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MAPPING THE GLOBAL GARMENT SUPPLY CHAIN

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WageIndicator Foundation, Amsterdam, August 2018

About WageIndicator Foundation - www.wageindicator.org

WageIndicator started in 2001 to contribute to a more transparent labour market for workers and employers by publishing easily accessible information on a website. It collects, compares and shares labour market information through online and face-to-face surveys and desk research. It publishes the collected information on national websites, thereby serving as an online library for wage information, labour law, and career advice, both for workers/employees and employers. The WageIndicator websites and related communication activities reach out to millions of people on a monthly basis.

The WageIndicator concept is owned by the independent, non-profit WageIndicator Foundation, established in 2003. Its Supervisory Board is chaired by the University of Amsterdam/AIAS-HSI and includes a representative from the Dutch Confederation of Trade Unions (FNV) and three independent members. The Foundation is assisted by world-renowned universities, trade unions and employers' organizations. It currently operates national websites in 92 countries, with 60 new countries in the pipeline. Its staff consists of some 100 specialists around the world. The Foundation has offices in Amsterdam (HQ), Ahmedabad, Bratislava, Buenos Aires, Cape Town, Islamabad and Venice.

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Kea Tijdens is a sociologist and senior researcher at the University of Amsterdam. Since 2000 she is also the scientific coordinator of the worldwide WageIndicator web survey on work and wages. She has published on issues related to survey design and on wage setting, industrial relations, working conditions, working time, women's work, occupational segregation, measurement of occupations, and web-survey methodologies.

Acknowledgements

The authors are grateful for the contributions of Paulien Osse, director of the WageIndicator Foundation (WIF), Nadia Pralitasari, WageIndicator Indonesia, and Daniela Ceccon, WageIndicator data manager, in particular concerning the garment industries of Indonesia, Ethiopia and Myanmar. Special thanks are due to the language editor, Denis Gregory, former Academic Coordinator at Ruskin College, Oxford, UK.

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1. Introduction

In 2016 the authors were part of the team that on behalf of the WageIndicator Foundation (WIF) prepared the report *Wages in Context in the Garment Industry in Asia*. This report, commissioned by the Ministry of Foreign Affairs of the Netherlands, was written for the Asian Living Wage Conference (ALWC), that took place on 25-26 May, 2016, in Islamabad, Pakistan. The ALWC objective was to promote living wages through social dialogue and supra-national co-operation within the garment sectors of leading Asian countries. The ALWC highlighted the need to connect the supply chain initiatives of brands to the collective bargaining processes carried out between local unions and employers (See Conference Report). The *Wages in Context* report provided contextual information concerning the relevant wage levels for the nine Asian focal countries: Bangladesh, Cambodia, China, India, Indonesia, Myanmar, Pakistan, Sri Lanka, and Vietnam. This information comprised national minimum wage levels and poverty lines; living wages for individuals and for a typical family based on cost of living data, and wage levels of the labour force and of the garment workers specifically. Besides analysing wage levels, national wage-setting regulations and industrial relations, the report also pointed to the wider economic context. An introductory chapter covered the development of global value chains and the garment industry.[1] After exploring statistics on exports and employment for the nine Asian countries, *Wages in Context* presented an overview of the garment / footwear supply chains of 25 global brands operating in these countries.

In July 2017, the 5th Conference of the Regulating for Decent Work (RDW) Network of the International Labour Organization (ILO) took place at the ILO's Geneva headquarters. This proved to be an excellent opportunity to exchange views with other researchers and with policy makers in this field. In a forum debate on 'Promoting Decent Work for Vulnerable Workers in Global Value Chains' we presented an update of *Wages in Context*. In particular, we refreshed the information on the garment / footwear supply chains of 15 major brands with the latest information available. At the RDW Conference we also attended a fringe meeting in which the ACT (Action, Collaboration, Transformation) Initiative was presented. In ACT, 17 brands and retailers have agreed to cooperate with the global trade union IndustriALL "to transform the garment and textile industry and achieve living wages for workers through industry-wide bargaining linked to purchasing practices" (website ACT). Subsequent contacts with Dr Frank Hoffer, Executive Director of ACT, and representatives of other initiatives aiming at 'a sustainable garment and textile sector'[2] and with NGOs active in this field, convinced us that the continuation of our research efforts would be rewarding.

In particular within the framework of activities of the WageIndicator Foundation (WIF) it makes sense to extend and publish analyses of the major garment / footwear supply chains. For example, during 2017-2019 WIF is involved in Indonesia in the 'Transparency through mobile Internet' project, enabling garment workers and employers to check, debate, negotiate and publish wages and working conditions online. Also, WIF projects on the

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1 We use 'garment', 'apparel', and 'clothing' in this report as synonyms.

2 Like in the Netherlands the agreement with this aim, coordinated by the Social and Economic Council (SER) (website).

implementation of living wages in Ethiopia's garment sector and on estimating living wages for Myanmar are currently in progress.

For the current report we built an extensive database covering the supply chains of 24 major garment and footwear-selling firms or brands drawing on useful recent information they disclosed on the Internet. Chapter 3, on methods and data, presents the main characteristics of these brands. The companies covered by our survey are[3]:

- 14 European firms/brands: Adidas; Amer Sports; ASOS; Bestseller; C&A; Debenhams; G-Star; H&M; KappAhl; M&S; Pentland; Primark; Puma, and Tesco;
- seven US-based firms/brands: Gap Inc; Levi Strauss; New Balance; Nike; PVH Corp; Under Armour, and VF Corp;
- two Japanese brand/firms: ASICS and Uniqlo;
- one mixed Asian/European firm/brand: Esprit.

At the start of our current research and primarily based on UNCTAD's export statistics as summarized in Chapter 2, we selected 25 production countries to be included in the database, namely:

- 16 Asian countries: Bangladesh; Cambodia; China; India; Indonesia; South Korea; Malaysia; Myanmar; Pakistan; Philippines; Singapore; Sri Lanka, Taiwan; Thailand, Turkey, and Vietnam;
- four African countries: Egypt; Ethiopia; Morocco, and Tunisia;
- five Latin American countries: El Salvador; Guatemala; Honduras; Mexico, and Peru.

Chapter 2 provides an introductory overview of the development of global value chains related to the garment industry. It notes that 'efficiency seeking' US-based multinational enterprises (MNEs) in the mid-1960s took the lead in shifting garment and other production to Asian and Latin American countries. More recently the integration of China, India and the CIS countries in the liberalised world economy played a part in shaping vertical production networks as did the proliferation of Export Processing Zones (EPZs) aiming to attract Foreign Direct Investment (FDI). A major distinguishing feature of the economic relationships surrounding garment manufacture has been the shift to 'buyer driven' supply chains whereby large retailers and global marketeers took advantage of labour cost differentials across countries. The chapter notes that in the 2000s, the 'standard structure' of the supply chains fitting in the global sourcing strategies of major garment and footwear retailers saw production being contracted out to deep (or long) supply chains. It refers to the advance of 'fast fashion' whereby increased variety and fashionability were key to driving sales and profitability. Instead of inducing a return of garment manufacturing to Europe and the US, the fast fashion business model has been intertwined with the growing efficiency and effectiveness of the major fashion sellers' global supply chains.

Building on evidence reported by leading authors in the field and international and national organisations, including trade unions and NGOs, Chapter 2 emphasizes that for the factories and workers involved in the global garment supply chains competition has been fierce with relentless downward pressures on wages and conditions. It refers to analyses of the challenges these chains are currently posing for workers, trade unions, NGOs and governments looking to secure decent production conditions and social upgrading. It may

[3] Currently nine of the 24 brands are a member of the ACT initiative: ASOS; Bestseller; C&A; Debenhams; Esprit; H&M; Pentland; Primark, and Tesco (website ACT).

be noted that some of the leading garment brands have lately shown steps in this direction, and greater willingness to work with the ILO's decent work agenda (ILO 2016) than would have been the case before the Rana Plaza disaster in Dhaka, Bangladesh (2013). The information concerning their supply chains these brands disclosed on the Internet has allowed to produce the database which lies at the heart of the analyses presented here.

Chapter 3 sets out the sources and methods used to compile this WageIndicator Garment Supply Chain Database. Covering the supply chains of 24 brands in the 25 production countries included, the database holds details of 8,110 factories. The insight that a database of this size can generate will be evident to the reader as this report progresses. At the same time, the constraints and gaps in the data are scrupulously set out in order to optimise the objectivity of both the analysis and commentary offered in the text. Chapter 3 also presents main characteristics of the 24 brands scrutinized, including data on sales, own employment and employment in their value chains.

Chapter 4 quantifies the relationship between the brands and the factories supplying them. A factory does not necessarily deliver to one brand. We start with a section showing the shares of factories that supplied more than one brand, by product categories (apparel, footwear and accessories) and countries, before detailing the distribution of the number of brands per factory, by country and by brand. A second section covers the sizes of the factories. Overall, we had to ground the distribution of factories over broad employment size classes, that is, from 1 to 1000 workers, 1001 to 5000 workers, and over 5000 workers. Again, we present various distributions, by product categories, countries and brands, and relate the size classes to the number of brands supplied per factory. We show rankings of the largest factories for footwear, apparel and accessories manufacturing. We add averages of employed per factory supplying the six brands that disclosed detailed numbers of employed per factory, before clarifying country shares in the supply chains of the 15 brands with large chains, as shown in the Statistical Appendix. As the garment industry in particular is a major source of work and income for women, Chapter 4 cannot do without a presentation of data on female labour participation across countries, brands, and product categories.

The focus of Chapter 5 is on factory ownership. A first overview relates parent firms to their country of origin, including the 25 production countries and a number of investing countries. We highlight a number of investors with widespread interests before showing the distribution of parent companies by the number of factories owned. Next, we concentrate on the issue of national versus foreign ownership. A cross tabulation details ownership relations by investing and production countries based on the numbers of factories before we engage in a slightly more speculative analysis of ownership based on the numbers of employed.

Chapter 6 concentrates on the location of factories within the production countries. For 10 countries in particular we specify the provinces and states with the largest number of factories actually supplying the 24 brands, pointing to various levels of spatial concentration. We devote a special section on China, a highly interesting country as far as it concerns garment industry (re)location. Finally, we explore the spread of EPZs in the countries scrutinized.

Chapter 7 summarizes the findings of the report and finalizes with recommendations for further research. We argue that expanding and regular updating the supply chain database is worthwhile because it would underpin longitudinal analyses. Case studies connected with the database would add value, in particular by unravelling the relationships between the brands as ultimate principals, the emerging large Asian manufacturers, and factory owners of various kinds.

2. Global value chains and the garment industry

Multinational enterprises and global value chains

Between 1965 and 1975, US-based multinational enterprises (MNEs) initiated a rush of foreign direct investment (FDI), particularly in electronics, textile and garment manufacturing. The decrease in tariff barriers along with advances in ICT and transport technologies enabled a growing number of MNEs to develop systematically into 'efficiency seekers'. These MNEs relocated labour intensive processes to countries with pools of cheap labour. FDI of US-based manufacturers in Mexico, South Korea and Taiwan topped initial, low-wage oriented investment in Puerto Rico, Singapore and Hong Kong. Japanese, British, German and Dutch MNEs followed suit. Latterly, production and servicing processes have continued to be split and fragmented in ever finer steps, executed in vertical production networks that specialize in different tasks or stages at separate locations around the globe ((references in) Van Klaveren *et al.* 2013, Chapter 1). In the 1970s notably in Asia the emphasis shifted from global value chains (GVCs) driven by producers to buyer-driven chains controlled by large retailers and global marketeers. These global buyers took advantage of labour cost differentials across countries, while maintaining productivity and quality standards. This was particularly the case in the global apparel value / supply chain (Gereffi 1994; Gereffi and Frederick 2010).

On the labour supply side, a major impetus for GVCs was the fast integration of China (from 1979), India and the former Soviet (CIS) countries (both from 1991 onwards), into the liberalized global economic system. An additional and partly overlapping impulse came from the development of Export Processing Zones (EPZs, including Free Trade Zones, FTZs, and Special Economic Zones, SEZs), with special incentives attracting export-oriented industries. According to ILO/ACTRAV, a few years ago some 3,500 EPZs were operative in 130 countries with an estimated 66 million workers. The vast majority of EPZ workers are women, especially in garment and electronics manufacturing (ILO 2014). We return to this issue in Chapter 6 when covering the location of garment factories within countries.

The garment industry: structure and challenges

In the 2000s, the 'standard structure' of the supply chains used to deliver the global sourcing strategies of major garment and footwear retailers saw production being contracted out to 'deep' (or long) supply chains, embracing production hierarchies with subcontracting down to three or even four tiers. As our current research confirms, most global garment retail brands neither have a domestic production base nor any reliance on their own factories anymore; their suppliers are mainly formally independent manufacturers (see Chapter 3). This is remarkable, in that it appeared to be at odds with a major turn in the sales strategies of leading clothing retailers. In the early 1990s Zara, the flagship subsidiary of the Spanish Inditex group, Swedish H&M and US-based Gap Inc took the lead in developing what has been dubbed 'fast fashion' whereby increased variety and fashionability were key to driving sales and profitability. Industry watchers suggested that this 'move' might induce a return of garment manufacturing to Europe and the US, or at least would concentrate production facilities closer to these main markets. For a while Inditex/Zara's strategy in particular suggested that a diversity of approaches to outsourcing might develop, allowing production to become 'closer not cheaper'. Yet, by 2002 Inditex' CEO announced that Zara's sourcing

would largely focus on Asia, principally on mainland China with the use of Hong Kong subsidiaries as sourcing agents (Tokatli 2008, 12-13[4]).

In the last two decades, the fast fashion business model has been refined and intertwined with the growing efficiency and effectiveness of the major fashion sellers' supply chains. Characteristically, fast fashion-oriented retailers respond quickly to trends spotted at fashion shows and from trend setting personalities exposed in the media, by transforming these trend indicators into cheap products that can hit the markets with minimal delay. As a result, fast fashion still looks to be a highly attractive sales model. Adopting the model can overtake the dictates of seasonal collection change, and by catering to young people shopping for new styles with greater frequency retailers sell more products each year. However, the stakes are high. Firms adopting fast fashion need a highly developed information infrastructure and an equally responsive global supply chain. Management courses and textbooks aimed at the business community continue to preach that global sourcing practices offer lower labour costs and diversified, high-quality supplies at the same time as minimizing investment in production facilities, lowering inventories and reducing delivery time. Pressures are high on costs and time throughout the supply chain; 'lean retailing' has become the catchphrase here. In large parts of garment retailing fast fashion has become the norm. Even brands that do not engage in a full 'fast fashion' model have difficulties evading the push for shorter lead times, the time given to factories between receiving an order and delivery of the product (Arrigo 2013; Taplin 2014).

A range of practical limitations have been spelled out that can frustrate the ideal picture just sketched, including: the lack of flexibility of product-specific strategies; political instability; language and cultural barriers; trade and customs regulations; lack of information sharing; transportation problems; the role of intermediaries with the potential to develop into international garment manufacturers in their own right -- all of which can contribute to the inherent vulnerability of supply chains with complex logistic processes (Cf. Murray *et al.* 1995; Gereffi 1994, 1999; Kinkel 2012; Taplin 2014). However, it would be wrong for those supporting the cause of labour to rely solely on the effects of such limitations. For labour, other and equally serious drawbacks remain in evidence. Clearly, the 'standard structure' just summarized tends to generate downward wage pressure on wages, working conditions and job security in the entire supply chain. That pressure is further compounded by conditions imposed by global buyers using their market power to influence: financial, technological and logistics/distribution capacities; the dispersion of their orders over first-tier garment manufacturers and the wage-setting power of these manufacturers and their associations in their respective home countries.

Leading authors in the field have analysed the challenges global garment value chains are currently posing for workers, trade unions, NGOs and governments looking to secure decent production conditions and social upgrading as well as the integration of garment production in national economies. Although they use different phrasing, their conclusions are quite similar. For example, Pickles (2013, 12) emphasized three issues in this respect: "1. apparel production has been disembedded from integrated textile and clothing complexes,

[4] Oddly enough and contrasting with Inditex' 2016 supplier map, its website at that point maintained that the majority of its manufacturing capacity was in the proximity of its headquarters (Van Klaveren 2016, 16, fn. 9).

mature industrial labour relations, and strong health and safety state institutions. This has simultaneously fuelled exploitation and restricted opportunities for developing backward and forward linkages; 2. increased fragmentation and geographic dispersion of the value chain is compounded by the reduced length of contracts, high turnover of suppliers, and higher demands on them, often without any increase in the contract price; 3. responsibility for decent work has thus been distributed across a much broader range of actors, many of whom are ill-equipped to afford or facilitate social upgrading."

In view of the potentially destabilizing impact of relocation processes in 'footloose' industries like garment production in supply countries, Gereffi and Mayer in 2006 already referred to a 'governance deficit of considerable magnitude' concerning efforts to come to grips with these factors. Milberg and Winkler (2011) pointed to the rents captured by lead firms in global (garment) value chains, stressing that these rents expressed the built-in asymmetry of the market's structure. They also noted that greater control over supplies of intermediate goods in terms of price and quality would provide countries with a better position to upgrade clothing production, economically and socially ('moving up the value chain') – a consideration extended by Gimet, Guilhon and Roux (2015). However, there is evidence that heavier demands and stricter performance monitoring on garment suppliers have latterly grown in importance and have raised the entry barriers somewhat for garment manufacturing. Nowadays, in the supply networks of the global retail brands and spurred by the trend towards 'fast fashion', more capabilities and higher standards may well be expected from suppliers than, say, a decade ago while maintaining constraints on low costs, short lead times, production flexibility, and, last but not least, compliance with labour, human rights and environmental standards (cf. Staritz 2011; Barrientos *et al.* 2011; Lee and Gereffi 2015; ILO 2016).

Additional insecurity has emerged with uncertainties concerning the future of international trade and the risk of 'trade wars'. Recently, for some Asian countries such uncertainties concentrated on the Trans-Pacific Partnership (TPP) agreement. Briefly after Trump's inauguration as president of the United States, his administration withdrew from that agreement, though many observers argued it would have reduced the signatories' dependence on Chinese trade and would bring them closer to the US. In May 2017 the remaining 11 partner countries --including Singapore, Malaysia and Vietnam-- agreed to revive the trade agreement; in January 2018 they signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTTP; wikipedia Trans-Pacific Partnership). Due to changes in international trade governance, the employment effects of shifts in the patterns of garment production are likely to reflect these high levels of uncertainty, perhaps rather more than some reporting seems to suggest (cf. World Bank 2016).

We might reasonably conclude, (and our earlier reporting pointed in this direction too), that in its current state the internationalisation of garment production and the structure of global garment supply chains continue to exhibit considerable hurdles that constrain the potential of the industry to promote decent employment and living conditions in particular for women. These factors, notably heavy competition, dispersion of orders, slow technological progress and weak governance, remain dominant in exerting downward pressure on wages and conditions, notwithstanding the number of times in the past couple of decades that they have been singled out for scrutiny and improvement.

The garment industry: exports

Table 1 provides an overview of the structure of garment exports in 2016 for the 25 countries scrutinised in this report. It shows that in that year their total garment exports amounted to USD 298 billion, or nearly 65 per cent of the world's total exports. The combined share of these 25 countries varied across product groups (the relevant seven 3-digit SITC groups, see key underneath the table), from less than 58 per cent in group 848 (accessories of other than textile fabrics) up to 74 per cent in group 843 (men's or boys' clothing of textile fabrics, knitted or crocheted). Across the board the underlying figures did not point to strong specialisation patterns across the large exporting countries. China, in spite of a recent decrease of its overall share (see below) was still quite dominant with 34.3 per cent of global garment exports, posting strong positions in particular in SITC groups 842 (37.1%), 844 (42.1%) and 846 (43.5%). Bangladesh, overall ranked second with a share of 6.2 per cent of global exports, was particularly well represented in SITC groups 841 (11.1%) and 845 (7.6%), as was Vietnam –in third position overall with 5.4%-- also in group 841 (7.3%). Some smaller exporters showed relatively stronger specialisation patterns, like Mexico and Pakistan both in group 841 (with shares of respectively 2.2% and 2.0%).

