel business

The Beijing City government has set a limit of eight million tons steel-making capacity at Shougang, in line with its goal of changing the production structure of Beijing towards knowledge-based, high value-added products with new and high technologies (Luo, 1998). Accordingly, Shougang's main objectives in iron and steel are to improve product quality, increase the share of high value-added products, and improve product variety. The development strategy of the Shougang Special Steel Corporation will be integrated with that of the other steel mills and will cease to duplicate the production lines. Shougang has identified light construction steel as a key route to enhance its capabilities in high value-added steels.

Shougang plans to improve the application of computers to automate the production process, improve production efficiency and reduce the emission of pollutants. A 2,160 mm hot-rolled mill will soon be installed, significantly enhancing Shougang's product mix. To further enhance the role of high value-added products, steel products are increasingly to be manufactured into semi-finished or finished form, according to the customers' specifications. The general strategy is to improve the whole production and marketing processes from the selection and preparation of iron ores to the distribution and after-sales services (SG, 1998:6-12).

4.5 Further development in overseas businesses

By 1996, Shougang had become one of the leading transnational corporations (TNCs) from LDCs, ranked twenty-first by value of overseas assets. Its foreign employment amounted to only 1,600, comprising less than 1% of its

total employment. However, its overseas assets were valued at US\$1.6 billion, amounting to 24% of the Group's total assets and its foreign sales amounted to US\$1.03 billion, amounting to 24% of its total revenue.

Through China Shougang International Trading and Engineering Corporation (CSITEC), Shougang aims to further develop the export markets and generate more revenues in Southeast Asia, South America and Africa. To enhance its role in raising foreign capital to restructure and renovate the core and second-tier companies in China, Shougang aims to substantially reduce the debt of Shougang Holdings (Hong Kong) from HK\$1.17 billion to HK\$300 million in 1998.⁵ It intends to inject high quality assets from the mainland into the Hong Kong vehicle.

The Hierro Iron Ore Mine in Peru is yielding profits. Since completing the purchase, Shougang has invested US\$150 million to process the iron ore at the mine so that it meets pollution regulations in the (developed countries) DCs. It has also invested in pelletising facilities. Iron ore pellets are especially in high demand because they can be used in the process of making steel through direct reduced iron. The upgrading of product quality has enabled the mine to export iron ore to a wide range of countries, including the US, Japan (Nippon Steel), South Korea (Posco). The mine made annual pre-tax profits of US\$3 million since 1997. It is planned to restructure the Hierro mine and float the company on the US and Canadian stock markets.

5 The Prospect of Shougang

It is possible that large indigenous integrated steel firms in LDCs will be able to catch-up with and even overtake those in the DCs by following the path of Nippon Steel (Japan) and Posco (South Korea). The rationales are as follows:

- For basic steel-making processes, the technology is embodied in equipment that can be purchased relatively easily and operated effectively in a relatively short time (Amsden, 1989).

⁵ Its debt-asset ratio stood at 32.5% in 1997.

- If local steel firms in LDCs are able to meet fast growing local demand, they may be able to generate sufficient revenues to reinvest to benefit from economies of scale, modernise production facilities and begin to generate technical progress.
- China processes rich iron ore and coal resources (low value-to-weight ratios).
- The low labour costs (US\$0.5/hour) more than compensate for the lower level of labour productivity in China, e.g. labour costs amount to less than 10% of total costs, while it rise to 26-27% in the US and Europe (MSDW, 1998).

Before catching-up their DCs' counterparts, Shougang has to overcome three major obstacles: mismatch of demand and supply, welfare legacy, and capital constraints and divestment.

