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**The Transformation of the Clothing Industry
in China***

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Abstract: *This article examines the transformation of clothing manufacturing in China with a focus on institutional support, technological upgrading and global production chains. The evidence shows that reforms and integration into global production chains has rapidly expanded China's exports but it has also driven the relocation abroad of Chinese clothing firms. Global integration has motivated clothing firms to upgrade through learning, adoption and innovation. Hence, despite improvements in technological capabilities the share of clothing value-added in manufacturing has gradually declined. Also, China has increasingly faced industrial structural change from clothing to the capital goods, real estate and high tech sectors.*

Keywords: China, clothing, global integration, production networks, technological upgrading

JEL Classification: L62, L22, L14, O31

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1. Introduction

China's economy has undergone massive transition where the central planning system has given way to a state-led market mechanism since economic reforms began in 1978. Unlike the endogenous emergence of market mechanism as demonstrated by Western experience, China's embrace of market mechanism was initiated by the government as an effort to tackle the domestic rising tension in the 1980s. Although the state-owned dominated the social production in the early post-reform era, various ownership are allowed and encouraged to participate in social economic activities after state-owned enterprise (SOEs) reforms. This institutional change has brought the decades-long rapid growth as new socio-economic changes triggered by economic reforms have been continuously well reflected by the institutional evolutions. New institutional arrangement after reforms has provided sufficient support to nurture the emerging industrialization, and sustain the technology upgrading and regional production network building.

The development of China's clothing sector can be divided into three phases:

- 1) *Pre-reforms Period (1949 to 1978)* Low productivity in clothing made led in this period is heavily constrained and takes inferior sector status due to government's policy focus on heavy industry. Although 1954 social transformation scheme introduced large-scale collective sewing cooperative, apparel sector was still ignored as non-strategic sector with substantial lack of national investment and backward production technology.
- 2) *Transition Period (1978- 2000)* Thanks to the economic reforms in 1978 which brought the sector into a golden growth era, clothing production started to grow with an average annual growth rate of 14% during the period from 1978 to 2000. Driven by national export-oriented policy, apparel production grew rapidly from 6700 million items in 1978 to 10 billion items by the year 2000. By the end of 2000, one fifth of global market was captured by Chinese clothing producers with their clothes being found in more than

220 countries/regions. The ever growing global competition encouraged the emergence of domestic brands and the formulation of a complete production system, which mostly consisted of private entrepreneurs and listed companies.

- 3) *Upgrading Period (2000-2013)* After 2000 the production focused more on value-added and branding cultivation. The insertion to the global market since its accession to WTO brought not only production expansion, but also new challenges on how to sustain a long-term sectoral development. Thus, rather than purely assembling and manufacturing, Chinese clothing manufacturers opt to emphasis on adding value to their product through original design, raw material research and network building.

Any discussion of this substantial growth would not be complete without the profound understanding on the strong institutional support behind. Likewise the emergence of clothing sector which was triggered by authorities' decision to open-up the transformation process including industrial upgrading need an optimal institutional arrangement to facilitate Chinese firms to upgrade both horizontally and functionally (Rasiah, Miao & Kong, 2013). The wide implication of digital technologies, such as computer aided design (CAD), computer aided manufacturing (CAM) and Enterprise resource Planning (ERP) have proliferated extensively into clothing manufacturing, pushing the sector to the technology frontier. Hence, this article attempts to identify the institutional forces that support technological upgrading and regional production network of China's clothing industry. Special focus was given to industrial policy and meso instruments in sustaining the technological upgrading, and on how participation in global production network stimulate Chinese clothing industry into moving upward in global value chain.

The rest of the article is organized as follows. After introduction, section two introduced the methodology with specification of concepts and presentation of analytics framework. Section three examines the evolution and current status of clothing sector. Section four discusses the integration to regional production network and the subsequent section examined the technological upgrade on both aggregate

and firm-level. Section six presents conclusion.

2. Methodology and Analytic Framework

This research adopts a mixed methodology, which combines the quantitative research with qualitative approach. Quantitative analysis by using metaphysical data is deployed extensively in this article to profile and analyse the physical development and economic performance of the clothing sector. Grubel-Lloyd intra-industry analysis will be presented to examine the competitiveness of the industry (Grubel & Lloyd, 1971). Meanwhile, qualitative evidence collected from case studies is also presented to complement the quantitative analysis for clarification, illustration and interpretation of social practices.

The quantitative data used in this research dran obtained from various secondary sources. Unlike customized surveys that are small, large surveys and censuses by government agencies are more representative. The qualitative evidence is drawn from interviews, observations, documentary reviews and materials gathered from field work undertaken in 2009-2011 in Wenzhou. The three representative firms we selected as case studies are Baoxiniao Group, Aokang Group and Red Dragonfly, which are leading national clothing firms.

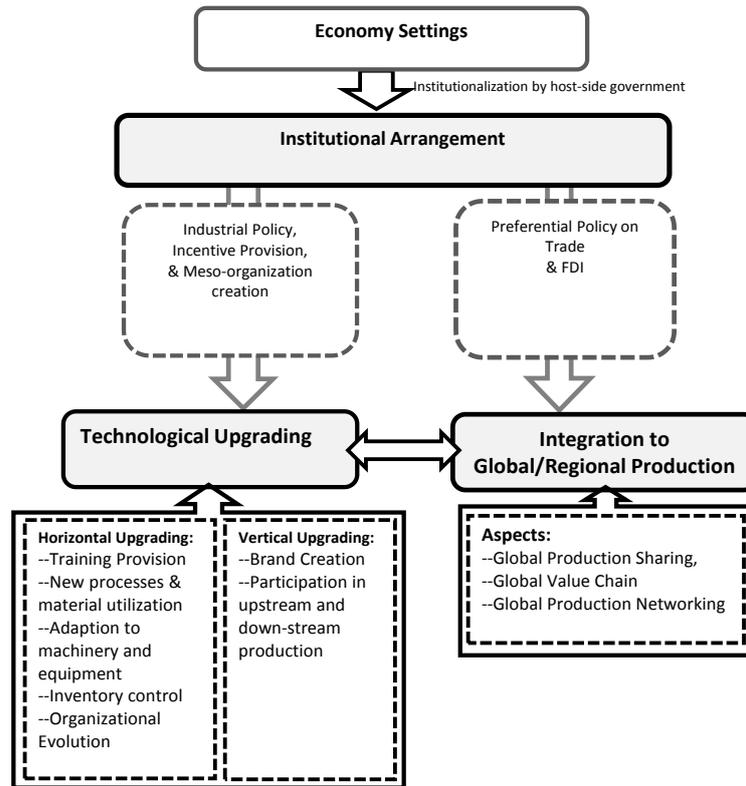
Two major concepts are examined here, namely, institutional support and regional production. We define the concept of “institutional support” in this article as a supporting influences that connect basic and high tech infrastructure, and promotes cohesion and integration among economic firms and meso organizations that stimulate firm-level learning, innovation and competitiveness. Institutional support requires a strong role by government in the formulation of industrial policy (Rasiah, 2009). The analytical framework was conceptualized based on the two major concepts noted above (see Figure 1).

Specifically, horizontal technological capability refers to upgrading in the same stages through training, improvements in processes and new materials, adaptations to machinery and equipment and inventory control, while vertical technological capability refers to functional movement into high value added stages in upstream

and downstream, or in complimentary activities, such as packing and logistic and original brand manufacturing. Incentives are targeted by governments to promote both international trade and FDI. Technological upgrading and regional networking are mutually influenced by each other. While technological upgrading accelerates integration into global value chains as the production becomes innovative and competitive, participation in global value chains helps firms upgrade through learning and innovation from buyers and competitors.

Based on Gereffi's (1999) articulation of global value chains, the analysis attempts to capture its impact on the expansion of output and technological upgrading in the clothing industry of China. Gereffi (1999) had analysed the social and organizational dimensions of international trade networks by using a perspective of global commodity chains specifying in the process that organizational learning occurs in trade networks: typical trajectory from assembly to Original Equipment Manufacturing (OEM) and Original Brand Manufacturing (OBM); and the organizational conditions that facilitate industrial upgrading moves from assembly to full-package networks. From being driven completely by buyer firms in the original framework, Gereffi *et al.* (2005) advanced a typology of global value chain with different levels of explicit coordination and power asymmetry. Econometric evidence on the spread of such activities to the developing countries in the clothing industry was provided by Rasiah *et al.* (2013). Also, evidence from Malaysia show that the clothing industry has also faced significant internal changes in the labour process (Rasiah, 1993), suggesting that it is possible to promote the high road to industrialization conceptualized by Piore and Sabel (1984).

