Fifth International Conference on Management of Technology
February 27 - March 1, 1996
Miami, Florida, USA

China's Electronics Industry and the Globalised Technology Market

David Bennett[1], Kirit Vaidya[1], Zhao Hongyu[1],
Wang Xing Ming[2], and Hu Yuping [3]

[1] Aston Business School, Birmingham, UK
[2] Business School of the People's University of China, Beijing
3 China Society for Research on Economic System Reform, Beijing

Address all correspondence to:

David Bennett
Aston Business School
Aston University
Birmingham B4 7ET
United Kingdom

Tel: +44 21 359 3611
Fax +44 21 359 5271

Key words:

International technology transfer; China; Electronics industry; Industrial development

Fifth International Conference on Management of Technology
February 27 - March 1, 1996
Miami, Florida, USA

China's Electronics Industry and the Globalised Technology Market

by

David Bennett[1], Kirit Vaidya[1], Zhao Hongyu[1],
Wang Xing Ming[2], and Hu Yuping [3]

[1] Aston Business School, Birmingham, UK
[2] Business School of the People's University of China, Beijing
[3] China Society for Research on Economic System Reform, Beijing

Abstract
Technology is increasingly becoming a commodity that is bought and sold on world markets or transferred by a variety of other means. Of all the industries to be affected by this phenomenon, electronics production has probably undergone the most dramatic transformation and in just a few years the structure of the sector has been massively transformed. Manufacturing is now increasingly footloose and globalised, attracted by low labour costs or local investment incentives, and the associated movement of technology has been an inevitable consequence.

Nowhere has the transformation of the electronics industry been more remarkable than in China. Just ten years ago its electronic products lagged well behind world standards in terms of design, performance and quality, yet today China is on the verge of becoming a leading global player. This is not just due to its low production costs and ability to rapidly assimilate transferred technology, but is also the result of its own vast domestic market which offers the possibility of greater scale advantages than have been achieved elsewhere in the region.

This paper discusses the emergence of electronics manufacturing in China and examines the role played by technology in enabling it to be transformed into a major world producer. It is based on research conducted in China during the last six years and draws on cases to illustrate how government industrial policy, coupled with foreign investment and technology inputs, have shaped the development and structure of the industry.

The Globalised Electronics Industry

The world's electronics industry has undergone dramatic change in recent years. Faced with increased levels of competition all the major players have increased their functional integration, diversified into new product lines, and moved production to more favourable locations. In the main the global pattern of electronics manufacture has been determined by the evolving strategies of the major multinational electronics companies. For them the pressure to drive down costs has caused them to rationalise their operations and focus much of their production on developing and newly developed countries, principally in South East Asia and the Pacific Rim (Dicken, 1992).

For the purpose of analysing the pattern of electronics production and its relocation it is useful to categorise the industry's operations according to 'upstream' and 'downstream' activities (Bennett et al, 1992). In general, the pattern that has evolved has been of high volume, low variety, 'upstream' production of items such as semiconductors being relocated to areas of low labour cost. Initially the offshore production of these items moved to the 'first wave' countries such as Hong Kong, South Korea, Taiwan, Singapore and parts of Malaysia. However, more lately the simpler production of more established items has moved to the 'second wave' countries including Thailand, the Philippines, Indonesia and the Caribbean.

For the 'downstream' production of electronics items such as lower volume, higher variety, finished products, geographical location based on labour cost is less significant because the material cost element is normally higher and added value is less. So, many of the operations which, during the 1980s, were located in low labour cost 'host' countries are now locating closer to their markets. In many cases this has meant returning production to 'home' countries or moving to countries where there is the benefit of expanding local markets as well as lower production costs.

At the same time, a particular feature of electronics production in offshore companies has been the progressive moves that have been made backwards along the product life cycle into product and process development so that now most of the first wave countries, with the support of their governments, are spending considerable sums of money on R&D activities (Tilley et al, 1994).

China as an Emerging World Economy

It has been almost 20 years since China opened its doors to the outside world and, during this period, its industrial policies have undergone many changes. The main policy in the late 1970s was simply to encourage and regulate foreign investment activities in China. However, this broad policy did not prove particularly effective in attracting sufficient foreign funds so more recently the idea has been to target areas and sectors for development. For example, in the 1980s the focus was on attracting foreign investment to the coastal regions where a more favourable investment climate was provided. This policy has since changed and in the 1990s the emphasis has been placed on developing particular sectors. These include 'bottleneck' industries (such as energy, transport, and raw materials), fast-growth industries (such as automobile production), export-oriented industries (such as textiles and light industrial products) and capital-based and technology-intensive industries (such as machinery and electronics).