5.1 Mismatch of demand & supply

Despite the large investment, China's steel technology still lags behind the world's leading producers in important respects. For example, it is estimated that the technologies used in top-blown oxygen converters and continuous-casting in China is 15-20 years behind that of South Korea, Japan and Europe. The comprehensive energy consumption in the Chinese steel industry is 30-40% higher than in that of their counterparts in DCs, which contributes to high level of pollution (SBMI, 1998:5). In Shougang, electric furnace only accounted for a merely 5% of its total crude steel output in 1998, which was well behind the industrial leaders in the US (45%) and South Korea (40%). This explains why cheap steel still imported at a record-breaking rate as Chinese steel-makers are unable to produce the right quality of high-value added steel, such as hot-rolled steel, cold-rolled sheet and stainless steel, demanded by the massive infrastructure project. In 1996, imports accounted for 50% of China's consumption of car sheets, 81% of stainless sheet, and 87% of domestic appliance sheet (SBMI, 1998). In the first-quarter of 1999, the steel import rose 42% to 3.58 million tons while the steel export slumped 18% year-on-year to 610,000 tons (SCMP, 31 May 1999).⁶ In 1996, the proportion of steel products judged to be at the level of "advanced world

⁶ This figure excludes an unknown amount of steel being smuggling into China.

standards” stood at 99% at Baogang, 81% at Wugang, 61% at Angang and just 29% at Shougang (ISIC, 1997:124-138).

Although Shougang’s output grew rapidly, a large part of the growth was in low value-added, low quality steel, such as construction steel. In the late 1990s, high quality steel still accounted for only 15% of its total output. In 1997, Shougang’s steel sold for the equivalent of US\$275/ton, much lower than US\$700/ton for British Steel and Usinor’s products. Shougang’s sales value in 1997 amounted to just US\$2.2 billion, compared with US\$11 billion for British Steel, US\$12 billion for Usinor and US\$25 billion for Nippon Steel. All four of China’s top producers together, namely Shougang, Angang, Baogang and Wugang, had a sales revenue of just US\$9 billion, still well below that of the main European and East Asian producers, reflecting, to a considerable degree their high proportion of low quality, low value-added products. Shougang found it **hard to extricate itself from a vicious circle**. The fact that it mainly produced low quality steel meant that it was mainly in competition with small-scale local producers contesting with them for local markets. The low value-added produced low profit margins, which in turn limited Shougang’s capacity to modernise through investment in R&D and new products. Assuming Shougang is able to increase its productivity dramatically to 380 tons/man/year by 2000, it is still well behind the industrial leaders of Nippon Steel (949 tons/man/year) and Posco (966 tons/man/year) (Table 3). Even assuming Shougang is able to achieve its aim to raise the share of high value-added steel products from a mere 12% in 1997, to 30% in 2005, and over 60% in 2010, Shougang cannot increase its market share on high value-added steel products shortly (SG, 1998:6-12).

5.2 Welfare legacy

With the exception of Baogang, China’s steel industry is vastly over-manned by world standards.⁷ A single large steel plant employs around 200,000 people, as many as the whole steel industry of Europe or the US (Table 3). Employment at the world’s leading steel firms, Nippon Steel and Posco, which produce more than three times the annual steel output of Angang or Shougang, is

only 20,000-30,000. The Chinese government has announced plans to reduce employment in the sector by 25%, or around 700,000, by the year 2000 (FT, 25 November 1997). Shougang estimates that roughly one-third of its total employees are redundant (SG, 1998:34). In 1998, Shougang retired and laid off 17,700 workers. Another 15,000 workers are expected to follow the similar fate in 1999 (SCMP, 9 March 1999). That still left 185,000 workers in its pay-rolls. In fact, remuneration is so low that the impact of downsizing on the competitiveness of China's large steel plants will be far less than was the case in DCs, or even in Brazil, where hourly wage rates are around thirty times as high as in China (MSDW, 1998).