Figure 1: Analytic Framework



Source: Authors

3. Sector in Transition

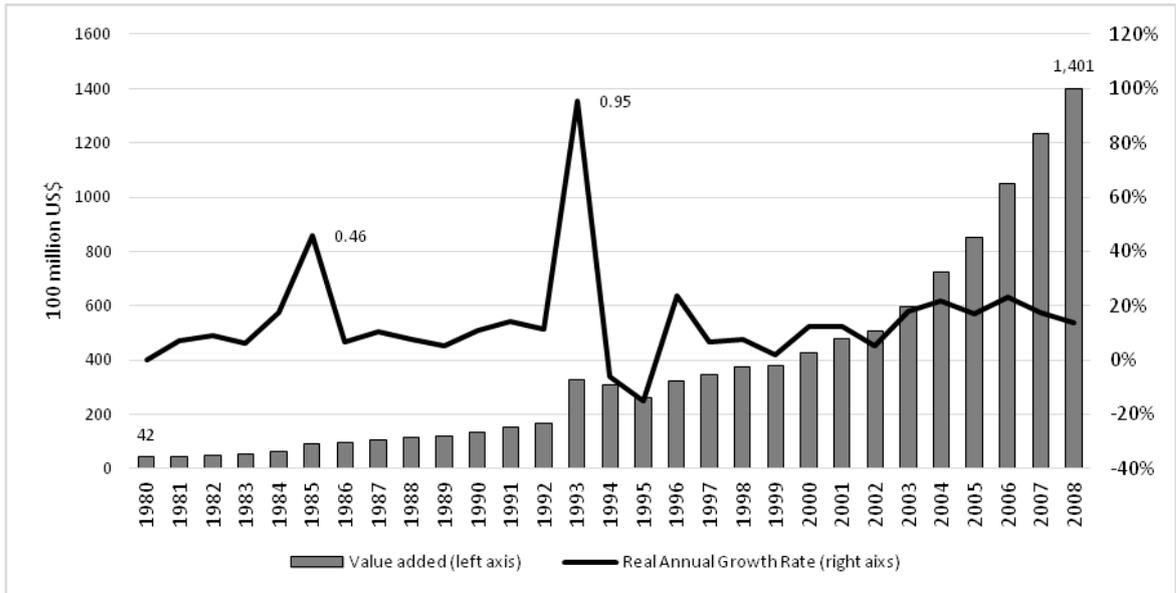
The clothing industry in China has undergone massive changes over the last few decades. While exports in global markets have expanded strongly since the turn of the millennium its share in China’s exports have fallen, which is a consequence of rapid structural change towards capital- and technology-intensive industries in the country.

3.1. Clothing in Manufacturing

The value-added of the clothing sector saw a trend growth from US\$ 4.2 billion in 1980 to US\$140 billion in 2008 growing on average by 13.3 percent per annum (Figure 2). Growth remained relatively stable except for the first peak of 46 percent in 1985 when the value-added reached US\$89 million from US\$6100 million in 1984. The annual growth rate peaked in 1993 at 95 percent with value added

shooting from US\$16.8 billion in 1992 to US\$32.8 billion in 1993. While there was a sharp decline in 1994-1995, real value-added started growing strongly again after that. The clothing sector enjoyed even higher expansion following China's accession into the WTO in 2001.

Figure 2: Value Added and Annual Growth, Clothing, China, 1980-2008

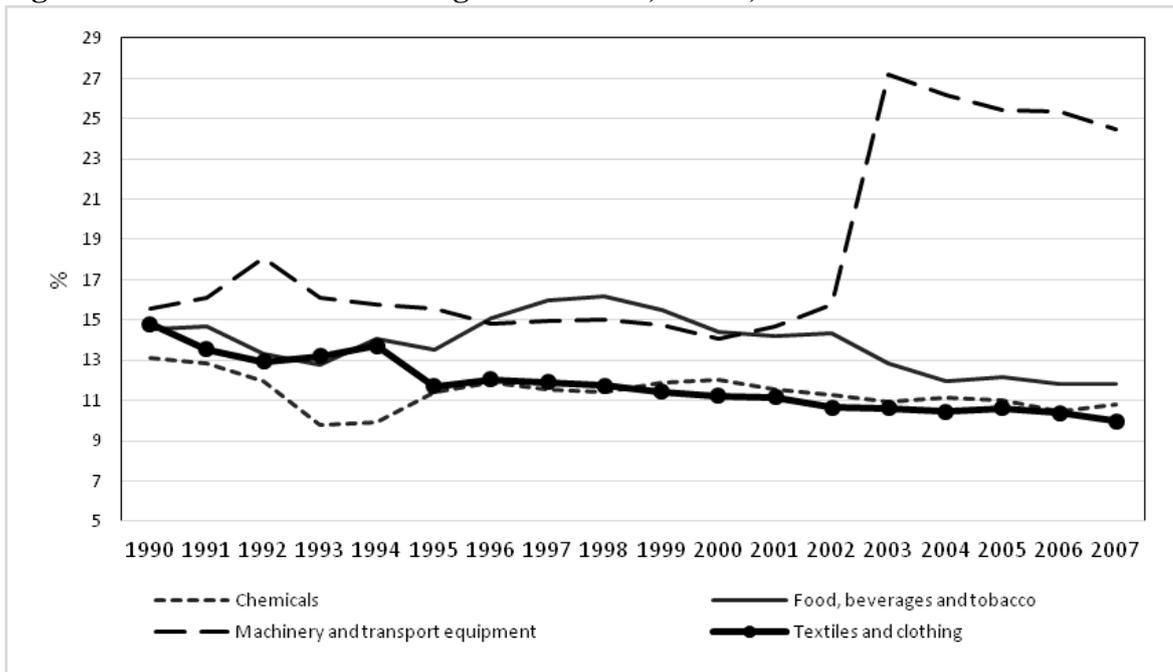


Note: Value added is in 1990 constant prices

Source: Calculated by authors based on Chen (2011)

However, the share of textile and clothing value-added in manufacturing declined in trend terms from 14.8 percent in 1990 to 9.9 percent in 2007 as the other manufacturing sectors began to grow sharply (Figure 3). Indeed, the share of machinery jumped to 27 percent in 2003 (Figure 3), which suggests that China is gradually moving towards industrialized economy where low-value-added activities (e.g. clothing manufacturing) increasingly less to the economy compared to high value-added manufacturing (e.g. transport equipment), though, China is still facing the problem of adding value to final products through technological and market transformation, and through process innovation to quicken throughput time.

Figure 3: Share in Manufacturing Value-added, China, 1990-2007



Source: World Development Indicator (2012)

3.2. Changes in Ownership Structure

Foreign direct investment entered China's clothing manufacturing after economic reforms. Table 1 compares the ownership structure of clothing sector between 2000 and 2011. Over the period, the share of foreign companies saw a significant growth from 19% in 2000 to 38.9% in 2011 due to the market friendly policies to attract foreign investors. While private producers did not experience significant changes in the shares (grew from 53% in 2000 to 59.9% in 2011), the share of collective companies plunged from 26% in 2000 to nearly zero with annual decreasing rate of 42%. The compound effect of increasing foreign investment combined with growth of private and township companies with an annual growth of over 60% led to the decreasing share of collective companies in China's clothing manufacturing. The ownership structure changes suggested that clothing industry of China is moving rapidly towards a complete competition industry, where foreign investor and private entrepreneurs gradually become the major player in the sector.

Table 1: Distribution of clothing firms by Ownership, China, 2000-2011 (%)

Types of firms	2000	2011
State owned companies	2.0	1.2
Collective companies	26.0	0.0
Foreign companies and joint ventures	19.0	38.9
Private companies	53.0	59.9

Source: China Statistics Yearbook (2012) and from China textile industry association.

The strong profitability of private firm provides some insight for its rapid emergence in garment manufacturing. A quick glance at the main economic indicator (using the latest data in 2011) shows that among the different types of clothing firms, private companies accounted for the main part of industrial output and also demonstrated better performance with its profitability being twice higher than the foreign companies and 4 times higher than the state-owned enterprises (Table 2).

