Dynamics and Changes of International Production Network in the Export-Oriented Apparels Industry of Bangladesh

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Abstract

Although the export oriented RMG sector of Bangladesh has experienced considerable changes in terms of size, structure and nature of linkages, it has not been researched adequately. The current study focuses on analyzing the recent dynamics and development of this sector's linkages with International Production Network (IPN). Based on trend analysis the study finds that over time, the sector has been moving upward in IPN. At its' earlier stage the sector was primarily involved in outward processing traffic (OPT) which has now enlarged up to Cut, Make and Trim (CMT) stage. However, the sector is yet to participate actively in Original Brand Manufacturing (OBM) stage by developing its' original designs rather than imitating world trends. It has been also found that the nature of production network is largely unidirectional, that is Bangladesh exports her RMG items mostly to the economically developed countries either from North America or Europe, where as imports from her closer geographical partners who are developing countries predominantly. Again, applying an augmented gravity model to find out the determinants and factors responsible for Intra Industry Trade (IIT), a proxy for IPN, the study finds that sourcing of raw materials depends upon issues like geographical proximity, adequate amount of supply, long term relationship, price and quality of products, and buyers' specification, although the destination of final products does not depend on these to that extent. The role of RTAs or PTAs has been found insignificant in promoting IIT for the sector. Finally, based on sample survey and consultations with the stakeholders, the paper has argued for integrated initiative e.g. industry

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specific trade agreement, simplification of customs procedures, etc to strengthen the production network among the countries.

1.   Introduction and Objective

International Production Network (IPN) has shaped the pattern and trend of international trade of all major commodities over the last few decades. The cross-border trade in unfinished products that has flourished due to the comparative advantage that lies in the different stages of production process for any particular country has led to the emergence of international production network (IPN) (Hummels, Ishii & Yi, 2001).[1] Its development strengthens the links between different domestic and international enterprises which operate in different territories in order to produce or deliver a single final product or service (Umemoto, 2005). These networks ensure involvement of most efficient countries in the production process, through which an optimum level of return for enterprises, quality and prices for consumers, efficient allocation of resources etc. could be attained.

The substantial rise of global trade of textiles and apparels after the end of multifibre arrangement (MFA) has strengthened the international production network by further consolidating the sourcing of apparels from a limited number of countries.[2] Global import of apparels has increased from US$193.56 billion during 2000 to US$316.1 billion in 2007 mainly by USA, EU and Canada with a combined share of 73 per cent of total import (Table 1). Although United States is the single largest importer of apparels, its share in global import has been decelerating overtime. On the other hand, EU has maintained a share of 44.6 per cent of global import of knitwear and 46.2 per cent of wovenwear products during

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[1]   IPN or GPN can take place in two different forms, namely in the form of agglomeration or fragmentation of production where, agglomeration concept originates from the firms' decision regarding space or location of their establishment, which in effect forms cluster of firms to reap the benefit of economies of scale and fragmentation is the idea of division of production process in different locations to take the locational advantage. However, very often these two forms can take place at the same time in case of locational decision for the MNEs.

[2]   According to NCTO (2004), since accession of China into the WTO in 2001 and upto March, 2004, 31 countries have lost 75-100 percent of their global market share of apparels, 40 countries have lost 50-75 per cent and another 17 countries have lost about 25-49 per cent of their market share in the US. It was projected that Central America and the Caribbean, despite their proximity to the US market, would be affected more compared to other countries (Rahman, Bhattacharya and Moazzem, 2008).

Table 1: Trend in Global Import of Textiles and Clothing Products

Country	HS-61 (Art of Apparel & Clothing accessories, Knitted or crocheted)			HS-62 (Art of Apparel & Clothing accessories, not Knitted/Crocheted)		
	2000	2004	2007	2000	2004	2007
World Import (in billion USD)	87.16	116.03	150.58	106.40	134.89	165.48
Importing countries						
Canada (%)	1.67	1.86	2.22	1.69	1.87	2.15
EU-25 (%)	36.73	42.48	44.60	37.43	43.73	46.15
USA (%)	31.56	28.47	26.33	32.17	27.38	23.73

Source: Computed based on data from WITS.

Table 2: Trend in Global Export of Textiles and Clothing Products

Country	HS-61 (Art of Apparel & Clothing accessories, Knitted or crocheted)			HS-62 (Art of Apparel & Clothing accessories, not Knitted/Crocheted)		
	2000	2004	2007	2000	2004	2007
World (in billion USD)	77.26	112.55	155.66	96.29	131.15	155.54
Sources						
Bangladesh (%)	1.55	2.67	3.00	3.03	2.46	2.87
China (%)	17.38	22.93	39.40	19.59	22.10	30.42
India (%)	2.35	2.20	2.65	4.00	2.80	3.37
Turkey (%)	4.78	5.56	5.15	2.58	3.46	3.50

Source: Computed based on data from WITS and for Bangladesh data of 2007 from NBR

2007; Canada's import of textiles and apparels, though not a large amount, is increasing over time at a slow pace (2.22 per cent in knitwear and 2.15 per cent in wovenwear products in 2007).

