

2022

Industry Research Report on Indian Electronics Industry



1st Aug 2022

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1. OVERVIEW OF GLOBAL ECONOMY

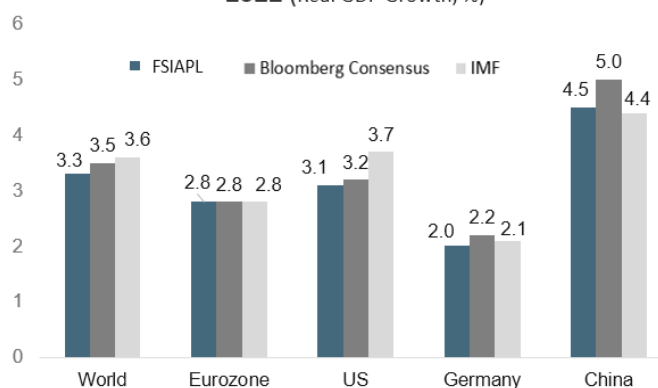
The Global economy is severely impacted because of Russia’s invasion of Ukraine; causing a tragic humanitarian crisis in Eastern Europe; and the sanctions aimed at pressuring Russia to end hostilities. Russia is a major supplier of oil, gas, and metals, and, together with Ukraine, of wheat and corn, the current and anticipated decline in the supply of these commodities has already driven their prices up sharply. Europe, Central Asia, Middle East and North Africa, and sub-Saharan Africa are most affected. The food and fuel price increases will hurt lower-income households globally, including in the Americas and Asia. A severe double-digit drop in GDP for Ukraine and a large contraction in Russia are more than likely, along with worldwide spillovers through commodity markets, trade, and financial channels.

Global economy was on a mending path but had not yet fully recovered from the COVID-19 pandemic, with a significant divergence between the economic recoveries of advanced economies and emerging market and developing ones. In addition to the war, frequent and wider-ranging lockdowns in China, including in key manufacturing hubs, have also slowed activity there and could cause new bottlenecks in global supply chains. Higher, broader, and more persistent price pressures have also led to a tightening of monetary policy in many countries. Overall risks to economic prospects have risen sharply and policy trade-offs have become ever more challenging.

Fitch Solutions India Advisory Pvt. Ltd. (FSIAPL) (erstwhile IRR Advisory Services Pvt. Ltd.) expects the Global economy to grow by 3.3% in 2022. At 3.3%, our forecast for global growth remains below the Bloomberg consensus estimate of 3.5% as well as the IMF's April 2022 forecast of 3.6%. FSIAPL’s growth forecasts was driven primarily by Russia, Germany and China. Central banks continue to tighten policy and Developed Markets

(DMs) are slowly catching up with Emerging Markets (EMs) tightening cycles. FSIAPL expects DM Central banks will start to move more quickly over the coming months and particularly in the US and the eurozone. FSIAPL now forecasts the US Federal Reserve will raise interest rates to 2.0% in 2022.

Global Growth Forecast Edges Slightly Lower To 3.3% In 2022 (Real GDP Growth, %)



Source: Bloomberg, IMF, FSIAPL

In the eurozone, FSIAPL expects the European Central Bank will start to normalise monetary policy and hike interest rates in Q42022.

In China, growth is forecast at 4.5% as a result of lockdowns, which are now impacting about 40% of the Chinese economy. China's zero-Covid policy is unlikely to be eased in the short term and will compound the existing downside pressures stemming from the real estate market and the regulatory clampdown on various sectors, including technology. As a result of the downward revision to Chinese growth, Emerging Asia will no longer be the fastest growing region. It will be overtaken by the Middle East and North Africa, which is benefitting from elevated energy prices as well as prospects for the Iran nuclear deal, which saw FSIAPL revise up Iran's growth forecast from 3.8% to 7.8%.

An overview of the Global Macro Economic projections is given in the table below:

Global Macro Economic Forecasts (2019-2026)

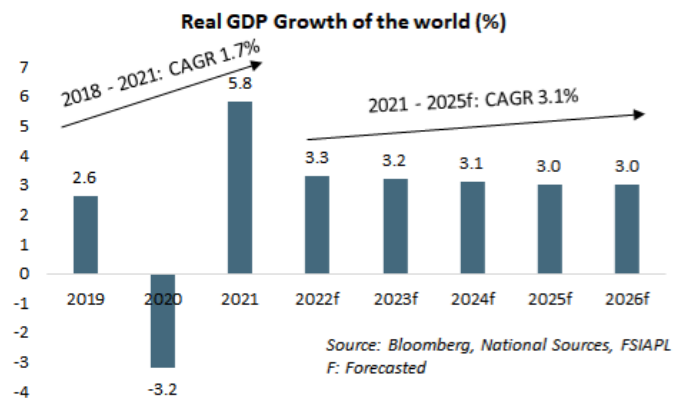
Name of the Country/ Economy	2019	2020	2021	2022f	2023f	2024f	2025f	2026f
Real GDP Growth (%)								
United States	2.3	-3.4	5.7	3.1	2.0	2.0	2.0	2.0
Eurozone	1.6	-6.3	5.4	2.8	2.4	2.0	1.7	1.7
Japan	-0.2	-4.5	1.7	2.3	1.3	1.0	1.0	0.9
China	6.0	2.3	8.1	4.5	5.5	5.4	5.3	5.2
India	6.5	4	-6.6	8.9	7.2	6.4	6.5	6.9
World	2.6	-3.2	5.8	3.3	3.2	3.1	3	3.0
Regionwise Real GDP Growth (%)								
Developed Markets	1.8	-4.4	5.2	3.1	2.1	2.0	1.9	1.9
Emerging Markets	3.7	-1.3	6.7	3.7	4.7	4.7	4.4	4.4
Asia Ex-Japan	5.4	0.3	7.5	5	5.6	5.5	5.4	5.4
Latin America	0.8	-6.6	6.6	1.9	2.2	2.4	2.4	2.5
Emerging Europe	2.9	-2.1	6.2	-3.9	3.5	3.8	2.7	2.3
Sub-Saharan Africa	2.8	-1.9	4.2	3	3.6	3.5	3.6	3.9
Middle East & North Africa	0.3	-3.0	4.2	5.6	4.0	3.7	3.6	3.6
Consumer Inflation (avg)								
United States	1.8	1.2	4.7	6.5	2.5	2.2	2.1	2.2
Eurozone	1.2	0.3	2.6	6.5	2.3	2.0	2.0	2.0
Japan	0.5	0.0	-0.3	0.4	0.8	1.0	1.0	1.0
China	2.9	2.5	0.9	2.7	3.1	2.3	2.3	2.3
India	3.4	4.8	6.2	6.7	5.7	4.8	4.0	4.0
World	2.9	2.8	4.4	6.6	3.9	2.9	2.8	2.8
Interest rates (%)								
Fed Funds Rate	1.75	0.25	0.25	2.00	2.50	2.50	2.50	2.50
ECB Refinancing Rate	0.00	0.00	0.00	0.00	0.75	0.75	1.25	1.25
Japan Overnight Call Rate	-0.10	-0.10	-0.10	-0.10	-0.10	0.00	0.00	0.00
Exchange Rates (avg)								
Eurozone - USD/EUR	1.12	1.14	1.18	1.13	1.16	1.20	1.23	1.24
Japan - JPY/USD	109	106	104	116	117	117	114	114
China - CNY/USD	6.91	6.90	6.45	6.40	6.55	6.68	6.72	6.74
India - INR/USD	70.4	74.10	73.9	78.0	80.0	82.0	84.0	84.0
Oil Prices (avg)								
OPEC Basket (USD/bbl)	64.04	41.47	69.89	113.00	105.00	93.00	87.00	87.00
Brent Crude (USD/bbl)	64.16	43.21	70.95	115.00	110.00	95.00	88.00	88.00

*f=forecasted

Source – Bloomberg, National Sources, FSIAPL

CAGR of the World GDP growth rate in the past and projected CAGR for the next 5 years

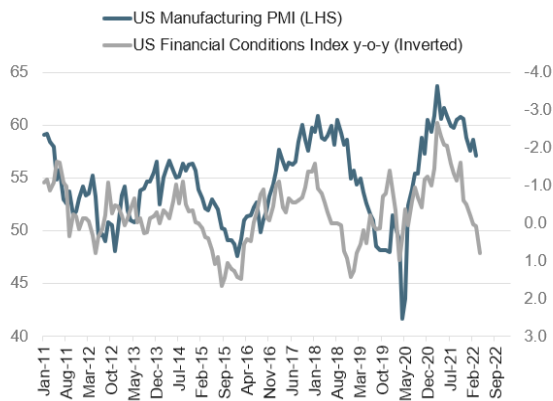
The CAGR growth for the period 2018 – 2021 was low at 1.7% due to degrowth of economies around the world because of global pandemic. Though there are current challenges faced by the global economies like geopolitical issues, high inflation, high oil prices, supply chain factors impacting the growth, the CAGR growth forecasted for the period 2021 – 2026f is 3.1%.



US: Fed to hike interest rates in 2022

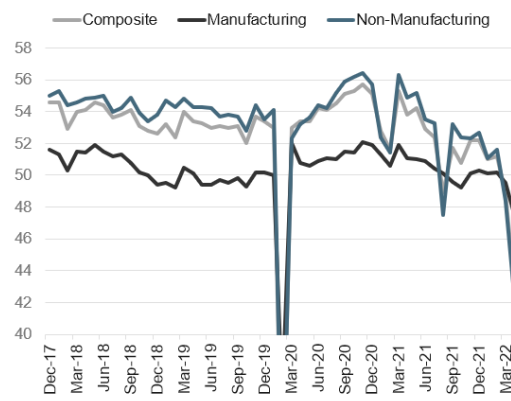
The Federal Reserve said it would increase its benchmark rate by three quarters of a percentage point, pushing its target range from 1.5% to 1.75% - the highest level since 2019. Higher inflation prints, more hawkish messaging by the Fed and continued labour market strength are the main factors behind a faster pace of monetary tightening. FSIAPL expects the US Fed to hike interest rates by a further 150-175 basis points, bringing the Fed Funds rate to 3.0-3.5% by the end of December 2022. Inflation accelerated to 8.6% y-o-y in May 2022 from 8.5% in March 2022. U.S. economy added 390,000 jobs in May 2022, with the unemployment rate holding steady at 3.6% for a third straight month. Moreover, FSIAPL continues to see upside risks to the inflation outlook owing to elevated commodity prices and the ongoing lockdowns in China, which could lead to a slower-than-expected decline in inflation. The Fed has continued to become more hawkish, with an increasing number of Fed Governors calling a faster move towards the 'neutral rate' which they estimate sits between 2.5% and 3.5%. Federal Reserve Bank of St. Louis President James Bullard is among the most hawkish members of the Federal Open Market Committee (FOMC) and has continued to advocate for a much faster pace of tightening. Unless there is a sharp decline in energy and commodity prices, or a large negative growth shock, FSIAPL expects Fed officials will look to front-load hikes and vote for a 50bps hike in the next meeting in order to anchor inflation expectations.

Tightening Financial Conditions in US To Weigh On Activity
US Manufacturing PMI vs Financial Conditions



Source: Bloomberg, FSIAPL

Lockdowns Hitting Chinese Economic Activity Hard
PMI Indices



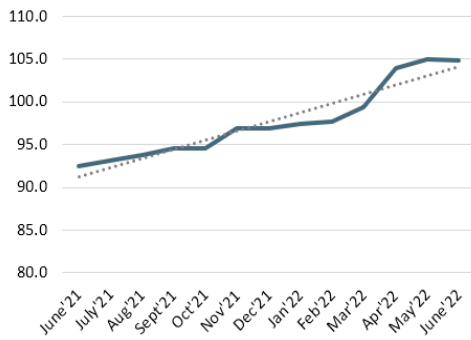
Source: Bloomberg, FSIAPL

The strength in the labour market continues to surprise, with the US economy adding 3,90,000 jobs in May 2022 and the unemployment rate holding steady at 3.6%. FSIAPL expects the unemployment rate to continue to edge lower over the coming months given the still-high level of job openings (11.4 million in April).

Currency risks starting to emerge

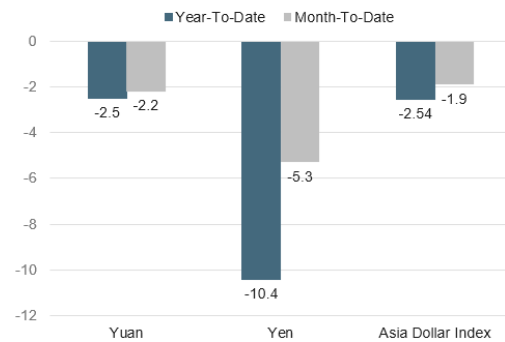
Not all Central Banks are hiking interest rates, and a divergence in monetary policy has been causing significant shifts in currency markets, particularly for the Japanese yen and the Chinese yuan. The Bank of Japan's decision to continue controlling its yield curve has seen spreads between US and Japanese bond yields widen sharply and has put significant downside pressure on the yen. The yen has declined to a 24-year low of ¥135.17 against the dollar. Similarly, as a result of the weakening growth outlook in China, the People's Bank of China has continued to ease monetary policy, which has also led to a narrowing of yield spreads with the US. As a result, the yuan has weakened to 6.75 against US dollar in June 2022. Rising volatility in the yuan could start to put additional pressure on emerging market currencies more broadly, while the combination of yen and yuan weakness could increase Asian policymakers' appetite to engage in a 'competitive depreciation' of their currencies in a bid to offset a loss of competitiveness.

US Dollar Racing Higher, Up over 12% in 12 months
US Dollar Index



Source: Bloomberg, FSIAPL

Yen And Yuan Decline Could Trigger Other Depreciations
Performance vs USD, %

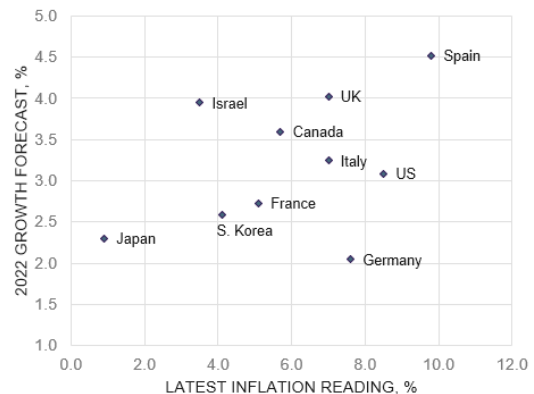


Source: Bloomberg, FSIAPL

Developed Markets: Stagflation risks are rising, lower growth ahead

DMs are facing rising stagflation risks as energy prices surge, weighing on companies and consumers via higher inflation and weaker demand. Worsening consumer sentiment, weakening purchasing power and hawkish central banks could combine to push some DMs into a period of low (or even negative) growth at a time when they are experiencing multi-decade high inflation readings. At the country level, FSIAPL has cut out 2022 forecast for Germany and Italy to 2.0% and 3.2%. FSIAPL has also revised down the growth projections for the US (3.5% to 3.1%), the UK (4.6% to 4.0%), France (3.6% to 2.7%) and Spain (5.4% to 4.5%). Among other major DMs, FSIAPL forecasts lower growth in Japan (2.5% to 2.3%) and South Korea (3.3% to 2.6%).

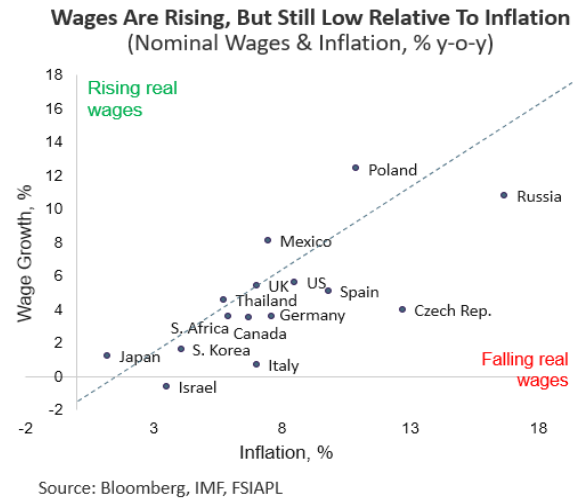
Germany At Risk Of High Inflation And Stagnant Growth
Developed Markets Growth vs Inflation, %



Source: Bloomberg, FSIAPL

Consumer confidence is key to shaping turning points in business cycles, as consumers tend to reduce spending when their confidence in the economy is eroded, with negative growth implications. Looking at the major DMs, French consumers have grown to be the most pessimistic among peers since the start of the Russia-Ukraine conflict, followed by Italian, German and Canadian consumers. By contrast, US and Japanese consumers are moderately pessimistic than they were before the war in Ukraine started. In particular, nominal wages have been struggling to keep up with inflation in Italy and Canada, followed by the US and Germany.

Available wage data show that, despite a tight labour market, inflation continues to outpace nominal wage growth, leading to negative real wage growth. In particular, nominal wages have been struggling to keep up with inflation in Italy and Canada, followed by the US and Germany. In Italy, for example, nominal wages rose by 0.7% y-o-y in February 2022, but in real terms they contracted by 3.2% in the same month, while in Canada real wages declined by 2.6%.



Governments have been implementing measures to (partially) offset the impact of elevated energy prices on consumers. In the eurozone, for example, governments have announced measures totaling between 1.0% and 1.5% of national GDP that have included subsidies to households and business, as well as price caps and cuts to fuel duty. More measures are likely to follow as strong nominal growth has seen tax revenues soar, while creating additional fiscal space.

Emerging Markets: Ukraine crisis prompts recession risks in vulnerable emerging markets

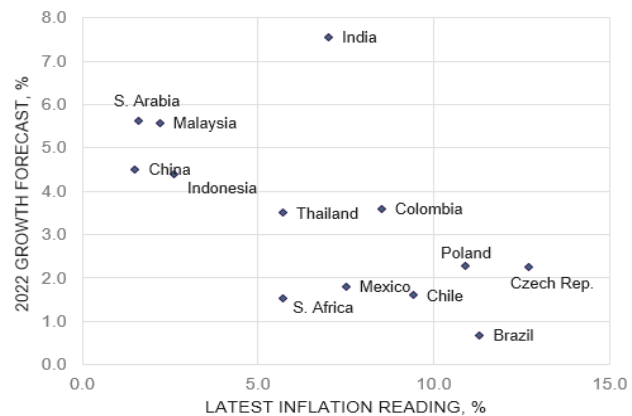
While most major EMs have few direct trade or investment links to Russia or Ukraine, Moscow's invasion will still create significant economic headwinds. FSIAPL expects that the war will result in a period of high food and fuel prices, which will add to elevated inflation and put pressure on balance of payments positions. EM growth is forecasted at 3.7%, and it is believed that risks are weighted to the downside. There are a few EMs that entered 2022 with less momentum and which could be pushed into technical recessions as they are hit by a combination of aggressive monetary tightening, adverse terms of trade and weakening sentiment. For example, in Thailand, South Africa, Brazil, Sri Lanka and Mexico output rose by less than 2.0% y-o-y in the final quarter of 2021. In Thailand and Sri Lanka, activity had already fallen in Q32021.

Even before the Russia-Ukraine war, Sri Lanka was facing a painful economic crunch as a result of balance of payments strains and a shortage of foreign exchange. The economy is facing mounting economic headwinds resulting from an acute shortage of foreign currency, rising inflation and tightening financing conditions. Moreover, the authorities have temporarily halted outstanding debt repayments according to reports by Bloomberg, and this will also dent investor sentiment. These multiple headwinds will weigh on the major sectors of the economy and result in a contraction in output of 0.5% in 2022.

The impact of higher commodity prices on South Africa will be more mixed; the country is a major exporter of coal, iron ore and platinum group metals. However, higher food and fuel prices will hit consumer spending and we forecast that the South African Reserve Bank will hike its key policy rate from 4.25% to 5.25% by the end of the year.

In Brazil, FSIAPL expects growth of just 0.7% in 2022 as the economy faces elevated inflation, increased political risk surrounding the October presidential election and the effects of aggressive monetary policy tightening. Policymakers have already raised the selic rate by 975 basis points since Q12021 and FSIAPL expects that they will raise their key rate from 13.25% to 14.50-15.0% by the end of 2022. This raises the risk of a technical recession at some point in 2022.

Brazil At Risk Of High Inflation And Stagnant Growth
Emerging Markets Growth vs Inflation, %



Source: Bloomberg, FSIAPL

In Mexico, the economy contracted by 0.7% q-o-q in Q32021, and activity stagnated in Q42021. Preliminary figures suggested that output fell in Q42021; the economy only dodged a technical recession when the final figures were updated. FSIAPL expects that the economy will continue to struggle in 2022, posting growth of just 1.8% as a result of slower US demand and an aggressive tightening cycle by the central bank.

The way ahead

The adverse consequences from the current geopolitical conflict are a reminder of the importance of global cooperation. This extends from addressing the immediate needs of war refugees to the eventual great effort to rebuild Ukraine. Multilateral institutions offer a critical safety net, providing emergency liquidity and preventing crises from spreading. On climate, advanced economies must make real progress toward their COP26 climate summit pledges. And as the pandemic is not yet over, Governments must use all tools at their disposal to combat the virus, both by meeting vaccination targets and by ensuring equitable access to tests and treatment.

Economic impact of Covid-19 pandemic on other economies

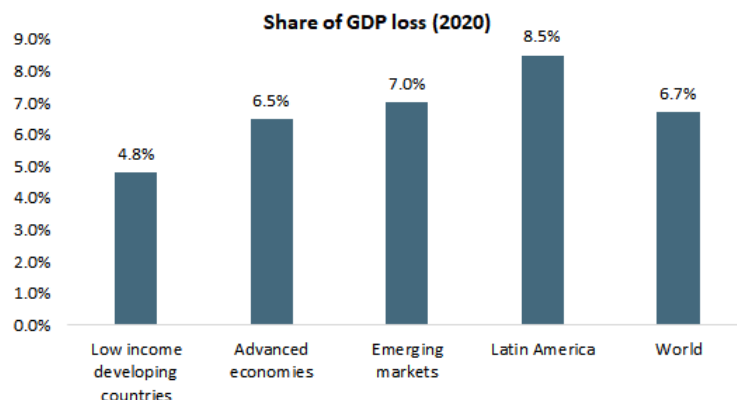
While there is no way to tell exactly what the economic damage from the global COVID-19 coronavirus pandemic is, there is widespread agreement among economists that it had severe negative impacts on the global economy.

Global stock markets have also suffered dramatic falls due to the coronavirus outbreak, although they were able to recover from the losses quite quickly. The Dow Jones reported its largest-ever single day loss of almost 3,000 points on March 16, 2020 – beating its previous record of 2,300 points that was set only four days earlier.

The economic damage caused by the COVID-19 pandemic is largely driven by a fall in demand, meaning that there are less consumers willing to purchase the goods and services available in the global economy. This dynamic could be clearly seen in heavily affected industries such as travel and tourism. To slow the spread of the virus, countries had placed restrictions on travel and many people could not purchase flights for holidays or business trips. This reduction in consumer demand was the reason why airlines lost planned revenue and as a result they had to cut their expenses by reducing the number of flights they operated.

Share of Gross Domestic Product (GDP) lost as a result of the coronavirus pandemic in 2020

In 2020, global GDP declined by 3.4% as a result of the coronavirus pandemic outbreak. As the world’s governments are working towards a fast-economic recovery, the GDP increased again in 2021 by 5.6%. According to the forecast for 2022, global GDP should increase by 4.5% in 2022.

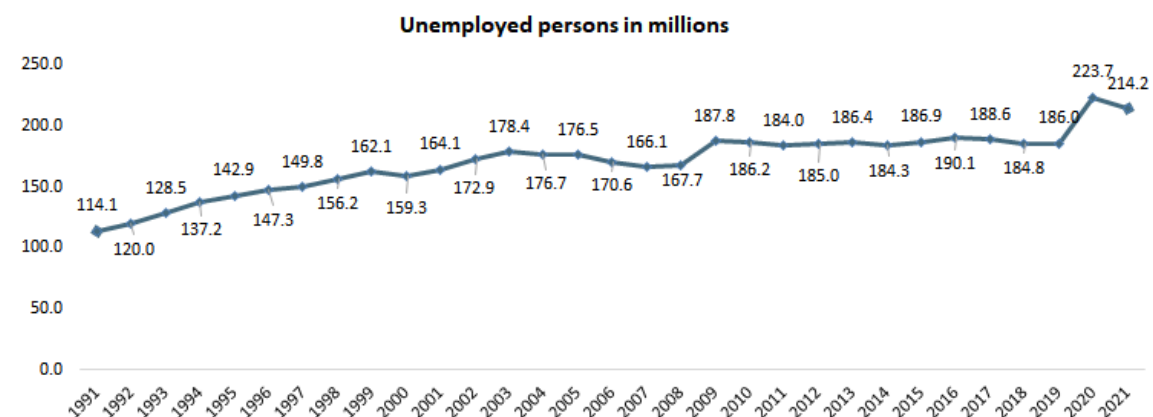


Source: Statista, FSIAPL

Forecasted global real GDP growth due to COVID-19 2019-2023

The coronavirus pandemic, has a significant impact on the global economy. In 2020, global GDP decreased by 3.4%, while the forecast for 2022 was 2.9% GDP growth. As the world’s governments were working towards a fast-economic recovery, the GDP increased again in 2021 by 5.6%. According to the forecast for 2022, global GDP should increase by 4.5% in that year.

Number of unemployed persons worldwide from 1991 to 2021

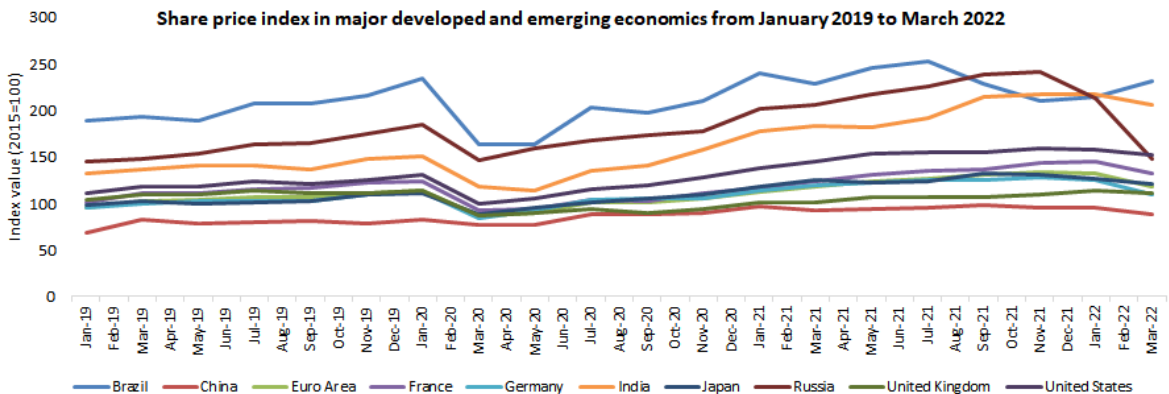


Source: Statista, FSIAPL

Between 2019 and 2020, the number of unemployed people worldwide increased from 185.95 million to 223.67 million, the biggest annual increase in unemployment in this provided time period. In 2021, the number of people unemployed increased slightly to almost 214.21 million. The COVID-19 pandemic hit many industries hard. Lots of people lost their jobs or were forced to reduce their employment radically throughout 2020. As a result, 131 million more people globally were classified as poor, meaning that they lived on two U.S. dollars or less daily.

Share price index in major developed and emerging economies 2019-2022

In the first quarter of 2020, global stock indices posted substantial losses that were triggered by the outbreak of COVID-19. The period from March 6 to 18 was particularly dramatic, with several stock indices losing more than 20 percent of their value. Brazilian and Indian share prices became the highest performing of the major developed and emerging economies as of March 2022, with index values of 231.15 and 206.38 respectively in that month. Conversely, the lowest-performing were China and the United Kingdom, both with index values of 88.86 and 110.92 respectively at this time. The index value is calculated with 2015 values as the baseline (i.e. 2015 = 100).



Source: Statista, FSIAPL

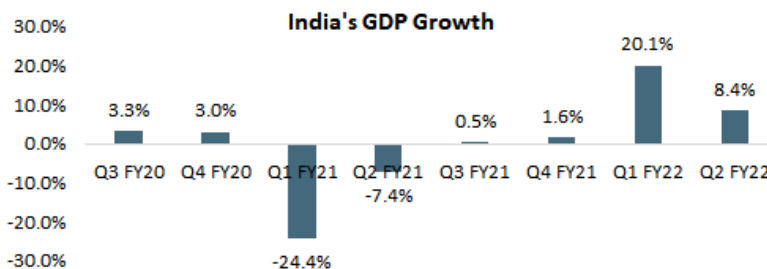
As of June 7, 2022, the CAC 40 index amounted to 6,516.94 points. The biggest drop in the history of the Paris stock exchange was recorded on March 12, 2020, due to the COVID-19 outbreak in Europe and around the world. The weekly value of the DAX index amounted to 14,502.41 as of April 20, 2022. This is well above the value of 13,681.19 points recorded in the middle of February 2020, prior to the global coronavirus (COVID-19) pandemic. All global stock markets were hit by the growing panic about the coronavirus pandemic, which accounts for this drop. The DAX (Deutscher Aktien index) is the most important German stock index, showing the value trends of the 30 largest and most liquid companies listed on the Frankfurt stock exchange. The Dow Jones Industrial Average (DJIA) index dropped around 8,000 points in the four weeks from February 12 to March 11, 2020, but has since recovered to 34,725.47 points as of January 26, 2022. In February 2020 - just prior to the global coronavirus (COVID-19) pandemic, the DJIA index stood at a little over 29,000 points. The COVID-19 pandemic triggered a turbulent period for stock markets – the S&P 500 and Nasdaq Composite also recorded dramatic drops. At the start of February, some analysts remained optimistic that the outbreak would ease. However, the increased spread of the virus started to hit investor confidence, prompting a record plunge in the stock markets. The Dow dropped by more than 3,500 points in the week from February 21 to February 28, which was a fall of 12.4% – its worst percentage loss in a week since October 2008.

Impact on Asia

Amid renewed COVID-19 outbreaks in China and a global economic slowdown, the Chinese economy is increasingly facing headwinds. According to a median projection in April 2022, China's GDP was expected to grow by 5.0% in 2022. In the first quarter of 2020, the second-largest economy recorded the first contraction in decades due to the epidemic. Apart from the manufacturing industry, the prolonged closures of business had caused significant losses in various sectors in China. The travel and tourism sector was massively affected by a drastic decline in flight ticket sales and hotel occupancy rates. The domestic tourism market lost around 20.0% in revenues for 2020. Industry experts predicted that the global travel and tourism industry could lose about USD 2.5 trillion in that year.

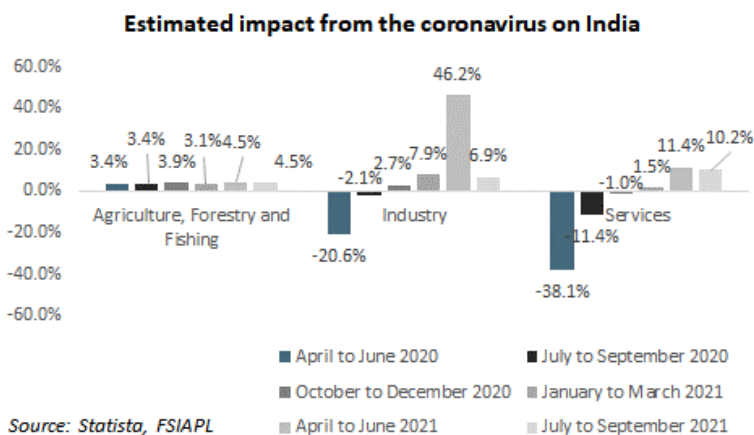
As of February 2022, a cumulative total of around 30.8 thousand employees in the manufacturing industry in Japan were planned to be fired due to the outbreak of the coronavirus disease (COVID-19). The list of planned displacements of workers in the country grew to a total of approximately 128 thousand since the outbreak.

India's quarterly GDP grew by 8.4% in the second quarter of FY22 compared to the same quarter in the previous fiscal year. While continuing to be a positive change, it was a significant reduction from the performance during the first quarter of FY22 when GDP growth peaked by 20.0%.



Source: Statista, FSIAPL

As of May 2022, the unemployment rate in India was recorded at nearly 7.0%, a decrease from the previous month. While the unemployment rate had significantly declined over the course of 2021 since having peaked in April 2020, the breakout of new coronavirus variants coupled with recurring lockdowns resulted in a

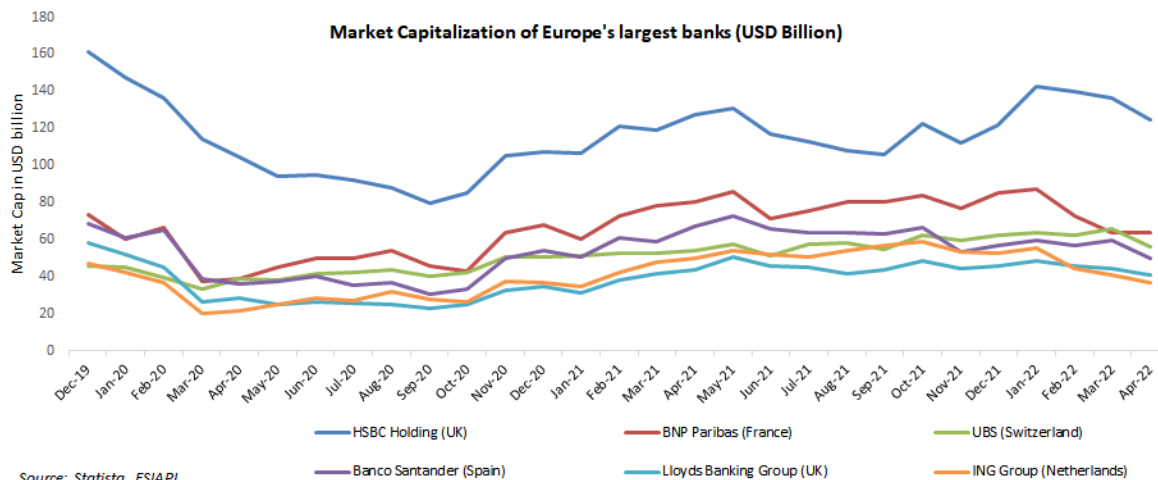


Source: Statista, FSIAPL

fluctuating trend of unemployment gripping the nation. The loss incurred by enforcing a lockdown in the country was estimated at 26 billion U.S. dollars.

