The Forming of E-platform-driven Flexible Specialisation: How E-commerce Platforms Have Changed China's Garment Industry Supply Chains and Labour Relations

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ABSTRACT: E-commerce platforms have promoted the rise of consumer-demand-driven supply chains in the garment industry. This kind of supply chain has raised the demand for a new type of production organisation exemplified by low processing costs, small batches, multi-varieties, and quick reorders. Drawing on the insights of flexible specialisation theory, this paper proposes the concept of e-platform-driven flexible specialisation to describe this emerging production organisation form. This flexible specialisation is characterised by highly fragmented and informal production organisations such as husband-and-wife-run workshops and production units based on daily wage workers. In the context of a severe labour shortage in the garment industry, workers participate in the construction of these informal production organisations in order to obtain higher wages and work autonomy. However, the increase in informal employment also makes garment workers more atomised and vulnerable to social risks such as the outbreak of COVID-19. It is necessary to innovate labour relation negotiation modes to cope with the impacts of the rise of the platform economy on labour relations.

KEYWORDS: E-commerce platform, garment industry, flexible specialisation, informal employment, supply chain, value chain.

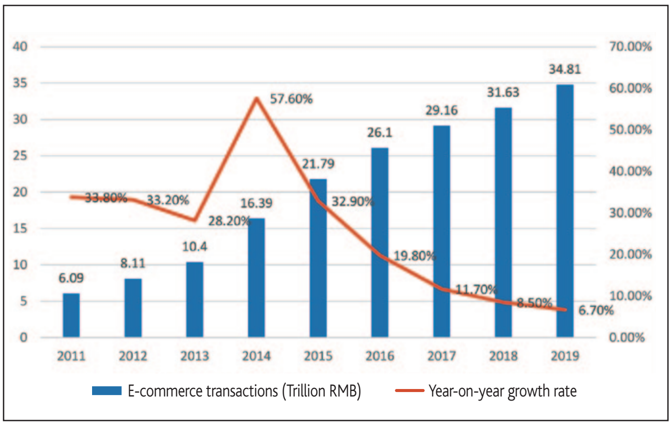
Introduction

In recent years, e-commerce platforms in China have developed rapidly and played an increasingly important role in the national economy. According to the data from the Department of Electronic Commerce and Information in China's Ministry of Commerce (*Zhongguo shangwubu dianzishangwu he xinxihua si* 中國商務部電子商務和信息化司), in 2019, China's e-commerce transactions reached 34.81 trillion RMB, with 51.26 million employees. Between 2013 and 2015, both the trading volume and the number of employees increased significantly (see Figure 1 and Figure 2). The development of e-commerce platforms not only changes business operation modes, but also promotes the formation of new social credit systems (Loubere 2017) and vocational qualification certification systems (Huang 2017).

Alibaba Group's platform is a typical example of China's platform economy. Alibaba Group (*Alijituan* 阿里集團) developed in three stages: start-up (1999-2003), growth (2004-2007), and maturity (2008 to present). In 1999, Jack Ma (Ma Yun 馬雲) and his team of 17 people founded Alibaba (阿里巴巴) in his apartment in Hangzhou, a city in Zhejiang Province, Southeast China. Their goal was to set up an online B2B platform to facilitate the participation of Chinese small and medium-sized enterprises in the global trade. On 15 April 1999, Alibaba.com, the company's first website, was launched, and on 10 May 2003, the platform Taobao.com went online. After five months, Taobao.com launched Alipay (*Zhifubao* 支付寶), an "escrow account" type of payment service whereby buyers only release the payment to the seller if they are happy with the purchase, a service that drastically reduced transaction risks for the buyer. In November 2007, Alibaba's B2B business was listed on the Hong Kong Stock Exchange, raising 1.69 billion USD to further drive growth, and by August 2008, the number of Alipay users exceeded 100 million. In August 2008, Alibaba announced the "Greater Taobao" (*da Taobao* 大淘寶) strategy, claiming that it would invest 5 billion RMB in the next five years to upgrade its ecommerce infrastructure centred around Taobao.com into a better consumer-oriented e-commerce ecosystem, so that all e-commerce activities, including payment, marketing, and logistics, could be done on the "Greater Taobao" platform. Alibaba Group's revenue in the fiscal year of 2020 was 509.71 billion RMB, a year-on-year increase of 35%. In the most recent fiscal year,[1] the transactions on Alibaba Group's platforms reached 7.05 trillion RMB.[2]