Table 1 Garment exports (SITC rev. 3 groups 841-846 + 848) in mln USD, 25 countries, 2016

SITC	841	842	843	844	845	846	848	total	% world total
Bangladesh	8608	4395	1876	2165	11270	78	228	28620	6,21
Cambodia	611	763	656	1358	2473	47	27	5935	1,28
China	21373	34900	10578	22568	44524	12534	11701	158178	34,29
Egypt	520	233	154	90	553	7	1	1558	0,34
El Salvador	83	77	371	160	1238	217	1	2147	0,47
Ethiopia	4	5	5	8	16	3	3	44	0,01
Guatemala	72	181	182	269	513	14	38	1269	0,28
Honduras	171	20	230	156	1283	135	2	1997	0,43
India	2642	4066	1805	1479	6016	954	970	17932	3,89
Indonesia	1575	1615	551	958	2206	266	303	7474	1,62
Korea, Rep.	100	227	60	111	435	947	173	2053	0,45
Malaysia	218	62	143	110	637	126	327	1623	0,35
Mexico	1701	293	114	253	1537	163	206	4267	0,92
Morocco	532	1654	70	333	832	35	26	3482	0,75
Myanmar	1118	281	22	42	111	1	88	1663	0,36
Pakistan	1558	620	1042	270	636	474	502	5102	1,11
Peru	25	18	181	106	494	22	15	861	0,19
Philippines	35	227	107	341	243	54	37	1044	0,23
Singapore	144	162	126	144	480	261	80	1397	0,30
Sri Lanka	583	676	304	1116	1615	303	230	4827	1,05
Taiwan	29	26	22	47	168	282	187	761	0,17
Thailand	319	232	454	429	1318	158	1199	4109	0,89
Tunisia	571	262	35	108	1129	36	22	2163	0,47
Turkey	2217	3294	794	2034	5215	1220	273	15047	3,26
Vietnam	5657	5218	1994	3236	7627	410	562	24704	5,36
25 countr.	50466	59507	21876	37891	92569	18747	17201	298257	64,73
Other c.	27267	34643	7736	15720	54857	10104	12709	163036	35,27
Tot world	**77733**	**94150**	**29612**	**53611**	**147426**	**28851**	**29910**	**461293**	**100,00**
% 25 c.	*65,21*	*63,40*	*74,01*	*70,79*	*62,93*	*65,09*	*57,57*	*64,73*	

Source: authors' calculations based on UNCTADstat Database

Key / SITC codes:

841 Men's or boys' clothing of textile fabrics (other than knitted or crocheted goods)
842 Women's or girls' clothing of textile fabrics (other than knitted or crocheted goods)
843 Men's or boys' clothing of textile fabrics, knitted or crocheted
844 Women's or girls' clothing of textile fabrics, knitted or crocheted
845 Articles of apparel, of textile fabrics, whether or not knitted or crocheted, n.e.s.
846 Clothing accessories, of textile fabrics, whether or not knitted or crocheted (other than those for babies)
848 Articles of apparel and clothing accessories of other than textile fabrics; headgear of all materials

Our 2016 *WageIndicator* reporting focused on wage levels, including the levels needed for attaining living wages in the garment industry in nine Asian countries: Bangladesh, Cambodia, China, India, Indonesia, Myanmar, Pakistan, Sri Lanka and Vietnam. In 2016 these countries accounted for over 55 per cent of world's garment exports. Table 2 shows the longer-term development of their garment export shares while detailing developments for 2014-2016. It makes clear that the massive growth of China's garment exports between 1995 and 2015, from about 14.5 per cent to over 37 per cent of the world total, took the lion's share of the Asian expansion. However, the table also indicates the rather spectacular fall of over 3 percentage-points in the Chinese share in 2016. At the same time the shares of the other two major 'growers', Bangladesh and Vietnam, continued to increase, as did the share –though still at a low level-- of 'newcomer' Myanmar. In 2016 the largest four garment exporters remained among these Asian countries, as China was followed by Bangladesh, Vietnam and India, whilst Turkey had developed into a fifth place with 3.3 per cent market share.

Table 2 Share of garment exports (SITC rev. 3 groups 841-846 + 848) in world garment exports, 1995 and 2014-2015-2016, nine Asian countries

	1995	2014	2015	2016
Bangladesh	1.29	4.83	5.59	6.21
Cambodia	0.09	1.42	1.72	1.28
China	14.41	37.29	37.38	34.29
India	2.46	3.53	3.89	3.89
Indonesia	2.02	1.53	1.69	1.62
Myanmar	0.04	0.06	0.13	0.36
Pakistan	0.96	1.00	1.07	1.11
Sri Lanka	1.10	0.98	1.02	1.05
Vietnam	0.49	3.99	5.02	5.36
TOTAL 9 c.	**22.86**	**54.63**	**57.51**	**55.57**

Source: authors' calculations based on UNCTADstat Database

Table 3 presents the trends in the shares of garment exports in the total merchandise (goods) exports of the nine Asian countries just mentioned between 1995 and 2015. It reveals that, in spite of the growth of the garment export shares of China, India and Vietnam in world trade, the shares of these exports within the total merchandise exports of these three countries decreased. Notably for China this reflected the structural shift from exports of goods based on low-wage labour and low-end technology to exports based on medium-level technology and higher quality goods prompted by the pressure of rising prices and wages (cf. Zhu and Pickles 2014; Hu 2015). By contrast, the economies of Bangladesh and Cambodia have been increasingly dependent on garment exports, recently accounting for over 80 and 65 per cent respectively of those countries' total merchandise exports. The garment industry of that other large country, Indonesia, has been going through difficult times expressed by the decreases in the country's shares in both world exports and own goods exports (cf. Van Klaveren and Tijdens 2012, 120-121).

Table 3 Share of garment exports (SITC rev. 3 groups 841-846 + 848) in total merchandise exports per country, 1995 and 2015, nine Asian countries

	1995	2015
Bangladesh	63.4	81.1
Cambodia	17.1	65.4
China	16.1	7.7
India	13.0	6.9
Indonesia	7.4	5.3
Myanmar	8.6	5.6
Pakistan	19.7	22.7
Sri Lanka	48.2	45.7
Vietnam	15.1	14.5

Source: authors' calculations based on UNCTADstat Database

Table 4 covers for 2015 the garment export structures of the nine Asian countries to which we added those of Mexico, Morocco, Tunisia and Turkey. We focused on the destination of exports towards in particular the US and the EU28 as well as to four European countries. Such information is important when it comes to assessing the (potential) effects of trade policies and agreements aiming at better work and conditions in the production countries. The table shows that garment exports of the Asian countries as a group were rather diversified by destination, with 25.2 per cent going to the US and 28.7 per cent to the EU28. Bangladesh showed up as an exception with 63 per cent of its garments' value exported to the EU28, by contrast, with 57 and 56 per cent respectively, Indonesia and Vietnam shared a

relatively strong export orientation towards the US. With less than 45 per cent, China's garment exports have become clearly less directed towards the US and the EU, and are currently also spread over other Asian countries, Africa and Australia. As could be expected, over 96 per cent of Mexico's garment exports headed for the US, whereas Morocco and Tunisia and to a somewhat lesser extent Turkey shared a strong orientation of their garment exports towards the EU.

Overall, the US and the EU28 have remained the largest garment importers, though their shares in world imports have decreased in the last decade, for the US from 27.5 per cent in 2005 to 21.4 per cent and for the EU28 from 45.2 per cent in 2005 to 40.4 per cent in 2015. Thus, these two largest retail markets currently account for some 62 per cent of global garment imports. Yet, developments in the last decade were far from linear. When in 2008-2010 the global crisis hit the garment retail markets, demand fell in the industrialized countries and access to finance was more constrained. In 2011 export growth picked up and between 2010 and 2015, garment exports of the nine Asian countries in total grew by 51 per cent. These increases were primarily at the expense of supplier countries located closer to the European and US garment markets, including Central and Eastern European (CEE) countries providing for retailers in the EU along with Mexico, Central American and sub-Saharan countries supplying the US.

Table 4 Garment exports (SITC rev. 3 groups 841 – 846 + 848) of 13 countries by destination, 2015, in mln USD, and shares of world total

	US	France	Germ.	Netherl.	UK	EU28	Tot. US + EU28	Total	Shares
Bangladesh	16.9	6.9	16.7	4.2	10.9	62.7	79.6	26143	5.59
Cambodia	29.1	3.8	9.7	3.7	10.4	41.6	70.7	8064	1.72
China	20.8	2.6	4.3	2.6	6.0	23.7	44.5	174702	37.38
India	21.7	5.0	7.3	2.2	10.5	38.5	60.2	18168	3.89
Indonesia	56.6	1.4	6.8	1.4	3.4	18.0	74.6	7905	1.69
Myanmar	0.0	0.0	0.0	0.0	0.0	37.3	37.3	619	0.13
Pakistan	33.4	2.9	9.9	6.2	13.4	54.5	88.9	5023	1.07
Sri Lanka	45.0	2.6	4.9	1.9	17.2	41.8	86.8	4772	1.02
Vietnam	55.8	1.0	3.6	1.3	3.6	14.3	70.1	23459	5.02
Tot 9 Asian c	25.2	3.0	5.9	2.3	6.9	28.7	53.9	266885	57.51
Share 9 Asian c	*66.9*	*33.5*	*40.9*	*45.2*	*59.3*	*40.4*		*57.5*	
WORLD	**21.4**	**5.1**	**8.1**	**2.9**	**6.6**	**40.3**	**61.7**	**467367**	**100.00**
Mexico	96.4	0.0	0.1	0.5	0.6	2.4	98.9	4475	0.96
Morocco	2.5	23.2	5.3	2.8	5.7	86.5	89.0	3102	0.65
Tunisia	0.5	36.5	11.5	5.1	4.7	98.0	98.5	2176	0.44
Turkey	1.9	5.2	18.6	6.2	15.0	76.0	77.9	15121	3.18

Source: authors' calculations based on UNCTADstat Database

The relevance of trade policies

The trade policies of industrialized countries have plainly contributed substantially to the international restructuring of garment manufacturing and to shaping garment trade flows. Since the 1950s, in order to protect their domestic textiles and clothing industries, industrialized countries imposed quantitative import restrictions. Most important of these was the Multi-Fibre Arrangement (MFA), signed in 1974. The MFA allowed the US, Canada and a number of European countries to impose selective quotas on textile and garment imports, and to make these imports subject to high tariffs and non-tariff barriers to trade (NTBs). The integration of new, low-wage developing countries in the global garment value

chain gained impetus when manufacturers, mostly from Japan, South Korea, Hong Kong and Taiwan, and later from China as well, were confronted with MFA quota limits in their home countries. From the 1970s, they relocated garment manufacturing through 'quota-hopping' to countries such as Bangladesh, Indonesia, Sri Lanka, and Vietnam, that had unused export quotas or no quotas at all (Gereffi 1999).

In 1995, under the Agreement on Textiles and Clothing (ATC), the textile import quotas permitted by the MFA were phased out over a ten-year transition period. The remaining quotas removed on 1 January 2005 were bilateral and the extent of their restrictiveness varied from country to country. Thus, their removal would have worked out differently, and some countries here were more effected by market forces than by changes in regulation. Nevertheless, the matter remained more complicated when new trade agreements came into existence with specific rules, like the bilateral trade agreement of Cambodia with the US, and the Generalized System of Preferences (GSP) program. For example, whilst the US excluded textiles and garment items from its GSP agreements, the EU included them. Albeit to a varying degree, Indonesia, Pakistan, Vietnam, India, Sri Lanka, and Bangladesh from 2005 on benefitted from the EU's GSP / Everything but Arms (EBA) program, shielding their garment exports to some extent from Chinese competition.

The garment industry: employment

Table 5 presents an overview of employment in the textile and garment cluster for the sub-sectors we are concerned with: textile, garment and the production of leather and related products (footwear etc.) in the 25 selected countries, in particular catering for export markets. For most countries a major effort was needed in order to trace information on employment in garment manufacturing alone at a minimum level of reliability. Here, we augmented the effort displayed in the 2016 *WageIndicator* report on garment wages in Asia and partly updated in our 2017 ILO presentation, on both occasions building on a multitude of *official* employment data (Van Klaveren 2016, 11-12; Van Klaveren and Tijdens 2017, 9). It should be noted that such official data, relying on national and international (ILO, UNIDO) sources, are neither available for all countries nor for 2017. In the current report we have integrated data from 'unofficial' sources, notably from trade unions and employers' associations. We tried in particular to estimate the numbers of informal garment workers for countries where we had not made such a calculation before, although only if we judged that such estimates met standards of reliability. For China, India, Indonesia, Pakistan and Vietnam this resulted in a considerable upward revision of the numbers shown in our 2016 and 2017 reporting.[5]

Next, we added data on employment in textiles and leather manufacturing, again, based on official and other sources. However, in particular the statistical division between employment in apparel manufacturing, basically cutting and sewing and ancillary activities, and in textiles production, basically spinning, weaving, knitting, dying and related activities, is often blurred in the statistics we had to use, whatever the source. Thus, the figures we produced on this basis must be regarded with some reservations. Moreover, the information of brands on supplying factories often did not allow the division between

[5] One should take into account that informal garment workers cater much more strongly for home markets than do formal workers concentrated in export industries. This is particularly relevant for countries with a large population like these four. See f.e. the website of WIEGO.

'apparel' and 'textile' – a main reason why we classified such factories under 'apparel'. By contrast, most brands clearly indicated if footwear factories were included in their supply chain. Indeed, we included the third sub-sector, manufacturing of leather and related products, because these activities are partly integrated in the supply chains of the brands scrutinized here. Five of them, Adidas, ASICS, New Balance, Nike and Puma, derived a considerable part of their sales by selling (sports) footwear.[6]

Table 5 indicates that in 2015-2016 for the 25 countries we estimated for employment in textile, garment and leather manufacturing at over 54 million workers in the 25 countries, of which approximately 15.3 million (28%) in India, 14.5 million in China (27%), nearly 5.2 million in Bangladesh (9.5%), and more than 4.1 million in Pakistan (7.5%). For garments manufacturing alone, we estimated that over 30.5 million workers were involved. Among the main production countries two groups showed up: one group, including China, India, and Pakistan, in which garment employment accounted for about half of textiles / garment / leather etc. employment, and a larger group, including Bangladesh, Cambodia, Mexico, Sri Lanka, Turkey and Vietnam where garment employment accounted for two-thirds or more of workers in textiles etc. China, India and Vietnam in particular have made steps in developing textile – garment clusters that have upgraded their garment manufacturing, taking profit from their large home markets (Gereffi and Frederick 2010; Ponte and Sturgeon 2013). More recently, governments of other Asian countries have announced plans in this direction (Sri Lanka: Sri Lanka Mirror 2017) or have been recommended to do so in order to 'move up the value chain' (Pakistan: Hamid *et al.* 2016).

In our 2016 garment report, using many official nation- and worldwide sources, we were able to estimate the shares of females in garment employment in the nine Asian countries on which that report focused. In Table 6 we repeat this exercise, departing from the numbers of total garment workers presented in Table 5 but keeping the female shares constant that we found earlier. On this basis we estimated that in the nine countries 15.3 million women, or 55 per cent of all employed, were involved in garment manufacturing. In Chapter 4 we will return to the female participation issue.

[6] One should be aware that footwear and leather clothing are not the only outlets for tanning as the first stage of leather manufacturing. According to figures of the European Commission, within the European Union about half of tanners' production goes to footwear and clothes, the other half to furniture, the automotive industry, and other leather goods (website EC / Growth).

Table 5 Employment in the textile, garment and leather industries in 25 countries, latest available year (x 1,000 persons)

	textile	garment	leather	total	year
Bangladesh	800	4,300	80	5,180	2015
Cambodia	70	615	65	750	2016
China	4,500	7,650	2,360	14,510	2015
Egypt	120	80	5	205	2016
El Salvador	30	65	10	105	2015
Ethiopia	50	15	25	90	2015
Guatemala	25	35	15	75	2015
Honduras	80	55	20	155	2015
India	6,250	7,950	1,100	15,300	2015-16
Indonesia	1,100	2,400	670	4,270	2016
Korea, Rep.	130	110	30	270	2016
Malaysia	30	55	10	95	2016
Mexico	180	385	60	625	2016
Morocco	190	180	30	400	2015
Myanmar	370	320	40	730	2015
Pakistan	1,800	2,180	175	4,155	2014-15
Peru	150	70	30	250	2016
Philippines	160	290	65	515	2016
Singapore	1	2	1	4	2016
Sri Lanka	70	440	30	540	2016
Taiwan	115	50	30	195	2016
Thailand	300	530	150	980	2016
Tunisia	55	140	25	220	2016
Turkey	355	765	70	1,090	2015
Vietnam	280	2,040	1,100	3,420	2016
Total 25 c.	**17,211**	**30,722**	**6,196**	**54,129**	
In %	*31.8*	*56.8*	*11.4*	*100*	

Source: authors' estimates based on various sources: Huynh 2017; ILO, UNCTAD and UNIDO statistics; national statistics China, India, Indonesia, Myanmar, Sri Lanka; information of trade unions and employers' associations.

Table 6 Employment in the garment industry, total and female, nine Asian countries, latest available year

	total x 1,000	female x 1,000	% female	year
Bangladesh	4,300	3,440	80	2015
Cambodia	615	505	82	2016
China	7,650	5,050	66	2015
India	7,950	1,910	24	2015-16
Indonesia	2,400	1,560	65	2015
Myanmar	320	304	95	2015
Pakistan	2,180	610	28	2014
Sri Lanka	440	334	76	2016
Vietnam	2,040	1,610	79	2015
TOTAL 9 c.	**27,895**	**15,323**	**55.0**	

Source: authors' estimates based on various sources: Huynh 2017; ILO and UNIDO statistics; national statistics China, India, Indonesia, Myanmar, Sri Lanka; China: Fan 2016.

3. Methods and data

The database

We grounded this report on the database we built concerning the supply chains of 24 major clothing and footwear-selling firms or brands for 25 production countries. The entry condition for inclusion in the database was that brands must have disclosed recent data on each factory in their supply chain, specifying full name, full address including names of (nearby) city, province/state, and country. In addition, we aimed for the ZIP code of each factory; full name of the parent company, and product category (apparel, footwear, accessories). Completion required considerable efforts from our side. As our overview in the Statistical Appendix (Table A1) shows, only a limited number of brands consistently published ZIP codes (8 of 24) and full names of parent companies (5 of 24). Also, names of provinces/states within countries and product categories were repeatedly lacking or mentioned inconsistently (respectively in eight and nine cases). Finally, our search suffered from typing errors that nearly all brands produced particularly in factory addresses, including misspelled cities and provinces. Especially for countries like Bangladesh, China and India, with names often near-identical, this resulted in more than a few hiccups for the authors to deal with. More often than not we were able to overcome these problems through smart googling.

The ease with which we could access indications of the number of employed per factory was an important issue. On the one hand only six out of 24 brands delivered exact numbers of employed: Adidas (including Reebok), Debenhams, G-Star, M&S, Nike, and Pentland. On the other hand, eight brands did not disclose employee numbers at all. After some hesitation we decided to include these eight -- among which were brands with large supply chains-- as a 'no numbers' category. The remaining 10 brands applied size classes for the numbers of employed in the factories actually supplying them; three did so applying detailed classes and seven used rough class divisions, with mutual differences.[7] We found the lowest common denominator in a division comprising factories supplying the 16 brands that delivered numbers along the size classes '1-1000', '1001-5000' and '5001 and more'. Seven brands disclosed exact figures on the shares of females per factory. It should be noted, we assumed that all numbers of employed were headcounts.

We compiled our database in June and July 2018, from early June on. At that moment in time, we found information dated 2018 (for 12 brands), 2017 (11 brands), and December 2016 for one brand (Levi Strauss). The exact dates (year, and if available, month) can be found in Table A1. The table shows that for 18 brands the available information was dated between September 2017 and March 2018, in other words, with a mutual time lag of less than eight months. We tried to get as synchronous data as possible in order to create maximum comparability between factories: especially important to conclude whether factories actually supplied more than one brand (see Chapter 4). At this last point, we used the term 'actually' for good reason. On their websites factory owners tend to advertise that they serve many brands. That is quite understandable from their point of view and may have been the practice over the years, but already in the 'Indonesia project' we learned that as a rule they

[7] ASOS disclosed exact numbers of employed and factories per supply country but not split numbers by factory.

actually supplied less brands than advertised. Such a gap between actual supplies and 'supplying over the years' seems universal.

As for the format of information, we based ourselves on five Excel files, 14 PDF's, and five world maps disclosed by the brands. These maps allow to find factory information by clicking on country and factory names. This seems an illuminating way of presenting but it turned out rather disadvantageous for building a database. It remained mostly unclear when factory information was renewed, and one or two months after the initial take-up we found repeatedly that such renewal had taken place unnoticed. Overall, Adidas through its Excel files delivered the most informative and accessible information (though in Adidas' information female shares were lacking).

Characteristics of the brands

In Table 7 we present recent data on main characteristics of the 24 brands scrutinized: their home country; range of sales; net sales in billion USD, and numbers of employed in total and in their supply chains. The data show a wide variation on four of five aspects. Looking at their come countries, the list includes seven firms with their base in the United States ((The) Gap Inc; Levi Strauss & Co; New Balance; Nike; PVH Corp; Under Armour; VF Corp); five companies based in the United Kingdom (ASOS; Debenhams; M&S (Marks & Spencer); Pentland; Tesco); two based in Germany (Adidas and Puma); two in Japan (ASICS and Uniqlo, the latter a subsidiary of Fast Retailing Co), as well as two in Sweden (H&M (Hennes & Mauritz)) and KappAhl). Home countries with each one firm represented were Denmark (Bestseller); Finland (Amer Sports); the Netherlands (G-Star (RAW)); Ireland (Primark, though a subsidiary of Ass. British Foods, UK), and Switzerland (C&A through their Cofra Holding AG). One firm (Esprit) had a double Hong Kong / German identity. A large majority of firms was publicly held (stock market listed); as privately held (family-owned) we identified Bestseller; C&A; Levi Strauss, and Pentland.

Compared to other, sometimes in terms of sales considerably larger, retailers such as supermarket chains, a number of these brands and their competitors are among the world's most internationalized companies. For example, H&M stated it had 4,553 stores in 62 countries by 31 August, 2017, and in a recent 'Global Footprint' note Gap Inc. reported by March 2018 some 3,617 company-operated or franchised stores in operation across 45 countries. Yet, Inditex exceeded H&M and Gap, reporting 7,448 stores in 96 countries in 2017.