These priority sectors benefit from incentives, such as favourable terms on taxation and commercial loans, foreign currency reservation, quotas on imports and exports, and favourable prices for raw materials etc. Such incentives have in turn encouraged foreign investment and technology into these priority industries. (Sino-European Business Review, 1994 a and b).

Influenced by continuous improvements in the investment environment and expanding market opportunities, foreign investment in China has increased dramatically. Up to the end of 1992 the number of approved projects was 91,000 with a contract value of US$106.4 billion and an actual investment of US$34.2 billion. However, during 1993 alone the number of further approved contracts was 83,265 with a total contract value of US$110.9 billion and the actual foreign funds in place were US$25.8 billion (Zhu et al, 1995)

The Electronics Sector in China

The Chinese electronics industry has achieved significant gains from the economic reforms and the open door policy. There are now more than 10,000 electronics enterprises in China and the

development of the electronics industry has been especially rapid during recent years. During the last 15 years the industry has maintained an annual average rate of increase of over 20 percent. In 1994 the industry output was around US$ 23 billion, accounting for more than 5% of industrial output, and was expected to rise to US$ 70 billion by the year 2000. China already has the world's largest output of television sets and, with a growth in production of 36 percent in just six months during 1994, it looks very likely to soon overtake Japan as the leading manufacturer of consumer electronics. In 1993 exports of electronics products were US$ 8.11bn and in 1994 they reached US$ 11bn, accounting for 11% of China's total exports.

The electronics industry is regard by the Chinese government as one of the country's four 'pillar' industries, the other three being motor vehicles, machinery and construction. The policy of "developing vigorously the pillar industries" was approved by the 14th National Party Congress in 1992. Now the relevant state ministries and committees are formulating programmes for developing these pillar industries.

As well as providing incentives to encourage electronics production the state has also adopted policies for attracting foreign capital to invest in innovation in certain key sectors of the industry, these include integrated circuits , production processes for electronic devices and components and the development of electronics products for use in financial services. The form of encouragement offered by the state includes advantageous credit terms, finance and taxation benefits and favourable foreign currency exchange conditions.

As a result of these policies aimed at attracting foreign capital, foreign-funded enterprises have become a major force in the industry and there are now more than 5,000 foreign-funded firms in China manufacturing electronic products. The contracted investment value of these firms is US$ 3.5 billion and their export income is US$ 4.43 billion, which accounts for 54.6% of the total export value of electronics products.

Case Examples of Foreign Funded Electronics Enterprises from the Research

In conducting their research, the authors have studied a number of electronics enterprises in China. To illustrate the type of foreign funding that is coming into the industry four of these are described briefly. They all produce telecommunications and related equipment but vary widely in terms of ownership and type of partner.

1. The Beijing Wire Communications Plant (BWCP)

BWCP is a state owned enterprise. It produces large programme control exchanges for international telecommunications, cash machines, personal computers and telephones.

Foreign capital and technology has been acquired through the establishment of five separate joint ventures:

i) A Sino-Sweden JV (with Ericsson), The Beijing Ling Li Xin Telecommunications System Co., which produces small programme control exchanges (for users).

ii) A Sino-German JV (with Siemens), The International Exchange System Co., which produces large programme control exchanges.

iii) A Sino-Japanese JV (with National), The National Device Ltd., which produces relays.

iv) A Sino-Hong Kong JV (with Heng Xin), The Beijing Yan Xin Ltd., which produces programming control exchanges.

v) A Sino-America JV, The Beijing You Li Co. which produces personal computers.

2. Shanghai Bell Company
Shanghai Bell is a joint venture which was established by the Ministry of Post and Telecommunications of China with Bell Alcatel of Belgium and also the Belgium Cooperation Foundation. The Chinese partner China holds 60% of its Shares. The company produces programme control telephone changes. Production started in October 1985 with an annual capacity of 300,000 lines. This increased to 450,000 lines in 1990 and 600,000 in 1991. By the end of 1992 its products were being used in over 200 telephone bureaux in China.