Impact on Europe

The economy of the European Union is expected to grow by 2.8% in 2022 as the continent emerges from the Coronavirus (COVID-19) pandemic. Compared with the previous year, the economy of Portugal is anticipated to grow by 5.8%. The coronavirus (COVID-19) outbreak hit the financial markets hard during 2020. Some of Europe's largest banks, HSBC and Banco Santander saw market capitalization values almost half between December 31 and October 31, 2020. The end of October saw a number of banks slump from the previous month after what appeared to be the start of a turnaround during June.

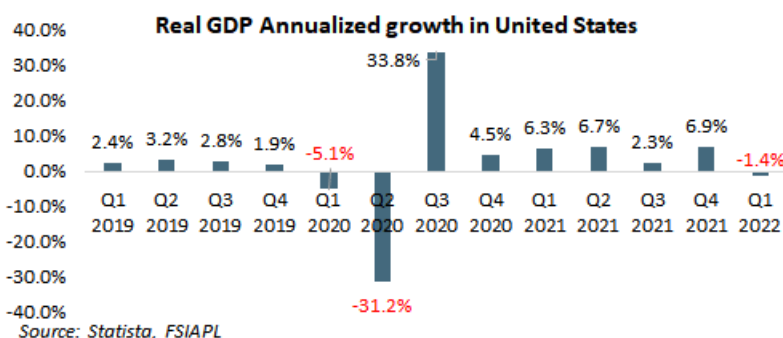


While nearly every country in Europe has a stock exchange, only five are considered major, and have a market capital of over USD 1.0 trillion. European stock exchanges make up two of the top ten global major stock markets. Europe’s biggest stock exchanges are the Euronext which combines five markets, and the London Stock Exchange. Since the Covid-19 outbreak all of Europe’s largest exchanges all saw large drops in total market capital value between January and March 2020. Since March, all major stock exchanges in Europe have been in recovery.

In January 2022, the seasonally adjusted balance value for export expectations in the German manufacturing sector was 17.4 points. This indicates that German companies expect an increase in manufacturing exports. For context though, these increases come after declines down to -0.2 points in November 2020 and -47.8 points in April 2020, suggesting the expected increase relates to the reopening of certain economic sectors following the coronavirus pandemic.

Impact on the United States

Despite a recent recovery from the economic effects of the coronavirus (COVID-19) pandemic, the real U.S. GDP decreased by 1.4% in the first quarter of 2022. This acts a potential warning of future implications of current events



such as war and supply chain hiccups. During the week ending May 28, 2022, about 200,000 initial unemployment claims were made. This is a decrease from the week prior, when initial unemployment claims stood at 211,000. The number of unemployment claims tends to fluctuate rapidly in response to national or global events such as shortages, pandemics, and wars. Around 11.1% of jobs in the

leisure and hospitality industry in the United States were at risk from the global coronavirus pandemic (COVID-19) which amounted to around 16.3 million jobs nationwide.

Impact of technological advancement

Human development in recent decades has been accompanied by rapid changes in technology and an increasing proliferation of digitized devices and services. And the pace of change seems likely to accelerate as a result of frontier technologies such as artificial intelligence (AI), robotics, biotechnology, and nanotechnology.

These technologies have already brought enormous benefits – dramatically highlighted in 2020 by the accelerated development of coronavirus vaccines. But rapid advances can have serious downsides if they outpace the ability of societies to adapt. There are fears, for example, that jobs are disappearing as more economic activity is automated, and that social media is exacerbating divisions, anxiety and doubt. Overall, there are concerns that frontier technologies will further widen inequalities, or create new ones.

Most of these issues have been voiced in developed countries. But the implications could be even more serious for developing countries – if poor communities and countries are either overwhelmed or simply left behind.

Technological advancement

We live in an age of dramatic technological advances, mostly concentrated in developed countries, but the great divides between countries that we see today started with the onset of the first industrial revolution. At that point most people were equally poor and the gaps in per capita income between countries were much smaller. Then with waves of technological change, Western Europe and its offshoots like Australia, Canada, New Zealand, and the United States along with Japan, pulled ahead. Most other countries remained on the periphery. Every wave of progress was associated with sharper inequality between countries with widening disparities in access to products, social services and public goods from education to health, from ICT infrastructure to electrification. Nevertheless, a few countries, notably in East Asia, were subsequently able to catch up through technological learning, imitation and innovation.

Increase in prosperity along with inequality

During recent decades of digitization, the world has seen growing prosperity. People on average are living longer and healthier lives. Rapid economic growth in emerging economies has fuelled the rise of a global middle class. Nevertheless, there is persistent poverty, and rising inequality too. Wealth is highly concentrated, and there are also large disparities in income-earning opportunities, as well as in

standards of education and health. These imbalances constrain economic growth and human development while heightening vulnerability, whether to pandemics, or economic crises or climate change and can soon destabilize societies.

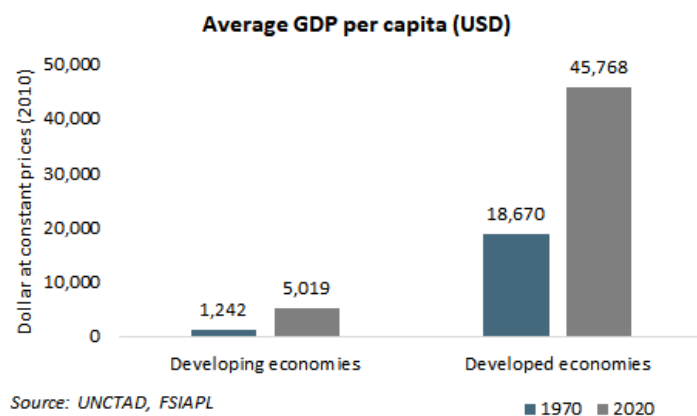
Different sides of inequalities

Inequality is a multifaceted concept related to differences in outcomes and opportunities between individuals, groups or countries. These differences can arise along any dimension of development i.e. social, economic or environmental. Inequality of outcomes and opportunities are closely intertwined. The outcomes for one generation affect the opportunities for the next resulting in intergenerational transmission of inequalities. People in low- and lower middle-income countries, on average, suffer from much higher levels of poverty and deprivation when compared with people in upper-middle and high-income countries.

Wide income gaps

Many of the inequalities correlate with levels of income. In the past 10 to 15 years, global income inequality has decreased, mainly because large developing countries, mostly in Asia and notably China, have grown faster and started to catch up. However, achievements in global equality are threatened by rising disparities within countries. Over the past 40 years, within-country inequality has increased not only in some developed countries such as the United States, and in Europe, but also in developing countries such as China and India.

Estimates suggest that between-country inequality now dominates. Between 1820, the onset of the industrial revolution, and 2002, the contribution of between-country inequality to global inequality rose from 28 to 85.0%. In other words, in 1820, global income inequality was driven by class divides within countries. Now it is driven more by



the lottery of birthplace: a person born in a poor country suffers a 'citizen penalty'. Since it is the dominant component, the recent relative reduction in inequalities between countries may be a cause for celebration. But it should disguise the fact that in absolute terms the gap between developed and developing countries has never been higher and continues to increase.

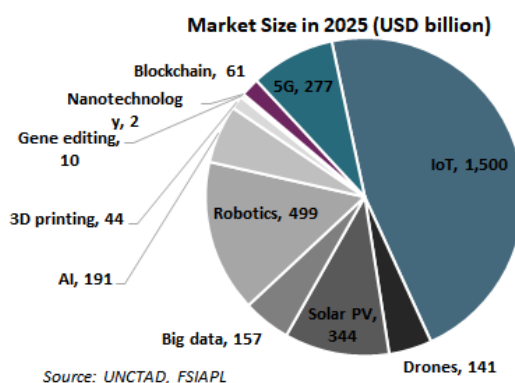
Response of government towards inequalities

To some extent governments can mitigate inequalities within countries through progressive taxation on incomes or wealth, or on income from capital. They can also make services such as education freely available to all. Governments can also increase social transfers, such as unemployment benefits, which reduce the risk of people falling into poverty. And in the workplace these actions can be complemented by those of stronger trade unions which help to increase wages.

Reducing income inequality between countries will mean harnessing technology and trade for structural transformation. If developing countries are to create economies that offer their people better-paid jobs they will have to take advantage of the new technological paradigm. Developing countries, and whole continents such as Africa, cannot afford to miss this new wave of technological change.

Moving towards new technologies

The “frontier technologies” are a group of new technologies that take advantage of digitalization and connectivity which enable them to combine to multiply their impacts. AI, the Internet of things (IoT), big data, blockchain, 5G, 3D printing, robotics, drones, gene editing, nanotechnology and solar photovoltaic (Solar PV) are some of the key technologies in today’s world.



These technologies can be used to boost productivity and improve livelihoods. AI, for example, combined with robotics can transform production and business processes. 3D printing allows faster and cheaper low-volume production and rapid, iterative prototyping of new products. As a group, these 11 technologies already represent a USD 350.0 billion market now and one that by 2025 could grow to over USD 3.2 trillion.

Finance companies have used these technologies, for example, for making credit decisions, and for risk management, fraud prevention, trading, personalized banking and process automation. The manufacturing sector has used them for predictive maintenance, quality control and human-robot combined work. Many of the major providers of these technologies are from the United States which is home to major cloud computing platforms. China is also a major producer, notably of 5G, drones and solar PV. For each of the technologies, these two countries are also responsible for 30 to 70.0% of patents and publications.

Progress in consumer electronics technologies

The differences in functions between phones, computers and televisions are vanishing as people used to send photos and documents through their computers; nowadays they can watch their photos and videos on their TVs and computers and browse the Internet on their phones, smart TVs and tablets.

The amount of data circulating the Internet has been growing by almost a thousand times every decade since the early 1990s. The ICT sector's electricity use for hosting, transferring and processing data already accounts for more than 2.0% of global electricity use. As most phones and computers have an average use life of around three years, the massive quantity of electronic waste produced every year also means increasing environmental impacts. Therefore,

Year	Global Internet Traffic
1992	100 GB per day
1997	100 GB per hour
2002	100 GB per second
2007	2,000 GB per second
2017	46,600 GB per second
2022	150,700 GB per second

Source: Technical University of Denmark, FSIAPL

reducing the time, resources, and electricity consumption due to people's use of consumer electronics for entertainment purposes is of great importance to the achievement of the sustainable development goals for sustainable and clean energy, environmental protection and climate change mitigation.

Trends of global internet growth and global IP traffic by devices

Particulars	2017	2022
Internet users	~3.5 billion	~4.8 billion
Devices and connections	18.0 billion	30.0 billion
Broadband speed	40.0 Mbps	80.0Mbps
Video viewing	75.0% - 80.0% of traffic	80.0% - 85.0% of the traffic

Source: Technical University of Denmark, FSIAPL

Particulars	2017	2022
Smartphones	18.00%	44.00%
TVs	32.00%	24.00%
PCs	41.00%	19.00%
Machine to Machine	3.00%	6.00%
Tablets	5.00%	6.00%
Non-smartphones	0.10%	0.10%
Other	0.01%	0.02%

Source: Technical University of Denmark, FSIAPL

Behind this lifestyle change is the rapid progress and breakthroughs in ICT technologies, in terms of thinner and bigger devices, touch screens, rapid increases in the operating speed and storage capacity of consumer electronics, high speed and universal access to the Internet via mobile data, Wi-Fi, inter-device Internet access sharing, cable fibre, as well as ever-decreasing prices for both consumer electronics and Internet access.

Progress in communication technologies

Another group of technologies behind consumer electronics' wide application is progress in telecommunications technology. Since 1G in the 1980s, telecommunication technologies have passed 2G, 3G, and 4G. 5G is being rolled out. The progress enabled faster and more convenient data exchange.

Difference between 1G to 5G telecommunication technologies

Generation	1G	2G	3G	4G	5G
Launch date	1980s	1990s	2000s	2010s	2020s
Main service	Analogue phone calls	Digital phone calls and messaging	Phone calls, messaging, data	All IP services (including voice, messaging)	Dynamic information access, wearable devices with AI capabilities
Key differentiator	Mobility	Secure, mass adoption	Better internet experience	Faster broadband Internet and low, lower latency	Simultaneous access to different wireless technologies – complete wireless communication
Weakness (addressed by subsequent generation)	Poor spectral efficiency, major security issues	Limited data rates – difficult to support demand for Internet/email	Real performance failed to match the hype, failure of WAP for Internet access	Due to speeds, bandwidth, and latency constraints, capacity unable to accommodate "Internet of things"	High-band spectrum may lead to some reliability issue
Theoretical download speed	2kbit/s	384kbit/s	56Mbit/s	1Gbit/s	10Gbit/s
Latency	N/A	629ms	212ms	60-98ms	<1ms

Source: Technical University of Denmark, FSIAPL

Moore's Law is the observation that the number of transistors on integrated circuits doubles approximately every two years. It describes the exponential technological progress and computational power in terms of operations that can be performed per second by computers. The power and speed of computers have been increasing exponentially; the doubling time of computational capacity and memory for personal computers was 1.5 years between 1975 to 2009.

Another indicator is the constant decrease in the price of consumer electronics and other ICT products. From 1997 to 2017, the price index of TV sets declined by 96.0% in the US, that of software declined by 67.0%. The price of new cars remained roughly the same over the same period.

ICT technology progress and the quick decrease in prices, as well as ICT companies offering free cloud storage for consumers in exchange of their attention, mean that people are only a few clicks away from the ocean of free and downloadable documents, books, audio and videos. As a result, most people accumulate a large number of documents on their computers; share documents, pictures, videos and audios through emails and social accounts; and rarely take time to delete or clean up the huge amount of information they harnessed. As a result, the data in mobile phones, gadgets, personal computers, servers and data centres keep growing. The exponential expansion of knowledge and information provides many options and new sources of information.

Conclusion

In the last three decades, tremendous technological progress has led to major changes to the ownership and use of consumer electronics in all countries and regions. Today, more than half of the world's population are regular Internet users. This makes the Internet a powerful tool in shaping people's knowledge and views. Going back 20 years, few people could have imagined having a multipurpose device so small in your pocket.

While enjoying the benefits of technological progress, a few side effects from consumer electronics utilization need to be tackled. This includes improving Internet security and fighting against criminal activities online, through spreading malware and spyware, scams, false information and misinformation. Another issue is the health impact of information overload and Internet addiction. Many people spend hours every day surfing the Internet, watching videos, playing games and communicating with others on social media platforms. Online time is the longest among young people. This can cause distractions, stress and reduction in time with family, face-to-face meeting with friends, and work and education.

Another issue is the energy use from people's online time. This includes not only household energy use, but the energy use by the cables, routers, switches and data centres. Internet use is expected to further increase, both among the people and the Internet of Things. In such situations, countries, especially developing ones, need to speed up their effort to promote the energy efficiency of consumer electronics, Internet infrastructure, and data centres.

Finally, most consumer electronics are designed for a short life of only a few years. Rapid technological progresses, the constant introduction of newer products with better and faster functions, and continuous cost reduction in consumer electronics and Internet access means many consumer electronics are dumped even before the end of their useful life. Globally, total e-waste reached 46 million tonnes in 2017. A large share of the e-waste from developed countries is shipped to developing countries for processing and recycling. E-waste contains many recyclable and valuable components, making its processing a profitable business for some countries and regions. However, e-waste also contain some hazardous components and parts that are low value. The leakage of heavy metals and incineration and landfill of e-waste can cause serious environmental and health problems to workers and local communities. Countries need to collaborate to tackle these environmental and social problems from the information age through awareness-raising, legislation, policies and regulations.

2. OVERVIEW OF INDIAN ECONOMY

India, the world's third largest economy in terms of its PPP (purchasing power parity) with population of over 1300 million has witnessed significant economic growth since the country was liberalized in early 1990s. Industrial deregulation, divestment of state-owned enterprises, reduced governmental controls on foreign trade and investment, served to accelerate the country's growth and India has been one of the leading growing economies, posting an average of 7.0% Gross Domestic Product (GDP) growth since beginning of this millennium. However, India's GDP growth rate has seen a downward trend over the past few quarters since Q1FY19, which has been further exacerbated by the coronavirus pandemic. The Russian invasion of Ukraine has further led to higher oil prices and supply disruptions, pushing up prices of commodities and further raising the inflation rate in India.

Trends in Gross Domestic Product (GDP)

The disruption caused by the COVID-19 pandemic unfolded with such a speed and scale that the disruption of production, breakdown of supply chains/ trade channels and total wash out of economic activities in certain sectors – e.g. aviation, tourism, hotels and hospitality – did not allow the economic activity to become normal throughout FY21. According to NSO data, the size of the Indian economy in FY21 was Rs. 135.6 trillion at 2011-12 constant prices. It grew to Rs. 147.7 trillion at 2011-12 constant prices in FY22 as per NSO's 2nd Advanced Estimate of National Income 2021-22.

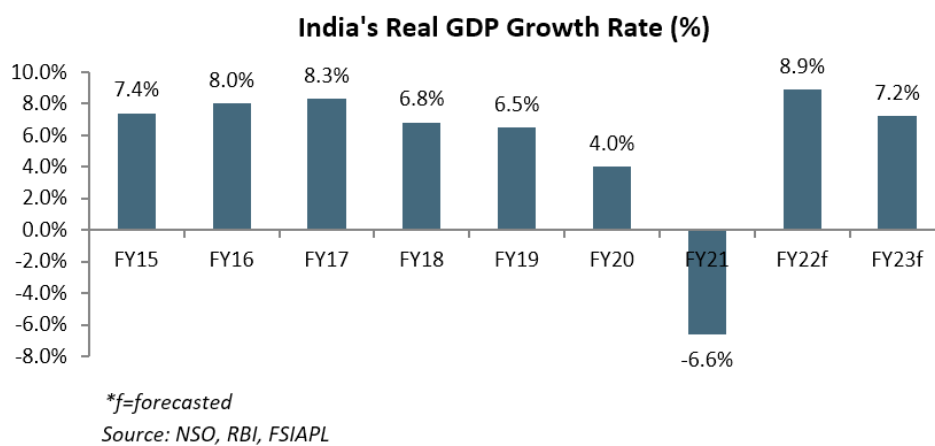
Components of Gross Domestic Product

Items/Year	(Base Year : 2011-12) Constant Prices					(Amount in Rs. trillion)	
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21 (1st RE)	2021-22 (2nd AE)
Private Final Consumption Expenditure	63.8	69.0	73.3	78.8	82.6	77.6	83.6
Government Final Consumption Expenditure	11.3	12.0	13.4	14.3	14.8	15.4	16.1
Gross Fixed Capital Formation	34.9	37.9	40.8	44.9	46.1	41.3	47.3
Changes in Stocks	2.4	1.2	2.1	2.6	1.1	-0.1	1.9
Valuables	1.9	1.5	2.1	1.9	1.6	2.1	3.4
Exports of Goods and Services	23.7	24.9	26.0	29.2	28.1	25.5	30.9
Import of Goods and Services	25.1	26.2	30.8	33.4	33.2	28.6	37.2
Discrepancies	0.8	2.8	4.4	1.7	4.0	2.4	1.7
Gross Domestic Product	113.7	123.1	131.4	140.0	145.2	135.6	147.7
Items/Year	(Base Year : 2011-12) Current Prices					(Amount in Rs. trillion)	
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21 (1st RE)	2021-22 (2nd AE)
Private Final Consumption Expenditure	81.3	91.3	100.4	112.2	122.4	120.3	140.2
Government Final Consumption Expenditure	14.4	15.9	18.4	20.4	22.0	23.9	26.9
Gross Fixed Capital Formation	39.6	43.4	48.2	55.1	57.4	52.6	67.0
Changes in Stocks	2.6	1.4	2.4	3.2	1.3	-0.1	2.2
Valuables	2.0	1.7	2.4	2.3	1.9	2.7	4.6
Exports of Goods and Services	27.3	29.5	32.1	37.7	37.5	37.0	49.2
Import of Goods and Services	30.4	32.2	37.5	44.7	42.7	37.8	54.1
Discrepancies	1.0	3.1	4.6	2.7	0.9	-0.7	0.4
Gross Domestic Product	137.7	153.9	170.9	188.9	200.7	198.0	236.4

RE - Revised estimate, AE - Advanced Estimate

Source - NSO, MOSPI, RBI, FSIAPL

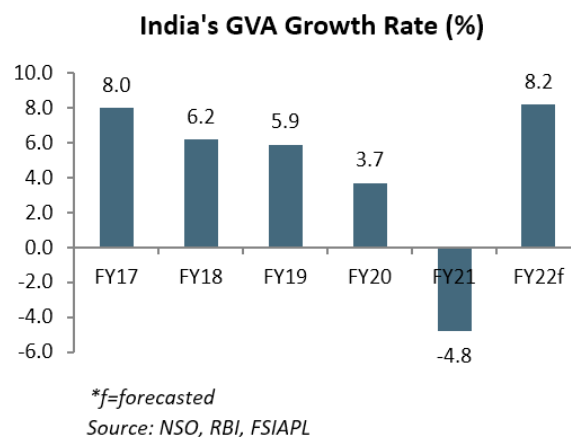
Private final consumption expenditure (PFCE) had registered a contraction for the first time in FY21 in the past four decades. PFCE picked up and grew by 7.6% in FY22. Government final consumption expenditure (GFCE) continued to provide support to aggregate demand; however, its contribution waned in FY21 and FY22 as stress mounted on government finances. Gross fixed capital formation (GFCF) recorded a contraction in FY21, primarily due to prevailing uncertainty and the imposition of lockdown. However, GFCF grew by 14.5% in FY22 owing to opening up of the economy. There was a marked expansion in the external sector in FY22; with imports increasing sharper than exports, overall net exports made a positive contribution to aggregate demand.



FSIAPL expects GDP to grow 7.2% y-o-y in FY23. After a gap of two years, the Indian economy will show a meaningful expansion as the real GDP in FY23 will be 9.1% higher than the FY20 (pre-COVID level) GDP level. Despite a meaningful recovery the size of the Indian economy in FY23 will be 10.2% lower than the FY23 GDP trend value.

Trends in Gross Value Added (GVA)

Gross value added (GVA) is the measure of the value of goods and services produced in an economy. GVA at basic prices, grew by 8.2% in FY22, after contracting 4.8% in FY21. The deceleration in GVA growth in FY21 was underpinned by a contraction in the industrial and the services sectors. While industrial GVA, driven by its largest constituent – manufacturing – moved out of contraction in Q3FY21, after having registered contraction in the preceding five quarters, the resilience of the agricultural sector provided a floor to the contraction in aggregate supply. GVA by agriculture and



allied activities registered a growth of 3.4% in FY22, with record production in food grains. This was the only sector which remained in expansion zone in FY21, resulting in an increase in the share of agriculture in overall GVA by 1.5% to 16.3%.

Components of Gross Value Added

GVA at Basic Prices (Base Year : 2011-12) Constant Prices					(Amount in Rs. trillion)		
Items/Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21 (1st RE)	2021-22 (2nd AE)
Agriculture, Forestry and Fishing	16.2	17.3	18.4	18.9	19.8	20.5	21.2
Industry	24.5	26.5	28.1	29.5	28.9	27.1	28.2
Mining & Quarrying	3.2	3.5	3.3	3.3	3.2	2.9	3.3
Manufacturing	19.0	20.5	22.1	23.3	22.6	22.5	24.8
Electricity, Gas, Water Supply & Other Utility Services	2.2	2.5	2.7	2.9	3.0	2.9	3.1
Services	64.3	69.5	73.8	79.1	84.1	77.1	10.6
Construction	8.7	9.2	9.6	10.3	10.4	9.6	10.3
Trade, Hotels, Transport, Communication and Services Related to Broadcasting	19.9	21.5	23.7	25.4	26.9	21.5	24.0
Financial, Real Estate & Professional Services	22.9	24.9	25.4	27.2	28.9	29.6	30.9
Public Administration, Defence and Other Services	12.8	14.0	15.1	16.2	17.3	16.3	18.4
GVA at Basic Prices	104.9	113.3	120.3	127.4	132.2	125.9	136.2
GVA at Basic Prices (Base Year : 2011-12) Current Prices					(Amount in Rs. trillion)		
Items/Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21 (1st RE)	2021-22 (2nd AE)
Agriculture, Forestry and Fishing	22.3	25.2	28.3	30.2	33.6	36.1	39.6
Industry	27.8	30.2	33.3	36.3	35.5	33.6	36.2
Mining & Quarrying	2.9	3.3	3.4	3.8	3.6	3.2	5.2
Manufacturing	21.5	23.3	25.7	28.1	27.0	27.1	33.3
Electricity, Gas, Water Supply & Other Utility Services	3.3	3.6	4.3	4.5	5.0	5.1	5.7
Services	75.7	84.3	93.5	105.1	115.2	109.4	113.4
Construction	9.9	10.8	12.0	13.5	13.7	13.1	17.0
Trade, Hotels, Transport, Communication and Services Related to Broadcasting	22.9	25.4	28.8	32.0	34.8	28.7	35.4
Financial, Real Estate & Professional Services	26.3	29.1	31.3	35.4	38.9	40.5	45.6
Public Administration, Defence and Other Services	16.6	19.0	21.4	24.2	27.0	26.8	31.7
GVA at Basic Prices	125.7	139.7	155.1	171.6	183.6	180.6	213.6

RE - Revised estimate, AE - Advanced Estimate

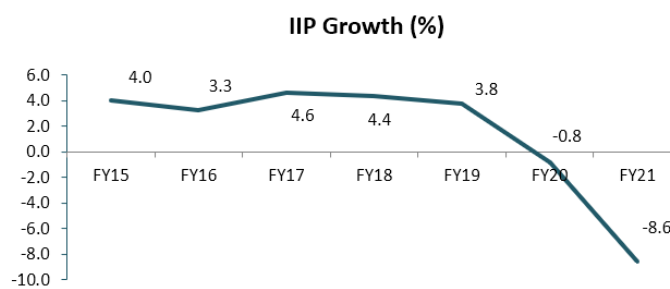
Source - NSO, MOSPI, RBI, FSIAPL

Sector-wise GVA trend estimates for the services show that realised growth in FY22 was below trend growth for trade, hotels, transport, communications and services relating to broadcasting and financial, real estate and professional services. In FY21, COVID-19 brought major services activities to a near halt and the sector contracted in a broad-based manner by 24.8% in Q1FY21 and 10.9% in Q2FY21, but in Q3FY21, services sector output returned broadly to its level a year ago. Domestic trading activities, railway freight traffic, port cargo, construction activities, and automobiles sales indicators for Q4FY21 suggested improvement in services sector.

Industrial Growth trends

The Index of Industrial Production (IIP) is a composite indicator that measures the short-term changes in the volume of production of a basket of industrial products during a given period with respect to

that in a chosen base period. GVA growth in industry contracted sharply on a y-o-y basis by 7.4% in FY21. This is the fifth year of sequential deceleration, including two successive years of contraction in the industrial sector. During Q1FY21, industrial activity plummeted sharply, registering a contraction of 31.1%. The turnaround in industrial activity since then has been volatile. IIP data show that the contraction was severe in case of consumer durables and capital goods, as consumers shunned discretionary expenditure while firms curbed investment. Cumulatively, the IIP declined by 8.6% in FY21. At the sub-sectoral level, however, electricity, gas, water supply and other utility services recorded a growth of 1.8% in GVA.



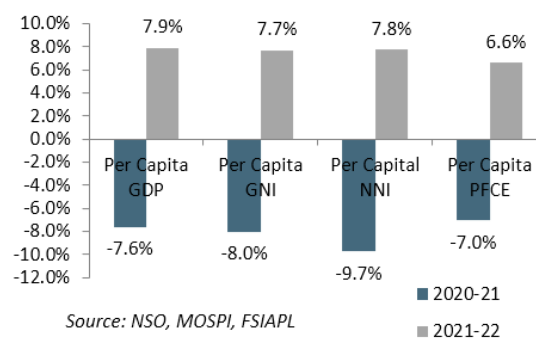
Source: MOSPI, FSIAPL

India's industrial production (IIP) for the month of March 2022 showed a dismal performance and grew at 1.9%. At the broad-based level, the output of manufacturing, the largest component of IIP, grew at 0.9% and mining and electricity at 4.0% and 6.1% respectively in March 2022. At the use-based classification, four segments namely primary goods (5.7%), capital goods (0.7%), intermediate goods (0.6%) and infrastructure goods (7.3%) witnessed positive growth in March 2022, but both consumer durables and non-durables recorded negative growth of 3.2% and 5.0%. The pattern of growth across used based classification suggest that weak consumption demand is likely to witness more headwinds in the coming months from high inflation and reversal of interest rate cycle, but the demand for infrastructure goods may continue due to the sustained government capex spending.

Per Capita GDP, Income and Final Consumption

India's per capita gross domestic product (GDP) dropped by 7.6% to Rs. 1,00,032 in 2020-21, while it increased by 7.9% to Rs. 1,07,934 in 2021-22. Per Capita Gross National income (GNI) dropped by 8.0% in 2020-21; whereas it increased by 7.7% to Rs. 1,06,217 in 2021-22. The per capita

Growth in Per Capita GDP, Income and Final Consumption (%)



Source: NSO, MOSPI, FSIAPL

private final consumption expenditure (PFCE), that represents consumer spending, dropped by 7.0% in 2020-21; while it increased by 6.6% to Rs. 61,054 in 2021-22.

Consumer Price Inflation in India

Retail inflation surged to a near 8-year high of 7.79% in April 2022, persisting above the Reserve Bank of India's (RBI's) upper tolerance level of 6% for the fourth straight month. High price levels of fuel and food items, especially of vegetables, spices and oils/fats, along with household services, contributed to the sharp rise in inflation. The food price inflation (combined for rural and urban) surged to a 17-month high of 8.10% in April 2022 from 7.68% in March 2022. Cereals and products inflation touched a 21-month high of 5.96%, vegetables inflation surged to a 17-month high of 15.41%, and spices hit a 17-month high of 10.56%. Pulses and products inflation moderated to 1.86% in April 2022 from 2.57% in the previous month.

All India year-on-year inflation rates for April 2022

(Base: 2012=100)

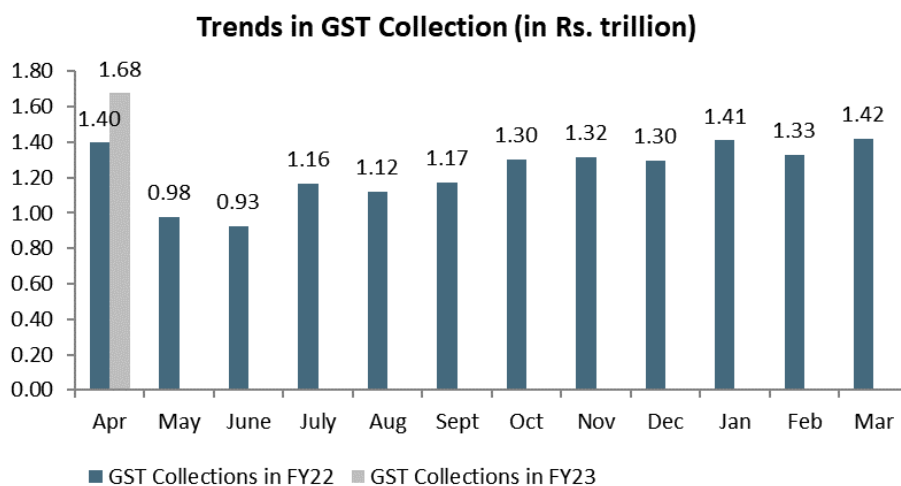
Description Category name	Rural			Urban			Combined		
	Apr-21	Apr-22	Inflation	Apr-21	Apr-22	Inflation	Apr-21	Apr-22	Inflation
	Index	Index	Rate (%)	Index	Index	Rate (%)	Index	Index	Rate (%)
Cereals and products	142.70	151.80	6.38	147.60	155.40	5.28	144.30	152.90	5.96
Meat and fish	195.50	209.70	7.26	202.50	215.80	6.57	198.00	211.80	6.97
Egg	163.40	164.50	0.67	166.40	164.70	-1.02	164.60	164.60	0.00
Milk and products	155.00	163.80	5.68	156.00	164.20	5.26	155.40	163.90	5.47
Oils and fats	175.20	207.40	18.38	161.40	185.90	15.18	170.10	199.50	17.28
Fruits	160.60	169.70	5.67	168.80	175.90	4.21	164.40	172.60	4.99
Vegetables	135.10	153.60	13.69	161.60	190.90	18.13	144.10	166.30	15.41
Pulses and products	161.10	165.10	2.48	162.80	164.00	0.74	161.70	164.70	1.86
Sugar and Confectionery	112.20	118.20	5.35	114.80	120.50	4.97	113.10	119.00	5.22
Spices	164.40	182.80	11.19	162.80	177.90	9.28	163.90	181.20	10.56
Non-alcoholic beverages	161.90	172.40	6.49	151.50	157.50	3.96	157.60	166.20	5.46
Prepared meals, snacks, sweets etc.	166.80	178.90	7.25	171.40	183.20	6.88	168.90	180.90	7.10
Food and beverages	155.60	168.60	8.35	162.00	174.50	7.72	158.00	170.80	8.10
Pan, tobacco and intoxicants	186.80	192.80	3.21	194.40	197.10	1.39	188.80	193.90	2.70
Clothing	160.70	177.50	10.45	155.90	168.30	7.95	158.80	173.90	9.51
Footwear	155.10	175.10	12.89	139.30	154.50	10.91	148.50	166.50	12.12
Clothing and footwear	159.90	177.10	10.76	153.40	166.20	8.34	157.30	172.80	9.85
Housing	-	-	-	161.40	167.00	3.47	161.40	167.00	3.47
Fuel and light	156.00	173.20	11.03	154.90	171.00	10.39	155.60	172.40	10.80
Household goods and services	155.50	167.60	7.78	147.60	159.80	8.27	151.80	163.90	7.97
Health	165.30	177.00	7.08	157.50	169.00	7.30	162.30	174.00	7.21
Transport and communication	151.70	166.20	9.56	142.10	159.30	12.10	146.60	162.60	10.91
Recreation and amusement	158.60	167.20	5.42	149.10	162.20	8.79	153.20	164.40	7.31
Education	164.10	170.90	4.14	157.60	164.00	4.06	160.30	166.90	4.12
Personal care and effects	154.60	169.00	9.31	156.60	168.40	7.54	155.40	168.80	8.62
Miscellaneous	158.00	170.20	7.72	150.50	163.10	8.37	154.40	166.80	8.03
General Index (All Groups)	157.60	170.80	8.38	158.00	169.20	7.09	157.80	170.10	7.79

Source: The National Statistical Office (NSO), Ministry of Statistics and Programme Implementation (MOSPI)

Rural inflation rose to an 8-year high of 8.38% in April 2022, while urban inflation was at an 18-month high of 7.09%. The previous high of the headline retail inflation was recorded at 8.33% in May 2014. Among states, the highest inflation rate was recorded by West Bengal, followed by Madhya Pradesh and Telangana. Core inflation - the non-food, non-fuel component of inflation - in April also touched a 95-month high of 6.97%, remaining more than 5% for 24 consecutive months. Going forward, the surge in global commodity prices following the ongoing Russia-Ukraine conflict and the resultant rise in domestic inflation owing to a pass-through of higher input costs across several categories of goods is expected to impact consumption demand and thereby hurt the growth in the output of consumer goods.

