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Global Production Networks and Industrial Upgrading in China: The Case of Electronics Contract Manufacturing

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Global Production Networks and Industrial Upgrading in China: The Case of Electronics Contract Manufacturing

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The role of global production networks in the IT-industry for China’s economic and social development cannot be assessed without an analysis of the profound changes in the productive structure of this industry in the global arena. Since the late 1980s, the IT-industry has experienced a rapid transition from traditional forms of Fordist mass-production, dominated by large vertically integrated corporations towards *vertical specialization* in product development, markets and manufacturing (Lüthje 2001). At the same time, the patterns of internationalization have changed profoundly – integrated transnational production as practiced by traditional multinationals has given way to network-based forms of organization described as *global flagship networks* (Ernst 2002). Manufacturing has not vanished from the scene. Its shape however has changed radically. An increasing amount of the assembly of electronics goods is shifted to large-scale integrated contract assembly firms that offer global one-stopping for brand-name customers. “Electronics Contract Manufacturing” or “Electronics Manufacturing Services” (EMS) has emerged as a centerpiece of globalized production networks in the electronics industry, for which China’s Pearl River Delta has become the largest location in the world.

Our paper will present findings from long-term international comparative research on the contract manufacturing industry in low-cost locations in Asia and Eastern Europe. With the dual focus on network structure and work-organization we propose an integrated perspective on the political economy of industrial restructuring and work, based on the assumption that the re-organization of work at the shop floor and company level is a central, but often neglected feature of industrial upgrading. The paper will start from a summary of key trends in the development of global manufacturing networks in the electronics industry, followed by an overview of contract manufacturing networks in China. In a third step, we outline the impact of contract manufacturing on the organization of work. From this perspective, we will, finally discuss some policy implications, relating the question of industrial upgrading to the reorganization of work and workforce development.

1.)The changing shape of production networks in global electronics

Since the 1980s, the information technology industry has undergone massive restructuring, which is at the heart of the accelerated shift of electronics manufacturing to low-cost countries, China in particular. The industry was re-shaped by a new brand of companies specializing in hard- and software-products for the PC-industry, computer servers, Internet equipment and all kinds of mobile computing devices like laptops or handheld digital assistants. This type of computer companies was initially created during the 1970s in Silicon Valley in California - especially among the newly emerging chip companies like Intel, National Semiconductor or AMD, or later in the PC industry led by Apple and later Microsoft and Compaq. Other than the first generation of computer companies like IBM or Digital Equipment in the U.S., Fujitsu in Japan, or Siemens in Germany, many Silicon Valley companies did not produce entire computer systems but only some key components like a microprocessor or a software operating system (Lüthje 2001: 165 ff.).

In the course of the “PC-revolution” beginning in the second half of the 1980s, some of these companies like Intel, Microsoft, Sun or Cisco acquired global dominance. This also engendered a massive shift in industry structure, accompanied by the crisis of many older computer companies (most visibly IBM and Digital Equipment) around 1990. Most of the traditional computer companies designed and produced the key components of computer systems under their own roof, including computer chips, operating software, and the hardware (“vertical integration”). With the emergence of specialized technology companies like Intel or Microsoft, the production system of the computer and later the telecommunications industry became more and more “modular”: computers, servers, Internet-routers etc. are assembled from standard components like chips, operating software, disk-drives, modems or displays which can be bought on the open market and assembled and configured in various ways for products of different competitors. This vertically disintegrated production system has been characterized as the “Silicon Valley system” or the “horizontal computer industry” (Grove 1996). Referring to the brand-names of Microsoft and Intel, some economists also use the term “Wintelism” (Borrus/Zysman 1997).

The growth of the new industry model has engendered a proliferation of subcontracting networks in manufacturing. Traditionally, subcontractors were relatively small firms in high-tech centers like Silicon Valley that performed assembly of printed circuit boards and standard electronic components like resistors, coils or cables. During the 1990s a new type of subassembly firms emerged, called contract manufacturers (CM). These companies, which tend to be very large and global in scope, provide integrated manufacturing services for brand-name companies. In contrast to traditional sub-assemblers, CM-companies provide all elements of manufacturing including product engineering, highly automated assembly of printed circuit boards, final assembly and configuration of computers and other IT-devices (called box-build), as well as components purchasing, distribution logistics, and repair services (Sturgeon 1997, Lüthje e.a. 2002).

Contract manufacturers have become important players in the production chain, currently accounting for about 15-20% of global value added in IT-manufacturing. As listed in our chart, these companies have multi-billion dollar revenues. Their toughest competitors are found among another brand of subcontractors, most of them based in Taiwan, who assemble products for brand-name companies, but still own the product design (these companies for example manufacture most of the world's notebook-computers sold under brand-names like Dell, or Compaq/Hewlett-Packard, the acronym for this type of production is ODM – Original Design Manufacturing). The small-scale subcontractor, however, has not disappeared. Most companies of this kind today are concentrated in low-wage manufacturing areas where they work as suppliers of cheap standard components assembled at low wages for CM and brand-name companies.