We should note here that the word 'brand' can be misleading. Most of the companies in our list sell multiple (sub-)brands, in fashion terms called collections or labels. Some of these (sub-)brands figure prominently in high-street fashion stores while many shoppers may be unaware of the connection with the parent firm. For example, it may not be widely understood that Reebok is an Adidas brand or that Banana Republic and Old Navy are brands of Gap Inc. Currently many garment and (sports) footwear sellers have adopted multi-channel strategies and advertise a variety of brands. Besides selling directly to consumers, US-based firms in particular are also acting as wholesalers selling to other fashion and/or department stores. A rather anonymous company such as PVH Corp owns famous fashion brands like Tommy Hilfiger and Calvin Klein, sold in PVH's own outlets as well as to department stores. VF Corp follows a similar strategy based on a portfolio among other brands including Lee and Wrangler. After having pulled out of quite a few markets,

even a 'classical' fashion retailer like Esprit has felt the need to invest in wholesale activities. The most extreme example in this respect is ASOS -- the only retailer we listed that operated purely online, selling over 850 brands as well as its own range of clothing and accessories. All other firms were undertaking massive efforts to promote online sales but they still for the most part relied on physical ('bricks and mortar') stores. On the other side of the company spectrum our list includes a large general merchandiser (Tesco) with an own clothing brand (F&F), a department store (Debenhams), and a combined food / clothing retailer (M&S), all three focusing on the UK as their home turf and their turnover only partly derived from clothing sales.

In column 2, Table 7 provides indications of the range of sales of the 24 brands/firms, divided into garment (G); footwear (F); sportswear (S); sports equipment (E), and accessories (A). Again, some variation showed up. All 24 brands sold garment articles; 15 offered footwear, nine sportswear, and all sold accessories as well. Linked up with the sales of sportswear, six brands also sold sports equipment. We traced six brands (Adidas; Amer Sports; New Balance; Nike; Puma, and Under Armour) selling in all five categories.

The amount of sales, defined as net turnover, also varied widely. In sales rankings the brands with sportswear as their core business showed up prominently. Leaving general merchandiser Tesco aside and based on 2017 data, Nike went to the top with USD 34.4 billion net turnover, followed by Adidas (USD 21.2 billion). As typical fashion sellers, H&M (USD 19.5 billion net turnover) ranked third, Gap Inc (USD 15.9 billion) fourth and Uniqlo (USD 25.8 billion) fifth. The 'smallest' firms among the 24 were KappAhl and G-Star, their net turnover being respectively 0.6 and 0.9 billion. For 2017, net turnover of the 24 brands/firms for the five categories mentioned jointly came in at approximately USD 202 billion. Based on various sources, we estimate global net sales of clothing and footwear for that year to amount between USD 1,550 and 1,850 billion. Their equivalent turnover for the main home markets of 'our' brands, USA, EU28 and Japan, would end up between USD 640 and 700 billion (websites UNCTADstat, Fashion United, Dr Sheng Lu). This would imply joint market shares worldwide for the 24 brands of 11 to 13 per cent worldwide and between 29 and 32 per cent in their home markets. As a number of these brands also generate considerable sales outside these home markets, their joint market share may be located somewhere between the extremes, that is, between 11 and 32 per cent.

Of course, like in virtually every business, the amount of sales (net turnover) and employment size were connected here as well. For the 16 brands involved in the calculation the correlation we found between the two values was considerable though not as high as might have been expected (R=.72). A major explanation may be the varying use of franchising practices; that variation seems largely responsible for differences in the relationship between size of sales and size of employment. We found that at least eight of 24 brands have adopted franchising practices on a considerable scale, in particular in their international expansion for the governance of their stores and distribution centres. Anyway, while leaving Tesco and M&S out of the equation, Gap Inc -- maybe surprisingly-- showed up with the largest number of employed in 2017 (135,000). H&M ranked second; the Swedish 'fast fashion' retailer at that point employed 123,200, followed by Nike (74,400), VF Corp (69,000), Primark (68,000), and Adidas (56,900). G-Star, having intensively applied franchising, posted the smallest number of own employees (800), followed by KappAhl (4,000) and Internet-seller ASOS (4,100).

The total number of employed by the brands themselves in 2017 surpassed 900,000, including 680,000 employed by the 16 brands delivering numbers of employed in factories. Without any exception, the numbers of employed in the supply chains these brands disclosed or we estimated[8] were much larger than the numbers employed by the brands themselves. Nevertheless, the connection between the number of employed by the 16 brands themselves and those employed in their global value chains remained intact, as expressed by the rather high correlation (R=.83) between the two.[9]

We estimated the supply chain of H&M to be by far the largest, comprising, by the end of 2017, of approximately 1,680,000 workers, of which some 1,430,000 (85%) were in the 25 countries under scrutiny, with Gap Inc ranking second, with an estimated 1,090,000 workers of which 1,037,000 (95%) were in the 25 countries. Nike and Adidas came next; according to their specifications, Nike's suppliers of garment, foot- and sportswear overall employed 932,400, including 885,800 (95%) in the 25 countries. Employment at Adidas' primary suppliers totalled 890,300, of which 814,100 (91%) in the 25 countries. Next, the clothing supply chain of M&S comprised 813,400 employed, of which 618,500 or 76 per cent were located in 'our' countries.[10] We estimated employment in two other large supply chains, those of C&A and Primark, at respectively 620,000 and 570,000, and their '25 country shares' at 84 per cent (C&A, based on supply volumes) and 92 per cent (Primark, based on number of factories) respectively. Esprit's 2016 Sustainability Report mentioned that their supply chain by then comprised 525,000 employed. Much smaller supply chains for which we have information detailing employment per supply country were those of Debenhams (285,500 employed, of which 281,800 or nearly 99% in the 25 countries); ASOS (116,500 employed, 90,500 or 78% in the 25 countries); Pentland (108,600 employed, 106,400 or 98% in the 25 countries), and G-Star (40,500, all within the 25 countries).

For the seven brands[11] that disclosed exact numbers of employed per supply country, the share of the 25 countries in their supply chains varied from G-Star's 100 per cent to 76 per cent for M&S, with the median value at 95 per cent. Based on the numbers of factories the comparable shares of the remaining 17 brands varied between 96 per cent (Bestseller) and around 70 per cent (VF Corp 71%; ASICS 70%, and New Balance 68%[12]); for this group the median came in at 85 per cent.[13] It will be clear that an overall estimate of the number of employed in the supply chains of the brands under scrutiny had to rely basically on the detailed information from the seven brands, with in the first instance the addition of estimates for the nine brands who provided numbers of factories per country and size classifications (column 7 in Table 7). Our calculations added up to approximately 8.82

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8 Based on the frequency divisions of Table 15 and taking into account the available exact numbers of employed in factories supplying various brands.

9 The correlation coefficient for the relationship between net turnover and employment in the supply chains of the 16 brands was similar to that between net turnover and employment of the brands themselves (*R*=.72).

10 By March 2018, the supply chain at large of M&S comprised 1,799 factories in 68 countries, with 1,074,300 workers.

11 Adidas; Debenhams; G-Star, M&S; Nike; Pentland, and ASOS.

12 The supply chain of VF Corp included a considerable number of factories in Brazil, Italy and Portugal as well as 51 factories in the US; that of ASICS had suppliers in Brazil and Japan, and the chain of New Balance included suppliers in Canada and various European countries.

13 The median for all 24 brands came at 89 per cent.

million employed in the supply chains of the 16 brands that indicated factory sizes, of which nearly 7.68 million (87%) were in the 25 countries. Under the proviso that 18 per cent of factories in these supply chains supplied more than one brand (see Chapter 4), de facto some 6.5 million workers would have been involved. Concerning the factories only supplying to the eight 'no number' brands an additional estimate, by necessity rather tentative, would add 1.4 million employed, bringing the total employed in the chains of the 24 brands in the 25 countries at 7.9 million. That accounted for nearly 15 per cent of all employed in the textile, garment and leather industries in the 25 countries.

Our research confirms the conclusion prevailing in the recent literature that hardly any global garment retail brand maintains a significant domestic production base. We found that 'our' 24 brands in total made use of only 261 apparel, footwear or accessories factories in their home countries, less than two per cent of the nearly 13,500 factories they reported as belonging to their global supply chains.[14]

When comparing the current 24 brands to those in the supply chain overviews of our 2016-2017 publications, it can be seen that we left out 12 brands: Charles Vögele; Inditex; Mango; New Look; Next; Orsay; Pimkie; Promod; Switcher; Takko; Tchibo, and WE Fashion. Most of these brands did not recently disclose the detailed supply chain factory information we defined as an entry condition.[15] In particular the lack of recent factory information from Inditex can be regarded as a loss. In our 2016 report we explored information from the large Spanish retailer in detail (Van Klaveren 2016, 15-16). However, while in its 2016 Sustainability Report Inditex continued to provide country totals of those employed in its massive supply chain[16], the firms' recent supplier map posted on the Internet did not allow to check data at factory level. In a similar vein, Mango, New Look and Takko concerning their supply chains disclosed country information but did not provide factory details.

[14] VF Corp showed the largest number (supplies from 51 factories in the US, 8% of VF Corp's total), followed by ASOS (from 45 factories in the UK, 6% of ASOS' total) and Nike (from 39 in the US, 8% of Nike's total). Except one factory owned by a brand (by PVH Corp in the US), all these factories were subcontractors.

[15] The parent firm of Charles Vögele was declared insolvent in 2017.

[16] Inditex disclosed for 2016 to have 6,159 factories included in their supply chain, with employment totalling 1,794,500.

Table 7 24 major garment and footwear brands: home country, range of sales, net sales in 2017, and number of employed total and in supply chain in 25 countries 2017-2018

	1	2	3	4	5	6	7
Adidas	DE	G;F;S;E;A	21.2	56.9	890	91	814
Amer Sports	FI	G;F;S;E;A	3.1	8.5		87(F)	
ASICS	JP	G; F;S;A	3.6	8.6	97*)	70(F)	68
ASOS	UK	G;F;A	2.4*)	4.1	117	78	91
Bestseller	DK	G;A	3.6	15.2		96(F)	
C&A (COFRA Hold.)	CH	G;F;A	6.6*)	35.0*)	620*)	84(V)	521
Debenhams	UK	G;F;A (etc)	3.4**)***)	27.0**)	283	99	281
Esprit Group	HK/ DE	G;A	2.0**)	7.3**)	525	81(F)	425
(The) Gap Inc	US	G;A	15.9	135.0	1090*)	95(F)	1037
G-Star RAW	NL	G;A	0.9	0.8	41	100	41
H&M	SE	G;A	19.5	123.2	1680*)	85(F)	1430
KappAhl	SE	G;A	0.6	4.0		95(F)	
Levi Strauss & Co	US	G;A	4.9	13.8		81(F)	
M&S	UK	G;F;A (etc)	13.7****)	80.8	813*****)	76	618
New Balance	US	G;F;S;E;A	3.8	5.5		68(F)	
Nike	US	G;F;S;E;A	34.4	74.4	932	95	886
Pentland	UK	G;F;S;A	3.0	19.1	109	98	106
Primark	IE	G;F;A	9.3	68.0	570*)	92(F)	525
Puma	DE	G;F;S;E;A	4.7	13.0	202*)	98(F)	197
PVH Corp	US	G;F;A	8.9	36.2		69(F)	
Tesco	UK	G;A (etc)	69.3******)	476.2		93(F)	
Under Armour	US	G;F;S;E;A	5.0	13.8	172*)	85(F)	146
Uniqlo (Fast Retailing)	JP	G;A	15.8	44.4		98(F)	
VF Corp	US	G;F;S:A	11.8	69.0	677*)	71(F)	481
Total ***)**			**201.8**	**900.3**			

Sources: company websites and Annual Reports; Forbes Global 2000 (website, 2018)

Key:

1. *Home country*
2. *Range of sales: garment (G); footwear (F); sportswear (S); sports equipment (E); accessories (A)*
3. *Net sales (turnover) in 2017 (x billion USD)*
4. *Number employed in 2017 (-12) (x 1000)*
5. *Number employed in total supply chain in 2017-2018 (x 1000)*
6. *Percentage employed / percentage volume (V) / percentage factories (F) by suppliers in 25 countries scrutinized in total supply chain*
7. *Number employed in supply chain in 25 countries in 2017-2018 (x 1000)*

Notes:

*) *authors' estimate*
**) *2016/17*
***) *of which ca. 70% G, F, A*
****) *of which ca. 40% G, F, A*
*****) *only garment*
******) *of which ca. 18% G, A*

4. Brands and factories

One factory, one brand?

The 24 brands individually disclosed usable data on 10,127 garment, footwear and accessories factories in the 25 countries selected.[17] However, a number of factories actually supplied more than one brand. Due to these 'overlaps' the number of factories to be scrutinized decreased to 8,110. This was exactly 80 per cent of the total number of factories reported, implying that the factories included in our database on average supplied 1.25 brands. Table 8 presents the distribution of the 8,110 factories by product category, showing that slightly over 74 per cent covered apparel manufacturing, 10.5 per cent footwear production, and 15 per cent the production of accessories.[18]

Table 8 Factories actually supplying 24 brands from 25 countries by product category, 2017-2018

	no. of factories	share in total
Apparel	6,018	74.2
Footwear	852	10.5
Accessories	1,197	14.8
Rest	43	0.5
Total	**8,110**	**100.0**

Source: WageIndicator Garment Supply Chain Database 2018

Table 9 gives a first impression of the relation between the number of factories for which the individual brands delivered data and the number left after correcting for overlaps, that is, supplying to more than one brand at the same time. The table shows that apparel factories delivered to on average 1.27 brands, footwear producers to 1.25 brands, and accessories producers to 1.21 brands.

Table 9 Average number of brands supplied per factory, by product category, 2017-2018

	no. of factories	av. no. of brands
Apparel	6,018	1.27
Footwear	852	1.15
Accessories	1,197	1.21
Rest	43	1.51
Total	**8,110**	**1.25**

Source: WageIndicator Garment Supply Chain Database 2018

Table 10 offers an overview by country of the relationship between the number of factories reported by the separate brands (A) and the number of factories actually supplying them (B), expressing B in percentages of A. The right-hand columns present the number of factories supplying more than one brand (C) and the share of these 'multiple-brand factories' in those actually supplying, expressing C in percentages of B. The outcomes of the two rankings were highly correlated, albeit negatively, according to the logic of 'the higher share B, the lower share C' (R=-.98). When focussing on the 13 production countries with at least 100 factories listed, it is easy to see that Bangladesh went on top twice: for that country 64 per cent of the total number of factories the brands reported showed up in our database

[17] Making up 75.3 per cent of the 13,448 factories the 24 brands reported in total as belonging to their global supply chains of garment, footwear and accessories.

[18] The 'rest' category is made up of factories whose function was not clearly indicated though judging by their names (and sometimes locations) they belonged to garment supply chains.

as actual suppliers (B/A ratio), and 39 per cent (224 factories) supplied to more than one brand (C/B ratio). Sri Lanka came second in the one ranking (67% as B/A ratio, but 33% 'multiple brand' factories indicated through C/B) and Cambodia in the other (68% as B/A ratio, with 34% as C/B slightly more 'multiple brands'). A group of three countries followed with their rankings somewhat mixed: Pakistan (71% as B/A, 24% as C/B); Indonesia (78% as B/A but also 24% as C/B) and Vietnam (74% as B/A and 23% as C/B). Turkey ranked seventh (80% as B/A, 19% as B/C), just ahead of India and Myanmar (both 81% as B/A ratio and 17% as B/C). China as the largest production country came in as no. 10 and showed a rather low concentration of brands per factory (expressed by 85% as B/A ratio and 13% as C/B ratio), which of course affected the overall ratios considerably. Thailand's outcomes were similar to those of China. Mexico had an even lower rate of 'multiple brand' factories (8%, connected with 91% as B/A ratio), and South Korea did not show any factories of that kind.[19] Among the production countries with less than 100 factories, El Salvador stood out with an even lower B/A ratio than Bangladesh (61%) and 45 per cent 'multiple brand' factories, followed by Egypt and Ethiopia.

Table 10 Number of factories actually supplying 24 brands from 25 countries and number of factories actually supplying more than one brand, by country, 2017-2018

	total factories			factories actually supplying >1 brand	
	reported by separate brands (A)	actually supplying brands (B)	% (B) of (A)	> 1 br. (C)	% (C) of (B)
Bangladesh	903	579	64	224	39
Cambodia	388	263	68	89	34
China	3,960	3,387	85	424	13
Egypt	59	43	73	11	26
El Salvador	33	20	61	9	45
Ethiopia	15	11	73	3	27
Guatemala	41	31	76	7	23
Honduras	17	15	88	2	13
India	1,232	1,001	81	170	17
Indonesia	361	280	78	68	24
Korea, Rep.	177	177	100	0	0
Malaysia	27	25	93	2	8
Mexico	231	211	91	17	8
Morocco	32	27	84	6	22
Myanmar	131	106	81	18	17
Pakistan	188	134	71	32	24
Peru	4	4	100	0	0
Philippines	39	33	85	5	15
Singapore	1	1	100	0	0
Sri Lanka	300	202	67	67	33
Taiwan	93	87	94	5	6
Thailand	131	111	85	14	13
Tunisia	42	39	93	3	8
Turkey	868	695	80	132	19
Vietnam	854	628	74	147	23
Total 25 count.	**10,127**	**8,110**	**80**	**1,455**	**18**

Source: WageIndicator Garment Supply Chain Database 2018

[19] As Table 11 shows, all South Korean factories employed 1,000 or less workers. We got no indications of formal barriers for Korean factories to accept orders from various brands at the same time (courtesy information of Dr Kiu Sik Bae, Korean Labour Institute).

Table 11 presents an overview by country of the number of brands actually supplied by factories in their respective chains. While concentrating on the production countries with at least 100 factories listed, Bangladesh once more went on top with relatively most 'multiple brand' factories: just 62 per cent of factories in that country actually supplied one brand, per factory on average 1.56 brands were served and 4 per cent supplied four or more brands. This time, Sri Lanka ranked second with a slightly higher average (1.49) than Cambodia (1.48). Pakistan again was in fourth place, with a higher average (1.40) than the averages of Vietnam (1.36) and Indonesia (1.29), in particular due to a higher share of factories (4%) that supplied four or more brands. Indonesia, though ranking sixth, lacked factories in the latter category altogether, as did Myanmar (ranked 8th) and Thailand (ranked 9th). Yet, in Turkey, ranked seventh again, 2 per cent of factories were in that category, as was in India (ranked 10th) 1 per cent of its over 1,000 factories. After all these countries China ended up with an average of 1.17 brands per factory; only one per cent of nearly 3,400 Chinese factories could be found in the '4 or more brands' class. Again, El Salvador showed up most prominently among the production countries with less than 100 factories, with an average of 1.65 brands per factory, only 55 per cent supplying one brand and 5 per cent supplying four or more brands. Remarkably, also over one in four of factories located in Egypt and Ethiopia served two or three brands.

Table 11 Distribution of number of brands supplied per factory, by country, percentages and averages, 2017-2018

	1	2	3	4	5	>=6	total	aver.	no. fact.
Bangladesh	62	26	9	3	1	0	100	1.56	579
Cambodia	66	24	8	2	0	0	100	1.48	263
China	88	9	2	1	0	0	100	1.17	3,387
Egypt	74	14	12	0	0	0	100	1.37	43
El Salvador	55	30	10	5	0	0	100	1.65	20
Ethiopia	73	18	9	0	0	0	100	1.36	11
Guatemala	77	19	0	0	3	0	100	1.32	31
Honduras	87	13	0	0	0	0	100	1.13	15
India	83	13	3	1	0	0	100	1.23	1,001
Indonesia	77	18	5	0	0	0	100	1.29	280
Korea, Rep.	100	0	0	0	0	0	100	1.00	177
Malaysia	92	8	0	0	0	0	100	1.08	25
Mexico	92	7	1	0	0	0	100	1.09	211
Morocco	81	19	0	0	0	0	100	1.19	27
Myanmar	81	14	5	0	0	0	100	1.24	106
Pakistan	77	13	6	1	2	1	100	1.40	134
Peru	100	0	0	0	0	0	100	1.00	4
Philippines	85	12	3	0	0	0	100	1.18	33
Singapore	100	0	0	0	0	0	100	1.00	1
Sri Lanka	66	23	7	3	0	0	100	1.49	202
Taiwan	94	5	1	0	0	0	100	1.07	87
Thailand	86	9	5	0	0	0	100	1.18	111
Tunisia	92	8	0	0	0	0	100	1.08	39
Turkey	81	14	3	1	1	0	100	1.25	695
Vietnam	77	15	5	2	1	0	100	1.36	628
Total	**82**	**13**	**4**	**1**	**0**	**0**	**100**	**1.25**	**8,110**

Source: WageIndicator Garment Supply Chain Database 2018

Table 12 presents another overview of the number of brands that factories in the respective chains actually supplied, yet this time distributed by the brands as principals. It shows that the (rather small) supply chain of G-Star included relatively the most 'multiple brand'

factories, as can be seen by its high average of factories involved (2.38) and the low percentage of factories only supplying to this particular brand (31%). In this respect Tesco ranked second, with averaged 2.07 factories and 39 per cent of factories supplying only to Tesco, and M&S third, with an average 2.04 and 44 per cent only supplying to M&S. Contrary to G-Star, both Tesco and M&S maintain extensive chains. New Balance followed suit, with a lower average (1.91) but also a lower 'one brand factory' share (42%). In this ranking, Debenhams (1.87 and 49% respectively) and PVH Corp (1.82 and 50%) came next. By contrast, ASOS showed up as the brand with the lowest average of factories involved (1.25) and the highest share of factories only supplying them (82%), with Esprit placed second (average 1.33 and 80% 'one brand' factories) and ASICS (also 1.33 averaged but 77% 'one brand') third. The latter three brands varied widely as for the size of their supply chains; whereas ASICS maintained a rather small chain, the chains of ASOS and Esprit were extensive. Overall, some inverse relationship could be detected between the size of supply chains and the number of brands served (if smaller chain, then more brands), but the correlation between the two series of values in the right-hand columns was not that strong (R=-.35).

