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**MAXIMIZING LOCAL VALUE ADDITION IN INDIAN
MOBILE PHONE MANUFACTURING:
A PRACTICAL PHASED APPROACH**

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*‘ A billion smartphones will
be sold in India in next five years.’*



Executive Summary

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India surpassed the USA to become the second largest global smartphone market in terms of users in early 2016. India has continued to register strong demand for smartphones to connect hundreds of millions of users to the internet. There is a substantial opportunity for every player in the mobile value chain when the second largest market by volume is still under-penetrated and growing at a time when growth in demand for smartphones in much of the rest of the world is waning. To summarize, India can safely be labelled as the next China in this sector.

It is estimated that more than a billion smartphones will be sold in India over the next five years. This will drive the number of smartphone users from a quarter of a billion to more than half a billion in the same time. This will still mean that only 55% of the total population will have smartphones. In this five-year period, the close to a billion smartphones, together with almost half a billion feature phones, that will be sold in India, will consume more than US\$80 billion worth of components. If these are not sourced or manufactured locally, they will need to be imported.

The “Make in India” initiative has been successful at driving some indigenisation of assembly of mobile phones; the number of mobile phone and related components manufacturing facilities are estimated to exceed 50 units by the end of CY2016, up from just two units before the ‘Make in India’ program was announced. We estimate more than 180 million mobile phones, worth some US\$9 billion at retail value, will be assembled in India in 2016. This is from a total of 267 million mobile phones worth US\$13 billion expected to be sold in India in CY2016. However, of this total, only an estimated US\$650 Million worth local value addition will be possible (defined as locally sourced components used by manufacturers for local manufacturing). This means that the overall localization rate will be just under 6% of the total value of US\$11 billion worth components going into those 267 million phones in CY2016. China which has built manufacturing ecosystem over more than a decade, has local value addition as high as 70% that satisfies not only domestic demand but also export demand. In some countries, like South Korea and Taiwan, the local value addition is also above the 50% level. In other emerging manufacturing hubs, such as Vietnam has crossed 30% mark and Brazil value addition has already reached sub 20% levels.

It is critical for the ‘Make in India’ initiative that it enters the next phase and transforms the manual semi-knocked-down (SKD) level assembly and minimal amount of local component sourcing into a large-scale manufacturing ecosystem over the next few years. Currently, most of the components and sub-components are imported and assembled in a semi-knocked-down format. There is hardly any incentive or effort to meaningfully invest in research, design, development, advanced surface mount technology (SMT) led printed circuit-board (PCBA) manufacturing, or attempts to attract key component suppliers to form a robust local manufacturing ecosystem.

Our study, conducted jointly by IIMB researchers and Counterpoint Technology Market Research Limited (hereafter referred to as Counterpoint Research), using data collected by Counterpoint Research analyzes the current state of mobile phone manufacturing in India and provides detailed recommendations on the future steps for a phased manufacturing approach. The impact and implications of this approach on the entire mobile phone industry is also further analyzed.

A practical phased approach has been proposed to maximise the local value addition by identifying, quantifying and analyzing the possibility of indigenisation of key components and corresponding sub-components that make up a mobile phone. This phased approach will drive the true local value addition to more than 30% by 2020 and potentially to as much as 50% thereafter.

For this to happen, high value components such as: PCBA, camera, display, housing, must be completely manufactured in India. This will follow on from the move towards domestically assembling chargers, batteries and other low-value accessories.

To begin with this involves greater investment in industrial design, PCBA design and surface-mount-technology (SMT) level assembly although many of the major silicon components will continue to be sourced from overseas. However, we believe manufacturing of major sub-components of chargers, batteries and cameras can be accomplished locally. Sourcing and assembling these key high-value components from local manufacturers will drive greater value addition.

The Government's role in driving the right policy reforms, such as effective duties on key components along with attractive incentive structures to drive key suppliers to India. In addition, funding engineering institutions and corporations to develop future research (e.g. 5G, automated manufacturing robotics, software, etc) to build domestic intellectual property (IP) and a strong pool of highly skilled professionals. These will help to make India a R&D hub for this critical industry sector.

Under the proposed plan, we estimate that more than \$15 billion worth components will be sourced locally over the period of five years through 2020, realizing not only significant savings in foreign exchange, reducing the level of imports but also assisting the creation of direct and indirect jobs. While India is the second largest country in consumption of mobile phones globally, this plan can transform India into a global manufacturing exports hub adding further to the country's GDP and balance of trade. Furthermore, the report also identifies multiple benefits to every stakeholder in the mobile phone ecosystem from OEMs to component suppliers to consumers.

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Section: I



Introduction

1.0 Introduction

How exactly do mobile phones generate economic growth? A fascinating story comes from the southern Indian coastal state of Kerala and its fishing industry where mobile phones were introduced in 1997 and coverage continued to spread thereafter. Kerala fishermen who on returning from a catch in the ocean used to match their haul into the coastline's fish markets mostly on gut and intuition, however, from 1997, they started using mobile phones to better match their haul to the coastline's markets. The results started showing as Harvard economist Robert Jensen¹ showed in his research in terms of surplus both for producers and for consumers. Wastage reduced by 35%, fisherman's profits increased by 8% on average and prices for consumers fell by 4% on average. The net result was that society clearly benefited.







If those are the indirect multiplier effects of a non-smartphone mobile economy from the mid-1990s, it is worth pondering today in 2016, how much might be the direct societal gains from smartphones in Indian society and especially if these are not just assembled but designed and manufactured in India without any dent to the import bill of the country. This study makes a humble attempt to offer some empirical evidence towards this hypothesis.

¹ See <http://www.economist.com/node/9149142> for a coverage on this story and Robert Jensen's research.

1.1 India in Context of Global Mobile Phone Market, Localization and reverse innovation

India recently surpassed USA² to become the second largest smartphone market in the world in terms of active users and it also remained one of the fastest-growing markets in the world. The Indian mobile phone market is projected to grow 10% in CY 2016 and the smartphone sub-segment by 22% annually, higher than key countries like USA, China, Indonesia and Brazil.

Exhibit 1.1: Mobile Phones Annual Volumes Growth in Key Markets: CY 2016

Country	Mobile Phones Sales Growth (%) 2016	Smartphones Sales Growth (%) 2016
INDIA 	+10%	+22%
CHINA 	+3%	+4%
USA 	-3%	-1%
BRAZIL 	-23%	-18%
INDONESIA 	-10%	+1%
GLOBAL 	-2%	+4%

Source: Authors' Estimates & Counterpoint Research Data

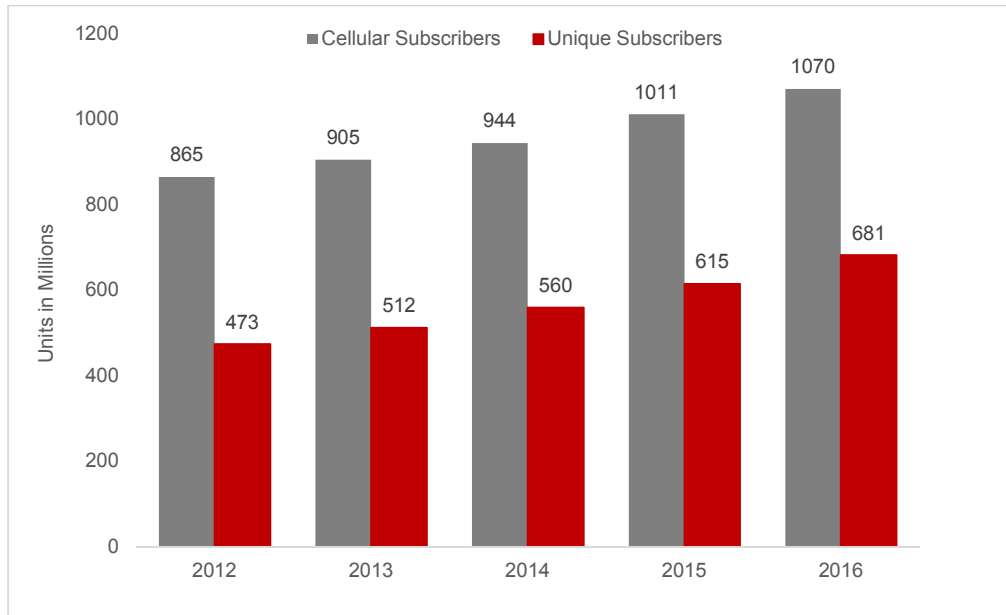
We estimate that approximately a billion smartphones³ will be sold in India over the next five years driving the number of smartphone users beyond the 600-million-mark, which implies almost 55% of the population will have a smartphone. These trends in predicted market expansion present a substantial opportunity for every player in the mobile value chain when the second largest mobile phone market by volume is still underpenetrated and growing, while the rest of the world smartphone demand has waned. The high potential for growth makes the Indian market attractive for hundreds of brands to enter every year and generate scale as demand in their existing markets nears saturation.

² Counterpoint Research Market Monitor Q4 2015

³ Counterpoint Research Forecast 2016

While the urban India has seen significant mobile phone adoption, but the gap between urban and rural tele-density is still significant. As per TRAI (see appendix at the end for an expansion of the acronyms), the overall tele-density in India at the end of Q2 2016 was 83.2%, with urban tele-density at 153.2 and rural tele-density at 51.4 out of the total subscription base of around billion last year as shown in Exhibit 1.2.

Exhibit 1.2: Total Cellular Subscriptions vs Unique Users in India



Source: TRAI & Authors' Estimates

This suggests that the next wave of growth will be driven by growth in rural India fuelled by growing smartphone penetration and further catalysed by the rollout of LTE networks.⁴ In addition to this, the Government has launched certain initiatives such as “Digital India”, that aims to bridge the rural-urban digital divide. Apart from connectivity, localized content and services are important in bridging the digital divide. Programs such as ‘Make in India’ in sync with “Digital India” will enable local innovations with the potential for many new digital start-ups to enable deeper integration of local features and services. Thus, locally manufactured cheaper mobile phones integrating ubiquitous cellular powered internet connectivity with localization of content and services, can engage the next hundreds of millions of users to drive the digital revolution in India. The growing digitally connected smartphone user base - will drive revolutionary digitization across the e-Governance, healthcare, banking, education and entertainment sectors.