3. Shanghai International Digital Telephone Equipment Co. Ltd. (SIDTEC)
SIDTEC is a joint venture in Shanghai which was set up in 1989. The shareholders are GPT (itself a joint venture between GEC of the United Kingdom and Siemens of Germany) with a 44% shareholding, and CITIC (The China International Trust and Investment Corporation) with 56%. The Chinese partner is a financial investor only whereas in the previous two examples both Chinese partners are involved in telecommunications. SIDTEC currently has 250 employees and the products manufactured are ISDX (Integrated Services Digital Exchange) private telecommunication switching systems. These systems are sold throughout China and customers include railways, mining companies, universities, car factories, government bodies, and hotels.

4. Motorola Co.
The Chairman of the Motorola Board, Robert Calvin, visited China in 1986 and the company subsequently conducted a 4 year study of the Chinese market. In 1992, the company established a wholly owned manufacturing facility and production commenced one year ago. Capital investment so far has been US$ 280 million and it is planned shortly to add a further US$ 300 million. The company intends to invest US$ 1.0 billion in total by the year of 2000. Motorola produces pagers, mobile telephones and integrated circuits in Tianjin, and electronics components in Hangzhou.

The Importance of the Domestic Market for Consumer Electronics
A particular characteristic of China's electronics industry which distinguishes it from the electronics industries in other newly developing countries is the vast domestic market which enables the industry to achieve economy of scale benefits and subsequent reductions in cost.

In the 1980's there was a shortage of electronics products in China so, to meet domestic demand, a large number of production facilities were introduced from advanced countries. At the same time the inward transfer of foreign investment together with product and process technology improved the specification and quality of electronics products, particularly those for home use. As a result, during the 1990's output has increased rapidly and now the demand for basic consumer electronics products, particularly colour TV sets, has essentially been satisfied. By the end of the 1980s there were 113 colour TV production lines installed in China and in 1994 the output of colour TV sets was 15 million (more than matching the domestic market demand of 14.4 million). According to the Information Centre of the Chinese Ministry of the Electronics Industry the predicted output of colour TVs for 1995 was 16.6 million compared with an expected demand of 16.4 million.

The consumer electronics industry in China is not without its problems, however. The first of these is duplication of production. There are many factories around the country which produce the same, out-of-date, products. The cause of this duplication was the decentralisation of the industry in the mid to late 1980s to overcome the previous problems arising from centralised control of electronics enterprises. Many of those which had been controlled by central government were put under local administration and new enterprises also emerged. The measures had some benefits

such as strengthening enterprises and making them more responsive but their financial and planning systems often remained weak and they had difficulty in transforming their old government functions. As a result, the managers of many of these decentralised enterprises took short sighted decisions. When a particular electronics product became popular in China almost every province invested in the facilities to produce it; the result being duplication and surpluses of capacity.

For instance, there are 51 colour TV factories in China but only five of them have an annual output of more than 1 million sets, which is considered to be the level required to enable manufacturing to be carried out efficiently. In fact fewer than ten produce more than 500,000 sets per year. Also the output of domestic audio-visual equipment uses only 60 per cent of total capacity, that of refrigerators uses only 36 per cent of capacity, and the output of washing machines uses only 50 per cent.

The second problem for the consumer electronics industry is the shortage of domestically produced components. The inefficient state-run firms cannot meet the demand for micro-electronic devices and semiconductors. As a result, there is a heavy reliance on imports of basic components and devices. For example, China's domestic market needs 700 million to 800 million integrated circuits annually, but in 1993 there was only the capacity to produced about 170 million.

To address some of the problems of the industry the Chinese government has taken a number of measures among which the most important are as follows:

1. In 1993 the electronics manufacturing industry in China was placed under a newly formed Ministry of the Electronics Industry whereas previously it was embraced by the Ministry of the Machinery Industry. Each province also now has an electronics industry bureau under the provincial government and the central Ministry. Although the Ministry and local bureaux no longer have a role in centrally planning and directly controlling production, they are responsible for establishing policies for their industries and providing guidance to enterprises .