Table 12 Distribution of number of brands supplied per factory, by brand, percentages and averages, 2017-2018

	1	2	3	4	5	>=6	total	aver.	no. fact.
Adidas	75	15	7	1	1	0	100	1.40	690
Amer Sports	54	29	14	2	2	0	100	1.68	63
ASICS	77	16	6	0	1	0	100	1.33	73
ASOS	82	13	2	2	0	0	100	1.25	494
Bestseller	65	22	9	1	3	1	100	1.57	259
C&A	63	22	9	3	2	1	100	1.63	755
Debenhams	49	28	14	5	3	1	100	1.87	356
Esprit	80	12	5	2	1	0	100	1.33	804
Gap Inc	70	18	8	2	1	1	100	1.49	777
G-Star	31	31	19	12	4	4	100	2.38	26
H&M	69	21	7	2	1	1	100	1.48	1,477
KappAhl	67	21	6	3	2	1	100	1.55	188
Levi Strauss	61	23	10	3	2	2	100	1.67	418
M&S	44	28	16	9	3	1	100	2.04	518
New Balance	42	35	18	2	4	0	100	1.91	103
Nike	68	20	8	1	3	0	100	1.52	330
Pentland	64	24	6	4	2	0	100	1.55	118
Primark	78	14	5	1	1	1	100	1.35	925
Puma	68	17	7	3	4	1	100	1.62	121
PVH Corp	50	31	11	4	2	1	100	1.82	538
Tesco	39	32	18	7	3	2	100	2.07	405
Under Armour	54	21	17	4	3	1	100	1.85	96
Uniqlo	76	13	6	2	3	0	100	1.44	133
VF Corp	65	18	11	4	1	1	100	1.60	463

Source: WageIndicator Garment Supply Chain Database 2018

We selected those factories supplying multiple brands, and then focused on the 13 brands with the largest number of factories. We mapped, through their supplying factories, their relationships with each other and with the 11 remaining brands. Table A3, in the Statistical Appendix, presents the outcomes of this exercise. The main clusters with over 50 factories involved were those of the factories both supplying C&A and H&M (103 factories); H&M and M&S (92); M&S and Tesco (82); H&M and Gap Inc (80); Gap Inc and PVH Corp (67); H&M and Tesco (66); H&M and Primark (64); Debenhams and Tesco (60); Esprit and H&M,

and M&S and PVH Corp (both 59); Tesco and Primark, and C&A and Tesco (both 55), and Debenhams and M&S (52). H&M appeared in no less than six of these major clusters: a kind of spider in the web. Tesco followed with four appearances, M&S with three, and C&A, Primark and PVH Corp each showed up twice. Of course, brands may primarily choose factories based on the kind of products, prices, lead times and other terms they have on offer. Nevertheless, the shaping of clusters may suggest the existence of certain patterns of mutual contacts and exchange of information on the buyers' side. It may well be that the growing role of large Asian garment and footwear manufacturers in coordinating supply chains, to be discussed in the next chapter, contribute to more stable clusters -- though it may take time before, if they take on such roles, new cluster patterns have settled.

It should be noted that the brands just mentioned are all focusing on garment sales, notably in fast fashion mode, using quite some supplying factories with less than 1,000 employed. Yet, it is also interesting to shed light on those brands with a strong focus on footwear. As the next section will show, their supplying factories are relatively large and, consequently, their chains and networks less extensive. Here, Adidas and Nike had quite some mutual suppliers (42 factories), while Adidas and New Balance came in second place (34) and both German brands Adidas and Puma shared less factories (18). Remarkably, Adidas shared quite some suppliers with the two American brands, PVH Corp and VF Corp (23 and 27 respectively). Nike showed the same pattern but weaker. The table clarifies that the fifth footwear brand, Japanese ASICS, has remained largely outside these clusters, as did the other Japanese brand in our database, Uniqlo. Differences in cultures and practices with European and US-based brands may have played their roles in both cases, likely combined with different logistic demands and shipping routes.

Factory size

We now delve into the size of the factories. The following tables are based on the distribution of factories over broad employment size classes, that is, from 1 to 1000 workers, 1001 to 5000 workers, and over 5000 workers. We could not avoid using such a broad categorization due to the broad size classes some brands presented. Moreover, because eight brands were subject to the 'no numbers' category, only 6,918 factories in total could be included here. Tables 13 (A and B) show their size distribution over the product categories. Overall, 5,311 factories or 77 per cent counted between 1 and 1000 employed, 1,434 or 21 per cent employed between 1001 and 5000 workers, and 173 factories or nearly 3 per cent were quite large, employing over 5000 workers each. The footwear factories in particular were relatively big, with 11 per cent in the largest size class and two out of three (67%) in the 1-1000 category (Table 13A). By contrast, the factories producing accessories were small overall, with 93 per cent in the '1-1000' class and only four employing more than 5,000 workers. The apparel producers came in between, with three quarters (75%) in the smallest class and 2 per cent in the largest. Table 13B shows that the apparel factories, while making up 74 per cent of all, accounted for a small majority (53%) of the large factory class.

Table 13 Distribution of factories actually supplying 16 brands from 25 countries by size class and product category, 2017-2018

A Row percentages

	1-1000 workers		1001-5000 workers		>5000 workers		total	
	no.	%	no.	%	no.	%	no.	%
Apparel	3,814	75	1,199	23	92	2	5,105	100
Accessories	972	93	68	7	4	0	1,044	100
Footwear	487	67	162	22	77	11	726	100
Rest	38	88	5	12	0	0	43	100
Total	**5,311**	**77**	**1,434**	**21**	**173**	**3**	**6,918**	**100**

B Column percentages

	1-1000 workers		1001-5000 workers		>5000 workers		total	
	no.	%	no.	%	no.	%	no.	%
Apparel	3,814	72	1,199	84	92	53	5,105	74
Accessories	972	18	68	5	4	2	1,044	15
Footwear	487	9	162	11	77	45	726	10
Rest	38	1	5	0	0	0	43	1
Total	**5,311**	**100**	**1,434**	**100**	**173**	**100**	**6,918**	**100**

Source: WageIndicator Garment Supply Chain Database 2018

Tables 14 (A and B) show the size distribution by the number of brands actually supplied per factory. As could be expected, we found some relationship between factory size and the number of brands supplied, though the correlation was rather weak (R=.24). Whereas 85 per cent of the factories in the class between 1 and 1000 employed served just one brand, this share was 63 per cent in the 1001-5000 class and 57 per cent in the largest class (Table 14B). Only 1 per cent of all smaller factories actually supplied four or more brands, against 9 per cent of the factories belonging to the largest size class. The average numbers of factories per brand by size class (not in the table) were respectively 1.20, 1.56 and 1.75. Either way, the fact remains that also majorities of 63 and 57 per cent of all factories in the '1001-5000' and 'over 5000' classes respectively had to depend on actually supplying one brand. Even in the 'over 5000' class, only one in five factories supplied three or more brands; the comparable shares were 12 per cent among the medium-sized factories and just 4 percent among the '1-1000' sized.

Table 14 Distribution of factories actually supplying 16 brands from 25 countries by size class and distribution of number of brands supplied per factory, percentages and averages, 2017-2018

A Row percentages

	1-1000 workers		1001-5000 workers		>5000 workers		total	
No. brands	no.	%	no.	%	no.	%	no.	%
1	4,524	82	902	16	99	2	5,525	100
2	598	61	349	35	41	4	988	100
3	137	48	129	45	19	7	285	100
4	34	47	31	42	8	11	73	100
5	14	40	17	49	4	11	35	100
6	4	40	5	50	1	10	10	100
7	0	0	1	50	1	50	2	100
Total	**5,311**	**77**	**1,434**	**21**	**173**	**3**	**6,918**	**100**

B Column percentages

	1-1000 workers		1001-5000 workers		>5000 workers		total	
No. brands	no.	%	no.	%	no.	%	no.	%
1	4,524	85	902	63	99	57	5,525	80
2	598	11	349	24	41	24	988	14
3	137	3	129	9	19	11	285	4
4	34	1	31	2	8	5	73	1
5	14	0	17	1	4	2	35	1
6	4	0	5	0	1	1	10	0
7	0	0	1	0	1	1	2	0
Total	**5,311**	**100**	**1,434**	**100**	**173**	**100**	**6,918**	**100**

Source: WageIndicator Garment Supply Chain Database 2018

The size distribution of factories differed widely across the 25 countries we studied, as Table 15 indicates below. The main supplying countries, with over 100 factories each, can be divided into four categories. As a first category, Indonesia, Vietnam and to a somewhat lesser extent Bangladesh stood out with relatively large shares of factories sized 'over 5000', respectively 12, 11 and 7 per cent, and less than half of all factories to be found in the smallest category (36, 28 and 47% respectively). Cambodia and Pakistan formed a second category. In these two countries just less than half of all factories could be found in the '1-1000' size class, but that position was in particular due to their substantial shares in the medium-sized class. In both countries the existence of large factories, accounting for 4 and 2 per cent respectively of their total, should not be neglected. A third country group consisted of Myanmar, Sri Lanka and Thailand, showing a rather similar division: about two-thirds of factories in the smallest class and one-third in the medium-sized. A fourth group was made up of countries showing large majorities of relatively small factories. China, Mexico, Taiwan and Turkey clearly belonged to this group, with over nine in ten factories located in the small size class, though India (with 79% employing 1-1000 workers) could be included as well. It should be added that, in spite of the dominance of relatively small factories, 1 per cent of the Chinese, Indian and Mexican factories had over 5,000 employed.

Table 15 Distribution of factories actually supplying 16 brands from 25 countries by size class and country, 2017-2018

	1-1000	1001-5000	>5000	total	no. fact.
Bangladesh	28	65	7	100	531
Cambodia	47	49	4	100	231
China	93	6	1	100	2,716
Egypt	55	45	0	100	33
El Salvador	61	39	0	100	18
Ethiopia	38	62	0	100	8
Guatemala	90	10	0	100	31
Honduras	33	67	0	100	15
India	79	20	1	100	918
Indonesia	36	52	12	100	254
Korea, Rep.	100	0	0	100	168
Malaysia	86	14	0	100	21
Mexico	92	7	1	100	189
Morocco	96	4	0	100	26
Myanmar	69	31	0	100	89
Pakistan	48	50	2	100	125
Peru	0	100	0	100	1
Philippines	62	35	3	100	29
Singapore	100	0	0	100	1
Sri Lanka	65	34	1	100	162
Taiwan	94	6	0	100	84
Thailand	62	38	0	100	55
Tunisia	95	5	0	100	19
Turkey	98	2	0	100	644
Vietnam	47	42	11	100	550
Total	**77**	**21**	**3**	**100**	
No fact.	*5,311*	*1434*	*173*		*6,918*

Source: WageIndicator Garment Supply Chain Database 2018

Table 16 shows a similar size distribution of factories according to the 16 brands they actually supplied. The table totals to 8,022 factories, whereas –as noted earlier-- the number of all factory names disclosed by the 24 brands amounted to 10,130. The difference is made up by the factories only supplying the eight 'no number' brands.

The table suggests that 14 of the 16 brands that delivered data on factory size were linked with factories employing over 5,000 workers while two were not; for Primark this was indeed the case, but for ASOS this could not be concluded due to the size classes this brand reported ('larger than 500' was classified as its largest class and seemingly 4% of the ASOS suppliers belonged to that class). Clearly, brands with a relatively strong emphasis on sourcing for footwear production were among those with the largest shares in the 'over 5000' class: at the top was Nike with 15 per cent of their supplying factories, followed by ASICS and Puma both with 8 per cent. However, the relatively small G-Star brand, with two apparel factories of over 5,000 workers in their network of 26 factories, also ended up with 8 per cent. Next, 7 per cent of factories supplying VF Corp had a workforce of over 5,000, as had 6 per cent of the factories supplying Adidas. Overall, we found some positive correlation albeit not that strong (R=.46) between the share of factories supplying the 16 brands in the 'over 5000' class and the share of footwear factories in their respective supply chains. These footwear shares varied from 45 per cent for Puma, 36 per cent for Pentland and 28 per cent for Nike to nil for G-Star. Notably the 'footwear share' of Adidas (18%) may seem pretty low, but it should be noted that this brand also listed a considerable number of very small apparel and accessories suppliers in notably South Korea and Taiwan. Taking

into account the numbers of workers instead of factories, we found that 38 per cent of workers supplying Adidas did so in footwear manufacturing, whereas that share went up to 61 per cent in Nike's supply chain.

Table 16 Distribution of factories actually supplying 16 brands from 25 countries by size class and brand, 2017-2018

	1-1000	1001-5000	>5000	total	no. of factories	
					total	% footwear
Adidas	70	24	6	100	690	18
ASICS	56	36	8	100	73	25
ASOS	100	0	0	100	494	10
C&A	81	18	1	100	755	5
Debenhams	78	20	2	100	356	15
Esprit	87	12	2	100	804	6
Gap	61	36	4	100	776	2
G-Star	61	31	8	100	26	0
H&M	71	27	2	100	1,477	4
M&S	62	36	2	100	518	3
Nike	41	44	15	100	330	28
Pentland	72	25	3	100	118	36
Primark	85	15	0	100	925	11
Puma	56	36	8	100	121	45
Under Armour	41	54	5	100	96	16
VF Corp	60	33	7	100	463	12
Total 16 brands	**77**	**21**	**3**	**100**	**8,022**	**15**

Source: WageIndicator Garment Supply Chain Database 2018

In order to complete the picture concerning the factory size distribution, we present three tables (A4.1, A4.2 and A4.3) in the Statistical Appendix with divisions of factories supplying the 16 brands for the product categories apparel, footwear and accessories. In the apparel category, only 2 per cent of factories accounted for over 5,000 workers against 75 percent in the 1-1000 class. Under Armour showed up as the brand supplied by on average the largest apparel factories, with 12 per cent in the largest and only 35 per cent in the smallest class. Remarkably, apparel factories supplying the brands oriented on footwear were relatively large; this was notably the case for those factories with ASICS, Nike and Puma as principals (Table A4.1). One may assume here a positive effect of their large-scale footwear suppliers; becoming familiar with such suppliers may have eased dealing with large-scale apparel producers and stimulated an orientation towards such manufacturers. Whereas overall in the footwear category 11 per cent of factories was over 5,000 employed and 22 per cent belonged to the '1001-5000' size class, these shares were much higher for ASICS (22 and 56%) and Nike (42 and 34%), with Adidas and Puma lagging somewhat behind. By contrast, the footwear suppliers of C&A and Debenhams could all be found in the smallest class and the same was true for nearly all suppliers of Primark (Table A4.2).

Across the board the factories supplying accessories were much smaller than those in the other two product categories, with hardly any factories in the largest size class, 7 per cent medium-sized and 93 per cent in the smallest class. Yet, and again remarkable, notably the footwear-oriented brands Nike (44%), Puma (26%) and ASICS (18%) were overrepresented as principals for medium-sized accessories suppliers, though sharing this position with Under Armour (36%) and VF Corp (24%) (Table A4.3). This result was in line with the broader preference for being supplied by larger factories that these five brands seemed to have.

The largest factories

A small group of 30 factories in our database (that is, as far as exact numbers of employed were available) were very large, employing 10,000 or more workers. This group of huge factories included 24 footwear and six apparel suppliers. Less detailed employment figures suggested that seven more apparel facilities reached the threshold of 10,000 employed.

In footwear, the largest factory in our database was Chang Shin Vietnam Co Ltd, owned by South Korea-based Changshin Inc, located in Ving Cuu, Dong Nai province, Vietnam, supplying Nike and according to that brand employing 24,300. Table 17 presents an overview of the 24 largest footwear factories, in order of size (rounded to -100s) and providing data according to this format. It may be noted that in one case, that of the PT Nikolas Gemilang facility of Taiwan-based Pou Chen Corp, the brands served disclosed different employment figures, respectively 19,200 by Nike and 15,600 by Adidas. The overview shows a strong concentration by location country: 13 of these very large footwear factories could be found in Vietnam, nine in Indonesia and two in China. They had just two principals: 17 factories supplied Nike, and eight Adidas. By contrast, the largest footwear factories supplying the other brands that provided detailed employment numbers remained (far) below the 10,000-mark: maximum 900 employed for Debenhams, 5,200 for M&S, and 5,500 for Pentland (G-Star had no footwear deliverers). Interestingly, 19 out of 24 huge footwear factories were owned by foreign investors: 11 from Taiwan (Pou Chen, 4; Ching Luh, 2; Dean Shoes, 2; Feng Tay, 2; Sports Gear, 1), seven from South Korea (Taekwang 3; Changshin, 2; Hwaseung, 1; Samho, 1) and one from Hong Kong (Right Source Investments). Five large footwear factories belonged to national capital groups, from Indonesia (3), China (1) and Vietnam (1) respectively.

Table 17 24 largest footwear factories, by owner, country of owner, location, number of employed, brand, and brand providing employment information, 2017-2018

factory	owner	cr.	location	no. empl.	brand	no. empl. according to
Chang Shin Vietnam Co Ltd	Changshin Inc	KR	Ving Cuu, Dong Nai, Vietnam	24300	Nike	Nike
Vietnam Chingluh Shoes Ltd	Ching Luh Group	TW	Ben Luc, Long An, Vietnam	22400	Nike	Nike
Vinh Long Footwear Co Ltd	Right Source Investments	HK	Long Ho, Vinh Long, Vietnam	22300	Adidas	Adidas
Freetrend VN Industrial Co Ltd	Dean Shoes Co Ltd	TW	Thu Duc, Ho Chi Minh City, Vietnam	21600	Nike	Nike
PT Nikolas Gemilang	Pou Chen Corp	TW	Serang, Banten prov., Indonesia	19200/ 15600	Nike Adidas	19200 (Nike) 15600(Adidas)
Tae Kwang Vina	Taekwang Group	KR	Bien Hoa, Dong Nai, Vietnam	18600	Nike	Nike
Vietnam Pou Sung Co Ltd	Pou Chen Corp	TW	Trang Bom, Dong Nai, Vietnam	17100	Nike	Nike
PT Pratama Abadi Industri	PT Pratama Abadi Industri	ID	Sukabumi, Jawa Barat, Indonesia	15800	Nike	Nike
PT Victory Ching Luh Indonesia	Ching Luh Group	TW	Tangerang, Banten, Indonesia	15300	Nike	Nike
PT TK Industrial Indonesia	Taekwang Group	KR	Subang, Jawa Barat, Indonesia	15300	Nike	Nike
Vietnam Moc Bai JSC	Taekwang Group	KR	Ben Vau, Thai Ningh, Vietnam	14500	Nike	Nike
Hwa Seung Vina Co Ltd	Hwaseung Industries	KR	Nhonh Trach, Dong Nai, Vietnam	14200	Adidas	Adidas
Adora Vietnam Footwear	Hing Fu Int'l Co Ltd	VN	Tinh Gia, Thanh Hoa, Vietnam	13900	Nike	Nike
Dona Standard Vietnam Co Ltd	Feng Tay Enterprises	TW	Xuan Loc, Dong Ni, Vietnam	13700	Nike	Nike
PT Chang Shin Indonesia	Changshin Inc	KR	Karawang, Jawa Barat, Indonesia	13600	Nike	Nike
Dean Shoes Vietnam	Dean Shoes Co Ltd	TW	Thu Duc, Ho Chi Minh City, Vietnam	13600	Nike	Nike
Pou Chen Corp Dongguan	Pou Chen Corp	TW	Dongguan, Guangdong, China	12800	Adidas	Adidas
PT KMK Global Sport	PT KMK Global Sport	ID	Tangerang, Banten, Indonesia	12800	Nike	Nike
Shoetown Footwear Co Ltd	Shoetown Footwear	CN	Qingyang, Guangdong, China	11900	Nike	Nike
Chi Hung Co Ltd	Sports Gear Co Ltd	TW	Binh Duong, Vietnam	10700	Adidas	Adidas
PT Feng Tay Indonesia Enterpr.	Feng Tay Enterprises	TW	Bandung, Jawa Barat, Indonesia	10300	Nike	Nike
PT Parkland World Indonesia (1+2)	PT Parkland World Indon.	ID	Serang, Banten, Indonesia	10300	Adidas	Adidas
PT Glostar Indonesia 2	Pou Chen Corp	TW	Sukabumi, Jawa Barat, Indonesia	10100	Adidas	Adidas
Vietnam Samho Co Ltd	Samho Industrial	KR	Ho Chi Minh City, Vietnam	10100	Adidas	Adidas

Source: WageIndicator Garment Supply Chain Database 2018

We compiled a similar overview for the apparel factories in our database exceeding the 10,000-workers' mark: Table 18. We found six apparel facilities for which exact information indicated that they recently employed over 10,000 workers, and added seven more factories for which at least some of the less detailed employment figures available suggested that they

had such numbers employed. Like the overview of huge footwear factories, this list shows a strong concentration by location country but along different lines: eight very large apparel factories could be found in Bangladesh, four in China and one in Vietnam. Also by contrast, the largest apparel factories supplied to a wide array of 17 brands, that is, to Esprit (5), Gap Inc (5), M&S (5), PVH Corp (4), Adidas (3), Bestseller (2), H&M (3), Tesco (2), VF Corp (2), Amer Sports (1), C&A (1), Debenhams (1), KappAhl (1), Nike (1), Puma (1), Under Armour (1), and Uniqlo (1). Brands for which the largest apparel providers remained below the 10,000-mark, included G-Star (largest supplier 9,200 workers), Nike (8,500), and Pentland (5,600).