⁴ For an understanding of LTE or Long Term Evolution technology see: <http://innovation.verizon.com/content/dam/vic/PDF/LTE%20The%20Future%20of%20Mobile%20Broadband%20Technology.pdf>

1.2 Past, Present and the opportunity: Mobile phone Market

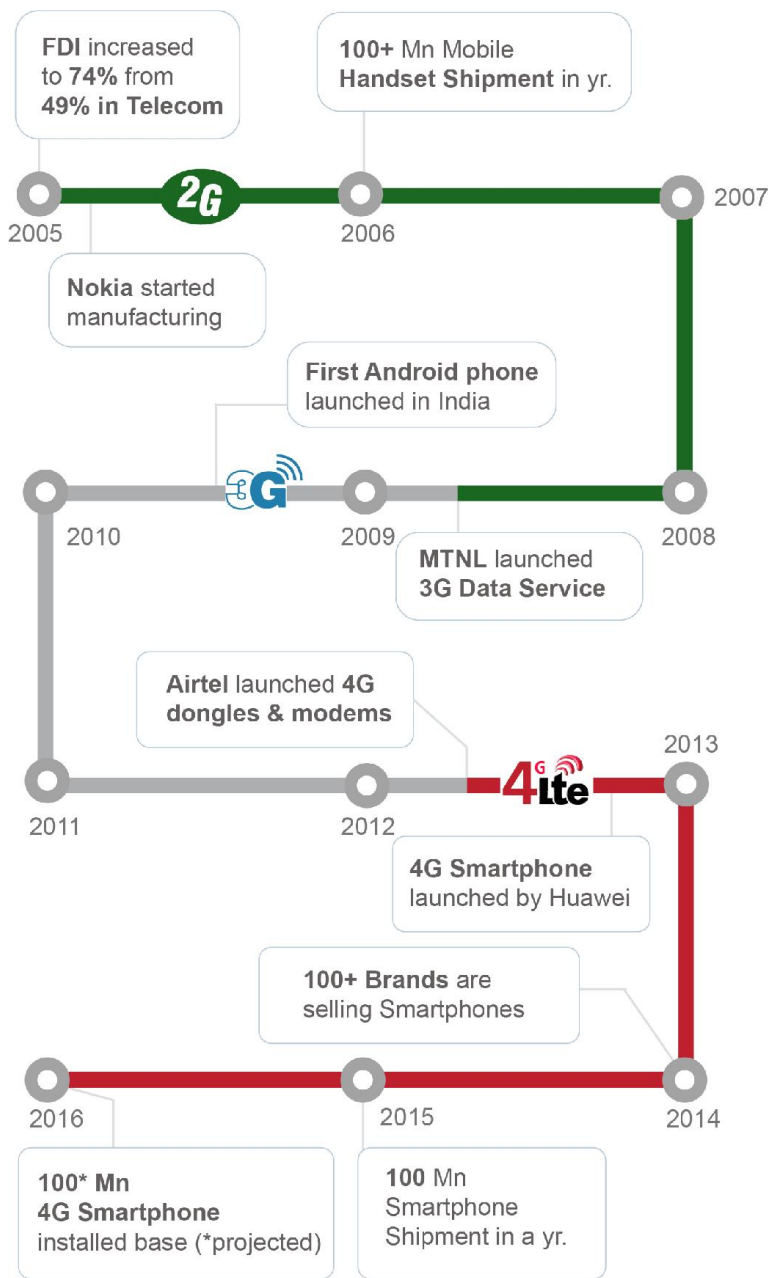
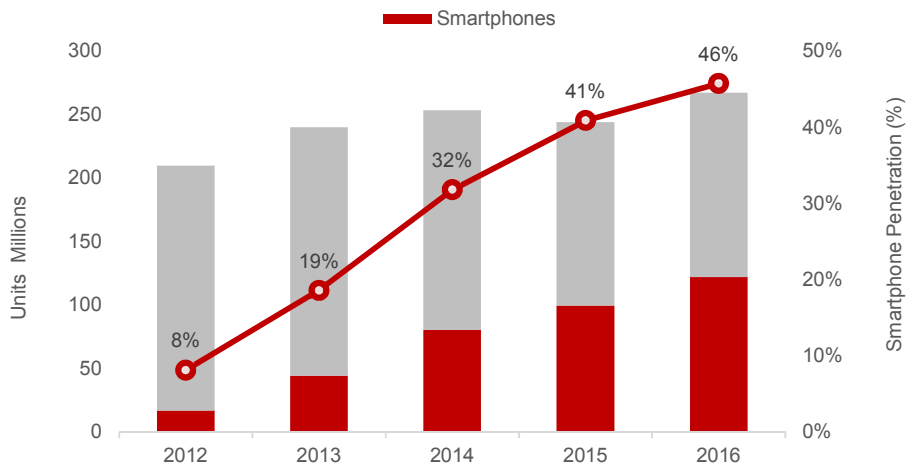


Exhibit 1.3: Key Milestones in Indian Mobile Phone Market from 2005

Indian mobile phone demand was catalysed by entry of international brands like Samsung and Nokia during 2006-2010. The market at the time was predominantly driven by feature phones. The scenario changed fast with the introduction of Android phones by international brands in 2009 and later by local brands since 2010. The advent of smartphones has propelled mobile phone growth especially in the “mobile first” economies such as India. The local brands like Micromax, Karbonn, Lava and others brought innovative features in the market tailored to local needs and preferences from dual sim to large battery to music phones to 3G/4G powered smartphones at affordable price points. The number of smartphone users in the past six years have grown by thirty times and will cross 300 Million early next year.

Having said that, India is still underpenetrated with smartphones contributing less than half of the total mobile phones sold, but in absolute volume terms it is growing and we forecast eight out of ten mobile phones sold in 2020 will be smartphones. Exhibit 1.3 alongside outlines the key milestones in Indian mobile phone market from 2005

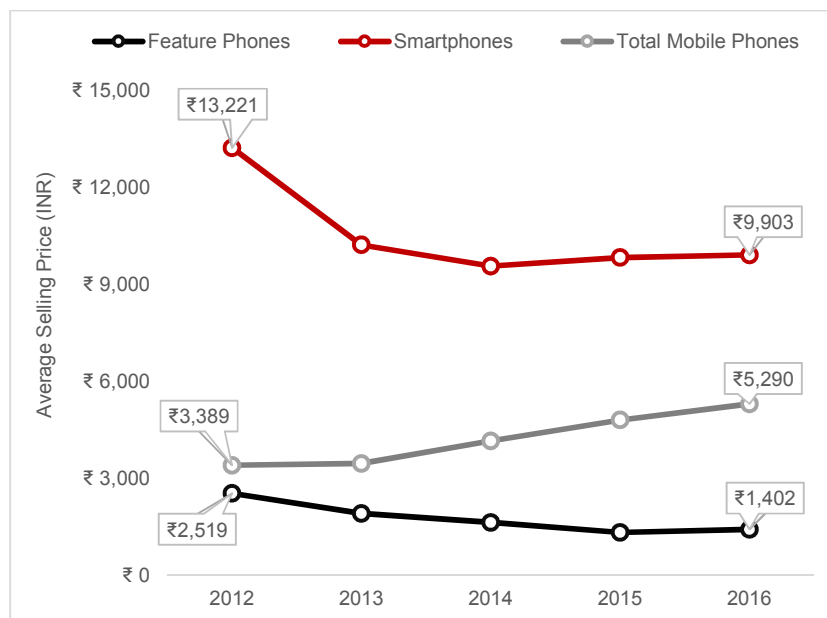
Exhibit 1.4: Total Mobile phone by Volume: CY 2012- 2016



Source: Authors' Estimates & Counterpoint Research data

The increasing smartphone penetration has increased the bargaining power of manufacturers (from components perspective) and boosted the overall average selling price (ASP) of mobile phones in India from INR 3389 (US\$51) in 2011 to INR 5290 (US\$79) in 2016. As users shift from feature phones to smartphones along with users upgrading their first smartphone purchase, we estimate the ASP to rise further by another 10% in CY 2017 which points to rising value of the total mobile phones to be sold in the industry. This rising metric is the basis of increasing the local manufacturing and makes the 'Make in India' initiative much more important.