Table 1: Global Top-Ten in Electronics Contract Manufacturing, 2001

Company	Revenues in Mio. \$
1. Solectron	\$16,149
2. Flextronics Int.'l	\$12,923
3. Sanmina SCI	\$10,830
4. Celestica	\$10,004
5. Jabil Circuit	\$4,086
6. Hon Hai Precision (Foxconn)	\$3,562
7. Elcoteq Network	\$1,667
8. Synnex	\$1,620
9. Manufacturers' Services	\$1,522
10. Benchmark Electronics	\$1,277

Source: isuppli

Through their continuing acquisitions CM-companies act as transnational “network builders”, assembling a variety of plants with different manufacturing practices in specific national markets and regions. In 1996, the then leading contract manufacturer, Solectron, had about 10 locations world-wide; by the year 2000 there were almost 50. CM-companies strive to build a presence in every region in the triad of the capitalist world-economy, combining operations in the lead economies with mass manufacturing in developing countries of the respective regions. For North America, Mexico has emerged as the prime low-cost location, for Asia Malaysia and China (the latter already hosting the largest number of CM-plants around the world), and for Europe Hungary, Poland, the Czech Republic, and Romania (Lüthje and Sproll 2003).

As in other segments of the IT industry, globalized just-in-time production is transforming older international divisions of labor based on the transfer of manual assembly processes with simple technologies to the “Third World”. In contract manufacturing, technologies and processes in developed and in developing countries

are rather similar. “Full-package production” in low-cost locations is supported by the global standardization of work procedures pursued by major CM firms. The recent recession in the IT industry has propelled an accelerating process of relocation of higher-end elements of the CM value chain to low-cost locations, driven by cost-efficiency demands on the part of brand-name firms.

Within this geographic division of labor we see highly complicated chains of production emerging for individual products. The case of mobile phone production for a major European brand name firm is illustrative. The company has shifted the entire manufacturing of this product to a major CM. The CM is managing the basic manufacturing, product fulfillment (final assembly, software application, and testing), and the logistics for the European market. To this end, the CM is operating a huge fulfillment center in Hungary with a capacity of seven million handsets per year. This center is receiving the manufactured handsets without software (“dummies”) from a factory of the CM in South China. The Chinese operation is handling the assembly of the printed circuit boards and of the handsets, including supporting functions like the manufacturing of plastic enclosures. The highly complex printed circuit boards are sourced from the CM’s manufacturing facility in China, with some engineering support coming from the CM’s operation in Germany. The dummy-handsets are shipped to the Hungarian fulfillment center by aircraft, where the operating software is applied according to the orders from telecom operators or retail chains. Here, each handset has to be equipped with software in the language for the country of destination and the specific requirements of each operator and retailer. After being packed in boxes, the handsets are finally delivered just-in-time to 15 different European countries (*ibid.*).

Within the networks of the global EMS-industry, Asia has clearly emerged as the central region for advanced manufacturing (UNCTAD 2002). The production systems of major CM in Asia are massive and complex, with large clusters located in Malaysia, Thailand, and China, and regional headquarters and some smaller specialized plants in Singapore, Hong Kong, Taiwan, and Japan. The shift to China is following the rush of major brand name IT-multinationals, which has been propelled by the global recession in the IT-industry following the bursting of the New Economy bubble of the 1990s. Since China has emerged as the fastest growing and often the world’s largest market for advanced computer, telecommunications and consumer electronics products and network infrastructure, it is offering the economic potentials for growth and continuing rapid innovation in the IT-industry which are lacking in the developed capitalist world. At the same time, the country is becoming increasingly important for technology development, such as in the field of new standards for mobile communications. In addition to all this, the very low level of wages and salaries, based on a seemingly incessant supply of migrant labor from rural provinces remains a major pull-factor for manufacturing in China (Lüthje 2003).