Another difference with the large footwear suppliers was that national capital groups, from Bangladesh (6) and China (3) respectively, were strongly represented; in apparel production just three foreign investors with four factories showed up, Hong Kong-based Regina Miracle International with two factories, another investor from Hong Kong, Hop Lun (HK) Ltd, and the Korean Youngone Corp. In contrast with footwear, Taiwanese investors did not own any of the large apparel factories. It may be added that the largest apparel factory, Regina Miracle Intimate Apparel (Shenzhen) Ltd, was one of the two factories we traced in our database that actually supplied seven brands.[20]

[20] The inclusion of Heshan Astros Printing, with an extremely high employment figure for such a facility, may be questionable.

Table 18 13 largest apparel factories, by owner, country of owner, location, number of employed, brand, and brand providing employment information, 2017-2018

factory	owner	cr.	location	no. empl.	brand	no. empl. according to
Regina Miracle Intimate Apparel (Shenzhen) Ltd	Regina Miracle International (Group) Ltd	HK	Shenzhen, Zhejiang, China	15000/ 14000	Adidas, Gap Inc, M&S, Nike, Puma, Under Armour, PVH Corp	15000 (M&S) 14000 (Adidas)
GMS Composite Knitting Ltd	GMS Comp. Knitting Ltd	BD	Gazipur, Bangladesh	13500	Esprit, M&S, Bestseller	M&S
Regina Miracle International Vietnam Co Ltd	Regina Miracle International (Group) Ltd	HK	Haiphong, Vietnam	13400	Adidas, M&S, PVH Corp	Adidas
Heshan Astros Printing	Heshan Astros Printing	CN	Heshan, Guangdong, China	12900	M&S	M&S
Youngone (CEPZ) Ltd	Youngone Corp	KR	Chittagong, Bangladesh	11900	Adidas, Amer Sports	Adidas
Hop Yick (Bangladesh) Ltd	Hop Lun (HK) Ltd	HK	Ganakbari, Dhaka, Bangladesh	10400	Debenhams, H&M, M&S, KappAhl, Tesco	Debenhams
A.K.M. Knit Wear Ltd	Anupam Hosiery Ind. (Al-Muslim G)	BD	Ganakbari, Dhaka, Bangladesh	11501-12000	C&A, H&M, Bestseller	H&M
Standard Group Ltd	Standard Group Ltd	BD	Gazipur, Bangladesh	>10000	Gap Inc	Gap Inc
Ningbo Haide Knitting Dyeing Co Ltd	Ningbo Haide Knitting Dyeing Co Ltd	CN	Ningbo, Zhejiang, China	>10000	Esprit	Esprit
Huafu Top Dyed Melange Yarn Co Ltd	Huafu Fashion Co Ltd	CN	Shaoxing, Zhejiang, China	>10000	Esprit	Esprit
Pacific Jeans Ltd	Jeans 2000 Ltd	BD	Chittagong, Bangladesh	>10000 /6001-6500	Gap Inc, H&M, Tesco, Uniqlo	>10000 (Gap) 6001-6500 (H&M)
Creative Collection Ltd	Refat Garments Ltd	BD	Gazipur, Bangladesh	>10000 / 5001-10000	Esprit, Gap Inc, VF Corp, PVH Corp	>10000 (Gap) 5001-10000 (Esprit, VF Corp)
That's it Sports Wear Ltd	Refat Garments Ltd	BD	Dhaka, Bangladesh	>10000 / 5001-10000	Esprit, Gap Inc, VF Corp, PVH Corp	>10000 (Gap) 5001-10000 (Esprit, VF Corp)

Source: WageIndicator Garment Supply Chain Database 2018

After our treatment of the size class division for the accessories suppliers it will come as no surprise that the largest accessories factories remained considerably below the 10,000-workers' mark. If we lower the threshold to 5,000 employed, we can compose an overview of these largest suppliers as shown in Table 19 – again, in order of size with employment rounded to -100s. We traced three accessories facilities for which exact data indicated that they recently employed 5,000 or more workers, and added two more factories for which less detailed employment figures suggested they had so many employed. Remarkably, these five factories were located in five countries. They supplied 12 of 24 brands: H&M (3), Adidas (2), C&A (2), Amer Sports, Debenhams, M&S, Primark, Puma, Levi Strauss, Tesco, Under Armour and VF Corp. Brands for which the largest accessories providers remained below

the 5,000-workers' mark included Pentland (largest supplier 2,100 workers), Nike (1,600), and G-Star (300). Two out of five large suppliers were owned by foreign investors: Starite International Vietnam Ltd by the Chinese parent Starite International, and SQ Birichina in Bangladesh by Singapore-based Q Collection. The large accessories suppliers from Pakistan, Indonesia and China had national owners.

Table 19 Five largest accessories factories, by owner, country of owner, location, number of employed, brand, and brand providing employment information, 2017-2018

factory	owner	cr.	location	no. empl.	brand	no. empl. according to
Starite International Vietnam Ltd	Starite Int'l Ltd	CN	Bien Hoa, Dong Nai, Vietnam	5500	Adidas, Under Armour, VF Corp	Adidas
Interloop Ltd - Hoisery Division 2	Interloop Ltd	PK	Faisalabad, Punjab, Pakistan	5200	Adidas, C&A, H&M, Primark, Levi Strauss, Tesco	Adidas
SQ Birichina	Q Collection Pte Ltd	SG	Mymensingh, Mymensingh, Bangladesh	5000/ 4500	Debenhams, H&M, M&S	5000 (D'hams) 4500 (M&S)
PT Kahatex Unit 1	PT Kahatex	ID	Bandung, Jawa Barat, Indonesia	>10000 /4501-5000	C&A, H&M	>10000 (C&A) 4501-5000 (H&M)
Zhongshan Worldmark Sporting Goods Ltd	Zhongshan Worldmark Sporting Goods	CN	Zhongshan, Guangdong, China	>5000	Puma, Amer Sports	Puma

Source: WageIndicator Garment Supply Chain Database 2018

As noted, six brands disclosed exact information on the numbers of workers in their garment supplying factories, namely, Adidas, Debenhams, G-Star, M&S, Nike, and Pentland. Their information allowed us to compile Table 20, showing the average numbers of workers in these factories in the 22 relevant production countries (in the absence of factories in Ethiopia, Peru and Singapore). The country figures in the table reflect to a considerable extent what we found concerning the size distribution of supplying factories across countries and presented in Table 15. Large factories could in particular be traced in Indonesia, Vietnam and Bangladesh, and to some extent in Cambodia and Pakistan too (the latter here with the exception of Pentland). The average factory sizes shown for China, India, Mexico, Taiwan and Turkey were indeed modest, albeit for China and India with the exception of the factories delivering to Nike; for the other three countries the averages of Nike's suppliers were the highest as well. In the next chapter, we compare these figures with those concerning the number of employed in the foreign-owned factories supplying these six brands. It may be noted that employment in the supply chains of the six brands counted individually in the 22 countries amounted to 2,74 million. With production in (again individually counted) 2,006 factories, average factory size ended up at 1,369 employed.

Table 20 Average numbers of workers per country in factories supplying 6 brands in 22 countries, 2017-2018

	Adidas	Debenhams	G-Star	M&S	Nike	Pentland
Bangladesh	5,020	2,518	5,231	2,682	2,660	
Cambodia	2,646	1,121		1,599	3,414	2,505
China	738	337	503	814	1,558	417
Egypt	871	635		1,451	1,371	
El Salvador	1,108				1,521	
Guatemala	796				891	
Honduras	1,430				3,161	
India	837	521	820	1,214	3,166	242
Indonesia	2,317	2,159		3,076	4,928	2,198
Korea, Rep.	23				387	
Malaysia	97				844	
Mexico	658				1,096	
Morocco		212	159	387		
Myanmar	1,826			792		
Pakistan	1,424	1,520		1,690	2,436	351
Philippines	1,299			133		
Sri Lanka	826	582		975	1,558	1,871
Taiwan	96			15	587	24
Thailand	1,095			910	1,358	1,489
Tunisia	448					
Turkey	356	593	147	303	803	131
Vietnam	2,730	1,655	1,157	1,549	4,392	1,684
Total	**1,180**	**792**	**1,557**	**1,194**	**2,684**	**902**
No. of factories	*690*	*314*	*26*	*518*	*330*	*128*
Total no. empl.	*814,121*	*281,825*	*40,515*	*618,513*	*885,809*	*106,409*

Source: WageIndicator Garment Supply Chain Database 2018
Note: no factories in Ethiopia, Peru and Singapore

Table A2, in the Statistical Appendix, shows the country shares in the supply chains of those 15 brands in our database with chains in the 25 countries using at least 300 factories each. The reader should be aware that these shares have been determined by calculations that used various bases, that is, supplied quantities (for one brand, C&A), employment (for five brands) or the number of factories (for nine brands). In Chapter 3 we have already summarized some outcomes.

When tracing the shares of the supplying countries in the chains of these 15 brands, China remains head and shoulders above the other countries, supplying the largest shares for 10 brands. In particular Bestseller and Primark can be seen to rely strongly on Chinese supplies. Yet, it also has to be noted that the average of the 'China share' of the 15 brands at large, 29.4 per cent, was considerably below China's 2016 shares in world garment exports and in global textile / apparel / leather etc. employment -- both approximately 34 per cent. Bangladesh came in second place, with 12.8 per cent averaged for 15 brands. Except for ASOS, all brands used Bangladeshi factories in their chains, with Debenhams, C&A and M&S most prominently doing so. Bangladesh was the largest supplying country for C&A. India ranked third (9.6% averaged), with all 15 brands buying from Indian suppliers, in particular ASOS, Gap Inc, and Primark. Vietnam (9.5%) followed suit, again with all 15 brands acting as buyers; most prominent buyers here were footwear-specialists Nike and Adidas, both with Vietnam as their largest country of supply. Turkey (5.3%) ranked fifth, with relatively large shares for Esprit and H&M. Indonesia's share (5.1%) came close; like Vietnam, Indonesia showed up as a major supplier for Nike and Adidas. Cambodia ranked

seventh (4.4%), supplying smaller but still considerable amounts to all 15 brands, in particular to Bestseller. Unlike China, the shares of each of these six countries in the 15 supply chains were considerably higher than their shares in world garment exports.[21]

Female participation

Female labour participation is an issue given as much coverage and exposure as possible in *WageIndicator* reporting, and this report is no exception to that rule. It is the case and worth noting that the garment industry in particular is a major source of work and income for women. Seven brands disclosed exact information on the female shares in the workforces of their suppliers: ASOS, Debenhams, G-Star, M&S, Nike, Pentland, and Primark. Five of them provided exact figures on the number of women employed per factory, whereas –somewhat peculiarly-- ASOS and Primark only disclosed size classifications. Table 21A shows the average shares of female workers in the factories supplying these brands, for ten countries: the nine Asian countries for which we presented country-based female labour participation rates in Table 6 as well as Turkey as a major production country. For some countries the female shares by brands / supplying factories diverged from the female participation rates presented in Table 6. The latter figures were estimates we produced based on nation- and worldwide sources, and we did not try to reconcile these two sets of female shares. For four countries the averages in Table 21A came amazingly close to the shares we found earlier, ie., for Cambodia (82%), China (66%), Sri Lanka (76%), and Vietnam (79%). For India the difference may be regarded as reasonably small. The averages varied widely for that country by brand, and the divergence with the national 24 per cent share we estimated earlier concentrate on two brands, M&S and Pentland.

Table 21B, showing the female shares across countries and product categories (sub-sectors), indicates that variation within countries in the distribution of factories according to product categories only showed as minor differences. For example, the average female shares for China were for apparel 67.8 per cent, for footwear 59.8 per cent and for accessories 64.7 per cent. Cambodia, Indonesia, Turkey and Vietnam showed similar small differences. Table A5, in the Statistical Appendix, showing the full results of our calculations on female shares, adds similar outcomes for countries not included in Tables 21A and 21B, notably for Taiwan and Thailand. In other words, sub-sector composition and production technology can explain differences in female shares across countries only to a small extent, at least as far as it concerns textile, garment and footwear manufacturing. Our results confirm the more general finding that cultural, legal and related conditions at national and local levels are most relevant in determining levels of female employment (Cf. Van Klaveren and Tijdens 2012; Besamusca *et al.* 2015).

Nevertheless, when returning to Table 21A we cannot overlook the current results for Bangladesh and Pakistan that were quite low compared to our earlier country outcomes. As for Bangladesh, no average for five brands came near the 80 per cent average we estimated earlier. For Pakistan, all five average shares remained far below the already low female participation rate calculated earlier (28%); the averages of the suppliers for three brands did not even reach 10 per cent. It may be that our efforts to include informal labour and home-

[21] Though we are the first to admit that, except for C&A, the basis for our calculations does not allow more exact comparisons with countries' world trade shares.

workers in the country-wide numbers lifted the female shares for Bangladesh and Pakistan considerably above the averages now found based on brand information. However, one might have expected a similar effect for Indonesia, but by contrast for that country the averages of the brands were all way above the country average we calculated earlier (65%). Finally, concerning Turkey a recent Dutch report referred to Turkish social security information setting the registered share of female workers in the garment industry for 2016 at 50 per cent (FWF 2016, 17). Table 21A shows higher averages for Turkey for six of seven brands, with considerably higher averages posted for Debenhams and Pentland.

Table 21 Share of female workers in factories in 10 countries supplying 7 brands

A. By brand, 2017-2018

	ASOS	Debenhams	G-Star	M&S	Nike	Pentland	Primark	Average
Bangladesh		57.4	46.8	60.1	53.1		53.1	56.5
Cambodia	77.8	82.2		88.2	76.6	90.8	76.6	81.7
China	58.0	67.7	61.1	66.8	66.2	68.0	66.2	65.5
India	18.0	21.1	23.3	53.0	35.2	47.7	35.2	31.4
Indonesia		87.0		83.2	83.6	78.8	83.6	77.6
Myanmar				81.2			90.1	86.3
Pakistan		11.1		8.5	6.3	4.5	6.3	8.0
Sri Lanka	76.7	80.9		77.1	68.0	81.5	68.0	75.7
Turkey	40.9	67.4	54.0	59.1	53.5	75.0	53.5	51.9
Vietnam	70.9	79.8	62.0	76.1	75.3	84.0	75.3	77.3

Source: WageIndicator Garment Supply Chain Database 2018

B. By product category, 2017-2018

	apparel	footwear	accessories	total
Bangladesh	56.4		76.0	56.5
Cambodia	80.2	91.7	86.5	81.7
China	67.8	59.8	64.7	65.5
India	33.8	30.3	17.9	31.4
Indonesia	81.6	71.7	75.3	77.6
Myanmar	9.0			86.3
Pakistan		11.1	3.9	8.0
Sri Lanka	75.7			75.7
Turkey	51.9		51.6	51.9
Vietnam	76.7	79.3	73.6	77.3

Source: WageIndicator Garment Supply Chain Database 2018

5. Ownership

Parent firms

In this chapter we return to the issue of ownership of the supplying factories for the three product categories. In Table 22 we present an overview by country of origin of the parent companies in our database related to all 8,110 factories. It shows that 7,057 factories, or 87 per cent of all, had owners based in the 25 supply countries. Yet, the distribution of ownership across these countries was quite uneven. For countries like India, Mexico, Pakistan, Sri Lanka and Turkey the numbers in both columns were rather balanced, suggesting for these countries a limited inflow of foreign direct investment (FDI) in their apparel, footwear and accessories production. Other countries showed imbalances, either with a lot more factories owned by parent firms based in the country in question than actually supplying (Korea, Malaysia, Singapore), indicating net FDI outflows, or, by less factories owned by parent companies, indicating net inflows of FDI – the latter most prominent for Cambodia, Indonesia, Myanmar and Vietnam, to some extent also for Bangladesh and Thailand, and in existence for nearly all smaller production countries. We will detail these indications in the course of this chapter.

Outside the 25 countries, as an investing country Hong Kong showed up most prominently. Table 22 indicates that the owners of 633 apparel, footwear and accessories factories, nearly 8 per cent of all, had their basis in Hong Kong. In our statistics regarding ownership and investing countries we separated data for Hong Kong from those for (mainland) China. Statistically, the former British crown colony, now a Special Administrative Region of China, complicates matters anyway. Its outbound investment flows stem from three sources: mainland Chinese enterprises; local entrepreneurs, and western and Japanese investors using financial and legal facilities in Hong Kong as intermediaries. Hong Kong has developed into a major global and regional trade hub, which according to the UNCTAD *World Investment Report* (2018, 23) jointly with Singapore has given a boost to the integration of China and other countries in East and South-East Asia in global value chains. Also, Hong Kong remains the principal financial centre within China and in that respect acts for investors as a 'gateway to China' (Wah 2017). Throughout this development, its initial role as manufacturing location to which we referred in Chapter 2, has nearly disappeared.[22]

The United States ranked second in the category 'investors from outside the 25', with US investors owning 147 factories, followed by investors from the UK (62, of which 20 were registered in the British Virgin Islands), Japan (38) and the United Arab Emirates (UAE, 19). If we leave out Hong Kong and include the UAE, the conclusion is justified that in this sector investors from developed countries played quite limited roles: they owned 335 factories, just 4 per cent of the 8,110 we traced. However, these figures may well underestimate the amount of western investment since Hong Kong is frequently used as the gateway to China, as just mentioned. Whatever the outcome, we hardly found any evidence of the 24 brands under scrutiny among the investors from developed countries.

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22 We found just one (small) apparel factory in Hong Kong (included in our database under China). The *Hong Kong Yearbook 2017* stipulates employment in apparel manufacturing by the end of 2017 to amount to 4,100 workers in garment and 2,300 in textiles.

Table 22 Number of factories actually supplying 24 brands from 25 countries and number of parent companies, by country of origin, 2017-2018

	supplying factories		supplying factories by parent comp.	
	No.	%	No.	%
Bangladesh	579	7,1	469	5,8
Cambodia	263	3,2	15	0,2
China	3,387	41,8	2,865	35,3
Egypt	43	0,5	34	0,4
El Salvador	20	0,2	10	0,1
Ethiopia	11	0,1	2	0,0
Guatemala	31	0,4	19	0,2
Honduras	15	0,2	6	0,1
India	1,001	12,3	1,006	12,4
Indonesia	280	3,5	162	2,0
Korea, Rep.	177	2,2	415	5,1
Malaysia	25	0,3	44	0,5
Mexico	211	2,6	178	2,2
Morocco	27	0,3	24	0,3
Myanmar	106	0,3	16	0,2
Pakistan	134	1,7	130	1,6
Peru	4	0,0	4	0,0
Philippines	33	0,4	19	0,2
Singapore	1	0,0	56	0,7
Sri Lanka	202	2,5	185	2,3
Taiwan	87	1,1	302	3,7
Thailand	111	1,4	86	1,1
Tunisia	39	0,5	23	0,3
Turkey	695	8,6	693	8,5
Vietnam	628	7,7	294	3,6
25 countries	8,110	100,0	(7,057)	(87,0)
Canada			7	0,1
Germany			9	0,1
Hong Kong			633	7,8
Italy			8	0,1
Japan			38	0,5
Sweden			7	0,1
United Arab Emirates			19	0,2
UK			42	0,5
British Virgin Islands			20	0,2
USA			147	1,8
other developed countries			38	0,5
other emerging & developing countries			30	0,4
unclassified			55	0,7
Total			8,110	100,0

Source: WageIndicator Garment Supply Chain Database 2018
Note: unclassified = joint ventures for which ownership could not be attributed to one country.[23]

The 8,110 factories in our database jointly were owned by 5,894 parent companies. Among these, 847 parent companies (14%) owned two or more factories, whereas 28 parent firms (0.5%) even owned more than ten factories. Table 23 shows the frequency division of parent companies according to the number of factories owned. Shahi Exports Pvt Ltd was top of

[23] For 55 international joint-ventures we abstained from exploring the relationship between their partners because of its time-consuming character.

our database as the owner of 43 factories, all in their home country of India. Second ranked Sri Lanka-based MAS Holdings with 35 factories (of which 30 in Sri Lanka, and others in Bangladesh, India, and Indonesia), followed by another Sri Lanka-based parent firm, Hirdaramani International Exports Pvt Ltd (29 factories, of which 21 were in Sri Lanka, 7 in Vietnam and one in Ethiopia), and the Hong Kong-based Crystal International Group Ltd (25 factories, of which eight were in China, seven in Sri Lanka, four in Bangladesh and Vietnam, and two in Cambodia). According to our database they produced for nine brands. Pakistan-based Artistic fabric & garment industries Pvt Ltd showed up in the database with 20 factories, nearly all located in an Industrial Area near Karachi, Pakistan.