GST collection trends

GST collections in April 2022 crossed Rs. 1.68 trillion, up 20% from the year earlier and Rs. 0.25 trillion more than the previous highest of Rs. 1.42 trillion in March this year.



Source: GST Council, FSIAPL

Of the total, central GST amounted to Rs. 331,590 million, state GST was Rs. 417,930 million, integrated GST was Rs. 819,390 million; while Rs. 367,050 million was collected on import of goods. Cess collection was Rs. 106,490 million, including Rs. 8,570 million on import of goods. The government has settled Rs. 334,230 million toward central GST and Rs. 269,620 million toward state GST from the integrated GST.

Total number of e-waybills generated in the month of March 2022 was 77 million, which is 13% higher than 68 million e-way bills generated in the month of February 2022, which reflects recovery of business activity at faster pace. The highest-ever GST collection in a single day took place on 20th April 2022 – Rs. 578,470 million through 958,000 transactions. During the month, revenues from import of

goods was 30% higher and the revenues from domestic transaction (including import of services) are 17% higher than the revenues from these sources during the same month last year.

For the March quarter, the average monthly GST collection stood at Rs 1.38 trillion. The impact of the continuing focus on ensuring timely compliance by all GST registrants by restricting the input tax credits of the buyers together with enhanced analytics to detect evasion has also contributed significantly to the all-time high collections.

Indian Economic Outlook FY23

An overview of the India's Macro Economic projections is given in the table below:

India - Economic Outlook FY23 (% change)	FY16	FY17	FY18	FY19	FY20	FY21	FY22f	FY23f
Gross value added at FY12 prices	8.0	8.0	6.2	5.9	4.1	-4.8	8.3	6.7
- Agriculture	0.6	6.8	6.6	2.6	4.3	3.3	3.0	3.0
- Industry	9.6	7.7	5.9	5.3	-1.2	-3.3	10.0	5.6
- Services	9.4	8.5	6.3	7.2	7.2	-7.8	9	8.3
Real GDP	8.0	8.3	6.8	6.5	4.0	-6.6	8.9	7.2
- Private final consumption expenditure (PFCE)	7.9	8.1	6.2	7.6	5.5	-6.0	8.2	8.1
- Government final consumption expenditure (GFCE)	7.5	6.1	11.9	6.3	7.9	3.6	4.3	7.8
- Gross fixed capital formation (GFCF)	6.5	8.5	7.8	9.9	5.4	-10.4	17.5	8.8
Nominal GDP	10.5	11.8	11.1	10.5	7.8	-1.4	18.7	13.2
Average wholesale inflation	-3.7	1.7	2.9	4.3	1.7	1.3	11.9	6.7
Average retail inflation	4.9	4.5	3.6	3.4	4.8	6.2	5.5	5.8
Year-end interest rate (10-yr G-sec)	7.5	6.7	7.4	7.5	6.1	6.2	6.5-6.6	6.9-7.0
Average exchange rate (INR/USD)	65.5	67.1	64.5	69.9	70.9	74.2	74.5	77.6
Fiscal deficit (central government, % of GDP)	3.9	3.5	3.5	3.4	4.6	9.3	6.6	6.7
Current account deficit (% of GDP)	1.1	0.6	1.8	2.1	0.9	-0.9	2.1	2.8

Source: Union Budget, NSO, RBI, FSIAPL

FSIAPL expects GDP to grow 7.2% y-o-y in FY23. Consumption demand as measured by PFCE has been subdued in FY22, despite sales of select consumer durables showing some signs of revival during the festive season. Although the January 2022 round of RBI's Consumer Confidence Survey shows that Current Situation Index increased marginally on the back of better sentiments with respect to the general economic situation, it continues to be in the pessimistic zone. The Expectations Index, which captures one year ahead outlook, moderated due to the surge in COVID-19 infection cases in January 2022. Household sentiments on non-essential/ discretionary spending continue to be subdued. As the consumer sentiment is likely to witness a further dent due to the Russia-Ukraine conflict leading to rising commodity prices/consumer inflation, FSIAPL expects PFCE to grow at 8.1% in FY23.

After PFCE, investment demand as measured by the GFCF is the second-largest component (27.1%) of GDP from the demand side. Private capex by large corporates, which has been down and out over the past several years, had shown some promise lately in view of the roll-out of the Production-linked Incentive Scheme and increased manufacturing sector capacity utilisation driven by higher exports. However, FSIAPL expects the surge in commodity prices and disruptions in global supply chain caused

by the Russia-Ukraine conflict to take a toll on their sentiments and there is a likelihood that this capex may get deferred till more clarity emerges with respect to the conflict. Government capex, however, is unlikely to be dented. By scaling up the capex to GDP ratio for FY22 to 2.6% and budgeting the capex at 2.9% of GDP for FY23, the government has been showing its resolve to do the heavy lifting. FSIAPL therefore believes that the overall GFCF growth will not be impacted much and it will grow at 8.8% in FY23.

A 10% y-o-y increase in petroleum product prices without factoring in currency depreciation is expected to push up Consumer Price Index inflation by 42bp and Wholesale Price Index inflation by 104bp. Similarly, a 10% y-o-y increase in sunflower oil without factoring in currency depreciation is expected to push Consumer Price Index inflation by 12.6bp and Wholesale Price Index inflation by 2.48bp. Both these events could increase the retail and wholesale inflation by 55bp and 109bp, respectively.

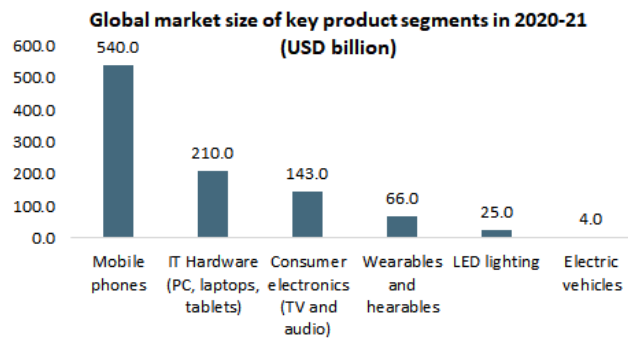
Retail prices of petrol and diesel were on hold since early-November 2021. However, they have begun to inch up from March 2022 almost on a daily basis. Therefore, FSIAPL estimates retail inflation to average 5.8% - 6.0% in FY23. Due to a higher import bill for items such as mineral fuels & oils, gems & jewellery, edible oils and fertilisers, FSIAPL expects the current account deficit to come in at 2.8% of GDP.

Although the union government acknowledges the adverse impact of the Russia-Ukraine conflict on the ongoing Indian economic recovery, it is unlikely to scale down its fiscal support already announced in the FY23 budget. Even the RBI has so far resisted the temptation to tighten its monetary policy stance, despite retail inflation being close to its upper tolerance level and/or occasionally breaching it. Although there is a case for a 50bp increase in the policy rates in FY23, the RBI may still opt for accommodation, because it believes initiating a premature demand compression via a monetary policy action would be counterproductive, particularly when the recovery is fragile and there is an output gap (the difference between potential and actual output) in the economy.

3. OVERVIEW OF GLOBAL IT PERIPHERAL AND MOBILE ACCESSORIES

Global IT peripheral and mobile accessories industry break-up

The electronics industry is one of the largest and fastest growing industries in the world. Electronic products continue to impact and shape our lifestyle prominently in today's digital era. With the world being more connected than ever and the digital push induced by pandemic; the demand for electronic devices is expected to grow steadily and continue to be a major economic driver across the globe.

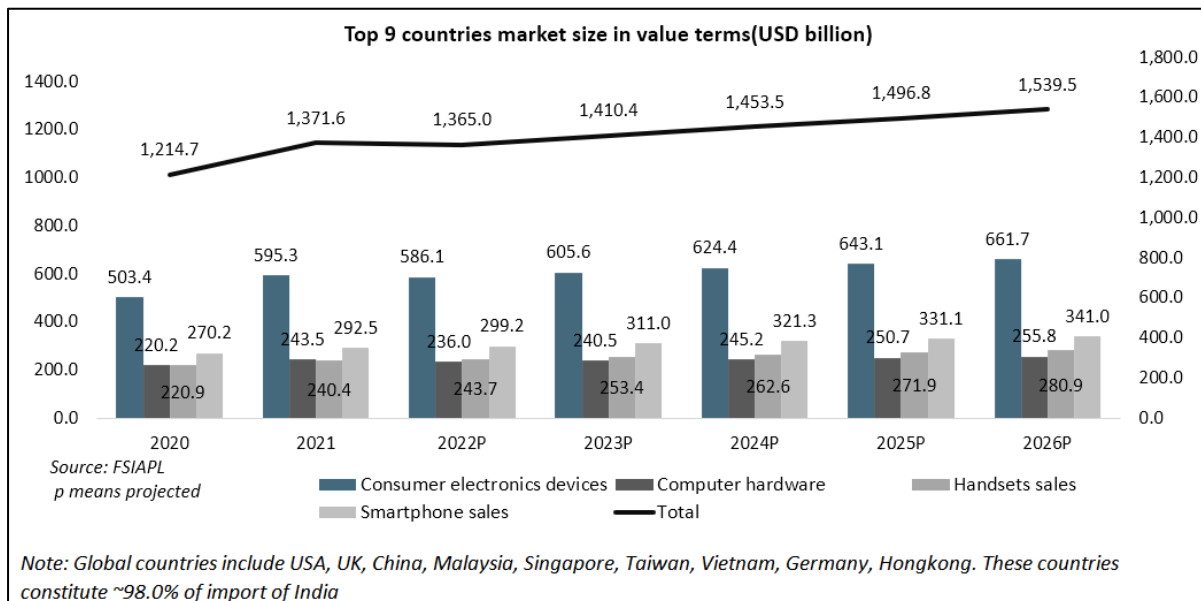


Source: Indian cellular and Electronics Association (ICEA), FSIAPL

The global electronics industry is estimated at USD 2.9 trillion in 2020 which is equal to the GDP of India. United States and European Union together represent more than 40.0% of the global market size. The global market for laptops, tablets and desktop computers is expected to stabilize around USD 220.0 billion by 2025. In volume terms, the market size is expected to be around 370 million units by 2025. Only 6 global players (Lenovo, HP, Apple, Dell, Acer, Asus) comprise 89.0% of the market shipments for laptops and 81.0% for tablets in 2020. The global manufacturing hubs are limited to a handful of countries with China being the predominant supplier to the world with 66.0% market share in 2021 and approximately USD 100.0 billion in value.

Trends in global market

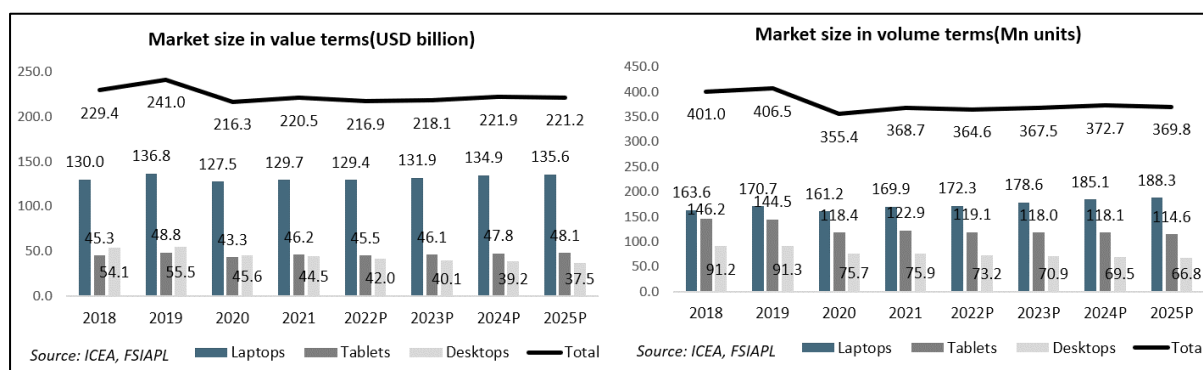
USA, UK, China, Malaysia, Singapore, Taiwan, Vietnam, Germany, Hongkong constitute for around 98.0% of Indian imports. These 9 countries have approximately 50.0% of the global market size of electronics industry. Therefore, we have considered the market size of these countries for the analysis of global market.



As per Fitch Solutions, the total market size of top 9 countries is expected to increase with the CAGR of 4.0% from USD1,214.7 billion in 2020 to USD 1,539.5 billion in 2026. Consumer electronics devices form the major part of the total market with 43.4% share followed by computer hardware (17.8%), handset sales (17.5%) and smart phone sales (21.3%). The consumer electronics devices market is expected to increase with the CAGR of 4.7% during the period. Other segments like computer hardware, handset sales and smartphone sales are expected to grow with the CAGR of 2.5%, 4.1%, 4.0% respectively. The biggest markets are China (44.6%), USA (34.1%) and Germany (10.2%). In next 5 years, the share of China in total consumption is expected to decrease from 44.6% in 2021 to 41.3% in 2026 while Germany is expected to see a decline from 10.2% in 2021 to 9.9% in 2026. On the other hand, USA, Vietnam and UK are going to see a surge in the consumption of the electronics market.

Laptops, tablets, desktops market size in value terms

Total market size of laptops, tablets, desktops was around USD 241.0 billion in 2019 which decreased by 11.4% y-o-y in 2020 to USD 216.3 billion due to global pandemic impacting the global business. The market size increased by 1.9% y-o-y to USD 220.5 billion in 2021. The laptops, tablets and desktops constitute 58.8%, 21.0% and 20.2% respectively out of USD 220.5 billion in 2021 but laptop and tablets share are going to increase while desktop share is expected to decrease in 2025. The total share would be laptop (61.3%), tablets (21.8%) and desktops (16.9%) in 2025. The global market of laptops, tablets and desktops in terms of volume and revenue, after registering growth in 2021, is expected to remain largely stable between 2021–25 for laptops, tablets and desktops segment.



Biggest market by Region (2021)

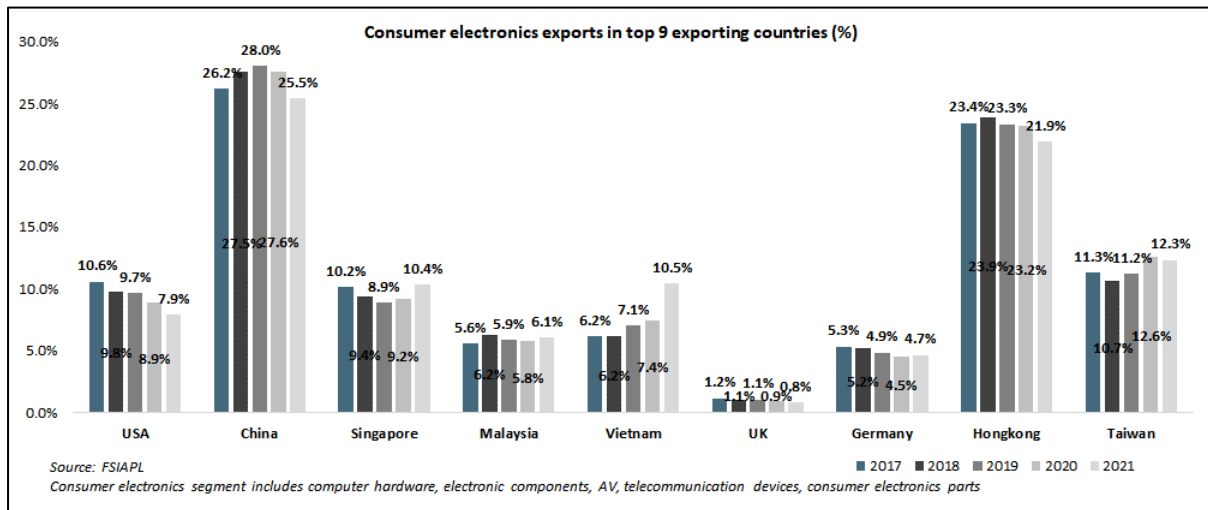
The US remained the largest market for laptops, tablets, and desktop computers in 2021, accounting for 28.3% of the total market. European Union (17.3%), China (16.4%), Japan (11.6%), UK (4.7%) and Latin America (3.9%) are the other key market constituting for 82.2% of the global market. India is the 7th in the rank of market size in 2021.

Country/ Groups	Laptops	Tablets	Desktops	Total	% Share
US	35.0	16.2	11.3	62.5	28.3%
European Union	22.5	7.9	7.7	38.1	17.3%
China	17.4	7.8	11.0	36.2	16.4%
Japan	14.9	4.3	6.4	25.6	11.6%
UK	6.1	2.5	1.7	10.3	4.7%
Latin America	5.5	0.9	2.3	8.7	3.9%
India	4.9	0.5	1.8	7.1	3.2%
South East Asia	3.7	1.1	2.0	6.8	3.1%
Canada	3.8	1.1	1.4	6.3	2.9%
Australia	3.5	1.2	1.0	5.7	2.6%
Brazil	3.0	0.5	1.1	4.5	2.1%
Korea	2.1	1.0	1.2	4.3	1.9%
Russia	2.0	0.5	1.0	3.5	1.6%
Gulf Cooperation Council	1.4	0.6	0.6	2.5	1.1%
Indonesia	1.5	0.2	0.7	2.3	1.0%
Africa (excluding South Africa)	0.9	0.6	0.6	2.1	0.9%
Switzerland	1.1	0.3	0.4	1.8	0.8%
Eastern Europe	1.0	0.2	0.4	1.6	0.7%
Turkey	0.9	0.2	0.4	1.5	0.7%
South Africa	0.7	0.2	0.2	1.1	0.5%
Norway	0.8	0.1	0.2	1.1	0.5%
New Zealand	0.5	0.1	0.2	0.9	0.4%
South Asia (excluding India)	0.3	0.0	0.2	0.5	0.2%
Others	3.3	1.0	2.1	6.5	2.9%
Total	129.7	46.2	44.6	220.5	100.0%

Source: ICEA, FSIAPL

Global manufacturing hubs and largest exporting nation

Among the exporters of this target segment, China appears to be the leading manufacturing hub—accounting for 66.0% (Laptops and tablets) of the world exports. Vietnam, Thailand, Malaysia, Mexico, Brazil, Poland, and Ireland may be considered as important exporting nations.



Electronics components (58.4%) form the major part of the total consumer electronics exports by the top 9 countries followed by computer hardware (19.6%), audio-visuals (3.1%), telecommunication devices (6.2%), consumer electronics parts (9.8%). China (25.5%), Hongkong (21.9%), Taiwan (12.3%), Vietnam (10.5%), USA (7.9%) are the biggest exporters of the consumer electronics segment in the world. China exported 25.5% of the total consumer electronics of the global market in 2021 but it has decreased from 28.0% in 2019. USA share in total exports has also decreased from 10.6% in 2017 to 7.9% in 2021 while exporting hubs have shifted to countries like Vietnam and Taiwan. Vietnam's share in total export has increased from 6.2% in 2017 to 10.5% in 2021 while Taiwan's share increased from 11.3% in 2017 to 12.3% in 2021. Vietnam has surged ahead from not exporting to being the 4th largest exporter over 3 decades with a progressive Tariff Policy and FTAs to increase production and exports.

Top exporters of office and telecom equipment (electronic products), 2019 and their rankings 1980 to 2019

Country	1980	1990	2000	2010	2019
China	35	20	11	1	1
Hong Kong, China	10	9	8	2	2
USA	2	2	1	3	3
Taiwan	9	8	5	8	4
Korea, Rep of	14	7	4	5	5
Singapore	8	6	3	4	6
Netherlands	6	11	10	6	7
Vietnam	No export	No export	44	28	8
Malaysia	15	12	6	10	9
Germany	3	3	9	9	10
Mexico	37	16	12	11	11
Japan	1	1	2	7	12
Phillippines	36	22	15	13	13
Thailand	45	18	17	12	14
Czech Republic	25	36	35	17	15
India	40	38	47	34	28

Source: WTO, ICEA, FSIAPL

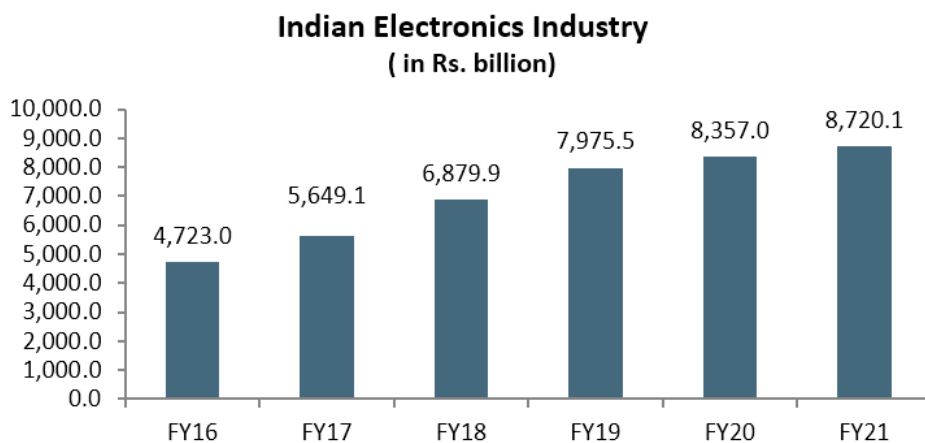
Among the top exporters from above table, Mexico and Thailand are two economies which in 1980 had the lowest rankings amongst the group. It is noteworthy that China, Mexico and Vietnam are deeply integrated in Global Value Chains as well as having larger electronics exports than India.

4. OVERVIEW OF INDIAN ELECTRONICS INDUSTRY

India is currently witnessing a digital revolution, which is increasing the usage of electronic devices. The growing middle-class population, rising disposable incomes, and falling electronics prices in the country are all contributing to the country's progress. India has already begun to see beginning activity with increasing production and assembly operations across products such as mobile phones and other consumer electronics, thanks to several government efforts aimed at boosting domestic manufacturing.

Overview of Indian Electronics Industry

Electronic goods in India include mobile phones, IT hardware (laptops and tablets), consumer electronics (TV, audio, accessories), industrial electronics, auto components, LED lightings and electronic components. The Indian Electronics Industry has grown at a CAGR of 13% from Rs. 4,723.0 billion in FY16 to Rs. 8,720.1 billion in FY21. Domestic electronics production has grown at a CAGR of 17.9% from Rs. 2,432.6 billion in FY16 to Rs. 5,544.6 billion in FY21. The key drivers of growth are large domestic market, and availability of skilled talent and low-cost labour. Import of electronic products have increased from Rs. 2,681.1 billion in FY16 to Rs. 3,993.7 billion in FY21; while Exports of electronic products from India increased at a CAGR of 15.9% from Rs. 390.6 billion in FY16 to Rs. 818.2 billion in FY21.



Source: Ministry of Electronics and Information Technology , FSIAPL

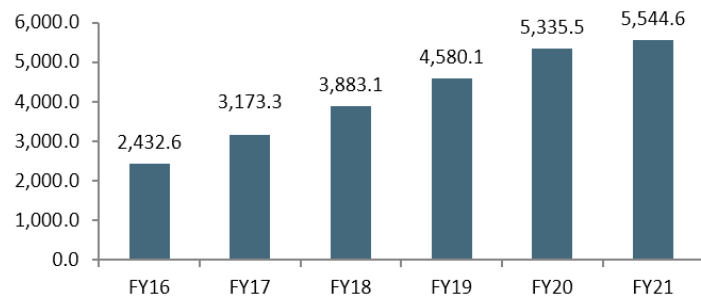
The industry has undergone major transformation in the last couple of years with the host of initiatives and reforms. The intent of the Government is to provide a level playing field for the domestic manufacturers enabling them to compete with imports in the sector by rationalizing tariff structure, simplifying procedures, providing incentives and upgrading infrastructure.

Domestic production of Electronic Goods

As a result of several initiatives taken by the Government and efforts of the industry, domestic production of electronic goods in India has grown at a CAGR of 17.9% from Rs. 2,432.6 billion in FY16 to Rs. 5,544.6 billion in FY21. The Government attaches high priority to electronics hardware manufacturing and it is one of the important pillars of both ‘Make in India’ and ‘Digital India’ programme of Government of India.

The Government’s ‘Make in India’ programme, launched in 2014, was designed to make India as the Global design and manufacturing hub by increasing domestic manufacturing and reducing India’s dependence on the services sector, thereby imparting a healthy mix of contribution from all sectors to the Indian Economy. Another

Domestic production of Electronics goods in India



Source: Ministry of Electronics and Information Technology, FSIAPL

flagship initiative, ‘Digital India’, also targets a substantial boost in the domestic manufacturing of electronics and aims at reducing India’s dependence on imports in this important sector. To encourage the electronic manufacturing in India, National Policy on Electronics 2019 (NPE 2019) was notified on 25.02.2019. The vision of NPE 2019 is to position India as a global hub for Electronics System Design and Manufacturing (ESDM).

In addition, the global landscape of electronic industry is changing significantly, and revised cost structures have shifted the attention of multinational companies to India. India is positioned as a destination for high-quality design work as well as a cost-competitive alternative. Many multinational corporations have established or expanded captive centres in India. Increasing penetration of consumer electronics in semi-urban and rural markets, a shift in lifestyle among the Gen Z population, and the adoption of smart devices are some of the key drivers that are assisting the rapid expansion of this industry.

Imports of Electronic goods in India

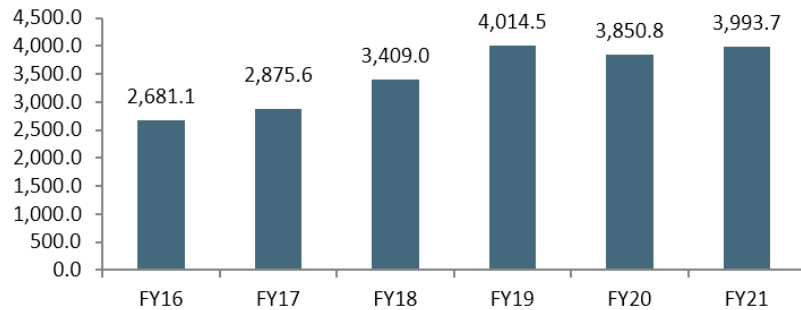
Import of electronic products have increased from Rs. 2,681.1 billion in FY16 to Rs. 3,993.7 billion in FY21. In FY21, China and Hong Kong accounted for approximately 60-65.0% of India's total electronic imports. The majority of semiconductor demand is now fulfilled by imports from the United States, Japan and Taiwan. The electronics industry relies extensively on Chinese suppliers, especially consumer electronics, industrial electronics, computer and IT hardware, strategic electronics, light-emitting diodes, etc.

The top three imported products are laptops and desktops, Flat Panel Display (FPD) televisions and storage devices.

Telephone equipment including mobile phones and components also make for the large share of imports made by India from China. During FY21, India imported 95% of parts used in

electronic integrated circuits and micro assemblies from China. Similarly, India's reliance on China was 93% in colour TV sets and 90% when it comes to imports of the subscriber-end equipment in the telecom industry during FY21.

Import of Electronics goods to India
(in Rs. billion)



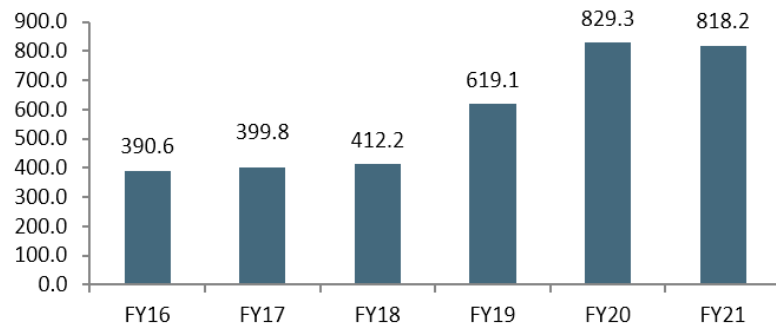
Source: Ministry of Electronics and Information Technology, FSIAPL

Export of Electronic goods from India

Exports of electronic products from India increased at a CAGR of 15.9% from Rs. 390.6 billion in FY16 to Rs. 818.2 billion in FY21. Mobile phones, IT hardware (laptops, tablets), consumer electronics (TV and audio), industrial electronics

and auto electronics are key exports in this sector. India holds superior design competence and the availability of a talented workforce at lower wages compared to China, which fortifies its position as the futuristic, domestic-cum-export-oriented manufacturing destination for the globe.

Export of Electronics goods from India
(in Rs. billion)



Source: Ministry of Electronics and Information Technology, FSIAPL

Cost-effectiveness, a talented and affordable workforce, a burgeoning domestic electronics market and export opportunities will drive the market. Globally, India ranks second in mobile phone manufacturing, which involves design of the handset, assembly of components, and manufacturing of the device. The government has been taking up a number of proactive steps to boost exports. An export monitoring desk has been set up to help remove impediments, constraints and bottlenecks faced by the export sector, especially during the pandemic. Government has taken several measures for the growth of the exports of electronics hardware sector. Special Economic Zones (SEZs) are set

up to enable hassle-free manufacturing and trading for export purposes and (Electronics Hardware Technology Park) EHTP units are the major contributors to exports.

Various Acts under the Department of Commerce are being reviewed to remove redundancies and outdated provisions. Several bilateral trade agreements are being pursued with great vigor. The government is committed towards developing each district in India as an export hub through initiatives such as One District One Product (ODOP). Support is also being extended to exporters through various exporters-oriented schemes. Efforts are being made to reducing compliance burden through rationalization and decriminalization and several initiatives are being undertaken to improve the ease of doing business. An IT based platform for providing exporters licensing and addressing their grievances is in the works. The Government is also working on enhancing value of branding of Indian exports to improve India's global standing as a reliable supplier and proactive steps are being undertaken to aligns the nation with the global value chain.

5. OVERVIEW OF KEY ELECTRONIC PRODUCTS

Electronics manufacturing sector has several verticals in terms of its constituents. The production profile of the electronics sector in India for FY21, based on the information provided by Industry Associations are as follows:

Product Segments	Rs. billion	% share
Mobile Phones	2,226.8	40.2%
Consumer Electronics	705.1	12.7%
Industrial Electronics	779.4	14.1%
IT Hardware (Laptops, Tablets)	222.7	4.0%
Electronic Components	668.0	12.0%
Strategic Electronics	296.9	5.4%
Auto Electronics	445.4	8.0%
Printed circuit board assembly	37.1	0.7%
LED Lighting	163.3	2.9%
Total domestic electronic production in FY21	5,544.6	100.0%

Source: Ministry of Electronics and Information Technology

Mobile Phones

India has become the second largest mobile handset manufacturing nation globally and India has also become the second largest smart phone market in the world thus making India as the fastest growing smart phone market in the world. Production of mobile phones has increased at a CAGR of 30% from 60 million units in FY15 to 290 million units in FY21; thus, making the domestic manufacturing of cellular mobile handsets and its sub-assemblies/ parts and components as one of the flagship sectors under the 'Make in India' initiative of the Government.

Consumer Electronics

Consumer electronics refers to any device containing an electronic circuit board that is intended for everyday use by individuals for the purpose of entertainment, recreation or communication. This encompasses a massive category of electronic products which includes televisions, cameras, digital cameras, calculators, VCRs, DVDs, clocks, audio devices, headphones, and many other home products. Key drivers for this market's growth are growing awareness, easier access, changing lifestyle, higher disposable income and reduction in the per unit prices. India produced Rs. 705.1 billion worth of consumer electronics domestically during FY21.