As the social problems faced in downsizing are especially acute in China, this explains why the development of non-core businesses is an important path to downsizing the steel sector.⁸ Shougang is following similar strategy by established the Shougang Service Company. Already, 400,000 Shougang employees and their families live in housing owned by Shougang. Over the next three years, Shougang will build another two million m² of housing. Gradual commercialisation of the management of this huge stock of property will generate 270 million *yuan* of revenues by the year 2000. In reality, it can be argued that there is only a **transfer of the economic burden of the welfare legacy to the “spin-off” subsidiaries** so that the balance sheet of the steel sector looks healthier. The surplus workers are still existed in the macro economy. Whether Shouguan can reach its ultimate goal to transform all its subsidiaries into financially self-sufficient companies is questionable. The critical issue is will Shougang have the time and capital to sustain the transitional period?

5.3 Capital constraints & divestment

The political and social constraints on making massive downsizing in employment have pushed Shougang towards the path of diversification. The process has been stimulated by the low profit margins and great market cycles in the steel industry. Nonetheless, there are costs attached to extensive downstream

⁷ Baogang began production in 1982 and have a much lower manning level (34,000 people) than other major plants (Table 3). Consequently, it has much lower welfare costs.

and service sector diversification. A large integrated steel company has only limited business skills in such activities. It may be unable to generate economies of scale, encounter fierce competition and the danger of diverting investment funds away from the core business. It is striking that the most successful steel company in the world, Posco, under state ownership has studiously avoided the path of conglomerate diversification so characteristic of the *chaebol* business structure of the rest of Korea. **Extensive diversification into downstream consumer goods and services** is taking Shougang along **the path of the *chaebols* rather than Posco.**

Shougang had borrowed heavily to finance the ambitious diversification programme in the early 1990s. In 1996, Shougang's total debt was 18.4 billion *yuan*, of which 79% was short-term. The loss-making second-tier company is another source to drain valuable capital from Shougang. In 1997, there was a total of 71 second-tier companies, of which 25 were loss-makers, with losses totalling 830 million *yuan*. The core iron and steel company made a profit of 958 million *yuan*, but the Shougang Special Steel Corporation lost 141 million *yuan*, mining operations lost 297 million *yuan* and the other non-steel operation lost another 393 million *yuan*, which offset 87% of the profits generated from the core company. Shougang's international operations made a profit of 212 million *yuan* (SG, 1998:3-6). Thus, the total Group profit of 351 million *yuan* disguised a very different performance between the separate branches of the Group.

Through the managerial and other complementary reforms, Shougang aims to reduce losses by 80% by 2000, and to eliminate loss-makers entirely by 2005 (*Ibid.*:6). Reports of Shougang unable to secure bank loans to serve its debts and 20% of the 220,000 strong workers have not been paid from two to six months in 1999 suggests that Shougang may experience difficulties on its cash liquidity (FT, 3 April 1999:4). To combat the oversupply, Shougang plans to reduce steel output by 800,000 tons (about 10%) in 1999 (SCMP, 13 February 1999). Obviously, restructuring with divestment is urgently needed to restore the balance sheet with productive assets. The divestment is more urgently on the non-core loss-making businesses, including the "spin-off" businesses from the welfare legacy and the

⁸ The Chinese large SOE is a complete society, with comprehensive social responsibilities towards

heavily over-manned machinery businesses taken over from the PLA. Due to the sensitive economic and political implications of large-scale redundancy that may result, it is this part of the business in Shougang Group proven to be the most difficult to divest.

6 Conclusions

The contract system at Shougang, which operated from 1979 to 1995, unleashed an extraordinary entrepreneurial energy in the formerly traditional state-run steel plant. Most large-scale technological up-grading in Shougang was conducted in the early 1990s, which coincided with a property speculation boom in which most Chinese firms participated, suggested that entrepreneurs at Shougang work for growth within their industry rather than for short-term profit maximisation.