The example of Flextronics, the largest contract manufacturer in the world, shows the complexity of contract manufacturing networks in Asia (see Table 2). The company has its operational headquarters for Asia in Singapore (also nominally the world-headquarters) and maintains a total of 25 locations throughout Asia. The Asian

facilities employ 50.000 workers, more than one half of Flextronics' global headcount of 95.000, and have 14 million sqft. of manufacturing space, more than three quarters of the company's total of 17,9 million (company information as of July 2003). The two main manufacturing bases are located around Singapore in southern Malaysia and in the Pearl River Delta (PRD) in South China, complemented by further factories in other high-tech locations in China (Shanghai, Nanjing, Beijing) and Malaysia (Kuala Lumpur, Penang). In addition, there is a number of facilities for the production of important supplies like plastic parts, metal enclosures, and some design centers. Strategic manufacturing capabilities are concentrated in certain plants which also function as know-how centers for other plants in the particular product category. Southern Malaysia, for instance, has a special focus on consumer printer products, the PRD-facilities on consumer electronics and mobile communications, Shanghai on telecommunications infrastructure. Flextronics' major U.S.-based competitors, Solectron, Sanmina-SCI, Celestica and Jabil, have production networks with a similar geographical division of labor, although smaller in size. European and Taiwanese contract manufacturers follow different integration strategies. Elcoteq from Finland, the smallest of the global CM, maintains a production network which is exclusively centered on China with three plants in Beijing, Dongguan and Shenzhen. Taiwanese contract manufacturers have their own world-order: their headquarters and major design and development operations are in Taiwan, new product introduction operations are in U.S. high-tech regions like Silicon Valley, volume manufacturing is concentrated in China.

2. Networks of mass-production in South China

As the example of Flextronics shows, contract manufacturers follow a distinctive strategy of *vertical integration*, combining the various stages of the production chain for IT-hardware systems within a global organization. In Asia and other low-cost locations this is basically achieved in two ways: either through the construction of very large plants, sometimes called industrial parks, which combine a broad spectrum of manufacturing resources under one roof, or through integration of various mid-sized plants in one region. The Flextronics industrial park in Doumen, South China, is a well-advertised example for the first strategy: it encompasses two major facilities for assembly of printed circuit boards, a fabrication cluster for raw printed circuit boards featuring highly advanced manufacturing technology, a large plant for plastic enclosures, another one for metal enclosures, and fulfillment and distribution capabilities. The park had a workforce of more than 12.000 in 2003, major products are mobile phones, game consoles and ink-jet printers (Flextronics 2003). One CM from Taiwan is practicing the philosophy of vertical integration in one place in an even more pronounced way. It maintains a huge manufacturing facility with about 60.000 workers in Shenzhen, probably the largest electronics plant in the world, encompassing about 15 manufacturing buildings dedicated to top international OEM in the computer and

communications field and design and manufacturing facilities for components unequalled in size (interview data).

Flextronics provides also a good example for the second strategy. Its smaller facilities in Guangdong form another production cluster of considerable size, including a regional manufacturing center for mid-volume consumer products (2.300 employees), two further plastics production plants with a joint workforce of 1.500, a smaller specialized enclosures facility in Shenzhen (300 employees) and an engineering center in Guangzhou (Flextronics 2003). In the course of the year 2003, this network has been expanded by the acquisition of a number of plastics and enclosures facilities from NatSteel Broadway, formerly a leading CM from Singapore, of which two large plastics plants of 2.300 and 2.900 workers respectively are located in the PRD area. Elcoteq with two complimentary facilities for high-volume and low-volume products and Sanmina-SCI with a PCB-assembly and an enclosures plant on one single campus are following similar integration strategies, Celestica in Dongguan and Jabil in Guangzhou have stand-alone plants in the area which are integrated into the larger manufacturing networks of the respective companies in China and Asia. Many of these mid-sized factories have been acquired from Hong Kong- or Taiwan-based entrepreneurs in the early 1990s, or from major multinationals, as in the case of the two Elcoteq facilities which were bought from Nokia and from a joint venture of IBM and a local company. For many of these plants, the acquisition by a contract manufacturer entailed significant upgrading of product portfolios and manufacturing technologies. As a result of this rapid build-up, which mainly occurred in the very recent years since about 1998, Guangdong has become host to the largest contract manufacturing complex in the world. All in all, about 15 facilities of the major CM from the U.S., Europe and Taiwan could be counted on the mainland side of the PRD-area by mid-2003, of which the industrial parks combine several plants in one location. Based on interview data and company information, the overall employment of these facilities can be estimated at a minimum of 85.000.

These networks of mass production emerge in an environment of a diversified export-oriented economy, which has made the PRD the fastest growing industrial region in China and one of the largest in the world. The rapid growth of advanced manufacturing in electronics is specifically driven by those factors that are commonly seen as the major locational advantages of the region (Cheng 1998 and 2000, Lin 1998). Most important is the availability of a highly developed logistics infrastructure, based on some of Asia's largest and most advanced seaport and airport facilities in Hong Kong and the rapid development of container ports and airports around the PRD. Economic development is heavily pushed by local governments, which enjoy a considerable degree of autonomy from central authorities. There is massive competition between major PRD-cities for foreign investors. At the same time, Guangdong province is in a similar race with other emerging industrial regions in China, Shanghai and its hinterland in particular. Local governments are supporting foreign investment through the development of industrial land, which often includes construction and leasing of manufacturing facilities, favorable tax conditions, flexible handling of government

