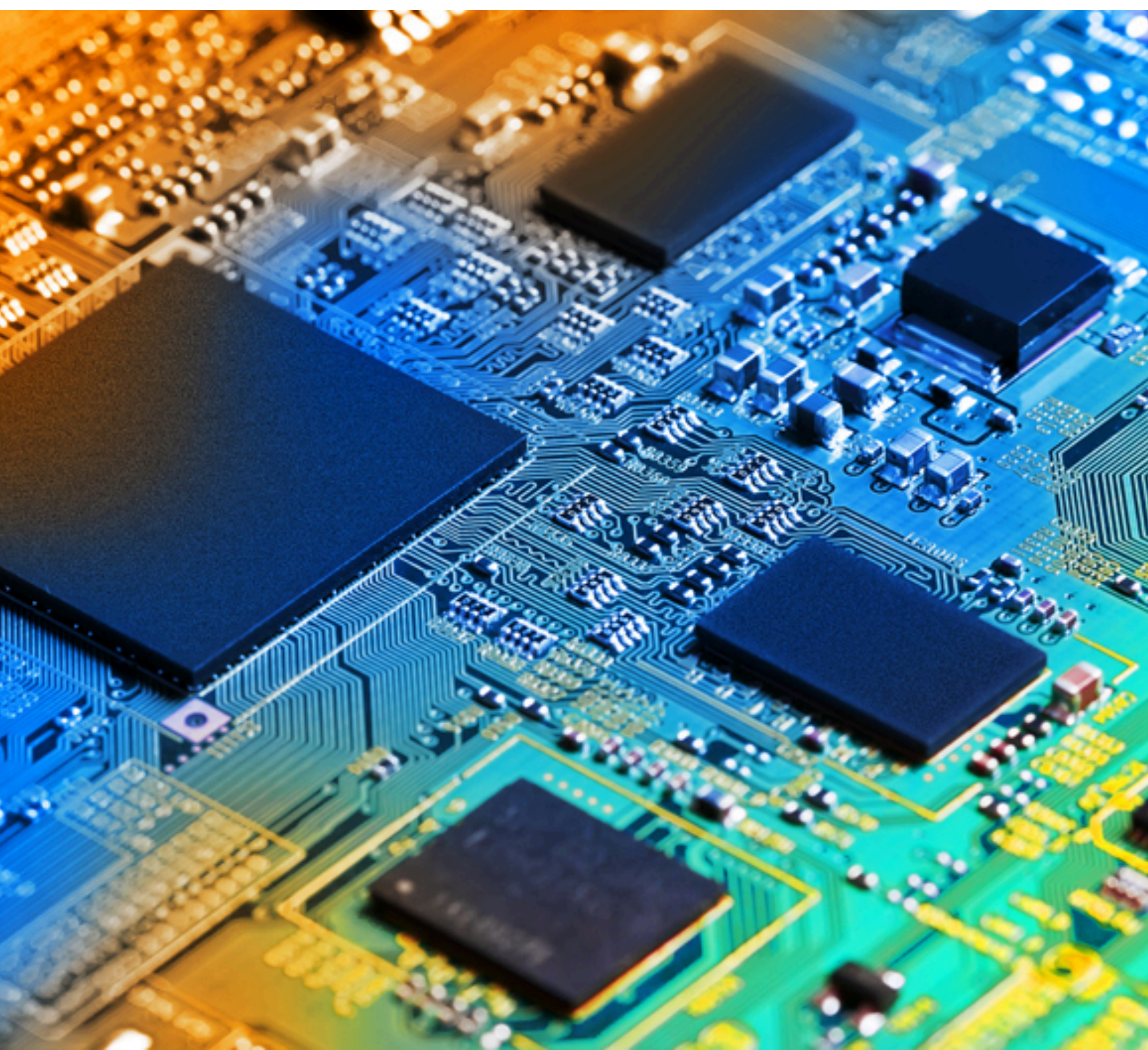


India

Consumer Electronics Report

Includes 5-year forecasts to 2024



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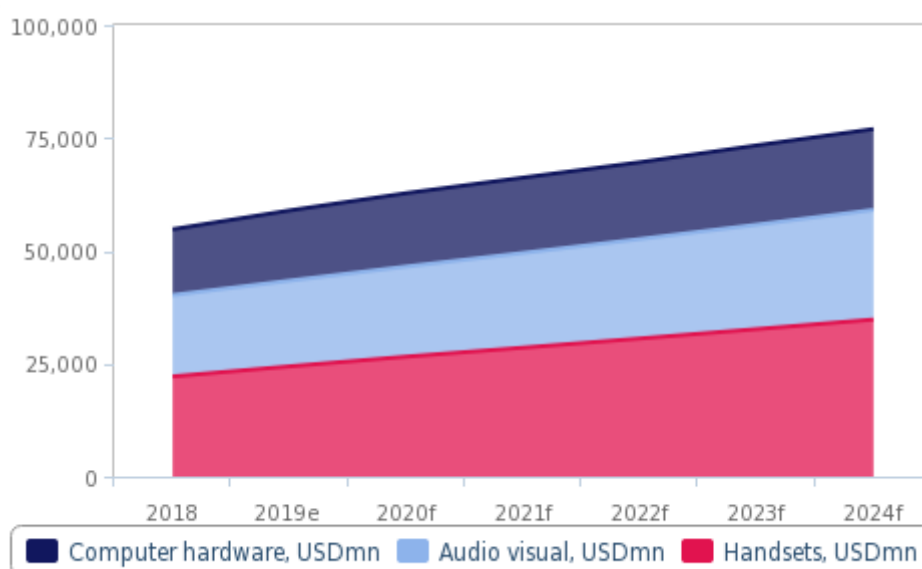
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Key View

Key View: Despite economic headwinds in 2020, there is still strong growth potential for India in the consumer electronics space. The transforming Indian household income profile will support demand for low-cost and mid-range devices, although price sensitivity will likely dampen demand in the premium, high-end segment. The pool of first-time buyers is still massive, providing strong opportunities for vendors for organic growth, as well as to tap on demand for replacement devices. Interest in investing into assembly facilities in India also continues to garner steam, although the components supply chain has not grown in tandem - assemblers continue to rely almost exclusively on components produced overseas.

Growing Incomes To Underpin Device Demand
(2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

Latest Updates And Industry Developments

- Consumer electronics spending continued to remain robust in the first few months of 2019 as vendors continued to tap into the large pool of first-time smartphone buyers, and first-time TV buyer households. The weakening rupee and slower economic growth in 2020 owing to domestic and external headwinds, however, could create drag on local currency device affordability.
- The performance of the computer hardware segment in 2020 will likely be strong, as vendors will stand to benefit from the end of extended Windows 7 support from **Microsoft** - this will trigger a round of investment into the PC stock from both government entities and corporates.
- In the audio-visual segment, flat-panel TV set upgrades will be the biggest growth driver, particularly as IPTV services become more affordable. In this segment, high-end TV sets, particularly ultra-HD/4K TVs will have a disproportional impact on segment value given their high unit prices. However, we believe that sales will be the largest in the low-end segment, which features brands such as **Micromax** and **Vu Televisions**. While new generation game consoles, namely **Sony's** PlayStation 5 will be released in Q420, this will have limited overall impact on the segment given high levels of price sensitivity, and the higher popularity of mobile and PC gaming.
- The Indian government will continue to boost the domestic electronics manufacturing sector through a combination of both tariff and non-tariff barriers. It imposes tariffs on the imports of electronics as well as electronics components, and at the same time, is pushing forward initiatives, including 'Make in India' and the 'National Policy on Electronics'.

SWOT

Consumer Electronics SWOT

SWOT Analysis

Strengths

- The addressable market is substantial and young, and this will support the growth of the retail market as disposable incomes rise across the board.
- Penetration rates of basic electronics products, including PCs, smartphones, and tablets, is low.
- Disposable incomes are rising across the board, which could translate into increased spend on key electronics segments.
- Massive addressable market; India is the second biggest country in the world in terms of population size, and has a large and youthful population, providing a big consumer base for retailers.

Weaknesses

- Poor availability of basic infrastructure, including broadband, electricity, and formal retail facilities makes the adoption of electronics difficult.
- Digital inequality remains significant, especially in rural areas of the country.
- Illegal products, such as Android set-top boxes which distributed pirated content, are present in the grey market.
- The Indian middle class remains relatively small, with only slow growth projected in income levels at the upper end of the scale.
- The demand for high-end products, such as LCD TVs and premium smartphones, is relatively low.

Opportunities

- There is a large pool of first-time smartphone owners, which handset vendors can target.
- Smaller, less developed cities are ripe for further vendor penetration, although overcoming logistical hurdles will be a key issue.
- Smart city initiatives could see increased adoption of Internet of Things (IoT) solutions, offering opportunities to device vendors over the medium term.
- 'Make in India' manufacturing initiative continues to drive foreign direct investment into domestic manufacturing facilities, which could drive down product prices in the long run.

Threats

- Low-cost mobile devices continue to cannibalise the demand for notebooks and desktops; generous mobile data allocations from operators have contributed to this trend.
- The introduction of Goods & Services Tax (GST) in July 2017 applies to locally made consumer electronics products, which has led to higher retail prices and narrower margins for vendors.
- Chinese smartphone brands continue to expand aggressively into the low-end segment, eroding the margins of Indian vendors.
- Manufacturing of high-end iPhones in India, which began in 2019 could squeeze vendors focused on the premium segment of the smartphone market.
- Revised labeling guidelines from the Bureau of Indian Standards could hurt the growth of white box vendors.

Industry Forecast

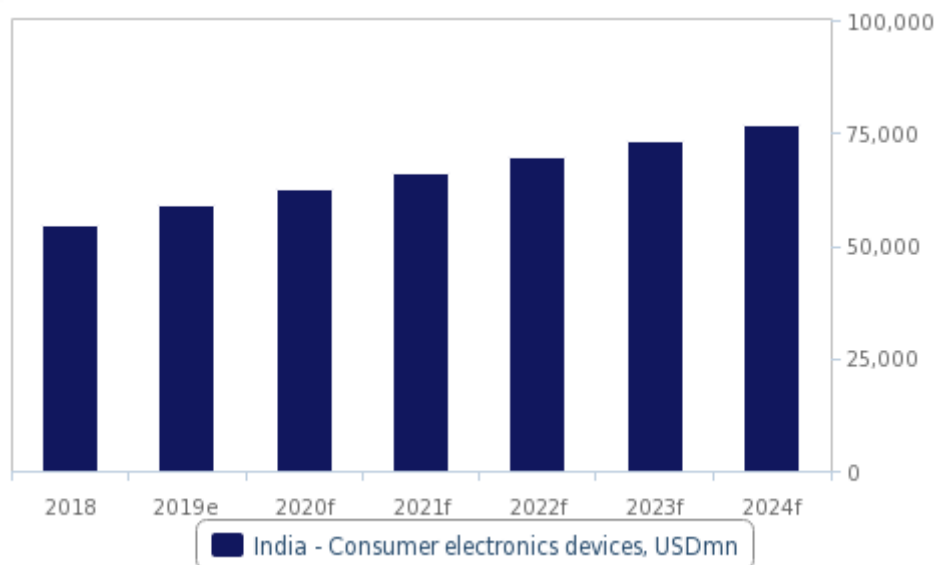
Key View: We expect consumer electronics spending in India to rise at a CAGR of 5.5% over the 2020-2024 period, underpinned by an improving income profile among both existing owners as well as first-time buyers. More global electronics manufacturers continue to invest into formal retail facilities in the country, as well as into setting up assembly facilities to skirt government tariffs on electronic device imports. India, to an extent, will stand to benefit as vendors diversify their production lines away from China, although production in India itself is skewed toward assembly - domestic assembly lines still rely heavily on foreign components.

2020 Outlook

Consumer electronics spending in India - including PCs and peripherals, TV sets, digital cameras and camcorders, audio devices and mobile handsets - is forecast to increase by 6.5% in 2020 to reach a total of USD62.8bn. We expect device spending growth will accelerate y-o-y in all three segments, supported by positive product cycles in key categories, and rising disposable incomes across the board.

- We have a positive view on real household spending in India, which is forecast to grow at 7.9% y-o-y in 2020, based on forecasts from our Consumer team, although this will be slightly lower than the 8.4% y-o-y estimated in 2019. Growth will be stimulated by positive demographic trends, rising incomes, and access to credit. However, several downside risks exist - poor growing weather during the kharif season will weigh on farmer incomes, which will weigh on consumption in rural areas. High levels of unemployment - which reached 8.5% in October 2019, the highest in 40 years, could also weigh on income growth. Slowdowns in the autos, manufacturing, and construction sectors will also impact incomes.
- Mobile handsets will be the most important segment in India in 2020. Mobile data services are very affordable, with Indian per GB data costs being the lowest in the world, following three years of price-led competition triggered by the mobile newcomer **Reliance Jio**. Indians continue to pass on PCs and tablets, instead purchasing smartphones to access the Internet. The smartphone market is deepening as the supply of low-cost devices increases, but volume growth as a driver of overall handset market value is partially offset by price erosion, with downside risk owing to the potential for overcapacity in the medium term. **Samsung** and **Apple** (through original design manufacturers (ODMs) **Foxconn** and **Wistron**) produce smartphones in India. Apple began exporting handsets made in India to meet export demand in November 2019.
- There will be increased spend on computer hardware in 2020, as we anticipate a pick-up in private and public sector PC spending to result from the end of extended **Microsoft** support for the legacy Windows 7 operating system. The need to maintain access to security patches and other feature updates will trigger investment in the PC stock - in September 2019, statistics from Statcounter suggested that Windows 7 still accounted for almost 38% of total Windows browsing traffic.
- Growth in the audio-visual segment is unlikely to outperform the other segments, although we believe there are some upsides in the TV segment, as strong consumer sentiment could lead to affordable flat-panel TV set upgrades in the mass market. Rising uptake of IPTV services, as Reliance Jio launches services, and **Airtel's** more competitive offerings could also trigger an upgrade to TVs. However, there will be little growth for cameras, radios, and game consoles, as smartphones continue to cannibalise these segments.