Table 2: Economy Statistics, Clothing Firms, China, 2011

Indicators	State owned	Private	Foreign and Joint-Venture
Numbers of firms	124	6060	3938
Industrial gross value*	183.59	6039.93	4843.71
Main business revenue*	204.42	5919.32	4683
Total profits*	9.92	390.61	352.15
Profitability of main business	4.85%	16.23%	7.5%
Employment (10 thousand persons)	7.34	151.07	166.39

Note: * in 100 million yuan

Source: China Statistics Year (2012)

Apart from the fact that private sector thrives, the profitability of the entire clothing sector (above-scale) steadily grew from 2.35% in 1998 to 7.11% in 2010 (Table 3). Both total number of firms and total profit witness a simultaneous growth over the observed period. The rising average profit per firm measured by year 2000 constant price indicates a growing firm's capability in generating profit. Chinese garment firms created, on average, approximately 5 times higher profits (3076 thousand yuan per firm) in 2010 compared to 1998 (621 thousand yuan). Although the growth rate of average profit per firm does not show stable growing rate, an increasing trend can be identified with an exception of a slide descend in 2002.

Table 3: Number and profitability, Clothing manufacturers (above scale), China, 1998-2010

Year	Total Profit #	Main business revenue#	Profitability (profit over revenue)	Total number of firms	Average profit per firm (in 2000 prices)*	Real profit growth [^]
1998	41.76	1779.10	2.35	6768	621.84	NA
2000	86.44	2133.01	4.05	7064	1223.67	96.78%
2002	111.19	NA	NA	9061	1195.46	-2.31%
2004	152.52	3879.81	3.94	10901	1242.45	3.93%
2006	273.38	5910.22	4.63	13072	1721.74	38.58%
2008	487.34	9074.13	5.37	18237	1896.66	10.16%
2010	851.91	11988.61	7.11	18547	3076.47	62.20%

Note: [^] periodic two-year growth rates; # by 100 million yuan; * in thousand yuan.

Source: National Statistical Bureau (various years)

Nevertheless, micro and small garment firms are facing great development challenges despite the promising growth achieved by medium and large scale manufacturer. The statistics from China textile industry association shows that, after taking micro- and small scale firms into account, the average profitability of clothing industry is estimated to be only 3% to 5% in 2010, which is much lower than aforementioned growth rate of 7% in 2010. Indeed, a large number of small garment firms are still limited as merely original equipment manufacturer (OEM) with no self-owned brands. Alternatively, their products have eventually found share similarities in market due to the lack of design and innovation capacity. Many opt to increase their competitiveness by reducing the price of their product in market, which subsequently squeezed the profit space enjoyed by small firms. By so doing, small firms face a vicious development cycle as the low profit margin greatly confined their ability to develop their own design capacity and brand, which again is a hurdle to the value appreciation of their product. Clothing manufacturing requires strong institutional support to promote the industrial upgrading so that transformation of traditional development mode can be achieved where more benefit from value-adding activities could be carried out by endogenous manufacturer.

3.3. Employment and Wage

The employment of clothing sector experienced a steady rise from 1.8 million in 1980 to 6.2 million in 2008, which is over three times than the former (Table 4). The employment grew staggeringly in two period particularly, which is from 1983 to 1994 and from 1998 to 2008, with the number dropping slightly in between from 1994 to 1998 (Figure 4). The first boom is associated with state policy of reform and open-up, when the integration of global production network created strong demand and subsequently created massive job opportunities for domestic labour. The second steep rise from 1998 was stimulated by China's accession to WTO, after which openness of China's market attracted further order and foreign investment from all over the world. Accompanied by a continuously positive growth after 1998, the steady growth of the employment shows that clothing sector was not terribly influenced by Asian Financial Crisis in the late 1990s.

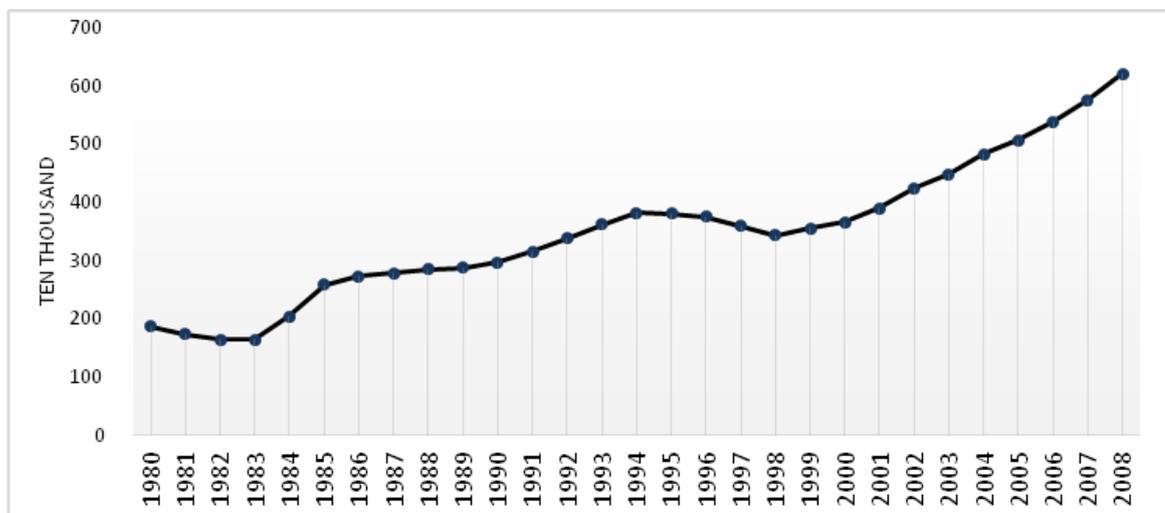
Table 4: Employment elasticity, clothing Manufacturing, China, 1980-2008

Year	Value added*	Real Annual Growth	Employment (in 10,000 yuan)	Employment Growth	Industrial Employment Elasticity
1980	42	NA	186	NA	
1981	45	7.14%	173	-6.99%	(0.98)
1982	49	8.89%	164	-5.20%	(0.59)
1983	52	6.12%	164	0.00%	0.00
1984	61	17.31%	203	23.78%	1.37
1985	89	45.90%	258	27.09%	0.59
1986	95	6.74%	272	5.43%	0.80
1987	105	10.53%	278	2.21%	0.21
1988	113	7.62%	285	2.52%	0.33
1989	119	5.31%	287	0.70%	0.13
1990	132	10.92%	296	3.14%	0.29
1991	151	14.39%	315	6.42%	0.45
1992	168	11.26%	337	6.98%	0.62
1993	328	95.24%	361	7.12%	0.07
1994	308	-6.10%	381	5.54%	(0.91)
1995	262	-14.94%	380	-0.26%	0.02
1996	324	23.66%	375	-1.32%	(0.06)
1997	346	6.79%	359	-4.27%	(0.63)
1998	373	7.80%	343	-4.46%	(0.57)
1999	381	2.14%	355	3.50%	1.63
2000	428	12.34%	365	2.82%	0.23
2001	480	12.15%	389	6.58%	0.54
2002	505	5.21%	424	9.00%	1.73
2003	596	18.02%	448	5.66%	0.31
2004	726	21.81%	482	7.59%	0.35
2005	851	17.22%	506	4.98%	0.29
2006	1,050	23.38%	538	6.32%	0.27
2007	1,234	17.52%	575	6.88%	0.39
2008	1,401	13.53%	620	7.83%	0.58

Note: *in 100 million US\$ at 1990 constant price

Source: Calculated by authors based on Chen (2011)

