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# Economic Contribution of Factoryless Goods Producing Firms in Singapore

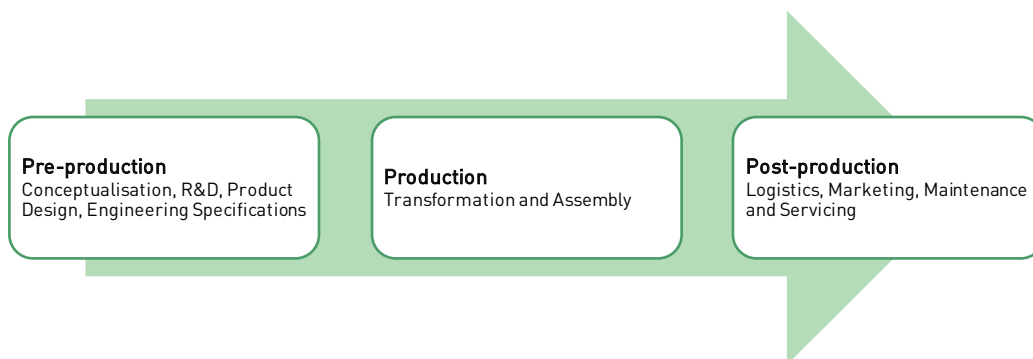
Given their rising global prominence, this article takes an in-depth look at factoryless goods producing firms in Singapore by examining their economic contribution to the Singapore economy.

## With the fragmentation of global value chains, firms can participate in different stages of the production value chain

Over the years, production value chains have become fragmented as firms seek to take advantage of the comparative advantages of different locations, and/or to exploit economies of scale by specialising in one or multiple stages of the production process. Today, the different activities in a production value chain can be performed by a single firm or many different firms, and the activities can take place in different locations within a country or across country borders (Bernard and Fort, 2013).

The rise in the prominence of factoryless goods producing firms (FGPFs) globally is a reflection of the fragmentation of production value chains [Exhibit 1]. In this article, FGPFs are defined as firms that perform pre-production activities such as conceptualisation, research & development (R&D), product design and engineering or development of specifications for production in Singapore, but outsource the actual production of the good (i.e., physical production and assembly & testing of the good) to a related firm in another country or to a contract manufacturer in Singapore or another country.<sup>1</sup> A prominent example of FGPFs is the fablessemiconductor firm that engages in the design of semiconductor chips in Singapore, but outsources the production of the chips to a separate firm either within or outside Singapore.

Exhibit 1: Typical Production Value Chain



## FGPFs have increased their presence in Singapore over the years

Over the years, FGPFs have increased their presence in Singapore, leveraging on our highly-skilled workforce to carry out knowledge-intensive pre-production activities.

<sup>1</sup> Based on this definition of FGPFs, a firm can be classified as a FGPF in Singapore even though its parent/sister/subsidiary company maybe engaged in production overseas. This definition is comparable to those currently used by national statistical agencies in the U.S.

FGPFs in Singapore can be found in both the manufacturing and services sectors. According to international statistical convention, the ownership of the material inputs<sup>2</sup> used in the production process determines the ownership of the output produced, which in turn affects the sectoral classification of FGPFs. Specifically, FGPFs are classified as manufacturing FGPFs if they own the material inputs to production and hence, the output produced. On the other hand, FGPFs that do not own the material inputs to production, and thus do not have ownership over the output produced, will be classified under the services sector (e.g., within the wholesale trade or business services sector). Depending on the sector that a particular FGPF is classified under, its economic contribution (e.g., output, value-added and employment) will correspondingly be recorded under that sector.

The rest of this article focuses on the contribution of FGPFs in the manufacturing sector.

### Manufacturing FGPFs provide well-paying, skilled job opportunities for local workers

FGPFs in the manufacturing sector contribute significantly to Singapore's economy and provide well-paying jobs for local workers, even though they do not directly undertake production activities and may not contribute to domestic exports in Singapore (see inset below). In particular, in 2016, roughly 78 per cent of the jobs created by manufacturing FGPFs were skilled jobs<sup>3</sup>, while the average remuneration per worker for these firms was \$117,000. Comparatively, the share of skilled jobs and the average remuneration per worker for the entire manufacturing sector were 69 per cent and \$55,000 respectively. Local workers are the main beneficiaries of the good jobs generated by the manufacturing FGPFs as they account for a larger proportion of the workforce in the manufacturing FGPFs.

Apart from providing well-paying and skilled jobs for locals, manufacturing FGPFs are also more productive on a per worker basis as compared to the average manufacturing firm. For instance, the average nominal value-added (VA) per worker of manufacturing FGPFs in 2016 was \$1.3 million, far higher than the \$182,000 for the overall manufacturing sector.