Consumer Electronics Demand
(2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

Market Drivers

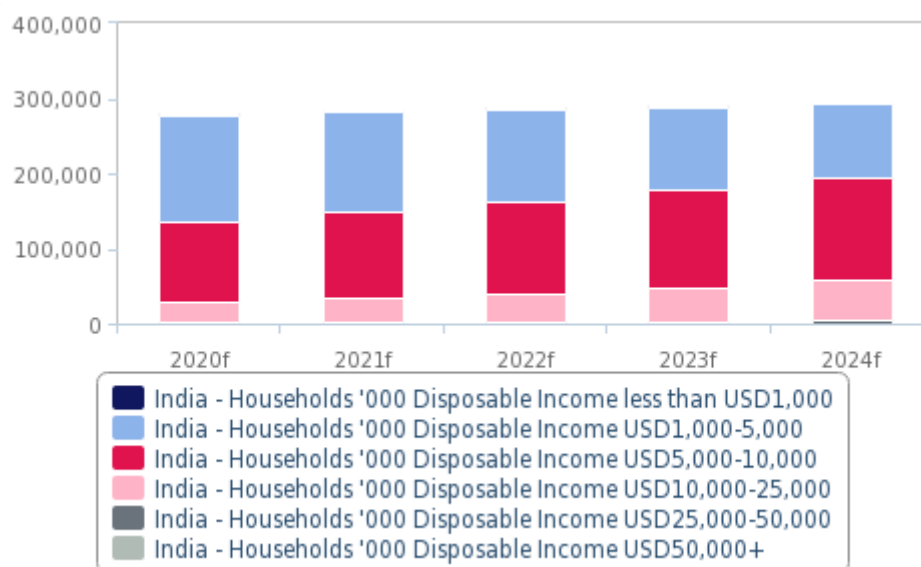
- India is a massive frontier market with very low penetration rates of electronics - this provides large opportunities, even toward the long term, for vendors to benefit from rising incomes, and from population growth. The presence of the large pool of first-time buyers that vendors have yet to tap on differentiates India from most other developed, and some emerging markets - where widespread ownership leaves vendors to rely heavily on replacement demand.
- Aggregate figures point to a positive overall outlook, but we believe the nuances of the Indian economic growth story are particularly significant to consumer electronics market development. We forecast a transformation in India's household income profile over 2020-2024 that will result in a deepening of the retail PC, AV and smartphone markets. India is, however, coming from a low base, trailing China by a wide margin in terms of household incomes, evident in our data for 2020 that show India to be a very low income market and is also reflected in household PC and smartphone penetration at around one quarter of the level of China.
- There will be several positive macroeconomic factors which will support growth of the electronics segment. First is the growth of the prime device buying population, namely the working adult population aged 15-64, which will rise by one percentage point over five-year forecast period. Second is the rise in GDP per capita, which in USD terms will increase at a CAGR of 3.6% from 2020 - 2024 to reach USD2,818.
- This increase in purchasing power will deepen the market for devices as the middle class expands and becomes more affluent. This will increase the affordability of imported devices, or devices assembled locally with imported components and parts, resulting in higher volumes as first-time buyers enter the market, as well as enabling higher unit prices for middle class consumers.
- The rupee, however, is forecast to weaken in 2020 to average INR74/USD in the year, namely due to worsening terms of trade, and narrowing real interest differentials with the US. The central bank is also focusing on growth support, which will likely spur action to limit rupee strength. This could potentially weigh on electronics spending, in USD terms, in the coming year. This dynamic, however, has been reflected in our forecast revision conducted in Q220.
- While the concentration of first-time buyers is the highest in the smaller cities, there is still a large concentration of households and individuals in the main urban areas who have yet to purchase their first electronics devices. Tapping this pool of late adopters, however, will be difficult, given that they are of the lowest value and are highly price sensitive. Vendors continue to expand their retail and distribution networks to target the next 200 - 400 smaller cities in India.
- The Indian government continues to double down on its 'Make in India' initiative, which includes a package of measures to

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promote domestic manufacture of electronics. India also maintains tariffs on imports of components used in electronics, in a bid to drive import substitution. However, manufacturing centres largely on assembly, rather than the production of components and materials - companies with local assembly facilities, including **Samsung**, continue to rely on imported components to meet their assembly needs.

- **Apple** in November 2019 began exporting its high-end iPhone XR smartphone, which is assembled in India by Taiwanese original design manufacturer (ODM) **Foxconn**. The company began selling the Indian-made iPhone XR locally in October 2019. Local assembly could lower production costs for Apple, and could allow it to lower its prices for its products sold domestically - this could boost demand, especially in the premium segment. It relies on ODM **Wistron** to assemble its iPhone 6S smartphone.

Purchasing Power And Demographic Trends
Household Income Breakdown (2020-2024)



f = Fitch Solutions forecast. Source: National sources, Fitch Solutions

Segments

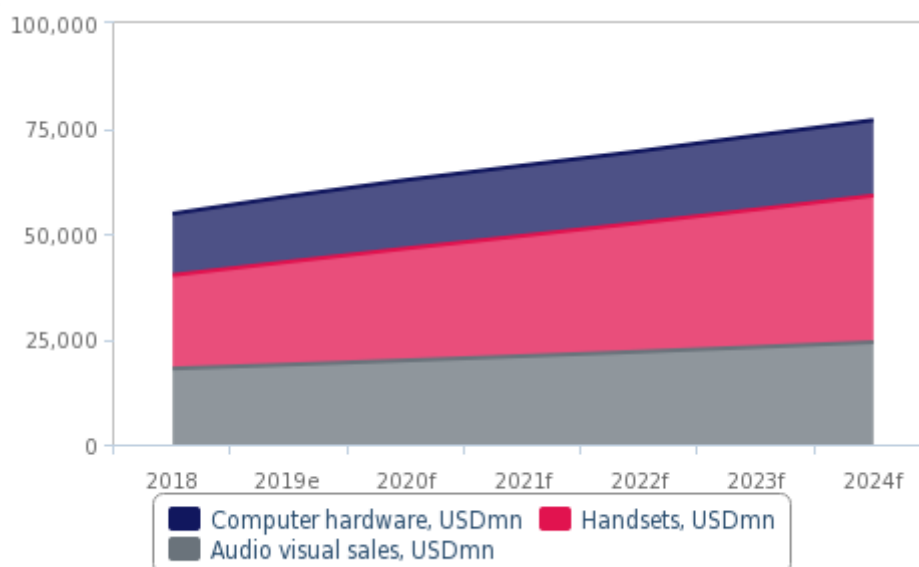
- **Mobile Handsets:** This will be a major segment for consumer electronics vendors. There has been a large pool of first-time buyers who flooded the market from 2016 to now, as price competition drove down the tariffs for voice and data services, leading to significantly improved affordability for mobile services. In 2020, spending on mobile handsets is set to account for over 42% of total electronics spending, and in 2024 will rise by a further percentage point. Sales coming from the emergence of first-time buyers will be a significant growth engine. While there is some potential for expansion of the mid-range and even premium smartphone demand as disposable incomes rise, a significant amount of growth will be driven by the growth of the low-cost segment. We continue to see price sensitivity continue to affect vendor and telco strategies, which have both sought to introduce low-cost, basic featurephones and smartphones. We also see little room for growth for Indian handset manufacturers, as the market continues to be dominated by Chinese brands such as **Xiaomi**, **Vivo**, and **Oppo**, together with **Samsung**, which commands the market by a considerable margin. However, iPhone volumes could grow, albeit slowly, as Apple expands its domestic manufacturing. This handset segment will grow by a CAGR of 7.3% over the 2020 - 2024 period.
- **Computer Hardware:** In 2020, we expect growth performance to be underpinned by the end of Windows 7 support from Microsoft, which will trigger investment in the PC stock by both public and private sector customers. Overall, PC growth remains largely muted, as Indians migrate toward smartphones which have cannibalised PC use-cases and have proven to be 'good-enough' for most use cases. Both local and foreign consumer technology brands have also adopted their services for mobile use, further reducing the need for PCs in many households. High price sensitivity and the lack of PC ownership/use has made India one of the most vulnerable PC markets to the threat of smartphones, although this scenario is also true in many other large

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emerging markets in Asia, including Indonesia and Vietnam. We still see opportunities in the higher-end of the market, primarily in gaming PCs, which are the choice for gaming enthusiasts, as well as ultra-slim and hybrid notebooks, which are primarily used by corporates - price sensitivity in these segments are much lower. Spending on computers are expected to grow by a CAGR of 2.9% over our forecast period, accounting for roughly 23% of all electronics sales by 2024.

- Audio-Visual Devices:** We view that there will be slight growth potential in the AV segment. Spending on TV sets will be the biggest driver in the medium term, a trend that will encompass both low-price first-time flat-panel upgrades, chiefly as the middle class in India expands, and the demand for models with higher resolution and larger screens expand. Demand could also be boosted by an appreciable degree as the appetite for IPTV services increase, particularly as Reliance Jio launches its services, and rival **Airtel** lowers its prices to attract more consumers to its network. Higher investments from over-the-top (OTT) players such as **Netflix** and **Hotstar** into more Indian content could, to an extent, elevate the demand for TVs, although viewing could remain limited to mobile devices. Game console demand could also jump, following the pending releases on the new generation PlayStation and Xbox consoles from **Sony** and **Microsoft** respectively in Q420. However, the opportunity for game consoles will however be small in volume terms due to affordability constraints and the relative popularity of PC and mobile gaming formats. Smartphones will continue to cannibalise the demand for digital cameras. This segment will grow by a CAGR of 5.1% over the 2020 - 2024 period.

Consumer Electronics Demand
(2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

CONSUMER ELECTRONICS OVERVIEW (INDIA 2018-2024)

Indicator	2018	2019e	2020f	2021f	2022f	2023f	2024f
Consumer electronics devices, USDmn	54,765.30	58,931.19	62,760.92	66,200.94	69,608.58	73,349.92	76,973.40
Computer hardware, USDmn	14,579.73	15,551.62	16,246.88	16,677.30	17,009.22	17,570.22	17,914.89
Audio visual, USDmn	18,015.36	18,970.18	19,956.63	20,974.42	22,023.14	23,124.29	24,280.51
Handsets, USDmn	22,170.20	24,409.39	26,557.42	28,549.23	30,576.22	32,655.40	34,778.00

e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

Industry Risk/Reward Index

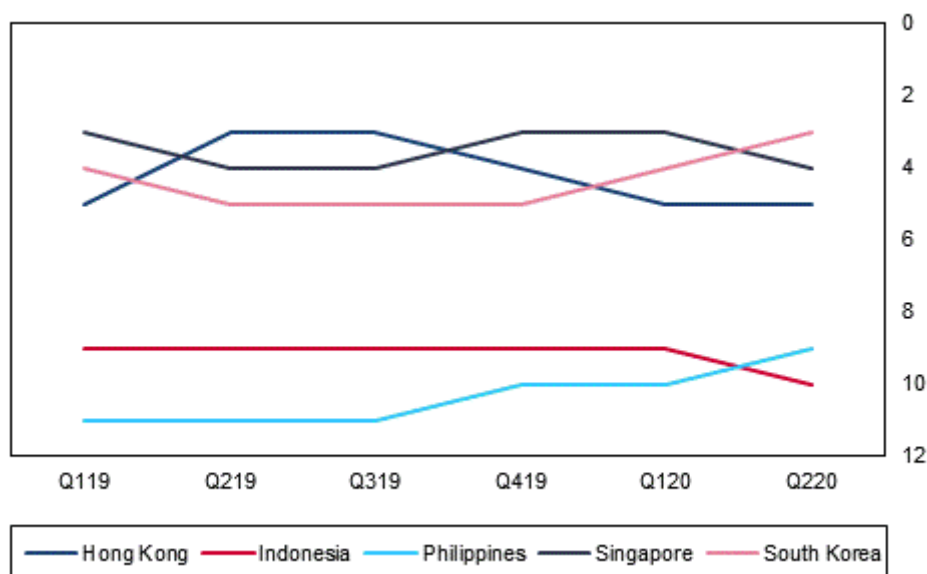
5G, US-China Tech War Key Drivers For The Asia Consumer Electronics Market

Key View

- 5G will be a key catalyst for the adoption of new device formats in 2020, including augmented reality (AR), and virtual reality (VR) devices.
- The US-China trade war remains a key risk, given the potential for further trade barriers to raise the cost of devices.
- We have added Bangladesh to our consumer electronics (CE) index, which makes its league table debut in 14th position. Its low overall score weighed on the average result for the Asia IT RRI, which came in at 52.3 points out of 100 this quarter. The addition brings the total number of markets covered by our Asia CE RRI to 15.

The overall score for the Asia CE Risk/Reward Index (RRI) fell by 1.3 points in the Q220 update, bringing the regional average to 52.3 points out of a potential 100. The decline has been largely due to the introduction of Bangladesh to our league table: its overall score of only 33.8 out of a possible 100 points has weighed heavily on the regional average. The introduction of revised macroeconomic forecasts coupled with more comprehensive 2019 trade and sales data has led to slight reshuffling of positions, while Bangladesh's entry at 14th place means that its peer, Pakistan remains at the foot of the table.

New Macroeconomic, Sales Data Reshuffles Table
Selected Asia Pacific CE Rankings, Q119 - Q220



Source: Fitch Solutions

Singapore saw the biggest slide in its overall score: its 2.1 point decline was sufficient to dislodge the city-state from third position, which it had held for the previous two quarters. Sales growth was tepid in 2019 as weaker economic activity, stemming from a pronounced slowdown in China weighed on the country's export growth. While the market dynamic in 2020 could see some upside owing to positive device upgrade cycles, we do not expect the commercialisation of 5G services in 2020 to provide much of a meaningful boost to the overall mobile handset segment in the year: nationwide 5G coverage is only expected toward the end of our forecast period. Amid a more competitive environment, telcos are also unlikely to pile in significant amounts of capex into their 5G networks in the short term.

South Korea, on the flipside, registered a 2.1-point gain in its overall score, moving it up two places to third in the league table. Uptake of 5G services was encouraging in 2019, with over 6% of the mobile market taking up a 5G connection by the end of November 2019. Our forecasts envisage the number of 5G subscriptions to rise to just over 50mn by 2024: this will provide strong opportunities for device vendors for volume growth in the higher-margin 5G-capable handset segment. Multi-device and multi-SIM strategies pursued by telcos will also continue to support uptake of devices, such as smart watches, fitness trackers, and tablets. We also view stronger potential in new and emerging device categories, such as smart speakers and AR/VR products, with 5G networks being the key catalysts for these new services. The release of new foldable devices in the coming years could also provide some uplift to the market.