regulations (including labor laws), and large-scale development of industrial zones like the Guangzhou Economic Trade and Development District or the future mega-project of Nansha Island in the Pearl River. In some cases local government have ownership stakes in Hong Kong- or Taiwanese-owned companies that have been acquired by CM. The intra-regional division of labor in electronics manufacturing is shifting rapidly. As is well known, Hong Kong has lost most of its light manufacturing industries developed in the 1960s and 1970 in the wake of the massive investments of Hong Kong- and Taiwan-based companies in Guangdong during the 1990s (Hsing 1998). In electronics contract manufacturing, Hong Kong has also lost its function as an operational hub for global CM-companies. Most manufacturing including the higher-end functions such as engineering and related product design have been moving to the mainland. Most CM started their presence in a region with a smaller manufacturing outlet in Hong Kong in the mid-1990s and then gradually re-located to the mainland. Today, most production and also manufacturing-related design and engineering work is happening in mainland facilities. Apart from corporate offices, some CM maintain warehouses in Hong Kong, also in conjunction with some final assembly, mostly for easing customs restrictions about manufacturing licenses for specific products. The highly advanced manufacturing infrastructure on the mainland today is accompanied by a growing presence of major international vendors and service firms for electronics manufacturing equipment (SCMP, March 11, 2003).

As can also be observed in other low-cost regions (Lüthje/Sproll 2003), the current process of vertical re-integration of manufacturing resources in newly industrializing countries engenders a gradual but accelerating shift of higher-end segments of the value chain to the respective locations. In China, most CM plants were started under overseas Chinese ownership in the early 1990s as assembly sites for low-end products, mostly computer peripherals like mice or keyboards. Today, there are still large volumes of such low-end mass products in most CM plants – however there is definitely an upgrading in the product portfolio, which is increasingly centered on mass-products of higher complexity with very strict quality requirements in the assembly process, like cellphones. At the same time, there is a trend of locating more products with lower volumes and a higher variety in product specifications like telecom network equipment or higher-end medical products in Chinese plants. Also, an increasing number of product introduction processes is located in PRD-factories, often upon request of major brand-name customers. This upgrading trend is also supported by the accelerated adaptation of design capabilities into the service portfolio of major CM, following the ODM-model of Taiwanese competitors. A very important element in this picture is also the growing significance of the emerging Chinese electronics multinationals in the region as brand-name customers of contract manufacturers. Companies like Huawei, ZTE, or TCL all have substantial business with foreign CM-firms, thereby producing important local upstream-linkages in the manufacturing chain. Recent press reports indicate that TCL is planning to use Flextronics manufacturing facilities in Hungary in its bid to become a major player on the market for advanced television sets in Europe (NYT March 5, 2004).

Table 2:

Flextronics Manufacturing Network Asia (2003)

Country	Location	Type of Facility
Japan	Tokyo	Sales Office
	Nagoya	Assembly
China	Beijing	Assembly
	Qingdao	Enclosures
	Changzhou	Enclosures
	Nanjing	Assembly
	Shanghai	Assembly Plastics
		Industrial Park planned
	Dongguan	Plastics Enclosures Ass.
	Gongming (Shenzhen)	Plastics
	Xixiang (Shenzhen)	Assembly Plastics
	Shenzhen	Enclosures
	Guanlan/Shajing	Plastics
	Doumen (Zhuhai)	Industrial Park
	Guangzhou	R&D
	Hong Kong	Asia HQ
	Plastics HQ North Asia	
India	Bangalore	Assembly
Thailand	Samutprakara	Enclosures
Malaysia	Penang	Assembly
	Shah Alam	Assembly
	Melaka	Assembly
	Senai	Assembly Plastics
	Tampoi	Assembly Plastics
Singapore	Woodland	Plastics
	Changi	HQ, R&D

Assembly: PCB- and systems assembly; enclosures: metal enclosures;
 plastics: injection molding for plastic enclosures and parts Source:
 Company Information

The rapid upgrading, however, is also producing new cleavages in the regional industrial structure. As major CM generally internalize a broad spectrum of production resources, there is relatively little room for development of skilled local suppliers, based on trust and long-term cooperation. CM-companies source strategic electronic parts like microchips, disk drives or LCD displays in large volumes from major international manufacturers. On the other hand, they tend to limit their local supply purchase to non-electronic parts and products like sheet metals, cables, plastic enclosures, or packaging materials etc. and to simple electrical or electronic components (called passives) such as resistors, coils, microphones etc., which entail labor intensive assembly processes mostly performed by small companies. Although figures are difficult to track, South China is said to have the world's largest concentration of such assembly firms, mostly from overseas Chinese investment in the

early 1990s. Among electronics multinationals and industry experts, there is an ongoing discussion about the quality of those suppliers (EN October 21, 2002). Some major CM in our sample advertise the presence of these companies as a huge cost advantage and a major attraction of the area, and purchase a broad spectrum of low- and high-end electronic and non-electronic components from a number of preferred companies. Others are more cautious and limit their purchasing to non-electronic components only. In any case, the integration of smaller component suppliers into the production systems of major CM remains highly selective, only a small number of suppliers can meet the often extensive requirements on their organizational and capital resources.