Exhibit 1.5: Average Selling Price Trend in India- CY 2012-2016

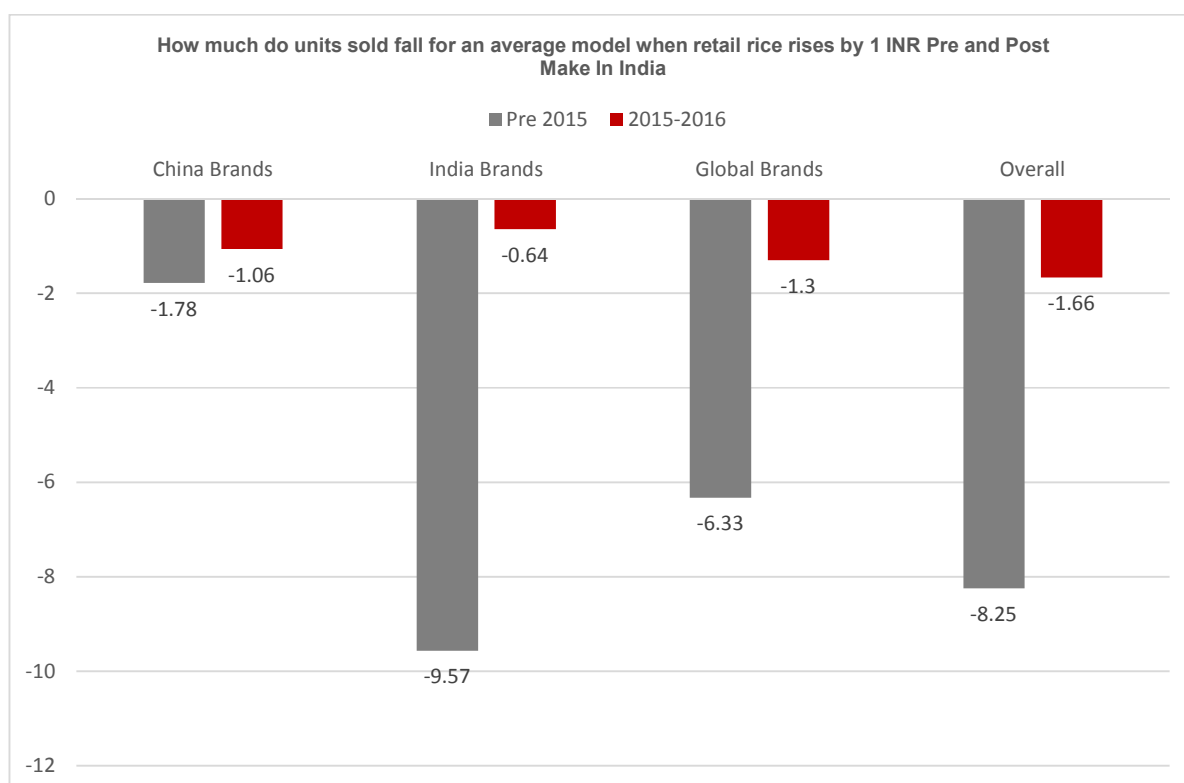


Source: Authors' Estimates & Counterpoint Research data

While the rising mobile phone ASP is a function of adoption of smartphones, most of the smartphones that are being adopted are in sub-INR 10,000 segment. By value the sub-INR 10,000 segment contributes to almost 60% of the market. This signifies that most of the components going into a mobile phone are not as advanced as they are in smartphones with ASPs above INR 30,000. This eases the barriers to manufacture locally in India.

In addition, the average Indian mobile phone user appears to be becoming less price sensitive, indicating an increase in their switching costs. We conducted a simple analysis examining the change in volume of sales in relation to a change in price. The results of this analysis (details available with authors on request) show the following. After the introduction of the 'Make in India' initiative there is a marked decline in the price elasticity of demand. For example, before 'Make in India', Chinese brands of phones on an average sold 1.78 fewer units with a 1 unit increase in price. After 'Make in India' was announced that changed to be 1.06 fewer units. However, for Indian brands the sensitivity to price changes is far more dramatically reduced. This indicates that consumers are becoming comfortable to domestic brands especially in affordable price segments. This should assuage some of the concerns domestic firms might have about losing business given their rising pricing power within domestic markets.

Exhibit 1.6 The Quantity to Price relationship in Indian Mobile Phone Market Pre- and Post-Make in India



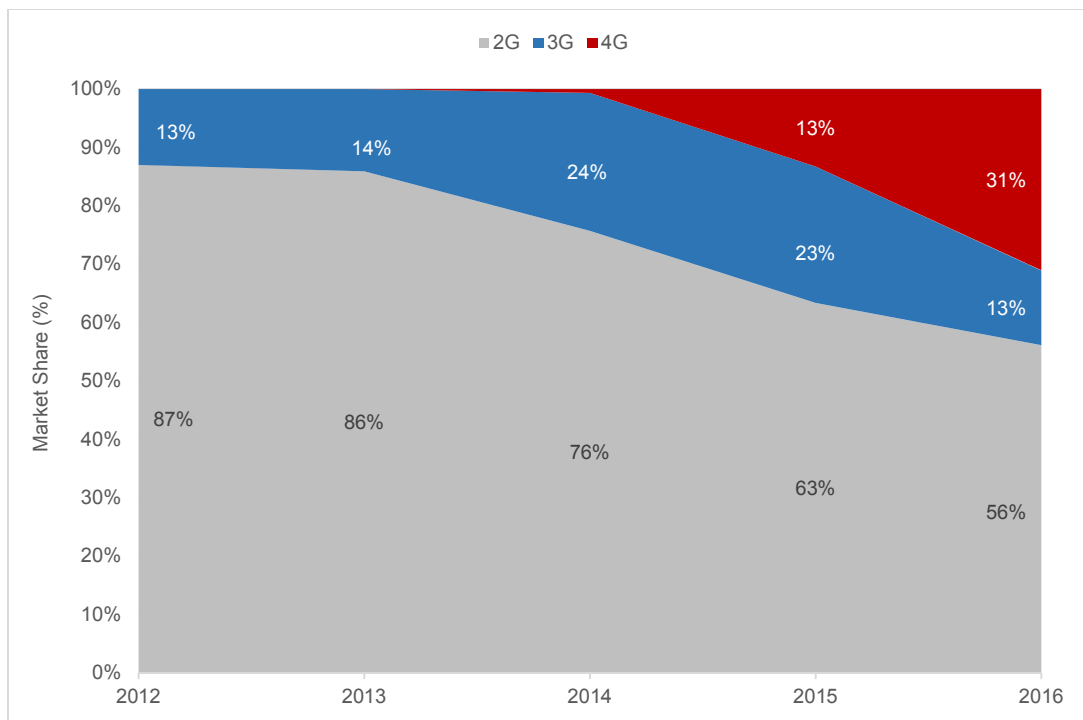
Source: Authors estimates with aggregate sales data from Counterpoint Research between 2011- 2016.

From a cellular technology perspective, in 2014, only one percent of the total mobile phones sold were LTE capable in India. By the end of 2016 we estimate one in three mobile phones sold to be LTE capable. In the smartphone

segment, almost two in three smartphones sold in 2016 will be LTE capable⁵. This will drive the installed base of LTE phones in India to over 100 million by year end 2016. This 'seeding' of the user base confers a high degree of future proofing and enables consumers to readily adopt high-speed LTE network services as they become available.

This should potentially translate to a mature device ecosystem in the country not only shaping operator strategies but also playing a key role in content consumption and bridging the digital divide in India. In summary, this is also validated by Exhibit 1.7 that shows by end of 2016, combined 3G and 4G capable phone sales are closing in on the volume of 2G phone sales; though the installed base will take longer to migrate.

Exhibit 1.7: India Mobile Phone Sales by Technology: CY 2012-2016



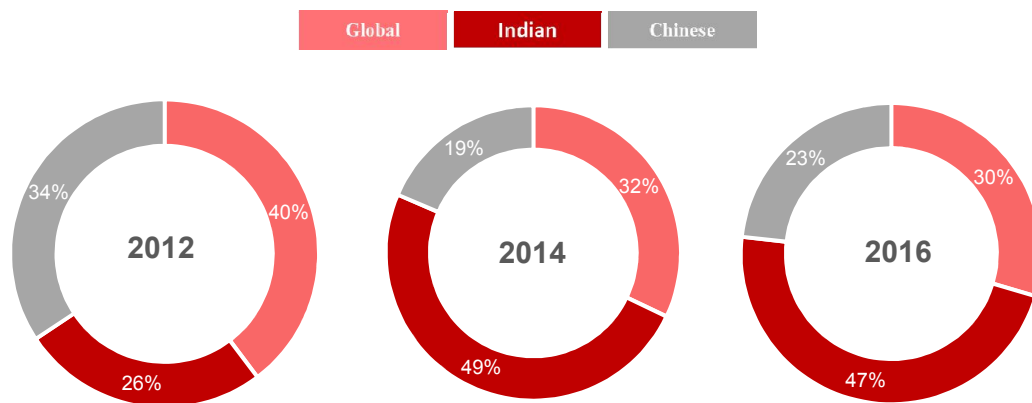
Source: Authors' estimates & Counterpoint Research data

⁵ Counterpoint Research Q3 2016 India LTE mobile phones forecast

1.3 Competitive Assessment & Positioning of OEMs - Indian vs Chinese vs Global Brands

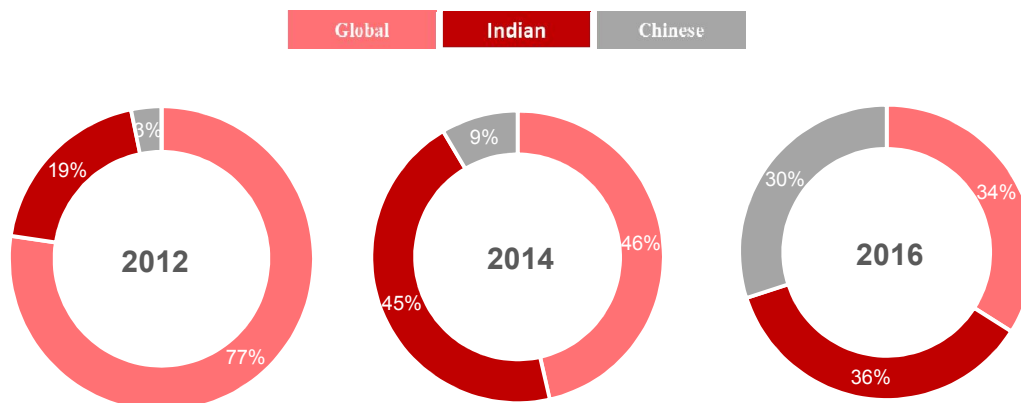
The competitive landscape has changed radically over the past few years in India. Today, close to 170 brands compete in the market with the top 20 brands capturing some 85% of the total volumes⁶. In terms of rankings, Samsung and local Indian brands dominated the overall phone and smartphone market for the past few years, but the smartphone rankings have been quite volatile for the past few quarters due to the growth of Chinese brands.

Exhibit 1.8: India Mobile Phone Market by OEM Category



One of the key reasons for the growth of Chinese brands is their affordable flagship offerings with stand-out features including strong design language and their ability to leverage deeper access to the Shenzhen-based manufacturing and supply chain ecosystem. It's important to draw understand how the Chinese mobile phone ecosystem has developed and how they have transformed "Made in China" over the last decade.