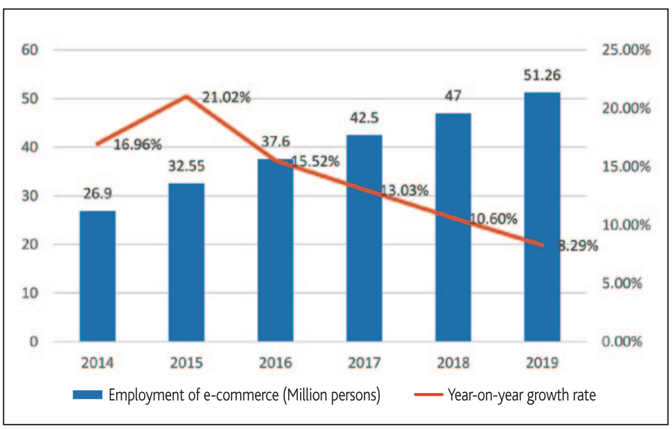
In terms of sales and the number of jobs created, the garment industry ranks first on the Alibaba platform. In November 2017, KPMG and the Ali Research Institute (*Ali yanjiuyuan* 阿裏研究院) jointly released the report "Breaking the Cocoon and Becoming the Butterfly: The New Retail Empowerment Garment Industry: The Charming Revolution of the Internet's Largest Category." According to this report, in China, the popularising rate of online shopping for clothing is much higher than other consumer goods, and it is the largest category of internet retailing. In 2016, China's garment industry had a 37% online shopping penetration rate, much higher than the retail industry's average of 12%. In 2016, garments (at 21%) accounted for the largest share of internet retail transactions, followed by housewares and furniture (16%), household appliances (11%), mobile phones and electronics (9%), food and drink (8%), and maternal and child products (7%). According to the report, "From Connection to Empowerment 'Smart +' to Help the High-quality Development of China's Economy" released by Ali Research, Ant Research (*Mayi yanjiuyuan* 螞蟻研究院), and Alibaba Cloud Research Centre (*Aliyun yanjiuzhongxin* 阿裏雲研究中心) in March 2019, Alibaba created 40.82 million jobs in China in 2018. In Taobao's 26 business categories, the top three for transaction-type employment opportunities created were clothing, shoes, hats and textiles (4.09 million), daily necessities

Figure 1. E-commerce Transactions between 2011 and 2019



Sources: Drawn by the author; data from the Department of Electronic Commerce and Information, Ministry of Commerce, China.

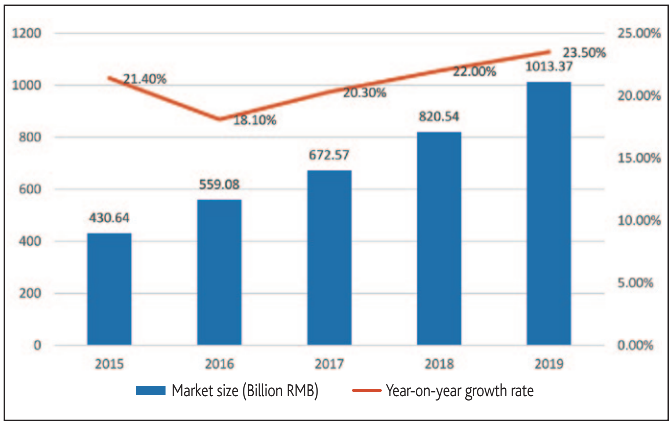
Figure 2. E-commerce Employment in China, 2014-2019



Sources: Drawn by the author; data from the Department of Electronic Commerce and Information, Ministry of Commerce, China.

(2.84 million), and household appliances and audio-visual equipment (1.62 million). The market size of e-commerce garment sales in China is significant and has been growing at a high rate in recent years (see Figure 3).

Figure 3. E-commerce Garment Industry Market Size, 2015-2019



Source: "Chinese E-commerce Garment Industry Research and Development Analysis Report in 2019," 25 April 2019, https://www.iimedia.cn/c400/64190.html (accessed on 4 February 2021).

The influence of the rise of the platform economy on employment has been an important area of research on technology development and labour employment transformation in recent years. Srnicek (2017) identified five types of internet platforms: advertising, cloud service, industrial internet, e-commerce, and lean. Most of the existing research has focused on the impact of the platform economy on service workers such as online taxi-hailing drivers (*wangyueche siji* 網約車司機), domestic workers, and delivery riders. While the manufacturing industry has a more complex supply chain and is affected by diverse platforms, the influence of the platform economy on employment in the manufacturing industry is rarely discussed systematically and theoretically. Using the garment industry as an example, this paper discusses (1) the characteristics of the manufacturing industry's value chain and supply chain under the impact of the platform economy; and (2) the influence of the platform economy on the production organisation forms and labour relations of the manufacturing industry, based on a review of existing relevant literature and empirical research.

The transformation of production organisations

From the handicraft workshop era, to the modern mechanical industry era, to the age of informatisation and intelligent manufacturing, the continuous development of industrialisation has also promoted profound transformations in production organisation and labour relations. Change in production organisation is a process systematically influenced by technology, the market situation, government policy, and the strategic choices of enterprises (Piore and Sabel 1984). The emergence of vertically integrated production organisations in capital-intensive and technology-intensive industries led to the emergence of two industrial management ideas: Taylorism, based on Bethlehem Steel's emphasis on process segmentation

1. Alibaba Group's financial report for 2020 comprises the company's financial data from April 2019 to the end of March 2020.
2. 阿里巴巴集團 Alibaba Group, "1萬億美元！阿里巴巴 2020年財報:世界最高銷售額" (Yiwanyi meiyuan! Alibaba 2020 caibao: Shijie zuigao xiaoshoue, USD 1 Trillion! Alibaba Group's financial report for 2020: The highest sales record in the world), *Sohu website*, 22 May 2020, https://www.sohu.com/a/397064079_119620 (accessed on 21 July 2020).

and standardisation; and Fordism, based on Ford Motor's standardisation and assembly line operations. Both systems are based on asset-heavy operations, in which employers buy the means of production, hire workers, and organise production directly.