In this consolidated and expanded market for apparels, only a limited number of countries have competitively performed as sources of apparels. China alone has maintained a share of 39 per cent in the case of export of knitwear products and a share of 30 per cent in the case of woven-wear products in 2007, although its shares in 2000 were 17 per cent and 19 per cent, respectively (Table 2). China's huge manufacturing base of textiles and clothing has been effectively used to expand the export at a substantially higher level after the end of quota regime in January, 2005. A number of other countries were able to perform well in this competitive situation, and Bangladesh is considered one of them. Bangladesh has able to enhance its export over time; in year 2007, it has supplied 3 per cent of global import of knitwear and 2.87 per cent of wovenwear products.

The development of the production network in export-oriented textiles and apparels can be attributed to a number of domestic and external factors. At the domestic level, factors that contribute to the development of production network include low wage, government's liberal policies, Back-to-Back L/C facility, establishment of SEZs, along with other fiscal incentives. These factors, which play a vital role in influencing the decision of MNEs to fragment their production decision, are also applicable for Bangladesh in the way of this sector's development. At the external level, tariff concession received as LDC member in the markets of developed countries such as USA, EU and Canada has contributed the most. At the early stage in the 1980s, easy to supplement production nature of apparel products and wide gap in wage level have motivated many foreign firms to shift their production plants to Bangladesh (BIDS, 1984).[3] Besides, low transportation costs, easy bank loan, availability of ready factory houses on rent, effective technology at low cost, Back-to-Back L/C facility have contributed significantly. Hoque, Murayam & Mahfuzur (1995) mentioned the role of foreign firms in filling up the gap in marketing and management skills, along with technological base. In their survey-based analysis, they conclude that EPZs play an important role in attracting investment in the apparel sector from Korea, Hong Kong and Taiwan.[4] BIDS (1989) found that a number of incentives provided by the government e.g. bonded ware-house, availability of capital, played a critical role to develop the industry. During the early stage, development of the production network was facilitated by the quota restrictions under the MFA, which restrained export of apparels of highly competitive countries at a certain level (BIDS, 1984; Rahman, 2004).

It can be inferred from the above discussion that global sourcing of apparels has been carried out within a limited number of competent and efficient supplying countries. Buyers of developed countries are always looking for sources advantageous in terms of service link facilities, government's pro-active policy initiatives to liberalize their trade and investment, availability of supporting

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[3]   Siddiqi (2004), identifies that the low wage is the major influencing factor for the outsourcing of apparel manufacturing in Bangladesh by the major suppliers in the world market, like South Korea, Hong Kong. He argues that, the abnormally low wage prevailing in the country gives competitive advantage (even with comparatively low productivity) to the foreign companies who outsource some part of their production process. Nath (nd) also supports the positive role of lower wage in the way of development of the apparel industry in Bangladesh.

[4]   According to Rahman (2004), under the centre-periphery structure of production process, firms from developed countries shift their production plants into developing countries. In focusing on the case of apparel industry of Bangladesh, he mentions that the lower production cost due to much lower wage cost has motivated the foreign firms to shift the relatively labour intensive part of the production process into Bangladesh, where the development of communication has also played a crucial role.

infrastructure and firms (role of SEZs), along with different regional and bilateral trading agreements, which reduces the tariff structure within the member countries to a large extent. Also, the closer geographical proximity among the trading nations plays as an important determinant in the way of fragmenting the production process, as it reduces the time-to-market of their products both raw materials and finished goods.

There is a growing indication that international production network in apparels can be further consolidated within a few large supplying countries. Bangladesh is considered one of the most potential sources of apparels to meet the growing demand for apparels. At present Bangladesh is ranked 5th in USA, 6th in EU and 2nd in Canada in terms of supplier of apparels. More importantly, during FY-2008-09 when the global financial crisis hit Bangladesh, it has maintained a strong positive export growth (over 15 per cent) owing to robust growth performance of export of apparels, although overall export growth, particularly export growth of apparels during July-December, 2009, was negative. From a long term perspective, it is argued that Bangladesh bears good potential to enhance its market penetration in global apparels market.

The present study focuses on the dynamics of development of apparels industry in Bangladesh with a view to analysing the structure and trend of growth of different parts of the production network in the country as well as to identify major factors responsible for the development of production network in recent years. This will provide an insight about the inherent strength and potentials of development of production network in the country.

After discussing the background, objectives and methodology of the study in section one, section two discusses the structure of and changes in IPN for the RMG sector of Bangladesh, while section three tries to identify the determinants of IPN for this industry using econometric analysis. And, finally, section four concludes the study with a summary of findings and some policy options to make the network much stronger in the coming days.

Methodology of the Study

To understand the development of international production network in the textile and clothing (T&C) industry of Bangladesh, a trend analysis has been carried out in the case of selected raw materials and components traded with major trading partners by using data available in the WITS. This analysis puts forward a comparison in historical pattern of trade of major T&C related products in different years, viz., 1995, 2000, 2002, 2004 and 2006.