Television is an important device in the home consumer electronics and has been identified as one product for which India can become the global hub for manufacturing. As per FICCI, India's TV

production stood at USD 4.24 billion in FY21 and is expected to reach USD 10.22 billion by FY26 with a CAGR of 20%. Type of televisions available today in the market cover a wide range that starts from Plasma to LED and LCD TVs which offer sharper, higher resolution pictures. With the decreasing trend in the prices of LCD/ LED televisions, the penetration of these TVs is increasing significantly.

Some of the initiatives taken by the government are increasing the Basic Customs Duty (BCD) on several consumer electronic goods to encourage companies to substitute imported goods with domestically manufactured goods; permitting 100% FDI in the consumer electronics manufacturing sector via the direct route and providing Capex subsidy under the Modified Special Incentive Package Scheme (M-SIPS), etc. Due to these efforts, foreign companies have been encouraged to set up manufacturing facilities in the area of consumer electronics without the need to establish a joint venture or some other form of partnership with a domestic entity.

Industrial Electronics

Industrial electronics can be classified on the basis of segments - Power Electronics, DC/AC converters, Material handling and Industrial Robots. The key application segments of the industrial electronics industry are process control equipment, test and measuring equipment, power electronics equipment, automation and analytical instruments. These technologies are gaining ground as modernization, automation and robotics would play an important role in the modern industry. The industrial electronics sector is witnessing growth due to enhanced digitization and robotics applications in Industry 4.0. Additionally, the impetus on Smart Cities and IoT will bring a whole new focus and demand on smart and automation electronics. India produced Rs. 779.4 billion worth of industrial electronic products domestically during FY21.

Increasing focus on the use of renewable power sources across the globe, growing adoption of power electronics in the manufacturing of electric vehicles, and increasing use of power electronics in consumer electronics are the major factors driving the growth of the power electronics market. Power electronics space in India is dominated by unorganized regional players, which is expected to grow at higher rate due to huge demand and low penetration. Inverters and UPS are also becoming household items driving the growth of this segment. Some of the Indian players have set up global tie-ups over the last few years and have brought in newer technologies into the Indian industry. Solar Photovoltaic and allied equipment is another segment which is likely to grow at a sustained high growth rate.

IT Hardware

The first application of electronics was in the domain of communication and computing. With the emergence of integrated circuit, the world saw the advent of the digital computer era, and with the advent of microprocessor in the 1970's, the world saw an exponential growth of the Information and

Communication Technology (ICT) industry. Such is its strategic importance that countries across the world have declared it as an essential commodity. With its pool of technical manpower, its proven capability as a design centre for most of the global hardware companies, the country is all ready to emerge as an end-to-end player and global leader in the ICT hardware design and manufacturing space. India produced Rs. 222.7 billion worth of ICT hardware products domestically during FY21.

India has a huge opportunity arising from both import substitution and export led manufacturing in the space of ICT hardware. In addition, ICT hardware holds the promise of high value addition in India, with the manufacturing of the Components (i.e., Sub-Assemblies of ICT Products), Product design and Semiconductor Design being done in the country. Emerging domains of AI, ML, IOT are becoming the new driving forces behind the growth of ICT hardware segment. These domains require the design of specialized Semiconductors, Sensors and Servers for which India has the capability. Another emerging domain in ICT hardware is the Large- Scale Data Centres. India with its technical prowess, cheap labour, large pool of manpower, English as the working language, has the opportunity to lead the world in all these domains.

Electronic Components

The global market for electronic components is expected to reach USD 191.8 billion by 2022, of which the Asia Pacific region is going to capture a dominant share. Following this global trend, the Indian electronic components market is also poised to grow significantly. India produced Rs. 668.0 billion worth of electronic components domestically during FY21. Mobile Phones, Consumer Electronics and Industrial Electronics account for the major demand (82%) for electronic components in India. This is followed by the demand of electronic components in computer hardware, strategic electronics and lighting industry sector. Industries like Mobile Phones, Industrial Electronics (due to the advent of EVs) and Strategic Electronics are expected to witness substantial growth in the near future. A strong component manufacturing base is essential for a sustainable ESDM ecosystem in India. This segment needs very high efficiency of operations to stay profitable. Availability of components and an effective supply chain is vital for EMS companies for their growth.

Strategic Electronics

The strategic electronics segment consists of Military Communication systems, Radars and Sonars, Network Centric systems, Electronic Warfare systems, Weapon systems, Satellite based Communication, Navigation and Surveillance systems, Navigational aids, Underwater electronic systems, Infra-Red (IR) based detection and ranging system, Disaster management system, Internal security systems, etc.

India produced Rs. 296.9 billion worth of strategic electronic products domestically during FY21. India has the second largest armed force in the world, and is considered the seventh largest aerospace and defence (A&D) market globally with a sizeable budget to cover the needs of the country's Army, Navy and Air Force. The large-scale modernization of the defence forces and the drive to manufacture local have become focus areas of the government. Emerging technologies are going to reshape modern day warfare, and will harness the power of electronics to do so. This will make the Indian strategic electronics (SE) sector, mainly comprising aerospace and defence, a vibrant industry over the next decade. The defence sector in the country has been growing at a modest pace for the past few years. However, it is the strategic partnership (SP) model in defence production that will boost the Make in India programme to a great extent. The concept of import substitution is being gradually accepted by stakeholders.

The next decade is likely to see exponential growth in combat systems as well as non-platform based programmes, facilitating smart battalions. Therefore, there are opportunities for electronics manufacturing in India in both standalone systems (as part of platforms) as well as at a sub-system level.

Automotive Electronics

Automotive electronics are the electrically operated systems integrated and mounted in several vehicle applications such as body electronics, safety systems, and infotainment. The automotive market demand is experiencing trends related to advanced mobility solutions, powertrain & vehicle system electrification, and advanced safety systems. Due to the increased implementation of these systems in vehicles, the penetration of automotive electronics has also increased, further creating the demand for automotive electronics products across the globe. India produced Rs. 445.4 billion worth of automotive products domestically during FY21.

The digitization of automotive systems by including connected technologies, in vehicle communication, and ADAS & automated systems have created several opportunities for market growth. The growing integration & adoption of automotive electronics in modern vehicles to deliver enhanced safety & comfort to consumers is one of the major factors driving the automotive electronics industry growth. Several features offered by OEMs including Automated Emergency Braking (AEB) system, airbag system, and lane departure warning, etc. have significantly decreased road accidents worldwide. Automotive electronics along with the presence of broad computing technologies and connected features are enhancing automobile capabilities. Alcohol ignition interlock, accident data recorder system, and emergency call system are some of the features gaining attraction, which will further propel the growth.

The global Auto electronics market is estimated to reach USD 382.16 billion by 2026, growing at a CAGR of 7.3% from 2019 to 2026. Automotive Mission Plan 2016-26 targets India to be among the top three in the world for engineering, manufacturing and export of vehicles and auto components. The growing presence of global automobile Original Equipment Manufacturers (OEMs) in the Indian manufacturing landscape has significantly increased the localization of their components in the country. India has become the preferred designing and manufacturing base for most global auto OEMs for local sourcing and exports.

LED Lighting

The lighting infrastructure in India is evolving rapidly through the replacement of conventional products and LED lighting is extensively used now, in a wide variety of domestic and industrial products ranging from screens and walls to ceilings and wearables. LED lighting offers multiple benefits over the other types of lighting systems including energy efficiency, cost-saving, longer life, lower heat emission, etc. Demand for the LED lighting market in India has been majorly driven by Government initiatives such as Unnat Jyoti by Affordable LEDs for All (UJALA) and Street Lighting National Programme (SLNP), Smart City project, housing for all etc. Under the SLNP, Government aims to replace over 1.34 crore conventional street lights in India.

Further with the decline in Average Selling Price of chips and components, the manufacturing cost of LEDs has declined significantly and has resulted in the growth of the LED market. Opportunities for LEDs have emerged in sectors like automotive, communications, signaling, and entertainment. Global LED lighting market was approximately USD 50.9 billion in 2020 and is expected to grow to approximately USD 135.58 billion by 2028 at CAGR of 12.5%. Indian LED lighting industry is assembling LED lighting products in India and is dependent on imports of chips and electronic components which are not manufactured in India. India produced Rs. 163.3 billion worth of LED lighting products domestically during FY21.

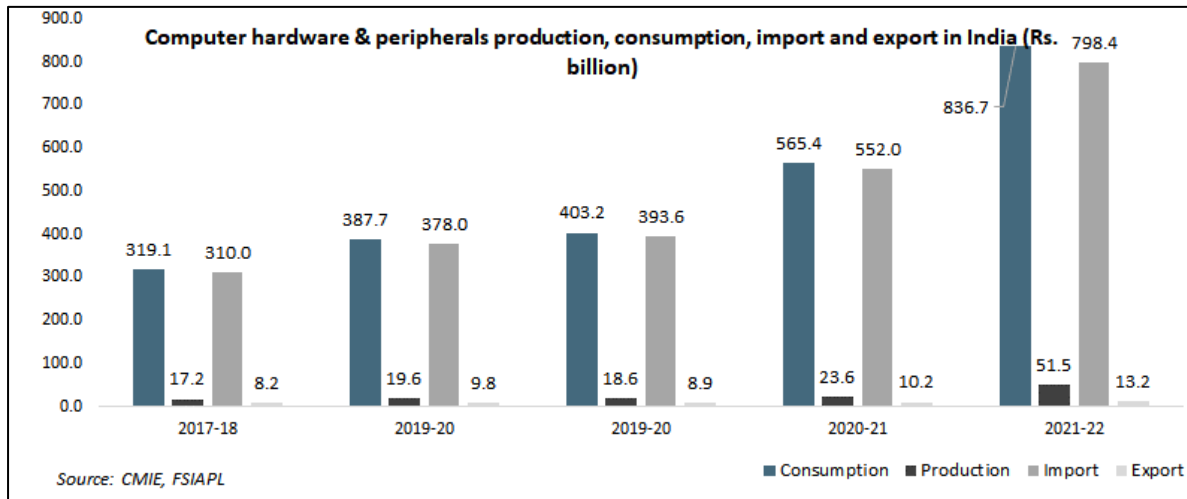
6. OVERVIEW OF COMPUTER HARDWARE & COMPUTER PERIPHERALS INDUSTRY

Mobile phones, laptops, tablets, and desktop computers are the pillars of today's information era because they support the backend infrastructure, facilitate a connected world and contribute to economic development. The ongoing pandemic has further underlined their importance, from interacting with the rest of the world to seeking information and services on a real time basis.

As per ICEA report, electronics segment is important is because this segment is expected to play a crucial role in achieving National Policy on Electronics' target of USD 400.0 billion by the year 2025. Of this target, USD 190.0 billion pertains to mobile phone manufacturing and the remaining USD 210.0 billion can be addressed through the production and export of laptops and tablets, desktops, computer hardware and peripherals. NPE 2019 aims at providing fiscal incentives for boosting exports and transforming India into a manufacturing and export hub.

Despite the overall growth of the Indian electronics industry, that of the computer hardware segment has remained largely insignificant over the years, with more imports and negligible exports. In part, the reason being that these devices fall under the category of Information Technology Agreement-I (ITA-1) products. Thus, the Basic Customs Duty (BCD) on their import is zero. Duties cannot be imposed on such imports as they will be in violation of ITA-1 (signed under the aegis of WTO). There is an inherent cost arbitrage and benefit to importing these devices as against their manufacturing in India. Therefore, unless exports are promoted, it is unlikely that the domestic market will offer any additional growth for companies aspiring to manufacture in India. On the contrary, rising imports are likely to further inflate the import bill and negatively impact the balance of trade situation.

Overview of computer hardware and computer peripherals in India



The consumption of computer hardware and peripherals increased with the CAGR of 27.3% from Rs. 319.1 billion in FY18 to Rs. 836.7 billion. Though production was very low at Rs. 17.2 billion in FY18 but it has increased with the CAGR of 31.5% to Rs. 51.5 billion in FY22. Though the production is still low and cannot fulfil the domestic consumption but it has increased at high rate over the period FY18-FY22. The major reason for exponential increase in consumption is due to global pandemic leading to increased application of technology in every aspect of lives including offices. Work from home led to major consumption of computer hardware by companies, organization and government around the globe.

India continued to import a significant amount of its consumer electronics which led to net forex outflow of USD 42.5 billion in FY19. In 2022, out of the total consumption of Rs. 836.7 billion, only Rs. 51.5 billion was produced in the country while Rs. 798.4 billion was imported. Total imports constitute 95.4% of the total consumption in 2022.

In terms of its GDP, India is amongst the largest economies in the world. However, its rank in terms of international trade is much lower. The fact that exports have grown for both small and large economies (e.g. Vietnam and China), suggests that market size is not the major determining factor for competitiveness and export performance. That would indicate that domestic market size is not the determining factor for FDI, exports and competitiveness especially if the policies used for the sector restrict scale of operations and do not emphasise cost reduction. The use of tariff policy becomes very significant in this context.

Nonetheless, there is a perception that India is in an advantageous position because it has a large and growing domestic market for most electronics products. This view about the significance of India's domestic market appears to be a misconception for many electronics products, including those on which there is a particular emphasis in the Indian tariff policy on electronics.

Trade of selected electronic products from 2018-21 (USD Million)

Products	2018-19		2019-20		2020-21	
	Export	Import	Export	Import	Export	Import
Finished products						
Laptop	40.9	2,966.8	10.6	3,167.9	24.0	4,745.0
Sub-Assemblies						
Battery Pack	32.4	1,612.9	37.7	1,622.2	37.0	1,514.0
Charger/ Adapter	604.1	834.9	952.1	754.6	605.0	845.0
Cables	58.0	178.0	70.0	177.0	88.0	170.0
Tablets	21.0	275.0	24.0	311.0	20.0	497.0
Desktop/ PC	39.0	1,795.0	50.0	1,706.0	62.0	1,836.0
Components						
Hard drive	17.0	484.0	17.0	458.0	11.0	369.0
Graphic card	7.0	106.0	13.0	107.0	6.0	93.0
Total	819.4	8,252.6	1,174.3	8,303.7	853.0	10,069.0

Source: ICEA, FSIAPL

Considering specific products mentioned above, out of the total trade of USD 10,922.0 million in 2021, import is 92.2% of the total trade while exports is only 7.8%. While exports of above products have grown by 2.0% from USD 819.4 million in 2019 to USD 853.0 million in 2021, imports have grown with the higher rate of 10.5% from USD 8,252.6 million in 2019 to USD 10,069.0 million in 2021. Out of the total import of above products, highest imported products are laptops (47.1%), desktop/ PC (18.2%) and battery pack (15.0%). These 3 products together account for 80.4% of the total imports.

Segmentation

The Indian market is price-sensitive in nature and most of the company focus on the low to mid-range segments. The sales are largest in the low-end segment. The computer hardware market includes all physical components integral to computing. The total market values include client computing hardware (desktop PCs, notebook PCs, adaptors, scanners and imaging devices standalone printers, thin-clients and workstations), networking hardware (Ethernet hubs and switches, Ethernet routers, WAN CPE and termination equipment, WAN multi-service switches, WLAN access points, WLAN cards and WLAN switches and appliances), security hardware (content-filtering and anti-spam appliances, encryption/SSL accelerators, firewall and VPN gateways, smart card readers and smart cards), servers hardware (high-end servers, low-end servers and mid-range servers) and storage hardware (hard-disk drives, NAS filers and arrays, NAS gateways, SAN adaptors and connectors and SAN disk arrays).

Segmentation of computer hardware and computer peripherals

Products	Segmentation	Features	
Computers, Monitors & Laptops	Home	Parts used for personal computers are generic because the usage is comparatively less than business use	
	Business	Manufacturers optimize business laptops for traveling and longer active periods than personal-use laptops	
	Gaming	Gaming laptops are the same as standard of business laptops with upgraded features. A gaming laptop means high speed, huge memory, better graphics, and fast processing power	
	Student	A student laptop is sturdy, lightweight and cost-effective	
	Premium	Premium computers and laptops are made targeting the high end customers with more high-end components, style and functionality and other smart features	
	All in one	Companies have come up with desktops which are highly efficient and can be use for all the purposes like work, avid and light gaming	
Chargers & Adapters	Wall adapter	Compatible with various Yoga and IdeaPad notebooks	
	USB type C adapter	Compatible with most USB-C laptops	
	Slim adapter	Compatible with most USB-C laptops available at premium pricing	
	Batteries	Laptop batteries are available depending upon the product model	
Mouse & Keyboard	Wired	A wired mouse and keyboard is a little bit faster and more responsive. It is a cheaper, more practical option for the desktops	
	Wireless	A wireless mouse and keyboard is easy to carry and can be freely moved at will. Wireless mouse is generally used with laptops and while travelling	
	Gaming	Gaming mouse and keyboards have dedicated gaming features	
Accessories	Multi-device	A wireless mouse and keyboard let the user type input into multiple devices like computer, laptop, mobile and tablet	
	Cables & Connectors	Micro & Type C	Tangle free cables and connectors are available with quick charging and data transmission features
		DisplayPort	DisplayPort is a digital interface designed to deliver video and audio over a singular cable.
		Ethernet Adapter	It enables a computer to access an Ethernet network
	Webcams & videos	Wired	Webcams with either interface with device, laptop, or desktop
		Wireless	Wireless webcams connect via bluetooth, either with a built-in Bluetooth card or a Bluetooth dongle via a short USB cord
	Printers	Home	Difference in ink which is suitable for low volume printing
		Business	Made with focus on high volume printing
		A3 printers	Can print a greater and larger variety of paper sizes
		Colour laser	A laser printer that prints in color using four toner cartridges (CMYK) of cyan, magenta, yellow and black which is more efficient
	Laser all in one	enhanced features like printing, copying, scanning, faxing, stapling, duplexing, hole punching and many more	

Source: FSI/APL

Supply chain channel

Consumer electronics sales are majorly high in metro cities due to favourable demographics, a young and working population, rising income levels, urbanization, growing brand orientation and efficient supply chain management. Supply chain management plays a key role in the industry growth. Efficient supply chain intensifies infrastructure drives in the regions of the country and allow vendors to penetrate even into smaller, less developed cities. Due to poor supply chain management, vendors continue to struggle in rural areas in India, where lack of basic infrastructure, including broadband, electricity and formal retail facilities present challenges to vendors in deepening their sales.

Multiple types of retailers

There are typically four types of retailers. The first is the large retailers which sell both computers and computer hardware and characterized by very large floor space or carpet area (20,000 – 30,000 square feet). They source their inventory directly from the OEM.

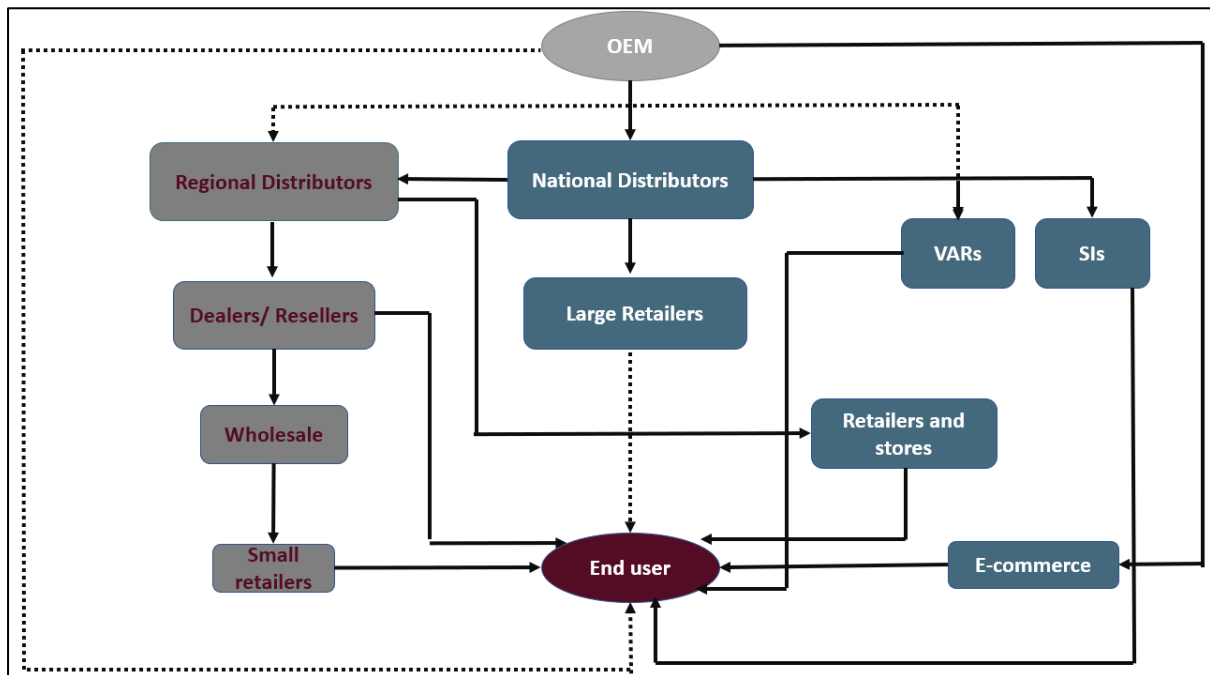
Then there are exclusive stores known as single brand retailer (SBO) which is a single-brand outlet. OEM directly franchise it out under there direct control. Inventory is sourced from National Distributor and regional distributors. Some global brands directly source it to the store. They have small to mid-size floor space.

The third type of retailer is a multi-brand outlet (MBO). They sell multiple brands and companies focus more on these stores because there is a continuous foot falls within these stores. Multi-brand outlets’ floor area varies from 2,000 to 2,500 square feet, either on one floor or on multiple floors. Some of these players have their own warehouse but mostly source from a distributor. Fourth type of retailer is usually called small retailers.

Retailer	Features
Large retailer	Sell IT and Non-IT, owned by large private and public corporations, inventory sourced directly from OEMs; Store size is very large
Single brand outlet	Franchised but under direct control of OEM, inventory sourced from distributors; small to midsize floor space
Multi brand outlet	These stores sell multiple brands, space varies depending upon the type of store; inventory is sourced from distributor but sales is monitored by OEM
Small retailer	

Brands are looking for more ways to directly engage with consumers and give them a differentiated experience. Accelerated by the pandemic, there has been an explosion in D2C brands in India—both established and insurgent which has doubled between the period 2020 – 2022.

PC distribution flow in India



Source: FSIAPL

Distributors in India

If we talk about the channel market and specifically sales of various computer and computer hardware products in India, there are slightly over 20,000 dealers and retailers in addition to nearly 24,000 value-added resellers in India. Supporting this vast channel network are national distributors and regional distributors. The flow of the product from the OEM to the end user is demonstrated in the above picture.

Opening the store adds up to the cost of the companies and therefore companies are focused on partnerships. These brands are covering new cities through partnerships which is around 14,000 partners in India as point of sales including multi-brand stores. Global players have focused on distributors and large multi-brand outlets. Global brands are creating an extension of their own direct channel without the associated cost and complexity of actually owning retail locations by promoting single-brand retailers which they used to do it earlier. With this strategy of distribution, they are enhancing the sales, marketing and operations capabilities of channel partners.

Computer OEM’s distribution partnerships with Indian IT services and solutions companies is strengthening the supply chain of these companies. These partners further leverage their sales and sales support network to distribute hardware and software products at pan-India level and extend the reach of the products even to Tier 1 to Tier 3 locations across the country which was not possible

initially. The partners are using their exhaustive last mile connect and supporting infrastructure in both rural and urban markets across India.

Increasing focus on online channels

Sales through e-commerce websites or through the company's own website are increasing exponentially. The penetration of online retail in electronics and appliances sales was around 3-5.0% in 2016 and it is more than 20.0-25.0% by 2021. This translated to the online retailing in electronics increasing at a compound annual growth rate of approximately 70.0-75.0% during 2016 to 2021.

Though global brands are increasing their stores in India, these brands have also understood that consumer electronics is one of the sectors which is rapidly moving to online channels and therefore in addition to bricks and mortar shops, OEMs are opening their own e-commerce websites in order to tap into the growing number of online buyers who prefer online discounts rather than visiting a retail shop. These players also partner with select ecommerce websites to ensure its customers are able to buy the product as per their buying preferences.

Supply chain challenges

Indian IT hardware supply chain is one of the most complex of any country as it includes a very large number of distributors, resellers and intermediaries. Due to complexity, it becomes difficult for retailers and their suppliers to effectively collaborate on forecasting, replenishment and inventory management. Inventory management is a major problem faced by retailers at the local store and warehouses as excess inventory leads to an increase in inventory costs thereby lowering profits especially for the retailers.

On the other hand, the organized retail segment has an efficient supply chain when compared with the unorganized sector. Needless to say, they have IT systems in place for inventory management. However, computer hardware and peripheral retailers still face problem in implementing IT systems across their stores and integrate with a central warehouse, due to high cost, requiring trained workforce and time-consuming process.

E-Commerce strategy towards efficient supply chain

Online retailers in India face lots of logistics challenges and prefer to fly their packets in the cabin of flights in order to avoid underdeveloped railways and roads. Majority of the goods ordered in India are moved by air, which pushes up the delivery cost of online e-commerce companies. Therefore, online retailers have focused on building their own logistics business in order to reduce air shipment costs. Companies are setting up their own regional warehouses and widening their supplier's network. To reduce air shipments, e-commerce companies are setting up regional warehouses and signing up

more suppliers across the country to ensure customers get orders delivered by the nearest supplier. Having their own network means these companies can handle delivery rescheduling requests better, manage product returns faster and help customers exchange products. In addition to building their own warehouses, they use neighbourhood grocery stores and petrol (gas) stations as delivery points. These companies are even signing agreement with the Indian Postal Service to reach far-flung places in the country.

Industry diversification (industry verticals, applications, client mix, geography, services offered)

The consumer electronics industry is a very complex industry because everything from raw material to final product consist of inputs which are highly technical and need to be sourced from different partners. The list of components is very high and shortage of even one item affect the production of the final products. The industry verticals of the consumer electronics industry can be further drilled down to finished products, sub-assemblies and components. The details about all the products is given below:

Products		
Finished products	Sub-Assemblies	Components
Mobile phone	Battery Pack	Mechanics
Smart watch, bluetooth earphones/ headsets	Digital Camera	Mechanics (SIM Socket)
OTT set top box/ set top box	PCBA	Base Station
Laptop	Charger/ Adapter	Mechanics for mobile phones
	Camera Module; Display Assemblies, Connectors, Vibrator	Earphones
	Motor for Mobile Phone	Speakers
	Others	Flash storage
	Cables	Hard drive
	Tablets	Motherboard
	Desktop/ PC	PCB
		Graphic card

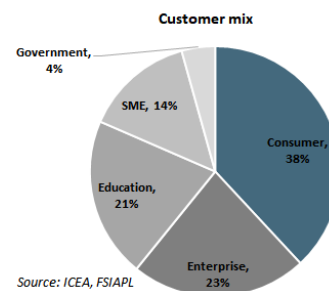
Source: ICEA, FSIAPL

Applications and client mix

The domestic market may be broadly categorized under the following segments from an end-user perspective:

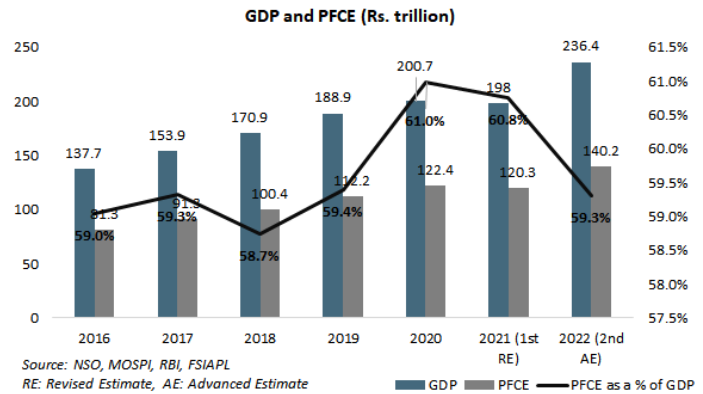
End-user	Segments
Government	Government mandates the procurement of goods for its departments or agencies with preference to higher local content
Large enterprises (B2B)	Large enterprises are a crucial segment for laptops, tablets and desktop computers since their workforce is highly dependent on electronic hardware
Consumer (B2C)	Retail consumers comprise another significant segment of the market
Education	This sector comprises around one-fifth of the market segment in India
Small and Medium Enterprises	SME is another segment that caters to the demand of small and medium enterprises

All these market segments have gained momentum post Covid-19 as entities move to an online mode for conducting their business and providing services. However, the requirements of the target segment are estimated to continue to be met by large imports from China, unless export-led policy initiatives in the form of incentives are provided.

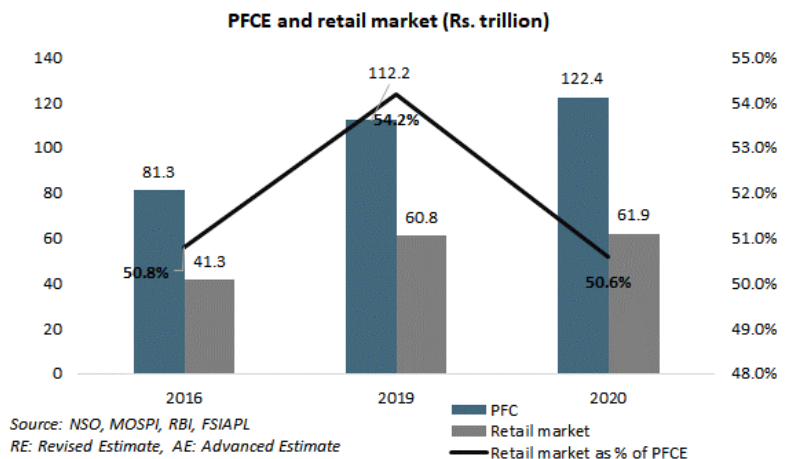


Geography

India is a country of over 1.3 billion people staying in 28 states and 8 union territories. Though technology is the integral part of everybody's life these days, still major part of consumer electronics industry can be considered a discretionary expense. Therefore, consumer electronics expenditure can be easily derived from the GDP of the state of the country. PFCE is around ~60.0% of the GDP over the last 7 years.



Retail industry in India is ~50.0%-55.0% of the PFCE in the country. Out of total retail market, approximately half of it constitute urban while the other half belongs to the rural market. Out of the total retail market of Rs. 61.9 trillion, the share is food and grocery (~65.0%), apparel & accessories (~7.8%), footwear (~1.50%), jewellery & watches (~8.0%), pharmacy & wellness (~3.0%), electronics (~10.0% - 12.0%) and others is ~2.7%. Out of the total consumption of electronics, computer hardware, peripherals account for approximately 10.0% of the electronics market. On the basis of that, we have come to the geographical market size of consumer electronics in India.

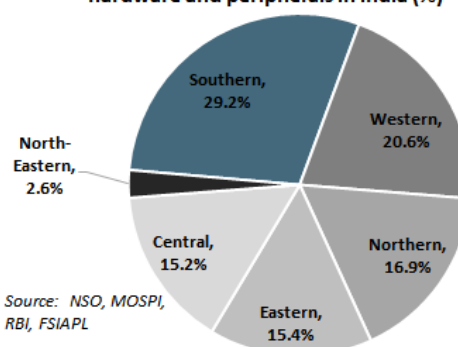


State	GDP (Rs. trillion)	Retail Market (Rs. trillion)	Computer hardware & peripherals (Rs. billion)	% share of market
Maharashtra	28.2	8.5	101.5	12.1%
Tamil Nadu	18.0	5.4	64.7	7.7%
Uttar Pradesh	16.9	5.1	60.8	7.3%
Gujarat	16.3	4.9	58.7	7.0%
Karnataka	16.3	4.9	58.6	7.0%
West Bengal	12.1	3.6	43.5	5.2%
Rajasthan	10.0	3.0	36.0	4.3%
Andhra Pradesh	9.7	2.9	35.0	4.2%
Telangana	9.6	2.9	34.5	4.1%
Madhya Pradesh	9.4	2.8	33.7	4.0%
Kerala	8.5	2.6	30.8	3.7%
Delhi	8.3	2.5	29.9	3.6%
Haryana	7.8	2.3	28.1	3.4%
Bihar	5.9	1.8	21.4	2.6%
Odisha	5.5	1.6	19.7	2.4%
Punjab	5.4	1.6	19.4	2.3%
India	236.4	61.2	836.7	100.0%

Source: NSO, MOSPI, RBI, FSIAPL

The above 16 states account for 92.0% of the retail consumption in India and 80.8% of the computer hardware & peripherals market in India in 2021. Maharashtra (12.1%), Tamil Nadu (7.7%), Uttar Pradesh (7.3%), Gujarat (7.0%), Karnataka (7.0%), West Bengal (5.2%) and Rajasthan (4.3%) account for 50.6% of the total computer hardware & peripherals market in India.

Zone wise market share of computer hardware and peripherals in India (%)



Source: NSO, MOSPI, RBI, FSIAPL

The sales are high in Southern states (29.2%) followed by Western states (20.6%). Maharashtra and Gujarat are only two states considered in western part therefore the percentage share is 20.6%. But metropolitan cities in these two states provide high consumption potential of consumer hardware & peripherals for the companies.

Services offered by companies and retailers in the country

Largest retailers in the country not only provide quality products from their brick and mortar stores but also through their websites. They have discount offers to attract their customers. These retailers tie up with financial institutions and provide various facilities in relation to payments like credit card payments, EMI facilities, Buy Now Pay Later (BNPL) services which help customers to buy expensive product with monthly payment. This seems like a win-win situation for both the customers as well as companies. India being a low-end market create a lot of challenges for premium products to penetrate the market. Innovative financing creates a solution to the players and also help financial institution to take a slice out of the industry growth in the country.