A central proposition of the “transition orthodoxy” about how to transform communist economies was that the pre-reform communist institutions should be destroyed. Their interests were thought to be irreconcilable with the market economy. Their members were thought to be incapable of turning towards the market and competitive behaviour. The experience of Shougang shows that the CCP and the PLA possessed a rich legacy of organisational and motivational skills. Even old Party cadres and army officers, such as Zhou Guanwu, possessed the capability to make the transition to the market economy, if given the correct incentive structure. Indeed, their lifetime experience of thinking strategically and mobilising people in complex institutions was a valuable skill for the construction of an effective market-oriented business organisation. In the transition to a market-oriented economy, the military style of traditional communist culture is a potentially valuable institutional force to assist the struggle to modernise and do battle in the marketplace.⁹ It can help to avoid the institutional problems of the typical large Western firm, such as principle/agent struggle, free-riding and

both the employees and their families, e.g. schools, hospitals, and housing, etc.

⁹ In contrast to the traditional theory of consumer economics and profit maximisation, Thurow (1991:51) has argued that in Japan during its rise to global power in the 1980s, competition was treated as warfare rather than a rational process of profit maximisation. Janelli's (1993:226) detailed account of a large Korean firm speaks of a “military style of life [that] pervaded the

bureaucratic hierarchy, which arise because the employees are motivated primarily by individual economic interests. Shougang's army-style of organisation, aiming not for profit maximisation but for victory in the battles of technical modernisation and growth may look irrational but nonetheless effective during the contract system period. Shougang challenged not only the traditional theory of the firm, but also the liberal neo-classical ideology which was battling for supremacy in China.

The contract system was, however, a crude instrument for allocating the stream of revenue stemming from the assets that Shougang operated. In the post-contract system, the direct influence of state planners on Shougang has substantially declined. Shougang's range of decision-making independence in respect to the purchase of inputs, its production structure and product marketing has increased substantially compared to the contract system, when the government still controlled many of the key decisions. Shougang is moving towards a new epoch, with the plans to float parts of the steel business on the stock market. It wishes to improve the value-added of output and per unit profits through increasing the production of high value-added products.

The steel sector presents very different possibilities for catch-up among firms in LDCs. Firms in this sector are less able to establish competitive advantage through brand, technical progress in product or process, and systems integration and high investment in information systems. The process of globalisation of business systems is much less advanced than in other sectors, so that the TNCs are relatively less far advanced compared to those in LDCs. China possesses the advantage of already being the world's largest producer of steel. Not only is the Chinese overall market fast-growing, but there is every prospect that it will continue to grow over the long-term, albeit with the usual cycles that characterise demand for steel in all economies. Moreover, Chinese demand is rapidly changing its structure towards high-quality steel as manufacturing output advances, consumer tastes change and Chinese manufactures increasingly penetrate world markets with the associated demands for high quality raw materials.