A separate exercise has been carried out considering all components under a single segment at a time instead of simply carrying out analysis on differentiated products (Austria, 2004). For this purpose, expert opinion was sought from different trade bodies (e.g. Bangladesh Textiles Mills Association), which helped to identify the products at HS 6 digit level that are used in any stage of the production process in the production network of textiles and apparels. It is found that about 80 to 90 per cent of the total import or export has been covered under these categories. For the sake of data availability and also for comparability among countries over the years, the analysis was carried out for the years 2002 to 2007.

To find out the determinants of intra-industry trade (IIT) for RMG industry, which is a proxy for international production network in the sector, a panel gravity regression analysis has been estimated; augmented traditional gravity models are used in analyzing the pattern of international trade. This exercise has enabled to identify factors responsible for the overtime development of IPN in the textile and apparels industry in Bangladesh.

2.   Structure of and Changes in International Production Network in the Textiles and Apparels Industry of Bangladesh

Bangladesh's involvement in the international production network of textiles and apparels industry is presented in Figure 1. Bangladesh has so far specialized in component network by manufacturing yarn, textiles and accessories and in production network by manufacturing garments. It has no specialization on raw material network and therefore completely depends on imported materials. Similarly, Bangladesh is completely dependent on buyers and their buying agents for exporting and marketing its manufactured products.

Raw Material Network

The major raw materials used for preparing fabrics, i.e. natural fibers and cotton fibers are either imported or manufactured at the apparel and textile producing countries. These raw materials are cotton, wool and silk (in the case of natural fibers) and natural gas, oil (in the case of synthetic fibers). In view of the quota phase-out, apparel manufacturing countries have changed sources of raw materials. According to Gherzi (2002), Bangladesh is highly dependent on raw materials supplying countries for manufacturing apparel (80 per cent).

Bangladesh's major source of import of cotton is Uzbekistan- about 50 per cent of total import of cotton originates from this single source (Table 3)[5]. India is the next important source for cotton; these two countries comprise more than 70 per cent of total cotton demand. It is interesting to note that during the 1990s and even in the early 2000s Uzbekistan was not the major source of cotton for Bangladesh; instead India, Pakistan and China were the main sources. The causes behind the major shift in the sourcing of cotton are firstly, the price and quality of cotton (Uzbekistan's cotton is considered to be better compared to that of other countries, according to the entrepreneurs who were interviewed); and secondly, the availability of the desired standard of cotton at a large scale. During the early 1990s when the backward linkage textile sector in Bangladesh was in a rudimentary stage, a small amount of the required level of cotton was procured from neighboring countries such as India, Pakistan and China. After about two decades when the demand for cotton has substantially increased for the large domestic base of backward-linkage textile sector, these countries could not remain the major source to meet the requirement of Bangladesh after meeting their domestic requirements. However, it is important to examine whether geographical proximity is still a major determinant of import of cotton from India. Table 4 shows that the countries of South Asia are still important sources of raw materials compared to extra-regional countries. Bangladesh imports the required raw materials for textiles and clothing items, such as HS 39 (Plastics and articles thereof), mainly from Thailand, China, India and Korea, which together comprised about 46.9 per cent of total import of these items. However, some of these sources are increasingly becoming more important, such as India and China. In 1995 the shares of these countries were only 2 per cent and 4 per cent, which increased to 11.7 per cent and 10.9 per cent, respectively, in 2008. Similar is the case with imports of inorganic chemicals and tanning (HS 28) and dyeing materials (HS 32).

Component Network

Local textile mills are able to supply only 20 per cent of fabrics required for woven factories, while local spinning and knitting mills could supply about 70 per cent yarn for spinning and 95 per cent for weaving textiles (Gherzi 2002). In

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[5]   Four major raw materials (at HS 2 digit level) have been taken into consideration for analysing import pattern based on their importance in the backward linkage textile industry. These items include inorganic chemical compound of precious material (HS:28); tanning/dyeing extract, tannins & derives (HS:32); cotton (HS:52); plastics and articles thereof (HS:39). A group of countries have been identified based on their relative share in overall import.