Malaysia posted a 0.8 point decrease in its score: weaker anticipated sales in 2020 is attributed to a bleaker economic outlook. Smartphone penetration is also approaching saturation in Malaysia, with mobile vendors keen to re-focus sales into premium smartphone categories. However, aggressive marketing and the expansion of sales channels by Chinese brands, such as **Vivo** and **Oppe** in the mid-range segment has lowered margins, impacting segment value growth because of the relatively lower unit prices. The pool of first-time buyers has also shrunk, although opportunities remain in the less affluent and more rural states in the country. A weaker Malaysian ringgit (MYR) forecast in 2020 will also weigh on USD-denominated spending.

The trade war between the US and China will be a risk to watch out for in 2020. Despite the conclusion of a phase one trade deal, which was announced in December 2019, US pressure on Chinese companies will likely continue into the foreseeable future, even if tensions continue to de-escalate. This will put upside pressure on production costs for Chinese companies, which could pass on the higher costs to consumers through higher selling prices. While tariffs on Chinese exports could ease, original design manufacturers (ODMs) such as **Foxconn**, **Wistron** and **Pegatron** are actively sourcing for production capabilities outside of Mainland China in an effort to skirt potential trade restrictions in the future, and to take advantage of lower labour costs found elsewhere in the region. Shifting supply chains could also raise prices for devices in the short term, which will in turn lead to higher prices for consumers, impacting spending.

ASIA PACIFIC CONSUMER ELECTRONICS RISK/REWARD INDEX, Q2 2020

	Industry Rewards	Country Rewards	Industry Risk	Country Risk	Q220 CE Score	Q-o-Q Change	Rank
Japan	68.3	70.0	85.0	74.9	71.9	0.0	1
Australia	60.0	70.0	85.0	76.0	68.3	0.0	2
South Korea	58.3	55.0	70.0	85.7	63.8	2.1	3
Singapore	43.3	70.0	85.0	84.5	62.3	-2.1	4
Hong Kong	48.3	67.5	80.0	72.0	61.1	0.0	5
China	68.3	22.5	55.0	70.7	55.9	-0.5	6
Taiwan	45.0	40.0	70.0	86.5	54.2	0.0	7
Malaysia	43.3	37.5	70.0	81.3	51.9	-0.8	8
Philippines	45.0	30.0	70.0	68.9	48.6	1.2	9
Indonesia	45.0	30.0	60.0	67.0	47.1	-0.4	10
India	55.0	10.0	60.0	66.3	46.6	0.6	11
Thailand	43.3	20.0	55.0	78.7	45.4	0.4	12
Vietnam	41.7	17.5	50.0	67.1	41.3	-0.6	13
Bangladesh	30.0	15.0	35.0	68.1	33.8	0.0	14
Pakistan	36.7	10.0	40.0	44.3	31.9	0.5	15
Average	48.8	37.7	64.7	72.8	52.3	-1.3	-

Note: Scores out of 100, with 100 being the best. The Consumer Electronics (CE) Index is the principal score. It comprises two sub-indices, Rewards and Risks, which have a 70% and 30% weighting, respectively. In turn, the Rewards Index comprises Industry Rewards and Country Rewards, which have a 65% and 35% weighting and are based on growth/size of the CE industry (Industry) and the broader economic/socio-demographic environment (Country). The Risks Index comprises Industry Risks and Country Risks, which have a 40% and 60% weighting and are based on a subjective evaluation of barriers to entry and the regulatory environment (Industry), and the country's broader Country Risk exposure (Country), which is based on Fitch Solutions' Country Risk Index. The Index structure is aligned across all industries for which Fitch Solutions provides Risk/Rewards Indices. Source: Fitch Solutions

Market Overview

Recent Developments

- Electronics spending in India expanded in both 2018 and 2019 in local currency terms. However, sluggish economic growth and rising unemployment in India, however, has weighed on income growth, which could likely translate into slower than anticipated sales in 2020. A bearish assessment of income growth trends over the coming years will also weigh on sales growth.
- The proliferation of 4G networks, even in sub-urban areas has been key in sustaining sales growth of mobile devices. Sales in the electronics segment is highly skewed toward smartphones and featurephones, with these devices preferred over traditional desktops, notebook computers, and tablets given their relative affordability and ease-of-use.
- The easing of local sourcing norms in India in July 2019 is paving the way for single brand retailers, including electronics vendors like **Oppo**, **Apple**, and **OnePlus** to begin direct-to-consumer online sales. Apple has stated in February 2020 that it will begin online sales later in the year, while launching its first physical store in 2021.
- There is potential for overcapacity to undermine returns to vendors in a very price-sensitive market. This is most significant in the smartphone market through price competition between Indian and Chinese vendors in the low- and mid-market as local production increases as part of the 'Make in India' initiative.

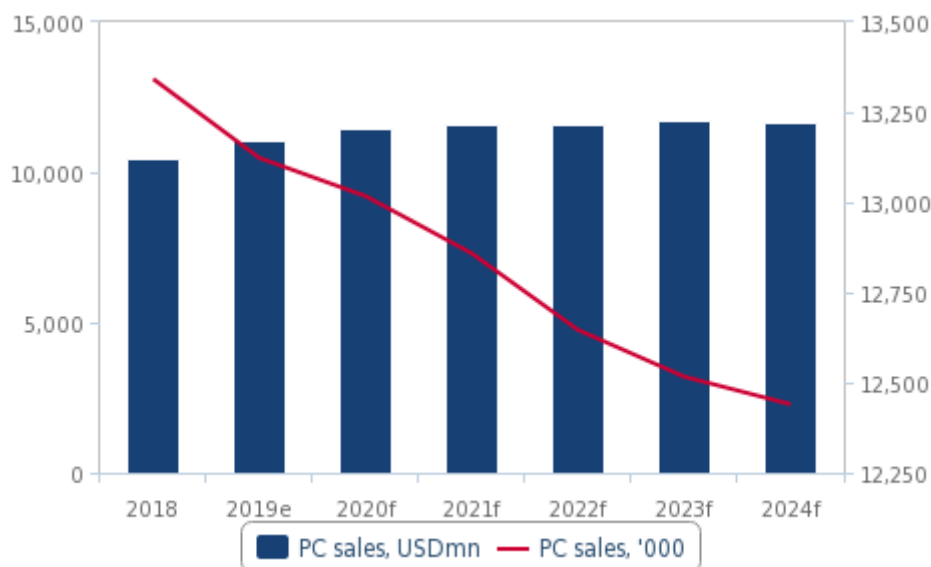
Computer Hardware

PC SALES (INDIA 2018-2024)							
Indicator	2018	2019e	2020f	2021f	2022f	2023f	2024f
PC sales, USDmn	10,441.76	11,050.72	11,472.70	11,585.51	11,589.27	11,726.71	11,696.51
PC sales, '000	13,342.02	13,122.91	13,017.11	12,858.20	12,645.90	12,516.31	12,439.96
Desktop sales, '000	4,597.24	4,496.10	4,401.68	4,313.65	4,244.63	4,180.96	4,122.42
Notebook sales, '000	5,169.57	5,267.79	5,383.68	5,512.89	5,656.23	5,814.60	5,977.41
Tablet sales, '000	3,575.21	3,359.02	3,231.75	3,031.66	2,745.05	2,520.76	2,340.12

e/f = Fitch Solutions estimate/forecast. Source: National sources, Fitch Solutions

Computer hardware spending advanced in 2018 and 2019, although at slower rates. Demand for notebook PCs remains subdued and the sharp fall in sales of tablet computers continues. Replacements of notebooks were also affected by the emergence of a new breed of very cheap big-screen smartphones, which also negatively affected the tablet market. We believe that within the PC segment, the market has expanded based on value, despite a decline in volumes; this has been due to increases in average selling prices (ASPs) of computers given the rising cost of components, as well as the rising popularity of ultrabooks and gaming PCs, which command higher premiums. We hold a positive view on the growth potential of the market and for vendors to deepen their presence in the hardware segment. India is one of the leading global hardware opportunities over the medium term - even with the downside of price sensitivity.

Computers: Demand
(2018-2024)

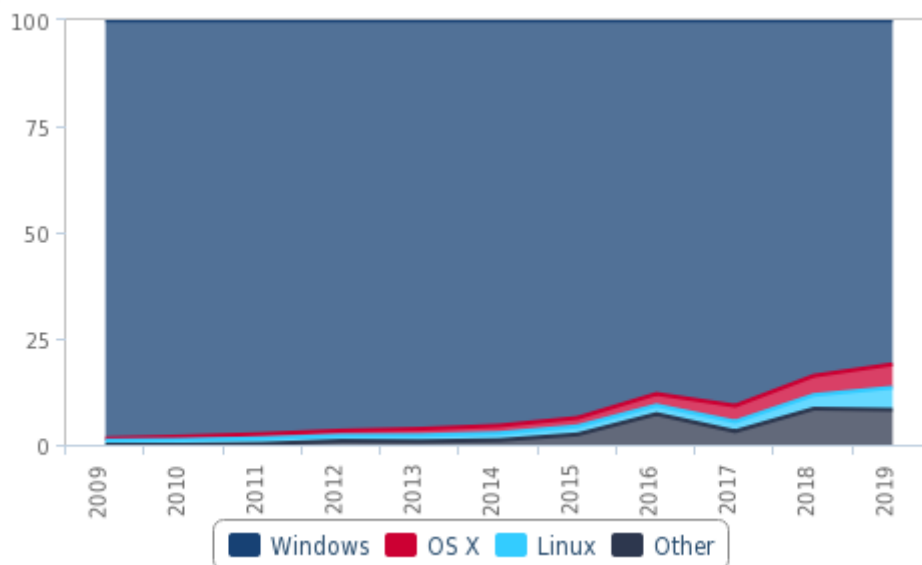


e/f = Fitch Solutions estimate/forecast. Source: National sources, Fitch Solutions

PC Market

- PC spending increased in both local currency and US dollar terms in 2019, following two consecutive years of decline. There was a boost in demand as a result of businesses and the government making preparations for the end of extended Windows 7 support by Microsoft in January, which required investment in hardware and/or software in order to upgrade to Windows 10 and secure access to ongoing security and feature updates. However, we believe that a substantial portion of the PC stock in India still leveraged older Windows versions, including Windows XP and Windows 7.
- Several characteristics of the Indian PC market should provide a platform for long-term growth. However, as a result of low average incomes, extremely high inequality (with PC purchases still unaffordable for whole swathes of the population) and a historical lack of action in the distribution of PCs to economically disadvantaged segments of the population, there is still much progress to be made before there is any significant convergence with more advanced markets in APAC. At the same time, PC demand could increasingly be cannibalised in favour of mobile-centric devices, namely smartphones, which could put PC sales on a permanently lower growth trajectory. The very low penetration of PCs, however, indicates a huge opportunity for vendors as incomes rise.

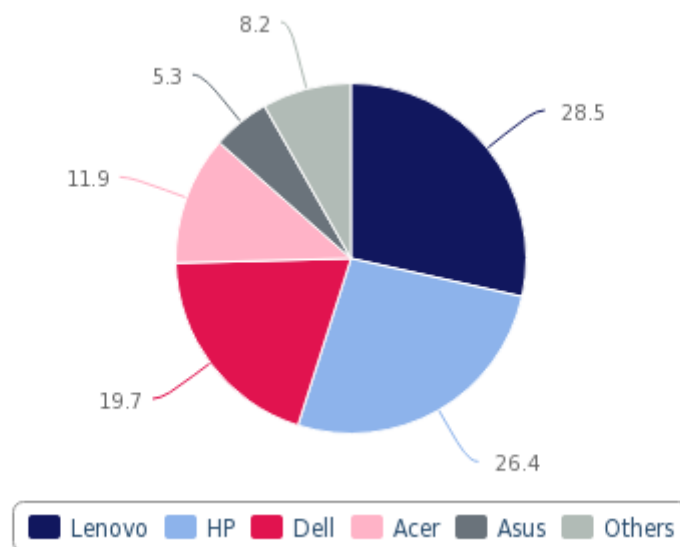
India PC Browsing Traffic By OS (%)
2009 - 2029



Source: Statcounter, Fitch Solutions

- India's PC market is competitive, both in terms of competition between brands and the focus of the whole market on being price competitive in a market where disposable incomes are low. In the quarter ending September 2019, **Lenovo** was the market leader in the Indian desktop and notebook market, with a 28.5% share of sales in the quarter, based on data released by IDC. This put the company ahead of **HP** (26.4%), **Dell** (19.7%), and **Acer** (11.9%). Taiwan-based **Asus** commanded the smallest share among the multinational vendors at 5.3%. Total shipments in the quarter totalled 3.1mn units. We believe that there has been a focus on gaming laptops and ultrabooks.
- As the Indian computer hardware market has grown, vendors have increasingly sought to produce 'made for India' models. These are now becoming a growing focus for main vendors such as **HCL**, HP and Intel. Typical features suited for Indian conditions include the ability to be operated on a 2V battery or to withstand extreme weather and dust. More recently, there has also been fast-paced development in the low-priced end of the tablet market as manufacturers look to produce devices with broad-based appeal among poorer consumers.