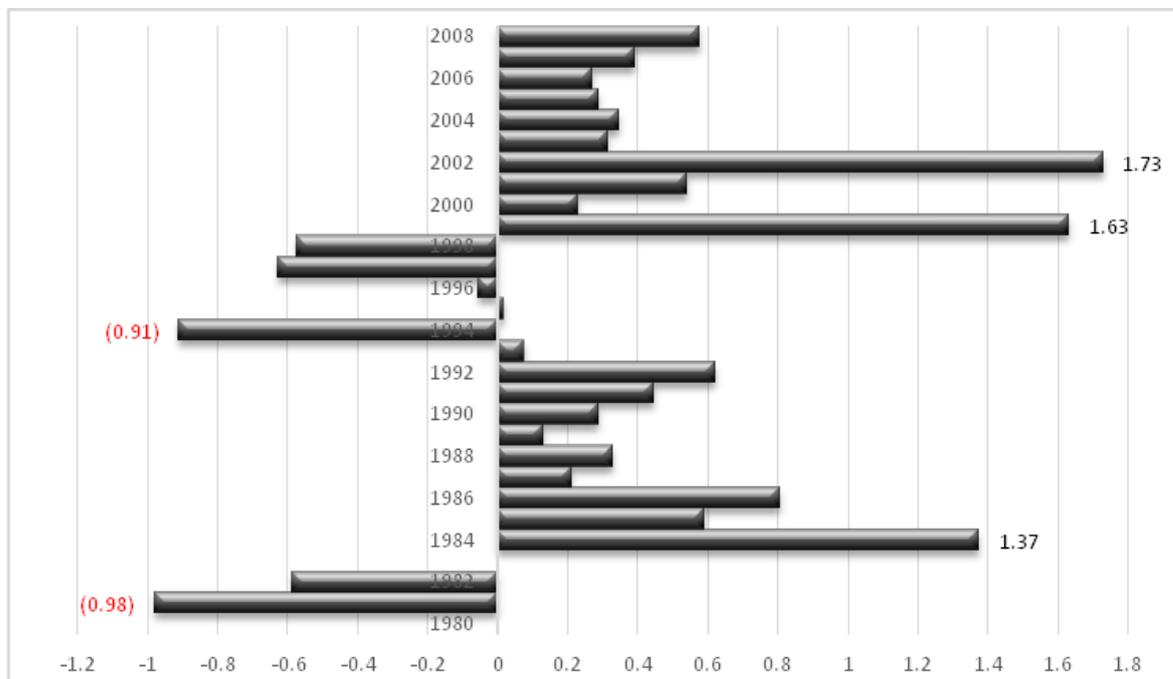
Figure 4: Employment, Clothing Manufacturing, China, 1980-2008



Source: Chen (2011)

An understanding of labour-intensive industries, such as, clothing, will not be complete without discussion on labour markets. Due to the impressive employment growth of 9 percent, industrial employment elasticity recorded its highest score of 1.7 in 2002 (Figure 5). While most of the years records positive elasticity during the observed period, negative figure in 1981-1983 and 1996-1998 was caused by the negative growth of employment, with the later possibly being an effect of nation-wide labour lay-off due to SOE reforms. The negative elasticity (-0.91) in 1994 stands out as an exception and is worth our focus. This is because a negative growth of industrial value-added ironically brought a positive employment growth 5.5%. We indicate that the excessive plump of value-added growth (95%) in 1993 reduced the growth effect in the subsequent year of 1994, where the industrial value-added output of the later still is sufficiently high (30 billion in 1994 compared to 26 billion in 1995) to deliver a positive job growth in 1994. Except for the skyrocketing figure in 1999 and 2002, the elasticity after 2002 decelerated and went back to the level of below 0.6, which suggests that labour-intensive clothing sector is slowly losing its capacity as a powerful employment generator. This is because technology upgrading and adoption of machinery in production significantly increase the efficiency of industrial output with a decreasing demand of cheap labour simultaneously.

Figure 5: Employment Elasticity, Clothing Manufacturing, China, 1980-2008



Source: calculated from Chen (2011).

The equilibrium of labour demand and supply dynamic can be observed from the statistics of real wage. Wages in the clothing sector being lower than national average and manufacturing from 2001 to 2011 suggested that the labour intensive clothing manufacturing are still cheap labour concentrated sector. The annual average growth of wage in clothing sector from 2001 to 2011 is 8.21% which is lower than both the wage level of manufacturing (8.92%) and national average (9.36%) as shown in Table 5. However, although the periodic growth rate of national and manufacturing wage were higher than clothing sector in the early 2000s, the later recorded a growth rate of 21% in 2007 and 23% in 2011, which exceeded the growth rate of manufacturing sector during the respective years. This indicates that the clothing sector has gradually transformed to experience rising real wages following a sustained rise in demand for labour and skills. This is also consistent with the anecdotal evidence that Guangdong employer is facing serious shortage of labour in labour intensive sector, contributing to more than 70 percent of the province's labour shortage gap in 2012 (Zheng, 2012). The high increase in real

wages obviously also suggests that China has managed to experience the high road to industrialization as defined by Piore and Sabel (1984), and Pyke and Sengenberger (1992).

Table 5: Real Wages and Growth Rate, China, 2001-2011

Year	2001	2003	2005	2007	2009	2011	Average Annual Growth (2001-11)
National Average	10,616	13,262 (24.92)	15,550 (17.25)	18,914 (21.63)	23,022 (21.72)	25,978 (12.84)	9.36
Manufacturing	9,692	12,030 (24.12)	13,614 (13.17)	16,177 (18.83)	19,142 (18.83)	22,787 (19.04)	8.92
Clothing sector	8,199	9,579 (16.83)	10,690 (11.60)	12,949 (21.13)	14,693 (13.47)	18,040 (22.78)	8.21

Note: Real wage is in constant 2000 prices; growth rate in bracket is periodic growth rate in percentage.

Source: China Labor Statistical Yearbook (various years)

While low labour cost has been a major stimulant of clothing production, rising wages has driven clothing firms abroad to countries, such as Bangladesh and Myanmar. Together with the appreciation of RMB currency, the production of low cost garments is increasingly moving from China to other countries, such as Myanmar and Bangladesh where average wages were only US\$40 and US\$70 monthly respectively in 2012. The shakeout of low cost labour as a result of industrial upgrading has, in turn, become another motivation for the movement toward a higher value added economic activities, as clothing makers have to seek a sustainable approach to re-gain their global competitiveness after the clothing producers is gradually losing its decade-long advantage of cheap labour.

3.4. Regional Disparity and Industrial Transfer

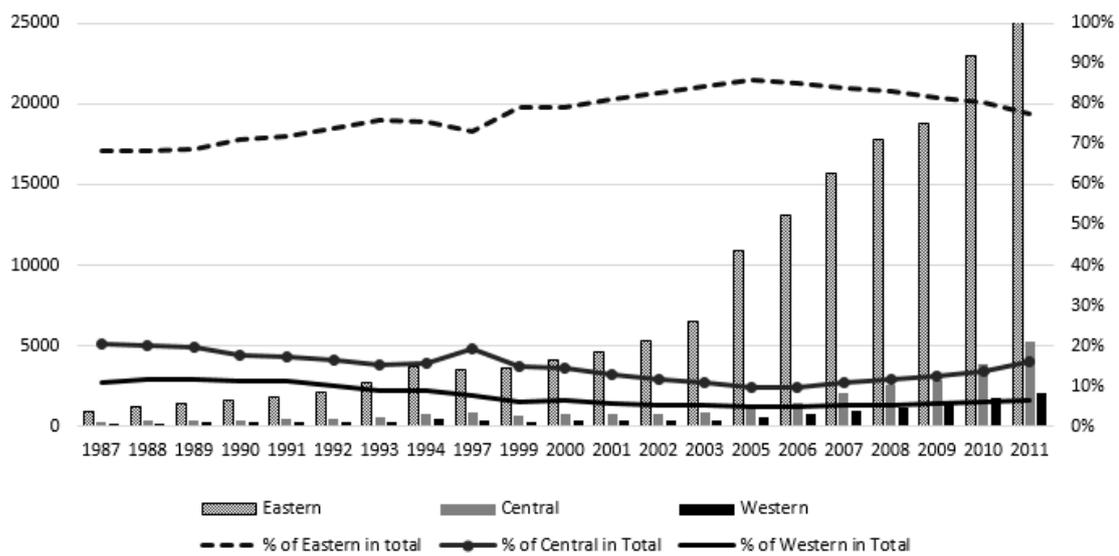
Industrial transfer is an economic process by which industries relocate from one to another area. While Shi (2004) argued that industrial transfer was adopted to better integrate with local markets, in China's clothing manufacturing it is driven largely by the pursuit of cheap labour and land. Despite a large supply of labour in

the coastal area, rapid growth has pushed up production costs thereby driving clothing firms to other locations in China since 2005 (Ruan and Zhang, 2014) reinforcing the “flying geese” and the arrival of the Lewis Turning Point (Lewis, 1954; Akamatsu, 1962).