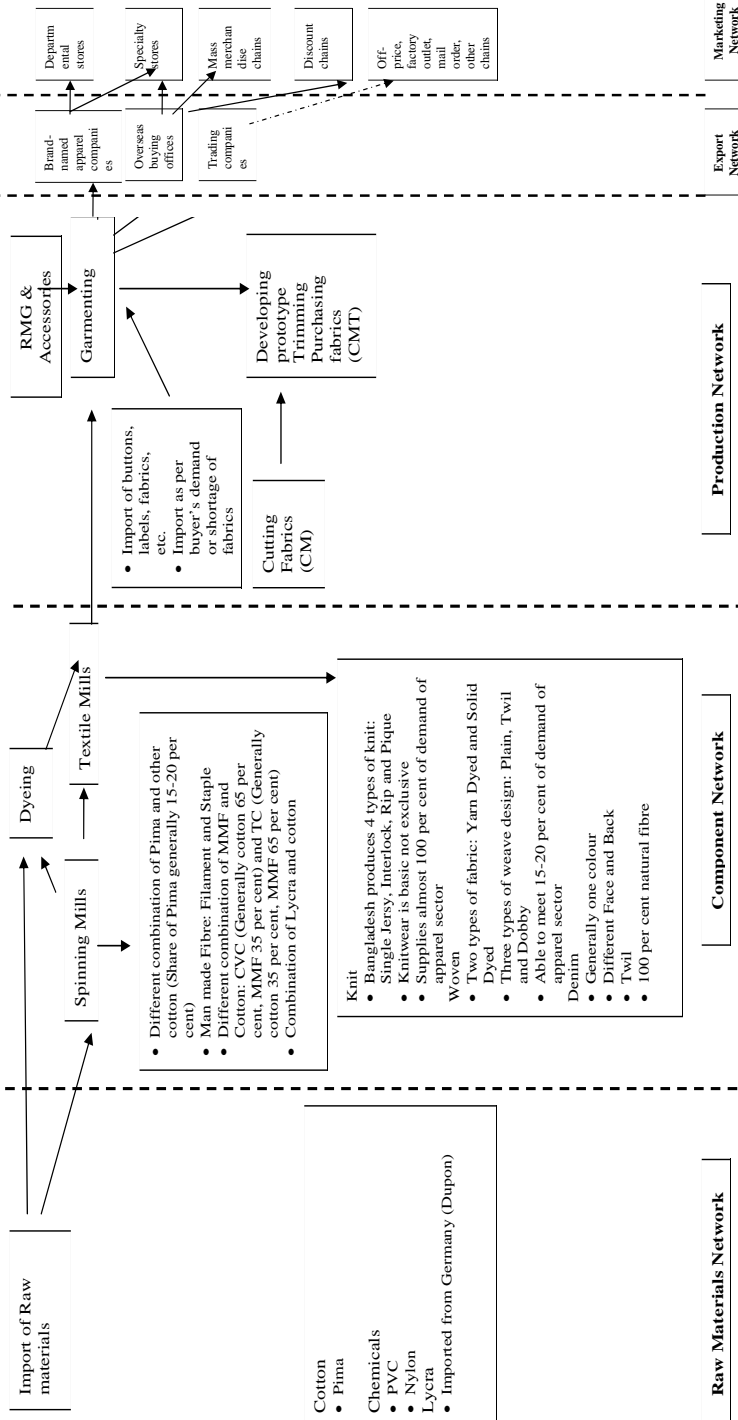Figure 1: Value Chain of the Textile and Clothing Sector of Bangladesh

Raw Materials Network

Cotton
• Pima

Chemicals
• PVC
• Nylon

Lycra
• Imported from Germany (Dupon)

Import of Raw materials

Component Network

Spinning Mills

Dyeing

Textile Mills

• Different combination of Pima and other cotton (Share of Pima generally 15-20 per cent)
• Man made Fibre: Filament and Staple
• Different combination of MMF and Cotton: CVC (Generally cotton 65 per cent, MMF 35 per cent) and TC (Generally cotton 35 per cent, MMF 65 per cent)
• Combination of Lycra and cotton

Knit
• Bangladesh produces 4 types of knit: Single Jersy, Interlock, Rip and Pique
• Knitwear is basic not exclusive
• Supplies almost 100 per cent of demand of apparel sector

Woven
• Two types of fabric: Yarn Dyed and Solid Dyed
• Three types of weave design: Plain, Twil and Dobby
• Able to meet 15-20 per cent of demand of apparel sector

Denim
• Generally one colour
• Different Face and Back
• Twil
• 100 per cent natural fibre

Production Network

RMG & Accessories

Garmenting

Developing prototype
Trimming
Purchasing fabrics (CMT)

Cutting Fabrics (CM)

• Import of buttons, labels, fabrics, etc.
• Import as per buyer's demand or shortage of fabrics

Export Network

Brand-named apparel companies

Overseas buying offices

Trading companies

Marketing Network

Departmental stores

Specialty stores

Mass merchandise chains

Discount chains

Off-price, factory outlet, mail order, other chains

Table 3 : Trend of Imports of Cotton (HS 52) in Bangladesh from
Selected Countries (as percentage of total import)

Country	1995	2000	2002	2004	2006	2008
Uzbekistan	0.00	2.19	6.71	21.00	36.10	48.60
India	13.20	9.80	24.45	14.36	20.80	23.81
Pakistan	13.60	6.77	4.06	5.04	8.67	2.79
China	13.10	20.84	13.89	20.76	8.58	0.20
United States	3.74	5.65	8.18	4.97	3.42	6.68
Korea, Rep.	5.18	1.86	2.66	1.86	0.96	0.20
United Kingdom	0.20	0.53	0.60	0.07	0.04	0.13

Source: Computed based on data from WITS and for year 2008 data from NBR.