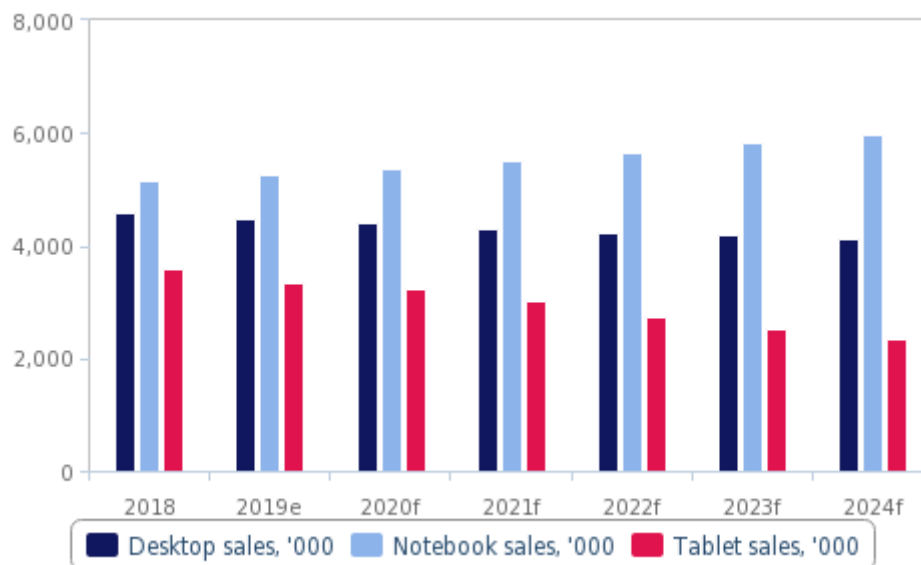
Lenovo Overtakes HP As Leading Vendor
India - PC Market Share, % (Q319)



Source: IDC

- The education and government sectors, among others, still have significant demand for desktops, while growing PC penetration in lower-tier cities should help to maintain demand for some time to come. The education sector represents a significant potential segment of PC demand. It has been estimated that of India's 1.3mn schools, only around 14% have access to ICT, defined as having at least one PC for each school.
- Tapping into this low penetration translates to a huge opportunity for PC vendors, even relative to other emerging markets in APAC. The disparity between PC penetration of below 5% and mobile phone penetration of over 70% is striking. Another driver is that 45% of India's population is under 25, which should boost PC and IT usage as living standards rise.
- Vendors are looking at government schemes in order to boost their sales. Initiatives such as the Digital India programme will fuel long-term demand for IT hardware. The roadmap for a private government cloud also bodes well for vendors as the government looks set to continue heavy investment in hardware and services in order to boost its efficiency and effectiveness in reaching out to more Indian citizens.

PC Volume Forecast
India - PC Volume Forecast (2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: National sources, Fitch Solutions

Tablets

- Tablet sales continued to decline in 2018 and 2019 as volumes shrank owing to competition from large screen smartphones ('phablets'), saturation of the core market, and a lengthening replacement cycles among existing users. Despite positive headway made by low-cost vendors into the tablet market through manufacturing incentives, there is limited growth potential in the market.
- India stands out as one of the few global tablet markets where Apple is not the market leader in terms of installed base - and in fact trails behind the Android ecosystem. Apple faces a threat, not only from its main global rival **Samsung**, but also from PC market leaders now targeting tablet growth (including Acer, Lenovo, **ASUS** and Dell) and more recently from low-cost vendors targeting the emerging market opportunity in India, such as **iBall** and **Datawind**.

Audio-Visual

AV SALES (INDIA 2018-2024)							
Indicator	2018	2019e	2020f	2021f	2022f	2023f	2024f
Audio visual sales, USDmn	18,015.36	18,970.18	19,956.63	20,974.42	22,023.14	23,124.29	24,280.51
Audio application sales, USDmn	3,343.20	3,270.96	3,108.23	2,963.48	2,845.09	2,784.06	2,793.08
Video application sales, USDmn	14,672.16	15,699.22	16,848.40	18,010.94	19,178.05	20,340.24	21,487.43
Flat-panel TV set sales, '000	14,456.38	15,714.08	17,034.07	18,413.83	19,850.10	21,338.86	22,875.26
Digital camera sales, '000	2,439.72	2,327.70	2,222.96	2,125.15	2,033.76	1,948.35	1,868.46

e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

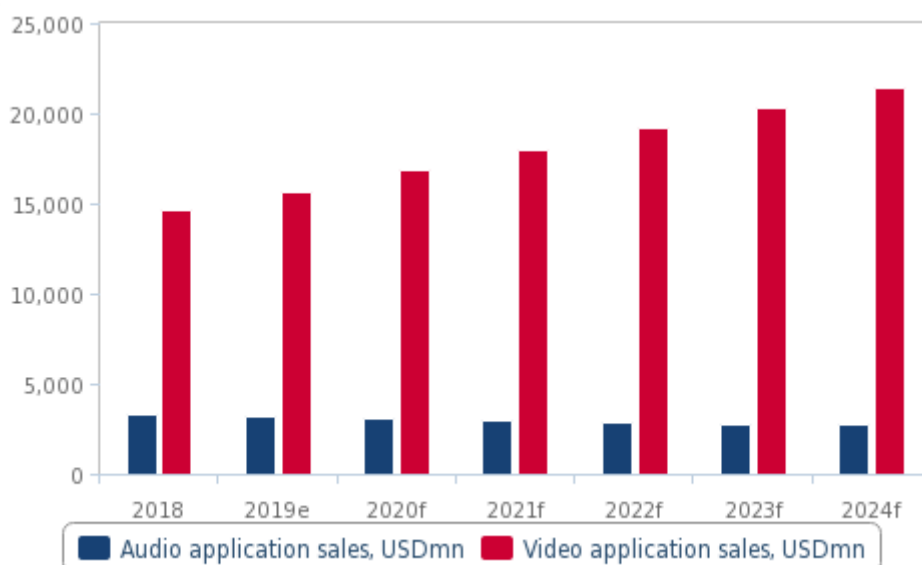
Audio-visual sales in India increased in 2018 and 2019, although the pace of growth slowed in 2019. We expect household income growth is expected to drive LCD/LED market expansion over the medium term and will far outweigh the negative outlook for digital camera sales. We believe that TV set vendors in India will benefit by tapping into the low penetration of LCD/LED TV sets and support an overall AV market value. While lower-to-middle income households will focus on procuring low-cost panels, the middle-to-high income segments will be keen on upgrades to larger and higher resolution screens.

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TV Sets And Accessories

- The penetration of TV sets in India is relatively low as ownership is not ubiquitous as is the case in most of developed APAC. The remaining non-TV owning households are primarily centred in the lowest income and rural areas of the country. We see strong opportunities for sales of LCD/LED models; while a segment of the market will be driven by upgrades to higher resolution models, the bulk of the market will be driven by first-time buyers and first-time upgrades of older TV sets to newer LCD/LED variants.
- Household TV set penetration is estimated at less than 60%, indicating the scale of the first-time buyer opportunity, which will be supplemented by a large replacement market, particularly among high-income urban households. LCD/LED volumes only surpassed the CRT market in 2013, underlining the Indian TV set market's status as a regional and global laggard.
- This underdevelopment means the market still has considerable potential, unlike much of the Asia Pacific region where even the flat-panel opportunity is saturated. As in much of the world, sports events are a major upgrade/replacement catalyst. In India, sales are driven by the Indian Premier League cricket competition that provides a significant boost to TV sales, with vendors reporting that sales of flat-panel TV sets double during the cricket season each year. There is also a regional dimension to our TV set market forecast, with underpenetrated tier 2 and tier 3 cities expected to outperform in the LCD/LED market.

AV: Demand
India - AV Demand (2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

- While the prices of some emerging products, such as OLED and HD TV sets, may be prohibitive for many relatively affluent Indian consumers, we forecast a more rapid uptake for smart TV sets with internet connectivity. Data from IDC suggests that smart TVs produced by **Xiaomi** were the largest vendor of smart TVs in the third quarter of 2019, with **Samsung** and **LG** trailing with shares of 14% and 13% respectively. The market leader announced in October 2019 that it was planning to expand its TV manufacturing capabilities in India; it stated that all models are currently manufactured in India, with the exception of its newly-launched 65-inch model.
- An up and coming driver in the more affluent segment of the population will be the launch of IPTV services. In particular, Indian telco **Reliance Jio** is launching a pay-TV product, and most recently, in February 2020, consolidated its media interests into a single entity, aiming to improve its presence in the market. Its aggressive price points could lead to an uptake of IPTV subscriptions and boost sales of TV sets. As its introductory offer, Jio also gave out free LED TVs for subscribers who took up high value plans. There were 69.3mn direct-to-home (DTH) subscribers by the end of September 2019.

Digital Cameras

- The Indian digital camera market was affected by cannibalisation by smartphones before incomes had risen to the point where ownership would become widespread. Therefore the decline in volumes was relatively modest compared to developed economies, but there was still a weakening of the market for dedicated devices among casual users as smartphone camera capabilities improved to be strong substitute products.

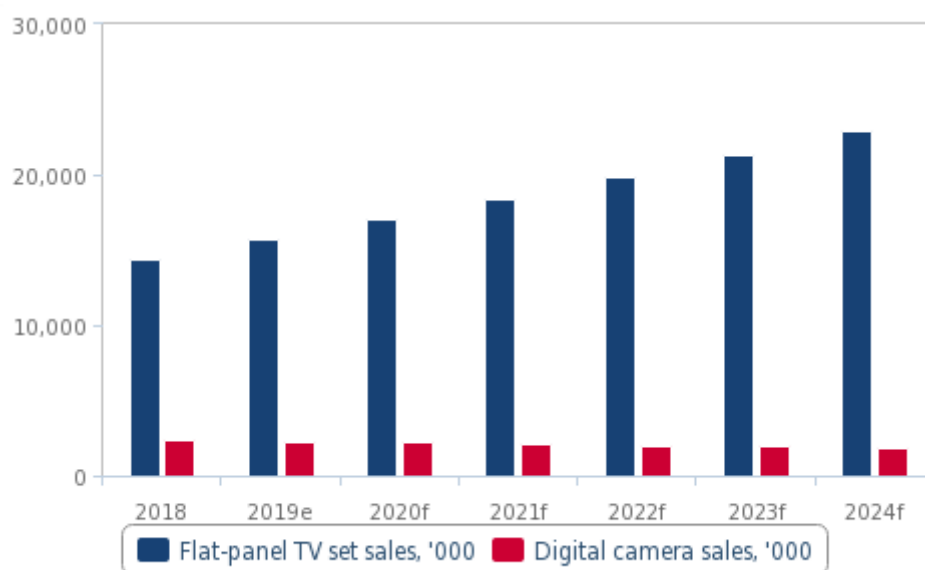
Games Consoles

- The games console market is relatively small in India, with low levels of ownership for both consoles connected to a TV set and for handheld devices. The reason for a small legacy of console gaming is that they are unaffordable for the vast majority of households, and because of a greater role for PC and online gaming in the local culture.

Audio

- Audio separates, such as radios, MP3 players, speakers and CD players, are the biggest audio category, and soundbars to accompany flat-screen TVs are a rapidly growing segment of the market, though limited to high-income households and thus a relatively small addressable market in India.
- Radios remain the dominant electronic source of information and entertainment in rural India with annual unit sales at still more than 5mn. The popularity of portable devices, such as smartphones, tablets and laptops, has undermined the demand for home AV devices and MP3 players, particularly in urban areas.
- An emerging area of sales is in smartphone complimentary audio, such as headphones and wireless speakers. However, this market is still low-value in per capita terms, given the relatively lower levels of disposable income. At the same time, many Indians continue to use the headphones/speakers that come bundled with the primary device purchase.

AV: Demand Key Products
India - Demand For Key AV Products (2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

Mobile Devices

MOBILE COMMUNICATIONS (INDIA 2018-2024)							
Indicator	2018	2019e	2020f	2021f	2022f	2023f	2024f
Mobile handset sales, USDmn	22,170.20	24,409.39	26,557.42	28,549.23	30,576.22	32,655.40	34,778.00
Mobile handset sales, '000	314,988.02	323,177.71	330,287.62	337,223.66	343,630.90	349,472.63	354,714.72
Smartphone sales, USDmn	20,350.42	22,731.42	25,072.76	27,379.46	29,542.43	31,787.66	34,108.16
Smartphone sales, '000	170,688.64	192,024.55	205,484.41	227,103.48	249,121.35	271,794.17	295,029.05

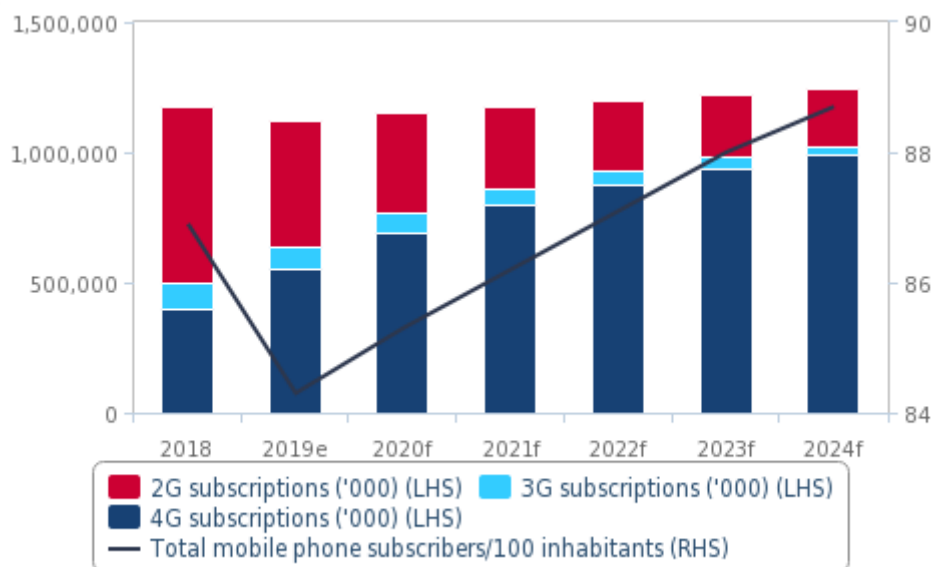
e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

The Indian handset market continued to grow in 2020, underpinned by strong sales of low-cost smartphones. We hold a positive view of market growth moving forward, given the robust foundations put in place for medium-term development of the market. Domestic assembly and manufacture continued as the government doubled down on its 'Make in India' industrial initiative. We believe a combination of local industry development and rising incomes makes India a leading global opportunity owing to its laggard status in terms of low penetration of smartphones, which we estimate reached roughly 30% by the end of 2019.

Mobile Subscription Trends

- India will witness strong organic growth in mobile subscriptions, even toward the long term as mobile penetration still far from the 100% mark. Sustained price competition has made services affordable to the mass public, and operators have been driving subscription growth through the sale of cheap smartphones and featurephones. However, multi-SIM ownership inflates the true level of mobile penetration in the market, although the regulator and operators engage in periodic deactivations of inactive SIM cards. The Telecoms Regulatory Authority of India (TRAI) reported 1.15bn mobile connections by the end of 2019. By the end of 2024, we expect the number of subscriptions to surpass 1.27bn.
- In December 2019, all three private mobile operators raised tariffs on their services as they sought to increase their margins to fund investments into their mobile networks and fibre backhaul. Operators have expressed keenness to maximise revenue from high-value subscribers through bundling as well as loyalty programmes, such as giving out free over-the-top (OTT) video subscriptions to high-value customers. 3G continues its rapid decline as subscribers latch on to LTE services.