3.) New Economy-Taylorism: work organization and labor control

Contract manufacturing is producing a special pattern of flexibilized manufacturing work with some common characteristics across the industry and its different locations (Lüthje e.a. 2002). Basic processes – automated and manual assembly of printed circuit boards and final hardware products (known as *box-build*), the manufacturing of raw printed circuit boards, the manufacturing of sheet-metals and plastics for enclosures, cable assembly, and warehousing and logistics functions - are standard and well-known throughout the electronics industry. The CM workplace is not very different from brand-name electronics plants, the predominance of state-of-the art manufacturing environments in mid-sized to large plants sets working conditions apart from traditional subassembly shops. Work design in CM plants is entirely related to the goal of securing product and service quality for the brand-name customer, fast and flexible response to changing customer requirements, and transparency of work processes to ensure quality control for the customer. CM companies pursue strict standardization of the labor process to ensure uniformity of work procedures on a global scale. Company-wide “common processes” are developed as a distinguishing feature of the CM-model, designed to offer a uniform interface for brand-name customers seeking global “one-stop-shopping” for manufacturing services.

Chinese contract manufacturing plants in many ways fit this global model. Factory environments are highly modern - a marked difference to the conditions in labor-intensive assembly shops usually associated with Chinese export manufacturing. The production equipment is state-of-the art and purchased from top international vendors, in line with the global standards of individual CM-companies. The high degree of vertical integration is reflected in a broad variety of labor processes inside most plants. CM-facilities in the PRD have the employment profile of typical manufacturing plants. In most factories in our sample 70-80 percent of the workforce were classified as “direct labor”, i.e. assembly, machine, warehouse and other categories of workers. Line workers are usually recruited through government or private labor agencies from distant provinces in inner China. Many city or provincial governments in rural areas maintain contracts or informal relationships with city governments in the PRD, providing for relatively regularized conditions in the recruitment process (for an analysis of this system: Hsing 1998: 84 f.).

“Indirect labor” includes engineering and administrative personnel and foremen, supervisors, and technicians. The number of engineering workers is growing, most of them in manufacturing engineering, PCB-design and metal and plastics engineering. The larger plants employ several hundred engineers, mostly Chinese, and many of them recruited from major mainland engineering schools. Only the top ranks of the engineering workforce are foreign or overseas Chinese, there is also a substantial proportion of engineers from other Asian low-cost countries, particularly from India and the Philippines. Skilled workers and engineers are also mostly hired from other provinces, however, not through mass recruitment schemes as for manufacturing workers but on a more individual base, often through colleges or career fairs in the respective areas. All companies in our sample reported an increasing bottleneck of skilled personnel in the face of the massive move of new plants into the area. However, only in some exceptional cases could we find that companies have recruited skilled workers and technicians (including some women) from the ranks of experienced line-workers.

The overwhelming majority of employees of CM plants – line workers and staff - are housed in dormitories on factory premises. The factory dormitories are the hallmark of an industrial labor market almost entirely based on immigrant workers, which can only be characterized as gigantic. Exact figures are difficult to track. The Statistical Yearbook of Guangdong Province reports 5,322 million “laborers from other provinces” for the seven major industrial cities in the PRD area in 2001 (Guangdong 2002). Most experts see official figures grossly underestimating the size of the industrial and immigrant workforce in the region. In general, the rate of labor turnover in PRD contract manufacturing plants is high. In our interviews, a monthly turnover of the plant labor force of 2% or around 25% annually was characterized as low by management, other factories reported an annual turnover of 30-40% annually.

The wage situation is generally characterized by the very low level of remuneration that makes China so attractive for assembly industries of all kinds. Monthly wages for operators in CM-plants in the PRD hover around a margin of 500-800 RMB (roughly 60-100 US-\$), including overtime. For technicians, clerical and engineering workers monthly pay is considerably higher, but still very low by international standards. In our interviews, the starting salary for an engineer recruited from a mainland China campus was numbered at 2000 RMB (about 250 US-\$) per month, although with the prospect of rapid substantial pay raises with work experience. Managers of CM-companies with factories in other industrial centers of China generally rate the cost level in the PRD area significantly lower, compared to Beijing, for instance, about 50%.