Table 4: Pattern of Raw Material Imports for RMG Industry
(top 10 countries according to year 2006)

Partner country	Share of Total-				
	2002	2003	2004	2005	2006
Singapore	18.19	24.21	21.12	24.26	29.99
China	14.88	13.58	12.70	17.57	14.95
India	22.01	20.64	18.52	15.65	13.95
Thailand	4.29	3.78	4.74	5.43	5.91
Germany	5.77	6.59	6.39	5.31	5.55
Taiwan, China	4.80	4.98	5.48	5.28	4.75
Korea, Rep.	6.59	4.88	6.01	3.96	4.18
Malaysia	1.16	0.34	0.30	0.44	3.31
Indonesia	2.81	2.40	2.77	2.52	2.51
Iran, Islamic Rep.	0.57	0.53	2.07	0.86	1.00
All countries (Million USD)	185.81	256.79	251.65	376.31	546.08

Source: Authors' calculation based on WITS data.

contrast, India and China are reaching self-sufficiency level in manufacturing these components, which clearly place them favorably in terms of dealing with leading apparel importers with full package.[6] Countries that have low level of self-sufficiency such as Indonesia, Sri Lanka, and Bangladesh, are compelled to depend on imported fabrics.

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[6] China and India import about 40 per cent of their fabrics demand, but with time it is coming down. Under China's immediate past 5 years plan, the intention was for the industry to be 80 per cent self-sufficient in woven finished fabrics by 2005 with a very large modernisation and expansion programme. (Gherzi 2002)

Intermediate Product Network

The majority of the import for RMG industry of Bangladesh falls under this category e.g. more than 70 per cent of total import in the year 2006 was for this stage of the production process, where only three countries namely Uzbekistan, China and India were responsible for more than 60 per cent of total import (Table 5). During this period a major change in the inner dynamics for sourcing of intermediate products for RMG industry occurred, when Uzbekistan became the most important country.

Compared to her export of RMG, export of both raw materials and intermediate products are very negligible and also concentrated in a number of countries. However, the export destination of intermediate products was less concentrated than its other parts, even if compared to the whole industry. The distinguishing feature of the export of intermediate products from other components of RMG industry is that it varied some how in between intra and extra-regional level.

Regarding import of manmade filaments (HS54), China is the single largest source of import, which accounted for about 50 per cent of total requirement of the country (Table 6). The other important sources are: Thailand and India. However, Korea was the single largest source of import of manmade filament during 1990s, which lost its importance overtime. The reasons for focusing on China in recent times are not only related with price and availability of the

Table 5:   Pattern of Intermediate Products Imports for RMG Industry
(Top 10 countries according to year 2006)

Partner country	Share of Total				
	2002	**2003**	**2004**	**2005**	**2006**
Uzbekistan	4.67	13.53	16.74	18.23	25.45
China	16.24	20.15	23.00	24.38	17.71
India	20.25	11.18	12.75	10.19	17.55
Pakistan	3.34	4.60	4.97	5.99	6.71
Hong Kong, China	15.12	14.12	8.50	8.61	3.78
United States	6.15	4.37	4.30	3.14	2.98
Thailand	1.78	2.63	2.26	2.28	2.89
Korea, Rep.	4.42	3.91	3.71	3.74	2.66
Indonesia	3.50	3.58	2.17	2.79	2.51
Taiwan, China	5.24	4.87	4.93	4.45	2.23
All countries (In Million USD)	1376.74	1759.09	1908.09	1856.60	1727.63

Source: Authors' calculation based on WITS data.

Table 6: Trend of Imports of Man-made Filament (HS54) in Bangladesh from
Selected Countries (as percentage of total import)

Country	1995	2000	2002	2004	2006	2008
China	7.29	14.24	15.82	25.79	29.41	49.34
Korea, Rep.	41.38	22.37	19.32	15.08	12.09	6.90
Thailand	1.54	2.72	2.79	6.82	9.39	12.65
India	2.61	3.06	3.43	3.20	5.48	14.36
Japan	0.30	0.57	3.50	3.12	5.38	0.43
United Kingdom	0.01	0.10	0.45	0.91	0.46	0.00
United States	0.20	0.26	0.82	0.61	0.29	0.20

required type of filaments, but also because of buyers' instruction as regards use of specific type of filament for particular types of fabric.

In case of manmade staple fibers, major amount of import originated from China 70.1 per cent of total import), followed by the distant second source, India (23.1 per cent) (Table 7). Other small supplying countries are Korea, Thailand and Indonesia. There is a structural shift in the case of importing sources - Korea which was earlier considered as a major source of manmade staple fibres in 1990s

Table 7: Trend of Imports of Man-made Staple Fibres (HS55) in Bangladesh from
Selected Countries (as percentage of total import)

Country	1995	2000	2002	2004	2006
China	11.97	23.31	24.33	32.23	70.09
India	2.80	3.02	8.17	5.84	5.56
Korea, Rep.	36.04	10.42	11.12	9.85	3.82
Thailand	3.33	4.70	6.61	9.48	3.79
Indonesia	7.33	6.14	8.23	5.19	3.03
United States	1.34	0.74	1.17	0.98	0.64
United Kingdom	0.07	0.07	0.82	0.33	0.53

has lost its importance overtime. Similarly, in the case of knitted and crocheted fabrics, Korea, China and Hong Kong China are the major sources of import for Bangladesh, whereas Thailand and India are used at a limited scale.