Industry Trends - Mobile
(2018-2024)

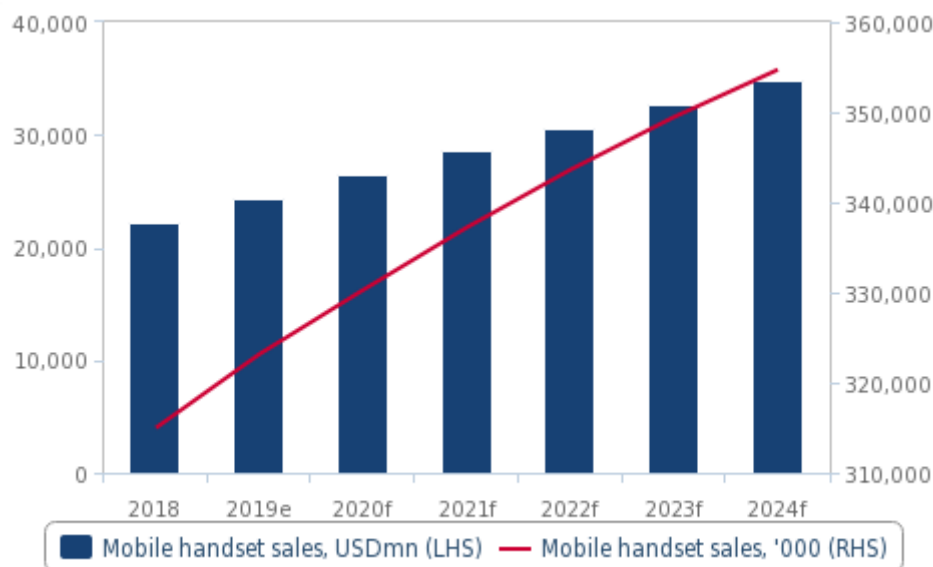


f = Fitch Solutions forecast. Source: Operators, TRAI, Fitch Solutions

Total Handset Market

- Total handset sales jumped in 2019, with value growth underpinned by an increase in average selling prices (ASPs), and an increasing share of smartphones in the sales mix. The continuation of the trend of large numbers of smartphone buyers entering the market will sustain value growth over the medium term, though price competition could see the boom lose momentum at lower penetration rates than elsewhere in Asia Pacific.
- As noted, the primary driver of value growth in the handset market over the medium term will be the increased share of smartphones in the device sales mix, but there will also be growth in total handset volumes as operators expand mobile services to new areas of the country.
- In terms of volume growth, smaller cities represent the largest target for handset vendors in the Indian market. Two-thirds of India's population reside in rural parts of the country, and vendors are expanding and strengthening their logistics networks and retail partnerships.
- In order to expand network coverage vendors must tailor their strategies to the fact that rural subscribers are typically price-sensitive and voice-centric, and this means entry-level handsets will continue to dominate featurephones. Aggressive tactics by local manufacturers mean that low-priced phones are increasingly feature-rich, and often come with cameras, dual-SIM, extended battery life and other features.
- The focus on the rural market has placed a premium on made-for-India features, such as 30-day battery backup, choice of languages, solar charge capability, dust-proof lamination and high-decibel speakers.

Mobile Handsets: Demand
India - Mobile Handset Demand (2018-2024)

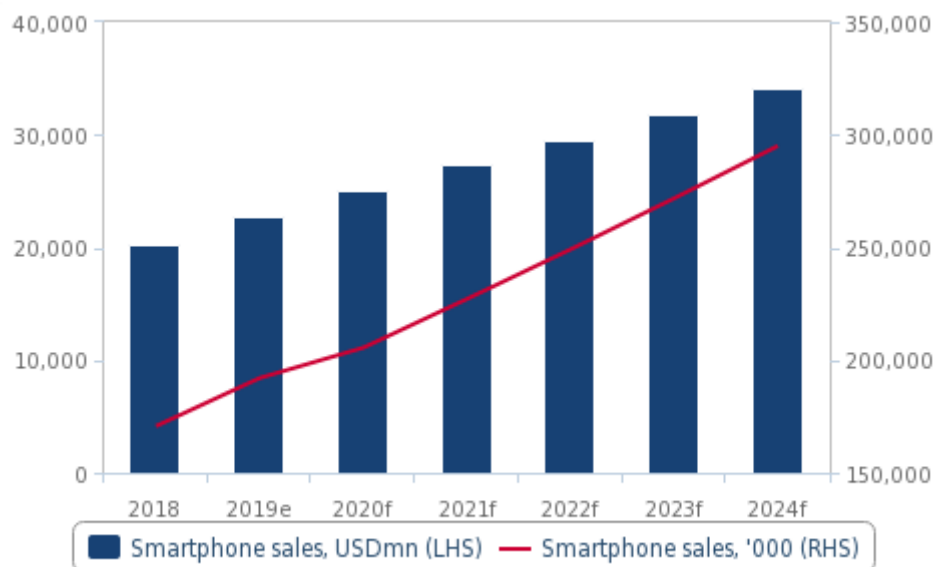


e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

Smartphones

- Despite stagnating growth in other parts of the world, smartphone sales in India remained robust. We view that the Indian smartphone market continues to be driven by Chinese and Indian brands, together with South Korean vendor **Samsung**. Sales are skewed toward the low end of the market, with sub-USD150 phones being a popular category for consumers. Locally-produced smartphones, primarily assembled in India with imported components (though this dependence is declining) are gaining in popularity. Market leader **Xiaomi** produces most of its handsets in India, while Samsung's single largest smartphone assembly facility is in the country. The large expansion in the supply of low-end smartphones will continue to catalyse an expansion in volumes.
- Despite the positives, we believe the Indian smartphone boom will not provide the same level of returns to vendors as earlier booms in other markets. This is because of low incomes compared with other emerging markets, the intensity of competition between the first wave of global smartphone vendors, Chinese vendors seeking growth outside their saturated local market and Indian brands.
- We forecast that the smartphone market will continue to exhibit strong volume growth in India over the coming years. The replacement smartphone market will continue to expand driven by rising volumes and value. The standout feature of the Indian smartphone market will, however, be the continued supply of first-time buyers, which we expect will decline only marginally.

Mobile Handsets: Smartphones
India - Smartphone Sales (2018-2024)



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

- Competition at the low end of the Indian smartphone market will be heavily centred on the Android ecosystem, extending a trend that has already seen an erosion of the share of featurephone devices. However, sales of featurephones which feature the **KaiOS** have proved to be popular, given its ability to run mobile apps such as **WhatsApp**, **YouTube** and **Facebook**. The Jiophone and Jiophone 2 featurephones sold by **Reliance Jio** runs on KaiOS.
- Besides Android and KaiOS, there is, however, little space for rival OSs in the market. Samsung last reported selling 1mn Tizen-powered smartphones in India in H115 by targeting featurephone to smartphone migrating consumers, however, it has since launched only a few new Tizen-powered phones into the Indian market.
- Nonetheless, it will be Android partner vendors that drive price erosion through a combination of ecosystem, vendor and production initiatives. Android One and Android Go models have been popular in India given their relatively lower technical requirements to run, and fast access to the latest Android updates. In recent years, Xiaomi, for one, has launched several Android One and Android Go models catered specifically to India.
- Large vendor investments in local production will also play a role in increasing the supply of low-cost smartphones. Companies such as **Lava** and **Micromax** have in recent years ramped up investments into new manufacturing facilities in the country. Apple, through original design manufacturers (ODMs) **Foxconn** and **Wistron** have also increased investment in the country, and in late-2019 began assembling iPhone XRs in India, as well as older iPhone models.

Industry Trends And Developments

Key View: Escalating trade tensions between China and the US will benefit India as electronics vendors are considering shifting their production lines on the Chinese mainland to low-cost production bases. India, which boasts centralised access to some of the region's key markets, a substantial labour pool, and a large, underpenetrated domestic market has already attracted some investments, with several contracts manufacturers including Foxconn pledging to expand their capacity in the country. Currently, however, manufacturing is focused mostly in low-value items, such as basic components and parts, as well as assembly. Price sensitivity remains a sticking factor as disposable incomes remain low, and this has kept sales of electronics skewed toward lower-value products.

Consumer Electronics Trade

- Electronic components have historically run to a negative trade balance owing to the location of precision fabrication and research and development facilities in developed Asian markets, such as South Korea, Japan and Taiwan.
- China is the largest export market in emerging Asia Pacific and is trailed - at some remove - by Malaysia, Vietnam and Thailand. The same three countries also headline the import arena, with China well ahead of its peers.

CONSUMER ELECTRONICS TRADE (INDIA 2013-2018)						
	2013	2014	2015	2016	2017	2018
Trade Balance (USDmn)						
IT Hardware	-5,315.3	-5,331.3	-6,055.3	-5,438.0	-6,059.7	-6,792.1
Electronic Components	-3,138.4	-2,577.9	-3,969.1	-5,293.2	-7,209.0	-10,817.5
AV	-2,004.1	-1,941.8	-2,182.3	-2,224.7	-2,760.4	-3,820.1
Telecommunications	-5,504.5	-9,128.1	-11,500.6	-9,759.2	-14,242.0	-10,631.9
Total	-15,962.3	-18,979.1	-23,707.4	-22,715.0	-30,271.1	-32,061.6
Exports (USDmn)						
IT Hardware	298.0	219.2	226.3	133.7	166.2	224.6
Electronic Components	471.2	443.4	371.7	336.5	383.5	501.9
AV	415.8	349.5	284.7	259.7	221.0	230.4
Telecommunications	3,192.4	1,113.1	535.2	744.5	523.7	1,310.9
Total	4,377.5	2,125.3	1,417.8	1,474.5	1,294.4	2,267.8
As A % Of National Exports	1.30	0.67	0.54	0.57	0.44	0.70
Imports (USDmn)						
IT Hardware	5,613.3	5,550.6	6,281.6	5,571.7	6,225.9	7,016.7
Electronic Components	3,609.7	3,021.4	4,340.8	5,629.7	7,592.5	11,319.4
AV	2,419.9	2,291.3	2,467.1	2,484.4	2,981.5	4,050.4
Telecommunications	8,696.9	10,241.2	12,035.8	10,503.7	14,765.8	11,942.8

	2013	2014	2015	2016	2017	2018
Total	20,339.8	21,104.4	25,125.3	24,189.5	31,565.5	34,329.4
As A % Of National Imports	4.36	4.59	6.43	6.78	7.11	6.76

Source: Trade Map, Fitch Solutions

- India's consumer electronics trade deficit of USD32.06bn in 2018, the highest on record. In that year, the demand for imported products increased across the board, particularly in the electronic components segment. We believe that this is due partly to greater local manufacturing efforts undertaken by global and domestic OEMs, as part of the 'Make In India' initiative promoted by the Modi government.
- The weakening of the Indian rupee (relative to the US dollar) through the course of 2018 also made India's low-cost manufacturing potential even more alluring, especially for US-based OEMs.
- Across all categories, exports increased on a y-o-y basis. Again, we view that this is a result of many OEMs shifting their manufacturing bases to India, motivated by import tariffs on electronics components, as well as from tax breaks and subsidies provided as part of the Make in India initiative.
- The export of telecommunications products, which includes mobile handsets and smartphones, surged by a substantial 150.3% y-o-y in 2018. We believe that this is due to greater investments by major smartphone vendors to begin producing in India. **Samsung** for one launched its largest smartphone facility in Noida in 2018. We expect this number to continue surging as more OEMs outline their plans for expanding their India presence; reportedly, international contract manufacturer **Foxconn** is investing into growing its assembly capabilities in the country. Local media reports in February 2019 further suggest that **ZTE** is studying plans to begin manufacturing handsets in India.
- Overall, domestic production is insufficient to meet local demand, with India needing to rely on production in other major manufacturing hubs in Asia, namely in Vietnam and China to meet the demands of the large, domestic market.

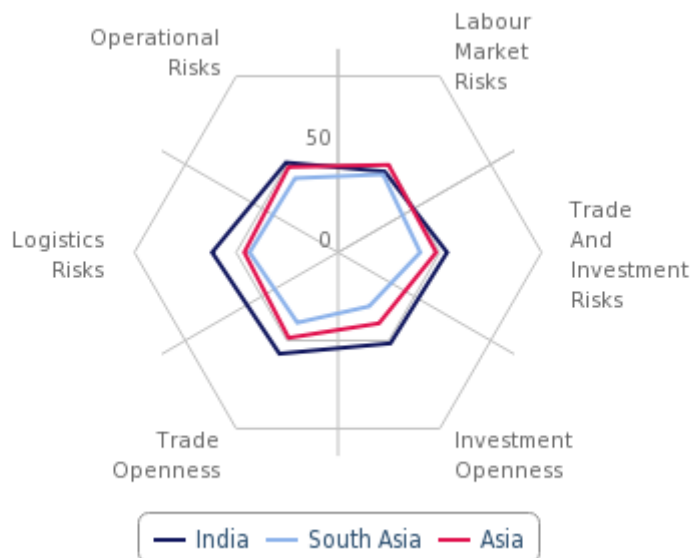
Industry Analysis

India's electronics hardware industry is small in comparison with the country's huge software and services industry. Data from the government suggests that electronic hardware production amounted to INR3.9trn (USD59bn) in FY17/18 (year ending March 2018). The market had continued growing despite the economic slowdown. Major product categories include mobile handsets, wireless equipment - especially base transceiver stations - and set-top boxes.

Apart from 'Make in India', the government has also introduced the draft National Policy on Electronics (NPE) in October 2018, in an effort to boost the competitiveness of the domestic CE industry. The plan aims to create a USD400bn electronics manufacturing industry by 2025. Besides that, in September 2018, the government exempted a total of 35 machine parts from basic custom duties in order to boost domestic mobile handset production. The government has also introduced a phased manufacturing programme (PMP) aimed at adding more smartphone components under the Make in India initiative, by imposing a 10% import duty and a 1% surcharge on imported components. The laws are due to become effective in January 2020.