All groups of employees work overtime almost on a regular base, facilitated by the fact that workers live on site in the dormitory and have no family life and little other attractions. Most plants operate on two or three shifts per day on five to seven days per week. In CM plants, working hours vary greatly due to customer requirements and seasonal demands. All plants in our sample had wage systems for operators based on straight hourly pay. Piece wage or incentive systems related to production quota could not be found. In contrast to many U.S. and European plants, CM in South China do not

pay bonuses for quality and productivity to particular groups of line workers or departments. Even under the conditions of high labor turnover, companies rarely provide pay incentives designed to stabilize the operator workforce. An important element of the wage relation in CM-factories in the PRD is embodied in the workplace-based housing system. Therefore, the quality of the accommodation and the food is an essential part of the reproduction of workers' lives and a crucial factor determining the quality of the workplace, often more important than the work situation itself.

The skill level of migrant workers is generally rated as very low. However, as a number of studies of migrant workers has shown, their education generally is higher than the term "floating population" might suggest: around two thirds of the migrant workers population in coastal provinces are estimated to have completed junior or senior high-school education (Hsing 1998: 36 f.). Most contract manufacturers in our sample had a junior high-school degree as a minimum requirement for hiring. The training systems in CM-plants in South China are organized along the globally uniform standards all companies have in this field. Most of the training is done "on the job". U.S. contract manufacturers usually provide an orientation training of 2-3 days for new employees, providing basic information about the workplace and familiarization with company values. For some more special jobs, new operators can get up to 8 weeks of training before work. Taiwanese companies tend to give a longer orientation training of sometimes two weeks, incorporating some basic work skills and massive education on company philosophy and workplace behavior.

Before this background, the hallmark of the production system in CM-plants in the PRD-area is the dominance of Taylorist work organization along the assembly lines. In most plants and manufacturing areas, work is very segmented, in PCB-assembly and in box-build a strict line organization is dominating. There is almost no group- or cell-based work organization, even where the nature of the products would permit it. Assembly lines are particularly seen as appropriate for high-volume mass products like mobile phones. In typical assembly line jobs, the individual operators usually do not perform more than one or two tasks. Some plants have experimented with sophisticated systems of work measurement like MTM. However, simple forms of direct, personalized control based on segmentation of tasks and responsibilities is preferred. Production floors in SMT- and box-build normally have one key-operator per production line, who takes care of running issues, and a number of shift leaders and production managers for the area or the department. Also, there is very little rotation of jobs or tasks. On the whole, the picture is dominated by a massive segmentation of work and a strong *polarization* of the workforce, as typical of Taylorist workplace regimes of earlier periods in industrialized countries. This picture is not altered by the fact, that most CM-plants in the region have installed Western style quality management systems at the shop-floor.

As in other areas of the world, work organization and industrial relations in transnational companies do not develop in a vacuum. In China, these conditions are basically shaped by the country's rapid transition to a "socialist market economy", in which Foreign Invested Enterprises play a pioneering role, by the reform of labor laws

and the trade union system, by migration policies of national and local governments and – most importantly – by the “commercial clientelism” (Lee 2002: 200) governing relationships between the state and foreign investors based on the relative fiscal and political autonomy of local government (Hsing 1998: 110 ff.). CM-plant managers characterize the weak enforcement of labor laws in Guangdong cities as standard practice, citing the local governments’ preoccupation with keeping labor cost down. Although the law stipulates a comprehensive presence of ACFTU trade unions in Foreign Invested Enterprises, such unions seem to be almost nonexistent in contract manufacturing plants in the PRD-area. Most factories in our sample reported not to have a union or a collective contract. Although in recent literature Guangdong sometimes has been portrayed as a leader in new forms of industrial relations in China (e.g. Ngok/Lee 2000), neither the official trade unions nor researchers in local labor colleges contacted during our research could point to any significant presence of trade unions in the region’s foreign invested electronics industry nor to viable activities or strategies designed to change this situation.

The conditions of a rapidly expanding industry, a booming labor market and institutionally disorganized politics of production are continuously producing a high level of insecurity for labor relations in manufacturing plants in the region. The fact that Guangdong had by far the highest number of officially registered and settled labor dispute cases in China in the 1990s (Sun 2000: 168 f.) is indicative of this situation. As recent studies of labor conflicts in the region show, the pattern of immigrant workers’ resistance remains highly individualized, only surfacing in a formalized way in trials before labor courts. The most common form of workplace resistance obviously is the change of workplaces, reflected in the very high turnover rates, which are also present in contract manufacturing plants. However, the rising number of lawsuits in industrial injuries indicates a gradual spreading of legal rights consciousness (Lee 2002: 217), supported by a limited, but growing publicity for such cases inside China mostly in local newspapers (as documented in Chan 2001), which increasingly reaches the national media and also official circles of trade unions and policy-makers in state and party institutions.