The share of Eastern China in national employment had risen from 57% in 1997 to 78% in 2008, which can be viewed as the Lewis’ turning point following rising wages and labour shortages (Figure 6). The government’s policy focus on Western (6%) and Central China has resulted in the share of the former remaining the same but Central China gaining with 15.0% of the employment. Hence, while clothing exports share from Eastern China fell from 92.6% in 2005 to 89.4% in 2011 those from Central China rose from 4.3% to 7.9% (Table 6).

Regional changes in industrial gross output demonstrate a similar Lewis turning point after 2005, albeit the gap is still wide (Figure 7). Although real output grew steadily since 1978, the share of the Eastern states fell from 85.8 percent in 2005 to 77.5 percent and in 2011, while that of the Central states rose from 9.5 percent to 16.2. Meanwhile, the share of Eastern China’s industrial value-added grew from 68.2 percent in 1991 to its highest share of 83.1% in 2005 before falling thereafter.

Figure 7: Industrial Gross Output¹ of textile and clothing industry, by regions, 1987 to 2011



Note: in hundred million yuan at current price

Source: China Yearbook of Industrial Economic Statistics (various years).

Coastal China had enjoyed preferential treatment in the early decades of economic reforms. Eastern China exported 92% of national production of textile and clothing valued at 309 billion yuan in 2005 (Table 6). However, this share fell from 92.6 percent in 2005 to 89.4 percent in 2011, while that of Central China rose from 4.3 percent to 7.9 percent as these states benefited from preferential incentives. However, despite continuous growth the Western states' share did not change much.

Table 6: Export, Value¹ and Percentage, China, 2005 to 2011

Year	2005	2006	2007	2008	2009	2010	2011
National	3336.03	3694.37	3984.09	4055.9	3732.25	4620.54	4959.61
%	100	100	100	100	100	100	100
Eastern	3090.56	3418.93	3687.06	3745.19	3409.11	4204.01	4433.6
%	92.64	92.54	92.54	92.34	91.34	90.99	89.39
Central	144.25	164.33	184.8	204.01	226.39	286.95	389.93
%	4.32	4.45	4.64	5.03	6.07	6.21	7.86
Western	101.21	111.09	112.24	106.7	96.74	129.6	136.09
%	3.03	3.01	2.82	2.63	2.59	2.80	2.74

Note: by hundred million yuan at current price.

Source: China Yearbook of Industrial Economic Statistics (various years).

The government's regional restructuring policies can be observed in The Great West Development and The Rise of the Central which were launched in 2001 and 2004 respectively to address the widening regional disparity between regions. Specifically, The Instruction to Promote Industrial Transfer of Textile and Clothing Industry issued by the Ministry of Industry and Information Technology on July, 2010 encouraged structural adjustment of clothing industry through regional industrial distribution taking account of their natural endowments. For example, while Western Xinjiang was encouraged to develop cotton and cotton-related industries, Inner Mongolia, Ningxia, Gansu and Qinghai provinces encouraged to develop cashmere and wool-related industries.

However, much of the industrial transfer has occurred in the upstream segments of the textile industry, and hence, not much value chain integration and clustering of clothing firms have emerged in the Western and Central states.

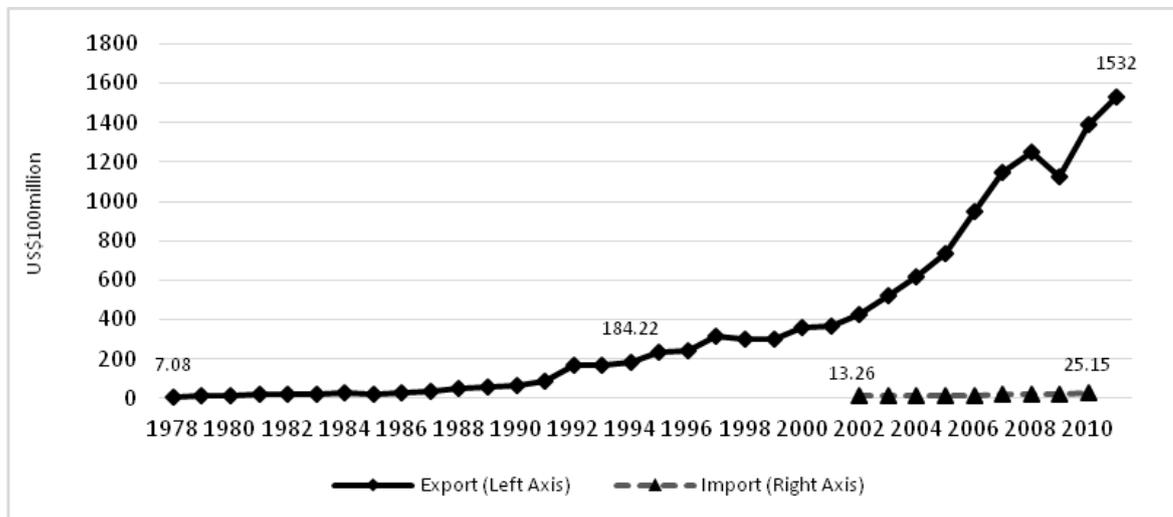
4. Growing Integration in Global Production Networks

In this section we discuss the continued integration of China's clothing industry into global value chains through trade, foreign direct investment and government policy emphasis. While the end of multi-fibre arrangement (MFA) in 2004 strongly aided this development as it removed most other preferential trading practices in the industry other than new preferences accorded some least developed countries, such as Cambodia, Laos and Myanmar, institutional changes within the country were also important in stimulating it further.

4.1. Export and Import

The great expansion of clothing export of China was encouraged by the national policy which transformed from import-substitution to export orientation trade policy. By 2012, China exported 26.2 billion clothing items to the global market among which Japan, United States and Europe are the major destinations. Driven by strong international demand, China's clothing firms started to export in 1978 (US\$700 million) and became No.1 exporter in the world for the first time in 1994 (Figure 8). Later, the export value continued to grow until reaching the peak of US\$153 billion in 2011. By then, except for a small decline of export value in 2008 as a consequence of global financial crisis, Chinese clothing manufacturing finally secured its leading position in the global market by continuously expanding over three-decade with an average annual growth rate of 17.6% over the period. Enjoying the prime advantages of abundant supply of cheap labour, Chinese clothing industry has become the largest in the world in terms of the production volume, as well as export value. In the meanwhile, garment import remains at extremely low level compared to its massive export. China imported clothing that is worth US\$1.3 billion in 2002 and US\$2.5 billion in 2010.

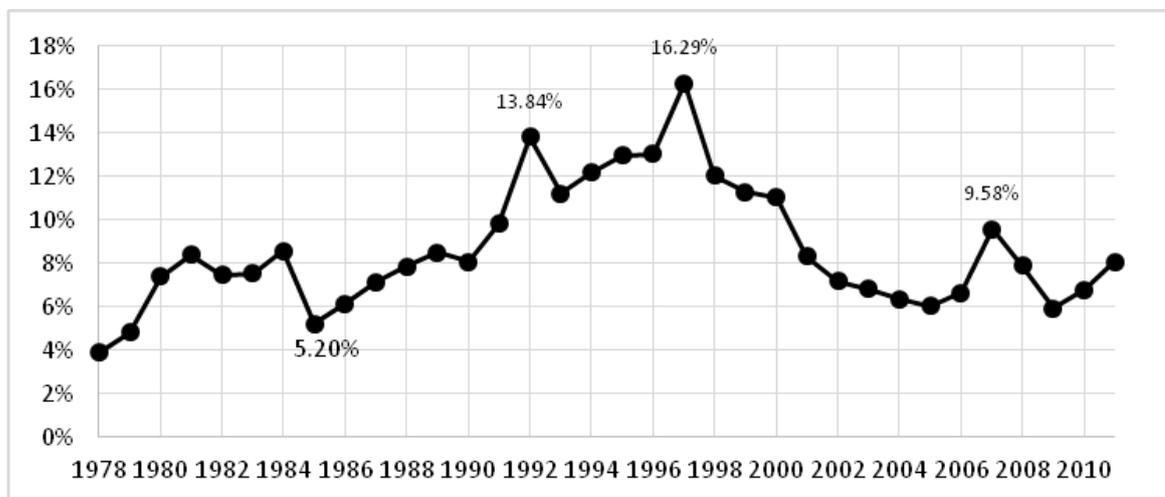
Figure 8: Exports and Imports, Clothing Manufacturing, China, 1978-2011



Source: China Custom Statistical Database.