However, India continues to suffer from a number of macroeconomic and political risk shortcomings that impact on its attractiveness as an investment destination for multinational players. For example, the fluid regulatory regime makes it difficult for companies to evaluate the risks relating to the buying of land, leasing of real estate, employing staff and anticipating changes to the taxation and licensing regimes. The mutable tax and employment laws are among the biggest obstacles to doing business in India and manufacturing is particularly exposed; however, India's infrastructure and logistics sectors are developing rapidly and the country scores above the regional average with regard to Logistics Risks, Trade Openness and Investment Openness. Bribery and corruption are rife, and this weighs on the country's attractiveness regarding Trade and Investment risks.

Operational Risk Scores In Regional Perspective
India vs Regional Operational Risk Scores (2019)



Note: Scores out of 100, with higher scores indicating lower risks. Source: Fitch Solutions

Computer Hardware

- India imports almost all of its computer hardware; the value of imports totalled a staggering USD7.02bn in 2018, while exports amounted to meagre USD225mn. The country represents a huge sales opportunity for global vendors and OEMs.
- However, as the majority of consumers have low disposable incomes, price sensitivity will be acute for the foreseeable future, particularly following the introduction of a new goods and services tax (GST) in July 2017, the removal from circulation of low-value banknotes traditionally used to pay for low-cost devices and the use of biometrics to prove consumers' identities.
- An increased emphasis on local production is welcomed, but most of the available subsidies have so far focused on getting PCs into schools, universities and the healthcare sector, so mass market demands for PCs will still need to be met externally. Estimates suggest that government purchases account for at least 10% of annual PC sales.

Components And Parts

- The components sector runs at a trade deficit, with a new record of USD10.2bn recorded in 2018, almost double the deficit seen in 2016. It should be noted that much of the volumes imported into the country are incorporated into part-assembled or finished goods that are then re-exported to multinational vendors and OEMs, or sold domestically. Components are increasingly being used outside mainstream consumer electronics, for example in heavy industrial machinery and automobiles. Expansion in those sectors would lead to a surge in both import and export volumes.
- However, many OEMs have stated that manufacturing electronics in India is not competitive as the country still lacks an established components supply chain. The imposition of tariffs for electronics components without the presence of a reliable domestic supply chain could hinder the ability for OEMs to produce in India.

AV

- AV accounts for nearly one third of India's consumer electronics industry. This is not surprising, considering the low penetration of LCD/LED TV sets, falling prices spurred by growing imports and high levels of demand among the swelling middle classes for access to sport-related programming and content.
- At the same time, interactive and social media elements are being incorporated into Indian programming, and consumers are increasingly coming to regard a TV set as a home entertainment hub. Increased local production of TV sets through the Make In India initiative should help drive down prices and boost sales.

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Telecommunications

- The manufacture of communications equipment has grown in importance in recent years as a number of indigenous OEMs have emerged with very low-cost products with relatively advanced features. However, the market is still skewed toward foreign players, namely Samsung and Chinese brands such as **Xiaomi**, **Vivo** and **ZTE**.
- The rapid rollout of 4G networks and services acted as a boost to sales of smartphones imported from Asian markets such as Vietnam and China, though the domestic smartphone segment is growing rapidly. Demand is still skewed toward devices supporting multiple SIM cards, with mobile users generally holding on to multiple prepaid SIMs to take advantage of periodic operator promotions.
- Numerous Indian OEMs have thrived, including **Micromax**, **Karbonn**, **Datawind** and **Lava** which have quickly gained traction in the Indian market, displacing traditional brands such as **Nokia** and **BlackBerry**. The local players are themselves under threat from China-based manufacturers, which offer devices with comparable specifications at very low prices.

Competitive Landscape

Indian Consumer Electronics Companies

Karbonn

Karbonn was founded in March 2009 as a joint venture between the **Jaina Group** and the **UTL Group**. The Jaina Group was originally established in 1991 as a distributor of home appliances and branched out into the distribution of mobile handsets in 1995. The UTL Group was established in the 1980s and is a leading Indian telecoms company with interests ranging from manufacturing to services and distribution. Karbonn manufactures mobile handsets and computer tablets, including the current Karbonn Smart+ range. The company's products are sold in more than 85,000 retail outlets across India with over 17 partners and are supported by more than 870 service centres.

In February 2019, Karbonn began production at its Tirupati plant in Andhra Pradesh, following its November 2015 announcement that it would invest INR2bn in the new facility. The plant has a workforce of 1,000 employees and occupies a space of 100,000sq ft, with an annual production capacity of 1mn handsets. The facility was initially expected to begin operations in September 2016 with an initial 2,000 employees and handset capacity of 500,000 per month. By early 2018, the company was offering 10 different smart TV models. Karbonn plans to offer 200 complimentary movies to its TV users, which they can watch through a special app on Karbonn's Smart TV. It first launched its range of smart TVs in Q316, with three screen sizes: 32-inch, 40-inch, and 52-inch.

In July 2016, Karbonn set up a new facility at Bawal, Haryana. This was the company's second facility in India, the other being Noida. The new facility has 22 assembly lines capable of manufacturing around 30mn devices annually and employs around 4,000 people. At launch, the facility was manufacturing 1.5mn units per month, with the aim of further ramping up production. The facility makes both Karbonn and **Panasonic** devices.

Lava

Lava was established in India in 2009 and within three years had consolidated its position among the top three mobile handset companies in the country. The company has also expanded into tablet computers and has established a research and development centre in India and abroad. Lava is reportedly looking to diversify beyond mobile handsets and plans to manufacture other connected devices, including smart TVs, Internet of Things products and wearable devices. Lava aims to achieve annual production capacity of 200mn units by 2022-2025.

Lava has a wide product portfolio that encompasses tablets, feature phones and smartphones, having various models in bar and touch form factor at multiple price points to suit all categories of consumers. Specific brands include the ETAB series of tablets, the IRIS series of Android-based smartphones, the Discover series of internet-enabled touch phones, the Spark series of premium bar phones and the ARC & KKT series of feature-rich budget phones.

In August 2019, Lava's parent **InOne Smart Technology** announced the launch of the **HTC** Wildfire X in India, after the company purchased rights to the Taiwanese brand in India. The handset will be launched as a **Flipkart** exclusive, and will start at a price of INR9,999 (USD140). In June 2017, Lava moved into the PC market when it launched the Helium 14 notebook, manufactured in partnership with **Microsoft** and **Intel**. The Windows 10-powered laptop was priced at INR14,999 (USD235) at launch and was initially sold exclusively on the **Flipkart** e-commerce platform before being made available through selected retail stores.

Micromax

Micromax started as an IT software company in 2000, working on embedded platforms. By 2008 it had entered the mobile handset business and by 2010 had become the largest Indian domestic mobile handset company. Micromax has built up a three-tier distribution network in India which extends across 65 super distributors, 1,500 micro distributors and over 100,000 retailers. Micromax also has a chain of exclusive retail outlets which are owned by third party partners. The company also has a presence in Bangladesh, Nepal, Sri Lanka, the Maldives, the UAE, Saudi Arabia, Kuwait, Qatar, Oman, Afghanistan and Brazil. Micromax Informatics' revenue in the financial year ended June 2017 (FY17) was INR56.61bn (INR98.26bn in 2015-16), down by 42% y-o-y. Notably, the company's revenue almost halved in the past two fiscal years; in 2014/15 it was INR104.50bn.

Micromax has struggled in recent years to compete in India's mobile market, as low-cost Chinese vendors have flooded the market. Furthermore, Micromax had underestimated the uptake rate of 4G technology in India and did not successfully position itself to capitalise on market growth trends. Micromax was one of the top mobile sales brands in the country in Q115 and its downwards slide began soon after, when Chinese offerings in the under-USD150 price range started being seen as extremely superior to their products. Several sources suggest that the company had a share of under 1% by the end of 2018, highlighting the challenges faces by the manufacturer.

Micromax markets an extensive range of more than 60 smartphones, featurephones, tablets and AV products, such as TVs and hi-fi equipment. In June 2017, Micromax moved to a dual-brand strategy, selling Micromax-branded devices only via physical retail outlets and Yu-branded devices via online-only stores. The new Yu Yureka Black was launched exclusively on Flipkart in early June 2017. The move is part of Micromax's strategy to compete more aggressively with low-cost Chinese devices sold by **Itel**, **Oppo** and **Xiaomi** and to circumvent the impact of demonetisation and the removal from circulation of low-value banknotes favoured by low- and mid-range device buyers. Micromax announced in December 2015 that it would invest INR3bn (USD44.74mn) by mid-2016 to set up three new manufacturing plants in Rajasthan, Telangana and Andhra Pradesh. The investment was expected to increase domestic production and reduce dependence on Chinese imports. The new facilities commenced operations over the course of 2016.

In Q118, the company stated that it would diversify into other segments of the Indian consumer electronics industry as mobile market competition heats up significantly and thwarts the revenue base. The company announced an INR200 (USD27.5mn) investment fund over the next 18 months to expand its air cooler, washing machine and refrigerator line-up.

Retailers

Electronics

The growing popularity of online retail is likely to have an adverse effect on conventional electronics retailers. Price advantage and fast deliveries are luring Indian customers, and some bricks-and-mortar players are reconsidering their plans. **Croma**, a subsidiary of **Tata Group**, is shelving plans for an aggressive nationwide expansion and is planning to focus on growing in the locations where it already operates its 120 stores across 25 cities. **Reliance Digital**, the largest physical retailer of consumer electronics and household appliances in India, is proceeding with its business model, which includes a widespread store expansion. The firm currently operates close 357 stores across 166 cities.

Smartphone sales buoy the electronics retail business and encourage retailers to focus on this particular product segment, striking deals with manufacturers and seeking ways to diversify the offering. The government's move to further relax foreign direct investment limits on single brand retail (SBRT) and the removal of local sourcing requirement norms will further benefit international smartphone vendors, such as **Apple**, to open up their own retail stores — a much-coveted prospect for global conglomerates, which have been hit by consumption slowdown in China.

SELECT ELECTRONICS RETAILERS

Company	Parent/owner	Sub-sector	Revenues	Employees	Stores	Notes
Croma	Infiniti Retail (TATA)	Home appliances, electronics	INR32.6bn (2014/15)	na	120	na
NEXT Retail	Private	Home appliances, electronics	na	na	na	na
Reliance Digital	Reliance Industries	Home appliances, electronics	na	na	357	na
e-zone	Future Group	Electronics	na	na	na	na
Viveks	Private	Home appliances, electronics	na	na	na	na
Lotus	Private	Home appliances, electronics	na	na	na	na
Terminal	Salora Retail Ventures	Home appliances, electronics	na	na	na	na
Vijay Sales	Private	Electronics	na	na	na	na

na = not available/applicable. Source: Company information, Trade press, Fitch Solutions

E-Commerce

India has a thriving e-commerce segment, which is projected to be the third largest in Asia, worth a forecast USD66.3bn in 2019 and rising up to USD92.1bn by 2022, an annual average growth of 14.1% annually between 2018 and 2022. The e-commerce sector has been the main change in India's retail market in recent years. Due to limitations on the activity that international retailers are allowed to undertake in the market, e-commerce has been driven by local firms such as Flipkart and **Snapdeal**. Many Indian brick-and-mortar retailers are also entering the e-commerce segment because of the high mobile penetration in the country. Online retailers are increasingly targeting this market with m-commerce websites. Retailers involved in this area include Snapdeal, **Myntra** and **Voonik**.

The government's regulations on e-commerce have, however, relaxed somewhat. Foreign direct investment (FDI) has been permitted in business-to-business online retail, but in November 2015 the government relaxed FDI requirements across 15 industries, and in August 2019, the government introduced plans to allow foreign single-brand retailers to sell online even without the presence of a physical store. This will be a boon to foreign electronics vendors, such as **Apple**, who had to sell its products through third-party retailers in India.

The opportunities versus the challenges is seeing the opportunities win out in India's e-Commerce sector, with international majors choosing to navigate the country's market, as it is just too big to ignore. The US retailer **Walmart**, for example, acquired a majority stake of 77% in domestic retailer Flipkart for USD16bn in May 2018. This puts Walmart head-to-head with its rival **Amazon** in India, with the latter entering India in 2013 and announcing in June 2018 that it would pump a further USD2bn into its India operations to strengthen its foothold, having already committed USD5bn to the market. The company is planning to use part of the investments to construct more fulfilment centres to support growing sales.

Domestic 'bricks and mortar' companies are also realigning their strategies to include a focus on e-Commerce. Amazon's entry has been particularly challenging for local e-commerce company Flipkart, easily the most successful Indian start-up company in terms of fund-raising, valuation and employment creation. To better compete in the e-commerce sphere, Flipkart had been in talks to acquire Snapdeal, but the talks fell through in August 2017. Other players in the e-commerce market include Patym, whose largest investor is Alibaba, which invested USD200mn in March 2017.

SELECT ONLINE RETAILERS AND E-COMMERCE MARKETPLACES

Company	Majority Owner	Sub-Sector	Notes
Flipkart	Walmart (77%)	General	Walmart acquired a 77% stake in Flipkart for USD16bn in May 2018.
Snapdeal	Jasper Infotech Pvt	General	Investors include Alibaba, Foxconn, and Softbank.
Shopclues	Clues Network Pvt	General	Investors include Singapore's GIC.
Amazon India	Amazon	General	In August 2019, Amazon was in talks to acquire a stake in Reliance Retail.

na = not available. Source: Company information, Trade press, Fitch Solutions

Regional Overview

Computer Hardware

The computer hardware competitive landscape was, by 2018, relatively settled in each product category, reflecting the maturity of the PC, peripherals, server and storage markets that had already consolidated globally into small group of vendors.

There was, however, a wide divergence in performance depending on what product category was the primary exposure. Vendors with exposure to the strong demand for server and storage solutions in 2018 recorded the fastest growth rates for computer hardware revenue growth, such as integrated hardware vendors **Dell EMC, HPE** and **Lenovo**. **Oracle's** hardware business was the relative underperformer in the server and storage category, reflecting the fact its hardware sales were tied to its software and cloud solutions, and so did not benefit to the same extent from the wider build out of capacity by firms and datacentre providers to meet demand for online content and cloud services. Other vendors to benefit from strong server and storage demand in 2018 were Chinese vendors **Huawei** and **Inspur Electronics**, which were not yet global leaders but were major players in the Chinese market. Another trend not captured in the performance of the largest vendors was of contract manufacturers having a growing role in the supply of bespoke server and storage solutions direct to large web services firms.

