Global Smartphone Supply Chain

The global smartphone supply chain is a modern marvel. But it will have to reinvent itself

FEW monuments to globalisation rival the smartphone industrial complex. This year 1.5bn devices will be made by millions of workers at hundreds of firms in dozens of countries.

When you tap your screen you are touching an object just as miraculous as Javanese spices seemed to 16th-century European nobs. In commercial terms the system is too important to fail. But this cosmopolitan wonder faces twin threats: the fading of the smartphone boom and the end of globalisation’s golden era. To assess these risks, Schumpeter has “stress-tested” the supply chain’s financial strength. Overall it is in reasonable shape, but a long tail of weak firms provokes concern.

For decades most consumer-electronics companies produced their wares close to home. Nokia hit the big time while churning out handsets from the small town of Salo in Finland. Then in the 1990s a few pioneers, including Cisco, and later Dell, outsourced manufacturing to a network of factories, mostly in Asia. That so impressed Steve Jobs at Apple that in 1998 he hired Tim Cook, a supply-chain expert. Mr Cook created a global archipelago of contract manufacturers and suppliers, which today has hundreds of key sites around the world.

The four other big smartphone firms each add their own twist. Samsung makes more of its devices in-house, but has huge factories in Vietnam and sells semiconductors and displays to its rivals. Huawei, based in Shenzhen, prefers to make components internally. Xiaomi and OPPO, both Chinese, are even leaner than Apple, using outsourced production at home and abroad.

These intricate networks have a vast economic footprint, as a recent IMF study shows. At the peak in October 2017, smartphone components accounted for over 33% of exports from Taiwan, 17% of those from Malaysia and 16% from Singapore. Smartphones comprise 6% of Chinese exports. Memory chips flow from South Korea and Vietnam; system chips from Malaysia, Taiwan and elsewhere; and displays from Japan and South Korea. Rich-world firms, such as Qualcomm, sell licences to use their intellectual property (IP). The parts are then assembled, mainly by armies of Chinese workers. The machine cranks up ahead of the launch of each new model—Apple may reveal its latest on September 12th—and spews out millions of devices.

The first threat to this system is that the number of new smartphones sold fell by 0.3% last year as China reached saturation and Western users upgraded less often. Yet despite this, total revenues increased by 10% for all suppliers of hardware and services to smartphone firms. Firms that sell games and services are booming; the sales of developers through Apple’s App Store rose by over 30% last year, to $27bn. New phones are stuffed with pricier chips and displays. The total value of the parts inside the iPhone X and Samsung Galaxy S9 is 28% and 13% more, respectively, than in their predecessor models, according to IHS Markit.

The system’s chief weakness is its long tail of puny firms. Many observers worry about labour conditions in the supply chain; the typical poorly paid assembly worker in China handles 1,700 phones a day. But life has been hard for some capitalists, too. One way to show this is to examine the finances of 42 big Apple suppliers. (These figures are estimates, using data from Bloomberg, IHS and Morgan Stanley; the 42 firms cover about three-quarters of Apple’s suppliers’ total gross profits and we weight each firm for the share of its business with Apple.)

Apple and 13 of its chip suppliers earn over 90% of the total pool of profits from the Apple system. Meanwhile the tail of other firms doing more basic activities must pay for most workers, inventories and fixed assets (see chart). So they have in aggregate a weak return on equity, of 9%, and a net profit margin of just 2%. Their earnings have not risen for five years. They include assemblers such as Taiwan’s Hon Hai and niche component makers, some of which are visibly struggling. On August 22nd AAC Technologies, a specialist in making phones vibrate, said its second-quarter profits fell by 39% compared with the previous year.

The typical supplier is secretive, battle-hardened, controlled by its founder and accustomed to volatility. If you take a broader sample of 132 suppliers to Apple, Samsung and Xiaomi, typically a third of them are shrinking in any given year. Their tight finances leave them exposed to trade tensions, which are the industry’s second big problem. In April America imposed sanctions on ZTE, a Chinese electronics firm that makes some handsets (they were lifted in July). So far America and China have refrained from messing with any other firms. Yet if tensions escalate, they could be in the firing line.

Supplier beware

Apple, Samsung and most semiconductor makers could ride out such tensions, with their high margins and cash-laden balance-sheets. But the long chain of other suppliers could not, given their razor-thin margins, big working-capital balances and fixed costs. Tariffs could push them into the red. Of the 132 firms, 52% would be loss-making if costs rose by just 5%. And a ZTE-style cessation of trade would be disastrous. If revenues dried up and the 132 firms continued to pay their own suppliers, short-term debts and wages, 28% of them would run out of cash within 100 days.

Choking the smartphone complex would be madness: consumers would be upset, millions of jobs would be at risk in Asia, and stockmarkets in America and East Asia would suffer. But even if governments avoid a shock, over time they are likely to push for a greater share of the profits, jobs and IP. America wants more plants at home. China is suing several foreign memory-chip firms for price-fixing and wants to build an indigenous semiconductor capability. If you are running a big firm in the smartphone complex, you should be reimagining things in preparation for a less open world. In a decade, on its current trajectory, the industry will be smaller, with suppliers forced to consolidate and to automate production. It may also be organised in national silos, with production, IP, profits and jobs distributed more evenly around the world. Firms will need to adapt—or be swiped away.