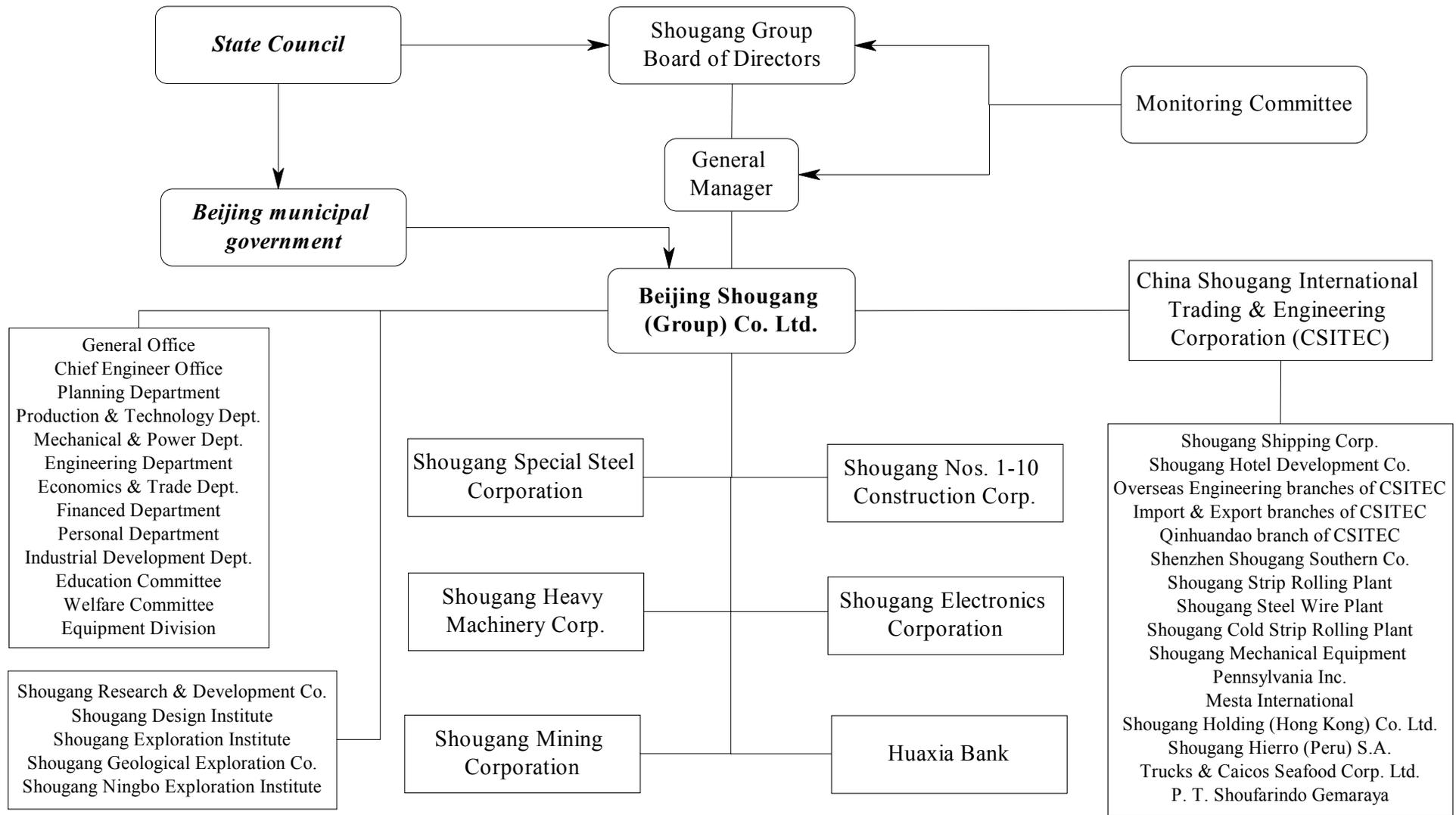
enterprise". Shougang's mobilisatory, quasi-military and highly disciplined management style

China's leading steel firms may well be able to compete at the low value-added end of the market. However, the steel market is becoming increasingly segmented as the global industry began to enter a period of large-scale institutional and technical change. In the US, a new form of large steel firm based around mini-mills began to develop, of which Nucor is the leading example. A truly global steel company, Ispat, based in London, with a collection of steel plants across the world, rapidly came to prominence. Within Europe, a series of large-scale cross-border mergers transformed the industry. By the turn of the millennium, a small group of "European champions" had emerged in the industry, led by Arbed, Thyssen-Krupps, Usinor and Corus (the merger of British Steel and Hoogovens). Each of these firms had global reach, with plants across the world, and a high capability in specialist, high quality, high value-added steel. They were able to supply the global needs of large firms in such industries as packaging, automobiles, complex machinery, high quality construction, and white goods. The leading companies established very close ties with their customers in order to meet their global needs for high quality steel. In the high value-added and high profit part of the industry, only Baogang can feel confident that it is able to directly compete with the emerging global giants of Europe and the established giants of Asia in Japan and Korea. Shougang, like other large traditional Chinese steel firms, will find it difficult to compete directly on the global level playing field in high quality steel.

Nonetheless, the experience of catch-up of Posco and Nippon suggest that we cannot write Shougang and other large Chinese steel firms off yet. If Shougang is able successfully to divest itself of loss-making non-core businesses, raise capital on the stock market and slowly downsize employment in the core business, it should be able to generate the resources for continued upgrading of its steel technology and diversifying its product portfolio. If Shougang was able to develop into globally competitive, modern integrated steel companies, then there is every likelihood that it would become formidable international competitor for the established giants.

under the contract system is a variant of the same East Asian tradition.