Another positive trend was demand for higher priced premium notebooks in the Windows ecosystem for both the consumer and commercial markets, which contributed to Dell, HP and Lenovo's 2018 revenue growth. Meanwhile **ASUS** and **MSI** capitalised on growing demand for gaming PC hardware, and this trend also boosted monitor spending through a shift in the sales mix towards desktops. The exception to this trend was **Apple's** computer hardware revenues that declined slightly in calendar year 2018, but this was partly due to product release cycles and performance is expected to improve in 2019 as new Mac and iPad products trigger consumer upgrades.

The clear underperforming product category in 2018 was again printer and copiers. The leading vendors were Japanese vendors **Canon, Ricoh, Seiko Epson, Kyocera** and **Brother** - and HP. These vendors continued to be impacted by the shift to mobile that has resulted in declining use of printing by home and office users, as well as the greater longevity of printing hardware that meant print supplies (not included as a computer hardware revenue) were of increased strategic importance.

COMPUTER HARDWARE

Company	HQ	Products	Financial Performance 2018*				
			Group Revenue	Group Operating Profit (loss)	Computer Hardware as % of Group Revenue	APAC Revenue (group)	Group Employees (year end)
Dell	US	PCs, Monitors, Servers, Storage	89,660	- 376	89%	na	145,000
HP	US	PCs, Printers	58,601	3,955	77%	12,306	55,000
Apple	US	PCs	261,612	67,970	17%	91,082	132,000
Lenovo	China	PCs, Monitors, Servers, Storage	49,966	1,114	87%	21,050	54,000
Canon	Japan	Printers & Office Equipment	35,792	3,106	43%	16,847	195,056
Ricoh	Japan	Printers & Office Equipment	18,458	- 800	54%	9,048	97,878
ASUS	Taiwan	PCs	11,755	563	70%	5,407	17,000
Acer	Taiwan	PCs, Monitors	8,041	124	87%	3,056	7,046
Seiko Epson	Japan	Printers & Office Equipment	9,938	639	66%	4,889	76,391
IBM	US	Servers, storage	79,590	12,191	8%	17,106	350,600
Fujitsu	Japan	Servers, Storage, PCs	36,115	1,944	18%	26,605	140,365
Microsoft	US	PCs	118,459	38,884	4%	na	131,000
TPV Technology (AOC)	Hong Kong	Monitors	9,148	190	56%	2,796	27,811
Cisco Systems	US	Servers, storage	50,639	13,450	8%	8,102	74,200
HPE	US	Servers, storage	30,852	3,091	13%	7,096	60,000
Micro Star International	Taiwan	PCs, peripherals	3,934	222	100%	905	13,000
Oracle	US	Servers, storage	39,424	13,383	9%	6,380	137,000
Kyocera	Japan	Printers & Office Equipment	14,916	390	23%	9,585	75,940
Brother Industries	Japan	Printers & Office Equipment	6,347	700	52%	2,735	38,620

*calendarised financials. na = not available. Source: Bloomberg, Fitch Solutions

Audio-Visual

The audio-visual market includes TV sets, set-top boxes, digital cameras and camcorders, audio equipment, and games consoles. TV set vendors featured heavily in the list of largest AV vendors by revenue again in 2018 because it is the highest value product category, with the leading brands from South Korea, China and Japan. The only vendors headquartered outside APAC among the largest AV vendors in 2018 were set-top box specialists **ARRIS International** and **Technicolour**.

Samsung Electronics is the largest AV vendor globally, and in each separate region - a position built mainly on its market leading share of LCD TV set sales, but also its range of audio products. Its main TV set rivals globally are **LG Electronics**, which took a lead in the high-end OLED market after pioneering the technology that helped to boost the profitability of its Home Entertainment division early in 2018, but through the rest of the year LG's TV set performance weakened due to challenges in emerging markets due to currency headwinds. The other diversified global AV brand is **Sony**, which reported mixed results at the product level - with a volume and revenue contraction in its TV set business, as well as a fall in PlayStation hardware revenues after the PS4 Pro upgrade cycle softened, all of which was only partially offset by growth in audio device revenues.

The broad trend for AV vendor financial performance was negative in US dollar terms in 2018 due to weaker global conditions in the TV set market, with only four companies recording y-o-y increases in AV revenues. These were Samsung as it benefited from growth in high-end Ultra-HD TV set sales and its **Harman** auto audio equipment business that it acquired in 2017. Meanwhile, the Chinese TV set vendors **TCL Multimedia** and **Changhong** achieved growth through international expansion, for instance, TCL reported gains from its globalisation strategy that targeted expansion in North America, Europe, India, Russia and South America with its range of TV sets that spanned affordable, smart and 4K models. The other vendor to grow AV revenues in 2018 was Japan's Canon that in terms of AV products is a digital camera specialist - and its growth was driven by its stronger presence in the mirrorless camera market and its expanded range of new category cameras, for instance durable and auto capture cameras.

The other Chinese TV set vendors were also following strategies of geographic and product diversification as a result of domestic pressures where the TV set market was saturating in volume terms and there was intense price competition. **Skyworth** was expanding into emerging markets such as India where it has targeted 6% market share by 2021 by challenging the big three brands in LG, Samsung and Sony, and **HiSense** also reported strong growth in its overseas business in 2018 and then announced investments in new chips in 2019 to improve image quality and AI functionality.

AUDIO-VISUAL DEVICE VENDORS

Company	HQ	Products	Financial Performance 2018* (USDmn)				
			Group Revenue	Group Operating Profit (loss)	AV as % of Group Revenue	APAC Revenue (group)	Group Employees (year end)
Samsung Electronics	South Korea	TV Sets, Audio	221,631	53,538	14%	100,037	309,630
Sony	Japan	TV Sets, Games Consoles, Audio, Digital Cameras	76,802	7,517	30%	37,883	128,400
TCL Multimedia	Hong Kong	TV Sets	17,018	444	99%	na	26,814
LG Electronics	South Korea	TV Sets, Audio	55,770	2,458	26%	28,076	73,773
Canon	Japan	Digital Cameras	35,792	3,106	17%	16,847	195,056
ARRIS International	United States	Set-top boxes	6,743	179	58%	431	7,900
Skyworth	China	TV Sets, Set-top boxes	4,420	139	87%	2,298	36,000
TPV Technology (AOC)	Hong Kong	TV Sets	9,148	190	40%	3,087	27,811
HiSense Electric	China	TV Sets	5,244	55	na	na	21,006
Changhong	China	TV Sets, Set-top boxes	12,508	203	25%	na	55,149
Nikon	Japan	Digital Cameras	6,505	609	42%	na	21,029
Technicolour	France	Set-top boxes	4,698	- 143	56%	564	17,745
Ricoh	Japan	Digital Cameras	18,458	- 800	9%	9,048	97,878

*calendarised financials. na = not available. Source: Bloomberg, Fitch Solutions

Mobile Handsets

There was mixed performance for the largest mobile handset vendors in 2018, the net result of which was a further concentration of the competitive landscape. Apple further strengthened its position atop the global smartphone market where the iPhone has long had an unassailable position as the leading device for developed markets and affluent customers in emerging markets. Financial performance for Apple's iPhone business improved in calendar year 2018 due to its success in upselling higher priced models to its base of existing iPhone owners, which allowed for revenue growth despite volumes being almost flat y-o-y. In 2019 Apple does however face challenges because unit price increases are an unsustainable growth engine, meaning its iPhone revenue generation will ultimately have to regress towards the volume trend, and there are additional pressures such as potential loss of share in China in the event of further escalation in geopolitical tensions.

This risk for Apple relates to what is the most important smartphone market development for 2019: the addition of Huawei to the US Commerce Department's Bureau of Industry and Security Entity List, which effectively blocked the sale of US technologies to Huawei, such as logic and RF chips, including Huawei's HiSilicon Kirin chips because they are based on **ARM** architecture. The situation is still live because there is potential for the Huawei measures to be rescinded depending on the progress of high-level US-China relations, which would allow Huawei to resume activities, but with competing interests involved in high-level government negotiations it is not possible to make predictions about the outcome. That said, there are conclusions to be drawn for Huawei if the US measures are not rescinded, because while it could adjust supply chains for most hardware components, the loss of **Google's** suite of Android services (maps etc) would be a critical blow to its smartphone aspirations outside of China where it has been so successful since 2016.

The potential blow to Huawei's smartphone business outside of China could be a boost to other Android partner vendors that faced several years of declining market share and revenues. Samsung was still the Android market leader in revenue terms in 2018, and its wide range of devices and geographic footprint position it well to capitalise on any international retrenchment of Huawei's business. Meanwhile, LG Electronics and Sony experienced sharp declines in USD denominated smartphone revenue in 2018 of around 30%, and so would welcome the reprieve from intense price competition. They do however lack the scale of Samsung, and as a result of streamlined product ranges towards premium models in order to improve profitability, they are not optimally positioned to take advantage Huawei's challenges.

The other major smartphone market vendors globally are the **Oppo** and **Vivo** brands (part of **BBK**), **Xiaomi** and **Transsion Holdings** (owner of the **TECNO**, **itel** and **infinix** brands). These Chinese vendors are all engaged in strategies of international expansion, though with different emphases. Oppo and Xiaomi are expanding in Western Europe, and Xiaomi already had success in Spain since launching in 2017 with a strategy of disruptive pricing on mid-range models. This pricing strategy - accompanied by marketing and channel investments - could also be successful in capitalising on Huawei losses in the emerging markets of Europe, Latin America and APAC where it was highly successful 2015-2018. Meanwhile, Transsion's geographic focus has always been Africa and more recently frontier APAC economies, where it sells low-cost smartphones and sub-USD10 featurephones, and 2019 will be an important year for the business's development through a listing on the Shenzhen stock exchange and investment in manufacturing operations in Africa.

MOBILE HANDSET VENDORS								
Company	HQ	Products	Financial Performance 2018* (USDmn)					
			Group Revenue	Group Operating Profit (loss)	Mobile as % of Revenue	Smartphone Unit Sales (mn)	APAC Revenue (group)	Group Employees (year end)
Apple	US	Smartphones	261,612	67,970	64%	218	91,082	132,000
Samsung	South Korea	Mobile Phones, Smartphones	221,631	53,538	40%	295 (1)	100,037	309,630
Huawei	China	Mobile Phones, Smartphones	105,191	10,689	45%	206	55,965	188,000
Oppo (BBK)	China	Mobile Phones, Smartphones	na	na	na	120 (1)	na	40,000
Vivo (BBK)	China	Mobile Phones, Smartphones	na	na	na	103 (1)	na	40,000
Xiaomi	China	Smartphones	26,463	10,689	70%	121 (1)	na	16,683
LG Electronics	South Korea	Mobile Phones, Smartphones	55,770	2,458	13%	41	28,076	73,773
Lenovo	China	Mobile Phones, Smartphones	49,966	1,114	13%	38.3 (1)	21,050	54,000
Transsion (TECNO/itel/infinix)	Hong Kong	Mobile Phones, Smartphones	na	na	100%	124 mobiles/17mn smartphones	na	na
Sony	Japan	Smartphones	76,802	7,517	6%	7	37,883	117,300

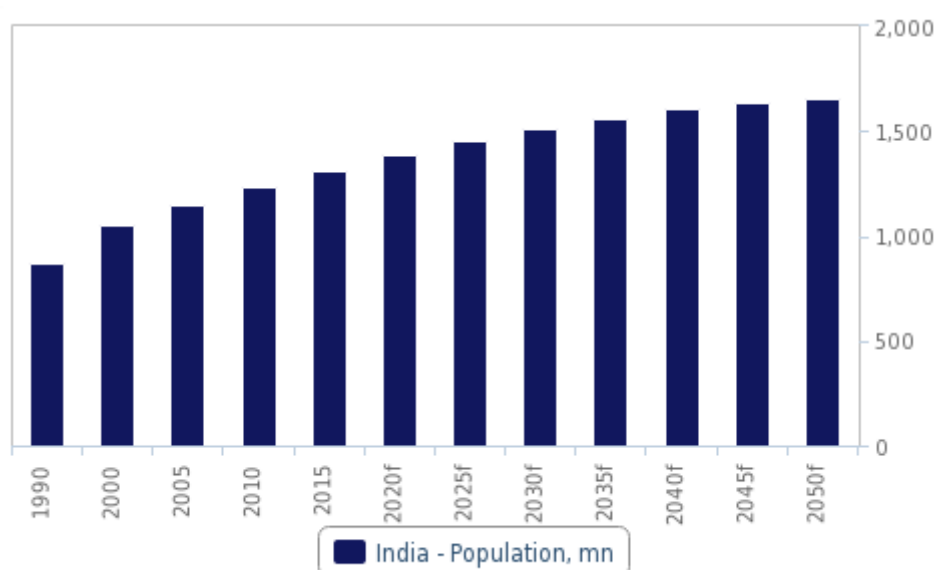
*calendarised financials. (1) Counterpoint Research estimates. na = not available. Source: Bloomberg, Fitch Solutions

India Demographic Outlook

Demographic analysis is a key pillar of our macroeconomic and industry forecasting model. Not only is the total population of a country a key variable in consumer demand, but an understanding of the demographic profile is essential to understanding issues ranging from future population trends to productivity growth and government spending requirements.