Since the late 1970s, the uncertainty, diversity, and unpredictability of consumer goods market demand have become increasingly prominent, leading to growing pressures on conventional production management systems characterised by large-scale, standardised production and vertically integrated large enterprises. Against this background, flexible production that was more responsive to market demands emerged. It was characterised by small batches, product variety, and complex production networks, all beneficial for enterprises looking to reduce market risk and obtain sufficient production capacity in an asset-light operation mode. Scholars proposed the concept of "flexible specialisation" to describe this organisational form of flexible production (*ibid*.). Flexible specialisation can be driven by core enterprises or professional markets. The former is the phenomenon of supplier clusters, constituted by small and medium-sized enterprises, forming around the demands of leading enterprises with strong innovation abilities: "Toyota City," formed around the lean production demands of Toyota Motor Corp., is a typical case of the core enterprise-driven model. The organisation of production in Silicon Valley also has these characteristics (Saxenian 1991). Such flexible specialisation is mostly based on formal production organisation and employs workers through formal labour relations. Flexible specialisation driven by professional markets, on the other hand, is a type of industrial cluster comprised of small and medium-sized enterprises with low production technology complexity, such as the silk weaving cluster in India (Basole 2016) and the watch industry in Hong Kong (Carney 1998). Such clusters are built upon informal production organisations and workers in informal employment.

The past two decades have witnessed the growing impact of e-commerce platforms in China. Neither of the top two categories of goods sold on e-commerce platforms in China – clothing and home furnishings – which account for more than 30% of online purchases (KPMG and Ali Research 2017), is produced by capital-intensive or technology-intensive industries like the automotive industry, so their production organisations are quite different from the core-enterprise-driven flexible specialisation. Meanwhile, compared with the offline professional markets, price competition is much fiercer and product categories change much faster on the e-commerce platforms.

The rise of platform companies has facilitated the emergence of consumer-demand-driven supply chains in China's apparel industry, which raises flexible and agile production demands (Luo *et al.* 2017). However, there is little research on how flexible production under the influence of the platform economy differs from existing types of flexible specialisations and how this kind of production organisation mode affects labour relations in manufacturing industries.

Research on labour relations under the influence of the platform economy

Qiu (2009) proposes the concept of "network labour" to discuss the impact of the Internet on labour relations. This concept refers to two major development processes: first, that the network, as a means of technical organisation and a new production tool, will affect the labour process of traditional manufacturing and service industries. This process is called "networked labour." Second, the network is not only a tool of production, but also a production activity of capital accumulation, which will create new industrial chains. This process is called "network is labour." The influence of platform economy on labour relations has been a hot spot in the study of labour relations in recent years, and the existing related research covers three major topics. First, the influence of the platform economy on employment forms and the bargaining power of workers: research has shown that the platform economy often appears in the guise of a sharing economy, blurring the labour relations so that workers often can only exist as self-employed people, unable to enjoy the various rights and interests of employees (De Stefano 2016). Meanwhile, the platform economy makes workers more atomic, lacking the possibility of collective bargaining (Cockayne 2016). Second, the impact of the platform economy on labour process: some research has categorised different types of platform work by taking the wage level and the degree of workers' control over the labour process as the dimensions (Kalleberg and Dunn 2016). With the help of internet technology and various management systems, the platform strictly controls the labour process and continuously encourages labourers to extend their working hours. Although labourers expect to exchange labour stability and security for flexibility in working hours, the strengthening of platform monopoly and the increased competitiveness between platform workers leaves them no choice but to accept platform policies that are not conducive to their own rights and interests (Liang 2017; Wu and Li 2018; Zhao and Liu 2018). A new study reveals that service workers can exercise contingent agency when they become familiar with the mechanism of platforms' labour control. However, this kind of agency is still vulnerable in comparison with that of factory workers (Sun and Chen 2021). Last but not least, the protection of workers' rights and interests in the platform economy: a report published by the European Parliament discussed policies that may promote the rights and interests of workers in the platform economy, such as increasing economic and employment data availability, making reforms to the labour relations legal system, social insurance system, tax system, and salary system, establishing standards on platform employment, and enhancing the collective bargaining rights of platform employees (Forde *et al*. 2017).

When examining the impact of platform economy on the production organisation and labour relations of the manufacturing industries and service industries, there are two important differences. The first is that the supply chain structures of the manufacturing industries are more complex, and different departments may be affected by different types of platforms. For example, the design and marketing departments of the garment industry may be influenced by e-commerce platforms, and the industrial internet platforms may have effects on production departments. Second, unlike the organisational form and labour relations of the service industries, which are directly affected by the platform economy, the manufacturing industry's labour relations are influenced by the platforms through their transformation of the structures of the value chains and supply chains, thus changing the production organisation modes and labour relations.

Unlike the traditional "buyer driven" or "producer driven" value chains, under the impact of the platform economy, China's garment industry value chain is characterised by an "infomediary-driven" model. Such a value chain has two notable features: (1) large e-commerce platforms control the dual markets of producers and consumers, and (2) control over information can generate new value (Li *et al*. 2019). How "infomediary-driven" value chains, together with the consumer-demand-driven supply chains, have influenced the production organisations and labour relations of China's e-commerce apparel industry will be elaborated in the sections on research findings.