With this background, CM-companies are experimenting with all kinds of policies to cope with the instability of the work force. Most of these concepts mirror the forms of modern company paternalism for which non-union computer and semiconductor companies in the U.S., from Silicon Valley in particular, have become famous (Eisenscher 1993, Lüthje 2001). The strong emphasis on company values in training programs reflects this, also the sometimes extensive leisure activities and the involvement of workers associations and hometown clubs in dormitories. The largest CM-plant in the area has a complete range of dining, shopping and amusement facilities which include a variety of smaller shops, large halls of sophisticated “Star Wars”-type video games and a cybercafe, all designed to give migrant workers the feeling of metropolitan campus life. Obviously, such displays of corporate generosity are reflective of the fact that migrant workers, women in particular, do not work for a wage alone but also for the promises of becoming urbanized individuals (Hsing 1998; 99). In

its contemporary form, such policies also mirror many aspects of the Chinese *danwei* and the underlying concept of comprehensive care for the worker by the work unit, the hallmark of Chinese workplace relationships during the socialist era (Li 1996). As in its motherland, the modern capitalist company paternalism is practiced under the auspices of continuously low wages in a situation of full or rapidly expanding employment (Wonacott 2002).

4. Conclusion: Organization of Work and Industrial Upgrading

The shifting of brand-name firms to “fables” models of production and the increasing vertical specialization “at the top” of global production systems in the electronics industry is resulting in a *massive re-integration of manufacturing resources “at the bottom”*, i.e. in contract manufacturing operations in newly industrializing countries like China. In this context, industrial development in China is rapidly advancing beyond simple mass-assembly towards more complex products and the integration of engineering and product design services. This development is based on a massive build-up of modern manufacturing work with strict segmentation and control. Both the tendency of vertical re-integration and the neo-Taylorist model of work raise the question whether the Fordist type of mass-production is making a global return “through the backdoor” - ironically in an industry which is usually seen at the forefront of vertical specialization, non-hierarchical workplace relations, and networks of trust-based cooperation (Lüthje 2004). What is evident, however, is that the mass workforce created from mostly female migrants from rural areas in China is left out from the process of industrial upgrading: the continuing modernization and upgrading of technology, equipment, and organization is not matched by any long-term advances in the standard-of-living, the skill-base, the job expectations for the overwhelming part of the workers.

Politics of production is rooted in the broader field of economic, industrial, and foreign-investment policies shaping the framework of industrial development in China. The very fact that working conditions in CM-companies do differ positively from sweatshop conditions in other assembly industries illustrates this point. Obviously, the relationship of major IT-brand-name firms with Chinese government authorities and the importance of the Chinese market for these companies make a difference. First-tier multinationals in the electronics industry all have substantial relations with national and local governments as potential customers for often large-scale projects like computer networks, in technology and product development for the Chinese market, or with regard to trade policies including manufacturing licenses and customs. Relationships of foreign multinationals with major Chinese SOE or private companies such as telecommunications network operators or the newly emerging Chinese brand-name companies in high-tech similarly call for a standing of good corporate citizenship which makes potential troubles regarding working conditions in subcontracting firms undesirable.

With this background, it should be clear that for advanced manufacturing industries the hotly debated question of labor standards cannot be reduced to monitoring of basic working conditions and of employee and trade union rights as laid out by the “core labor standards” of the ILO. In a state-of-the art industrial environment, the question arises which positive standards of work, work organization, and skill development can be established to overcome the well-known negative impact of Fordist-Taylorist work organization. As the technological and organizational level of plants around the world is largely equal, it is only fair to use workplaces in Western countries as the benchmark. The often-heard argument that China as a developing country would have to make certain concessions on working standards and rules sounds hollow in industries which explicitly strive for global uniformity in manufacturing procedures. Furthermore, there exist also many benchmark companies in China, mostly among privatized SOE and some flagship joint ventures.

China could have a strategic role for an integrated upgrading of industry structures and work organization. As the country’s domestic market is essential for the economic well-being of the world-economy today, China is definitely in a better position to escape from the race to the bottom in working conditions and labor rights than most smaller countries in global manufacturing chains. In this situation, there is definitely room for improvement for wage and work standards in industries like electronics contract manufacturing, without risking substantially China’s international competitiveness. More importantly, the country hits at a fast speed the barriers of extensive growth based on low-wages and extensive consumption of resources, a situation illustrated by the tendencies of market saturation and oversupply in key sectors of the IT-industry as computers or mobile phones. An alternative pattern of industrial development, of course, would imply a fundamental shift in the policy discourse – from privatization and import of technology towards a broader perspective that would treat human labor as the essential force of production in industrial development. In the face of China’s importance in global production networks of the electronics industry, this would definitely have an impact on other low-cost locations that are part of today’s zero-sum game for foreign investment and economic development.