Analysis of raw material and component network of textile and clothing industry reveals that the sources of import have overtime changed. The countries which were considered major sources in 1990s and early 2000s have gradually lost their

importance as major suppliers. In the case of raw material network, supply of cotton mainly originates in Uzbekistan, while a major share is also held by India. On the other hand, in the case of import of various components of textile and clothing, though China is a major source, a number of other countries are also considered important. Although in most instances these are Asian countries, the set of countries have changed over time. A number of reasons are found to be important behind this shifting of sources, such as price and quality of products, availability of adequate supply of large volume of products, buyers' specification in case of sourcing of raw materials and components, geographical proximity etc. However, regional trading arrangement is not considered as major determinants in case of changes in sourcing pattern over time; lack of effective operation of these RTAs because of various reasons is a related issue in this case.

Production Network

There are four stages in the production process, and manufacturers' involvement in a particular stage depends on the level of development of their enterprises in terms of technology, skill profile, expertise on fashion and design of global level etc.[7] Bangladesh has over time improved its production techniques and this has allowed it to fully shift from the early stage of production (assembly) to OEM. Under the stage of OEM, it has gradually improved its position from CM to CMT. After the phasing out of quota, because of the pressure of competition, Bangladesh has increasingly been moving towards FOB form of production, where buyers and retailers directly place their orders by contacting with manufacturers. With the development of network between retailers and manufacturers, especially after the phasing out of quota, manufacturers can work as major contractors or sub-contractors of major overseas contractors. Bangladesh is lagging behind Indian and Chinese firms in terms of performance in designing, developing new fashion products or developing their own trends.

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[7]   At the earliest stage of the production process, which is called assembly or outward processing traffic (OPT), buyer supplies cut fabrics, threads, buttons, zips and trims, with everything to be assembled according to the design prepared by the buyer to be re-imported. In the second stage of production (Original Equipment Manufacturing (OEM), manufacturers undertake more tasks within the production process, like cutting according to the patters supplied by the buyer, or preparing and grading the patterns according to the prototype supplied by the buyer, or even purchasing the inputs for OEM production. This stage involves different types of steps: Cut and make (CM), and Cut, Make and Trim (CMT). In more advanced stage, manufacturers develop their own brand (Original Brand Manufacturing (OBM)) and sell it in domestic, regional and international markets. And at the final stage of achievement, manufacturers influence the global fashion (Original Design Manufacturing (ODM)) by developing their original designs rather than imitating world trends and become known and recognizable brand-manufacturer world wide.

Export Network

In the buyer-driven value-chain, manufacturers have less scope of involvement in the export network. Manufacturers are more and more dependent on a group of large buyers because of the latter's increasing dominance in the retail market. Bangladeshi entrepreneurs are getting orders more and more through direct contact with buyers and retailers, although they have started businesses through contact with buying houses. Buyers and retailers prefer to place large volume of orders to selected manufacturers in order to reduce transaction costs and ensure quality of products.

As regards the export of finished products of textiles and clothing, the major market for Bangladeshi products are United States and some big economies from Europe (Tables 8, 9 and 10). Here, a remarkable feature of market dynamism for export items is that Germany as a single country is getting more importance over time, whereas the share of United States is falling gradually although it still imports the highest amount from Bangladesh.

Table 8: Pattern of Finished Products Exports for RMG Industry
(top 10 countries according to year 2006)

Partner country	Share of Total				
	2002	2003	2004	2005	2006
United States	43.71	33.17	28.96	33.68	33.17
Germany	13.50	19.30	20.64	19.84	19.75
United Kingdom	10.27	11.31	12.24	10.74	10.18
France	7.87	8.05	9.13	8.24	7.88
Spain	2.69	3.79	4.41	4.58	4.98
Canada	2.06	4.19	4.90	4.72	4.69
Italy	4.11	4.24	4.60	4.24	4.48
Netherlands	5.03	4.97	4.38	3.66	3.91
Belgium	3.05	3.43	3.16	2.89	2.79
Turkey	0.01	0.00	0.17	0.35	0.61
All countries (In Million USD)	3910.03	4866.93	6123.86	6721.94	8130.39

Source: Authors' calculation based on WITS data.

Final/ Finished Products

Compared to the import of raw materials or intermediate products for RMG industry, the import of finished products is very low and also very much concentrated in a few sources of their import. For import of finished products this concentration is also increasing over time. Only three countries accounted for almost 80 per cent of total import of finished products in 2006 whereas these countries supplied about 68 per cent of total imports in 2002.