Table 1. Interviewee Information

Personnel Category \ District	Guangdong Province		Zhejiang Province		Jiangsu Province	Other Provinces and Cities
	Guangzhou	Jieyang	Hangzhou	Jiaxing	Changshu	
Tmall/Taobao store owners	9	2	2	1	Null	4
Offline clothing market store owners	4	Null	1	Null	4	Null
Manufacturing workers/managers	6	Null	6	2	Null	Null
Platform, e-commerce association personnel, etc.	7	1	3	Null	Null	Null

Research method

This research was conducted in five garment manufacturing and sales centres in Zhejiang, Guangdong, and Jiangsu provinces between April 2018 and July 2020. These three provinces have the three highest garment industry output values (CNGA 2020), and number of Taobao Villages[3] in China (Ali Research 2020). The five cities investigated are Guangzhou (廣州), Hangzhou (杭州), Jiaxing (嘉興), Changshu (常熟), and Jieyang (揭陽). The author tried to interview representatives of all the important personnel roles in e-commerce apparel. The interviewees consist of e-commerce shop owners, garment workers, relevant Alibaba personnel, e-commerce association leaders, e-commerce training practitioners, labour intermediaries, and physical clothing shop owners. The total number of interviewees exceeded 50 (see Table 1).

Guangzhou is the traditional centre of clothing production and sales in China. It also has both the largest number of Taobao Villages in Guangdong Province and the largest single Taobao Village in China – Dayuan Village. In Guangzhou, the author interviewed nine Tmall[4]/Taobao clothing shop owners, four clothing market shopkeepers, six people in the manufacturing sector, four staff members of the e-commerce association, and three people from e-commerce training institutions. Junpu Village in Jieyang City, also in Guangdong Province, is a very famous Taobao Village as it was ranked one of the top 10 most beautiful Taobao Villages of China in 2020 (Ali Research 2020). It is also emerging as a clothing industry sales centre on e-commerce platforms. Here, the author interviewed two Taobao store owners and the head of the e-commerce association.

In Zhejiang Province, the author conducted research in Hangzhou and Jiaxing. Hangzhou is the centre of garment manufacturing in China and the location of Alibaba Group's headquarters. Here, the author interviewed two Tmall/Taobao shop owners, a market clothing shop owner, six garment workers, two relevant Alibaba personnel, and a person in charge of an e-commerce live streaming organisation.

Jiaxing is also an important garment industry cluster. Pinghu, in Jiaxing District, is known as a famous garment manufacturing city in China. The author interviewed two owners of large garment factories here to understand the differences between export and online orders in the apparel manufacturing industry, as well as an online clothing store owner in Jiaxing.

The author conducted long-term fieldwork (from December 2011 to January 2014) on the production organisation and workers' situation in the garment industry in Hangzhou and Jiaxing for the doctoral dissertation. Therefore, some comparisons can be made with the e-commerce platform research conducted between March 2018 and July 2020 to explore the impact of e-commerce platforms on the production organisation and labour relations of the garment industry.

Changshu is also a clothing production and sales base, with many traditional clothing markets. The author interviewed four clothing shop owners in physical markets here to understand the operation mode differences between the e-commerce clothing industry and traditional clothing markets.

In addition, the author interviewed four Taobao store owners in other provinces to learn about the rules of e-commerce platforms and the operation mode of Taobao store owners.

The clothing e-commerce shops investigated by the author are mainly small and medium-sized Tmall and Taobao stores, and the understanding of the situation of large Tmall/Taobao stores was mainly achieved by participating in the Women's Wear Supply Chain Conference in 2019 and analysing the existing literature.

E-commerce platforms intensify price competition in garment production

According to the author's observation, the leading role of large platform companies such as Alibaba in the value chain is mainly manifested in two aspects. First, they have harvested huge profits through possession of customer information and flow. In Alibaba, data has been elevated to the height of a productive factor and used to explain the rationality of the platforms in sharing profits: "Data is widely employed (by many Taobao Villages) as a new production factor in design, manufacturing, marketing, sales, logistics, and finance and significantly improving efficiency and driving innovation" (Ali Research 2016: 22).

In order to win customer traffic (*liuliang* 流量), e-commerce merchants need to spend a lot of money conducting live-streaming sales, homepage promotions, and bidding searches on Taobao (Shao 2017). Some e-commerce merchants use click farming to fake popularity and strive for higher search rankings, but this has to be paid for, and they also run the risk of being downgraded if caught:

3. According to the *Research Report on Taobao Village in China 2014* conducted by Ali Research, a village has to meet the following three criteria to qualify as a Taobao Village: (1) merchants are registered as residents of the village and conduct business there; (2) the annual e-commerce GMV should be no less than 10 million RMB; (3) the number of online merchants registered in the village should be no fewer than 50, or at least 10% of the village households.
4. Tmall is also part of Alibaba's retail platform. Unlike Taobao stores, which can be run by individuals, Tmall stores are operated by companies.