Exhibit 1.9: India Smartphone Market by OEM Category



Source: Authors' estimates & Counterpoint Research data

Chinese brands and the entire supply chain have risen significantly on the mobile phone and smartphone experience curve. Chinese suppliers are now experts in hardware design, software and user interface integration. They have built a robust original design manufacturer (ODM) and supplier network. This has been possible due to

⁶ Counterpoint Research: Q3 2016 Market Monitor India Report

local original equipment manufacturers (OEMs) investing heavily in local manufacturing, R&D backed by government incentives and strong domestic and export consumption.

Once part of a robust integrated ecosystem, these manufacturers have expanded beyond home markets into new markets, such as India, by leveraging their product expertise. Furthermore, these brands have also been aggressive in terms of their device launches and capturing key marketing trends to offer well-designed products at competitive price points with clever marketing and robust channel strategies.

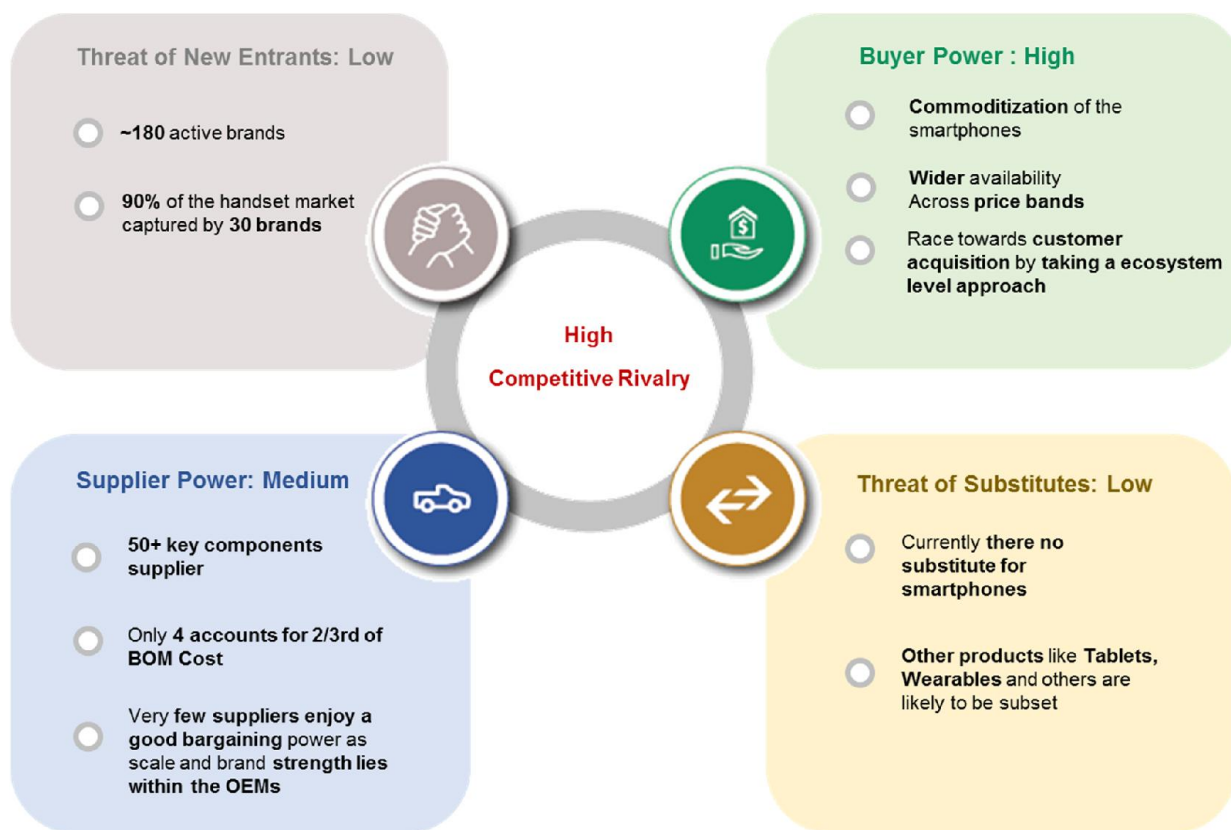
Most of the Chinese brands are competing in the \$75-\$200 price segment, which is important in the overall contribution to sales. This segment used to be dominated by local Indian brands and global brands such as Samsung.

This is signalling a possible period of slow growth for Indian and global non-Chinese brands. Indian brands can benefit from the 'Make in India' and 'Digital India' initiatives from the government to take the control of manufacturing into their own hands rather than depending on outside ODMs to design and manufacture their products.

To succeed local brands must develop strategies that allow the development of sustainable competitive advantages while also neutralizing the threats from Chinese brands. This calls for innovation and investment in R&D, building in-house capability with greater possibility of localization, quality control and differentiation.

1.4 Porter's Five Forces Framework

Exhibit 1.10: Framework for Indian Mobile Phone Industry



Source: Authors' estimates & Counterpoint Research data

Threat of New Entrants:

The India Mobile Phone Industry is already competitive with close to 180 active brands in the market. Almost all the leading brands are already present in a fiercely competitive market. As the market moves from first time smartphone users to replacement buyers, it becomes tough for new players to enter and compete in this low margin industry. Because of this we can expect consolidation happening from 2017. Other reasons that limit the threat of new entrants is the rapidly advancing technology. New entrants face a steep learning curve. Furthermore, hardware no longer offers sustainable competitive differentiation, but all competitors must keep up with the latest hardware trends. Existing market leaders are more likely to invest in hardware even as it ceases to be a differentiating factor. A disruption can never be ruled out but, any that arises is most likely to come from existing brands.

Threat of Substitute products:

There is no clear substitute for smartphones. In fact, all other product categories like Tablets, Wearables and other IOT products are either subsets or build around smartphones.

Bargaining Power of Buyers:

With smartphones becoming the center of people's lives, there are hundreds of services that drive our digital lives and are very much dependent on smartphones. Be it Social Media, Entertainment, Payments and others. As competition increases over the years and visible differences in innovation levels in hardware from the consumer's point of view became marginal, smartphones have increasingly become commodities. Further the availability of various models across different price bands and the brands' race to acquire customers gives buyers high bargaining power and higher value for money.

Bargaining Power of Suppliers:

Of all the components used in mobile phones, four components (Chipset, Memory, Display, Battery) contribute to almost 2/3rd of the total cost. Few players have competencies in the key components yet the bargaining power resides with brands in most cases as, except for very advanced devices, there are multiple potential suppliers for most components and competition is often fierce to win positions in key phones. Most OEMs will multisource many of the components and will often switch between suppliers, limiting the visibility each individual component supplier has of the overall project share they possess.

Competitive Rivalry:

The Indian phone industry is one of the most competitive markets in the world. The margins are thin and scale is enjoyed by only 30 out of 170 brands that account for around 90% of the market. In such a scenario, it becomes extremely challenging for players to make their products stand out from the rest of the market. Going forward we expect some brands to exit the market as margins continue to be thin. Brands with low scale and thinner margins will find it tough to survive.

Section: II



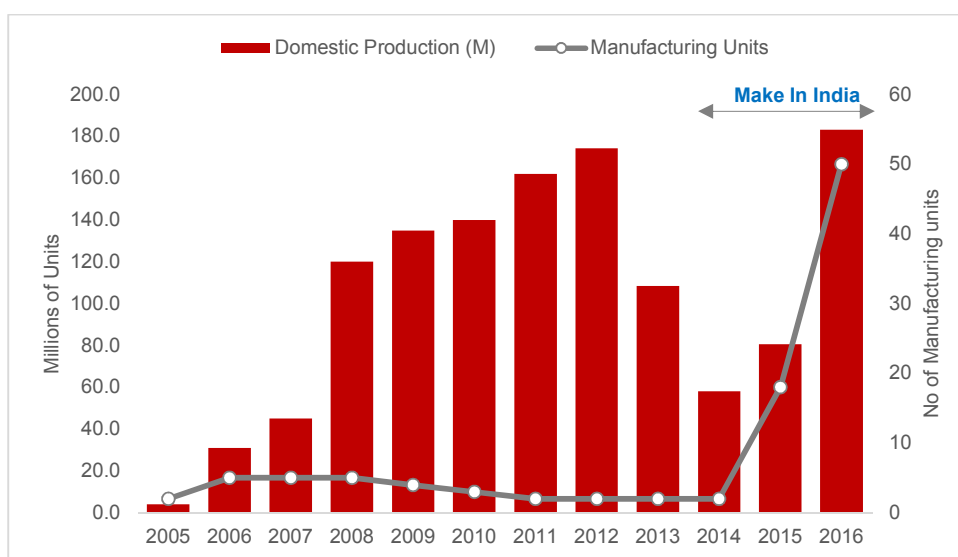
Mobile Phone
Manufacturing in India

2.0: Mobile Phone Manufacturing in India

2.1: Making of a mobile phone in India - The Journey

Mobile Phone manufacturing has been prevalent in India since 2005. Large companies like Nokia, Samsung, LG and Motorola which setup their manufacturing plants alongside smaller players such as Elcoteq. While some of those companies exited manufacturing a few years ago as their global position deteriorated, since the 'Make in India' program was announced, we have seen many domestic as well as international brands ramp up manufacturing units in India.