Table 9: Trend of Exports of Articles of Apparel & Clothing Accessories,
Knitted or crocheted (HS61) from Bangladesh to Selected
Countries (as percentage of total export)

Country	1995	2000	2002	2004	2006	2008
Germany	17.42	17.57	17.57	24.40	24.69	20.94
United States	30.24	26.38	27.28	15.46	16.70	15.16
France	13.54	12.41	11.94	13.00	11.34	10.81
United Kingdom	12.43	9.32	11.01	11.93	10.20	11.00
Spain	0.49	1.84	4.04	6.35	7.23	6.72
China	0.00	0.02	0.00	0.01	0.02	0.05
India	0.00	0.00	0.00	0.00	0.01	0.02

Source: Computed based on data from WITS and for year 2008 data from NBR.

Table 10: Trend of Exports of Articles of Apparel & Clothing Accessories,
Not Knitted/Crocheted (HS62) from Bangladesh to Selected
Countries (per cent of total export)

Country	1995	2000	2002	2004	2006	2008
United States	52.30	53.51	52.82	41.66	49.58	47.36
Germany	9.41	11.40	11.75	18.51	16.23	14.05
United Kingdom	9.66	7.78	9.25	10.50	8.25	8.58
France	7.09	5.60	5.68	5.93	4.84	4.42
Canada	2.70	2.30	1.91	5.41	4.47	4.75
China	0.01	0.01	0.01	0.05	0.10	0.07
India	0.00	0.06	0.01	0.06	0.04	0.15

Source: Computed based on data from WITS and for year 2008 data from NBR.

The major portion of exports of RMG was in the form of finished items. For example, in 2006 this category accounted for more than 85 per cent of total export under RMG industry. Again, the export of finished items is also targeted to a limited number of countries. Only ten countries accounted for more than 90 per cent of total export of finished products and the share of top three countries in total export was about two-third of total export. Although, no major change has occurred during this period, some changes have emerged within the countries for the share dynamics, where the share of USA has declined and the share of Germany and Canada increased considerably.

For trading relations of Bangladesh, in terms of sourcing and destination of RMG related items, there is a clear division based on the geographical or economic condition of the trading partners. In the case of export of RMG products, the major countries are the economically developed countries either from North America or Europe, whereas for import of RMG products Bangladesh's

concentration lies mainly with her closer geographical partners who are at the same time predominantly developing countries. One of the reasons for this distinctive division in sourcing and exporting of RMG items might lie in the nature of the whole process of RMG production to consumption. The pressure of reduced "lead time" might be one which has induced entrepreneurs to procure their necessary raw materials and intermediate items from near-by sources. On the other hand, for export of RMG items, as the most developed countries of the world who are the major consumers of these items are mainly in North America and Europe, and the developing countries in this region are also the large producers of RMG items, Bangladesh has limited options to sell her products at regional level. These two unique economic characteristics along with some favorable tariff treatment for RMG imports provided by the developed countries (e.g. Zero tariff access in EU and Canadian Market) have influenced the production network for RMG industry of Bangladesh to emerge primarily as a one-way trading relationship, rather than a two-way relation.

3.   Factors Responsible for the Development of International Production Network in Bangladesh: Findings from Gravity Analysis

The changing dynamics in the production network in textiles and apparels industry has been analysed on the basis of identifying the determinants of intra-industry trade (IIT) index.

Regarding the country specific determinants of IIT, Veeramani (2001) highlights certain country specific factors, such as per capita income difference, technology gap and human capital endowment difference which are found to be crucial in theory and are also relevant in determining the pattern of India's IIT. In their paper to measure and examine vertical intra-industry trade patterns in the East Asian region and using the data from the electrical machinery industry based on the supposition that VIIT is closely related to offshore production by multinational enterprises, Fukao, Ishido, & Ito, (2003) conclude that FDI plays a significant role in the rapid increase in VIIT in East Asia in recent years.

The determinants of IIT can be divided into two characteristics; product specific and country specific. A country characteristic such as closeness to the trading partner increases the IIT. The negative relationship between geographical distance and IIT can be reflected in transportation costs. In the view of Lorena (2005) economic theory predicts that the volume of IIT depends on two groups of determinants; the first group is related to country and the second one to industry. The determinants related to country are: the level of economic development, size

of market, distance between countries, trade orientation, economic integration and trade barriers. And, the industry-specific determinants are connected with the characteristic of an industry. These include product differentiation, economies of scale, market structure, product life cycle and foreign direct investment.

In an attempt to identify the country level determinants of IIT for motor cars between Eastern and Western Europe, Wieslander (2006) points out the role played by geographical proximity and economic size as well as the per capita GDP as a determinant of the nature of IIT, vertical or horizontal. In order to measure product differentiation, Lorena mentions that economic literature uses R&D, advertising, marketing and sales costs relative to total sales. These variables are all assumed to vary positively with IIT. According to Yeung (2008), in theoretical terms, there is indeed a complex link between global production networks and industrial clusters. For industrial clusters to emerge and sustain, both local and non-local links are highly important. Local links refer to localized assets in specific territories such as institutions, labour, and capital formation. Non-local links point to flows of knowledge, people, and capital exogenous to these industrial clusters. They are critical to the formation of industrial clusters insofar as they bring in new markets and technologies.