Figure 1: Shougang Group Corporate Structure, 1998



Source: Shougang Group, 1998

Table 1: Distribution of Profits in Shougang Corporation, 1978-1997

Year	Total profits	Handed over profits	Retained profits	State infrastructure tax†
	(in million <i>yuan</i> , % share in brackets)			
1978	300 (100%)	294 (98.2%)	6 (1.8%)	0.8
1979	369 (100%)	336 (91.1%)	33 (8.9%)	4.9
1980	444 (100%)	382 (86.0%)	62 (14.0%)	9.3
1981	445 (100%)	380 (85.4%)	65 (14.6%)	9.7
1982	527 (100%)	408 (77.4%)	119 (22.6%)	17.9
1983	633 (100%)	438 (69.2%)	195 (30.8%)	29.3
1984	778 (100%)	469 (60.3%)	309 (39.7%)	46.3
1985	934 (100%)	504 (54.0%)	430 (46.0%)	64.6
1986	1,121 (100%)	540 (48.2%)	581 (51.8%)	87.2
1987	1,345 (100%)	579 (43.0%)	766 (57.0%)	115.0
1988	1,615 (100%)	620 (38.4%)	994 (61.5%)	149.1
1989	1,893 (100%)	665 (35.1%)	1,228 (64.9%)	184.1
1990	2,092 (100%)	713 (32.1%)	1,379 (65.9%)	207.2
1991	2,361 (100%)	964 (40.8%)	1,396 (59.1%)	194.2
1992	3,202 (100%)	830 (25.9%)	2,372 (74.1%)	323.9
1993-1997*	23,101 (100%)	16,197 (70.1%)	6,904 (29.9%)	N/A
1979-1997*	40,903 (100%)	24,025 (58.7%)	16,878 (41.3%)	N/A

Notes:

†: 15% of retained profits.

*: These data were provided separately from the other information in the table. Data for 1993-1997 are derived from the other information in the table.

Sources: 1978-1992 annual data from Salomon Brothers, 1994:16; other data from interview.

Table 2: Structure of Principal Steel Products at Major Chinese Steel Plants, 1997