Exhibit 2.1: India Mobile Phone Domestic production vs Manufacturing Units

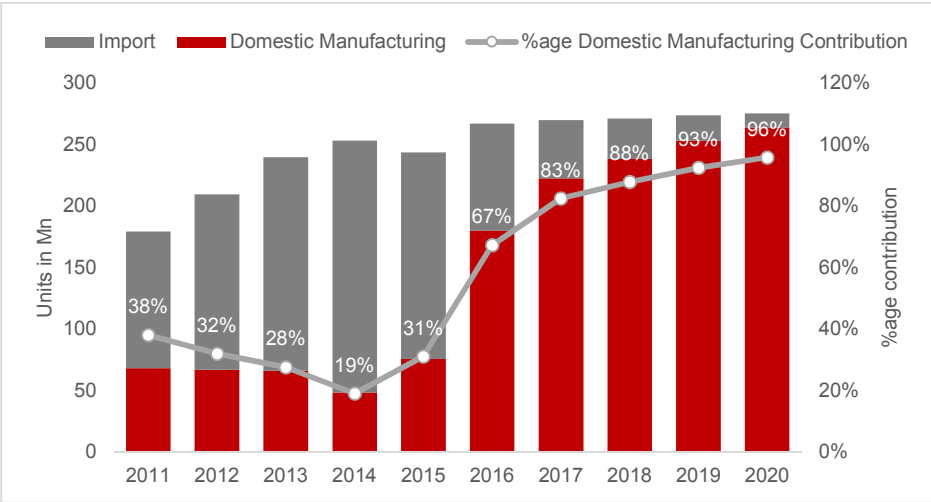


Source: Authors' estimates & Counterpoint Research Data

The domestic production of mobile phone volumes peaked in 2012 when Nokia and Samsung together dominated the entire Indian market. In addition, India was a major export hub for these companies. Since Nokia's decline in 2013-2014, and the new government driving the "Make in India" initiatives with necessary policy reforms, total manufacturing units will reach almost 50 with a combined output of close to 180 million units in 2016.

Two out of every three mobile phone to be sold in India will be domestically produced. This is a significant feat and the foundation to transform India into a global mobile phone manufacturing hub. It is feasible that India can become the second largest mobile phone manufacturing hub globally. We estimate that by 2020 almost 96% of the phones to be sold in India will be manufactured in India. When you add exports on top of the domestic consumption, the production number increases significantly.

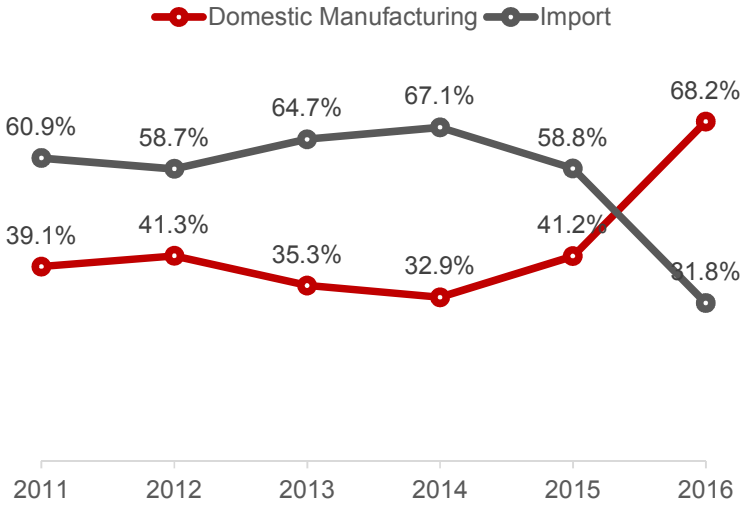
Exhibit 2.2: India Mobile Phone Domestic Consumption: Local Manufacturing vs Imports



Source: Authors' estimates & Counterpoint Research Data

From a value perspective, 2016 has been a pivotal year for India as domestic manufacturing will surpass imports from total retail sales value of the mobile phones to be sold in India in 2016.

Exhibit 2.3: India Mobile Phone Market Forecast by Domestic Production (Value)



Source: Authors' estimates & Counterpoint Research Data

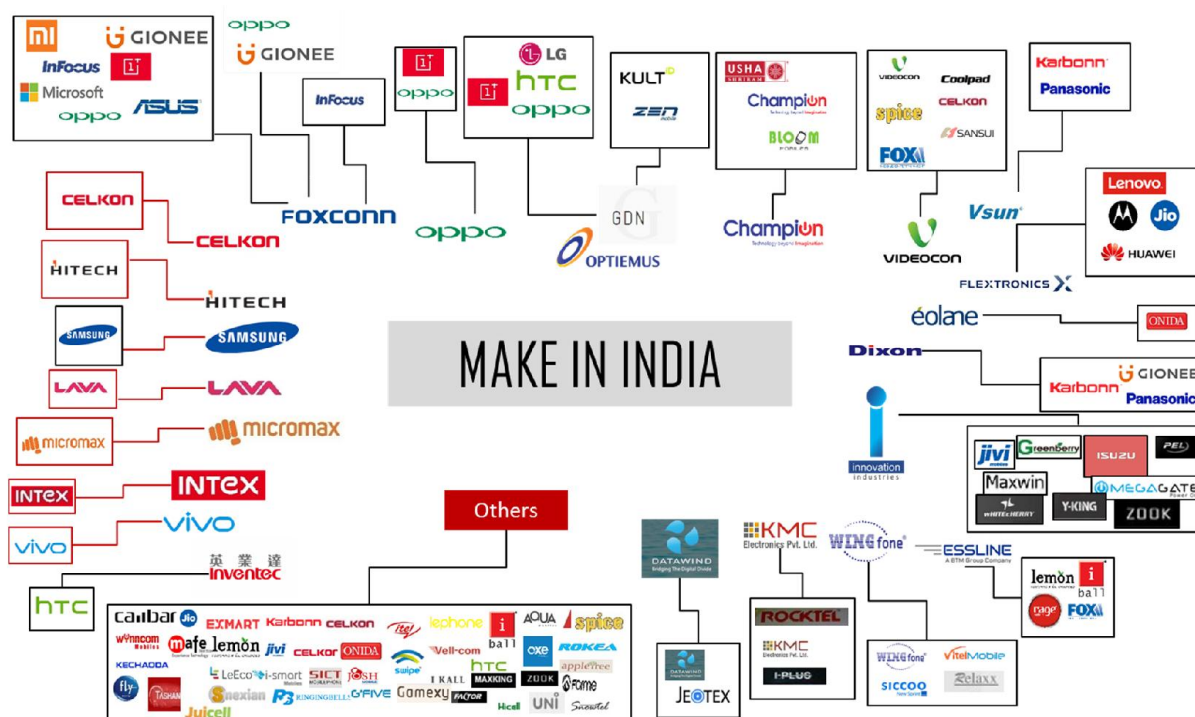
Global brands such as Samsung have almost completed a decade of manufacturing mobile phones in India and are a benchmark for many other OEMs to setup a massive domestic manufacturing unit, scale and benefit from it. The Make in India initiative is attractive for OEMs to setup domestic manufacturing in India not only because of the differential duty advantage but also because it gives them more control over the manufacturing, quality, processes and features localization. Furthermore, incentives from state and central governments under this initiative coupled with cheaper labour costs in India is making the proposition much more attractive.

2.2: Current State of Mobile Phone Manufacturing in India: Facilities, Capacity, Incentives

With more than 265 million mobile phones being sold in India in CY2016, manufacturing in India has become imperative not only from the perspectives of boosting GDP and reducing trade deficit but also from OEMs growth strategy perspective to enable effective logistics, cost savings, better localization, tighter quality control and other meaningful benefits.

Since the launch of 'Make in India' program in September 2014 by the current government with necessary policy reforms (raising excise duty differential between domestic and imported phones) complemented by associated different central and state-led incentive schemes domestic manufacturing of mobile phones has expanded. Currently, there are more than 50 facilities from OEMs to ODMs to EMS to component suppliers involved in manufacturing of mobile phones in India

Exhibit: 2.4: OEM/ODM/EMS Mapping⁷



Source: Author's estimates & Counterpoint Research data

Furthermore, these facilities have been established across 13 states with a combined capex of close to INR 1700 crore (\$267 million) in two years. This has brought employment opportunities to the various states and created a competitive platform among various states which have been lately tweaking their policies and regulations to attract maximum investments.

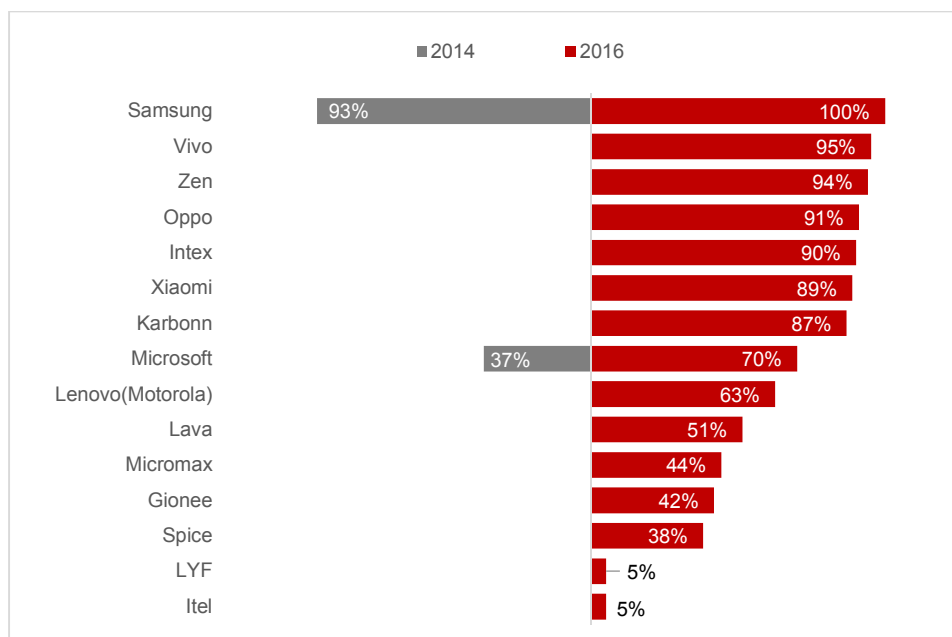
The total combined manufacturing capacity across these facilities can be scaled up to close to 40 million units per month with average output currently ranging from 12 to 15 million per month depending on demand. The bulk of

⁷ Counterpoint Research: Q3 2016 Mobile Phone ODM Tracker

the capacity is still unused but with indigenisation of supply chain and growing domestic and export demand capacity utilization should increase.

Looking at the current demand, we estimate roughly 180 million mobile phones will be manufactured domestically in 2016, up 137% annually. And these will be contributing to almost two in three phones shipped in India in 2016. Exhibit 2.5 highlights the mix of imports vs domestic assembly by top OEMs in the Indian mobile phone market.