These retailers also act as a buying guide for the customers and help them understand the latest technology across Laptops, Desktops, Printers, Displays and accessories. Along with the warranty and guarantee, companies provide care pack services which is an extended coverage at an affordable price.

Care pack services

Features	1 year standard warranty	Care Pack
Total years of coverage	1 year	2 - 5 years
Next business day exchange	✗	✓
Remote problem diagnosis and support	✓	✓
No deductibles or hidden fees	✓	✓

Source: FSIAPL

Companies are educating the customers about their products and how can users make their devices more efficient and faster to use. They guide their customers about which product would be suitable to them according to their use and accordingly sell their products. Tech guide forms crucial part of company's service because young demographics are more aware about different products and are tech savvy which makes it essential to offer them right products otherwise it may impact their brand image.

Retailers also provide store support and product support to the customers because after sales also form important part of customer satisfaction. Quick and smooth services post sale of the product help the players to not only earn revenue from the customers for their services but also retain the customer in future.

Store support	Product support
Track order	Support & troubleshooting
Store contact	Software & drivers
Store FAQ	Support forums
Care packs	Business products
Return policy	
Payment	

Source: FSIAPL

Companies provide sales support as well as post-sales support on messaging platforms which makes it comfortable for the customers to reach to the companies for their problems.

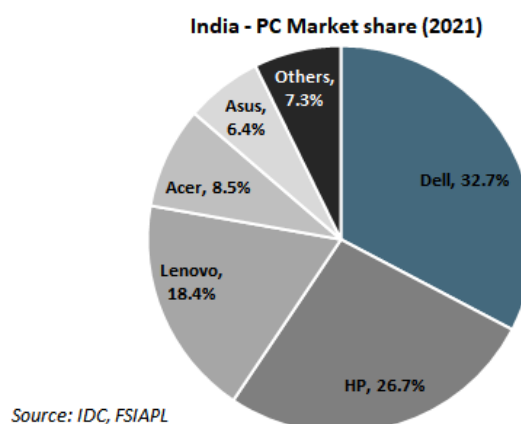
Global player competition (specifically Chinese accessories players)

The global market for electronics is approximately USD 2.9 trillion. Electronics has now become the world's leading traded commodity, along with oil. Indian electronics market is around ~3.0-4.0% of the global market which is very low.

EMS companies such as Foxconn, Flextronics, Jabil, Wistron, Dell, Lenovo, and HP, already have a presence in India primarily foraying into mobile phone manufacturing/ assembly. Global brands such as Samsung, Apple, HP, Dell, ACER, Lenovo and ASUS are also expanding their presence in India. Global brands usually have a leaner cost structure, better economies of scale, understanding of core operations and technology and invest heavily in R&D. Global brands leverage the manufacturing set-up of EMS players to produce and market their products competitively. Global manufacturers’ focus on producing at scale, combined with their need to diversify, augurs well for them to set up base in India and develop a component ecosystem to make products in India for the world. This may fructify provided India offers an incentive plan over the next 4–6 years that may compel companies to shift their production from competing East Asian destinations such as Thailand, Indonesia, Vietnam and Philippines, etc.

Overall, trade data suggest that domestic production is insufficient to meet local demand, with India needing to rely on production in other major manufacturing hubs in Asia, namely in Singapore, Hongkong, Vietnam and China to meet the demands of the large, domestic market.

As per IDC, Dell is the largest PC vendor in India with market share of 32.7% It was followed by HP, which has a market share of 26.7%. The two vendors were ahead of Lenovo, Acer and Asus, which had shares of 18.4%, 8.5% and 6.4%, respectively in 2021.



Most of the leading electronics firms are present in India. With appropriate policies that incentivize increasing the scale of their production, the potential for a manifold increase in manufacturing is high in the country. Below table shows the scope of expansion of output in India for the major firms. Currently, their production in the country accounts for a very small share of their global production.

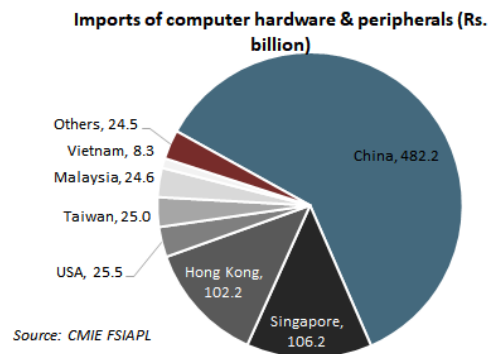
Revenues of major companies in India and globally

Company	Revenue in India (USD billion)	Global revenue (USD billion)	% share of Indian Revenue to global revenues
Dell	5.0	92.2	5.4%
HP	3.0	56.6	5.3%
Samsung	10.0	200.0	5.0%
Apple	1.8	274.5	0.7%

Source: ICEA, FSIAPL

Samsung earned revenue of USD 10.0 billion in 2020 which was highest among the other players. Dell and HP are the 2nd and 3rd in case of revenues earned. While Dell, HP and Samsung have comparatively

good share of Indian revenues in total global revenues, Apple has earned only 0.7% of the total revenues from India. India stands out as one of the few global tablet markets where Apple is not the market leader in terms of installed base and 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.



China – the biggest competitor of domestic players in India

Currently India continues to import most of electronics products, and mostly from China. It is no surprise then that the growth in computer hardware manufacturing in India has been abysmal because India currently suffers a cost disability of 7.52%–9.8% vis-à-vis Vietnam and 17.32%–19.0% vis-à-vis China for the manufacturing of these products locally.

China dominates the global competition with high exports. 66.0% of laptops and tablets are made in China. China exports 25.5% of consumer electronics of top 9 exporting countries of the world which includes US, China, Singapore, Malaysia, Vietnam, UK, Germany, Hongkong and Taiwan. Though Indian market is considered potential market for electronics sales in coming years, domestic players lag behind in manufacturing of computer hardware and peripherals due to low import duty, low economies of scale leading to high cost and high dominance of China in the sector. Therefore, global players especially China dominate the Indian market.

The single largest segment that contributed to the India’s trade deficit was in electronic components. This is due to the import of inputs, such as integrated circuits (CPU, RAM chips), transistors and diodes to be utilised in assembly facilities in the country. China account for 60.4% of the total import of India followed by Singapore (13.3%), Hong Kong (12.8%) and USA (3.2%). All the other countries constitute only 10.3% of the total import of India. Therefore, China is the biggest threat to the domestic players of computer hardware and peripherals market.

China accounts for a majority of global electronics manufacturing, as compared to India’s meagre 3.0%. Domestic manufacturers may not expand substantively as domestic sale/ range-bound market size offers limited opportunities.

List of leading contract manufacturers in Taiwan and China

Company	Headquarters	Manufacturing locations	Revenues (USD million)
HonHai Precision (Foxconn)	Taiwan	China, India, Japan, Vietnam, Malaysia, U.S.	1,78,600
Pegatron	Taiwan	China, Indonesia, US, Europe, India	45,672
Wistron	Taiwan	US, Europe, China, Taiwan, India	29,358
BYD Electronic	China	China	7,616
Universal Scientific Industrial	China	China, Taiwan, Mexico, Poland	5,343
New Kinpo Group (parent – Kinpo Electronics)	Taiwan	US, China, Thailand, Malaysia, Brazil, Mexico, Philippines	4,598
Shenzhen Kaifa	China	China, Malaysia, Philippines	1,899
Pan International	Taiwan	China, Taiwan, Malaysia, Thailand	856
Global Brands Manufacture Ltd.	Taiwan	Taiwan, China	730
Orient Semiconductor Electronics	Taiwan	Taiwan, China, US	586
Shenzhen Zowee Technology	China	China	480
DBG Technology	China	China, Hong Kong	315
3CEMS Group	China	China	NA

Source: ICEA, FSIAPL

India's import of laptops has increased by 42.0% in value terms in the last five years from the period FY16-FY21. 87.0% of which continues to come from China. Just like laptops, two-thirds of all tablets sold in India are imported from China. In absolute terms, India's dependency on China is very high.

Factors impacting cost reduction in electronics manufacturing

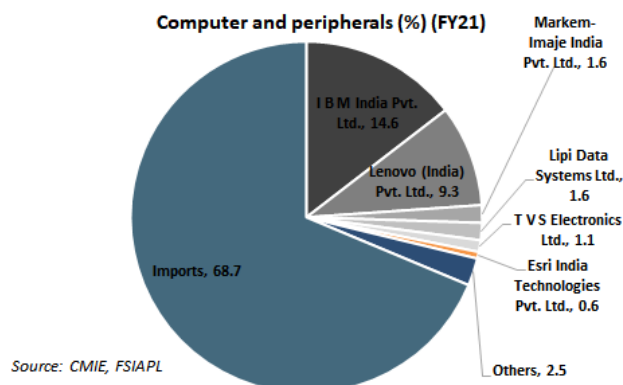
Sr.No.	Factor resulting in cost reduction	India	Vietnam	China
1	Corporate income tax exemption/reductions	0.73%-0.95%	1.5%-2.0%	2.0%
2	Subsidy for machinery and equipment	Nil	0.20%	3.0%
2A	State subsidies in India for capital investments	0.6%-1.2%	NA	NA
3	Cost of power	0.0%	1.0%	1.0%
4	Interest subvention on working capital	0.0%	1.5%-2.0%	3.0%-3.5%
5	R&D subsidy	0.2%	0.4%-1.0%	2.0%
6	Incentive for supporting industry	0.0%	0.5%-1.0%	0.0%
7	Manufacturing incentives	-	0%	1.0%-2.0%
8	Exemption/reduction of land rental	0.0%	0.50%	0.6%
9	Industrial land development support	0.4%	0.50%	0.6%
10	Building (or plug and play)	Negligible	0.30%	1.0%
11	Labor subsidy	Negligible	0.50%	2.0%
12	Logistics	0.0%	0.50%	1.0%
13	Factors affecting 'Ease of Doing Business'	-	1.5%-2.5%	2.0%-3.0%
14	Duty-free imports for creating fixed assets, and of inputs not available domestically	0.0%	0.5%	-
	Total	1.88%-2.7%	9.4%-12.5%	19.2%-21.7%
	Cost disability differential for India, Vietnam and China	-	7.5%-9.8%	17.3%-19.0%

Source: ICEA, FSIAPL

To cater to the global market, India needs to address cost disabilities and promote exports from the country. It is estimated that the country suffers from various disabilities like high cost of power, tax, and ease of doing business. This renders India almost 10%–20.0% less competitive than Vietnam and China, respectively. India must address these issues in the long run. Meanwhile, the government should endeavour to offset these disabilities by providing incentives that are WTO-compliant, easy to implement and help India take off from the export runway.

Competition overview in India

Computer hardware and computer peripherals manufacturing in India is very low. Therefore, global players dominate the Indian market with their products. Also, with the growth of e-commerce, online sales of consumer electronics in India has increased exponentially. Specially, consumer electronics product has high share in total sales of e-commerce player in India. The biggest competitor of Indian players is import. The market share in the computer and its peripherals market is IBM India Pvt. Ltd. (14.6%) and Lenovo (India) Pvt. Ltd. (9.3%) and are the biggest players in the domestic market. Both the companies are the subsidiaries of the global players. The grey market for electronics also remains large in India with illegal products preventing OEMs from increasing their sales.



Cannibalisation also happens at high magnitude in computer hardware and peripherals segment. Sales of mobiles and smartphones impact the sales of laptops and desktops. Competition between domestic telecom players will continue to put downward pressure on mobile data prices, and stimulate consumer upgrades from featurephones on to low-cost, LTE-enabled smartphones. As a result of this competition, many Indians continue to pass on PCs and tablets and are purchasing smartphones to access the Internet. The smartphone market is deepening as the supply of low-cost devices increases.

In case of last stage of distribution, Croma was the first multi-brand store to sell consumer electronics among other retail products. Croma currently has more than 150 stores in India. Other retailers are NEXT Retail (600+ stores), Reliance Digital (1850+ stores), e-zone (92+ stores), Viveks (34+ stores), Lotus (19 stores) and Vijay Sales (120+ stores).

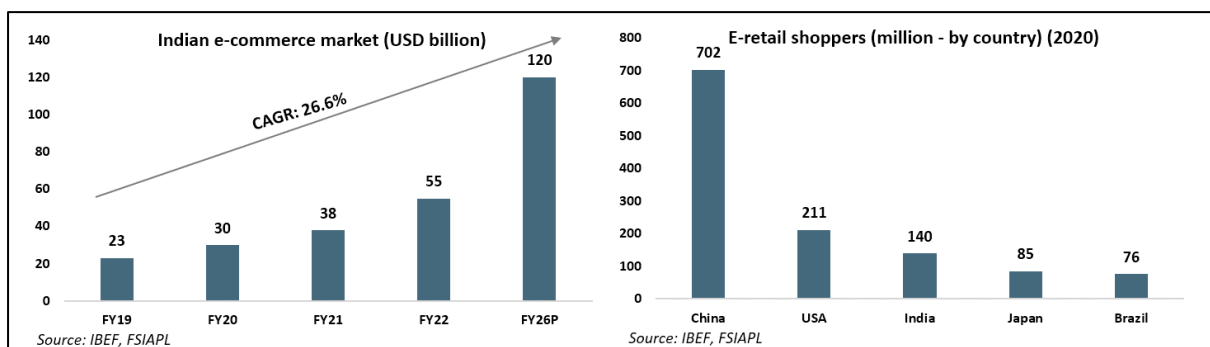
Company	Parent/ Owner	Sub-sector	Stores
Croma	Infiniti Retail (TATA)	Home appliances, electronics	150+
NEXT Retail	Private	Home appliances, electronics	600+
Reliance Digital	Reliance Industries	Home appliances, electronics	1850+
e-zone	Future Group	Electronics	92+
Viveks	Private	Home appliances, electronics	34+
Lotus	Private	Home appliances, electronics	19
Terminal	Salora Retail Ventures	Home appliances, electronics	NA
Vijay Sales	Private	Electronics	120+

Source: FSIAPL

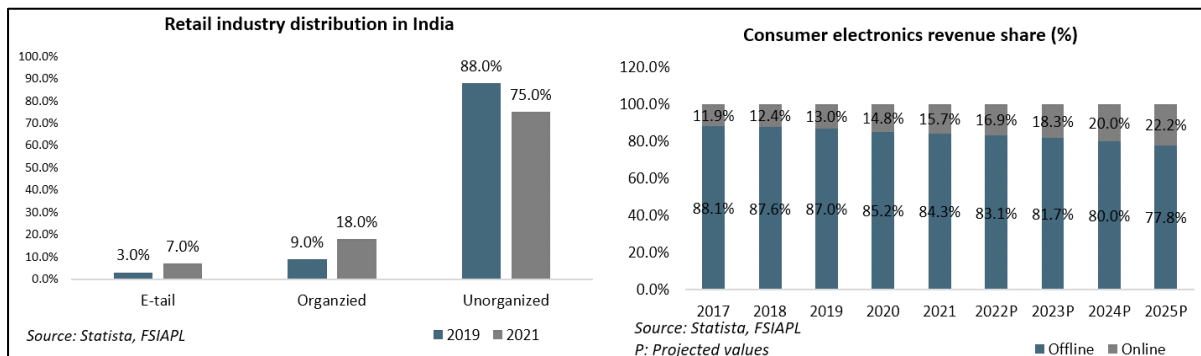
E-commerce

The consumer electronics and apparel segments of the Indian e-commerce retail market represented about 40.0% of the total market share in 2020. All other segments had a volume share of less than 10.0%. At least one electronic item was ordered online from 97.0% of pin codes of the country. 1 in every 2 smartphones are now sold online, 1 in every 5 laptops, desktops and tablets are sold online while 1 in every 10 appliances (personal and home) are sold online.

The competition in the e-commerce business in India is fierce. The market is filled with many local and foreign companies trying to hold the maximum market share. Amazon India and Flipkart are the prominent players in the local market. Amazon India outnumbered all other Indian marketplaces with more than 295 million visitors per month by July 2021. Second was Flipkart with more than 167 million visitors per month. All other Indian marketplaces did not cross the hundred million mark.



Small retailers are typical ‘next-door store’ with small floor space but they are getting squeezed by the multi-brand outlets and eCommerce sites. Online players with vast logistic network and supply chain are enticing customers with deep discounts. Sales have been shifting online, and this is hurting offline retailers. There is a growing trend of customers checking the product price online and then coming to a brick and mortar retail store to negotiate for same price, shrinking their margin and losing interest in running a retail store business. Consumers are also adopting the practice of browsing products, touching and feeling at offline stores but purchasing online due to attractive discounts. It is not possible for brick and mortar retailers to compete against the deep discounts offered by online retailers.



Growing inclination of the customers towards e-commerce purchasing has adversely affected profit margins of small retailers. E-commerce predatory pricing is a major threat faced by the bricks and mortar outlets. A branded PC is available at 5-15.0% discount compared to the maximum retail price. E-commerce companies are selling at even heavier discounts, which is a serious threat to the offline retailers. These companies tend to sell electronic products at 10-15.0% lesser than their MRP.

It is common knowledge that India's e-commerce market India is still in nascent phase, yet it is growing rapidly. India's e-commerce grew at a y-o-y rate of 44.7% from USD 38.0 billion in FY21 to USD 55.0 billion in FY22. The growth is driven by rapid technology adoption especially by consumers and SMBs led by the use of devices such as smartphones and tablets. Online shopping products' diverse portfolio includes electronics, men and women fashion, toys, kids and baby products, books, etc. The largest selling online products are books, apparel and accessories and electronics, accounting for about 80.0% of product sales. Further, e-commerce has captured 20.0% to 25.0% of Indian IT hardware market mainly through organized online brands such as Flipkart, Amazon, etc. E-commerce offers cheaper and reliable transport, storage and logistics cost (relatively), enabling passing on deep discounts to consumers along with the convenience of ordering products from home/ office and cash on delivery.

Many retailers have developed mobile apps to connect with their new and potential customers. Consumers in tier 1 cities majorly refrain from buying smartphones from stores and prefer online products due to heavy discounts and other offers. Specially millennials buy their electronic products from online stores only. Companies directly launch their product on the online platform rather than their retail store. The retail sector is quickly moving towards online sales for IT hardware manufacturers as well because it allows them to launch products across the country on 'Day 1'. This also reduces spending on physical stores' promotions for the manufacturers. On the other hand, traditional physical stores struggle to keep up with the ever-increasing real estate rentals, and inventory carrying cost. Optimizing these costs via use of technology seems to (internet, mobile phones, etc.) imperative as the trend for multichannel experience increases.

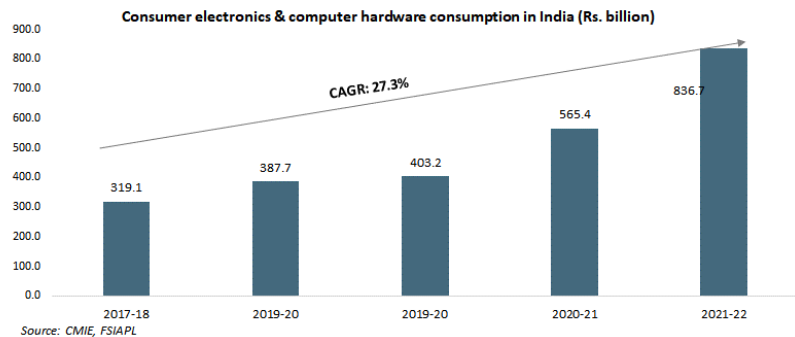
Though the sales from online retail is increasing, brick and mortar still hold a key place in electronic product distribution in the country. A Hybrid model where combination of online and offline market can provide competitive advantage to companies in today's market because it enhances the supply chain efficiency of the companies. Most of the companies have realised this and even if consumers are moving online, brick and mortar retailers are launching their omni-channel strategies and websites. However, the reverse is also happening with online players opening brick and mortar stores in order to enhance online sales experience.

But the government's regulations on e-commerce have tightened. The Indian government announced the introduction of new ecommerce guidelines and rules, which had placed restrictions on foreign e-commerce companies operating in India, effective from 1st February 2019. The rules ban online retailers from selling products from companies or affiliates in which they own an equity interest. Furthermore, inventory of a vendor will be deemed to be controlled by the e-commerce company if more than 25.0% of purchases of the vendor are from the marketplace entity. E-commerce companies are also restricted from entering into exclusive merchandise deals with their partners.

Indian computer hardware & computer peripherals (consumption, economic comparison for manufacturing & distribution, Top 10 products)

India's PC penetration of 15 per 1000 people is very low as compared to USA (784 for 1000 people) and China (41 per 1000 people) which reflects the growing opportunity in India. Similarly, the usage of the computers

and its peripherals in commercial and industrial establishments and offices is likely to grow at a steady pace. Similarly, with the availability of 5G networking capability, network equipment (Routers, Switches, WLAN) are poised for a fast growth in the coming decade.



With the increasing adoption of 'work from home' and 'hybrid working models', the demand for laptops has seen an exponential growth over PCs in the recent past. Both desktops and laptops/notebooks have seen growth owing to the bulk buying by most corporates with the increasing adoption of digitalisation. The Indian traditional PC market includes desktops, notebooks, and workstations, which registered strong growth during 2021. According to International Data Corporation (IDC), the traditional PC market clocked y-o-y growth of a whopping 44.5% in 2021 (January to December) to reach total shipments of 14.8 million units. The notebook category emerged as the volume driver with shipments reaching as many as 11.6 million units in 2021. On the other hand, the desktop category recovered from a steep decline in 2020, to a handsome 30.0% y-o-y growth. This can be attributed to strong demand from enterprises, SMB, and consumer segments. With the country heading towards normalisation, the demand for PCs saw a huge recovery in Q4 2021, clocking shipment of more than 4 million units. The demand for desktops were driven by education and VLE segments, shipping more than 8,00,000 units for the first time in 8 quarters. In Q2 2021, notebooks clocked more than 3 million units of shipment for the second quarter in a row. On the back of the huge commercial demand of PCs, this segment posted a sharp growth of 81.4% on a y-o-y basis in Q4 2021.

Growth drivers

- India is the second-most populous country in the world with a population of 1.4 billion in 2021 with a median age of 26.7 years. With a majority of the population of the country being young, India is expected to grow faster across various sectors, especially IT and IT peripherals market
- India has ~12 million retail outlets, of which only 10 to 15.0% are digitised. Such outlets are expected to grow by more than 35.0% during the period 2021 – 2028. The growth is expected

to be driven by specific categories such as consumer durables and electronics, food and groceries and quick service restaurants (QSRs), which are forecasted to grow at 27.0%, 20.0% and 15.0% y-o-y, respectively. Further, the apparels and footwear category are also expected to record double-digit growth

- India has seen an incremental growth in its urban population over the past decade. The country's urbanisation rate is expected to reach around 40.0% by 2025 driving the demand of IT and IT peripherals
- The IT spending by the Indian government is estimated to reach USD 8.3 billion in 2022, recording a y-o-y growth of 8.6%. This growth is likely to happen on the back of the fact that digitalisation has been gaining increasing traction, and has taken a giant leap in 2020 owing to the pandemic. Migrating from legacy systems to digital would be a major reason for IT spending growth in 2022. According to Gartner, IT spending in India is estimated to increase to USD 101.8 billion in 2022 from USD 81.89 billion in 2021 driving the IT and IT peripherals market
- The per capita net national income in India is estimated to increase from ~Rs. 1,25,000 in 2020-21 to ~Rs. 1,50,000 in 2021-22, at current prices, thereby, indicating the increasing ability to spend
- The huge IT workforce of the country coupled with IT infrastructure has helped India emerge as a global investment hub. The data annotation market in India stood at USD 250.0 million in 2019-20, which is expected to grow to a substantial USD 7.0 billion by 2030 on the back of increasing domestic demand for artificial intelligence. Further, the Indian software industry is also expected to reach USD 100.0 billion by 2025. These factors are expected to drive the IT and IT peripherals market in India in the foreseeable future
- As stated by the Department for Promotion of Industry and Internal Trade (DPIIT), the computer software and hardware sector in India attracted cumulative foreign direct investment (FDI) worth USD 81.31 billion between April 2000 and December 2021 driving the sectoral growth

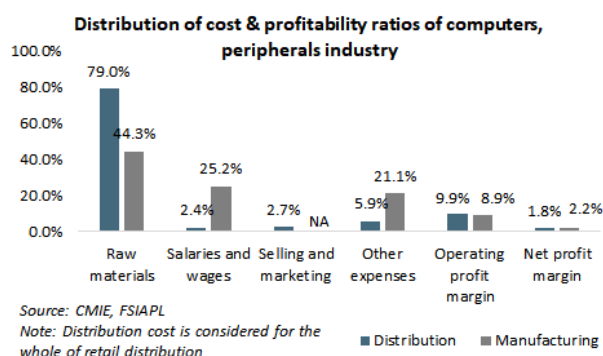
Economic comparison of distribution and manufacturing of computer hardware and computer peripherals

A product such as a computer, laptop or tablet is made up of around 20 components and assemblies that are sourced from around the world. Specifically talking about laptop, a bare chassis forms the outer shell and the first thing that is installed in the chassis is the motherboard (Printed Circuit Board Assembly or PCBA), which is the heart of the product. All other components and assemblies—the hard drive, memory, keyboard, LCD assembly (including the webcam), Bluetooth PCBA, and battery—are connected to it.

After the product is assembled, it goes through rigorous testing processes to make sure it is functioning as per the specifications and is ready for market consumption. Parts and assemblies are checked for correct installation and functionality. The processor, memory, battery, hard drive, power adaptor, webcam, etc., are checked, so is the LCD assembly for colour calibration, brightness, sharpness, resolution, and touch functionality. Functioning of all ports, buttons, keys, and mechanical functionality is checked. Laptops and tablets undergo drop tests to ascertain that the impact resistance of the devices is as per their designs. The product is then sent to a run-in area where the operating system and other necessary software are loaded, and extended hardware testing is undertaken. It is also checked for overheating. To ensure quality and reliability, the product is assembled in an air-conditioned environment, with anti-static flooring, air curtains, etc.

Once the process is complete, the product goes through a quality check. After clearing that, the product is packed, along with the accessories, and is ready for dispatch to the customer.

Comparing the distribution of cost and profitability ratios of distribution and manufacturing business, raw materials form the major cost for distribution business because it includes the finished goods inventory. For manufacturing, 44.3% cost is raw material cost. PCBA is 40.0% of bill of material of raw material cost in manufacturing business. Operating profit is high in distribution business at 9.9% but net profitability was high at 2.2% in manufacturing business in 2021.



Top 10 products

India is highly dependent on import for consumption of consumer electronics products in the country. More than 90.0% of the total product hardware and peripherals are imported. Therefore, the imports numbers give right rationale about the top 10 products consumed in the industry. The details about the top 10 imported products in 2021 are given below:

Rank	Top 10 products	2020-21 (USD million)
1	Camera Module; Display Assemblies, Connectors, Vibrator Motor for Mobile Phones	6,445.0
2	Laptop	4,745.0
3	Smart watch, Bluetooth Earphones/ Headsets	3,534.0
4	Mobile	2,230.0
5	Desktop/ PC	1,836.0
6	Battery Pack	321.0
7	Digital Camera	853.0
8	Charger/ Adapter	845.0
9	PCBA	538.0
10	Tablet	497.0

Source: ICEA, FSIAPL

Out of the total import of USD 21.8 billion in 2021 of the above products, Camera Module, Display Assemblies, Connectors, Vibrator Motor for mobile phones was the top most products with the share of 29.5%. Top 5 products account for 86.0% of the total imports in India.

7. INDIAN MOBILE PHONES MARKET

As per Ministry of Electronics and Information Technology, India produced Rs. 2,226.8 billion worth of mobile phones domestically during FY21. Over 200 manufacturing units for cellular mobile handsets and their sub-assemblies/ parts/ components have been set up in India during the last couple of years, resulting in estimated employment for about 7 lakh persons (direct and indirect). Most of the major brands (both foreign and Indian) have set up the manufacturing plants or have sub contracted their mobile handset manufacturing to Electronic Manufacturing Services (EMS) companies.

Segmentation of mobile phones

A mobile phone is a telephone with access to a cellular radio system so it can be used over a wide area, without a physical connection to a network. A mobile phone can be either a basic cellular phone or a smart phone.

Segmentation on the basis of type

Particulars	Cellular phones	Smart phone
Features	Make calls, send texts, take photos, and access the internet.	Make calls, send texts, take photos, access the internet, play games, and use apps
	Cheaper alternative to a smartphone	May include a digital assistant like Siri or Google Assistant
	Straightforward, simple interface	Sophisticated operating system with customization options
Operating systems	Simple and basic	Different operating systems like android, iOS, Windows and Symbian available
Costing	Costs less than a smart phone	Costlier than cellular phones. Available in different price range depending on the need

Source: FSIAPL

Segmentation on the basis of price

Segment types	Price range
Ultra Low-cost segment	Less than Rs. 3,000
Low- to medium segment	Between Rs. 3,000 - 10,000
Mid range segment	Between Rs.10,000 - 20,000
Affordable premium segment	Between Rs.20,000 - 35,000
Premium segment	Above Rs. 35,000

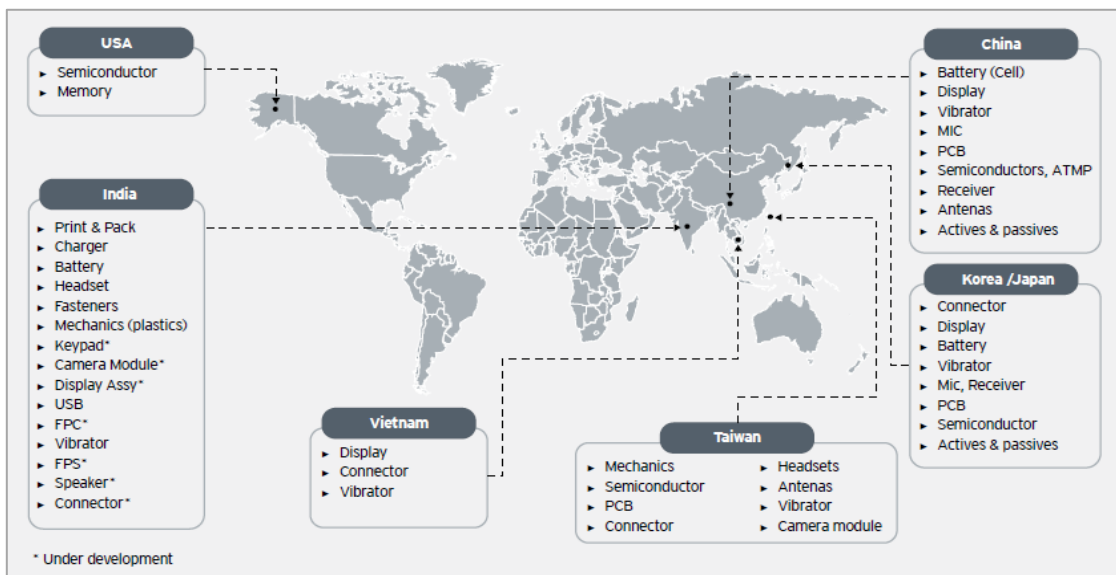
Source: FSIAPL

Supply chain model of a mobile phone

A mobile phone has an extremely complex supply chain that is basically made up of three areas:

- Extracting raw materials: At the bottom of the supply chain is the raw materials extraction, such as metals and metal ores. The raw materials are used to make the basic components of a phone. Often the raw materials are from mines. China is one of the world’s largest suppliers of raw materials for electronic products.
- Manufacturing of components: The next few steps in the supply chain require manufacturers to transform the raw material into a usable material or component. The end product is made up of many different components each with its own supply chain. Component suppliers are numerous and will often specialise in particular parts which may be used by many different brands. A basic smartphone is comprised of the following components:
 - a circuit boards
 - an antenna
 - a liquid crystal display (LCD)
 - a microphone
 - a speaker
 - a battery
 - a camera
- Assembly: Once the components have been sourced from manufacturers they are taken to a factory for assembly. In China the largest company to assemble components for electronic companies is Foxconn. The iPhone is famously made at its Zhengzhou facilities in China.

Supply Chain eco-system of Smart Phone Manufacturing



Source: Ministry of Electronics and Information Technology

The global value chain of smart phones spans across the globe and various countries specialize in certain specific elements of the ecosystem. While development of complete ecosystem may take time

in India. India shall strive to capture a significant share of the assembling ecosystem across entire electronics manufacturing industry.