Companies / category of plants	Major products:									
	heavy rail	large section	medium section	small section	quality section	wire rods	Medium plate	sheet	strip	seamless steel tubes
	(in 10,000 tons, % share in total in brackets)									
Baosteel	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	116.9 (9.8%)	415.5 (31.8%)	49.5 (9.5%)	56.4 (15.6%)
Angang	28.2 (29.3%)	12.3 (9.4%)	44.3 (10.4%)	35.0 (1.4%)	6.6 (1.1%)	64.2 (3.3%)	140.5 (11.7%)	204.1 (15.6%)	56.5 (10.9%)	34.5 (9.6%)
Shougang	0.0 (0.0%)	0.0 (0.0%)	17.0 (4.0%)	235.9 (9.3%)	36.0 (6.1%)	269.8 (13.8%)	44.4 (3.7%)	4.2 (0.3%)	31.6 (6.1%)	0.0 (0.0%)
Wugang	3.6 (3.7%)	37.7 (28.9%)	9.8 (2.3%)	2.0 (0.1%)	7.6 (1.3%)	40.4 (2.1%)	148.9 (12.5%)	208.5 (15.9%)	3.8 (0.7%)	0.3 (0.1%)
Baotou	29.2 (30.3%)	29.7 (22.7%)	0.0 (0.0%)	42.8 (1.7%)	11.9 (2.0%)	64.4 (3.3%)	0.0 (0.0%)	0.0 (0.0%)	56.5 (10.9%)	34.5 (9.6%)
Magang	0.0 (0.0%)	0.7 (0.5%)	42.0 (9.9%)	24.2 (1.0%)	0.0 (0.0%)	86.7 (4.4%)	36.6 (3.1%)	0.0 (0.0%)	15.2 (2.9%)	0.0 (0.0%)
Pangang	34.9 (36.2%)	33.3 (25.5%)	0.4 (0.1%)	4.6 (0.2%)	1.6 (0.3%)	22.1 (1.1%)	33.4 (2.8%)	36.4 (2.8%)	13.0 (2.5%)	0.0 (0.0%)
Bengang	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	19.1 (3.3%)	0.0 (0.0%)	21.1 (1.8%)	176.7 (13.5%)	0.0 (0.0%)	0.0 (0.0%)
Key plants	95.9 (99.5%)	122.7 (94.0%)	157.4 (37.1%)	786.4 (31.1%)	605.3 (103.3%)	921.1 (47.1%)	824.7 (69.0%)	1,213.5 (92.8%)	234.3 (45.1%)	243.2 (67.5%)
Local plants	0.4 (0.4%)	7.6 (5.8%)	179.5 (42.3%)	1,131.5 (44.7%)	188.3 (32.1%)	884.0 (45.2%)	396.4 (33.1%)	50.3 (3.8%)	125.4 (24.1%)	64.7 (17.9%)
non-system output	0.0 (0.0%)	0.4 (0.3%)	87.4 (20.6%)	612.7 (24.2%)	57.9 (9.9%)	148.5 (7.6%)	1.8 (0.2%)	44.3 (3.4%)	96.6 (18.6%)	52.6 (14.6%)
China:	96.4 (100%)	130.6 (100%)	424.2 (100%)	2,530.6 (100%)	585.7 (100%)	1,953.6 (100%)	1,195.9 (100%)	1,308.1 (100%)	519.8 (100%)	360.5 (100%)

Source: Compiled from CMISI, 1998: 8-9 & 42-44.

Table 3: Remuneration and Labour Productivity in Selected Countries and Plants, 1994-1998

Countries / firms	Year	Number of steel workers	Average weekly wage (in US\$)*	Labour productivity (in ton/man/year)
Japan:	1998	221,000	1,197.9	423.1
Nippon Steel	1995	27,583		948.9
NKK	1995	17,692		614.8
Kawasaki	1995	13,384		753.5
South Korea:	1998	64,000	453.5	625.0
Posco	1994	22,891		966.1
Taiwan:	1996	22,878	304.6	528.9
China Steel	1995	9,239		666.9
Germany:	1998	80,000	732.0	558.8
Thyssen	1995	126,987		84.3
Krupp	1995	66,740		74.3
France:	1998	38,000	N/A	531.6
Usinor-Sacilor	1995	58,335		265.7
UK:	1998	33,000	N/A	524.0
British Steel	1995	40,000		335.0
US:	1998	160,000	770.78	610.6
USX	1995	20,845		529.3
Bethlehem Steel	1995	19,500		486.1
LTV	1994	15,300		489.3
China:	1997	3,768,860	109.45	28.91
Baosteel	1997	34,688	259.53	529.0
Angang	1997	180,519	106.56	51.0
Shougang	1997	218,153	105.58	70.0**
Wugang	1997	119,518	125.33	51.0
Baotou	1997	94,494	99.90	58.0
Magang	1997	46,218	120.23	64.0
Pangang	1997	95,707	114.32	35.0
Bengang	1997	91,541	113.45	38.0

Notes:

*: For advanced countries, the wage rates were in 1995 data. For China, the wage rates were in 1996 data.

** : Shougang's internal document revealed that the labour productivity was 156 tons per man year (SG, 1998:7). This higher figure may EXCLUDE those workers not directly involved in steel production.

Sources: Compiled from ISIC, 1997:122-123; CMISI, 1998: 276-280 & IISI, 1999.

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Abbreviations on newspaper / magazine titles:

BR: *Beijing Review*

CDBW: *China Daily: Business Weekly*

FT: *Financial Times*

SCMP: *South China Morning Post*

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