References

- Borras, Michael/Zysman John (1997): *Wintelism and the Changing Terms of Global Competition. Prototype of the Future? BRIE Working Paper 96B*. Berkeley, Calif.: Berkeley Roundtable on the International Economy.
- Chan, Anita (2001): *China’s Workers Under Assault. The Exploitation of Labor in a Globalizing Economy*. Armonk.: M.E. Sharpe.
- Cheng, Joseph Y. S. (ed.) (1998): *The Guangdong Development Model and Its Challenges*. Hong Kong: City University of Hong Kong Press.
- Cheng, Joseph Y. S. (ed.) (2000): *Guangdong in the Twenty-first Century: Stagnation or Second Take-off?* Hong Kong: City University of Hong Kong Press.

- Eisenscher, Michael (1993): Gewerkschaftliche Organisierung in der Computerindustrie: Die Erfahrungen des UE Electronics Organizing Committee im "Silicon Valley". In: Lüthje, Boy Scherrer Christoph (eds.): *Jenseits des Sozialpaktes. Neue Managementstrategien, Gewerkschaften und Arbeitskämpfe in den USA*. Münster: Westfälisches Dampfboot.
- Ernst, Dieter (2002): The Economics of Electronics Industry: Competitive Dynamics and Industrial Organization. *The International Encyclopedia of Business and Management (IEBM), Handbook of Economics*. Ed. William Lazonick. London: International Thomson Business Press.
- Flextronics (2003): Corporate Fact Sheet Asia. CD-ROM files. Singapore.
- Grove, Andrew S. (1996): Only the Paranoid Survive. How to Exploit the Crisis Point That Challenge Every Company and Career. New York/London e.a.: Currency Doubleday.
- Guangdong sheng tongji yu (2002): Guangdong tongji nianjian. Beijing: Zhongguo tongji chubanshe.
- Hsing, You-tien (1998): *Making Capitalism in China. The Taiwan connection*. Oxford/New York: Oxford University Press.
- Lee, Ching Kwan (2002): From the specter of Mao to the spirit of law: Labor insurgency in China. *Theory and Society*. 2002(31):189-228.
- Li, Hanlin (1996): *Research on the Chinese Work Unit Society*. Frankfurt/Bern: Lang.
- Lüthje, Boy (2001): *Standort Silicon Valley: Ökonomie und Politik der vernetzten Massenproduktion*. Frankfurt/New York: Campus.
- Lüthje, Boy (2002): Electronics Contract Manufacturing: Global Production and the International Division of Labor in the Age of the Internet. *Industry and Innovation. Special Issue: Global Production Networks*. Editors Dieter Ernst and Linsu Kim. Vol. 9(No. 3):227-247.
- Lüthje, Boy (2004): Kehrt der Fordismus zurück? Globale Produktionsnetze und Industriearbeit in der "New Economy". *Berliner Debatte - Initial*. Heft 3, 2004.
- Lüthje, Boy/Schumm, Wilhelm/Sproll, Martina (2002): *Contract Manufacturing: Transnationale Produktion und Industriearbeit im IT-Sektor*. Frankfurt/New York: Campus-Verlag.
- Lüthje, Boy/Sproll Martina (2003): Electronics Contract Manufacturing: Networks of Transnational Mass Production in Eastern Europe. Faust, Michael Voskamp Ulrich Wittke Volker, Eds.: *European Restructuring in a Global Economy: Fragmentation and Relocation of Value Chains*. Göttingen: Soziologisches Forschungsinstitut - SOFI; 2003.
- Ngok, King-Lun/Lee Grace O. M. (2000): Collective Contracts and Chinese Style Collective Bargaining: A Case Study of Guangdong. In: Cheng, Joseph Y. S., (Ed.): *Guangdong in the Twenty-first Century: Stagnation or Second Take-off?* Hong Kong: City University of Hong Kong Press; pp. 143-165.
- Sturgeon, Tim (1997): Turnkey production networks a new American model of industrial organization? *BRIE Working Paper 92A*. Berkeley, CA: Berkeley Roundtable on the International Economy. 49 pp.
- Sun, Wen-bin (2000): Labour Disputes in Shenzhen: The Origin, Pattern and Settlement of Workplace Conflicts. In: Cheng, Joseph Y. S.,(ed.): *Guangdong in the Twenty-first Century: Stagnation of Second Take-off?* Hong Kong: City University of Hong Kong Press; 2000.
- UNCTAD - United Nations Conference on Trade and Development (2002): *World Investment Report 2002. Transnational Corporations and Export Competitiveness*. New York/Geneva: UNCTAD.
- Wonacott, Peter (2002): China's Trump Card: Smart, Cheap Labor Tech Production. *The Asian Wall Street Journal*, March 15.

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