Exhibit: 2.5: OEMs Import vs Domestic Manufacturing Mobile Phone Volumes in India CY 2016

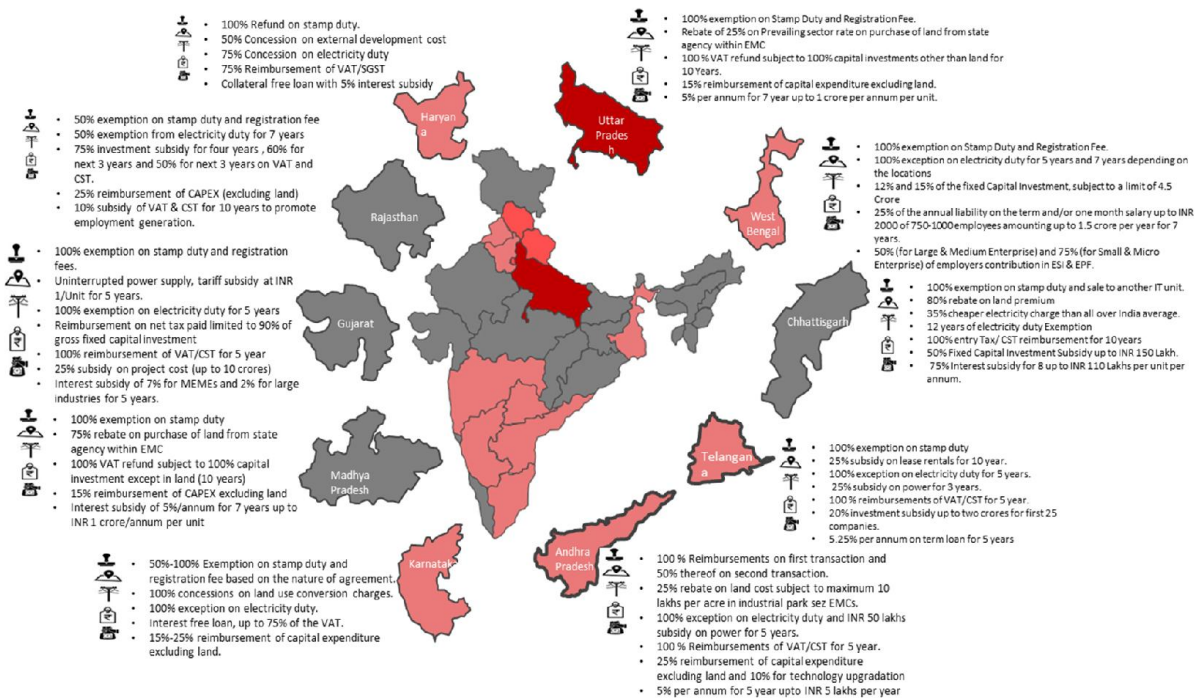


Source: Authors' estimates & Counterpoint Research Data

There is a significant shift in importing phones to manufacturing domestically. This is partially attributable to incentives schemes from Government, including various concessions, reimbursements, exemptions on taxes, duties in addition to subsidies on CAPEX investments, employees' skills developments, EPFs and ESI⁸.

⁸ Refer Glossary section in section 6.0

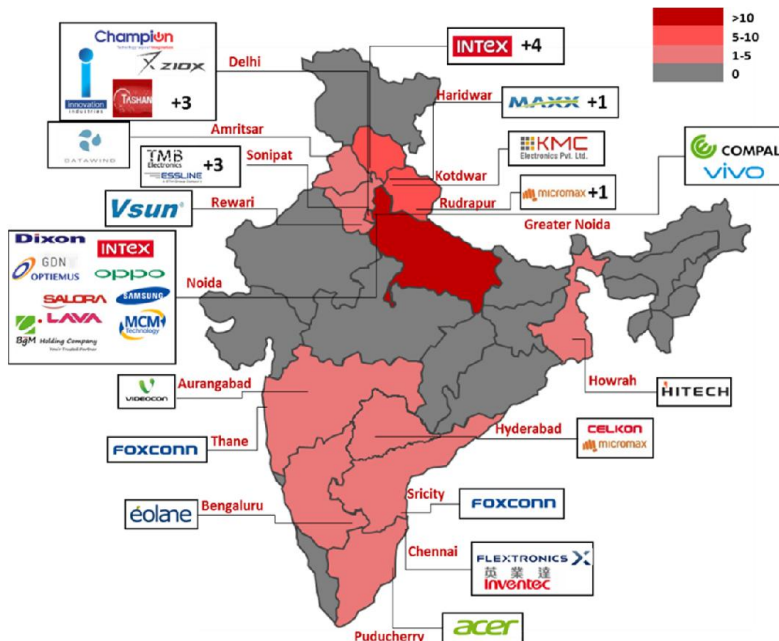
Exhibit: 2.6: Incentive Schemes for mobile phone manufacturing in India 2016



Source: Authors' estimates & Counterpoint Research Data

This has led to different manufacturing units mushrooming in different parts of the country. The following exhibit offers a snapshot of distribution of different manufacturing units for different OEMs by states.

Exhibit: 2.7: OEM/EMS/ODM Mobile Phone Manufacturing facilities in India 2016



Source: Authors' estimates & Counterpoint Research Data

Noida belt has seen the most number of manufacturing facilities with Uttar Pradesh in total of 15 facilities in India in 2016 followed by New Delhi, Uttarakhand and Himachal Pradesh with 5 or more facilities. The higher distribution of the facilities in and around Delhi NCR area has been because of the proximity to the corporate headquarters of many of the manufacturers, access to regulators, availability of resources such as land, labour since the growth of India's leading manufacturer Samsung in this area.

In terms of splits, almost 34% of manufacturing facilities in India are owned by individual OEM brands such as Micromax, Intex, Lava, Samsung and so forth. Comparatively, there is a rise of contract manufacturers which own almost two-thirds of all facilities.

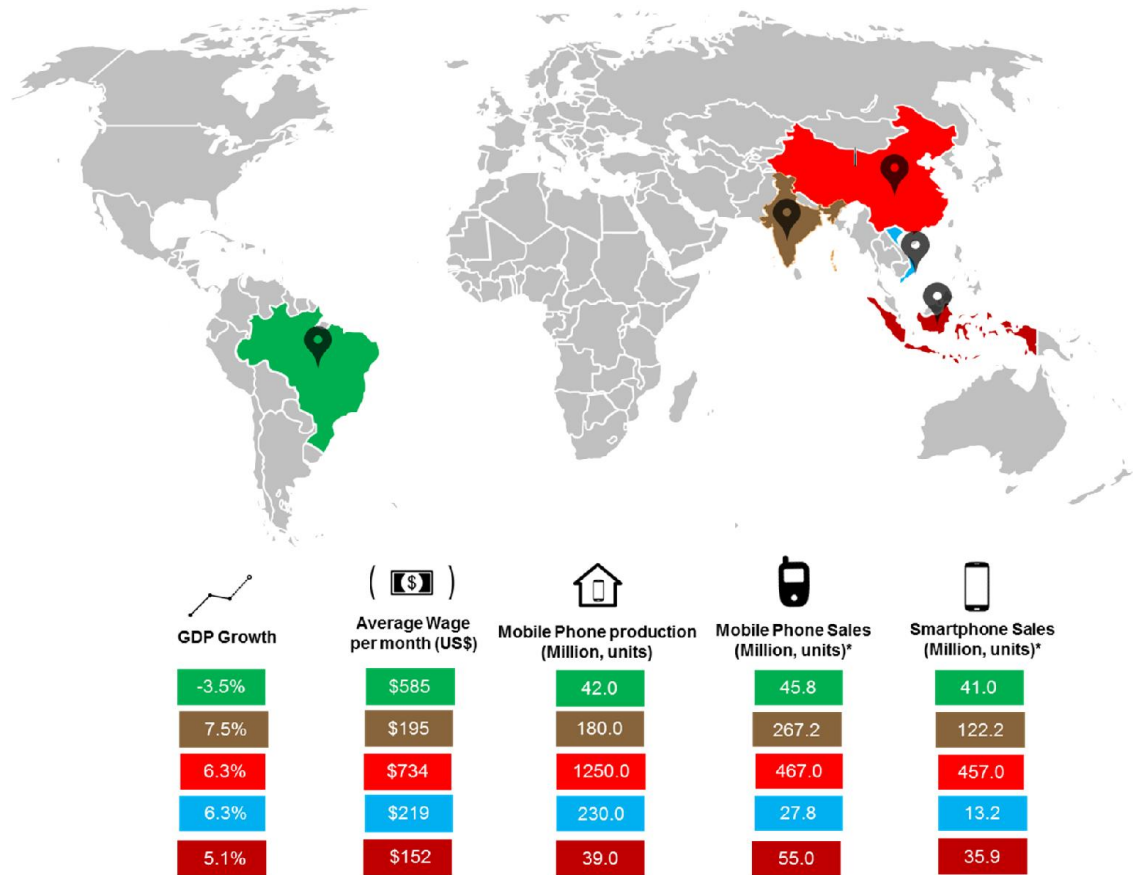
Further, out of the almost 50 manufacturing facilities, almost three-fourth are Indian manufacturers, followed by Taiwanese with 10% and Chinese with 10%. Many of these Indian and Taiwanese manufacturers are assembling mobile phones for multiple Indian as well as Chinese brands. We haven't still witnessed major Chinese ODMs such as Wingtech, Tinno, Sprocomm, Huaqin or Longcheer to design and manufacture mobile phones here in India.

2.3: Comparison of production across Economies

China, India, Brazil, Indonesia and Vietnam now account for almost 85% of the world total phone manufacturing. While India and Indonesia have lately started pushing domestic manufacturing through new initiatives, China, Brazil and Vietnam have robust policies and frameworks for almost a decade now. As an example, Vietnam offers mobile manufacturers a 30-year tax holiday at just 10% tax which can be further extended to 100% exemption. While in China, Government offers many incentives for traditional manufacturing industries, including ODMs, in China's less developed mid-west region. However, in the wealthier coastal zones, government incentives are more targeted towards smart manufacturing, i.e. robots. Brazil on the other hand offers between 55% to 100% state tax return apart from a 75% reduction in income tax.