> We bought the Tmall store for 70,000 *yuan*. We had to pay 60,000 *yuan* for the annual technical fee and 50,000 *yuan* for the guarantee deposit. For annual sales over 1.2 million *yuan*, the deposit will be refunded. Last year, our Tmall store had a turnover of 1.5 million *yuan*, but over 500,000 *yuan* was spent buying advertisement services and more than 300,000 *yuan* on the salaries of six employees. The advertising cost was more expensive than the total wages of the workers. Everyone employs click farming, which costs 15 *yuan* per item, but if caught by Ali, the store will be downgraded, and some functions of its Taobao account might be suspended.[5]

According to interviews with Taobao clothing store owners, a large proportion of sales income has to be used to cover the costs of advertising: "On average, about 45% of the price of a piece of clothing is devoted to employees for production and the operation of the online stores, about 35% for advertising expenses and about 5% for the Tmall platform fee, giving a net profit of approximately 15%."[6]

The second important influence of the platforms on value chains lies in the development of the price competition mechanism. This phenomenon is rarely discussed in existing related research. Alibaba has developed multiple platforms, such as Alibaba.com, Taobao.com, Tgc1688.com, the Alipay credit system, and Cainiao logistics, to control large amounts of data and traffic, and Tmall and Taobao store owners and manufacturers must obey the complex rules made by Alibaba in order to successfully sell goods. Many interviewees complained that the advent of online sales and the ease of same product searches in both the business-to-customer (B2C) online market places, such as Taobao and Tmall, and the business-to-business (B2B) platforms, such as Alibaba, had caused intense price competition among sellers and producers across the country, making profits increasingly thin.

Taobao's policy is that if a store wants to sell the same products using photos copied from other sellers or suppliers, it can only purchase goods from the original image providers. Should a store turn to suppliers other than the original owners of the product images, it would be reported to and punished by Taobao. This policy was meant to forbid image theft, but had the effect of making the profits of online sales transparent so that, according to one Taobao clothing store owner, no one Taobao seller can increase prices too much.[7]

The same goods search function intensifies price competition between stores as well as between manufacturers. At the same time, against the background of the "infomediary-driven" value chain (Li *et al*. 2019), online store owners have to spend a lot of money to earn the traffic to sell goods. Many Tmall/Taobao store owners interviewed by the author said that since 2014, their profit rates had dropped from 30-40% to 10-20% due to the increasingly intensified price competition and rising costs of marketing. This kind of situation influences the production process and raises the low production price demand for online orders.

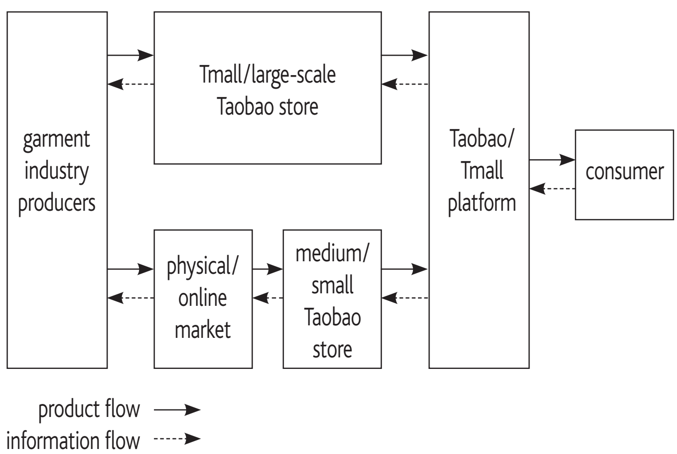
The consumer-demand-driven supply chain raises the claim to small batches, multi-varieties, and quick reorders for production

Handu Yishe (韓都衣舍, Handu for short) is a purely online clothing brand launched in 2006, and from 2014 to 2017, it was the top women's apparel seller in the Double 11 Shopping Carnival (an annual commercial carnival invented by the Alibaba Group in 2009). As a typical example, it is useful for understanding the emergence of consumer-demand-driven supply chains in the Chinese apparel industry (Luo *et al*. 2017). Handu adopted an innovative management structure called "product teams." These teams are granted a high degree of autonomy in brand management, product design, and sales and are encouraged to use e-commerce sales to analyse consumer feedback after launching new products and to decide whether to increase production. To support the agile and responsive orders from the product teams, Handu also established a highly flexible supply chain characterised by small-batch orders and fast replenishment (Luo *et al*. 2017; Li *et al*. 2019).

The majority of existing studies focus on the consumer-demand-driven supply chains of large Tmall or Taobao stores such as Handu, but a few depict the supply chain situation of small and medium-sized Taobao stores.

Figure 4 summarises the product and information flow in the supply chains of Tmall/Taobao stores of various sizes investigated in this study. Tmall stores and large Taobao stores normally make small batch orders, usually of 50 to 150 items, for pre-sales. During the pre-sales, these online apparel shops carry out such activities as live promotions, bidding searches, or displaying advertisements for click tests to attract consumers. Based on the consumer feedback collected from the pre-sales, these online stores then decide whether to modify the product design or increase reorders. The chain serves as a loop. Small and medium-sized Taobao shops follow a similar model of sales and production, a minor difference being that smaller Taobao shops make small quantity orders, sometimes as few as 30 items per order, from small workshops. Some small Taobao shops buy products directly from offline and online wholesale markets. By drop shipping (*yijian daifa* 一件代發), the costs associated with inventory can be reduced or eliminated altogether .

Figure 4. Consumer-demand-driven Supply Chain of the Garment Industry under the Influence of Platform Economy



Source: Drawn by the author, based on interviews with 33 online store owners and suppliers.

5. Interview with a Tmall store owner, Guangzhou, 26 March 2019.
6. Interview with a store owner of Tmall Top 2000 Sales of Women's Wear, Guangzhou, 17 April 2018.
7. Interview, Hangzhou, 20 May 2018.