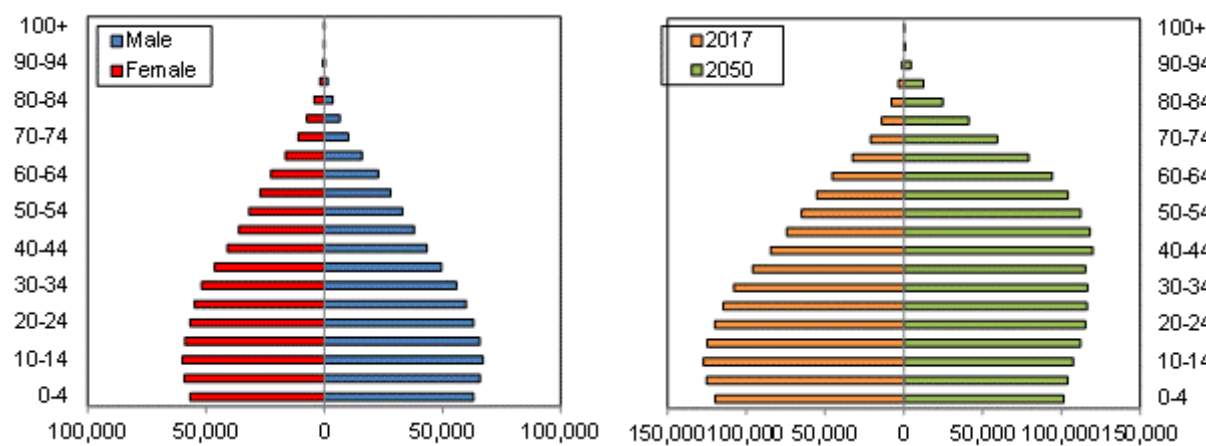
The accompanying charts detail the population pyramid for 2017, the change in the structure of the population between 2017 and 2050 and the total population between 1990 and 2050. The tables show indicators from all of these charts, in addition to key metrics such as population ratios, the urban/rural split and life expectancy.

Population
(1990-2050)



f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

India Population Pyramid
2017 (LHS) & 2017 Versus 2050 (RHS)



Source: World Bank, UN, Fitch Solutions

POPULATION HEADLINE INDICATORS (INDIA 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, total, '000	870,133.5	1,053,050.9	1,144,118.7	1,230,980.7	1,309,054.0	1,383,197.8	1,451,829.0
Population, % y-o-y		1.79	1.60	1.38	1.17	1.06	0.92
Population, total, male, '000	450,351.8	545,513.6	593,062.0	638,471.9	678,564.3	716,370.8	750,945.2
Population, total, female, '000	419,781.7	507,537.3	551,056.7	592,508.8	630,489.7	666,827.0	700,883.8
Population ratio, male/female	1.07	1.07	1.08	1.08	1.08	1.07	1.07

na = not available; f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

KEY POPULATION RATIOS (INDIA 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Active population, total, '000		506,787.4	640,951.0	714,450.9	787,765.4	860,127.6	924,931.8
Active population, % of total population		58.2	60.9	62.4	64.0	65.7	66.9
Dependent population, total, '000		363,346.1	412,099.9	429,667.7	443,215.3	448,926.4	458,265.9
Dependent ratio, % of total working age		71.7	64.3	60.1	56.3	52.2	49.5
Youth population, total, '000		330,035.9	365,773.8	375,114.2	380,274.3	375,144.9	367,656.9
Youth population, % of total working age		65.1	57.1	52.5	48.3	43.6	39.7
Pensionable population, '000		33,310.2	46,326.1	54,553.5	62,940.9	73,781.5	90,609.0
Pensionable population, % of total working age		6.6	7.2	7.6	8.0	8.6	9.8

na = not available; f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

URBAN/RURAL POPULATION & LIFE EXPECTANCY (INDIA 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Urban population, '000	222,293.0	291,347.6	334,483.1	380,742.3	428,675.9	481,117.7	537,713.9
Urban population, % of total	25.5	27.7	29.2	30.9	32.7	34.8	37.0
Rural population, '000	647,840.5	761,703.3	809,635.6	850,238.4	880,378.1	902,080.1	914,115.1
Rural population, % of total	74.5	72.3	70.8	69.1	67.3	65.2	63.0
Life expectancy at birth, male, years	57.6	61.8	63.7	65.5	66.9	68.0	68.9
Life expectancy at birth, female, years	58.3	63.4	65.4	67.8	69.9	71.2	72.3
Life expectancy at birth, average, years	57.9	62.6	64.6	66.6	68.3	69.5	70.5

na = not available; f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

POPULATION BY AGE GROUP (INDIA 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, 0-4 yrs, total, '000	121,428.3	127,607.0	129,579.4	128,484.5	121,415.3	121,159.4	119,816.8
Population, 5-9 yrs, total, '000	110,807.1	121,411.4	125,145.4	127,614.1	126,977.1	120,218.7	120,170.1
Population, 10-14 yrs, total, '000	97,800.4	116,755.4	120,389.4	124,175.7	126,752.5	126,278.9	119,654.8
Population, 15-19 yrs, total, '000	87,840.7	108,712.4	115,756.7	119,374.5	123,333.2	125,968.4	125,615.6
Population, 20-24 yrs, total, '000	78,210.5	95,727.8	107,329.6	114,279.5	118,180.3	122,132.7	124,926.0
Population, 25-29 yrs, total, '000	70,106.2	85,444.2	94,266.5	105,700.7	112,808.8	116,799.3	120,907.7
Population, 30-34 yrs, total, '000	61,928.5	75,843.0	84,075.5	92,780.9	104,208.0	111,446.5	115,568.0
Population, 35-39 yrs, total, '000	54,262.3	67,792.4	74,495.7	82,611.9	91,299.5	102,748.2	110,062.5
Population, 40-44 yrs, total, '000	41,674.2	59,512.3	66,349.5	72,951.7	81,035.7	89,703.0	101,127.5
Population, 45-49 yrs, total, '000	35,366.1	51,500.3	57,843.4	64,566.1	71,137.6	79,154.5	87,783.4

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Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, 50-54 yrs, total, '000	31,357.5	38,644.9	49,414.4	55,647.7	62,322.6	68,807.6	76,722.5
Population, 55-59 yrs, total, '000	25,924.8	31,529.5	36,310.1	46,656.3	52,822.1	59,315.4	65,652.5
Population, 60-64 yrs, total, '000	20,116.7	26,244.2	28,609.4	33,196.2	42,979.8	48,856.2	55,049.4
Population, 65-69 yrs, total, '000	14,429.9	19,615.8	22,530.0	24,805.3	29,092.7	37,882.7	43,274.6
Population, 70-74 yrs, total, '000	9,531.4	13,158.1	15,537.5	18,064.0	20,166.1	23,845.6	31,254.1
Population, 75-79 yrs, total, '000	5,488.6	7,733.7	9,324.3	11,184.5	13,255.6	14,965.9	17,850.9
Population, 80-84 yrs, total, '000	2,656.8	3,839.6	4,664.9	5,740.6	7,128.7	8,582.6	9,785.7
Population, 85-89 yrs, total, '000	911.1	1,479.8	1,850.2	2,305.2	3,000.5	3,803.2	4,628.4
Population, 90-94 yrs, total, '000	249.9	417.9	531.5	686.3	917.5	1,224.1	1,567.7
Population, 95-99 yrs, total, '000	37.8	72.2	103.2	137.2	193.6	265.8	357.1
Population, 100+ yrs, total, '000	4.8	9.0	12.0	17.9	26.8	39.0	53.9

na = not available; f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

POPULATION BY AGE GROUP % (INDIA 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, 0-4 yrs, % total	13.96	12.12	11.33	10.44	9.28	8.76	8.25
Population, 5-9 yrs, % total	12.73	11.53	10.94	10.37	9.70	8.69	8.28
Population, 10-14 yrs, % total	11.24	11.09	10.52	10.09	9.68	9.13	8.24
Population, 15-19 yrs, % total	10.10	10.32	10.12	9.70	9.42	9.11	8.65
Population, 20-24 yrs, % total	8.99	9.09	9.38	9.28	9.03	8.83	8.60
Population, 25-29 yrs, % total	8.06	8.11	8.24	8.59	8.62	8.44	8.33
Population, 30-34 yrs, % total	7.12	7.20	7.35	7.54	7.96	8.06	7.96
Population, 35-39 yrs, % total	6.24	6.44	6.51	6.71	6.97	7.43	7.58
Population, 40-44 yrs, % total	4.79	5.65	5.80	5.93	6.19	6.49	6.97
Population, 45-49 yrs, % total	4.06	4.89	5.06	5.25	5.43	5.72	6.05
Population, 50-54 yrs, % total	3.60	3.67	4.32	4.52	4.76	4.97	5.28
Population, 55-59 yrs, % total	2.98	2.99	3.17	3.79	4.04	4.29	4.52
Population, 60-64 yrs, % total	2.31	2.49	2.50	2.70	3.28	3.53	3.79
Population, 65-69 yrs, % total	1.66	1.86	1.97	2.02	2.22	2.74	2.98
Population, 70-74 yrs, % total	1.10	1.25	1.36	1.47	1.54	1.72	2.15
Population, 75-79 yrs, % total	0.63	0.73	0.81	0.91	1.01	1.08	1.23
Population, 80-84 yrs, % total	0.31	0.36	0.41	0.47	0.54	0.62	0.67
Population, 85-89 yrs, % total	0.10	0.14	0.16	0.19	0.23	0.27	0.32
Population, 90-94 yrs, % total	0.03	0.04	0.05	0.06	0.07	0.09	0.11
Population, 95-99 yrs, % total	0.00	0.01	0.01	0.01	0.01	0.02	0.02
Population, 100+ yrs, % total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

na = not available; f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

Consumer Electronics Methodology

Industry Forecast Methodology

Fitch Solutions' industry forecasts are generated using the best practice techniques of time-series and causal/econometric modelling. The precise form of model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined.

Common to our analysis of every industry is the use of vector autoregressions, which allow us to forecast a variable using more than the variable's own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA).

In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases, we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

We mainly use OLS estimators and in order to avoid relying on subjective views and encourage the use of objective views, we use a 'general-to-specific' method. Fitch Solutions mainly uses a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock', for example poor weather conditions impeding agricultural output, dummy variables are used to determine the level of impact.

Effective forecasting depends on appropriately selected regression models. Fitch Solutions selects the best model according to various different criteria and tests, including but not exclusive to:

- R2 tests explanatory power; adjusted R2 takes degree of freedom into account;
- Testing the directional movement and magnitude of coefficients;
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value);
- All results are assessed to alleviate issues related to auto-correlation and multi-collinearity.

Fitch Solutions uses the selected best model to perform forecasting.

Human intervention plays a necessary and desirable role in all our industry forecasting. Experience, expertise and knowledge of industry data and trends ensure that analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

Sector-Specific Methodology

Consumer Electronics forecasting is complicated due to the fragmented nature of the market, with little transparency of vendor data and low apparent agreement between many sets of figures in terms of market definition, base and methodology. Individual variables taken into account in creating each forecast include:

- Economic context, and GDP and demographic trends;
- Technological developments, and diffusion rates;
- Underlying demand trends;
- Telecommunications market developments

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- Projected GDP share of industry;
- Maturity of market structure;
- Regulatory developments and government policies;
- Exogenous events.

Estimates for each industry segment are calculated using government statistics, where available, and our own macroeconomic and demographic forecasts.

Sources

Sources used in electronics reports include national ministries, statistics agencies, ICT regulatory bodies, national industry associations, officially released company results and figures and international and national industry news.

Risk/Reward Index Methodology

Fitch Solutions' proprietary Risk/Reward Index (RRI) provides a comparative regional ranking system evaluating the ease of doing business and the industry-specific opportunities and limitations for potential investors in a given market. The RRI system divides into two distinct areas:

Rewards: Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may inhibit its development. This is further broken down into two sub categories:

- Industry Rewards (this is an industry-specific category taking into account current industry size and growth forecasts, the openness of market to new entrants and foreign investors, to provide an overall score for potential returns for investors)
- Country Rewards (this is a country-specific category, and the score factors in favourable political and economic conditions for the industry)

Risks: Evaluation of industry-specific dangers and those emanating from the state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period. This is further broken down into two sub categories:

- Industry Risks (this is an industry-specific category whose score covers potential operational risks to investors, regulatory issues inhibiting the industry and the relative maturity of a market)
- Country Risks (this is a country-specific category in which political and economic instability, unfavourable legislation and a poor overall business environment are evaluated to provide an overall score).

We take a weighted average, combining industry and country risks, or industry and country rewards. These two results in turn provide an overall Risk/Reward Index, which is used to create our regional ranking system for the risks and rewards of involvement in a specific industry in a particular country.

For each category and sub-category, each state is scored out of 100 (100 being the best), with the overall Risk/Reward Index a weighted average of the total score. Importantly, as most of the countries and territories evaluated are considered by Fitch Solutions to be 'emerging markets', our score is revised on a quarterly basis. This ensures that the score draws on the latest information and data across our broad range of sources, and the expertise of our analysts.

Fitch Solutions' approach in assessing the risk/reward balance for infrastructure industry investors globally is fourfold:

- First, we identify factors (in terms of current industry/country trends and forecast industry/country growth) that represent opportunities to would-be investors;
- Second, we identify country and industry-specific traits that pose or could pose operational risks to would-be investors;
- Third, we attempt, where possible, to identify objective indicators that may serve as proxies for issues/trends to avoid subjectivity;
- Finally, we use our proprietary Country Risk Index (CRI) in a nuanced manner to ensure that only the aspects most relevant to the infrastructure industry are incorporated. Overall, the system offers an industry-leading, comparative insight into the opportunities/risks for companies across the globe.

Sector-Specific Methodology

In constructing these indices, the following indicators have been used. Almost all indicators are objectively based.

CONSUMER ELECTRONICS RISK/REWARD INDEX INDICATORS

Rewards

Industry Rewards

Consumer electronics sales, USDmn

Sales per capita, USD

ICT development

Growth, %

Country Rewards

Urban/rural split

Young population

Richest 10%, % of total

GDP per capita, USD

Risks

Industry Risks

Barriers to entry

Government consumer electronics policies

Country Risks

Short-term economic risk

Real PC growth, volatility

Short-term financial risk

Trade bureaucracy

Institutions

Source: Fitch Solutions

Weighting

Given the number of indicators/datasets used, it would be inappropriate to give all sub-components equal weight. The following weighting has been adopted:

WEIGHTING OF INDICATORS	
	Weighting (%)
Rewards	70, of which
Industry Rewards	65, of which
Consumer electronics sales, USDmn	50
Sales per capita, USD	16
ICT development	16
Growth, %	16
Country Rewards	35, of which
Urban/rural split	25
Young population	25
Richest 10%, % of total	25
GDP per capita, USD	25
Risks	30, of which
Industry Risks	40, of which
Barriers to entry	10
Government consumer electronics policies	10
Country Risks	60, of which
Short-term economic risk	10
Real PC growth, volatility	10
Short-term financial risk	10
Trade bureaucracy	10
Institutions	10

Source: Fitch Solutions



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