Even though the export value saw a continuous take-off, the share of clothing in total export displays a relatively complex pattern. The share peaked in 1997 at 16.3% followed by a decade-long drop to 6.05% in 2005 (Figure 9). A small fluctuation occurred after 2005 but the ratio remains below 10% over the whole period from 2005 to 2010. Being consistent with the dynamic in Figure 3, these observations again testify the argument that the rise of other manufacturing sector (such as machinery) undermined the contribution of clothing sector to total economy despite the dramatic growth of its absolute value. The diminishing ratio could also be explained by the strategic relocation of clothing production line from China to the countries with cheap land and labour, such as Vietnam and Indonesia.

Figure 9: Share of Clothing Export in Merchandise Export, China, 1978-2011 (%)



Source: China Custom Statistical Database.

The topography of Chinese apparel industry displays an uneven regional development where most of China’s textile and garment production is clustered in the coastal provinces of Guangdong, Zhejiang and Jiangsu, and the two river deltas of Pearl River and Yangtze River. Benefiting from its geographical location next to Hong Kong, Guangdong province witnessed a phenomenal economic take-off featured by clothing manufacturing. Especially after 1992 when Deng Xiaoping made his tour of the region, Guangdong accelerated its reform process in order to catch up with its advanced Asian neighbours. Although Guangdong ranks third in China’s textile and apparel production (26.6 percent) it is China’s leading exporter (20.5 percent). In 2005, exports reached total of US\$16.6 billion with textile representing US\$4.8 billion (12 percent growth rate) and apparel representing \$11.8 billion (17 percent growth rate). Over two-thirds of Guangdong’s firms produce for exports accounting for US\$ 10 billion in 2001 which further strengths competition between local firms (ElSayed *et at.*, 2006).

4.2. Foreign Direct Investment

Inward foreign direct investment has been a powerful driver of garment manufacturing in China. China was ranked as the third largest recipient of FDI after the United States and United Kingdom in 2005 (UNCTAD, 2004). The increases in

FDI inflows have largely gone into manufacturing. However, with the relative advantage of cheap labour and land lost to other newly emerging economies, such as Vietnam and Cambodia, FDI inflows declined from US\$1.9 billion in 2000 to US\$1.6 billion in 2010 (Table 7). The share of clothing in total FDI decreased from 3.2 percent in 2000 to 1.5 percent in 2010, while the share going to manufacturing fell from 71 percent in 2000 to 47 percent in 2010, which is largely a consequence of other sectors becoming more attractive. The sharing of FDI in real estate grew from 8 percent in 2000 to 23 percent in 2010.

Table 7: FDI in Clothing Manufacturing and Real Estates, China, 2000-2010

Year	2010		2008		2005		2000	
	Value ¹	%	Value	%	Value	%	Value ²	%
Total	1057352 4	100	923954 4	100	603246 9	100	623795 2	100
Manufacturing	4959058	46.9	498948 3	54.0	424529 1	70.3 7	442543 0	70.9 4
Clothing	160250	1.52	182336	1.97	210404	3.49	198833	3.19
Real Estate	2398556 8	22.6	185899 5	20.1	541807 2	8.98	523213	8.39

Note: ¹ Value in 2005, 2008 and 2010 refers to actual use of FDI in US\$ 10,000; ² Value in 2000 is contractual value in US\$10,000.

Source: China Trade and External Economic Statistical Yearbook (various years)

Meanwhile, outward FDI in clothing manufacturing emerged since the 2000. By the year of 2011, China had invested in 177 countries US\$430 billion with fixed assets of US\$2000 billion (Wang, Liu, & Qian, 2011 pp.5). In clothing, outward FDI was driven by rising costs of domestic labour and raw materials. China's clothing industry is increasingly transferring production to the least developed countries, such as, Cambodia, Bangladesh and Myanmar to lower costs and enjoy preferential trade access (Smith, 1776; Ricardo, 1821). According to National Textile Association, over 130 clothing and textile firms have obtained approval to set up overseas factories with US\$780 million invested in the clothing and textile industries by 2005, which accounts for 30% of China's overseas processing and trade investment. Cambodia is a key destination accounting for 107 Chinese clothing and textile firms in 2005.

Although enterprises owned by the central government have led the

outward-investment strategy, institutional support and preferential policies have also been given to small- and medium enterprises (Table 8). Support has also been given to overseas investment projects that stimulate exports of whole-set textile equipment and participation in overseas exhibitions and training, links with foreign research institutes and for filing for patents, and registering international brands and to establish logistics and distribution centres in foreign counters and major markets.

Table 8: Preferential Policy and Institutional Support for Outward Investment, China

Government Support	Time	Authority	Documents	Policy Objective
Simplify Administrative Procedure	June, 2003	Ministry of Commerce & State Administration of Foreign Exchange	<i>The Notification to Ease the Supervisor Control and Grant Delegation to Overseas Processing and Trade Project</i>	Simplify the examination procedure for overseas investment, Provide local enterprises legal assistance to invest aboard,
	October, 2004	Ministry of Commerce	<i>The Provisions on The Examination and Approval of Investment to Operate Business Abroad</i>	The state shall help and encourage relatively competitive enterprises with various forms of ownership to invest to run enterprises abroad. The economic and commercial counselor's office of the embassy (consulate) to the foreign country/region shall response and provide relative assistance to the applicant enterprises.
	May, 2009		<i>The Administrative Regulations on Overseas Investment</i>	Relax the local restriction to approval the overseas investment, shorten administrative approval duration
Relax Currency Control	2004	State Administration of Foreign Exchange	<i>The Notifications on Several Issues on Internal Foreign Currency Management of Multi-national Corporations</i>	Foreign currency transactions are allowed from domestic firm to its overseas branches or other national firms which need capital to expand overseas operations
	July, 2006		<i>The Administrative Measures on Outward Direct Foreign Currency</i>	Cancel the deposit for profits remittance from overseas investment to ease the difficulties currency exchange and relax the currency control.
	May, 2009		<i>The Administrative Measures on Outward Direct Foreign Currency</i>	Expand the direct investment channel of domestic company; The profit made overseas is allowed to be reinvested into overseas business expansion

			<i>Investment by Domestic Company</i>	
Fiscal and Financial Preference	October, 2004	Ministry of Finance & Ministry of Commerce	<i>The Notification to Provide Financial Assistance to Resource-related Foreign Investment and Economic Cooperation</i>	Provide direct subsidy or interest subsidy to outward resource-related FDI
	December, 2009		<i>The Administrative Regulations on Special Fund for Outward Economic and Technological Cooperation</i>	
	2003	Ministry of Commerce, Ministry of Land and Resource	NA	Set up special funds for overseas exploitation of mineral resources
	October, 2004	National Development and Reform Commission and China's Import and Export Bank	<i>The Notification on State Providing Credit Support to Overseas Key Investment Project</i>	Set up Annual Overseas Investment Special Fund, Provide preferential interest to export credit
Preferential Taxation Policy	2007	State Bureau of Taxation	<i>The Opinions of the State Administration of Taxation on Performing Taxation Service and Management Regarding the Overseas Investments of Chinese</i>	Adopt tax credit to avoid double tax paying; implemented the interim measures for the calculation and collection of taxes on overseas incomes, further enhance the awareness of the importance of taxation service and management

			<i>Enterprises</i>	
	April, 2009		<i>The Taxation Measures for the Income Obtained Outside China</i>	
Risk Management Assistance	January, 2005	National Development and Reform Commission & China Export & Credit Insurance Corporation	<i>The Notification to Establish Risk Avoidance Mechanism for Major Overseas Investment Project</i>	Encourage and support the enterprises who has comparative advantages to invest overseas. Protective policy are given and recommendation to avoid risk is also available.
Business Consultancy and Recommendation	2011	Ministry of Commerce & National Development and Reform Commission	<i>Investment Guide for Foreign Countries and Key Industries</i>	Provide government opinion on the key investment destination and specify the feature industry in each foreign country.