The author interviewed a traditional clothing stall owner in Changshu, a city in Jiangsu Province. The interviewee recalled the changes in the clothing industry caused by the rise of the e-commerce platforms over the past ten years:

> Before the rise of Taobao, we could sell a few thousand goods for six months. Now we have to change the product style every week. We can't produce too many pieces for each order, and few people come to the clothing markets to buy goods.[8]

However, others praise this change. The president of Jieyang Junpu Village E-commerce Association (*Jieyang Junpu cun dianshangxiehui* 揭陽軍埔村電商協會) believed that the consumer-demand-driven supply chain was in line with the supply-side structural reform (*Gongjice jiegouxing gaige* 供給側結構性改革) promoted by the central government.[9]

In sum, the emergence of the platform economy has enabled Chinese apparel firms to understand the needs of consumers faster. The development of e-commerce apparel firms has also led to the rise of fast product design updates and small production orders, although in certain situations large amounts of clothing can be sold through multiple reorders. As noted in the previous section, the same product search function has led to fierce price competition and has significantly lowered the cost of production. In order to meet e-commerce platform requirements for products (low processing costs, small batches, multi-varieties, and quick reorders), the garment industry has formed a production mode dominated by small and minor production organisations as well as extreme flexible employment practices; this e-platform-driven flexible specialisation[10] will be analysed in the next section.

E-platform-driven flexible specialisation

Drawing upon empirical evidence collected from fieldwork in urban villages producing clothes for online stores, the author finds that the ownership structure of the clothing supply chain has changed in response to the development of the flexible production of Taobao orders. The all-important links in Taobao's apparel supply chain, such as design, production, and marketing, have turned into costs and risks shared by small and specialised organisations. The enterprises, workshops, and individuals in each link specialise in a certain field of business according to their own core competitiveness, and form a win-win synergy with each other, and in the production organisation, the e-platform-driven flexible specialisation emerged. Most of the production organisations in this kind of flexible specialisation belong to labour-intensive industries with similar production capacities and product types, unlike the situation of flexible specialisation driven by core enterprises in which various small and medium-sized factories produce different parts for leading enterprises to integrate into complex products. Compared to the traditional offline professional market, the products sold on e-commerce platforms exhibit new features: more intense price competition, shorter product life cycle, smaller initial production orders, and a sales volumes heavily dependent on online traffic. Therefore, the e-platform-driven flexible specialisation requires more flexible production organisations and informal labour relations to reduce production costs and improve responsiveness to uncertain market demands. Self-employed and daily wage workers are widely present in areas of e-platform-driven flexible specialisation. Under the background of labour shortage in the garment manufacturing industry, a large number of skilled workers choose to become informal workers for higher wages and work autonomy.

Since the fourth quarter of 2010, the demand ratio (number of job vacancies/job seekers) in China's labour market has consistently exceeded 1. The demand for employees has mainly come from the manufacturing sector, where there has been a widespread labour shortage in factories. Between 2011 and 2013, China's demand ratio fluctuated between 1.04 and 1.10, and by the third quarter of 2018, it had reached 1.25, indicating that the labour shortage had become more serious.[11] The demand ratio in the garment industry is often the highest of all manufacturing industries, and there has been a severe shortage of all-round skilled workers who can process a whole garment. In pursuit of higher wages and more work autonomy, many skilled workers choose to organise cooperative production teams or become independent outsourced workers (Fan and Xue 2018). When the labour shortage in the garment industry met Taobao orders' huge demand for flexible production, many garment workers chose to take advantage of this to become self-employed or daily wage workers.

Alibaba has identified three distinctive features of the employment pattern emerging under the influence of the platform economy: free connections, rapid gathering, and flexible employment (Ali Research *et al*. 2019). These three concepts are more like slogans, which do not refer specifically to any particular job, nor do they make clear through what kinds of mechanisms the platforms have influenced the changes in employment patterns. Using the garment industry as an example, this study reveals the mechanism by which the platform changes order demands by reforming the value chain and supply chain, thus affecting the employment forms. Two extremely flexible forms of employment in this new type of flexible specialisation are introduced below.

Low-cost urban villages, decentralised production organisation, and informal employment are more suitable for the low unit price and fragmented nature of Taobao orders. In Jiubao (九堡), an important Taobao clothing production centre located on the outskirts of Hangzhou, there are numerous family workshops run by skilled couple workers who undertake large amounts of Taobao orders. In 2018, working 14 hours a day, the processing fee for Taobao orders could reach 400-500 RMB per person. These family workshops can complete regular Taobao orders, usually 50-100 items per batch, within one to two days. Some interviewees said that many factories registered on the Tao Factories platform (*Taogongchang* 淘工廠)[12] took orders from the platform and then outsourced them to family workshops because these small producers were more adaptive to quickly changing and small-batch tasks.[13] A survey of 121 garment factory workers in Shanghai and Jiaxing, in which the author participated, revealed that the average monthly salary of these workers in 2011 was 2,684.59 RMB, with an average hourly salary of about 8.26 RMB. In 2013, based on fieldwork in the same region, the author found that the average hourly wage of all-round skilled workers outside the factory ranged from 11 RMB to 21.4 RMB. In 2018, all-round skilled workers running their own household workshops could earn 28.6 RMB to 35.7 RMB per hour. The combination of the growing labour shortage and the rise of small-batch orders from Taobao

8. Interview with a clothing market stall owner, Changshu, 18 May 2018.
9. Interview, 9 October 2018.
10. E-platform here refers to e-commerce platform.
11. The data were obtained from the Chinese employment network affiliated with the Ministry of Human Resources and Social Security.
12. The Taobao Factory platform is an internet platform connecting Taobao store owners and factories. It is a platform launched by Alibaba's 1688 business division. The platform was officially launched in December 2013.
13. Interview, 18 May 2018.