2 . In 1994 the China Electronics Corporation (CEC) was formed as the largest company group in the electronic industry. The group is directed by China's State Council and has ministry-level status. The Group, with a capital of 7.8 billion Chinese yuan (around US$ 900 million) has 59 companies, including 28 domestic subsidiaries, 23 overseas-funded joint ventures and eight overseas operations in Hong Kong, the USA and Japan. The establishment of the CEC represents an attempt by the Chinese central authorities to regain control over the key enterprises in China's electronics industry. It will develop large scale production and boost the technological level of China's electronic industry

3. China is trying to create its own electronics 'titans'. The Ministry of the Electronics Industry has indicated that China would form several "electronics giants" in order to further stimulate the development of the industry. The Ministry has announced a strategy to help some Chinese enterprises grow into these electronics giants. In 1994 it gave special support to five large companies: The Shanghai Audio and Video Co, The Changhong (Rainbow) Electronics Co., The Legend Group, China Panda Electronics Group, and The Caihong Electronics Co. The Ministry is also due to select several more large companies in 1995. To enable them to grow rapidly the Chinese government intends to afford these companies the same preferential treatment as is given to overseas investors. This includes granting special loans to support the development of new technology and high-tech products. They will also be given priority in receiving government investment and favourable treatment on taxation and land use. Additionally they will be authorized

to raise capital through various channels, including stock issues. In this way the Ministry plans to improve the industry's competitiveness on the world market by nurturing them until they grow into large electronics groups .

4. The Chinese government is seeking to develop the domestic production of components, particularly semiconductors, of which it aims to attain an output of 1 billion units by the year 2000. To encourage this development there is an import tariff of 40% on components which are not intended for use in re-exported products and a number of the country's 350 semiconductor manufacturers are investing heavily in foreign technology. One of the case companies investigated by the authors is the Tianjin Zhong-Huan Semiconductor Corp., located in the new technology development area of Tianjin, China's third largest city. Owned by the municipal government it has invested almost US$ 14 million on three projects involving technology from Japan and the USA.

The Influence of Government Policy on Enterprises - The Case of TV Manufacture

It may be seen from the previous discussion that the Chinese government has recently started to use its influence to shape the electronics industry after several years in which a 'free for all' policy predominated. To illustrate the way in which the changes in approach have affected different enterprises three case companies from the authors' current research on industrial development and technology transfer under China's economic policy reforms have been selected (Bennett 1994). They are all TV manufacturers but with very varied fortunes.

1. Beijing Peony Electronics Group

Based around the Beijing TV Factory this group was formed through mergers with a screen factory and the Dong Fong TV Factory. Both the latter two factories were weak but the merger helped to improve their efficiency. The group's strategy is i) enlargement ii) quality improvement iii) export expansion. Its success partly results from a partnership with Panasonic (Matsushita) for technology transfer (product and process). Since the group was formed it has established a new communications equipment company to make pagers and operate networks. It has also formed a joint venture with a Korean company (Goldstar) to develop and manufacture a new range of lower cost televisions. The Beijing Peony Electronic Group has capacity to produce 1 million television sets per year and its current annual output is 800,000. Most are sold in China under the brand names 'Peony' and 'Mudan' and the group has almost 9% market share.

2. Changhong Electronics Co.

Unlike many of China's major electronics enterprises which are located in the coastal areas or provincial capitals, the Changhong Electronics Co. is located in the relatively minor city of Mianyang in the inland province of Sichuan. However, it is probably the most successful of China's electronics companies and has certainly emerged as the country's leading television manufacturer. The company, which is actually organised as a group, imported advanced technology from several Japanese companies and developed a competitively priced large-screen colour TV with a reputation for high quality. In 1994 the Changhong Electronics Co., which sells its products under the Changhong, or 'Rainbow', brand name produced 1.7 million sets and captured almost 20% of the Chinese market. In 1993 the total revenues of the company exceeded 2.8 billion Chinese yuan (around US$ 32 million) which put it in first place among China's electronics companies in terms of financial performance. With a capacity to produce 2 million TV sets per annum and the ability to further drive down prices it represents the biggest threat to the other major industry players. It has also been targeted for special government support, as was mentioned earlier.