Source: compile by authors.

4.3. Intra-industry Trade

By disaggregating G-L index³ of different types of products in clothing sector, we found a very low-level intra-industry exchange from 2002 to 2010, with all the observation being less than 0.10 (Table 9). In terms of time-series trend, the intra-industry trade of the whole clothing sector is facing a declining trade as the figure drops from 0.06 in 2002 to 0.04 in 2010. Among all the main products, clothing accessories record the highest intra-industry exchange level, but with the lowest level in the wool knitted garments making. While leather product and accessories saw a moderate growth in the exchange within the sector, the rest products experienced a declining trade with their partner inside the sector.

Table 9: G-L index, Clothing Manufacturing, China, 2002-2010

Year	Clothing	Wool knitted garments	woven clothing	leather clothing	Other clothing	clothing accessories	Headgear
2002	0.06	0.06	0.05	0.03	0.01	0.03	0.03
2003	0.04	0.05	0.05	0.02	0.02	0.03	0.04
2004	0.048	0.05	0.05	0.03	0.02	0.02	0.03
2005	0.04	0.04	0.04	0.01	0.02	0.1	0.08
2006	0.03	0.03	0.04	0.04	0.03	0.05	0.06
2007	0.03	0.02	0.04	0.04	0.02	0.09	0.07
2008	0.04	0.03	0.04	0.07	0.02	0.08	0.06
2009	0.04	0.02	0.04	0.06	0.02	0.07	0.05
2010	0.04	0.02	0.03	0.07	0.02	0.05	0.04

Source: Cao (2012).

The small share of intra-industry in total trade volume shows that endogenous products are mostly traded out, indicating that there is no completed value-chain within the sector or a powerful multinational corporation to organize the whole production process from raw material processing to the final product manufacturing. The current sector players are still characterized as small- medium producer with insufficient capacity to participate in each stage of the whole value chain. A large deficit in the intra-industry trading pattern gives trading partner country higher chance to impose import barriers to tip the trade balance in its favour. In so doing,

³ The Grubel-Lloyd index is measured as total trade in an industry minus the difference between exports and imports, with the assumption that such difference standing for inter-industry trade.

Chinese clothing manufacturers fall into a disadvantage position in global market as they face higher uncertainty from counter party, at the same time, limiting themselves in making the profits. Further, China's clothing industry gained competitive advantages mainly in cheap labour and abundant resources rather than diversified demands and scales of economies. Hence, international trade of Chinese clothing industry is still trapped in a stage which is mainly based on the vertical labour division.

4.4. Institutional Support for Trade Expansion

China joined as a partner with the Association of Southeast Asian Nations (ASEAN) in 2004, creating the world's largest free trade zone. The ASEAN-China Free Trade Agreement (FTA) has been projected to increase exports from ASEAN countries to China by 48 percent and increase China's exports to ASEAN by 55 percent. The three sectors that are expected to benefit the most from this deal are textiles and apparel, electrical appliances and machinery, and other manufactures (Enright *et al.*, 2005).

After few years of practice, China-ASEAN FTA stands out as one of the most promising regional network. The textile and apparel trade volume reached US\$16.39 billion in 2010, which is 7% higher than 2009. In 2010, ASEAN successfully surpassed Hong Kong as the largest export market for wire fabric from China. According to China Customs data, China's textile and apparel exports to ASEAN reached US\$14.43 billion in 2011⁴.

In general, as for the development of clothing industry, China and ASEAN has both competitive factor and big collaborative space. In the past few years, China and ASEAN's textile and garment industry is facing the same problem: with the continuation of global economic crisis, the international economic recession reduced orders, coupled with improved labour costs and other factors, the situation is not optimistic any more. Hence, intra-regional development within China-ASEAN framework was further promoted by enhancing industrial cooperation so that both can mutually benefit from the development of the apparel industry. Bi-lateral and multi-lateral cooperation have been in place, for example, the leader of Cambodia,

⁴ Data from January to September, 2011.

Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam have entered a memorandum which aimed to further enhance cooperation by improving the trade smoothness and openness.

5. Technological Upgrading

Although the Chinese clothing industry is slowly moving towards a more sustainable development trajectory through technological upgrading, their innovation capabilities are still low. Table 10 shows that R&D intensity remains quite low with the highest (0.22%) being recorded in 2011. While the absolute value of R&D expenditure and R&D personnel grew at an average annual rate of 26% and 33% from 2006 to 2011 respectively, R&D intensities are below 1% level. We infer that the presently considerable size of Chinese clothing sector are still labour-intensive. The number of valid invention patents saw an encouraging improvement from 48 in 2006 to 686 in 2011, the ability to transform the intellectual invention into real production capacity is limited as the growing speed of revenues from new products is lower than the growing rate of invention. Data supplied by the International Data Corporation revealed that 85% of the firms fell below 1%, another 10% reached 1% to 2%, while only 5% achieved above 2% of informatics inputs in sales revenue. Compared to national firms, foreign firms demonstrated a relatively higher percentage of over 3%.

The first challenge that Chinese clothing firms face is technology equipment where the adoption rate of mechatronics and digitalize equipment has not been significantly improved yet. The cutting-edge computer-aided design system has a limited application rate and modern warehousing equipment is not sufficiently adequate given the huge production. Meanwhile, design which is a core component of clothing, is still mostly done on paper samples. As a result, Chinese clothing producers faced long product development cycles. China-made clothing needed 10 weeks to reach the market, whereas the world's average cycle is just 2 weeks. In addition, clothing designers are still too few in China. Hence, skilled labour and local designers with strong sense of innovation are needed to participate in the

upgrading process, which also includes the innovation of business model through the development of online and new market strategies.

Table 10: Main indicators of R&D and innovation, Clothing Manufacturing, China, 2006-2011¹

Year	R&D personnel	R&D Expenditure ² (1)	Main business revenue ³ (2)	R&D intensity (%)	New products development expenditure*	Industrial value of new products*	New products revenues*	Export of new products revenue*	Patents application	Invention patents
2006	4142	88208	5910.22	0.15	N.A	N.A	N.A	N.A	N.A	48
2007	4996	96603	7335.75	0.13	N.A	N.A	N.A	N.A	N.A	352
2008	5259	123017	9074.13	0.14	177224	2735842	2578006	957541	620	189
2009	8066	149512	10140.52	0.15	213657	4552441	4833870	890824	1537	284
2010	7422	165556	11988.61	0.14	293185	5457619	2608667	741499	1907	228
2011	17248	289534	13214.41	0.22	401892	8573809	8075745	953207	3565	686

Note:

¹. The data from 2006 to 2010 are from large and medium size firms and the data of 2011 is from the firms above size, which refers to those with annual revenue above 5 million yuan.

² *in ten thousand yuan

³ in 100 million yuan

Source: China S&T statistics yearbook (2012)

5.1. Institutional Support for Technological Upgrading

To promote economic catch-up with global leaders, the government stimulated technological upgrading. Two major features of institutional support were identified. The first attempt is to create a fair and competitive market environment for firms to compete and grow. The second is to regulate industrial upgrading standards and provide firms a guideline to upgrade. The former characteristics come with a substantive formulation of competition rules and regulations together with favourable policies to support firms' entry into global markets, while the latter is characterised by the initiation of industry standards to spearhead firm-level upgrade technological upgrading.

A vibrant economic cluster cannot be separated from dynamic private sector. It is especially true for Chinese clothing firms which are dominated by small private firms. Hence, substantive institutional support, including favourable tax reduction, export subsidy and internal property rights policies have been issued to nurture the development of private sector. For example, export restriction has been relaxed by State Council in 2001 where private enterprises are eligible to apply for the right to export product with the same standards to state-owned and collective enterprises. In particular location, such as economic zone and free trade zone, relaxation has been further exercised. In addition, threshold for private enterprises to be listed has been lowered to help private enterprises overcome the financial difficulties. Government assistance can also be found in the "*Opinions to further support the healthy development of small and micro enterprises*" (No. 14 documents) and "*Provisional view on providing financial support to small- and micro-enterprise*" (No. 87 document) with the former seeking to nurture the development of innovative, ventures, and labour intensive firms, and the latter reducing firms' financial burden to enhance sectoral performance.