India's "Make in India" initiative with certain state and center level incentives and Indonesia's much talked about 30% local sourcing rule of LTE devices have seen players starting their domestic manufacturing operations in past couple of quarters in these two growing Asian countries.

Exhibit: 2.8: Comparison of Key Mobile Phone Production Economies

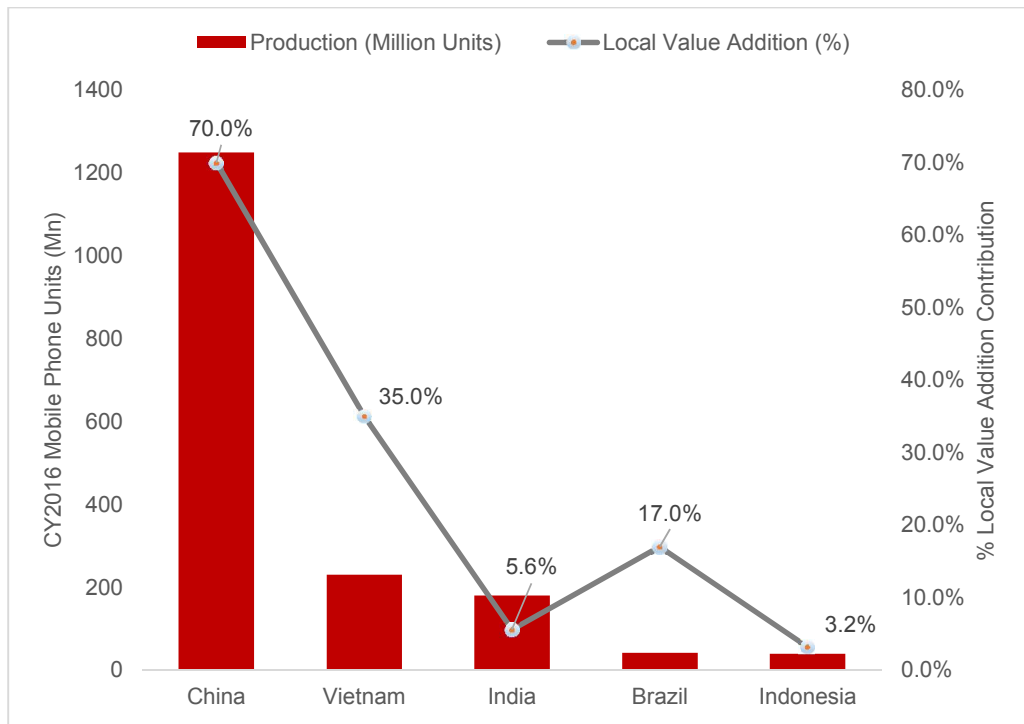


Source: IMF 2016 Projections, Trading Economics, Counterpoint Research Data, *Sales includes Imports + Production

With labor wages increasing in China and the possible withdrawal of fiscal incentives in Brazil, due to the tough economic environment, manufacturers have started to rethink their next manufacturing hubs. In such

a scenario India is strongly positioned as next big destination in terms of manufacturing as it is the only market in the world which has huge domestic demand as well as being a viable export hub. It is also one of the fastest growing economies. In addition to cheap labor it also offers a rich pool of software developers which can create value addition in terms of local apps and services for the phone manufactures. However, to make this happen we need to ensure a strong component ecosystem in India and subsequently increase the current local value addition which lies in single digits:

Exhibit: 2.9: Mobile phone production and local value addition- CY 2016



Source: Authors' estimates & Counterpoint Research Data

Brazil:

- Brazil is facing one of the most challenging economic scenarios in the past twenty-five years. The profitability in the manufacturing sector has declined and production levels are down.
- The mobile phone manufacturing is estimated to decline by 11% in CY 2016 as smartphone growth slows.
- Having said that all the key mobile phone brands like Samsung, Motorola, Alcatel, ZTE and others have their local assembling operations due to high import duties involved. A domestically produced phone is around 40% cheaper than a similar model that is imported.
- Apart from this the policies to incentivize R&D remain attractive under Innovation Act, Informatics Act and PADIS law. Especially the PPB (Basic Productive Process) under Informatics Act which defines, per product, production steps and corresponding %age value addition with respect to certain components. Ex: PCBA (85%), Charger (85%), Battery Cells (60%), Memory (40%) and others.
- This has led to the total local mobile phone component value contribution of 17% in Brazil.

Indonesia:

- Indonesia is the fourth largest country in the world in terms of population. While the overall mobile phone penetration is high, the smartphone penetration in Indonesia is still under 50%.
- In June 2015, Indonesia Ministry of Communication and Information Technology announced new rules for a mandatory 30% local sourcing of LTE devices starting 2017.
- However, post criticism of the rule in wake of weak component ecosystems and lack of clarity in calculating value, the Indonesian government allowed the inclusion of software and patents as contributing to the 30% value addition.
- The two options approved were categorized under hardware and software. For hardware, the provisions are 70-20-10% sourcing for hardware, development and software while for software it is 70-20-10% sourcing for software, development and Hardware, subject to certain conditions.
- The number of local manufacturing plants has increased from 3 to 20 in just two years with an estimated output of 39 Million units in 2016. However, the local value addition remains low (3.2%) due to weak component ecosystem in Indonesia.

Vietnam:

- Vietnam is the second largest market in the world in terms of mobile phone manufacturing. However, the production is dependent mostly on Samsung, which is manufacturing almost 50% of its total global phones in Vietnam. Other brands manufacturing in Vietnam includes: LG, Microsoft and a few local players.
- The domestic demand is met mostly by imports while exports of mobile phones is estimated to reach \$33 billion in CY 2016 with production of 230 Million units.
- The investment incentives in Vietnam are attractive for the foreign players. It offers a 30-year tax holiday window at just 10% tax on mobile phone manufacturing which can be 100% exempted in the first four years and further reduced to 50% in the next nine years. Additionally, VAT exemption is applied on technology transfer.
- Further tax incentives are also granted based on location and size of investments. Additional tax incentives have been allocated in the high-tech sector backed by R&D. Companies are permitted to use profits before tax to establish a fund for scientific and technology development where the amount paid may not exceed 10% of the total taxable income for the assessable tax year.
- The current local mobile phone value addition with respect to components stands at 35% due to availability of cheap labor and the entry of component players like Samsung Display. However, going forward, Vietnam needs to reduce its dependency on Samsung especially as Microsoft declines toward zero.

China:

- China continues to be mobile phone manufacturing hub in the world contributing to almost two-third of the global mobile phone manufacturing.
- The component ecosystem remains strong and favorable government policies continue to attract investments from foreign investors. The government encourages investments in R&D.

- It offers a reduced corporate income tax of 15% to the TASC's (Technologically Advanced Service Company). Apart from this separate incentive have been allocated to High-New Technology Enterprises (HNTE) status.
- However, with recent currency woes and increasing labor costs, some of the players have started to invest in new manufacturing locations to offset perceived risks.
- The current local mobile phone value addition with respect to components stands at 70% thanks to the strong and mature Shenzhen manufacturing ecosystem, growing local display and semiconductor fabs.

Exhibit: 2.10: Key Indicators Comparison for Global Manufacturing Opportunity

	China	India	Brazil	Vietnam	Indonesia
Domestic Market Consumption	Green	Green	Yellow	Red	Red
Export Market Opportunity	Green	Green	Yellow	Green	Yellow
Smartphone User Penetration	Green	Red	Red	Yellow	Yellow
Average Wage (Manufacturing)	Green	Red	Yellow	Red	Red
Barriers to Entry for New Players	Green	Red	Green	Red	Red
Barriers to Entry for Manufacturing	Red	Yellow	Green	Red	Yellow



Source: Authors' estimates & Counterpoint Research Data

Section: III



From Assembly to
Full-Scale Manufacturing

3.0: From Assembly to Full-Scale Manufacturing – A Phased Approach.

While the breadth of total manufacturing of mobile phones in India has risen rapidly due to differential in excise duties on the full imported phone and some components (such as batteries, chargers and accessories), the depth of manufacturing remains elusive. The current state of manufacturing is still limited to SKD level (semi knocked down) components being imported and assembled in India and the sub-components are still being imported, thus limiting the “local sourcing and value addition” to just assembly part of the components. The current contribution of locally sourced components and sub-components is just 6% to the total value of components going into a phone. Given the pivotal role of mobiles phones towards economic growth, a status quo such as this will be economically unfortunate.

For purpose of this study, we therefore define the term “true value addition” which highlights the actual value generated by local sourcing of components and local assembly of mobile phones. If a particular component is assembled locally but the sub-components are being imported, then the true local value addition would be just related to the assembly costs of that component. However, if all the sub-components are sourced locally then we can estimate the “true value addition” or “localization rate” to be 100%.

We estimate that the true local value addition generated in local component sourcing and local assembly will be close to USD\$650 million out of the total USD\$11.6 billion in total value of the mobile phones to be sold in 2016. This implies that the contribution will remain around 6% level. Hence, a policy intervention will be important in improving these levels of contribution and improve the localization rate. In terms of contribution in the form of employment, more than 30,000 new direct jobs have been generated via the rise in the number of mobile phone manufacturing units since “Make in India” program launch.