Some large Korean parent firms in particular, had obviously left their domestic production base. Youngone Corp were, according to our database, in this category, owning 13 factories abroad but no factories at all in South Korea. They had seven factories in Bangladesh, three in Vietnam, two in China, and one in El Salvador. Altogether these factories produced for eight brands. In a similar vein, another Korean firm, Hansae Co Ltd, controlled five factories in Indonesia, five in Vietnam and one in Guatemala. Clearly, these are reflections of a wider trend. As the Korean garment industry approached its mature stage, a growing number of home manufacturers felt (rather early) the need to upgrade to higher value-added activities. They became increasingly involved in design, product development, retailing, and international trade (cf. Ha-Brookshire and Lee 2010). In our 2016 garment report we noted, referring among others to Merk (2014), that "Quite some first-tier companies in the Asian countries at stake have upgraded and diversified their businesses and serve multiple brand-name buyers, each accounting for a quite limited share of their turnover, seizing factory capacity often for only part of the year or for a few seasons, and with no guarantee that orders will be repeated" (Van Klaveren 2016, 9). Elsewhere large garment and footwear suppliers notably from Hong Kong and Taiwan, are following the same track. A number of them have emerged in the supply chains of global brands co-ordinating and even orchestrating capacity. As such, they may be expected to play leading roles in swiftly relocating manufacturing activities not simply within but also across countries. As part of their analysis of this trend towards "leading multinational garment manufacturers", Azmeh and Nadvi (2014) presented four cases. One covered the Hong Kong-based Crystal International Group Ltd, which in 2012 employed around 45,000 workers globally, a number which recently had increased to approximately 70,000. The same firm advertised that it had "20 self-operating manufacturing facilities spanning across five countries" (company website). In our database the Crystal Group appeared with 23 factories: indeed in five countries: seven of which were in China, six in Sri Lanka, four each in Bangladesh and Vietnam, and two in Cambodia.[24]

According to our database this type of leading garment producer was almost exclusively based in emerging and developing countries and was rarely to be found in developed countries. The main exception was VF Corp, with 14 factories in our database, of which 13 were located in Mexico and one in Honduras. At the same time this US-based entity was the only brand among the 24 scrutinized with its own production facilities in the 25 countries covered.

[24] The Crystal Group management most likely regards some of their factories in China and Sri Lanka that we counted separately as belonging to an integrated operation.

Table 23 Distribution of parent companies by number of factories owned, numbers and percentages, 2017-2018

No. factories	no.	%
1	5,047	86
2	437	7
3	148	3
4	101	2
5	48	1
6	27	0
7	20	0
8	14	0
9	16	0
10	8	0
>10	28	0
Total	**5,894**	**100**

Source: WageIndicator Garment Supply Chain Database 2018

Looked at in which country the factory was located (not in the table), it turns out that the ownership of factories was clearly most concentrated in Sri Lanka where 74 per cent of the factories had more than one owner. Pakistan (62%) and Bangladesh (59%) followed at some distance. A distribution by the owner´s country of origin showed that 76 per cent of the Sri-Lankan owners each owned more than one factory, followed by Hong Kong and Pakistan, with 61 per cent of owners based in these two countries each owning more than one factory. A breakdown by product category (also not in the table) found factory ownership most concentrated in apparel manufacturing: 41 per cent of all apparel factories had more than one owner, followed by 34 per cent in footwear and only 23 per cent in accessories manufacturing.

Foreign ownership

Now we turn to the shares of factory ownership held by national and foreign owners, the latter indicating the spread of Foreign Direct Investment (FDI). We added joint ventures as a separate category for this analysis. Table 24 shows the distribution of the ownership categories across the product categories. We found that 1,675 factories (20.6%) in our database were foreign-owned, excluding 86 joint ventures, of which 55 involved firms based in two or more countries. Including these international joint ventures lifted the total of foreign-owned factories to 1,730, or 21.3 per cent. The table reveals that in the three main categories, with 30 per cent of factories foreign ownership was most widespread in footwear, considerably more than in apparel (20%) and accessories (17%).

Table 24 Distribution of ownership of factories actually supplying 24 brands from 25 countries: national, foreign and joint-ventures, by product category, 2017-2018

	national	foreign	joint-venture	total	no. factories
Apparel	79	20	1	100	6,018
Accessories	82	17	1	100	1,197
Footwear	69	30	1	100	852
Rest	65	35	0	100	43
Total	**78.3**	**20.6**	**1.1**	**100**	**8,110**

Source: WageIndicator Garment Supply Chain Database 2018

Table 25 presents the distribution of ownership categories for all 25 countries we studied. For those countries with more than 100 garment, footwear and accessories factories in our database, national ownership clearly dominated in Turkey (99%), India (95%) and Pakistan

(93%). It was also strongly marked in South Korea (88%), China (leaving out Hong Kong) and Bangladesh (both 79%), Sri Lanka (78%), and Mexico (77%). In the preceding chapter we found notably in India and Sri Lanka, that a limited amount of national capital groups had developed into multi-factory owners. Thailand (63% of factories with national ownership) and Indonesia (54%) were somewhere in the middle of this distribution, with quite strong positions for foreign investors in their garment and footwear industries. At the other end of the scale, Vietnam had a minority of factories (45%) with a national owner. Whilst for Myanmar the share was only 14 per cent and for Cambodia a tiny 3% revealing the near-complete dominance of foreign owners in 'our' industries in that country.

Table 25 Distribution of ownership of factories actually supplying 24 brands from 25 countries: national, foreign and joint-ventures, by country, 2017-2018

	national	foreign	joint-venture	total	no. factories
Bangladesh	79	20	1	100	579
Cambodia	3	97	0	100	263
China	79	20	1	100	3,387
Egypt	77	21	2	100	43
El Salvador	45	50	5	100	20
Ethiopia	18	82	0	100	11
Guatemala	58	39	3	100	31
Honduras	26	67	7	100	15
India	95	5	0	100	1,001
Indonesia	54	45	1	100	280
Korea, Rep.	88	11	1	100	177
Malaysia	88	12	0	100	25
Mexico	77	21	2	100	211
Morocco	89	11	0	100	27
Myanmar	14	85	1	100	106
Pakistan	93	5	2	100	134
Peru	100	0	0	100	4
Philippines	55	45	0	100	33
Singapore	100	0	0	100	1
Sri Lanka	78	17	5	100	202
Taiwan	90	9	1	100	87
Thailand	63	34	3	100	111
Tunisia	46	41	13	100	39
Turkey	99	1	0	100	695
Vietnam	46	54	0	100	628
Total	**78.3**	**20.6**	**1.1**	**100**	
Total no.	*6,349*	*1,675*	*86*		*8,110*

Source: WageIndicator Garment Supply Chain Database 2018

Table 26 (p. 44) presents a cross tabulation, showing horizontally the number of factories owned by residents from the country mentioned in the left-hand column, and vertically the number of factories by home country of the parent companies. For example, owners based in Bangladesh owned 460 factories in their own country, one in China, three in India, and four factories elsewhere in the 16 countries not specified in the table (horizontal). Thus, Bangladeshi residents owned, leaving out joint-ventures (1%), 79 per cent of factories in their country – an outcome corresponding with that of Table 25. Besides these 460 factories, 34 Bangladeshi factories were owned by residents of Hong Kong, 25 by Indian residents, 16 by Koreans, et cetera (vertical).

In essence, the table clarifies that:

- Hong Kong-based investors have started or acquired garment manufacturers to a considerable extent outside this Special Administrative Region, in particular in China (403) but also in Vietnam (62), Myanmar (34) and Sri Lanka (15);
- leaving investment from Hong Kong aside, Chinese investors in garment manufacturing have expanded abroad to Cambodia to the point where they own one-third (88) of all such factories, and to Myanmar (33) and Vietnam (22);
- Korean firms have acquired considerable interests in Vietnam (111 factories), Indonesia (67), China (32), Cambodia (20), and Bangladesh (16);
- Taiwanese investors have acquired somewhat less but still considerable interests abroad, in China (70 factories), Vietnam (63), Cambodia (53) and Indonesia (14);
- Singapore-based investors played a more limited role, with ownership of factories mainly in Cambodia (15), Indonesia (13) and Vietnam (11)[25];
- Indian firms have also expanded modestly abroad, mainly to Bangladesh (25 factories) and China (11);
- Malaysian firms developed foreign interests mainly in Vietnam (11 factories);
- US investors mainly focused on China (49 factories) and to some extent on India (16) and Vietnam (15); among their other destinations (51 factories), Mexico (26) showed up as most important, followed by the smaller Central American production countries;
- UK investors mainly owned factories in China (11) and Bangladesh (10);
- Japanese firms had interests mainly in China (16 factories).

Using the number of factories in the production countries as the criterion, the largest foreign investors in the respective countries comprised: China in Cambodia; Hong Kong in Bangladesh, China, Myanmar, Sri Lanka, and Thailand; Korea in Indonesia and Vietnam, and the USA in India.

[25] Similar to Hong Kong, Singapore's manufacturing facilities have nearly disappeared. Again, here we found just one (small) apparel factory. The *Yearbook of Statistics Singapore 2017* registered for 2016 less than 3,400 workers in textiles, apparel and leather production.

Table 26 Distribution of factories actually supplying 24 brands from 25 countries by number of parent companies and countries of factory ownership, 2017-2018

	Bangla-desh	Cam-bodia	China	India	Indo-nesia	Myan-mar	Thai-land	Sri Lanka	Viet-nam	all other	Total
Bangladesh	460	0	1	3	1	0	0	0	0	4	469
China	0	88	2,694	0	5	33	5	1	22	17	2,865
Hong Kong	34	57	403	1	7	34	8	15	62	12	633
India	25	0	11	955	1	1	2	5	2	4	1,006
Indonesia	0	0	4	0	155	0	0	0	1	2	162
Korea, Rep.	16	20	32	0	67	5	1	0	111	163	415
Malaysia	0	5	5	0	0	0	0	1	11	22	44
Pakistan	0	0	0	1	0	0	1	0	0	128	130
Singapore	4	15	6	0	13	3	2	0	11	2	56
Sri Lanka	4	0	0	4	1	0	0	167	6	3	185
Taiwan	2	53	70	3	14	6	3	0	63	88	302
Thailand	0	3	3	0	1	0	73	0	6	0	86
Vietnam	0	2	2	0	0	0	0	0	290	0	294
Japan	1	3	16	0	3	1	4	1	8	1	38
UK	10	3	11	6	0	0	1	1	6	4	42
USA	7	1	49	16	4	2	1	1	15	51	147
All other	16	13	80	12	8	21	10	10	14	1,052	1,236
Total	**579**	**263**	**3,387**	**1,001**	**280**	**106**	**111**	**202**	**628**	**1,553**	**8,110**

Source: WageIndicator Garment Supply Chain Database 2018

Although factory numbers provide some indication of the spread of activities of investors from different national backgrounds, this criterion has its limitations if the aim is to assess the impact of foreign investment on particular sectors or on national economies. We have already presented some evidence that in apparel, footwear and accessories manufacturing the share of foreign-owned factories in employment seems to be considerably larger than their share expressed in numbers of factories, in particular in Asia. Tables 17, 18 and 19 showed that 24 of the largest 42 factories in the three product categories had foreign owners, all from other Asian countries (11 from Taiwan, eight from Korea, three from Hong Kong, and one each from China and Singapore). However, the limited availability of employment data per factory hampers a reliable overall calculation of foreign employment shares across countries. We have tried to tackle this problem in two ways: using the data for 16 brands as to analyse the distribution of foreign-owned companies by size class, similar to what we presented earlier for all companies serving this group of brands. Thereafter, we present a more detailed analysis for the six brands that disclosed exact employee numbers per factory.

Table A6 in the Statistical Appendix presents the equivalent of Table 15, namely, a distribution of *foreign-owned* factories supplying 16 brands by size class and country. The table comprises 1,357 of the total 1,730 foreign-owned factories, the difference due to 'no number' factories. Whereas Table 15 overall showed 77 per cent of factories in employment size class '1-1000', 21 per cent in class '1001-5000' and 3 per cent in class '5001 and more', as we now find 58, 34 and 8 percentages respectively for the foreign-owned factories -- in other words, a clear shift towards the larger categories. This shift was most plainly visible for India, Indonesia and Vietnam. While India had few firms in the largest size class, 20 out of Indonesia's 30 factories in that class proved to be foreign-owned; for Vietnam that was the case for 51 out of 62 factories in the largest class. These three countries ended up with respectively 14, 18 and 18 per cent of all foreign-owned factories employing 5,001 or more workers. Compared with such percentages, Bangladesh, Cambodia and China witnessed only a slight shift towards larger foreign-owned factories, in part because the numbers of

factories involved were rather small. For example, only nine of 39 factories in Bangladesh in the largest class proved to be foreign-owned, while that was the case for ten of China's 19 large factories. Moreover, the direction of the shift was not unequivocal, also because three larger supplying countries had no factories in the largest size class. In Sri Lanka and Thailand foreign-owned factories took larger shares than overall in the '1-1000' category, and in Turkey among the medium-sized. The latter could also be noted for Mexico, Taiwan and Tunisia.

For the six brands with detailed company information we separated averages of employment for their foreign-owned supplying factories from the total averages displayed in Table 20. Table A7 shows the outcomes. Unsurprisingly, the average sizes for foreign-owned supplying factories in the 21 countries under scrutiny[26] for this selection of brands, turned out to be consistently higher than the overall averages. As regards Vietnam such an outcome could be seen for all six brands, in India for all four with data available, in China for five of six brands, and in Bangladesh for four of five. In 40 out of 59 possible country/brand combinations (cells), the averages for foreign-owned firms were higher than the total averages, in 13 cells they were smaller, and in six cases they were equal. The outcomes for the supply chains of Adidas and Nike in particular were striking. Whereas in Adidas' supply chain foreign-owned factories represented 24.5 per cent of the number of factories, their share in employment rose to 57 per cent. A similar outcome showed up for Nike's chain, in which foreign-owned factories in numbers accounted for 35.5 per cent but in terms of employment for 76 per cent. For the six brands employment in the 528 foreign-owned factories in their chains involved 21 countries and accounted for up to 1,43 million. This was 52 per cent of total employment in all factories supplying the six brands in the same 21 countries. Compared to the average 1,369 employed in all factories supplying these brands, the average for foreign-owned factories in their chains was nearly twice as high with an average of 2,712 employed.

Based on information assembled in Tables A6 and A7, we estimated that approximately 2.71 million were employed in the foreign-owned factories included in the supply chains of the 16 brands that indicated factory sizes comprising 25 countries. This would mean a share of just over 35 per cent in the nearly 7.68 million employed in these chains at large, and is much higher than the share of the number of foreign-owned factories (21.3%) we found earlier. Of course, this difference reflects the much larger average size of the foreign-owned production facilities.

26 Besides having no suppliers in Ethiopia, Peru and Singapore, the six brands neither had a foreign-owned supplier in Malaysia.

6. Location

Spatial concentration

Finally, we concentrate on the location of factories within the production countries. Concerning that location and based on the factory addresses we gathered, including indications of cities and provinces and ZIP codes, we compiled Table 27, presenting the provinces or states with the largest number of factories supplying the 24 brands in percentages of the total number of factories per country. The table covers ten countries: eight Asian countries, Mexico and Turkey. As might be expected, in most countries a strong geographical (spatial) concentration could be seen. Competition in particular between locations for *manufacturing for export* particularly in Asia is fought on many fronts and includes: labour productivity of the factories; an adequate labour supply; infrastructural facilities; transportation with minimal disruption, and well-equipped (air)ports not far from factories. All these are factors that are considered to be essential to bear down on that key performance indicator, lead time. And for the time being these factors work in combination towards producing geographical concentration.[27]

We can now briefly characterize the location situation per country.

For Bangladesh, with 95 per cent of factories manufacturing for export the domination of Dhaka, the country's capital and a megacity, and nearby Chittagong port, is clear. The northern city of Mymensingh, by contrast, accounted for just 3 per cent of factories.

In Cambodia, the spatial concentration of the garment export industry is somewhat less obvious. According to our database its capital Phnom Penh and surroundings took 60 per cent of factories, whereas the Southern and Western provinces Kandal and Kampong Speu could claim another 25 per cent.

Five coastal provinces in eastern China dominated that country's export manufacturing of apparel, footwear and accessories. We found that they recently accommodated 87 per cent of all factories. Below we will elaborate on the location issue for China.

India showed a strong concentration of production for the export of apparel, footwear and accessories in four states. These states, jointly accounting for just one quarter of India's population, made up 83 per cent of the Indian factories in our database. They did so as follows: 1) the southernmost state of Tamil Nadu, with the city of Tirupur as the main centre of textile and apparel manufacturing and trade; 2) the south western state of Karnataka, with a major concentration in and around its capital, the megacity Bangalore; 3. the large and populated northern state Uttar Pradesh, with textile and apparel production clustered in and around the cities Noida, Agra and Ghaziabad; 4) Haryana, the north western state, with apparel production concentrated in and near Faridabad, the state capital, and Gurgaon.

In Indonesia, the manufacturing of apparel and footwear for export is almost exclusively based on the island of Java. Jawa Barat (West Java), Jawa Tengah (Central Java), Banten, the westernmost province of Java, and the country's capital Jakarta, jointly were home to 95 per

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[27] 'For the time being': notably traffic congestion may mark the limits of spatial concentration. Traffic jams are reported to be daily nightmares in various Asian cities, like Dhaka and Jakarta, also hampering international trade to and from these countries (cf. Daily Star (Bangladesh) 2018; The Guardian Jakarta 2016).

cent of factories. Our database contained only one Indonesian factory outside Java (on Riau Island).

In South Korea, over 85 per cent of the export manufacturing of apparel, footwear and accessories was located in its capital Seoul and the surrounding province Gyeonggi-do, and in the three Metropolitan Cities, Daegu, Busan and Incheon, areas where in 2015 60 per cent of Korea's population lived.

Mexico's manufacturing of apparel and footwear for export is relatively spatially dispersed, as our figures confirm. The four Mexican states with according to our database the largest amounts of factories, Puebla, Guanajuato, Jalisco and Cuidad de Mexico, jointly accounted for just less than 60 per cent.

In Pakistan, the export manufacturing of apparel, footwear and accessories was almost exclusively to be found in two of four provinces, Punjab and Sindh. In Punjab, the country's most populous province, the cities Ludhiana and Jalandhar appeared as prominent production and trade centres, whereas in Sindh production concentrated in the metropolis Karachi.

As for Turkey, just over half of all factories our database contained for this country were located in Istanbul. Outside this metropolis, more modest concentrations could be traced in the provinces/cities Izmir, Bursa and Tekirdag, jointly accounting for just over one of five factories, and with the rest more dispersed throughout Turkey.

Vietnam showed up as the country with the most spatially dispersed export industry producing apparel, footwear and accessories. The four provinces Ho Chi Minh City, Binh Duong, Dong Nai and Long An jointly contributed less than half (44%) of all factories in the database. We traced one or just a few factories in most of the country's 64 other provinces.

We should add some brief notes on three Asian countries with over 100 factories that are not included in Table 27. For Sri Lanka, we found exactly half of all factories located in the Western province, in or nearby the de facto capital Colombo, with rather equal shares for six other provinces and only a few factories in the remaining two provinces Ampara and Uva. The location pattern in Thailand came out rather similarly, with half of all factories concentrated in or close to its capital Bangkok, and up to eight factories located in 23 of the other 75 provinces. By contrast, Myanmar saw a strong concentration with around 90 per cent of factories located in and around Yangon, the country's largest city and commercial centre.

Table 27 Provinces / states with largest number of factories actually supplying 24 brands in percentages of total factories per country, 10 selected countries, 2017-2018

Country of factory	Province / state / area of factory	no. factories	% country total
Bangladesh	Dhaka	475	82.0
	Chittagong	77	13.3
	Mymensingh	18	3.1
	Largest 3 provinces		*98.4*
Cambodia	Phnom Penh	158	60.1
	Kandal	51	19.4
	Kampong Speu	17	6.5
	Largest 3 provinces		*86.0*
China	Guangdong	905	26.7
	Zhejiang	862	25.5
	Jiangsu	643	19.0
	Shandong	312	9.2
	Fujian	237	7.0
	Largest 5 provinces		*87.4*
India	Tamil Nadu	315	31.5
	Karnataka	212	21.2
	Uttar Pradesh	166	16.6
	Haryana	145	14.5
	Largest 4 states		*83.8*
Indonesia	Jawa Barat	125	44.6
	Jawa Tengah	81	28.9
	Banten	43	15.4
	DKI Jakarta	17	6.1
	Largest 4 provinces		*95.0*
Korea, Rep. of	Seoul Spec. Met. City / Gyeonggi-do	94	53.1
	Daegu Metropolitan City	23	13.0
	Busan Metropolitan City	19	10.7
	Incheon Metropolitan City	15	8.5
	Largest 4 spec. areas / provinces		*85.9*
Mexico	Puebla	53	25.1
	Guanajuato	32	15.2
	Jalisco	25	11.8
	Cuidad de Mexico	15	7.1
	Largest 4 states		*59.2*
Pakistan	Punjab	68	51.5
	Sindh	62	46.3
	Largest 2 provinces		*97.8*
Turkey	Istanbul	360	51.8
	Izmir	72	10.4
	Tekirdag	41	5.9
	Bursa	36	5.2
	Largest 4 provinces		*73.3*
Vietnam	Ho Chi Minh City	118	18.8
	Binh Duong	69	11.0
	Dong Nai	61	9.7
	Long An	31	4.9
	Largest 4 provinces		*44.4*

Source: WageIndicator Garment Supply Chain Database 2018

China

China is a highly interesting country when delving into garment industry (re)location. Initially, within China the growth of private sector-led garment production was driven by the masses of unskilled or semi-skilled workers migrating from the Western and Central provinces to the Eastern coastal regions. Export garment production concentrated in the

coastal provinces, Guangdong, Fujian, Jiangsu, Shandong, and Zhejiang. By 2007 these five provinces accounted for about 70 per cent of China's garment output. For garment production single women between 18 and 25 years of age, the 'migrant maiden workers', were managers' first choice. In the garment industry the export boom we described in Chapter 2 gave way to vertical and horizontal integration, product and process innovation, and considerable productivity gains. Nevertheless, since the early 2000s export-oriented garment producers in the coastal regions have found themselves squeezed between low contract prices, rising input costs, stricter labour and environmental regulation, labour shortages, and the struggles of migrant workers for better wages and working conditions. Indeed, labour shortages led to an influx of both married women and men for sewing jobs, and the profit margins of most producers fell to low levels (Zhu and Pickles 2014; Zhang *et al.* 2015; Fan 2016). The consequences of the shifts in international competition became subject of discussion. In the 2010s Chinese sources came to regard the rise of Vietnam and Myanmar in particular as garment-exporting countries as cumbersome to Chinese interests (cf. Yang 2016).