Distribution channel of mobile phones in India

The distribution channel of mobile phone manufacturers in their domestic country and overseas market are depicted in the table below:

Distribution channel in domestic country		
Seller	Distribution Channel	Consumer
Manufacturer	Exclusive agencies	Consumer
	Distributor (general merchandise stores, discount stores, department stores, home-shopping, online, etc.)	
	Direct Sales (B2B and online channels)	

Distribution channel in overseas market						
Seller	Distribution Channel			Consumer		
Production subsidiaries	Regional sales office	Retailer			Consumer	
		Dealer	Retailer			
		Distributor	Dealer	Retailer		
		Direct Sales (B2B and online channels)				
	Regional distribution office	Regional sales office	Retailer			
			Dealer	Retailer		
		Regional sales office	Distributor	Dealer		Retailer

Source: FSIAPL

Most mobile brands have a strong presence across leading online channels including Amazon, Flipkart, Myntra, Tata CLiQ and Paytm, and has an offline presence in various cities through their own retail outlets and modern trade outlets including Croma, Reliance and Vijay Sales. These brands have presence through its own e-commerce website as well. India's brick and mortar shops still account for around 60% of the overall mobile phone market. Hence many players have strengthened their offline networks in the recent years

Offline distribution strategy of key players are as follows:

- While the traditional offline channel includes national distributor, regional distributor, city distributor and a retail, before a product reaches a consumer, Xiaomi's 'direct to retail' strategy only includes a distributor and a retailer. The company also has a 'Mi Home concept' for offline market, where the product directly reaches the consumer.
- Samsung has service dealers who handle the key accounts for it. It also sells the products through large retailers. Consumers can browse through products in the showrooms and choose

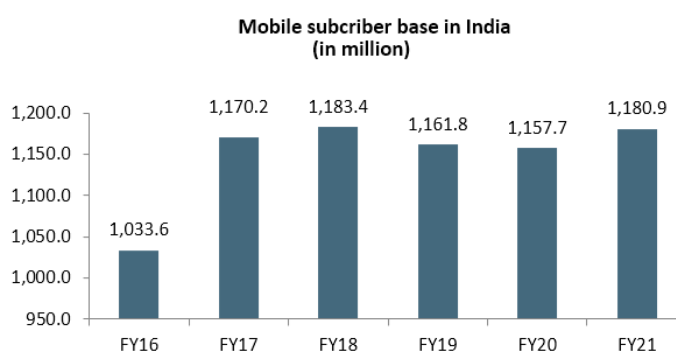
their items of choice. It should be mentioned that Samsung sometimes distributes its products through a single distribution company in a particular territory.

- Realme, which started as an online exclusive brand, is also taking a regional approach and focusing mainly Northern India and some focus on parts of East and West. They have one-layer distribution and lowest margins for trade. They have a pull strategy for the channels.
- Oppo and Vivo distributes its products through various channels such as retailers, distributors, wholesalers and brick & motors stores like single-brand retail outlets.

Mobile subscription trends in India

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. As per Telecom Regulatory Authority of India, the overall mobile subscriber base was 1,180.9 million as of FY21 in comparison to the mobile subscriber



Source: Telecom Regulatory Authority of India, FSIAPL

base of 1,157.7 million as on FY20 registering an increase of 23.21million subscribers during FY21.

Overall subscriber base and tele-density of India (FY21)

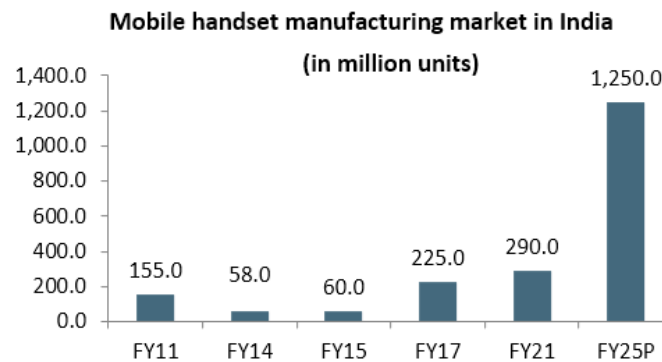
Particulars	Wireless	Wireline	Total (Wireless+Wireline)
Total subscribers (million)	1,180.9	20.2	1,201.1
Urban subscribers (million)	645.2	18.6	663.8
Rural subscribers (million)	535.75	1.7	537.4
Overall tele-density	86.7%	1.5%	88.2%
Urban tele-density	137.1%	4.0%	141.0%
Rural tele-density	60.1%	0.2%	60.3%
Share of urban subscribers	54.63%	91.8%	55.3%
Share of rural subscribers	45.4%	8.2%	44.7%
No. of internet subscribers (million)	799.3	26.0	825.3
No. of broadband subscribers (million)	755.4	22.8	778.1

Source: Telecom Regulatory Authority of India, FSIAPL

Telecoms operators are focusing on extracting greater value from existing subscriptions as well as on improving network service quality and deepening their content strategy in order to retain subscribers. Partnerships, such as the one between Airtel and Amazon announced in January 2021 to sell over-the-top (OTT)-focused prepaid plans, signal a new paradigm, where telcos work together with OTT providers to develop new content-focused products and services. This is especially important as the existing bundling model, whereby OTT services are offered for free, is increasingly becoming commoditised and will eventually become unsustainable for OTT players. India's mobile market and its lofty 5G ambitions could be a victim of rising tensions with China, as the potential ban on 5G gear made by Huawei and ZTE in all Indian mobile networks could raise costs for operators and delay its rollout. This could add further downside pressure on the already bearish forecasts for 5G in India.

Mobile handset manufacturing market in India

India's mobile manufacturing journey began in the mid-2000s with the entry of Nokia. Nokia was attracted by the tax exemptions offered through Special Economic Zones in India, and set up a massive plant at Sriperumbudur in Tamil Nadu. Manufacturing grew impressively between 2008 and 2012 in India, with the major thrust coming from Nokia's production figures. During FY11, the country produced 155 million handsets, exporting 105 million. Subsequently, the Nokia plant scaled down and eventually closed in October 2014, due to a government freeze on assets in response to a tax dispute. Various component manufacturing facilities set up to support Nokia's manufacturing activity also shut down. The lack of policies to attract other smartphone manufacturers led to the collapse of India's mobile manufacturing. In FY14, production dipped to just 58 million units with exports going down to zero.



Source: India Cellular & Electronic Association, FSIAPL

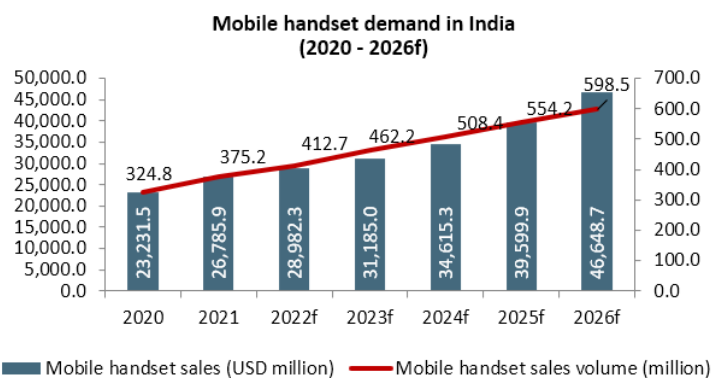
Since 2014, the tide has begun to turn and India is rebuilding its mobile manufacturing base. With policies like the Phased Manufacturing Program acting as enablers, the country today has 120 mobile handset and component manufacturing units which have attracted an investment of roughly USD 1 billion. Production of mobile phones has increased at a CAGR of 30% from 60 million units in FY15 to

290 million units in FY21. If India extends its ambitions to the export market, it could manufacture around 1,250 million handsets by 2025.

Mobile handset market in India

India's mobile penetration rate is estimated to have remained just under 100% by the end of 2021. Mobile handset market was at USD 26,785.9 million in 2021 and it is estimated to reach USD 46,648.7 million by 2026f. 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.

India sold 375.2 million mobile handsets in 2021. The sales are estimated to grow up to 598.5 million by 2026f. 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



Source: FSIAPL

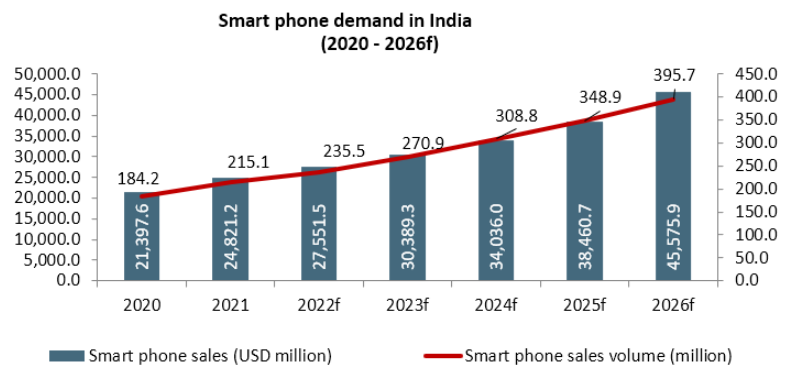
sensitive and voice-centric and this means entry-level handsets will continue to dominate feature phones. Aggressive tactics by local manufacturers mean that low-priced phones are increasingly feature-rich, and often come with cameras, dual-SIM, extended battery life and other features. The focus on 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.

Smartphone market in India

Despite higher anti-China sentiment as a result of political clashes in mid-2020, FSIAPL estimates that cost-focused Chinese vendors (Xiaomi, Realme, Vivo, Oppo) continue to dominate the market at the expense of Indian brands, as well as South Korean vendor Samsung. Sales remained skewed toward the low end of the market, with sub Rs.15,000 phones being a popular category for consumers. Nonetheless, locally-produced smartphones, primarily assembled in India with imported components (though this dependence is declining) are gaining in popularity. Notably, brands such as Karbonn and Lava had taken advantage of deteriorating Sino-India relations to market their Indian credentials, although these devices still rely heavily on components manufactured in China and other parts of the world.

Companies including Apple and Xiaomi produce devices in the country through the use of contract manufacturers such as Hon Hai Precision (Foxconn), while Samsung's single largest smartphone assembly facility is situated in India. The large expansion in the supply of low-end smartphones will continue to catalyze an expansion in volumes. This is expected to be driven further by the launch of Production Linked Incentives (PLI) by the Indian government from 2021 onwards. Indian smartphone boom may 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.

The Indian smartphone market was valued at USD 24,821.2 million in FY21 and it 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.



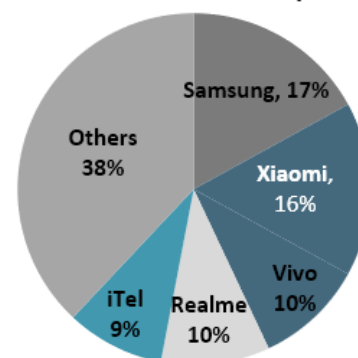
Source: FSIAPL

Rising component prices have led companies to abandon the entry-level category, which accounts for about 75% of the market by volume, choosing to move up the price ladder to the mid-premium segment, which has higher margins. 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.

Key players in the Indian handset market

Samsung captured the top position in the handset market in 2021, taking 17% share. Vivo and Realme followed with 10% market share each. Feature phone shipments reached 86 million units in 2021. Feature phones today pack several advanced features including 4G support, GPS, and even includes support for apps like WhatsApp, YouTube, and so on. iTel led the feature phone market, taking 24% share followed by Lava, Samsung and Jio. Rural consumers buy feature phones and are typically price sensitive and voice-centric and this means entry-level handsets will continue to

Market share of Top brands in Indian handset market (FY21)



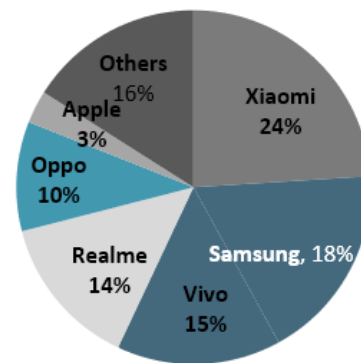
Source: FSIAPL

dominate feature phones. iTel has been leading the feature phone market for the last two consecutive years.

Key players in the Indian smart phone market

- 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 that 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.
- Chinese phone makers Xiaomi, Vivo, Realme and Oppo continue to rule more than 60% of the smart phone market in India in FY21. South-Korean brand Samsung has also contributed to the overall smart phone sales in India.
- Xiaomi maintained the top position in India’s smartphone market in 2021 with 24% share. Component shortage in the second half of the year, which affected volumes in the mass market segment, led to slower growth. Xiaomi grew majorly in the affordable premium segment (Rs. 20,000 – 30,000) in 2021 with the Mi 11x series. The entry-level models, Redmi 9A/9 Power/9, were the major volume drivers. Poco, Xiaomi's sub-brand, emerged as the fastest growing online brand. Going forward, it will keep focusing on the affordable premium segment and offline expansion.
- Samsung remained at the second position in 2021 with 18% market share. Supply chain disruptions, absence of new Note series, reduced focus on the entry-level segment and fewer launches in the mid segment compared to the previous year led to an overall decline. However, Samsung was the top brand in 5G smartphone shipments in Q4FY21. Its campaign on providing maximum bands in 5G smartphones facilitated this growth. It also led the Rs. 20,000 – Rs. 45,000 segments with a 28% share. Samsung’s foldable device (Fold and Flip series) shipments grew substantially in FY21. Samsung is planning to gradually exit the high volume but low value feature phone business in India, with the final batch of devices for the country set to be manufactured by contract manufacturing partner Dixon in December 2022. The company is thought to be focusing its efforts on higher price tiers.

Market share of Top brands in Indian smartphone market (FY21)



Source: FSIAPL

- Vivo emerged as the top 5G smartphone brand in FY21 with a 15% share. It grew 2% y-o-y in FY21 driven by a strong performance of its Y series. It remains the leading player in the offline segment while simultaneously strengthening its hold in the online segment through its sub-brand iQOO.
- Realme was the fastest growing in FY21 with 20% y-o-y growth. Switching to 'Unisoc' to manage component shortages, production expansion through partnerships with EMS, focus on the premium segment with newly launched 'GT series' and high demand for its revamped C series and Narzo series favored this high growth for realme. Going forward, realme is aiming to provide 5G in all smartphones priced above Rs. 15000. It also plans to enter the ultra-premium segment.
- OPPO held the fifth position in FY21 with 10% market share. It now has a leaner portfolio in the budget segment as it is focusing on the upper, mid and premium segments. With a larger focus on higher ASP devices like the Reno 6/7 series, OPPO's play in the mid-premium segment has risen compared to previous years. However, its online presence remains limited.
- 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. iPhone 12 models were purportedly planned to be assembled in the country in 2021.

Government initiatives to boost manufacturing of mobile phones in India

Till 2011, India was a major manufacturing and export hub for mobile phones. However, the pace of exports reduced significantly post shutdown of Nokia's manufacturing facility in 2014. Domestic manufacturing also suffered tremendously. Imports grew and India's mobile industry became largely import dependent. To push electronics manufacturing in mobile manufacturing, the Government in consultation with the industry resorted to Phased Manufacturing Policy (PMP) in 2017. This was aimed at a duty-based import substitution effort that would largely depend upon imposing duties in a phased manner. It was an attempt to start generating domestic manufacturing primarily for domestic use. The exports were negligible.

Five years later in 2022, the approach and the entire strategy of the Government has undergone a change - from PMP (import substitution) to the PLI approach aimed at transforming India into a global hub for mobile and electronics manufacturing. This would bring competitiveness, scale and exports at the centre of the policy focus, replacing the earlier import substitution objectives and supportive policies.

The government's effort in making India a manufacturing hub is evident as below:

- NPE 2019 envisages strengthening India's linkages with global trade, integration with global value chains and build policies and incentive framework to boost exports. The policy aims to transform India into a destination for manufacturing and exports.

- The Ministry of Commerce and Industry is undertaking a major restructuring exercise to support India's outlook towards exports and Free Trade Agreements (FTAs).
- The trade policy is exploring half a dozen new bilateral FTAs with UAE, UK, Australia, Canada and EU in 2022. It has also launched a revitalized India-US Trade Policy Forum in November 2021.
- There has been a complete shift in strategy which goes beyond the vision of import substitution to 'Make in India for the World'. This fresh outlook as noted above is aimed at transforming India's manufacturing prowess by focusing on competitiveness, scale and exports.

Way ahead

With the increased availability of smartphones at affordable prices, the mobile phone has become more than a communication device, and services are becoming increasingly linked through mobile, the Internet and other digital modes of delivery. The growth of 4G services gave an impetus to the advent of the data revolution, which used these services. With the advent of 5G technologies, the future of mobile phone landscape looks promising, and the evolution of 5G would bring various new applications/technologies like artificial intelligence, quantum computing, virtual reality, etc., to the fore. 5G will generate data at unprecedented velocity and at an immense volume. This fast data will fuel a wide range of data-driven services and digital business models.

8. INDIAN MOBILE ACCESSORIES MARKET

Mobile phone accessories are additional devices and equipment used to enhance the functioning of the mobile phones. Indian mobile accessories market includes mobile chargers, cables, power banks, earphones/headphones, smart watches and activity bands.

1) Mobile chargers

Electronic devices such as mobile phones, tablets, cameras, laptops, head gear etc. which drain batteries at faster rates require mobile chargers to charge the batteries. In terms of data transfer, the USB (Universal Serial Bus) cable is used to link a variety of handheld devices to computers. The different segments of mobile chargers are as follows:

Parameter	Types	Features
Connector	USB-Type A Charger	USB-Type A chargers have male connectors that connect to the female Type-A ports present on a host device like computers or laptops. These cable cords have a rectangular shape with the bottom part comprising of the pin connectors
	USB-Type B Charger	USB Type B connectors fit into the female Type B ports present on large peripheral devices like printers, scanners and external storage devices. They have a characteristic square shape with sloped corners on the top
	USB-Type C Charger	USB Type C connectors refers solely the shape of a 24 pin connector which can be either a plug or receptacle. The connector has more pins than past USB cords, hence it can charge devices and transfer anydata quickly
	Mini - USB Charger	Mini-USB chargers are much smaller and thicker compared to other kinds of phone chargers. On one end of this charger cable is a standard flat end USB and on the other end you can find a smaller version of either Type-A, B or C Chargers
	Micro-USB Charger	Micro-USB Charger are physically smaller in size to Mini USBs and are OTG (On-the-Go) compliant. They support a high data transfer
Usage	Wall chargers	A charger connected to a wall. Charging a device from a wall outlet is typically faster than charging it from a USB port
	Car chargers	Car chargers are designed to be plugged into a motor vehicle's electrical system so as to draw power from the vehicle's battery
Port	Single Port	Used to charger solely for one device
	Multi Port	Used to charger multiple devices - smartphone, tablet, laptop






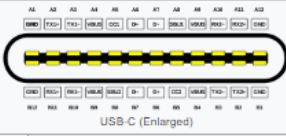




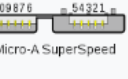

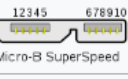

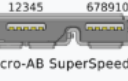
Source: FSIAPL

2) USB Cables

USB is an industry standard that establishes specifications for cables, connectors and protocols for connection, communication and power supply (interfacing) between computers, peripherals and

other computers. A broad variety of USB hardware exists, including different connector types, of which USB C type is the most recent.

Different segments of USB cables

Standard	USB 1.0 1996	USB 1.1 1998	USB 2.0 2001	USB 2.0 Revised	USB 3.0 2008	USB 3.1 2013	USB 3.2 2017	USB4 2019
Maximum transfer rate	12 Mbps		480 Mbps		5 Gbps	10 Gbps	20 Gbps	40 Gbps
Type A connector	 Type-A 1.0 - 1.1		 Type-A 2.0		 Type-A SuperSpeed		Deprecated	
Type B connector				 Type-B	 Type-B SuperSpeed		Deprecated	
Type C connector	N/A			 USB-C (Enlarged)				
Mini-A connector	N/A	 Mini-A			Deprecated			
Mini-B connector	N/A	 Mini-B			Deprecated			
Mini-AB connector	N/A			 Mini-AB	Deprecated			
Micro-A connector	N/A		 Micro-A		 Micro-A SuperSpeed		Deprecated	
Micro-B connector	N/A		 Micro-B		 Micro-B SuperSpeed		Deprecated	
Micro-AB connector	N/A		 Micro-AB		 Micro-AB SuperSpeed		Deprecated	

3) Power banks

Power bank/ portable chargers is a portable device that can store electricity for charging phones, cameras, laptop and computers. They can charge up using a USB charger when power is available, and then used to charge battery powered items like mobile phones and a host of other devices that would normally use a USB charger.

The different segments of power banks are as follows:

Parameter	Types	Features
Type of charging	Universal power bank	Normally charged from a standard USB charger, once fully charged the power bank can be used to charge other devices
	Solar power bank	They have photovoltaic panels which uses sunlight to charge up. They can also be charged from a USB charger as well
	Wireless power bank	Has a charging pad with Qi Fast Charge output and one can place their wireless device right on top of the charging pad
Battery	Lithium-ion power bank	Higher energy density, can store more power and are cheaper to manufacture
	Lithium-polymer power bank	Light weight, slim and considerably fast charging
Capacity	1000 mAh - 20,000 mAh	Power banks come with different power holding capacities

Source: FSIAPL

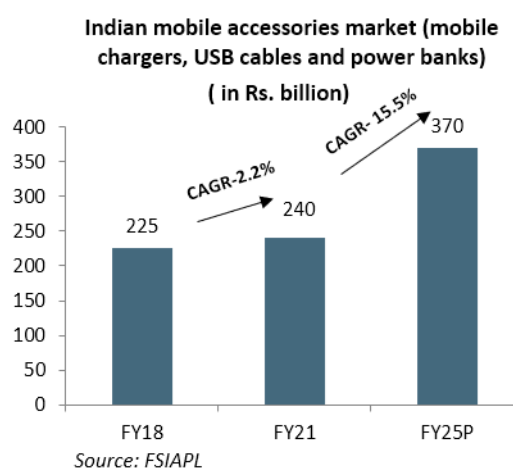
Distribution Channel of mobile accessories in India

Though the market is still largely fragmented and unorganized with grey, unbranded sellers having a big share of approximately 65%, the Indian mobile accessories market will continue to offer opportunities for branded players to survive and grow. The organized online segment has been growing the fastest. Online retail in the mobile accessories market includes retail through e-commerce marketplaces and Direct-to-Consumer platforms.

India has lakhs of multi-brand stores and hundreds of online retailers for mobile accessories. Availability of a strong distribution network and zeal to gain the competitive advantage are the essential driving factors for the providers of the mobile accessories to climb up the ladder. The slashing of the average selling prices of accessories has made the products affordable for consumers from all the economic strata, which has enabled the market to expand enormously. The pullback factors like lack of standardization, threat to privacy, counterfeit production of branded accessories and the compulsion to adhere to competitive pricing remain potent risks often setting limits to the providers of the Indian mobile accessories.

Market size of mobile accessories market (mobile chargers, USB cables and power banks)

The mobile accessories market (mobile chargers, USB cables and power banks) was range bound during the period FY18-FY21 due to the Covid-19 pandemic. The market grew at a CAGR of 2.2% from Rs. 225 billion in FY18 to Rs. 240 billion in FY21. Various brands are entering the market and the mobile accessories market is expected to grow at a CAGR of 15.5%



from Rs. 240 billion in FY21 to Rs. 370 billion in FY25P. The rapid proliferation of smartphones and mobile-enabled devices is a major factor in augmenting the demand for mobile accessories in India. Growth in the segment is driven by growing Gen Z and Millennial population with relatively higher disposable incomes and digital maturity, rising smartphone penetration and affordability of data plans.

4) Earphones and Headphones

Hearable technology is referred to as a hybrid technology which combines the advantage of wearable technology with hearing devices. These devices are used for sound applications, audio masking, directional hearing, audio analysis, noise cancellation, and other applications in various industry verticals. Hearable devices in different industrial applications are now enabled with inbuilt voice-enabled virtual assistant and wireless communication features.

Segmentation of Indian Hearables market

Parameter	Types	Features
Design	In ear design	These are the smallest and most portable type of earphones. They rest in the bowl of the ear, outside the ear canal, though a portion might extend into the canal.
	Ear clip design	These headphones are compact and have ear-loops to keep them in place
	Neckband design	Provides convenient controls, better mics that are nearer to the mouth, and bigger batteries
Connectivity	Wired	These headphones come with dependable wire which one has to insert into their source of music. They offer a stable and lag-free connectivity, which in return ensures top class audio clarity. One doesnot have to worry about charging them
	Wireless	These headphones gets connected with bluetooth and provides freedom of mobility, comfort and convenience
Utility	Music & Entertainment	Driver quality, noise-cancellation, and comfort level
	Workout	Decent sound quality, durability, reliable performance (with minimal dropouts), battery life and noise cancellation (as well as hear-through or transparency modes)
	Gaming	Ability to listen to big sounds and little details
	Travel	Compact and lightweight without compromising on sound or good noise isolation
	Work from home	Comfortable to wear, earphones with mic, good audio output

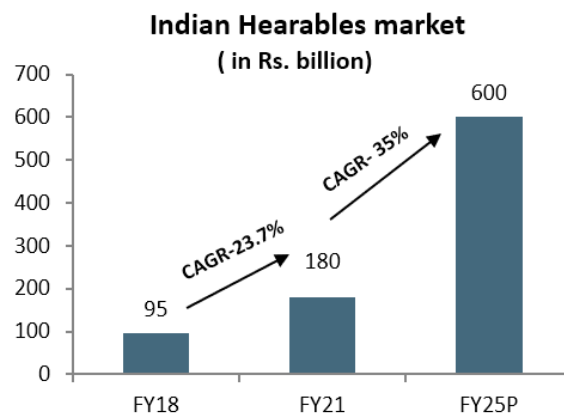
Source: FSIAPL

Market Size of Indian Hearables market

Indian hearables market mainly comprises of headphones, earphones, wireless earbuds and wireless neckbands. The Indian hearables market has grown significantly at a CAGR of 23.7% from Rs. 95 billion in FY18 to Rs. 180 billion in FY21. The growth was primarily driven by new launches, discounts across channels and aggressive marketing by various brands. The market growth in the last one and half year was aided by an array of affordable products targeting gaming, office and online education segments.

The market is expected to grow in double digits at a CAGR of 35% from Rs. 180 billion in FY21 to approximately Rs. 600 billion in FY25P.

Headphones have evolved and witnessed vast improvements in terms of technology over the years. Shift in preference of consumers from wired headphones to wireless headphones is expected to affect the market significantly. Wireless communication via Bluetooth earbuds technology has been a breakthrough for headphones. Wireless headphones are enabled with Bluetooth and Wi-Fi technology, which facilitate the users to link their phones to other devices and headsets. The revolution of technology in the miniaturization of electronic devices is allowing to design more reliable & portable wearables and contributing to the continuously changing health monitoring tactic. The popularity of neckband devices is also increasing as users are upgrading from a wired ecosystem and also want an alternative hearable device. Hearable computing is the next emerging technology, which promotes hands-free calling and communication, ensures voice communication in a noisy environment, and provides a solution by combining signals from in-ear and external microphones.



Source: FSIAPL

Key players in the Indian hearables market

The Indian hearables market has been witnessing an exponential growth in players in the last one and a half years with more than 40 companies entering the fray. The market for wireless hearing aids grew significantly aided by an array of affordable products targeting gaming, office and online education segments. The share of the Rs. 1,000-2,000 price band grew to 60% of the overall shipments in FY21. India saw the maximum number of new launches in Q3 2021 with a major emphasis on the low-to mid-price segments (less than Rs. 2,999). In this quarter, brands like realme followed the partner brand/sub-brand strategy with the launch of Dizo and Omthing respectively to expand their reach and enhance competitiveness.

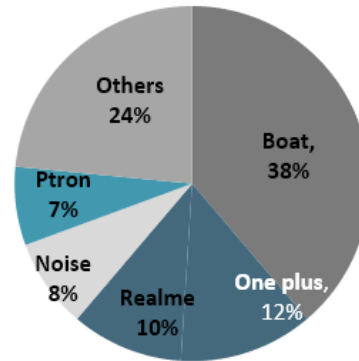
Top 5 players constitute more than 75% of the Indian hearables market. Boat topped the charts with a 40% share of the total hearables' shipments in Q2FY21. It was followed by Oneplus (12%), Realme (10%), Noise (8%) and Ptron (7%).

- Boat captured approximately 38% market share in the overall Indian market during Q2FY21. Apart from its strong integrated marketing strategy and keeping up with the trends of multiple launches and value-for-money offerings, it also actively participated in multiple sales events, like the Amazon

Great Freedom Sale and Amazon Prime Day Sale. It even hosted a ‘Boathead Days’ sales event on its e-brand store. Above all, its model Airdopes 131 was the bestseller for the second time and reached 1 million units for the first time.

- OnePlus added many products to its portfolio. However, the OnePlus Buds Pro mainly caters to the premium segment. OnePlus also offered discounts on its existing models during the Amazon Freedom Sale and at Amazon Rakhi Store.
- Realme rose to the third spot with an 10% share driven by the success of its mid-range device Buds Air 2 and latest release Buds Q2 Neo in the low-price segment. In addition, realme stood number one in the mid-price segment of Rs. 3,000 – Rs. 4,999. The Chinese brand also hosted a ‘realme Fan Festival’ event on its e-commerce website to provide the latest devices at a more affordable price point.
- Noise had an 8% share and moved one step up to grab the spot driven by multiple offerings in the low-price segment. Like Boat, it also launched new devices during the Amazon Prime Day Sale and offered multiple discounts. It added newer devices such as the Buds VS102, Buds VS103 and Buds VS303 to its low-range VS series during Q2FY21.

Market share of Top brands in Indian hearables market (Q2FY21)



Source: Counterpoint, FSIAPL

Players are looking to make these devices locally to reap the benefits of the government’s PLI scheme. Domestic manufacturing is gaining more significance as more brands continue to partner ODMs to bring made-in-India devices and enhance their production capabilities. Noise partnered with Optimus, promising to offer multiple locally made devices in the coming quarters. Similarly, realme announced a partnership with Khy Electronics. Another Indian brand, Ambrane, set up a unit to locally manufacture audio devices. Ptron also elevated the progress of its domestic manufacturing capabilities and expects to double its revenue by next year. Mivi launched its first Made-in-India hearable device, DuoPods A25 during FY21. Mivi is the second brand after Ptron to launch a Made-in-India hearable product. Boat also decided to shift most of its manufacturing base to India to provide more affordable devices. The latest entrant, Aiwa, is also exploring a similar possibility, which indicates that more brands are likely to follow this path to offer new features at low price points.

Growth drivers for Indian Hearables market

The various factors impacting the growth of the Indian hearables market are as follows:

Increase in Demand for Wireless Headphones and infotainment Devices

Headphones have evolved and witnessed vast improvements in terms of technology over the years. Shift in preference of consumers from wired headphones to wireless headphones is expected to affect the market significantly. Wireless communication via Bluetooth earbuds technology has been a breakthrough for headphones. This is attributed to the fact that wireless headphones are enabled with Bluetooth and Wi-Fi technology, which enable the users to link their phones to other devices and headsets. The sale of electronic infotainment devices such as mobile phones, laptops, vehicle infotainment device, digital music systems, digital TV, and others, is growing at a high rate, and headphones are major accessories for these devices. Smart headsets offer multiple benefits, including convenience; high-definition sound quality; multiple user facility; and freedom from wire maintenance, portability, and mobility. Thus, increase in use of infotainment devices is one of the factors driving the growth of the hearable market.

Rapid technological advancements in voice user interface

Implementation of technologies such as Bluetooth/NFC speakers, Wi-Fi, noise cancelling technology, language translation, fitness & heart rate tracking, voice-based personal assistants, contextual location-based suggestions, environment-based noise suppression or audio enhancement, and gesture & touch-based control, have led to increase in adoption of smart headphone across domestic and commercial sectors. Hearable computing is referred to as the next emerging technology in the coming years. It is a genre of wearable computing and is expected to be the ultimate human user interface. It promotes hands-free calling and communication. In addition, it ensures voice communication in a noisy environment and provides a solution by combining signals from in-ear and external microphones.

Surge in demand for miniaturized wearable electronic devices for health monitoring

Rapid advancements in the trend of wearable health devices in the consumer market has majorly impacted the growth of hearable market. Consumers are investing in smart hearables to monitor health status and prevent from the treat of hearing loss in extreme noise conditions. Furthermore, the revolution of technology in the miniaturization of electronic devices is allowing to design more reliable & portable wearables and contributing to the continuously changing health monitoring tactic. Also, these devices allow to continuously monitor human vital sign during the daily life or in clinical environment with benefits of minimizing discomfort and interference with normal human actions. All these factors of emerging wearable health devices assist in boosting the market growth.

Multiple Use-Cases

There are multiple use cases for hearables, which lead consumers to own multiple pairs of headphones/earphones for specific purposes. This is particularly applicable to Gen-Z and Millennials who are evolved users and hence own different set of devices for gaming, travel, calling and other purposes. This is also leading to shorter replacement cycles for hearables as consumers diversify their use-cases and brands deliver with innovative products in a fast-paced market.

Unbundling of Earphones and Smartphones

Over the past few years, most national and international smartphone companies have stopped providing wired earphones in their phone boxes. This unbundling has led to consumers buying hearable products separately - which created significant opportunities for players in the hearables market to innovate beyond the simplistic wired earphones provided by the smartphone companies, and offer a wide range of wired, wireless and truly wireless earphones and headphones.

5) Smart watches and activity bands

Indian wearables market consists of smart watches and activity bands. The betterment of mobile networks helped the development of the wearable industry in India.