For present regression model, a panel gravity model has been considered (Ekanayake, 2001).

The model:

$$liit_{ijt} = \alpha + \beta_1 lpcy_{it} + \beta_2 lpcy_{jt} + \beta_3 tgdp_{it} + \beta_4 tgdp_{jt} + \beta_5 ldist_{ij} + \beta_6 lwrimi_{it} + \gamma_1 rtad_i + \eta$$

Where,

- $liit$ = Intra-industry trade index between country I and j at time t in the defined RMG sector.
- α = Constant
- $lpcy$ = Log of per capita GDP of Country i at time t.
- $lpcy$ = Log of per capita GDP of Country j at time t.
- $tgdp$ = Log of trade to GDP ratio of country i at time t.
- $ldist$ = Log of trade to GDP ratio of country j at time t.
- $ldist$ = Log of distance between countries i and j in nautical miles.
- $lwrimi$ = Log of manufacturing wage rate index in country I at time t.
- $rtad$ = RTA dummy where 1= if there is any trade agreement between country i and j or i gets any kind of export facility like GSP and 0= otherwise.
- μ = Write noise error term.

The regression has been carried out for two different time periods: one regression considered the time period for which data is available from two sources such as UNOMTRADE and National Board of Revenue (NBR) and another regression considers the time period for which data is available only from UNCOMTRADE. The first exercise has been carried out mainly to increase the number of observations of the regression analyses. However, we have not found any major difference in the significance levels of the models, except some minor variation in the coefficient values for these two regressions.

From the estimated regression results (Table 11), it is found that most of the explanatory variables are not statistically significant although they have the expected signs. The traditional gravity variables, like per capita GDP of the trading partners, have their positive but insignificant influence on establishing the intra-industry trading relations. The most influencing factor in determining the

Table 11: Regression Results: Determinants of IIT in the Export-Oriented RMG Industry of Bangladesh Dependent variable:

Variable	For period 2002-2008		For period 2002-2006	
	Year specific	Country specific	Year specific	Country specific
α	381.20	440.62***	443.79	413.58**
lpcy	2.57	1.89	50.11	35.89
lpcy	1.85	6.28	5.23	6.13
tgdp	.91	.86	1.13	.99
tgdp	-.06**	-.06	-.13*	-0.92
lwrimi	-32.78	-36.85	-74.28	-61.05
ldist	-19.86*	-27.08**	-24.07*	-24.05***
rtad	6.18	.38	3.35	1.66
Number of observations	182	182	130	130
Number of groups	7	26	5	26
R-sq: within	0.17	0.02	0.17	0.03
between	0.89	0.21	0.98	0.17
overall	0.17	0.15	0.18	0.16

Note: *, **, *** denote significance level at 1%, 5% and 10% respectively.

intra-industry trade in the RMG industry of Bangladesh is geographical distance, which on the other hand works as a proxy for transportation cost. We have constructed the dummy variable in a special manner to see the impact of any kind of trade preference to Bangladesh, whether that is bilateral or unilateral, on the intra-industry trade relations which has been found as insignificant for all the regressions. The regression shows that manufacturing wage rate index is not a

significant determinant for the development of IIT, and same is true for level of intra-industry trade.

4.   Concluding Remarks

The development of production network in the textiles and apparels industry of Bangladesh is largely unidirectional. Although backward linkage textile sector has developed overtime in the country, this is not sufficient to provide 'full packaged' supply to the buyers. The industry is largely dependent upon imported raw materials particularly in the case of wovenwear products. In the case of import of raw materials and intermediate products from different sources some product-specific trends are observed and this has changed over time. Some of the countries which were earlier considered as major sources have become less important later on, while others are considered to be important at later stage. Changes in the sources are attributable to geographical proximity, adequate amount of supply, long term relationship, price and quality of products, and buyers' specification. Sources of import of raw materials of Bangladesh are, however, not the destination of final products.

Since different sources have been chosen by entrepreneurs for the procurement of raw materials and intermediate products, a network between major sourcing countries can be strengthened through an integrated initiative between these countries where industry specific issues should be kept in mind. An industry specific trade agreement can be signed where countries under the network will take initiative to reduce the cost of import by reducing duties, development of trade facilitation measures with a view to reducing transport cost, transaction cost and time required for procurement of raw materials and time required for shipment of products.

A number of other issues need to be taken into consideration in order to strengthen the production network between countries. Firstly, member countries should take measures for simplification of customs procedures between countries in order to speed up the process of trade. Secondly, in order to enhance the cross-border trade, the trade infrastructure at border points needs to be improved. Particularly countries having joint borders with Bangladesh should take adequate trade facilitation measures (such as speeding up the process of customs clearing, modernization of customs clearing system, adequate place to transfer products, ensuring availability of officers at border points). Thirdly, often non-tariff barriers (NTBs) hinder trade between two countries. Hence, countries working under the value chain should jointly work for identification of NTBs and thereby take necessary measures to eliminate those barriers.

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