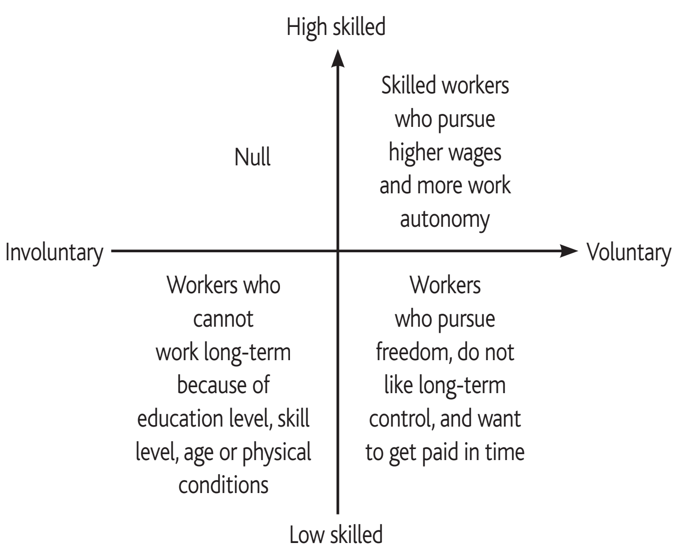
has led to significant wage increases for high-skilled clothing workers in informal employment.

In some urban villages in Guangzhou, many garment workers are recruited directly from the streets and their wages are paid on a daily basis. This pattern of employment has even given rise to a peculiar low-price daily room and bed rental system that meets the needs of daily wages and flexible labour.[14]

In Shiling (獅嶺), a leading leather production centre located on the northern periphery of the city of Guangzhou, there were 16 Taobao Villages and a large number of factories processing Taobao orders in 2018. Every day, more than 10,000 people looked for short-term jobs, mostly daily paid, in five spontaneously formed casual labour markets.[15] Because the number of online orders is unstable and product designs change quickly, online sellers tend to conduct trial sales with a relatively small volume of goods. If the customer feedback is positive, thousands or sometimes tens of thousands of additional orders would be made, usually with a very short delivery time. This production model has also made the factory labour force demand unstable, and has led to a flexible employment mode. Compared to orders for online shops, orders for export and franchised stores are more stable: each export order is usually at least 800 items, and while a franchised store order is smaller than that of an export order, it is still bigger than a first order from online sellers. These two types of orders are more stable, making estimating the amount of labour needed easier. According to a leather factory manager based in Shiling, domestic market orders have continued to grow in recent years because payment collection is fast and cash flow abundant. Payment collection from export orders, on the other hand, takes much longer, and in some cases has to be written off.[16]

In addition to the decrease in export orders and growth of unstable and fast-changing online orders, two other factors have also profoundly shaped the highly flexible mode of employment: 1) the shortage of workers has given them more autonomy over their forms of employment. Many people want to get wages through the daily salary system to reduce the risk of default. At the same time, with the same skill level, the salaries of the daily paid workers are normally higher than those of long-term workers, which also allows workers to arrange their working and living time more independently; and 2) based on the flexible daily paid system, enterprises can reduce their costs for social insurance, off-season labour, and dismissal.

Figure 5. Types of Daily Wage Workers



Source: Drawn by the author.

The leather factory manager and daily wage workers interviewed by the author all mentioned that many people, some high-skilled and some low-skilled, voluntarily choose to become daily wage workers. Some are unable to become long-term workers because of their personal circumstances. Figure 5 shows three types of daily wage workers in the leather product manufacturing sector; they mainly differ in terms of skill level and whether they actively choose to work short-term jobs for various reasons. Workers who are high-skilled and voluntarily accept daily paid jobs aim to pursue higher wages and more work autonomy. Low-skilled workers voluntarily accepting daily wages are unwilling to be constrained by long-term contracts and want to get paid more often. The third type of daily wage workers are low-skilled and do not have much bargaining power in choosing their wage type. This type of worker finds it difficult to find a long-term job, mainly because of their education level, skill, age, or physical condition. High-skilled but involuntary daily wagers were not found in the field studies because of the skilled labour shortage. Although the emergence of daily wage workers has met the growing need for labour flexibility among factories and small workshops in the leather products sector, such informal employment has also increased the risk of labour disputes. Daily wage workers are usually hired based on verbal agreements, which means that disputes over production issues such as unit price, production speed, and product quality cannot be resolved based on formal contracts. Daily wage employment has also increased the uncertainty in production: an average assembly line in the leather product sector usually requires around 20 people, and the absence of workers in a certain procedure could easily interrupt production and affect the overall speed of output and deliveries.