Clearly, the Chinese government and manufacturers all felt forced to develop new strategies in order to manage both competitiveness and the social costs of growth in export garment manufacturing. Zhu and Pickles (2014, 45-59) showed that from around 2000 on a sequence of policy initiatives emerged to encourage garment producers to upgrade product quality and production processes ('Go Up'); through subsidies and infrastructural development to relocate manufacturing to less-developed areas in mainly the Western and Central provinces ('Go West'), or to outsource manufacturing outside China ('Go Out'). We briefly assess here the state of affairs concerning these three 'moves'. Firstly, upgrading has definitely taken place in Chinese garment manufacturing, though industry insiders find it hard to conclude to what extent. For example, Butollo (2015) pointed out that a number of Chinese suppliers have succeeded in launching their own fashion brands. Secondly, insiders' opinions seem to differ as to whether any relocation from coastal to inland regions has occurred. Zhu and Pickles stated in 2014 that "Although an increasing number of inter-provincial enterprise relocations (Go West) are now occurring, most of the relocations actually still take place within a province" (56). Others have been more reluctant in this respect. According to Zhang *et al.* (2015), the clustering of textile and clothing firms in Western and Central China had not taken off. In 2016 the employers' association, China National Garment Association (CNGA), maintained that 70 per cent of the country's garment production capacity was still located in the five coastal provinces (website CNGA).

Our data on the location of the factories in China also cast doubt as to whether relocation of garment production capacity away from the coastal provinces has taken place to any real extent. Table 28 suggests that this is definitely questionable for *export* garment production. Table 27 indicates that the five coastal provinces, Guangdong, Zhejiang, Jiangsu, Shandong and Fujian jointly took a 86.0 per cent share in the number of Chinese factories included in our database. With Table 28 we add an overview for all Chinese provinces where these factories were located making their 2017-2018 shares as comparable as possible[28] with the

[28] Our sample is much smaller than that of Zhu and Pickles (derived from Chinese official statistics) whereas the meaning of their criterion 'market share' is not quite clear. Also, our data may not have sufficiently traced that in recent years subcontracting has speeded up to lower tier factories located in inland provinces, a possibility Zhu and Pickles suggested (61, fn. 3).

data Zhu and Pickles (2014, 42-3) presented in their text and in a figure for 2007. Between 2007 and 2017-18 most percentage shares remained in the same category. However, the shares of the three largest producer provinces seemed to have increased further. In the same period the shares of garment production in three of the four largest cities (Beijing, Shanghai, and Tianjin) decreased into the next lower category, as did the shares of four provinces, Henan, Hubei, Hunan and Hebei – the latter province part of the Eastern Region, the others making up the backbone of the Central Region. While a decrease of the shares of the large cities could be expected and meant a continuation of relocation processes that started back in the 1990s, our outcomes for the four Central / Eastern provinces seem quite striking.

Table 28 Provinces with largest number of factories actually supplying 24 brands in percentages of total factories, China, 2007 and 2017-2018

Province	no. factories	%	% categories	
			our data 2017-18	market shares Zhu & Pickles 2007
Guangdong	905	26.7	>15%	>15% (24.2%)
Zhejiang	862	25.5	>15%	>15% (17.2%)
Jiangsu	643	19.0	>15%	>15% (17.1%)
Shandong	312	9.2	5-10%	5-10%
Fujian	237	7.0	5-10%	5-10%
Anhui	79	2.3	1-5%	1-5%
Shanghai City	75	2.2	1-5%	5-10%
Liaoning	52	1.5	1-5%	1-5%
Jiangxi	46	1.4	1-5%	1-5%
Henan	30	0.9	0-1%	1-5%
Hubei	29	0.9	0-1%	1-5%
Hunan	24	0.7	0-1%	1-5%
Hebei	19	0.6	0-1%	1-5%
Guangxi	14	0.4	0-1%	0-1%
Tianjin City	14	0.4	0-1%	1-5%
Beijing City	8	0.2	0-1%	1-5%
Sichuan	8	0.2	0-1%	0-1%
Guizhou	5	0.1	0-1%	0-1%
Inner Mongolia	5	0.1	0-1%	0-1%
Jilin	4	0.1	0-1%	0-1%
Shaanxi	4	0.1	0-1%	0-1%
Ningxia Hui	3	0.1	0-1%	0-1%
Changzhou	2	0.1	0-1%	0-1%
Shanxi	2	0.1	0-1%	0-1%
Chongqing City	1	0.0	0-1%	0-1%
Heilongjiang	1	0.0	0-1%	0-1%
Hong Kong	1	0.0	0-1%	0-1%
Qinghai	1	0.0	0-1%	0-1%
Xinjiang	1	0.0	0-1%	0-1%
Total	**3,387**	**100.0**		

Source: WageIndicator Garment Supply Chain Database 2018; Zhu and Pickles 2014
Note: in 2017-2018 data no factories in Tibet and Yunnan

Regarding the third, 'Go Out' 'move', it seems that Chinese firms have thus far only invested abroad in garment, footwear and accessories manufacturing to a relatively limited extent. In the row 'China', Table 26 indicated that Chinese inhabitants owned 171 factories abroad, just 6 per cent of the factories owned in their own country. Even if total outbound investment

from Hong Kong is included, which adds another 230 factories, the sum would be no more than 13 per cent – moreover, the caveat remains that investment from Hong Kong most likely only partly originates from Chinese sources. We should add that, as noted in Chapter 3, China's garment exports have become less directed towards the US and the EU, and also spread over other Asian countries, Africa and Australia. Based on the UNCTADstat database we calculated for the period 2005-2015 that these exports shifted 12 percentage-points towards the latter three regions.

Export Processing Zones

Finally, we explored our database to get indications of the spread of Export Processing Zones (EPZs) or similar economic zones in the countries we studied. As noted in Chapter 2, such zones have been developed in a majority of countries worldwide, aimed at attracting (foreign investment in) export-oriented industries as a key element in their industrial strategy. Basically, EPZs offer tax exemptions, easy profit repatriation and free physical infrastructure, while local authorities often add limitations on labour legislation and place bans on trade unions or limitations on their activities. As a result, according to the ILO's Bureau for Workers' Activities (ACTRAV), "Working conditions and industrial relations in these zones often do not meet the standards set out in ILO instruments" (website ILO-ACTRAV/EPZs; see also UNCTAD 2015). From the beginning, garment and electronics manufacturing were among the main industries using such incentives.

Applying the factory address list included in the database and a wide range of search terms,[29] we ended up with outcomes as shown in Table 29. South Korea had to be excluded because quite some factory addresses disclosed by the brands for that country referred to offices of the companies in question or were otherwise inadequate. For the remaining 24 countries we traced 2,364 garment, footwear and accessories factories located in export processing or similar zones -- in other words, around 29.8 per cent of all factories in our database. With over 77 per cent both Guatemala and Myanmar had the highest shares of factories located in EPZs. A group of smaller supplying countries followed: Egypt (72%), Ethiopia (64%), El Salvador (60%), and Morocco (52%). The African countries notably were relative newcomers in export garment production, as was Myanmar. Among the larger production countries, Vietnam (45%) and Pakistan (41%) demonstrated the highest shares of factories located in EPZs, followed by China (36%), Bangladesh (29%), and Sri Lanka and India (both 26%). By contrast, with just 8 per cent the share of EPZ-located factories in Turkey's total remained low.[30] Due to their massive amount, the more than 1,200 factories located in Chinese EPZ's represented over half of all (most right-hand column) the factories included.

If we assume the size of employment in the garment, footwear and accessories factories located in EPZs to be equally distributed as among all factories, then combining Tables 4 and 29 allows to estimate employment in these factories in the EPZs in the 24 countries to

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29 Export Processing Zone (EPZ), Special Economic Zone (SEZ), Development (and Economic) Area, Development Park, (Economic) Development Zone/Zona/District, Industrial Area/ Park/Zone, Technical Development Zone/Unit, Parque Industrial, Zona Franca, Zona Libre, Zône Industrielle, Organize Sanayi Bölgesi.

30 Though regarding Turkey problems we encountered in linking factory addresses with EPZs may have played a role.

total nearly 12.5 million. However, we can only test this assumption for the six brands that disclosed detailed factory information. We found that the size distribution of their suppliers located in EPZs did not deviate much from the overall averages as shown in Table 20. Although this result may have brought our estimate somewhat closer to reality, it remains possible that the outcome for the industry at large including all possible brands as principals, would one way or another show a higher deviation.

One might have expected that the share of factories located in EPZs across countries would be closely connected with the share of foreign investment (FDI) in garment factories. However, calculating the correlation between the foreign ownership shares as indicated in Table 25 and the 'EPZ shares' as just discussed ended up with a positive but only modest coefficient (R=.40). Similar shares for foreign investment and EPZ location could be found in Myanmar, Sri Lanka, Vietnam, and Philippines. China, India and Pakistan by contrast showed FDI shares considerably below their shares of factories in EPZs, although Cambodia, Indonesia and Thailand showed FDI shares much higher than their 'EPZ shares'. Obviously, foreign investors have found their way to garment production in the latter three countries without being particularly attracted by the existence of EPZs. As regards China and India, after 2000 the formation of EPZs and similar zones may for the largest part have served other goals than attracting FDI. It mainly seems to have been a policy instrument aimed at stimulating industrial clusters, regional economic growth and innovation (Leong 2013).

Table 29 Factories actually supplying 24 brands in Export Processing Zones (EPZ) and other industrial zones in percentages of total factories per country and in zones, 24 countries, 2017-2018

	no. of factories		%	
	in zones	total	row	column
Bangladesh	169	579	29.2	7.1
Cambodia	19	263	7.2	0.8
China	1,222	3,387	36.1	51.7
Egypt	31	43	72.1	1.3
El Salvador	12	20	60.0	0.5
Ethiopia	7	11	63.6	0.3
Guatemala	24	31	77.4	1.0
Honduras	6	15	40.0	0.3
India	261	1,001	26.1	11.0
Indonesia	10	280	3.6	0.4
Malaysia	1	25	4.0	0.0
Mexico	29	211	13.7	1.2
Morocco	14	27	51.9	0.6
Myanmar	82	106	77.4	3.5
Pakistan	55	134	41.0	2.3
Peru	0	4	0	0.0
Philippines	15	33	45.5	0.6
Singapore	0	1	0	0.0
Sri Lanka	53	202	26.2	2.2
Taiwan	5	87	5.7	0.2
Thailand	2	111	1.8	0.1
Tunisia	9	39	23.1	0.4
Turkey	58	695	8.3	2.5
Vietnam	280	628	44.6	11.8
Total	**2,364**	**7,933**	**29.8**	**100.0**

Source: WageIndicator Garment Supply Chain Database 2018
Note: Rep. of Korea excluded

7 Summary and recommendations

First and foremost, the data presented in this report highlight the massive significance of the garment industry in the 25 countries studied. Together these countries accounted for some 65 per cent of world garment exports in 2016. China, despite a noticeable fall in its share in 2015-16, still took some 34 per cent, followed by Bangladesh and Vietnam, both countries with recent and strongly growing shares in world garment exports. For Bangladesh in particular, but also for the economies of Cambodia, Sri Lanka, Pakistan and Vietnam, garment exports were of crucial importance. The US and the EU28 remain as the largest importers, accounting for over 60 per cent of world garment imports, illustrating the importance of US and EU trade policies.

In this report we have estimated that in 2015-2016 these 25 production countries were responsible for over 54 million workers in textile, garment and leather manufacturing. The biggest shares of this employment were found in India (15.3 million, or 28%), China (14.5 million, 27%), and Bangladesh (nearly 5.2 million, 9.5%). Moreover, the supply chains of the 24 garment and footwear brands we studied were estimated to account for 7.9 million employed in the 25 countries. This suggests that nearly 15 per cent of all workers in the textile, garment and leather industries in these countries ultimately depended on supply decisions taken by these brands. By contrast we estimated that the total number of workers directly employed by the 24 brands themselves came out at around 900,000 in 2017. If the workers employed in manufacturing for these brands in countries outside the 25 were included, there were nine times as many employed in these supply chains as were employed formally by the brands in their stores, distribution centres and offices.

We should add two notes on employment. First, it must be emphasized that textile, garment and leather manufacturing, and the garment sub-sector in particular, remains hugely important for the employment of women. Seven brands provided detailed information on the female shares in their supplying factories. At around 55 and 10 per cent average respectively, these outcomes were much lower than earlier calculations based on official statistics had suggested for Bangladesh and Pakistan. Conversely, India and Indonesia showed averages of around 30 and 80 per cent respectively which was considerably higher than earlier suggested. For four countries the brand information confirmed the female participation rates we found earlier, namely: around 80 per cent for Cambodia, Sri Lanka and Vietnam, and around 65 per cent for China. Furthermore, our data confirmed other findings that very few global garment brands have maintained any significant domestic production bases. Our research found less than 2 per cent of production capacity was located in the home countries of these brands.

Starting from the question 'one factory, one brand?', Chapter 4 explored the quantitative relationship between brands and factories. We found that many factories actually produced for more than one brand, though their share was less than we initially expected. The 24 brands we studied individually disclosed usable data on 10,127 factories in the 25 countries selected, but due to the 'overlaps' caused by 'multiple-brand factories' the number of factories to be scrutinized decreased to 8,110. Overall, 18 per cent of all these factories supplied more than one brand, an average 1.25 brands served per factory. Among the production countries with at least 100 factories, Bangladesh was top of the list with 39 per cent of all factories supplying more than one brand, followed by Cambodia (34%) and Sri

Lanka (33%) and then at some distance by Pakistan and Indonesia (both 24%) and Vietnam (23%). China although the largest production country came in as no. 10 with a rather low concentration of brands per factory (13% 'multiple-brand'), whereas Mexico had an even lower concentration (8%) and in South Korea all factories listed served only one brand. A more detailed distribution showed on average 1.56 brands per factory for Bangladesh with 4 per cent of factories here supplying four or more brands, followed by Sri Lanka (1.49 and 3%) and Cambodia (1.48 and 2%). Next came Pakistan, also with 4 per cent supplying four or more brands but with a lower average (1.40). China ended up with an average of 1.17 brands per factory with only one per cent of nearly 3,400 Chinese factories in our database recorded as serving four or more brands.

As for the number of brands actually supplied by factories in respective supply chains, one might have expected brands with relatively small chains to use many 'multiple-brand' factories. Indeed, such a correlation could be detected but it was not strong. Some brands with small chains frequently shared factories with others (G-Star, for example), but this was also the case for Tesco and M&S with their much more extensive chains. At the other extreme, ASOS, Esprit and ASICS showed up as the brands with the lowest average number of factories involved but ASICS maintained a rather small chain, whereas ASOS and Esprit had large chains. We also traced clusters of brands that shared supplying factories. H&M came out as the biggest spider in the web here, appearing in six of the largest clusters. Two British brands, Tesco and M&S, followed their Swedish competitor in this respect. In the footwear realm, Adidas and Nike had quite a number of mutual suppliers. By contrast the Japanese firms, ASICS and Uniqlo, could hardly be found in the clusters that supplied western brands.

Analysing the 6,918 factories by employment levels showed that 77 per cent of employment was in factories employing between 1 and 1000 workers, 21 per cent in factories with 1001 to 5000 workers, and nearly 3 per cent in factories with over 5000 workers. The footwear factories in particular were relatively big, with 11 per cent in the largest size class and two-thirds in the 1-1000 class. By contrast, the factories producing accessories appeared to be smaller overall. We noted 24 footwear factories with over 10,000 employed, compared to 13 apparel factories of that size. We found some relationship between factory size and the number of brands supplied. Nonetheless, in the '1001-5000' and 'over 5000' employment classes the majority of factories appeared to depend on actually supplying just one brand. We should add that the distribution of factory sizes differed widely across countries. Indonesia, Vietnam and to some extent Bangladesh showed relatively large shares of big factories and less than half in the '1-1000' category. On the other hand, China, India, Mexico, Taiwan and Turkey featured as the main countries with large majorities of relatively small factories. As for the brands, Nike stood out with one-sixth of its supplying factories larger than 5,000 employed, followed by ASICS, Puma and G-Star with 8 per cent in this size class. It may seem logical that footwear brands would be strongly represented here in view of the relatively large scale of footwear manufacturing. However, apparel factories supplying footwear-oriented brands, in particular ASICS, Nike and Puma, were relatively large as well.

Chapter 5 explores the ownership of the supplying factories. We found that the 8,110 factories in our database were owned by 5,894 parent companies. Among these, 14 per cent owned two or more factories, whereas 28 parent firms (0.5%) owned more than ten. The multi-factory parent companies we traced were almost exclusively based in emerging and

developing countries hardly any in evidence in developed countries. The main exception was VF Corp, the only brand among the 24 scrutinized which had own production facilities in the 25 countries covered. Concerning the spread of FDI, we found that 20.6 per cent of all factories were foreign-owned. The inclusion of international joint ventures lifted total foreign ownership to 21.3 per cent. FDI was most widespread in footwear manufacturing (30%), which was rather more than in apparel (20%) and accessories (17%). FDI, and consequently national ownership, varied widely across countries. For example, national ownership clearly dominated in Turkey (99% of factories), India (95%) and Pakistan (93%), and was also strongly marked in South Korea (88%), China (leaving out Hong Kong, 79%) and Bangladesh (also 79%), Sri Lanka (78%), and Mexico (77%). Thailand (63%) and Indonesia (54%) were in the middle of this distribution, while in Vietnam the national share was less than half (45%). In Myanmar it was even lower (14%), and for Cambodia a tiny 3 percent revealed the near-complete dominance of foreign owners.

A cross tabulation table based on the number of factories revealed patterns of FDI notably in Asian garment production. Hong Kong showed the greatest outbound investment to the 25 countries, though these flows may have stemmed from either mainland Chinese enterprises, local entrepreneurs, or, from western and Japanese investors. Korea ranked second in this respect followed by investment from Taiwan; Singapore; India; Malaysia; the US; the UK (including British Virgin Islands); Japan, and United Arab Emirates. When collating employment figures it became clear that the size of foreign-owned factories played a considerable role. Using data from the six brands disclosing detailed factory information, we found in 40 out of 59 country/brand combinations the average number of employed for foreign-owned firms higher than the total averages. These and similar figures underpinned our estimate that foreign-owned firms accounted for approximately 35 per cent of employment in the supply chains of the 16 brands that delivered (rough) data on factory sizes – an outcome some 1.7 times higher than the estimate based on factory numbers. We should add that this is not the full picture. Notably in India, Pakistan, Bangladesh and Sri Lanka, national capital groups have developed into owners of a considerable number of factories on their home turf, up to 43 factories in the case of Shahi Exports Pvt Ltd. of India.

Chapter 6 covered the location of factories within the production countries. For 10 production countries we presented an overview of the provinces or states with the largest number of factories supplying the 24 brands. For most countries strong spatial concentration could be witnessed. A few provinces or states accounted for over 80 per cent of all factories in seven countries: Bangladesh (3 provinces), Cambodia (3 provinces), China (5 provinces), India (4 states), Indonesia (4 provinces), South Korea (4 special areas / provinces), and Pakistan (2 provinces). In three countries, Mexico, Turkey and Vietnam, the (export) industry producing apparel, footwear and accessories appeared to be more geographically dispersed. We also devoted a separate section on the (re)location of China's garment industry, trying to trace the effects of Chinese policy initiatives on the industry's development. We found that in spite of these initiatives, the distribution of garment production over China's provinces had hardly changed in the last decade.

Finally, we explored the spread of EPZs or similar economic zones. For 24 countries (excluding South Korea) we found 2,364 garment, footwear and accessories factories were located in such zones, nearly 30 per cent of the total factories in our database. In Guatemala, Myanmar, Egypt, Ethiopia, El Salvador, and Morocco more than half of all factories were

located in EPZs. For the largest part these were newcomers in export garment production. For the larger production countries such shares fluctuated between 45 per cent (Vietnam) and 26 per cent (Sri Lanka and India), with Turkey being the exception (8%). We found some correlation between countries' 'EPZ shares' and their 'FDI shares', but this relationship was not that strong. It seems that foreign investors have found their way into garment production in Cambodia, Indonesia and Thailand without being particularly attracted by the existence of EPZs. Moreover, in China and India the more recent formation of EPZs seems largely to have served other policy goals, such as stimulating industrial clusters, regional economic growth and innovation than simply attracting FDI.

Two years after our report on (wages in) the Asian garment industry, we cannot avoid the conclusion that the global garment supply chain has continued to go through turbulent times. Changing economic, social and institutional conditions in the supplying countries, changes in trade flows and their conditions (trade wars!), shifts in competitive structures and even in chain architecture, as well as the ever-growing societal pressure towards sustainable and decent production, have all combined to add to the downward pressures on labour in the global garment sector. Such factors require continuous evaluation, and to this end we unfold proposals for further research, looking in particular at ways to optimise the use of the WageIndicator Garment Supply Chain Database.