3. The Chengdu TV and Electrical Equipment United Group Co.

The Chengdu TV and Electrical Equipment United Group Co. is located in Chengdu, the capital city of the province of Sichuan. It is one of four television factories in the province, their emergence being explained by the central government's decentralisation policy mentioned earlier. Originally the factory started assembling CKD kits from JVC in Japan then, during the 1980s rush to acquire technology from abroad, it imported products and processes from Sharp and Sanyo. The annual capacity of the Chengdu factory is 300,000 colour TVs and 600,000 black and white sets. There is still a market for black and white televisions in China's rural areas and as exports to developing countries. In contrast to the previous two companies, the Chengdu TV factory appears to be caught in a vicious circle of problems. Total output is only between 300,000 and 400,000 sets per year and these appear to be almost all black and white sets. Production of colour TVs seems to have more or less ceased, brought about by high production costs due to poor economies of scale and inferior quality compared with that offered by its competitors. The technology used is also not 'approved' which means that the company does not benefit from certain 'privileges' such as priority access to components. The Panasonic and Hitachi technology used by Beijing Peony and Changhong is approved and, additionally, has a better reputation among Chinese customers who are becoming increasingly sophisticated and discerning when making what, for them, is a major capital purchase. Chengdu TV and Electrical Equipment United Group Co's survival seems to be dependent on a high risk strategy based on an assumed future demand for black and white televisions.

Perceptions on Transferring Technology into China Among Foreign Companies in the Electronics Industry

To ascertain the perceptions of British and other foreign companies on the situation in China with regard to technology transfer a questionnaire survey has been carried out among manufacturing companies that are intending to transfer, or have transferred, their technologies to China. Altogether there were 207 respondents, among which 22 companies were in the electronics sector (Zhao et al, 1995).

The general findings from the survey indicate that the potential for technology transfer to China is well recognised but possible obstacles are also identified. However, the findings also reveal a wide variation of opinion between industries concerning the situation in China and the transfer of technology within each industry. The main results are as follows, looking in particular at the electronics sector:

<u>The Attractions of China for Transferring Technology</u>
The attractions of China were determined by asking participants to indicate their motivations for transferring technology there, among which exploitation of the Chinese market through technology transfer constituted a substantial proportion of responses. *'To gain a access to the Chinese market'* was identified by 87% of companies in the electronics industry and 57% of electronics companies indicated that transferring technology to China was *'part of a global strategy'*.

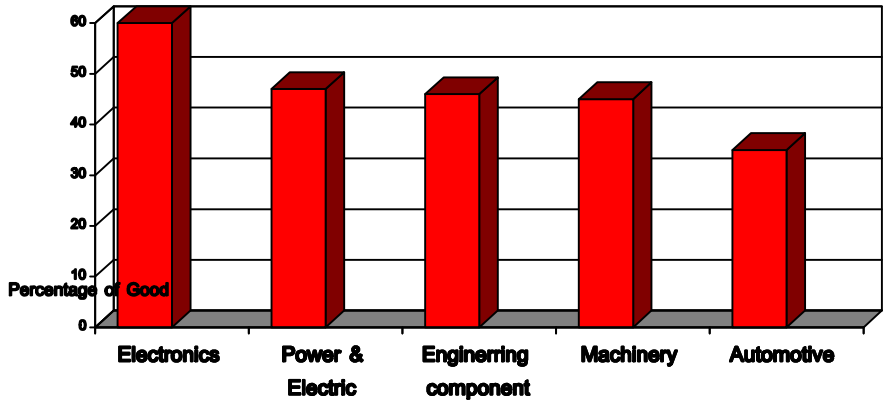
Among the reasons for transferring technology to China, *'existing markets are saturated'* and *'profits are falling'* were identified by 22 % and 13 % respectively in the electronics sector which was lower than the average percentage for all industries (30% and 20%). Rather, *'to exploit the benefit of linking with foreign partners'* was cited by 30% of companies in the electronics sector which was 10% higher than the overall average response to this reason. Also, about 70% of companies in the sector indicated they would transfer (or had transferred) *'established technology'* to China, although only one electronics company (less than five percent) said the perceived benefit

of doing so was *'to use standard technology in a less costly way'* compared with the overall average response of 10%.

From these results it can be argued that foreign investment related production in China's electronics industry is influenced less by foreign companies' falling profits or saturated conditions in existing markets. Instead, it is influenced more by the opportunity of gaining access to the Chinese market and benefiting from collaboration with Chinese partners by exploiting local advantages. For example, *'to gain access to a cheaper labour force'* was cited by 30% of respondents in the electronics sector, whereas in the automotive, aerospace, and power and electrical sectors this factor was only cited by 12%, 17% and 18% of companies respectively.