Segmentation of Indian Wearables market

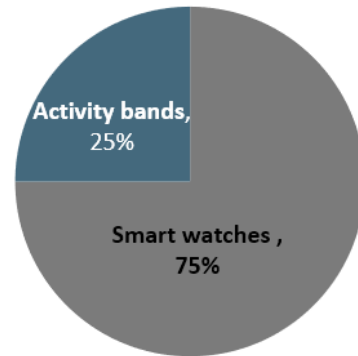
Parameter	Types	Features
Product	Extension	They require a tethered phone to work. They are connected to the phone via Bluetooth, and can show notifications, alerts, calls, and more
	Standalone	Not connected with the phone. They have eSIM cards powerful microprocessors. They have built-in GPS, bluetooth, music library, social media etc
Application	Personal	Helps with notifications and personal updates
	Wellness	Analyze steps, distance, calories, heart rate, pulse rate etc.
	Sports	Energy level measurement, oxygen saturation measurement, stress level tracking, heart rate measurement, breathing rate, sleep analysis and menstrual cycle tracking
Operating systems	Watch OS	Watch OS is the operating system of the Apple Watch, developed by Apple Inc.
	Andriod	Andriod OS connects smart watches with andriod phones
	Wear OS	Wear OS is a version of Google's Android operating system designed for smartwatches and other wearables.
	RTOS	Real-Time Operating System (RTOS) encompasses proprietary operating systems that also allow for third-party applications on smartwatches.
	Tizen	Tizen is the operating system that Samsung has built its wearable devices

Source: FSIAPL

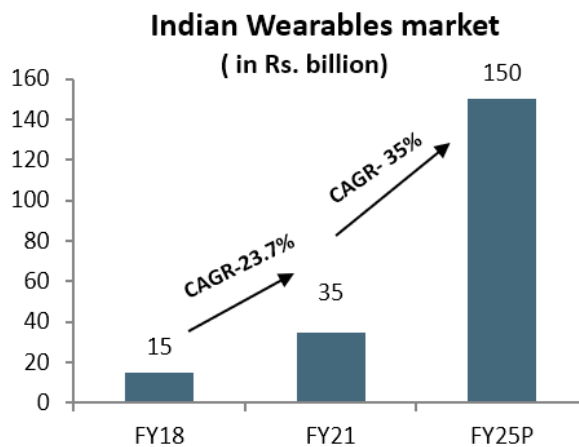
Market Size of Indian Wearables market

Indian wearables market comprises of headphones, earphones, wireless earbuds, wireless neckbands and speakers. The Indian wearables market has grown significantly at a CAGR of 32.6% from Rs. 15 billion in FY18 to Rs. 35 billion in FY21. The sales volume penetration of wearables in India was approximately 2% indicating massive headroom for growth in the future. Out of the total wearables market, smart watches constitute 75% of the Indian wearables market, while activity bands hold around 25% of the balance Indian wearables market. This would further be boosted as technological improvements in the wearables market reduce costs and prices causing the market to shift towards advanced product categories, offering better quality and consistency. The market is expected to grow in double digits at a CAGR of 43.9% from Rs. 35 billion in FY21 to approximately Rs. 150 billion in FY25P.

Product wise market share of Indian wearables market (FY21)



Source:FSIAPL



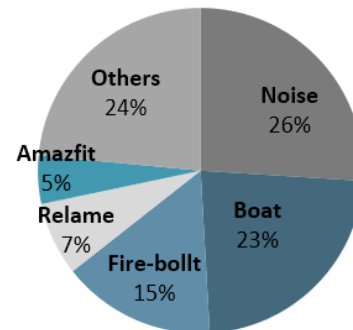
Source: FSIAPL

Wearable technology enables personalized healthcare by real-time, continuous, and longitudinal health monitoring. As a result, healthcare practitioners are now beginning to adopt wearables for patient monitoring, which is handy for prediction, prevention, and timely intervention. The proliferation of new entrants in the mass market segment has increased competition, putting a lot of pressure on brands to differentiate in a market that is getting inundated with lookalike products. Despite the logistic challenges and increase in freight costs, vendors remained aggressive in their shipments and were able to manage the inventory in Q1FY23.

Key players in the Indian wearables market

India-based brands have captured over two-thirds of the watch market with their aggressive offerings and marketing spends on digital platforms. Noise maintained its lead for the sixth straight quarter with a 26% market share in Q3FY21, followed by Boat with a 23% market share. Fire-Boltt replaced Huami for the third position as its share jumped to 15% in Q3FY21 from 5.5% from a quarter before. Realme with 7% share entered the fourth position backed by its newly launched watches, and Amazfit settled at the fifth position with around 5% market share. So far, these new-age brands have been able to limit the incumbent smartphone brands’ ability to make any dent in their growth and continue to dominate the wearables category.

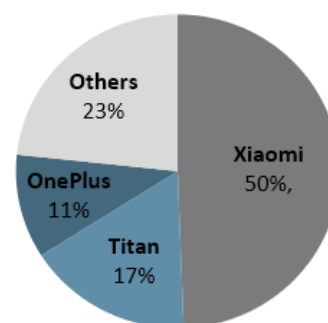
Market share of Top brands in smart watches category (Q3FY21)



Source: International Data Corporation, FSIAPL

Indian activity band makers are developing strong in-house capabilities, innovative product offerings, technology superiority, and effective alliances including online e-commerce partners, retailers and distributors across the country. Xiaomi leads the market with 50% market share as of Q3FY21, while Titan and One Plus has 17% and 11% market share as of Q3FY21.

Market share of Top brands in activity band category (Q3FY21)



Source: International Data Corporation, FSIAPL

Growth drivers for Indian Wearables market

The various factors impacting the growth of the Indian wearables market are as follows:

Improved features available makes the product attractive

Smartwatches are designed to, either on their own or when paired with a smart phone, provide features like connecting to the internet, running mobile apps, making calls, messaging via text or video, checking caller ID, accessing stock and weather updates, providing fitness monitoring capabilities, offering GPS coordinates & location directions, and more. These features make the smart watches and activity bands attractive among the consumers.

Growing health awareness

The growing health awareness amid consumers boosts the demand for smart watches and activity bands. A smart watch allows the user to take the required health precautions ahead of time. Doctors

can simply check their patients' health status from afar and maintain, prescribe, or treat them as needed. Most of the smart watches monitors the heart rate, nervous system activity, emergency or inactivity alerts, and health events.

Integration of AI

Artificial intelligence (AI) integration ensures smart diagnostics and patient health monitoring. Individual participation in sports and other physical activities is expanding, and this, combined with the emerging trends of adventure recreation & wellness tourism, is fuelling market expansion.

Large base of youth

Based on the United Nations Development Program's 2020 estimates, India's median age is 28.4, which is significantly younger than that of China (38.7) and the US (38.3). The working population of India makes up 55% of the total population of India. India will continue to contribute to the working population globally. Moreover, India has the largest Millennial and Gen Z population of approximately 708 million, which constitutes approximately 51% of India's total population. Large base of young population, who are technology driven and brand conscious is a major growth driver for wearables market in India. The repurchase frequency of the young population is also on a higher side indicating that the growth in future will be led by not just the new smartphone users, but also the existing smartphone users, who are likely to repurchase these products.

9. INDIAN HOME AUDIO MARKET

Home Audio segment majorly includes tower speakers, multimedia speakers, home theatre systems, sound bars, wired speakers and portable speakers.

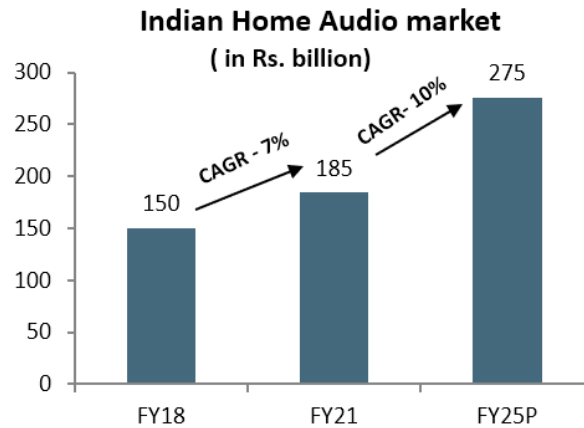
Segmentation of Indian Home Audio market

Parameter	Types	Features
Design	Stereo speakers	Stereo speakers has two speakers - right and left, with one of them usually housing the power amplifier. While these speakers are good enough for music, one will miss out on a sub-woofer which typically helps in reproducing bass. Stereo speakers come in a variety of sizes and shapes, including thin and compact ones, floor standing towers to bookshelf format ones.
	Tower Speaker	The bigger size and more woofer drivers of tower speakers allows them to move more air through the drivers than desktop or bookshelf speakers, which generally allows them to produce deeper, more impactful bass than standalone bookshelf speakers.
	Multimedia Speaker	Deeper bass and clearer vocals are made possible with multimedia speakers. These speakers are perfect for anyone who wants to listen to good music, watch movies at home.
	Portable Speaker	Lightweight and easily portable. It is suitable for out of home experience especially during travel.
	Home Theatre Systems	Home theatre packages are setups that come bundled an audio amplifier-receiver, a subwoofer and satellite speakers. There is a subwoofer that reproduces low frequencies and others are satellite speakers for the front, center and rear channel speakers. These are suitable for in-house audio experience.

Source: FSIAPL

Market Size of Indian Home Audio market

The penetration of Home Audio market in India is rapidly increasing owing to the steady growth of the entertainment industry in the country. The Indian home audio market has grown moderately at a CAGR of 7% from Rs. 150 billion in FY18 to Rs. 185 billion in FY21. Rising disposable income, changing lifestyles, rapid urbanization, digitalization and advancement in technology are some of the major factors driving home audio equipment market. The rising awareness and adoption of home audio equipment due to advertisement and promotions on online channels boosts the sales of these products. The audio and voice user interface technologies are evolved significantly to offer a wide range of platforms providing higher levels of integration, immersive sound quality, wireless connectivity and on-device artificial intelligence for smarter devices. The home audio market is expected to grow in double digits at a CAGR of 10% from Rs. 185 billion in FY21 to approximately Rs. 275 billion in FY25P.



Source: FSIAPL

Growth drivers of Indian Home Audio market

Modern consumer is likely to invest on good-quality audio products that can be used in daily life. Continuous technological advancements in such devices and increasing investments in research & development are further accelerating market growth. Increasing usage of music storage equipment, popularity of high-speed data streaming and online entertainment are expected to foster innovations in the home audio equipment market. Other trends fostering the growth of Indian Home Audio market are as follows:

Growing innovation and advances in technology

There has been a tremendous growth in technology over the past decade. Vendors are upgrading their existing products with new technologies to improve sound quality and to provide users with a good audio experience. Technologies such as noise cancelation, extra bass, sound retrieval system, and dolby digital sound provide an enhanced listening experience to consumers.

High preference for wireless technology

Consumers are increasingly demanding for wireless technology for hassle-free maintenance and fast functionality. One of the major factors driving the sales of wireless speakers globally is the ability of speakers to easily stream audio content wirelessly. These portable speakers are available in various sizes and designs to suit consumer requirements. Most of the portable devices such as laptops, smartphones, and tablets are equipped with Wi-Fi and Bluetooth connectivity, allowing users to stream content wirelessly.

Rise in number of smart homes

Many homes are being remodelled to smart homes. A smart home consists of media and entertainment gadgets, consumer electronic devices and other smart electronics that interact with

each other through a home network. Smart speaker segment in India is expected to witness significant growth over the period of next few years, with multiple players entering the segment. The smart speaker segment in India has mostly been dominated by players such as Amazon and Google for the past few years. However, brands such as Xiaomi, Bose, and Sony have entered the segment recently, with new speakers powered by Amazon and Google's voice assistants. The demand for smart homes is driving the need of smart audio speakers.

10. INDIA DIGITIZATION TREND

India Digitization Trend

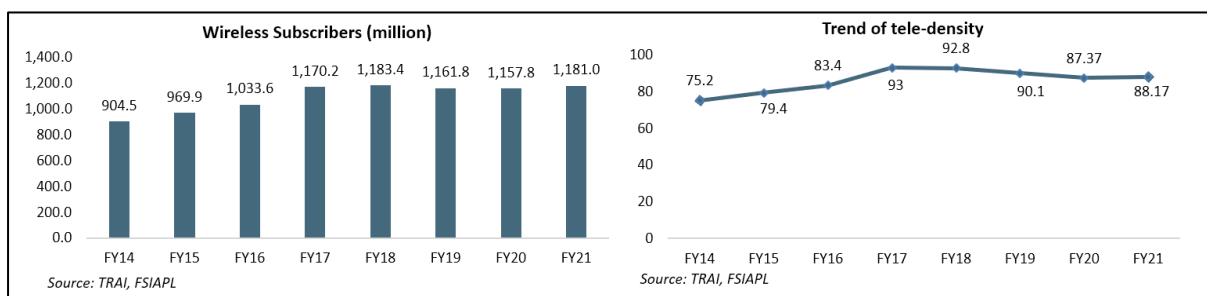
Every organization is already an IT organization today. Corporates or SMEs, every workplace today is accessing digital tools and solutions most organically to be more efficient and grow in competitive world. Futuristic technologies are adopted faster than ever in which global pandemic played a major role too. India is one of the fastest-growing digital markets in the race, after the US and China. The IT industry here has witnessed growth in the last two decades, and soon, it is expected to touch the USD 100.0 billion mark.

The Government of India has also been pushing and supporting for rapid digitization, leading to increasing investments in the IT sector. In the recent Union Budget of 2022-23, the Government of India has made a few announcements which will lead to some major developments in India on the digitization front. Apart from direct digitization in banking, higher education, and health sector, the country will soon have its own Digital Currency issued by the Reserve Bank of India. Also, the government has announced that data centres will be given infrastructure status in the country allowing it to play a key role in enabling a digital economy.

Some of the major technological trends that will continue to transform the Indian digital landscape industry in the present year are the Internet of Things, Artificial Intelligence, Blockchain Technologies, Cloud Adoption, and Data Security & Cyber Protection.

Mobile phones and Internet

India's consumer digital economy is projected to reach USD 800.0 billion by 2030, from USD 85-90.0 billion in FY20, driven by increase in online shopping. Increasing mobile density and mobile internet users played key role in creating this market. The increasing mobile density and mobile internet users are being leveraged upon by companies to offer their services using mobile as an access device as well as an access channel. Companies have been offering various products and services through all three channels – SMS, USSD (Unstructured Supplementary Services Data) and mobile applications.



The increase in smartphones has helped to accelerate the adoption of digitization in businesses. Further, it has led to numerous innovations in business models and strategies, payment mechanisms such as tokenisation and scanning of QR code for making payments using smartphones. These have facilitated the shift from cash to non-cash payments.

Internet usage is on the rise in India. While the average Indian until 2013 used to spend more on voice services than on mobile data services, the majority of an average mobile bill now pertains to data charges according to a report by the Internet and Mobile Association of India (IAMAI). As on end March 2022, there were over 778.1 million and 47.2 million wireless and wireline broadband subscribers, respectively across the country. The increase in internet penetration has ensured adoption of digitization across the country.

Internet and Broadband Subscribers (million)

Segment	Category	Internet Subscribers (million)		% Growth
		Mar-20	Mar-21	
Wired	Broadband	19.2	22.7	18.6%
	Narrowband	3.2	3.2	0.2%
	Total	22.4	26.0	16.0%
Fixed wireless (Wi-Fi,Wi-Max,Radio&VSAT)	Broadband	0.6	0.7	11.5%
	Narrowband	0.0	0.0	0.0%
	Total	0.6	0.7	11.3%
MobileWireless (Phone+ Dongle)	Broadband	667.7	754.7	13.0%
	Narrowband	53.5	44.0	-17.9%
	Total	721.2	798.6	10.7%
Total Internet Subscribers	Broadband	687.4	778.1	13.2%
	Narrowband	55.8	47.2	-15.3%
	Total	743.2	825.3	11.0%

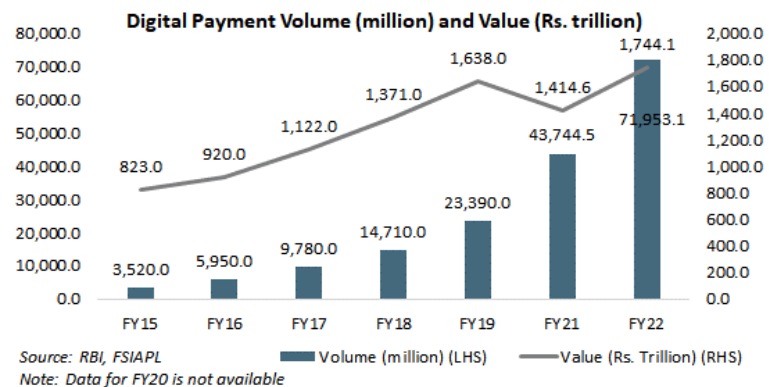
Source: TRAI, FSIAPL

The Internet subscriber base in the country in FY21 stood at 825.3 million as compared to 493.96 million in FY18. The total broadband subscriber base of the country in FY21 is 778.1 million whereas it was 412.60 million in FY18. The number of urban and rural Internet subscribers is 502.53 million and 322.77 million respectively. The total internet subscribers for urban are 107.3 per 100 person while it is 36.2 per 100 person in rural areas.

Progress in Digitisation

As per RBI, the digital payments in the country have witnessed a CAGR of 54.0% and 11.3.0% in terms of volume and value, respectively over the period FY15-FY22, demonstrating a steep shift towards digital payments. Within the digital payments, retail electronic payments comprising credit transfers (NEFT, fast

payments (IMPS and UPI)) and direct debits (ECS, NACH) have shown a rapid growth in terms of volume and value, respectively over the same period.



Digitalization of payments

India's track record of adoption of digital technology is reflected in IMD's World Digital Competitiveness Ranking, 2021 in which it ranks 18th in a list of countries with population of 20 million or more, well ahead of most emerging market peers. Along with the government sector, other economic entities have also been rapidly adopting digitalisation as an enabling tool in their operations. India has been one of the fastest growing market for digital transactions, with a rich variety of digital payment options. As per ACI Worldwide, Indian financial technology comprises 40.0% of the world's digital transactions. India made 48.6 billion real-time payments through 2021 and was ahead of China.

The Indian real-time payments market is well developed compared to other markets such as the U.S., the U.K., Canada, and Australia. The widespread adoption of real-time payments resulted in an estimated cost savings of USD 12.6 billion for Indian businesses and consumers in 2021. This in turn – which helped to unlock USD 16.4 billion of economic output, which represents 0.56% of the country's GDP.

With consumers increasingly shifting from cash- to mobile-based real-time payments, skipping payment cards, the share of real-time payments of the total payments volume will rise to over more than 70.0% in 2026. That is expected to push savings for businesses and consumers forecast to rise to USD 92.4 billion in 2026, helping to generate an additional USD 45.9 billion of economic output, (equivalent to 1.12% of the country's forecasted GDP).

Real-time payments were available in India since the launch of Immediate Payment Service (IMPS) in November 2010. However, the Unified Payments Interface (UPI) (a real-time payments system

launched in April 2016 based on IMPS) is the one that disrupted the payments space in the country, enabling real-time payments using QR codes, mobile numbers, and virtual IDs. The wider adoption of UPI-based mobile payment apps, growing acceptance of QR code payments among merchants and increasing preference for digital payments amid the COVID-19 pandemic helped real-time payments account for a 31.3% share of total payments transaction volume in 2021.

IMD world digital competitiveness ranking

The IMD World Digital Competitiveness Ranking presents the 2021 overall rankings for the 64 economies covered by the WCY. The rankings are calculated on the basis of the 52 ranked criteria: 32 Hard and 20 Survey data.

Digital trend – India

Factors	2017	2018	2019	2020	2021
Knowledge	37	46	38	39	41
Technology	59	53	49	50	44
Future readiness	51	48	46	56	50
Overall	51	48	44	48	46
Competitiveness and digital rankings					
Digital	51	48	44	48	46
Competitiveness	45	44	43	43	43
Peer Group Rankings (Asia Pacific - 14 countries)	12	11	11	11	11
Population > 20 million (29 countries)	21	18	18	19	18

Ranks given out of 64 countries

As per IMD world digital competitiveness ranking, the overall ranking has improved from 51 rank in 2017 to 46 rank in 2021. In countries where population is more than 20.0 million, the rank has improved from 21st in 2017 to 18th in 2021. Knowledge is the know-how necessary to discover, understand and build new technologies. Technology factor take into consideration overall context that enables the development of digital technologies. Future Readiness is the level of country preparedness to exploit digital transformation.

Knowledge

Sub factors	2017	2018	2019	2020	2021
Talent	43	43	38	41	38
Training and education	57	59	47	51	43
Scientific concentration	6	26	28	29	47

Talent	Rank
Educational assessment PISA - Math	-
International experience	35
Foreign highly-skilled personne	41
Management of cities	45
Digital/Technological skills	21
Net flow of international students	43

Training & education	Rank
Employee training	34
Total public expenditure on education	35
Higher education achievement	53
Pupil-teacher ratio (tertiary education)	57
Graduates in Sciences	6
Women with degrees	-

Scientific concentration	Rank
Total expenditure on R&D (%)	47
Total R&D personnel per capita	53
Female researchers	-
R&D productivity by publication	2
Scientific and technical employment	61
High-tech patent grants	49
Robots in Education and R&D	21

Talent and training & education rank has improved over the last 5 years while rank in scientific concentration has deteriorated over the years.

Technology

Sub factors	2017	2018	2019	2020	2021
Regulatory framework	59	56	55	53	52
Capital	28	3	3	7	4
Technological framework	63	62	62	62	62

Regulatory framework	Rank
Starting a business	57
Enforcing contracts	63
Immigration laws	42
Development & application of tech.	26
Scientific research legislation	24
Intellectual property rights	44

Capital	Rank
IT & media stock market capitalization	12
Funding for technological development	29
Banking and financial services	25
Country credit rating	53
Venture capital	22
Investment in Telecommunications	1

Technological framework	Rank
Communications technology	36
Mobile Broadband subscribers	45
Wireless broadband	63
Internet users	64
Internet bandwidth speed	52
High-tech exports (%)	40

Sub factors like regulatory framework, capital and technological framework has improved but the rank is still low in case of regulatory framework due to complexity during starting a business and enforcing contracts. High investment in telecommunications improved the rank of capital from 28th in 2017 to 4th in 2021. Due to low per capita internet users and wireless broadband, the rank is lowered to 64 and 63 respectively impacting the technological framework rank.

Future Readiness

Sub factors	2017	2018	2019	2020	2021
Adaptive attitudes	59	54	54	55	55
Business agility	29	33	29	52	36
IT Integration	56	56	56	55	51

Adaptive attitudes	Rank
E-Participation	28
Internet retailing	57
Tablet possession	60
Smartphone possession	52
Attitudes toward globalization	22

Business agility	Rank
Opportunities and threats	16
World robots distribution	12
Agility of companies	24
Use of big data and analytics	15
Knowledge transfer	29
Entrepreneurial fear of failure	55

IT Integration	Rank
E-Government	59
Public-private partnerships	23
Cyber security	32
Software piracy	48

Though internet penetration in India is increasing, per capita utilisation is low which led to low rank of 55th in adaptive attitudes but it has improved from rank of 59th in 2017. Similarly, lack of e-governance dragged the rank of IT integration to 51st in 2021 though it too improved from 56th rank in 2017. On the other hand, business agility rank has lowered from 29th in 2017 to 36th in 2021.

11. DEMAND DRIVERS: INDIAN ELECTRONIC PRODUCTS & ACCESSORIES INDUSTRY

The Indian consumer durables market is broadly segregated into urban and rural markets and is attracting marketers from across the world because of high demand in the country with more than 100.0 billion potential customers. The sector comprises of a huge middle class, relatively large affluent class and a small economically disadvantaged class. Global corporations view India as one of the key markets from where future growth is likely to emerge. The growth in India's consumer market would be primarily driven by a favourable population composition and increasing disposable income. Along with it, demand growth is likely to accelerate with easy access to credit. In the nut shell, multiple factors including rising incomes, favourable demographic trends, enterprise modernisation and increased urbanisation, will support device sales over the coming 10 years.

Abundant talent at low cost

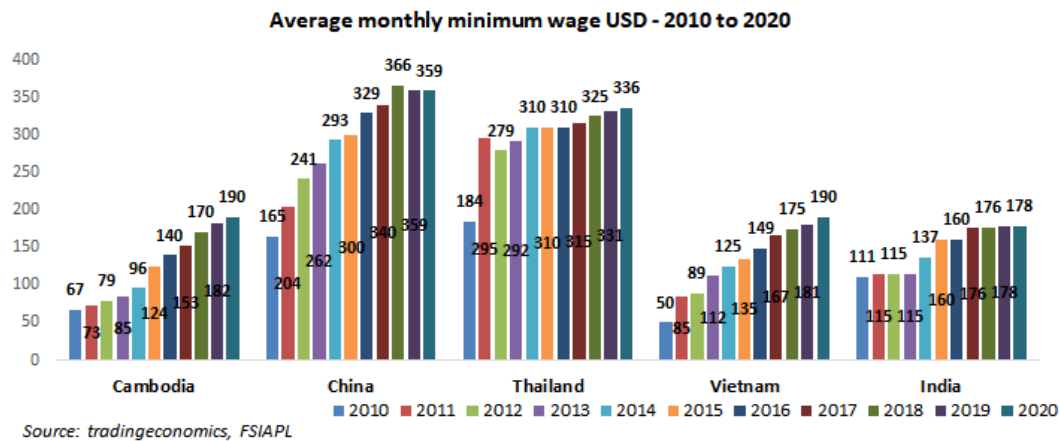
India is rapidly developing to become a global powerhouse. India is home to a massive consumer base, and the working-age population is soaring. The global corporate arena is swiftly turning to the Indian talent pool due to several push-pull factors like the technique of problem-solving, digital literacy, relentless hard work, low cost and the ability to adapt to new technology. Transition is the law of nature, and Indian talent has the potential to circumvent this global transition.

India has gained a well-deserved place in the global information technology sector. The UN Department of Economic and Social Affairs stated that India is the leading contributor in terms of talent to the world, with around 17.5 million Indians settled in various parts of the world. The country also has a low-cost advantage, which is 5-6 times less compared to the western countries.

Silicon Valley, the tech capital of the US, is home to some of the top companies across the globe. The top 15 firms in the Valley constituted almost 40.0% of tech employees and generated USD 1.4 trillion in revenue in 2020. According to Gulf Today, around one-third of all engineers in the tech capital are of Indian origin, and approximately 10.0% of the world's largest tech companies have CEOs of Indian origin. Experts believe that the training and rearing of Indian managers can help in creating a pipeline of potential leaders.

India is the sixth-largest economy in the world and India's share in the global GDP is close to 3.1%. A recent report released by the Bank of America states that India is projected to be the world's third-largest economy by 2031. India's imperative rise will be backed by three key drivers which are India's

talent pool, rising financial maturity and development of mass markets. India’s talent pool has been constantly shaping the country’s economy as they bring in digital skills, enhanced talent and a plethora of ideas that too at low cost as compared to western counter parts.



Back in 2015, China’s increasing wages were followed by other neighbouring countries. Its cost of skilled factory labor, which is much higher than the minimum wage was already higher than that of the other countries we compared it to. By 2018, the difference had grown. It’s been quite clear for years that other Asian countries are better suited for making simpler and lower-cost products especially country like India.

It’s clear to see that India is more likely to provide cheaper manufacturing than more expensive neighbours like China and Thailand.

Government support (PLI schemes)

The government spending on IT will grow 12.1% to USD 9.5 billion in 2022. The growth estimate is less than a 15.0% jump in the government’s IT spending in 2021 and higher than the 5.0% growth estimated at the global level for 2022. Gartner estimated software vertical to witness the highest growth at 27.9% in 2022 to USD 2.195 billion while the IT services vertical to grow 13.4% to USD 2.4 billion.

The government’s efforts aimed at tech sector modernization continue to drive investment into domestic ICT manufacturing as evidenced by the latest 2022-23 Union Budget of India. The government’s PLI has shown early promise and could be pivotal in driving down device costs and stimulating sales. Original design manufacturers have grown their manufacturing presence in the country, taking advantage of the PLI.

To boost manufacturing, generate employment, increase exports and cut imports, the government had launched the Production-Linked Incentive, or PLI scheme. At present, it covers 14 significant sectors and involves a total outlay of Rs. 3.0 trillion.

Objective of these schemes entail Make in India, incentivizing foreign manufacturers to start production in India and incentivize domestic manufacturers to expand their production and exports. The PLI scheme is to promote manufacturing in India which will further lead to job creation in various sectors in the country. These schemes aim at reducing pollution, climate change, carbon footprint, reducing oil and fuel import bill through domestic alternative substitution, boost job creation and economy.

In April 2020, the government introduced three new mobile handset manufacturing schemes, namely the PLI, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECES) and Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme, which collectively have an outlay of Rs. 500.0 billion. In February 2021, it was reported by official sources that around 20 firms had filed for PLI incentives with the government targeting over USD 15.0 billion worth of IT hardware manufactured under the scheme by 2025-26.

- In September 2021, 52 companies have applied for availing PLIs for white goods makers, proposing an investment of Rs. 60.0 billion in manufacturing components for air conditioners (ACs) and LED lights. In case of Electronic / Technology products, approved financial outlay over a five-year period is around Rs. 50.0 billion under the Ministry of Electronics and Information Technology.
- In June 2021, the government extended the PLI scheme for large scale electronics manufacturing by a year (until FY26), giving a boost to the industry. The PLI scheme was initially approved on November 11, 2020 in 10 key sectors (including electronics and white goods) to boost India's manufacturing capabilities, exports and promote the 'Atmanirbhar Bharat' initiative.
- India is on a path to become a USD 1.0 trillion digital economy by 2025. In addition, projects such as 'Smart Cities' and 'Digital India', coupled with factors such as the government's push for data localisation, Internet of Things (IoT) market in India, are expected to increase the demand for electronic products. The PLI scheme aims to boost the production of electronic products in India.
- The National Policy on Electronics 2019 is targeting production of one billion mobile handsets valued at USD 190.0 billion by 2025, out of which 600.0 million handsets valued at USD 100.0 billion are likely to be exported.
- The PLI scheme, which has been approved for 16 electronics firms, including 10 manufacturers of mobile handsets, would further improve India's role in the global mobile market and complement the goal of making the country a global mobile production hub for manufacturers.

Atmanirbhar Bharat

Atmanirbhar Bharat which translates to 'self-reliant India', is a phrase the Prime Minister of India Mr. Narendra Modi and his government used and popularised in relation to the country's economic development plans. The phrase is an umbrella concept for India to play a larger role in the world economy, and for it to become more efficient, competitive and resilient.

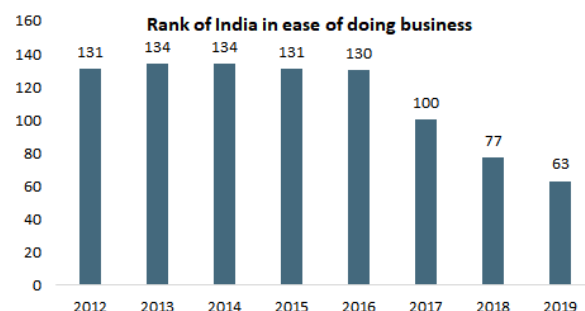
On 12 May, 12 October and 12 November 2020, the government announced a total of three Atmanirbhar Bharat packages worth USD 390.0 billion in relation to the COVID-19 pandemic in India. The second and third economic stimulus packages were labelled Atmanirbhar Bharat Abhiyan 2.0 and 3.0. As part of the Atmanirbhar Bharat packages, the government decided to change the definition of Small and medium-sized enterprises (MSMEs), boosting scope for private participation in several sectors, increasing FDI in the defence sector; and the changes found support in many sectors.

As per ICEA report, the government set out the target of achieving USD 300.0 billion worth of electronics manufacturing by 2026 to make India self-reliant and do not depend majorly on imports. The factors integral for increasing manufacturing in the country are PLI schemes, improving trading logistics, technological upgradation, developing the domestic ecosystem and need for building domestic companies, consistent policies, economies of scale and improving competitiveness. There are challenges like predatory prices from global players, unfair competitive practises, access to capital and interest subvention, lack of knowledge and skills in the sector.

Given the critical role of electronics in other economic sectors and its importance for implementing social policies and public services, it would continue to be a priority sector under Atmanirbhar Bharat Abhiyan. The sector will also play a key role in implementing the PM's vision of a 'Digital India'. The electronics sector has the potential to become one of the top exports of India within the next 3–5 years, together with a number of products that could emerge as important exporting hubs.

Ease of doing business in India

The Ease of doing business index ranks countries against each other based on how the regulatory environment is conducive to business operation and stronger protections of property rights. Economies with a high rank (1 to 20) have simpler and more friendly regulations for businesses. Ease of doing business is crucial to every country who is looking to become a manufacturing hub. It improves the countries reputation at the global level which attracts global



Source: Tradingeconomics

players to set up their manufacturing units in the country. Investors get keen in investing into the country, high competition leads to better product development and consumers are also benefitted in the end with good quality products at low prices.

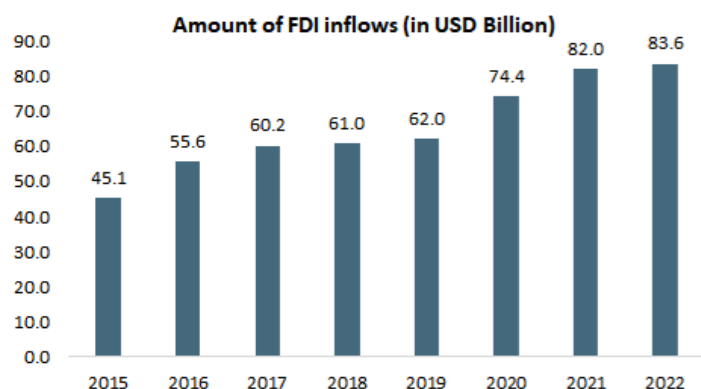
Among the chosen 190 countries, India ranked 63rd in ease of doing business 2020: World Bank Report. In 2014, the Government of India launched an ambitious program of regulatory reforms aimed at making it easier to do business in India. The program represents a great deal of effort to create a more business-friendly environment. India is one of the top 10 improvers, for the 3rd time in a row, with an improvement of 67 ranks in 3 years.

India has emerged as one of the most attractive destinations not only for investments but also for doing business. India jumps 79 positions from 134th (2014) to 63rd (2019) in 'World Bank's Ease of Doing Business Ranking 2020'. With the aim to improve the ease of living and the ease of doing business in India, more than 25,000 compliances have been reduced by the GoI. Positive changes have led to this impressive improvement in India's ranking.

FDI policies

FDI is when a company takes controlling ownership in a business entity in another country. With FDI, foreign companies are directly involved with day-to-day operations in the other country. FDI is an important monetary source for India's economic development. Economic liberalization started in India in the wake of the 1991 crisis and since then, FDI has steadily increased in the country. India, today is a part of top 100-club on Ease of Doing Business and globally ranks number 1 in the greenfield FDI ranking.