#### **Inset 1: Relationship between Manufacturing Output and Domestic Exports**

As explained above, in line with international statistical classification standards, the economic contribution of manufacturing FGPFs such as their output and VA will be recorded under the manufacturing sector, even though they do not undertake production activities.

In terms of trade statistics, however, changes in the output of manufacturing FGPFs may not lead to a corresponding change in domestic exports (DX) if the FGPFs decide to outsource part or all of their production *overseas* and the manufactured goods are subsequently shipped out from the country of production to the destination market. This may then contribute to a divergence between the performance of manufacturing output and DX.

We have seen this especially in the case of electronics output and electronics DX given the rising prominence of fabless semiconductor firms in the electronics cluster in Singapore.<sup>4</sup> For instance, the production arrangement of fabless semiconductor firms in Singapore's electronics cluster was one of the factors that contributed to the divergence in electronics output and electronics DX in the first half of 2018, with the former rising by 16 per cent year-on-year (yoy) even as electronics DX declined by 7.7 per cent yoy over the same period.<sup>5</sup> There have also been other episodes of divergences where electronics DX rose even as electronics output fell (e.g., between 1Q15 and 3Q15) due to other factors such as a rise in the prices of our electronics products and/or a draw-down of inventories by electronics firms.

<sup>2</sup> Material inputs refer to the raw materials or intermediate goods that are transformed into the final good.

<sup>3</sup> Skilled jobs refer to positions in the following occupations: professionals, managers, executive and technicians.

<sup>4</sup> Apart from the presence of FGPFs, such divergences may also be contributed by other factors. *First*, as electronics DX is measured in nominal terms whereas electronics output is measured in volume terms, a change in the export prices of our electronics products could lead to a divergence between electronics DX and electronics output. *Second*, a build-up or draw-down of inventories by electronics firms in response to changes in demand conditions could also lead to a divergence between electronics DX and electronics output. See Box 6.1 of the Economic Survey of Singapore 2013 for more details.

<sup>5</sup> Another contributing factor to the divergence in the first half of 2018 was a fall in the prices of our electronics exports.

## **Additionally, manufacturing FGPFs add to the vibrancy of Singapore's manufacturing sector and help to strengthen our innovative capabilities...**

In addition, manufacturing FGPFs add to the vibrancy of Singapore's manufacturing sector and play an important role in supporting the growth of other manufacturing firms. For instance, within the electronics cluster, some fabless semiconductor firms that engage in pre-production activities (e.g., R&D and product design) also outsource part of their production to local contract manufacturers, such as local foundries and assembly & testing firms, thereby supporting the growth of these firms.

Furthermore, these manufacturing FGPFs work closely with local contract manufacturers and equipment suppliers to jointly conduct R&D and co-develop production processes. This in turn helps to strengthen the innovative capabilities of Singapore's manufacturing sector.

## **...as well as anchor related companies that provide a suite of supporting functions in Singapore**

Apart from supporting the growth of other manufacturing firms and spurring innovative activities, most FGPFs in Singapore are accompanied by a group of related companies<sup>6</sup> that provide supporting functions, such as logistics, distribution, and marketing & sales, among others. The economic activities of these companies in turn generate even more VA and employment for Singapore beyond that created by the FGPFs themselves.

## **Conclusion**

FGPFs have become a more prominent feature of Singapore's manufacturing ecosystem. These firms engage in pre-production activities such as R&D and product design in Singapore, but outsource the physical production of the goods to a related firm in another country or to a contract manufacturer either in Singapore or overseas.

Despite not carrying out production activities directly, manufacturing FGPFs nonetheless contribute significantly to the Singapore economy and provide well-paying jobs for local workers. Moreover, they add to the vibrancy of Singapore's manufacturing sector and help to spur innovative activity through their partnerships with local contract manufacturers and equipment suppliers. As most manufacturing FGPFs are accompanied by related companies that provide a suite of supporting functions such as logistics and distribution, the economic footprint in terms of VA and employment of the entire group of firms is generally larger than that of the FGPF alone.

Going forward, MTI and EDB will continue to strengthen Singapore's manufacturing base and innovative capabilities by anchoring firms that engage in high-value manufacturing and also production-related services (e.g., R&D and product design) in Singapore. Given their symbiotic relationship, the co-existence of manufacturing and production-related services will allow Singapore to identify new areas of growth at an earlier stage and maintain our competitiveness in the global market.

*Contributed by:*  
Economics Division  
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<sup>6</sup> Related companies refer to subsidiaries, sister or parent companies that belong to the same business group.

## Reference

Bernard and Fort (2013), "Factoryless Goods Producers in the US", National Bureau of Economic Research, pp. 1.