We began in Chapter 2 with garment exports data drawn from the UNCTADstat Database. This provided indications of global changes to the centres of gravity evident in garment production. For example, we traced the advance of Bangladesh and Vietnam and most recently that of Turkey as significant players in garment production. The case of Turkey probably indicates the retreat of garment manufacturing closer to the EU market that industry watchers already envisaged some two decades ago. Although with a time lag of about a year, UNCTAD information showed that garment manufacturing had also taken off in countries such as Myanmar and Ethiopia, suggesting an expansion to new low-wage locations. We can also see that for countries with a rapidly growing middle class and a related growth of their internal market, trade and production figures for garment and footwear have begun to converge at some speed. UNCTAD data can be combined with UNIDO and other data indicating the size of production measuring MVA (manufacturing value added) and employment. However, this is a painstakingly complex exercise. Whilst employment figures at industry level remain concise for most countries, national labour force surveys tend not to measure employment in more detail than the two-digit ISIC (in the EU NACE) classification. Hence the ability to differentiate between trends in employment in textiles, garment and footwear production is severely constrained.

Against this backdrop, we recommend to continue and expand analysing factory employment information disclosed on the Internet by major garment and footwear brands. To start building the current database, an extensive check revealed that 24 brands delivering information on the Internet about their supply chains was about the maximum we could attain. We calculated that recently sales of these brands taken together accounted for one-thirds of total sales in their home markets. In order to have more reliable statistical outcomes, it will be worth targeting the involvement of brands with sales covering over half of total sales in the US, European and Japanese markets. This target asks for societal pressure on brands to follow the forerunners by publicly disclosing factory employment information. Such information should live up to standards of completeness and

comparability while even much of the current brand information does not fully comply with such standards. Table A1, in the Statistical Appendix, gives an indication of the lacunas here.

In order to derive maximal effect from an improved database, compiling factory employment information disclosed by brands needs to be repeated at regular intervals, preferably each year for at least the next three years. Such a regular updating would open up possibilities for much wider and more consistent analyses than we have been able to undertake for this report. It would allow longitudinal analyses in many of the fields covered by our chapters. Such analyses would, for example, provide more insight into concentration tendencies. Accordingly, we recommend an expanded focus on developments within and between supply chains in order to further elaborate their consequences for labour. A major and under-researched issue is here the relationship between the brands as ultimate principals and the large Asian garment and footwear manufacturers that increasingly orchestrate the flows of goods, capital, labour and information throughout many chains that are utilised. Azmeh and Nadvi, while reporting on this relationship, have pointed to "(….) a paucity of firm-level research and information about such Asian garment suppliers and how they manage their globally dispersed production processes" (2014, 709). Further to the development of the supply chain database, detailed case studies would be highly welcome in order to disentangle the underlying power relations, including the implications for national and international trade unions.

After all, the incidence and impact of low-wage competition in the global garment supply chain remain central issues, both for policy makers and for the research community. In this respect an improved and expanded supply chain database will deliver better information on shifts in the number of factories within and across countries. Additional and essential information on wages, wherever possible at the levels of individual workers and factories could be expected to be generated by the integration of the database with WageIndicator's Minimum Wage Database and the WageIndicator Salary Survey. As wage formation processes are thoroughly linked with other industrial relations issues, including the quality of work, the supply chain database could be augmented with relevant information from a number of existing sources, such as the ILO / IFC Better Work / Better Factories programmes as well as with collective bargaining information from IndustriALL and its affiliated unions, not forgetting information from WageIndicator's Decent Work Check.

Statistical Appendix

Table A1 Information disclosed on supply chains of 24 garment / footwear brands, 2017-2018

	media	date	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Adidas	Excel	18-01	x	x	x	x	x	x	x		x					x
Amer Sports	PDF	17		x				x						x		
ASICS	PDF	17-01	x	x	x	x		x	x				x			x
ASOS	map	18-05		x	x	x	x	x	x	x		x			x	
Bestseller	PDF	17-12	x	x	x		x	x	x					x		
C&A	map	18-01		x	x	x	x	x	x				x			x
Debenhams	PDF	17-12		x	x			x	x		x				x	x
Esprit	Excel	18-03		x	x		x	x	x				x			x
Gap Inc	PDF	17-09		x	x			x	x	x			x			x
G-Star	map	18-06		x	x	x	x		x		x				x	x
H&M	map	18-03		x	x	x	x	x		x		x				x
KappAhl	PDF	17-09		x	x			x						x		
Levi Strauss	Excel	16-12		x	x			x	x					x		
M&S	PDF	18-03		x	x			x	x		x				x	x
New Balance	PDF	17-06	x	x				x	x					x		x
Nike	PDF	18-02		x	x		x	x	x	x	x				x	x
Pentland	PDF	17-08	x	x	x	x		x			x				x	x
Primark	map	18-01		x	x			x	x				x		x	
Puma	PDF	18	x	x	x			x				x				x
PVH Corp	Excel	18-03		x	x					x				x		
Tesco	PDF	18-03		x	x									x		x
Under Armour	PDF	17-03	x	x	x			x					x			x
Uniqlo	PDF	17-02		x	x			x	x					x		
VF Corp	Excel	17-11	x	x	x			x	x	x			x			

Source: WageIndicator Garment Supply Chain Database 2018

Key:

1. *limited to tier 1 factories*
2. *full name factory*
3. *full address factory*
4. *status factory*
5. *ZIP code factory (blank = not or inconsistent)*
6. *name city (blank = not or inconsistent)*
7. *name state / province (blank = not or inconsistent) and country*
8. *full name parent company*
9. *employed per factory: exact numbers*
10. *employed per factory: detailed size categories*
11. *employed per factory: rough size categories*
12. *employed per factory: no numbers*
13. *employed per factory: percentage of females*
14. *product categories*

Table A2 Supply chains of 15 garment / footwear brands with over 300 supplying factories: country distribution, 25 countries, 2017-2018

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Av.
Bangladesh	3.4		11.8	28.0	45.9	6.0	5.9	16.0	2.8	25.7	0.3	8.3	4.8	12.7	7.5	12.8
Cambodia	6.5	0.7	10.1	7.9	9.4	0.6	6.3	2.6	2.1	6.9	2.9	2.0	0.5	3.1	3.8	4.4
China	19.3	29.9	48.9	17.2	23.8	39.9	28.0	28.1	31.9	12.0	14.7	51.4	30.8	35.6	23.8	29.0
Egypt	0.7	0.1		0.2	0.9		1.1		2.3	0.4	0.4		0.8	0.8	2.3	0.9
El Salvador	1.2						0.4		0.3		0.5		0.1		0.9	0.6
Ethiopia								0.5					0.8		0.1	0.5
Guatemala	0.4						2.2		0.2		0.4		0.3		1.5	0.8
Honduras	0.5						0.2				1.7				0.7	0.8
India	3.1	21.8	6.6	7.4	7.5	8.9	14.4	9.6	8.6	9.4	3.1	16.2	5.7	10.2	11.6	9.6
Indonesia	15.4			3.5	0.8	0.6	9.3	4.0	1.0	2.6	19.6	0.4	1.7		2.3	5.1
Korea, Rep.	0.2					4.2	2.4	0.9	1.7		0.3		0.4		0.1	1.3
Malaysia	0.0						0.7		0.3		0.7	0.1	0.3			0.4
Mexico	0.6			2.7			0.2		4.2		1.5		0.9			1.7
Morocco				0.4		0.9		0.4		0.2		0.2	0.1	0.2		0.3
Myanmar	1.2		7.3	2.9		0.6	0.2	2.3		0.6		0.7	0.3		0.1	1.6
Pakistan	4.3		1.7	3.1	3.7	1.9	1.6	1.8	3.1	0.4	1.0	2.1	0.3	1.3	0.3	1.9
Peru				0.1									0.4			0.3
Philippines	1.9						0.7			0.0			0.1			0.7
Singapore																0.0
Sri Lanka	0.6	1.9	1.0		1.8	0.1	5.8	1.4	5.1	7.4	3.3	0.8	5.9	7.5		3.3
Taiwan	0.5					0.7	0.1		0.2	0.0	0.6	0.1	0.4		0.9	0.4
Thailand	2.3	0.4						0.2	4.5	0.1	3.2		1.1	11.2	0.6	2.6
Tunisia	0.1	0.2		0.3		0.2	0.1	0.2	0.5			0.1	2.2	0.2	0.3	0.4
Turkey	0.5	7.4	8.0	6.6	1.9	13.7	0.4	13.6	3.1	3.8	0.3	7.3	3.2	8.0	1.9	5.3
Vietnam	28.5	5.8	0.3	3.6	2.9	3.0	14.8	2.8	8.9	6.5	40.5	2.1	7.9	2.5	12.2	9.5
25 countr.	*91.4*	*77.7*	*95.7*	*83.9*	*98.7*	*81.3*	*94.8*	*84.4*	*80.8*	*76.0*	*95.0*	*91.8*	*69.0*	*93.4*	*70.9*	*85.7*
Other c.	8.6	22.3	4.3	16.1	1.3	18.7	5.2	15.6	19.2	24.0	5.0	8.2	31.0	6.6	29.1	14.3
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
No. fact.tot.	*1036*	*739*	*284*	*1766*	*356*	*1026*	*825*	*1723*	*564*	*518*	*484*	*1022*	*766*	*462*	*628*	

Source: WageIndicator Garment Supply Chain Database 2018

Key:

1. *Adidas (DE)*
2. *ASOS (UK)*
3. *Bestseller (DK)*
4. *C&A (DE)*
5. *Debenhams (UK)*
6. *Esprit (HK/DE)*
7. *Gap Inc (US)*
8. *H&M (SE)*
9. *Levi Strauss (US)*
10. *M&S (UK)*
11. *Nike (US)*
12. *Primark (IE)*
13. *PVH Corp (US)*
14. *Tesco (UK)*
15. *VF Corp (US)*

4: based on country shares in sourcing (most likely FOB value)

1, 2, 5, 10, 11: based on employment in supplying factories per country

3, 6, 7, 8, 9, 12, 13, 14, 15: based on number of supplying factories per country

Table A3 Clusters of brands supplied by the same factories, 13 brands (horizontal) and 24 brands (vertical), 2017-2018

	1	2	3	4	5	6	7	8	9	10	11	12	13
Adidas	x	8	2	1	8	14	24	14	42	6	23	8	27
Amer Sports	17	0	0	0	0	0	2	2	8	0	0	0	5
ASICS	4	0	0	0	1	1	0	2	5	0	2	1	2
ASOS	0	14	21	12	3	13	8	11	0	14	3	13	7
Bestseller	1	21	10	20	8	28	2	15	1	11	9	10	3
C&A	8	x	27	27	28	103	27	49	3	44	27	55	18
Debenhams	2	27	x	9	8	35	9	52	0	39	18	60	5
Esprit	1	27	9	x	27	59	8	32	2	6	22	11	11
Gap Inc	8	28	8	27	x	80	36	34	11	6	67	13	28
G-Star	1	3	0	0	1	5	3	4	0	0	8	0	6
H&M	14	103	35	59	80	x	22	92	8	64	49	66	24
KappAhl	0	10	8	9	3	29	5	7	0	15	1	4	1
Levi Strauss	24	27	9	8	36	22	x	16	13	14	30	14	33
M&S	14	49	52	32	34	92	16	x	3	27	59	82	22
New Balance	34	1	0	0	1	0	3	0	13	0	3	0	11
Nike	42	3	0	2	11	8	13	3	x	2	18	1	13
Pentland	3	3	5	0	3	4	0	5	1	0	22	4	5
Primark	6	44	39	6	6	64	14	27	2	x	16	55	5
Puma	18	2	1	4	2	6	1	4	7	1	2	0	5
PVH Corp	23	27	18	22	67	49	30	59	18	16	x	27	25
Tesco	8	55	60	11	13	66	14	82	1	55	27	x	6
Under Armour	15	1	1	0	5	0	5	2	14	0	5	1	14
Uniqlo	5	3	1	2	9	10	4	3	7	1	3	2	2
VF Corp	27	18	5	11	28	24	33	22	13	5	25	6	x
Total	**171**	**279**	**180**	**161**	**235**	**460**	**162**	**291**	**107**	**207**	**270**	**247**	**160**

Source: WageIndicator Garment Supply Chain Database 2018

Key:

1. *Adidas*
2. *C&A*
3. *Debenhams*
4. *Esprit*
5. *Gap Inc*
6. *H&M*
7. *Levi Strauss*
8. *M&S*
9. *Nike*
10. *Primark*
11. *PVH Corp*
12. *Tesco*
13. *VF Corp*

Table A4.1 Distribution of factories actually supplying 16 brands from 25 countries by size category and brand, apparel, 2017-2018

	1-1000	1001-5000	>5000	total	no. of factories
Adidas	67	29	4	100	374
ASICS	58	36	6	100	33
ASOS	100	0	0	100	312
C&A	78	21	1	100	588
Debenhams	71	26	3	100	245
Esprit	84	14	2	100	659
Gap Inc	57	39	4	100	673
G-Star	58	33	8	100	24
H&M	68	29	3	100	1,239
M&S	62	36	2	100	476
Nike	46	49	5	100	219
Pentland	62	35	3	100	37
Primark	80	19	1	100	671
Puma	52	41	7	100	46
Under Armour	35	53	12	100	57
VF Corp	63	32	6	100	342
total 16 brands	**75**	**23**	**2**	**100**	**5,105**

Source: WageIndicator Garment Supply Chain Database 2018

Table A4.2 Distribution of factories actually supplying 16 brands from 25 countries by size category and brand, footwear, 2017-2018

	1-1000	1001-5000	>5000	total	no. of factories
Adidas	54	30	17	100	121
ASICS	22	56	22	100	18
ASOS	100	0	0	100	51
C&A	100	0	0	100	38
Debenhams	100	0	0	100	54
Esprit	93	7	0	100	45
Gap Inc	76	18	6	100	17
G-Star					0
H&M	78	20	2	100	60
M&S	56	38	6	100	16
Nike	24	34	42	100	92
Pentland	64	31	5	100	42
Primark	99	1	0	100	106
Puma	49	45	5	100	55
Under Armour	20	67	13	100	15
VF Corp	29	53	18	100	55
total 16 brands	**67**	**22**	**11**	**100**	**726**

Source: WageIndicator Garment Supply Chain Database 2018

Table A4.3 Distribution of factories actually supplying 16 brands from 25 countries by size category and brand, accessories, 2017-2018

	1-1000	1001-5000	>5000	total	no. of factories
Adidas	87	11	1	100	157
ASICS	82	18	0	100	22
ASOS	100	0	0	100	131
C&A	92	6	2	100	129
Debenhams	91	9	0	100	57
Esprit	98	2	0	100	100
Gap Inc	92	8	0	100	86
G-Star	100	0	0	100	2
H&M	91	7	1	100	176
M&S	88	12	0	100	26
Nike	56	44	0	100	16
Pentland	92	8	0	100	38
Primark	98	1	1	100	146
Puma	68	26	5	100	19
Under Armour	59	36	5	100	22
VF Corp	74	24	2	100	66
total 16 brands	**93**	**7**	**0**	**100**	**1,044**

Source: WageIndicator Garment Supply Chain Database 2018

Table A5 Share of female workers in factories supplying 7 brands in 22 countries, by brand and product category, 2017-2018

		ASOS	Deben-hams	G-Star	M&S	Nike	Pent-land	Pri-mark	average 7 brands	no. fact.'s 7 brands
Bangladesh	Apparel		57.1	46.8	59.7	59.0		53.1	56.4	199
Bangladesh	Access.		76.0						76.0	1
Cambodia	Apparel	77.8	80.6		87.4	67.5	91.0	76.6	80.2	75
Cambodia	Footwear		95.0		91.4		90.0		91.7	9
Cambodia	Access.		86.5		88.0		91.0		86.5	4
China	Apparel	60.8	71.6	55.5	66.3	72.7	69.2	69.1	67.8	635
China	Footwear	48.0	57.4			79.8	62.7	57.8	59.8	204
China	Access.	57.8	68.4	78.0	70.5	79.0	69.9	66.4	64.7	273
Egypt	Apparel		64.5		37.5	34.7			48.6	9
El Salvador	Apparel					53.3			53.3	3
Guatemala	Apparel					55.5			55.5	4
Honduras	Apparel					50.0			50.0	5
India	Apparel	19.1	26.1	23.3	53.0	73.0	23.0	37.3	33.8	348
India	Footwear	16.4	12.0			52.4	75.0	7.9	30.3	41
India	Access.	15.7	10.7				20.0	27.5	17.9	58
Indonesia	Apparel		87.0		83.2	80.5	83.4	83.6	81.6	31
Indonesia	Footwear					71.8	71.0		71.7	20
Indonesia	Access.					75.3			75.3	3
Korea Rep	Footwear					27.9			27.9	7
Malaysia	Apparel					40.4		36.0	39.9	9
Mexico	Apparel					62.1			62.1	12
Mexico	Footwear					53.0			53.0	1
Morocco	Apparel		87.3	71.0	85.0			77.5	81.8	8
Myanmar	Apparel				81.2			90.1	86.3	14
Pakistan	Apparel		11.1		8.5	11.0		6.8	9.0	29
Pakistan	Access.						4.5	3.0	3.9	7
Philippines	Access.				70.0				70.0	1
Sri Lanka	Apparel	76.7	80.9		77.1	73.3	81.5	68.0	75.7	98
Taiwan	Apparel				93.0	67.3		67.0	72.4	5
Taiwan	Footwear					51.3	79.0		56.8	5
Taiwan	Access.					83.0	73.7		77.4	5
Thailand	Apparel	80.5			90.0	71.8	77.0		73.4	25
Thailand	Footwear						69.8		69.8	5
Thailand	Access.	53.0				79.0	70.0		63.8	4
Tunisia	Apparel	80.5						95.0	85.3	3
Turkey	Apparel	41.1	67.4	54.0	58.8	48.0	75.0	53.4	51.9	243
Turkey	Access.	37.8			64.3			54.1	51.6	18
Vietnam	Apparel	70.3	79.8	62.0	76.4	76.8	84.5	76.4	76.7	107
Vietnam	Footwear	72.0			77.2	77.8	85.5		79.3	50
Vietnam	Access.				67.5	78.8	76.0	64.0	73.6	11

Source: WageIndicator Garment Supply Chain Database 2018
Note: no factories in Ethiopia, Peru and Singapore

Table A6 Distribution of foreign-owned factories actually supplying 16 brands from 25 countries by size class and country, 2017-2018

	1-1000	1001-5000	>5000	total	no. fact.
Bangladesh	31	60	9	100	103
Cambodia	40	54	6	100	118
China	83	15	2	100	479
Egypt	50	50	0	100	8
El Salvador	56	44	0	100	9
Ethiopia	50	50	0	100	6
Guatemala	91	9	0	100	11
Honduras	33	67	0	100	9
India	66	20	14	100	29
Indonesia	29	53	18	100	112
Korea, Rep.	100	0	0	100	17
Malaysia	100	0	0	100	1
Mexico	71	26	3	100	34
Morocco	100	0	0	100	3
Myanmar	63	37	0	100	57
Pakistan	50	50	0	100	6
Peru	0	0	0	100	0
Philippines	46	46	8	100	13
Singapore	0	0	0	100	0
Sri Lanka	73	27	0	100	30
Taiwan	75	25	0	100	4
Thailand	69	31	0	100	13
Tunisia	83	17	0	100	6
Turkey	83	17	0	100	6
Vietnam	37	45	18	100	283
Total	**58**	**34**	**8**	**100**	
No fact.	*792*	*462*	*103*		*1,357*

Source: WageIndicator Garment Supply Chain Database 2018

Table A7 Average numbers of workers per country in foreign-owned factories supplying 6 brands in 21 countries, 2017-2018

	Adidas		Debenhams		G-Star		M&S		Nike		Pentland	
	av.no.	N	av.no.	N	av.no.	N	av.no.	N	av.no.	N	av.no.	N
Bangladesh	5662	5	4812	4	9200	1	2823	23	2660	1		
Cambodia	2960	14	918	6			1464	15	3886	7	2799	3
China	2132	41	545	24	464	4	1603	17	1833	49	668	15
Egypt							2598	1	1429	2		
El Salvador	1091	3							1979	2		
Guatemala	775	1							413	2		
Honduras									3161	5		
India	3364	3	442	1			1714	4	4465	5		
Indonesia	3362	24	2159	1			2135	2	6016	23	4085	2
Korea, Rep.	59	4							37	1		
Mexico	1035	1							2083	4		
Morocco			147	1	159	1						
Myanmar	2112	5					1220	1				
Pakistan	1586	4										
Philippines	2711	4										
Sri Lanka	388	1	647	4			907	15	899	1		
Taiwan	522	3										
Thailand	1411	7					910	1	1581	4		
Tunisia	160	1										
Turkey			671	1			481	2				
Vietnam	3591	48	3055	2	1157	3	2617	11	4965	71	1695	17
Total	2754	169	1135	44	1632	9	1884	92	3796	177	1498	37
Total FO	465,426		49,942		16,952		173,320		671,890		54,827	
Total Empl	814,121		281,825		40,515		618,513		885,809		106,409	
FO/Empl	57.2%		17.7%		41.8%		28.0%		75.7%		51.5%	
FaFO/Empl	24.5%		14.0%		34.6%		17.8%		35.5%		28.9%	

Source: WageIndicator Garment Supply Chain Database 2018

Note: no factories in Ethiopia, Malaysia, Peru and Singapore

Key:

Total FO total employed in foreign-owned factories in supply chain brand

Total Empl total employed in factories in supply chain brand

FO/Empl percentage of employed in foreign-owned factories in total employed in factories in supply chain brand

FaFO/Empl percentage of number of foreign-owned factories in total number of factories in supply chain brand

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