China's Economic Policy

Figure 1. Perceptions on infrastrucutre between industries



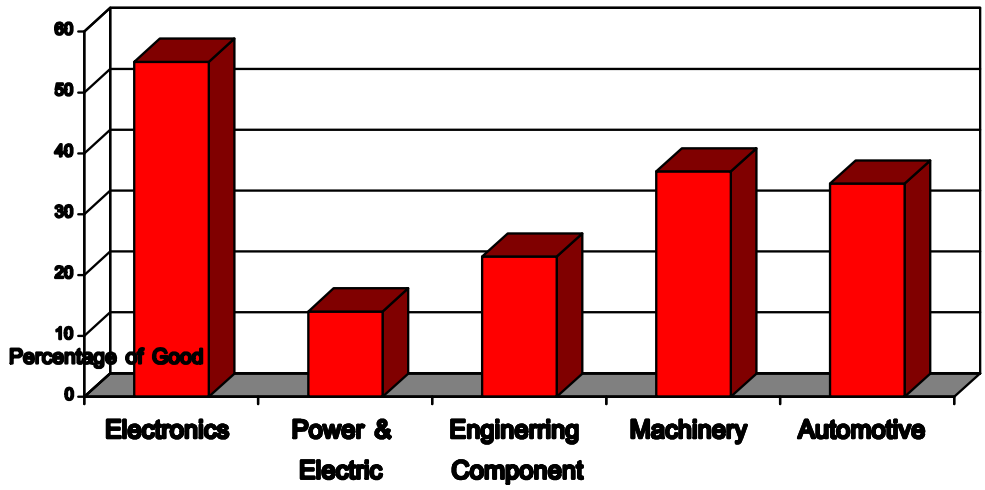
Among all the industries surveyed the largest proportion of firms (48%) thought China's economic policy to be *'moderately favourable'* among five categories of response. However, respondents in the electronics sector had a more favourable assessment of China's economic policies with every one regarding them as *'favourable'*. It is interesting to note, however, that only around 10% of firms in the electronics sector identified *'China's policies for foreign investment'* as an attraction for making a technology investment in China. This would seem to suggest that foreign electronics companies are being attracted to China more because of its thriving economy and buoyant domestic market than its attractiveness as an offshore manufacturing platform.

Factors Influencing the Capacity to Absorb Transferred Technology

It was mentioned earlier that the Chinese Government is now switching its priorities to certain industries rather than targeting geographical regions. This means that some industries now enjoy better infrastructure support, higher quality of equipment etc. Electronics is one of the sectors where preferential policies are being applied and, compared with the other sectors surveyed, respondents

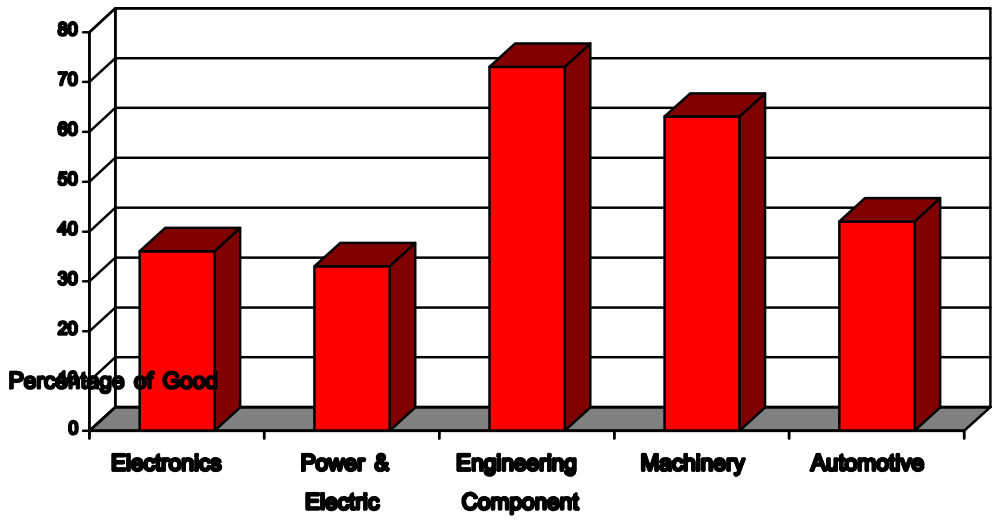
thought it had a superior infrastructure (See Figure 1) and a better quality of equipment (See Figure 2).