China is leading the world in consumer digitalisation, measured by the number of online consumers (600 million), the proportion and scale of mobile payments, the value of online retail (9 trillion RMB), and the number of courier deliveries (50.7 billion pieces). However, China's supply-side level of digitisation is relatively low: its proportion of digital factories is much lower than in Europe and the United States (46% in Europe, 54% in the US, and only 25% in China), and flexible supply chain and customisation production capacity is also underdeveloped in China (Ali Research *et al*. 2019). These insights are consistent with the findings of this study. Clothing, the top goods category on Taobao, is highly reliant on informal and flexible employment and non-factory units such as family workshops for production. Only medium and high-end apparel brands, which are less dependent on e-commerce platforms for sales, can more systematically deploy industrial internet technology to organise and upgrade production. The organisation of production of these brands is mainly built upon formal labour relations.

Conclusion

The Alibaba Group and its e-commerce platforms are representative of China's rapidly growing platform economy. Its platforms, such as Taobao and Tmall, are market leaders in terms of transaction volumes, profitability, and job creation in both domestic and global markets.

14. Interview, 19 October 2018.
15. The data sources for this part are from the interviews of leather factory managers and daily wage workers in Shiling from 26 to 27 March 2019 and observations in the daily wage market. From interviews, it is estimated that there are now more than 10,000 participants in these markets.
16. Interview, 26 March 2019.

The Alibaba Group believes that the Chinese smart economy's unique trajectory is characterised by the fact that consumption is shaping supply (Ali Research *et al*. 2019). However, the digitisation of the consumer side is not necessarily accompanied by the intelligentisation of the production side. With apparel, which has long been the top goods category on the e-commerce platforms, for example, the platform economy has facilitated the emergence of the infomediary-driven value chain and the consumer-demand-driven supply chain. The infomediary-driven value chain in China's apparel industry has two important features: first, big platform companies such as Alibaba have gained huge profits from advertisements and other value-added service fees by controlling large amounts of consumer information and traffic. Second, big platform companies have played leading roles in facilitating low-price competition among producers. The platform economy has also promoted the supply chain driven by consumer demand in the apparel industry, and as a result, apparel orders that rely on platform sales have been characterised by small batches, multi-varieties, and quick reorders. This form of production, in turn, has fostered the e-platform-driven flexible specialisation. Two kinds of extremely informal forms of employment have increased in response to the clothing orders based on the e-commerce platform: the husband-and-wife workshops completing the processing of online clothing shop orders, and the daily-wage workers participating in the production of factories or workshops as they adapt to the variability of orders. The clothing industry supply chain dominated by e-commerce platforms has replaced vertically integrated enterprises with a large number of small production organisations and self-employed workers to improve flexibility as well as reduce costs and corporate responsibilities. Meanwhile, a large portion of profits has moved to the platforms that monopolise traffic and data.

The rise of the platform economy and the accompanying strong demand for labour in the garment industry allow workers to autonomously participate in the construction of a more flexible employment mode in order to obtain higher wages and more autonomy in arranging working hours. However, this kind of agency is extremely atomised and thus very vulnerable to changes in the labour market.

"Atomised" refers to two facts. First, compared with long-term factory workers, the daily wage workers change their workplaces frequently and lack interest in the consistency and solidarity generated by working with their co-workers for a long time. Second, for self-employed workers, e-commerce platforms have promoted more small orders suitable for production by small husband-and-wife workshops, and these are not as beneficial to workers' collective rights protection as cooperative production teams with more than six workers when encountering payment problems.

These workers are also "vulnerable" because informal employment under the influence of the platform economy reduces their ability to resist risks, as has been made evident in the face of COVID-19. According to the investigations the author conducted between May and July 2020 in Guangzhou Dayuan Village (Guangzhou Dayuan cun 廣州大源村), the biggest Taobao Village in China, many foreign trade-oriented garment companies have had to turn to the domestic market, especially for the e-commerce platform, which has intensified the fierce competition in apparel sales online. Many garment manufacturers lack orders due to the depressed market, so there is less demand for temporary workers, and wages have been cut by about a third compared to the year before. During June and July, the slack season in clothing production in Guangzhou, a number of garment enterprises asked employees to take long leave, during which long-term workers only draw their low basic salaries, while temporary workers have no income security in this situation. Under the influence of the e-commerce platform, the very production flexibilities that the garment workers actively participated in constructing have increased their work vulnerabilities.

The Taobao Villages in China's rural areas have received a lot of economic and political support from local governments because previously the online stores helped to solve the employment problem of rural residents and increased their incomes (Li 2017). However, the workshops clustered in the urban villages producing Taobao orders and the informal employment mode have also brought many social problems. The organisation of such production has often resulted in the same buildings being used for accommodation, storage, operations, etc., and they are unfortunately prone to fires with large casualties. Informal employment can also easily cause labour problems, such as child labour and wage arrears. The informal economy contributes little to local taxation, but the management cost is high, which poses a challenge to social governance. As a result, many local governments have repeatedly mobilised campaigns to evict Taobao clothing production workshops, but government campaigns cannot effectively address the informal employment problems caused by the rise of the platform economy. The more fundamental solution is to make adjustments in national laws and regulations related to macro-level labour standards, mid-level collective bargaining, and micro-labour contracts, making them more adaptive to the reality of informal employment. Meanwhile, policymakers need to pay attention to the regional variations in development modes, industrial conditions, and workers' subjectivities when they take measures to deal with the problem of informal employment in different areas.

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