The second form of institutional support came from the formulation of industrial standards. Except for existing international standards organization series and OEKO-TEX Standard 100 environmental labelling, China set up "*China Environmental Management System Certification*" to complement the implementation of ISO 14000, which aims to improve the environmental management system during the production process. Meanwhile, OEKO-TEX Standard 100 provides eco-friendly

categorization of clothing production. As Oeko-Tex Standard 100 label has high recognition in international market, any clothing firms that operates an export business has to keep in accordance and acquire the license. The introduction of such standard help firms in upgrading their production techniques, as well as capture the international market.

The third form of institutional support came from the formulation of cluster-based industrial policy (Rasiah, Kong, & Vinanchiarachi, 2011). The provincial, municipal and county governments worked with the firms and universities to initiate training and designing centres to strengthen clustering among small- and medium firms with all the pillars of the systemic quad that Rasiah (2007) considered important in clustering (see also Sonobe, Hu, & Otsuka, 2002; Lin, Li, & Yang, 2011). Indeed, global integration in textile and clothing production can also be seen in the way clusters of Chinese firms have integrated with foreign locations. According to the statistic provided by China National Textile and Apparel Council (CNTAC), there are 146 major apparel clusters in China, of which, 25 percent are located in Zhejiang and 21 percent in Jiangsu. Jiangsu, Zhejiang, Shandong and Guangdong accounted for 23.2 percent, 19.7 percent, 17.1 percent and 10.6 percent respectively of the total national industrial output in 2009. The Yangtze delta and the Bohai Rim attracted 76.8 percent of China's textile enterprises and 61.0 percent of textile employees in 2010.

6. Firm-level Upgrading: Evidence from Clothing Firms in Wenzhou

In this section, we analyse upgrading activities that local manufacturers have undertaken in Wenzhou, Zhejiang Province. The qualitative approaches using case study have natural merits in gathering in-depth understanding of the upgrading process in practice, and thus, helps us to capture the efforts of firms on how they learn, adopt and innovate.

Zhejiang Province was because of its prominent status as the most dynamic homes of clothing clusters in China. Zhejiang exports textile and clothing totalling US\$14 and US\$16 billion respectively, which took up one-fifth of the national total

export. By the end of 2005, there were 6,768 formal textile enterprises in Zhejiang employing 1.5 million employees.

The clothing industry in Wenzhou is transforming from imitators to active implementers of global competition rules. In 1980s and early 1990s, the clothing industry exhibited low quality levels and high counterfeiting. The irregular competition in the initial stage was expressed by one of the entrepreneur:

At the initial of market reforms, poor institutions could not assist firms to meet market requirement. Hence, it was understandable that the quality of the products was low. However, learning led to innovations, which made especially the leading firms strengthen production quality and observe copyright regulations.

Industrial upgrading is reflected in the nature of competition, which shifted from price rivalry to innovation competition that is characterized by improvements material strength and in self-branding and custom services. For instance, Baoxiniao, a leading clothing brand, began to cultivate brand culture by organizing social fashion activities domestically and internationally. Fashion parties and tours have been organized to cultivate a positive image as a fashion leader. Having 60 thousand loyal customers, and the privileged customers accounting for 40% of the total generated considerable market demand, is also as an important motivation for firm to upgrade their business. Direct sale chain network has been established to effectively reduce the over-reliance on franchisees, and expertise product turn-over.

Also, the leading firms have increased participation in R&D and talent cultivation. The shoe and clothing maker, Aokang group has its own shoe Science and Technology institute, which has filed 3 invention patents, 31 utility patents and 24 design patents. The Red Dragonfly group has filed 3 invention patents, 27 utility patents and 21 design patents. The Red Dragonfly group has its own testing labs to develop raw materials and style designing, while the Aokang group concentrates on diversifying product types. Aokang has initiated a project with Zhejiang University to expand its complementary product and services. In addition, it has set up shoe-centres in Wenzhou, Dongguan and Milan to track the latest fashion trends.

Also, Baoxiniao, a leading firm in shoe and clothes making, has its own museum of clothes and shoes to enhance the company's culture and brand identification in the market. In addition, Baoxiniao group that we interviewed has shown strong enthusiasm to expand human resources. Expect for the requirement that middle level managers have to hold at least a Master's degree, the company has taken initiatives to set up its own learning hall and organize two Masters in Business Administration (MBA) courses. The chairman of the board expressed the following,

Although we spent a lot of money to organize the training classes, we believe it is a success if one person stands out as an excellent leader or manager out of 50 course attendants. With this vision towards talent cultivation, the company has successfully produced a pool of talents, which will definitely play a positive role in promoting company's development in the future.

Certainly, the path towards a technological sophisticated clothing sector is never easy but full of barriers and challenges that need to be carefully addressed. One of the most pressing tasks is to enhance the identification of domestic brands. Due to lack of design capacity, Chinese customers have a strong tendency to appreciate foreign brands that they reckon as representatives of good design and quality. For example, although the three companies that we studied mainly serve Chinese customers, the brand ambassadors are westerner (advertisement and poster) to cater the special preference of local buyers. What's more, the translation of brand name into foreign names is found to be customer's fond, such as O'Connell and Aokang. It also has been found that many domestic companies registered in Europe countries, such as Italy and France, to take advantages of foreign names but the actual design and manufacturing are completely done in China. It is true that domestic buyers need time and trust to recognize Chinese-owned brands. However, a lot more work is needed to enhance endogenous branding recognition for the apparel industry to emerge as a world-class designer. The previous industrial upgrading benefited from efficiency through the adoption of cutting-edge technology and sophisticated machinery. But, the clothing manufacturing is now facing a new round of challenge

on how to translate the human capital resource into real production capacity through the technological upgrading and product value appreciation.

7. Conclusions

Using the data from primary and secondary source, this article examined transforming clothing sector in China under two major forces, namely technological upgrading and participation in regional production network. Special focus has been given to articulate how institutional support featured by open-up policy encourages firms to enter global market, and subsequently the initiatives from the accession motivate firms upgrade technology capacity through learning, adoption and innovation.

We have analysed the sectoral development of the clothing industry since economic reforms began in the 1980s, and the new challenges faced by clothes makers in China. Although the absolute value of clothing export has increased, its share in total export has fallen compared to its peak over the period 2000-2007. FDI inflows in the industry also demonstrates a falling trend with its focus increasingly shifting towards the emerging sectors, such as, machinery manufacturing and real estate industry. Hence, the importance of labour-intensive clothing in China's economy is gradually declining. Nevertheless, industrial productivity can be expected to continue to rise the industry is a technology using sector that can benefit from knowledge flows from China's growing high-tech industries.

Meanwhile, the innovation capabilities of the firms is still confined to production technology with little participation of firms using their own designs and brands and in R&D intensities. Although the evidence from case studies shows signs of emerging consciousness to improve design and innovation, the overall clothing industry is still facing great challenge to compete with globally established brands. As the comparative advantages of cheap labour and land is slowly declining as wages are rising, it is pertinent that Chinese firms raise their competitiveness through technological upgrading and the launching of their own brands to participate in high value added activities.

The empirical evidence from China's clothing sector reinforces the statement of Gereffi's (1999) that connecting in global value chains offers firms in developing sites the opportunity to grow and compete internationally. Although China's clothing firms have never led production as Japan did in Flying Geese model, rising costs is slowly forcing the country's movement away from its status as a second tier industrialized nation towards becoming a newly industrialized economy. The development of a technology mechanism to coordinate the flow of knowledge between institutional players will go a long way to stimulate the movement of firms to the technology frontier (Rasiah, 2007). The evidence shows that institutional support has helped industrial upgrading and integration into global production networks.

This study indicates that the government's focus on targeting technological capability has been important in the structural transformation of manufacturing from lower to higher value added activities. Challenges facing the sector, such as, shortage of design capacity and human resource requires strong institutional support from government at every level to lift the position of its clothing sector in the global value chain. In addition, government policy is needed to be in place to nurture the integration of a complete industrial chain in China. It is also important that firms in China are encouraged to grow into large MNCs so as to enable such firms to internalize production chain to increase their global competitiveness.

Since this article did not produce overwhelming evidence enough to explain to evaluate econometrically institutional support provided by government, future studies should revisit this the issue through a large quantitative study to analyse the contribution of institutional instruments, such as, meso-organizations dealing with university education, basic R&D, designing and training to evaluate their impact on firm-level technological upgrading into designing and branding activities.

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