Figure 2. Perceptions on quality of equipment between industries



The level of technological development in the electronics sector was assessed to be *'high'* or *'moderately high'* by 64% of responding companies, being higher even than some traditional sectors such as machinery (58%) and engineering component manufacturing (55%) which have a longer history of the government support for technological development in those industries. One of the reasons for this relatively favourable impression of such a young industry is probably that many imported foreign technologies in the electronics sector are of the labour-intensive type, involving assembly of products with imported components. This type of technology has probably been more effectively absorbed by Chinese enterprises than knowledge-intensive technologies, which may result in the better perception by foreign companies in the electronics industry. Indeed, the survey indicated that the "skills of the labour force" in the electronics sector were perceived as superior to those in other industries, with 90% of responding companies considering them to be *'high'* or *'moderately high'* among five response categories. This compares very well with some other industries, such as engineering components manufacturing and civil engineering, which were considered to have much lower skills (considered, respectively, by only 38% and 33% of respondents to be high or moderately high).

Figure 3. Perceptions on Managerial Know-how between Industries



When considering the level of "managerial know how" it is interesting to note that the situation is reversed compared with that for the skills of the labour force. In the electronics sector managerial know how was considered by respondents to be less well developed compared with more traditional industrial sectors (See Figure 3). This is probably where being a relatively newer industry carries a disadvantage. By comparison the more mature traditional sectors, with the exception of power and electrical equipment, were considered to have better managerial know-how at the enterprise level.

Conclusions

On the evidence presented, the electronics industry in China seems set to become one of the world's most important markets for technology. Unlike most other developed and newly developing countries, however, China has an enormous and growing domestic market for electronics products which enables economies of scale to be achieved which would otherwise require large export sales. It is, therefore, not unreasonable to believe that indigenous Chinese enterprises will play as important a part in the future as the multinational corporations have in other parts of the world.

Longitudinal case studies of enterprises such as the Beijing Peony Electronics Group and Changhong Electronics Co. have revealed the extent to which imported technology has been assimilated, refined and redesigned, leading to the capability being developed for designing new products and processes. Elsewhere, there are enterprises such as the Chengdu TV and Electrical Equipment United Group Co. which have been less successful with using similar technology and are losing the competitive race.

The findings from the enterprise case studies have been supplemented by a questionnaire survey of foreign technology supplier perceptions. The results of the survey show that management at the enterprise level can be a crucial issue in electronics manufacturing in China. It may prove to be the main obstruction to effectively absorbing transferred technology and in such cases helping Chinese enterprises to acquire training in management and the transfer of knowledge will be just as important as transferring technology hardware.

Technology transfer is becoming an important channel for gaining access to the Chinese market. The potential of China is well recognised and for low added value, downstream, operations market pull appears to be a main driver rather than technology push. On the other hand, China's economic policies and lower labour costs have been successful in directing foreign investment into higher added value, upstream, operations. However, this pattern may change as the Government's policy priorities are realigned and the economy develops

Acknowledgements
The authors wish to acknowledge the help and access provided by the many Chinese companies, government bodies and agencies that have been involved in the research. Particular thanks are also due to the British Council for providing funding under its Academic Links with China Scheme and the China-Britain Trade Group for its co-operation with the questionnaire survey.

References

Bennett D, Forrester, P and Hassard J (1992) Market-driven Strategies and the Design of Flexible Production Systems: Evidence from the Electronics Industry, International Journal of Operations and Production Management, Vol 12, No 2, pp 25-37

Bennett D J, Vaidya K G , Zhu F D and Wang X M (1994) Strategies for Industrial Development and Management of Technology under China's Economic Policy Reforms, in "Operations Strategy & Performance" Proceedings of European Operations Management Association First International Conference, University of Cambridge/European Operations Management Association

Dicken P (1992) Global Shift: The Internationalization of Global Activity (2nd Ed), London, Paul Chapman Publishing.

Sino-European Business Review (1994a), No.2, Hinckley: Sino-European Business Ltd

Sino-European Business Review (1994b), No.6, London: Sino-European Business Ltd

Tilley K J, Williams D J and Conway P P (1994) Offshore Development of Electronic Products, Engineering Management Journal, August 1994, pp 185 - 192 (Institution of Electrical Engineers).

Zhu F D, Wang X M, Bennett D and Vaidya K (1995) Technology Transfer Under China's Economic Reforms: Business Environment and Success Factors, Technology Management, Vol 2, No 1.

Zhao H Y, Bennett D J Vaidya K G and Wang X M (1995) Transferring Technology into China: Perceptions of Foreign Companies, in "Technological Innovation and Global Challenges", proceedings of the IAMOT European Conference on Management of Technology, Birmingham, UK., July