The non-resident or Indian company does not require prior nod of the RBI or Government of India for FDI under automatic route. The government's approval is mandatory under government route. Consumer electronic comes under the 100.0% automatic route category which is favorable for the industry as the FDI process is simpler for automatic route than the government route.



Source: IBEF, Government of India

According to the Department for Promotion of Industry and Internal Trade, FDI equity inflow in India stood at USD 572.8 billion between April 2000 - December 2021, indicating that the government's efforts to improve ease of doing business and relaxing FDI norms have yielded results. Total FDI inflow into India in the third quarter of FY22 stood at USD 17.9 billion, while the FDI equity inflow for the same period stood at USD 12.02 billion. Data between April-December 2021 indicates that the computer software and hardware industry attracted the highest FDI equity inflow of USD 10.25 billion, followed by the automobile sector at USD 5.96 billion, services sector at USD 5.35 billion, trading sector at USD 2.99 billion, construction activities at USD 1.59 billion, and drugs and pharmaceuticals at USD 1.21 billion. Between April-December 2021, India recorded the highest FDI equity inflow from Singapore (USD 11.69 billion), followed by the US (USD 7.52 billion), Mauritius (USD 6.58 billion), the Cayman Islands (USD 2.74 billion), the Netherlands (USD 2.66 billion), and the UK (USD 1.44 billion). In the same period, Karnataka registered the highest FDI equity inflow of USD 17.25 billion, followed by Maharashtra (USD 9.69 billion), Delhi (USD 6.39 billion), Tamil Nadu (USD 2.38 billion), Gujarat (USD 2.06 billion), and Haryana (USD 2.03 billion). During the third quarter of FY22, foreign owned assets in India stood at USD 926.2 billion, up from USD 852.4 billion in the third quarter of FY21.

Growth in cloud market

Gartner forecasts India's public cloud end-user spending to total USD 4.4 billion in 2021. There is double-digit growth as Enterprises adopt hybrid working infrastructures. End-user spending on public cloud services in India was around USD 4.4 billion in 2021, according to the latest forecast from Gartner, Inc. As compared to 2020, end user spending on public cloud grew from USD 3.3 billion which is 31.4% year on year growth.

Indian companies saw the benefits of cloud during the first wave of the pandemic in 2020. The companies have to invest in cloud to build business resilience and minimize the impact of continued disruptions. India has experienced consistent double-digit growth in cloud spending over the last three years while the pandemic only accelerated the shift. The continued trend of increased remote workers in coming years will lead to an increase in spending on desktop-as-a-service (DaaS) and infrastructure-as-a-service (IaaS). These segments are forecast to grow 47.7% and 52.2%, respectively.

India public cloud services end-user spending forecast (USD millions)

Particulars	2020		2021		2022P	
	Spending	Growth (%)	Spending	Growth (%)	Spending	Growth (%)
Cloud Business Process Services (BPaaS)	190.0	2.0%	207.0	9.2%	218.0	5.2%
Cloud Application Infrastructure Services (PaaS)	764.0	39.0%	997.0	30.5%	1,252.0	25.6%
Cloud Application Services (SaaS)	1,168.0	3.1%	1,411.0	20.8%	1,696.0	20.2%
Cloud Management and Security Services	269.0	7.3%	317.0	18.0%	378.0	19.2%
Cloud System Infrastructure Services (IaaS)	946.0	7.3%	317.0	18.0%	378.0	19.2%
Desktop as a Service (DaaS)	50.0	65.4%	73.0	47.7%	86.0	17.2%
Total	3,387.0	19.0%	3,322.0	31.4%	4,008.0	26.4%

Source: Gartner, FSIAPL

P indicates Projected value

For the first time, spending on SaaS and cloud management and security services will experience double digit growth in India. SaaS has been pivotal in supporting the sudden increase in the mobile workforce, as well as customers, in 2020. Learning from this, Indian companies will continue to build on the above trend as they move towards a composable business environment.

Within SaaS, customer experience and relationship management and content services were the highest growing segments in 2021. In 2020, spending on e-mail and authoring declined 0.2%, however, this trend reversed in 2021. E-mail and authoring grew by approximately 25.1% in 2021. With the increase in remote workers by organizations due to the pandemic, more business was conducted using email and collaboration tools, which drove the growth of these services.

Growth of data centers

The Indian data centers industry's capacity is expected to witness a five-fold increase as it is expected to add overall 3,900-4,100 MW of capacity involving investments of approximately Rs. 1.0 trillion in the next five years.

The Indian data centers (DC) market is witnessing healthy growth primarily driven by large hyper-scalers like Amazon web services, Google, Microsoft, Facebook, IBM, Uber, Dropbox that are outsourcing their storage needs to third party DC providers.

To cater to the increasing demand, Indian corporates and foreign investors including have started investing in Indian Data Centers. Along with them, existing players in the business are also expanding their capacities. The favourable regulatory support, rapidly growing cloud computing, increasing internet penetration, government effort on digital economy, adoption of new technologies like IoT and 5G, growing needs of hyper-scalers are some of the major factors driving the demand for data centers in the country. The sector is likely to witness a five-fold increase in capacities in the next five years. The government's decision to accord infrastructure status to the data centers will enable the

players to get access to longer tenured debt at competitive rates and access to foreign funding through the external commercial borrowing route.

The industry revenues are expected to increase at a CAGR of around 18-19.0% during FY22-FY24 after witnessing 24.0% CAGR growth during FY18-FY21 supported by increase in rack capacity utilization and ramp-up of new data centers. Between the two major services provided by the DC players, co-location services account for around 62%-65.0% of revenues as compared to managed services which account for 28%-30.0% of revenues.

Some of the state governments like Maharashtra, Telangana, Karnataka, and Uttar Pradesh have provisions of special incentives like exemption on stamp and electricity duty, power subsidies, land at subsidised cost and other concessions by some of the state governments to boost data centre investments.

Further, the information technology ministry has plans to offer incentives worth up to Rs. 150.0 billion under a national policy framework for data centers. This includes an incentive of 4-6.0% if the components including IT hardware and power are procured from Indian manufacturing units and incentive of up to 3.0% for use of renewable energy.

Emerging geographies and verticals

India's ecommerce market which is around USD 55.0 billion in FY21 will be the third-largest by scale, and the annual gross merchandise value (GMV) is expected to reach USD 100.0 billion in FY25 and USD 350.0 billion in FY30. Much of this growth will be due to direct-to-consumer (D2C) market which is an emerging sub-segment of the traditional ecommerce ecosystem.

The D2C trend initially took off in India's Tier 1 cities as big city dwellers were mostly internet savvy and familiar with the nitty-gritty of online shopping. But the market for brands has gradually expanded outside the metros, throwing open massive opportunities for sellers from Tier 2 and Tier 3 cities. Many brands have witnessed majority part of their revenue coming from Tier 2 and 3 cities. Tier 2 locations and Tier 3 cities is expected to account for 88.0% of the online shoppers between 2020 and 2030. Brands are keen to explore the untapped user base across Tier 2+ locations which is a wide swath of semi-urban and rural India.

The product and services for which non-metro users crave also determine which D2C brands can successfully penetrate the new markets. Market data indicates their interest in the latest trends, gadgets and more, which means D2C players in fashion, FMCG and consumer electronics can tap into this user base more readily.

The youth in Tier 2, Tier 3 and even Tier 4 markets are very aspirational. They want new gadgets and want to sport the latest fashion trends. So, it is fairly easy for brands in those segments to penetrate these cities. As the users in the hinterlands become comfortable with shopping online, the companies have noticed a visible change in the buying patterns from these cities. Companies have equally attributed their growth story to Tier-2 and Tier-3 cities, a massive increase as compared to the share of the cities before the pandemic.

On the other side, for the fashion category particularly, there is resistance to shopping online in Tier 2 and Tier 3 cities. Target audience in these cities are more comfortable with trying and buying from neighbourhood stores rather than the ease of online shopping.

To keep up with the growing demands of the industry and ensure effective scale in the tier 2 and beyond cities, companies are also opting for collaborating and partnering with the kirana stores to increase their sales and awareness.

12. SWOT ANALYSIS: INDIAN ELECTRONIC PRODUCTS & ACCESSORIES INDUSTRY

SWOT Analysis of Indian Electronic products and Accessories Industry	
Strengths	<ul style="list-style-type: none"> • Substantial young addressable market with rising disposable incomes will support demand for consumer • Rising levels of adoption of cheap mobile data services has underpinned the demand for smart devices • Sustained economic growth will translate into rising disposable incomes, which will mean increased spend • Digitisation drives from both the public and private sector could see elevated demand for electronics
Weakness	<ul style="list-style-type: none"> • Covid-19 shocks exacted a heavy toll on the economy over FY20-FY21 • Higher-margin devices, such as LED TVs and premium smartphones, remains relatively low • Electricity and formal retail facilities present challenges to vendors in deepening their sales
Oppurtunities	<ul style="list-style-type: none"> • The market has many 'low-hanging fruit', as the penetration rates of basic electronics products, including PCs, smartphones and tablets, remain very low • Intensifying infrastructure drives in the rural regions of the country will allow vendors to penetrate into smaller, less developed cities in the future • Government-led initiatives, such as the National Electronics Policy and 'Make In India' will continue to drive foreign direct investment into domestic manufacturing facilities, which could drive down product prices in the long run • Smart city initiatives could see increased adoption of IoT solutions, offering opportunities to device vendors over the medium term
Threats	<ul style="list-style-type: none"> • Fresh increase in Covid cases and the Russia - Ukraine conflict both pose wider trade and logistics related challenges in 2022 • Covid-related lockdowns continue to pose downside risks in 2022 • Anti-Chinese sentiment driver by border skirmishes remain a concern heading in 2022 • The demand for notebooks and desktops continue to be cannibalised by low-cost smart devices, the adoption of which have accelerated owing to generous mobile data allocations offered by Indian operators

Source: FSIAPL

13. NOTABLE TRENDS IN INDIAN ELECTRONIC PRODUCTS & ACCESSORIES INDUSTRY

The Indian electronics industry is in the midst of an exciting phase owing to new technology, introduction of innovative products and global competition which keeps the industry on its toes. This means that manufacturers must focus on continuous innovation and improvement of products. Here are some notable trends of the industry:

Technology-conscious consumers

Consumers are abreast with new technology and are now demanding products with built-in artificial intelligence. This has led to the development of intelligent electronics and consumer durable products. For instance, washing machines can now sense the load and decide the appropriate washing cycle. Artificial intelligence will move beyond consumer products and will be available in several medical electronics and industrial electronic products.

Big players expanding into newer segments

Big players are expanding their current offering to get a bigger piece of the pie. Panasonic is looking beyond consumer electronics to business solutions and Xiaomi into the white goods sector. The Hero group's Hero Electronics is said to enter the consumer good industry and launch AI products while LivPure has entered the air-conditioners space by launching on Flipkart.

Shared economy

The industry is not only looking at selling electronic goods and appliances but also renting it out offering add on services like relocation and free maintenance to make it more attractive than owning them. This is targeted to consumers who are in need of appliances for a short-terms or do not want the hassles like servicing, repairs, etc

Contract manufacturing

Many consumer electronics appliance companies have started outsourcing manufacturing to local contract manufacturers like Dixon and Amber. While this was more often done in China rising power costs, high labour costs (almost 3 times of India) and a stronger yuan have made India an attractive proposition. In early 2019, Samsung was in talks with Dixon and Foxconn to make TVs in India.

Miniaturisation and the addition of multiple functions

The trend of miniaturisation has led to the creation of smaller devices or components. Consumer demand for smaller products to make them handier and easier to manage has resulted in miniaturised products with greater density of components, made possible through VLSI designs. This often leads to lower cost of production, resulting in fall of product prices. This trend is expected to continue and will impact the traditional component market, as most traditional components will be replaced by chip components and integrated circuits.

Consumer demand for smart and connected devices

Smart devices require at least a microcontroller to add intelligence to the device, one or more sensors to allow for data collection, one or more chips for connectivity and data transmission, and a memory component. The connected devices that transmit information across the relevant networks will rely on innovations from semiconductor players—highly integrated microchip designs, for instance, and very low power functions in certain applications.

Large data driving development

Integrated circuits and modules for high frequencies will be in vogue taking into the large data that needs to be transmitted in a very short time in communication, sensors or astronautics. Advances in integrated circuit technology are driving packaging and interconnect designers to accommodate more input/output connections and larger sized dies, which dissipate more power and operate at faster speeds. This will also generate a demand for components and products suitable for high frequency applications.

Emerging System on Chip (SoC) based devices

System on Chip (SoC) based devices with provision for optimal power and connectivity features as well as with sensor integration, will be in demand to make products smarter to support the wide adoption of Internet of Things (IoT). The first generation of such chips are already on the way, although it will probably be a few generations before chips can deliver all the functionality required.

Electric vehicles and connected mobility related applications

EVs and mobility related appliances have already opened up huge opportunities for power electronics devices and components, including power management semiconductors, etc. However, the desire for a longer driving range between charges, faster battery charging times, increasing electronics integration for infotainment, safety and security, and other applications will further technological advances, increasing the total electronics content of EVs.

14. CHALLENGES FACED BY INDIAN ELECTRONIC PRODUCTS & ACCESSORIES INDUSTRY

While the policy initiatives of the government have had a positive impact on the electronic products and accessories manufacturing ecosystem, there are various challenges being faced by the industry across qualitative (non-tariff, infrastructure related) and quantitative (tariff, Free Trade Agreements etc.) aspects. Few of the challenges are as follows:

Cost competitiveness of China and Vietnam

Chinese manufacturing has dominated the past few decades, driven by the offshoring trend from North American markets. Particularly for electronics assembly, this trend has shaped the industry for more than 20 years. Primarily as a result of lower labour wages and decent infrastructure, many electronics systems moved their operations to Asia or partnered with contract manufacturers working in that region. Businesses that offshored benefitted from significantly lower labour costs and a large labour force that could accommodate the ever-increasing manufacturing demands. Also, in comparison to China and Vietnam, India provides for lower income tax exemptions and reductions to electronics manufacturers. No income tax holidays are being provided in India unlike those provided in Vietnam, making the latter the preferred choice for manufacturing. Vietnam also offers very long-term predictability of 10-30 years of Income Tax holiday/concessional rates tailor-made for global value chains.

Lack of Ease of Doing Business

Industrial land development support – In the policy initiatives and schemes of the government, the cost of land is not factored in. While Department for Promotion of Industry and Internal Trade (DPIIT) has instituted measures such as launch of e-madhyam portal to ease the identification and acquisition process, the cumbersome process of land acquisition overall acts as a deterrent for quick setting up of a manufacturing unit. The compliance requirements and scrutiny from the authorities coupled with the time-consuming process impact the business environment and acts as a dampener to attracting the investments in India.

Lack of Plug and play infrastructure

Competing nations such as China and Vietnam readily provide the infrastructure support in the form of buildings and related permits to manufacturers, i.e., the regulatory compliances are undertaken by the government authorities and readymade facilities (including dormitories on the site) are handed

over to the manufacturers. Lack of such plug and play model hampers the attractiveness of India and may prejudice manufacturers' decision to set up units in India.

Lack of Free Trade Agreements (FTAs) with developed economies

Compared to its Asian peers, India does not have many FTAs in place and instead, loses out on lower duty benefits on exports to major economies such as United States, European Union, United Kingdom, Middle East region, Australia, Japan etc.

Lack of Component Ecosystem

Electronics components form the fundamental backbone of manufacturing ecosystem. In the absence of a full-fledged component ecosystem in India, these components are required to be imported that results in increased costs and lead time for the manufacturers. Moreover, India lacks in manufacturing of even components that are labour intensive and are feasible to manufacture in India given the availability of cheap and skilled manpower. An active policy support to promote local manufacturing including through domestic players appears to be missing at present.

Punitive duty structures and tax levies

India is a signatory to various FTAs which enables global manufacturers to manufacture at scale in such FTA partner countries and sell the goods in India. However, it is also important to note that placing sole reliance on the policy of import substitution through higher tariffs may not be desirable. Brazil is a case in point where high tax levies had forced manufacturers like Sony and Xiaomi to shut their units in Brazil. The lead time and hassles in customs clearance creates another non-tariff barrier that impacts the turnaround time in the industry and creates inefficiencies in the system.

High import tariff on electronic components

In the absence of an existing component ecosystem in India that ensures manufacture of quality inputs that are to be subsequently used in the manufacture of high-quality finished products, the manufacturers have no alternative but to import the requisite inputs. Increased tariffs may ultimately lead to inflated costs of the products and thereby reducing their competitiveness in the global markets. Additionally, a less competitive product is estimated to eventually defer investments from the electronics sector. When compared to its Asian peers, India imposes the highest tariffs on inputs of electronic products and such tariffs continue to be subject to amendments frequently. These unpredictable tariff measures may significantly impact the positive impact of PLI policies.

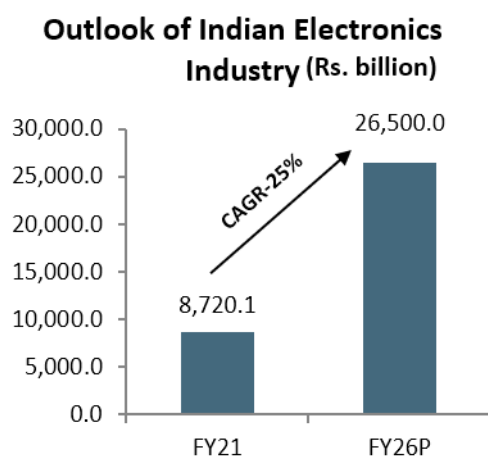
Restrictive PLI Conditions

Although the financial incentives by the PLI schemes have been a step in the right direction, the eligibility criteria and sales target-based incentives may be deterrent to Small and Medium Enterprises

or any new entrant. The present schemes are premised on a hit or miss basis, wherein incentives may be denied to a manufacturer on failure to meet the targets even by a small margin. Therefore, the conditions in the PLI scheme may not achieve the desired results due to the stringent limits and criteria to be eligible for the scheme. PLI scheme do not account for flexibility in terms of higher tenure, increased incentives to offset tariff hikes (including in near future) as well as a mechanism to ensure timely payment of PLI incentives to applicants.

15. OUTLOOK OF INDIAN ELECTRONIC PRODUCTS INDUSTRY

Indian electronics industry is estimated to grow at a CAGR of 25% from Rs. 8,720.1 billion in FY21 to Rs. 26,500 billion in FY25P.



Source: FSIAPL

Domestic production is envisaged to grow at a CAGR of 30% from Rs. 5,544.6 billion in FY21 to Rs. 20,500 billion in FY26P. The product wise growth prospects of each segments in domestic production from FY21 to FY26P is highlighted in the table below:

Domestic production of each segments	Rs. billion	Rs. billion
	FY21	FY26P
Mobile Phones	2,226.8	9,500.0
Consumer Electronics	705.1	1,500.0
Industrial Electronics	779.4	1,900.0
IT Hardware (Laptops, Tablets)	222.7	2,000.0
Electronic Components	668.0	1,400.0
Strategic Electronics	296.9	800.0
Auto Electronics	445.4	1,400.0
Printed circuit board assembly	37.1	900.0
LED Lighting	163.3	1,100.0
Total domestic electronic production in FY21	5,544.6	20,500.0

Source: FSIAPL

The increasing labour costs in China, the geo-political trade and security environment, and the Covid-19 outbreak are compelling many global electronics majors to look at alternative manufacturing destinations and diversifying their supply chains. India is one of the leading contenders for alternate solutions for global electronics companies. India has the potential to be one of the most attractive manufacturing destinations and support the objective of 'Make in India for the World'. The electronics sector has the potential to become one of the top exports of India in the next 3-5 years. Electronics exports may account for significant contributions to the Indian economy in terms of foreign exchange earnings and employment generation.

16. COMPETITION ANALYSIS OF KEY PLAYERS

Compuage Infocom Limited:

Compuage Infocom Limited (CIL) is listed on BSE and is promoted by Mr. Atul Mehta, in 1987, is a distributor of IT products. Today, CIL has established itself as a distributor of major global IT brands. CIL's traded product portfolio comprises of 5 different verticals namely PCs components and peripherals; Mobility products; Physical safety and security products; Enterprise solutions and Cloud computing. CIL has an established distribution network with a central warehouse located in Chennai and 3 redistribution hubs located at Kolkata, Delhi and Chennai. CIL has niche presence across India with 46 sales offices, 27 warehouses, and a team of 800 professionals catering to more than 12,000+ resellers spread across over 600 cities/ towns in India. The company collaborates with renowned brands like Alcatel-Lucent, Acronis, CISCO, Microsoft, Extreme Networks, Asus, Sandisk, SAP, ASRock, Vertiv, Xerox, Fujifilm, HP, ADMC, AMP, Dahua, Digifort, Molex, Numeric, Relicell, Systemax, Tyco, Zoho etc.

The Company has its global footprints over 7 countries across SAARC nations with the set-up in Singapore to manage them. It manages the complete supply chain from procurement, warehousing, breaking bulk, technical support, material movement and credit deployment. The Company's business is bifurcated into 4 product segments, viz., IT Consumer, IT Enterprise Solutions, Cloud Computing and Hardware Services.

The strength of the company is experienced promoters with long track record in IT distribution business and continuous financial support provided by the promoters in the form of unsecured loans. The company has established market position, large scale of operations backed by its presence across various business segments with diversified product mix, strong distribution network, and its association with vendors having well established IT hardware/ software brands, and prudent risk mitigation practices followed by the company with respect to the inventory and receivables management.

Creative Newtech Limited (CNL - Previously known as Creative Peripherals and Distribution Limited):

Founded in 1992, Creative Peripherals was originally incorporated on September 22, 2004 as a Private Limited Company and it has recently changed its name from Creative Peripherals and Distribution Limited to Creative Newtech Limited. CNL is engaged in the business of distribution of IT products, Imaging, Lifestyle and Telecom products. The registered office of CNL is situated at Borivali, Mumbai. Currently, CNL is operating nationwide through its 20+ branches, warehouses and service centres. CNL commenced its operations with distribution of IT products.

They started with distribution of Microsoft hardware, Epson Printers, AOC TFT Monitor and continued adding newer products/brands to their portfolio. Engaged in distribution business, CNL has partnered with a number of renowned brands for distribution in the country such as Rapoo Technologies Limited, Lino Manfrotto + Co S.p.a, Transcend Information Inc, ViewSonic International Corporation, Olympus Corporation, Belkin Inc, Zioncom (Hong Kong) Technology Limited, Apple India Private Limited, Sennheiser Electronics India Private Limited, Gopro Cooperatief U.A, TPV Technology India Private Limited, Printronix, SIEPL India Electronics Private Limited, Vintron Infronatics Limited and Samsung India Electronics Private Limited specialising in IT, Lifestyle, Imaging and telecom products.

CNL also undertakes contract manufacturing for several Honeywell products and have recently started distribution in the Middle East. CNL's is a broad-based distribution model which is based on multiple products and multiple brand strategy. CNL also operates in the indirect sales model and they play the role of supply chain consolidator between several IT manufacturers and many IT channel partners. They operate with a dealer network of around 6,000 dealers. Thus, they provide distribution services of both volume business and value business products.

Rashi Peripherals Limited

Rashi Peripherals Limited was incorporated in 1989, by Mr. Krishna Choudhary and Mr. Suresh Pansari. It is one of the 5 largest IT Distributors in India engaged in the business of Information Technology Product Distribution and aftersales services of information technology products. The company collaborates with over 30 renowned brands like AMD, AOC, APC, ASUS, ATEN, Belkin, Cambium Networks, Cornelis Networks Google Chromecast, Colorful, Crucial by Micron, DDN, DELL, EATON, ECS, Fitbit, HP, Infortrend, Intel, JBL, Lenovo, LG, Logitech, Mercusys, NVIDIA, Optoma, Samsung, SanDisk, Supermicro, Toshiba, TP-Link, Ubiquity and Western Digital. It serves over 9,000 dealers and retailers in over 750 locations across the country through a network of 50 branches and 50 service centres.

Savex Technologies Private Limited

Savex Technologies Private Limited, incorporated in 1988 and promoted by Mr Anil Jagasia, is one of the largest Information and Communication Technology product distributors in India. The company is headquartered in Mumbai and has 107 sales offices and 42 warehousing and stocking locations catering to over 750 cities in India. The Savex group has been associated for more than a decade with its principals, which include leading players such as Samsung in the telecom mobility segment, and HP and Lenovo in information technology products such as notebooks, desktops and printers. Citrix, D-link, Logitech, Ubiquiti, Microsoft, Avaya, Aruba are some of the principals in networking segment. Savex group benefits from Inflow's principals which are in cyber security, unified communications and

collaboration, networking, automatic identification, data capture, infrastructure and application software, storage management, electronic security products and related services.

Financial comparison of Balaji Solutions Limited and the above 4 mentioned competitors is provided in the table below:

Company	Balaji Solutions Limited			Compuage Infocom Limited			Creative Newtech Limited		
	FY19	FY20	FY21	FY19	FY20	FY21	FY19	FY20	FY21
Key financial parameters (in Rs. million)									
Net Revenue	6,030.8	4,521.6	4,834.8	45,148.3	42,325.1	37,297.9	3,707.2	4,590.6	5,263.2
EBITDA	106.7	92.1	204.4	935.6	1,049.9	944.3	133.2	168.2	187.3
PAT	24.8	36.3	162.2	226.9	305.1	206.8	58.5	77.7	93.8
Net Block of Fixed Assets	189.5	240.2	265.9	539.2	501.0	471.2	89.3	88.9	98.5
Total Assets	1,695.6	1,418.8	1,622.8	12,412.1	11,415.1	11,328.4	1,185.2	1,548.7	1,917.7
Shareholder's Networth	442.6	1,478.9	641.1	1,768.0	2,020.8	2,222.8	333.1	412.4	616.8
Total Debt	554.6	497.7	375.3	4,963.7	4,838.2	6,098.7	358.9	318.8	429.3
Key ratios									
EBITDA Margin(%)	1.8%	2.0%	4.2%	2.1%	2.5%	2.5%	3.6%	3.7%	3.6%
PAT Margin (%)	0.4%	0.8%	3.4%	0.5%	0.7%	0.6%	1.6%	1.7%	1.8%
ROCE (%)	10.2%	6.6%	16.9%	14.5%	14.8%	12.0%	18.5%	20.9%	19.1%
Interest Cover(x)	1.3	1.8	6.7	1.7	1.7	1.4	2.8	3.3	3.8
Debt/Equity (x)	1.3	0.3	0.6	2.8	2.4	2.7	1.1	0.8	0.7

Company	Rashi Peripherals Limited			Savex Technologies Private Limited		
	FY19	FY20	FY21	FY19	FY20	FY21
Key financial parameters (in Rs. million)						
Net Revenue	39,905.1	39,357.3	59,263.7	1,16,950.3	1,53,462.9	2,11,283.0
EBITDA	644.1	958.0	2,160.0	3,321.4	3,862.3	5,060.0
PAT	285.2	401.1	1,373.6	1,629.7	2,085.5	3,124.6
Net Block of Fixed Assets	565.3	568.6	592.0	396.6	1,289.6	1,380.2
Total Assets	9,665.9	10,387.6	15,268.4	24,842.9	27,084.2	35,111.2
Shareholder's Networth	1,956.1	2,364.9	3,664.4	9,714.0	11,859.5	14,958.9
Total Debt	3,697.3	3,253.4	4,889.9	8,824.1	11,786.2	12,219.8
Key ratios						
EBITDA Margin(%)	1.6%	2.4%	3.6%	2.8%	2.5%	2.4%
PAT Margin (%)	0.7%	1.0%	2.3%	1.4%	1.4%	1.5%
ROCE (%)	10.9%	16.3%	28.8%	17.6%	17.3%	18.9%
Interest Cover(x)	3.4	2.4	7.0	4.2	4.0	7.3
Debt/Equity (x)	1.9	1.4	1.3	0.9	1.0	0.8

Source: Company Annual Reports, Ace Equity Database

Notes:

1) Financials numbers of Compuage Infocom Limited, Creative Newtech Limited, Rashi Peripherals Limited and Savex Technologies Private Limited are consolidated in nature.

2) Capital Employed in ROCE formula is considered as an average of last 2 years

Total Addressable Market of Balaji Solutions Limited

Balaji Solutions Limited is one of the leading IT Hardware and Mobile accessories distribution houses in India, in alliance with numerous multibillion global brands catering to a wide array of Computer hardware peripherals, Imaging & Laptop Consumables and Mobile Accessories. Total addressable market of Balaji Solutions Limited stands at Rs. 1,205.4 billion in FY21, which is projected to increase at a CAGR of ~22.5% to Rs. 2,711.6 billion in FY25P. The product category wise break-up of each addressable market is given in the table below:

Total Addressable Market of Balaji Solutions Limited

Product Category	Market Size in Rs. billion (FY21)	Market Size in Rs. billion (FY25P)	CAGR % (FY21-FY25P)
Computer Hardware and Computer Peripherals	565.4	1,316.6	23.5%
Mobile accessories - Chargers, USB cables and power banks	240.0	370.0	11.4%
Hearables - headphones, earphones, wireless earbuds and wireless neckbands	180.0	600.0	35.1%
Wearables - smart watches and activity bands	35.0	150.0	43.9%
Home audio segment	185.0	275.0	10.4%
Total Addressable Market of Balaji Solutions Limited	1,205.4	2,711.6	22.5%

Source: FSIAPL

Balaji Solutions Ltd. have products like cabinets, keyboard, mouse, monitor, motherboards, SSD, UPS web camera, laptop adapter, laptop screen under their Foxin computer peripheral portfolio. Balaji Solutions is also the laptop distributor for one of the global leaders in India. This implies that Balaji Solutions caters to the whole computer hardware and peripheral market which saw the consumption of Rs. 565.4 billion in FY21. Total addressable market for computer hardware and peripherals is going to increase with the CAGR of more than 20.0% over the next 4 years to around Rs. 1,316.6 billion in FY25P.

In case of mobile accessories like chargers, USB cables and power banks; the market is expected to grow at a CAGR of 11.4% from Rs. 240.0 billion in FY21 to Rs. 370.0 billion in FY25P. The growth will be majorly driven by the increasing number of mobile device users and substantial growth in adoption of smartphones and tablets in India. Factors such as rising young population, increasing disposable income, rapid advancement in technology, increasing online promotions, attractive discounts and offers will push the growth of hearable and wearable devices in India.

Abbreviations

A&D: Aerospace and Defence	LTE: Long Term Evolution-Advanced
AEB: Automated Emergency Braking	MBO: multi-brand outlet
AI: Artificial intelligence	MRP: Maximum retail price
BCD: Basic Customs Duty	M-SIPs: Modified Special Incentive Package Scheme
BNPL: Buy Now Pay Later	NACH: National Automated Clearing House
CNL: Creative Newtech Limited	NAS: Network-Attached Storage
CPE: Customer premises equipment	NEFT: National Electronic Funds Transfer
D2C: Direct to customer	NPE: National Policy on Electronics
DaaS: desktop-as-a-service	ODMs: Original design manufacturers
DAX: Deutscher Aktien index	ODOP: One District One Product
DC: data centers	OEMs: Original Equipment Manufactures
DJIA: Dow Jones Industrial Average	OTT: Over-the-top
DMS: Developed Markets	PCBA: Printed Circuit Board Assembly
DPIIT: Department for Promotion of Industry and Internal Trade	PFCE: Private final consumption expenditure
ECS: Electronic Clearing Service	PLI: Production Linked Incentives
EMC: Electronics Manufacturing Clusters	PMP: Phased Manufacturing Policy
EMI: Equated monthly instalment	PPP: Purchasing Power Parity
EMs: Emerging Markets	QSRs: quick service restaurants
ESDM: Electronics System Design and Manufacturing	RBI: Reserve Bank of India
FDI: foreign direct investment	SAN: Storage Area Network
FOMC: Federal Open Market Committee	SBO: single brand retailer
FPD: Flat Panel Display	SE: Strategic Electronics
FSIAPL: Fitch Solutions India Advisory Private Limited	SEZ: Special Economic Zones
FTAs: Free Trade Agreements	SEZs: Special Economic Zones
GDP: Gross Domestic Product	SLNP: Street Lighting National Programme
GFCE: Government final consumption expenditure	SMEs: Small and Medium Enterprises
GFCF: Gross fixed capital formation	SoC: System on Chip
GMV: gross merchandise value	SP: Strategic Partnership
GNI: Gross National income	SPECS: Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors
GVA: Gross value added	UJALA: Unnat Jyoti by Affordable LEDs for All
IaaS: infrastructure-as-a-service	UK: United Kingdom
IAMAI: Internet and Mobile Association of India	UPI: Unified Payments Interface
ICEA: India Cellular and Electronics Association	US: United States of America
ICT: Information and Communication Technology	USB: Universal Serial Bus
IDC: International Data Corporation	USSD: Unstructured Supplementary Services Data
IIP: Index of Industrial Production	VAR: Value-added reseller
IMPS: Immediate Payment Service	VPN: Virtual private network
IoT: Internet of Things	WAN: Wide Area Network
IR: Infra-Red	WLAN: Wireless Local Area Network
LCD: Liquid Crystal Display	WTO: World Trade Organization

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For any information on this document, please contact:

Fitch Solutions India Advisory Pvt. Ltd.
 (erstwhile IRR Advisory Services Pvt. Ltd.)
 Wockhardt Towers, West Wing, Level 4, Bandra Kurla Complex, Bandra E, Mumbai – 400051. India
 T +91 22 4000 1700 F +91 22 4000 1701 www.fitchsolutions.com/products/custom-research