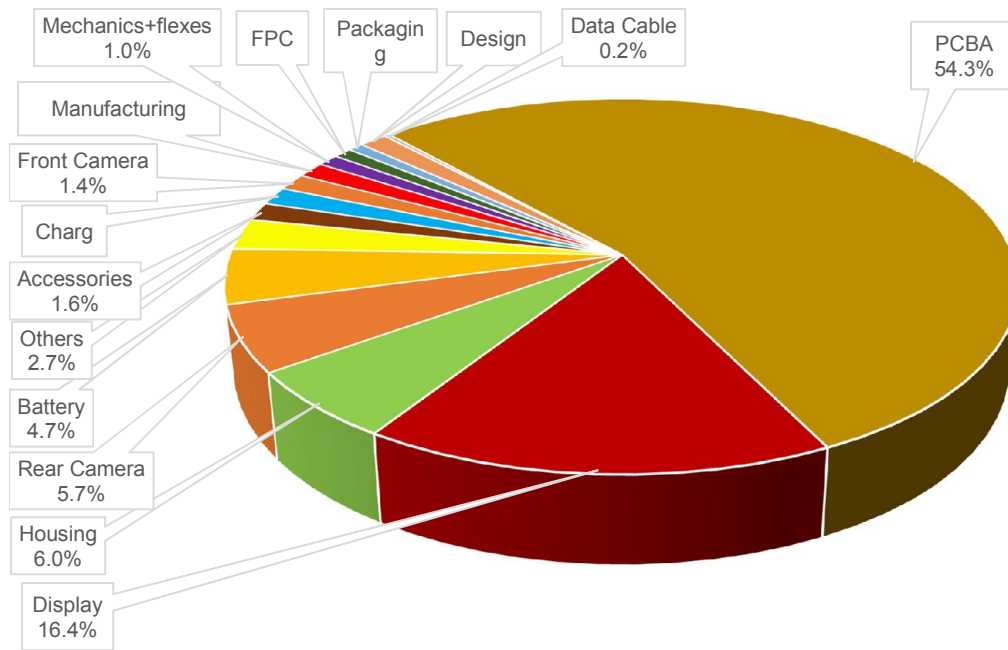
However, we believe that this is just the first phase of manufacturing, and the Make in India program is in a nascent stage and needs to drive significant policy reforms to assemble a mobile phone with a goal to increase the overall local sourcing value addition to as high as 30% in coming years. Reaching this goal will ensure meaningful impact not only to the economy but also for the entire mobile ecosystem.

To achieve the 30% value addition goal, the current state of manufacturing needs to move beyond SKD assembly to Completely Knocked Down (CKD) level with greater investment in design and research and focus to source components and resources locally by attracting component suppliers. This approach will help form a robust component ecosystem and usher in advanced manufacturing processes.

To reach this goal, a phased manufacturing plan must be adopted. For this it is very critical to understand and identify which components can be locally sourced or assembled in the near to mid to longer term.

In Exhibit 3.1 we have taken a deep dive into what constitutes a smartphone and identified respective components from an extensive “Bill of Materials” BoM analysis to drive a practical phased manufacturing approach.

Exhibit 3.1: Key Components Share of Bill of Materials Value for Mobile Phones in India

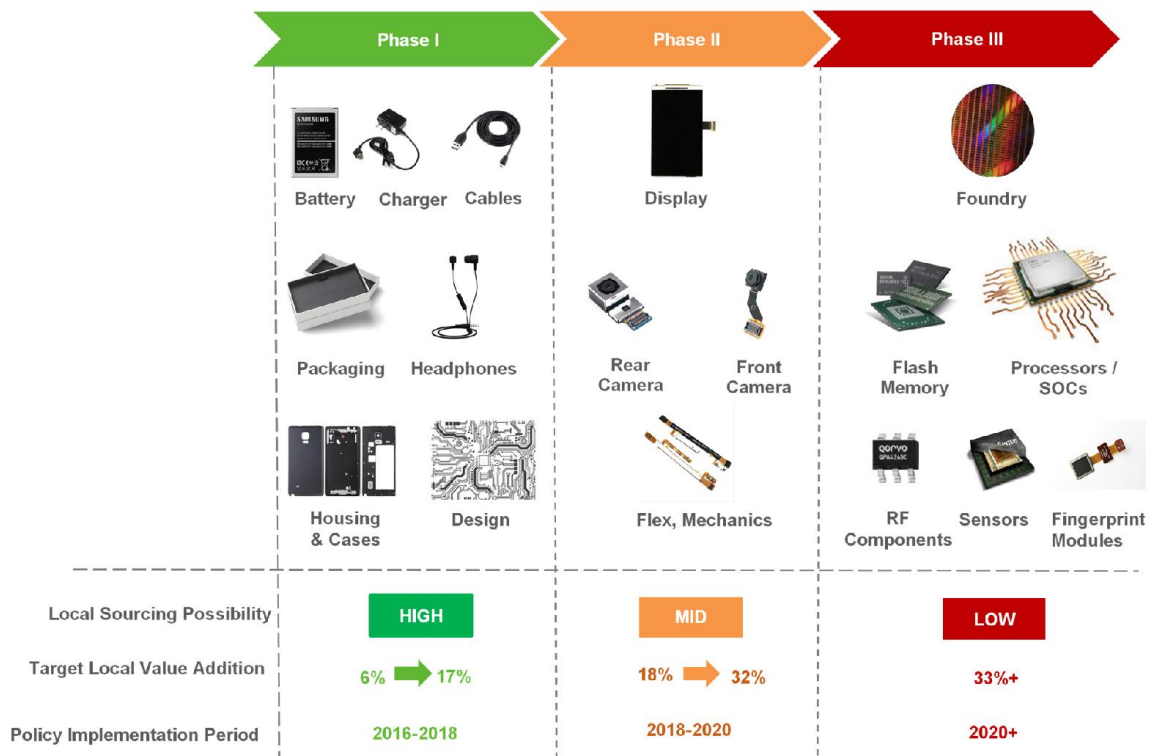


Source: Authors' estimates & Counterpoint Research Data

The top components such as PCBA, Display, Housing, Battery, Cameras and Charger contribute to almost 90% of the total mobile phone costs. Some of these high value key components are currently imported and contribute to almost zero value addition.

The following Exhibit 3.2 highlights our proposed plan identifying different components for a phased local sourcing approach for coming years. Accordingly, we also highlight the possible level of value addition that could be achieved.

Exhibit 3.2: Make in India: Mobile Phone Phased Local Value Addition Plan



Source: Authors' estimates & Counterpoint Research Data

3.1: Phase I: Components with High Possibility of Local Sourcing

Battery, Chargers, Cables, Headphones, Packaging have been correctly identified by regulators as the components with high possibility have begun assembling locally in India with an increase in excise duty on some of these components. These four components together can contribute to roughly 10% of the total BoM costs value going into the phone if every sub-component within those components is locally sourced.

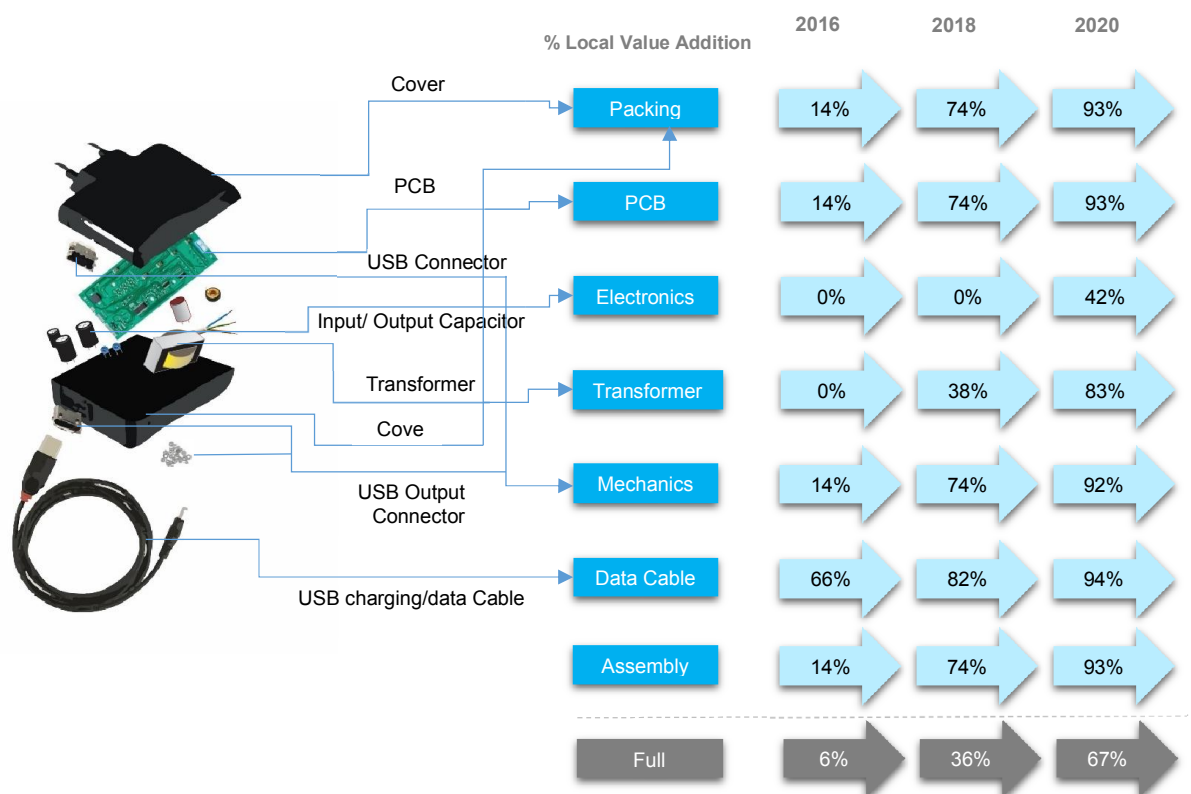
The government's imposition of differential excise duty on import of a fully assembled Battery and Charger has helped achieve some level of extra value addition but mostly in terms of assembling these components. However, the major sub-components such as electronics within the charger or fuel-cell within the battery which alone constitutes more than 65% of the total charger or battery costs are still being imported. reduces the local value addition impact and is the current level of "true value addition".

In addition to above components, the phase 1 of policy reforms should also include local sourcing of phone Housings (front, back, side keys, etc) as well as indigenising overall industrial design, design mounting and assembly of PCBA to maximize the value addition through 2020.

The following deep dives highlighting the need for CKD level manufacturing and local sourcing of sub-components to drive real domestic value addition.

3.1.1: Charger

Exhibit 3.3: Charger Sub-Components Local Sourcing Contribution %



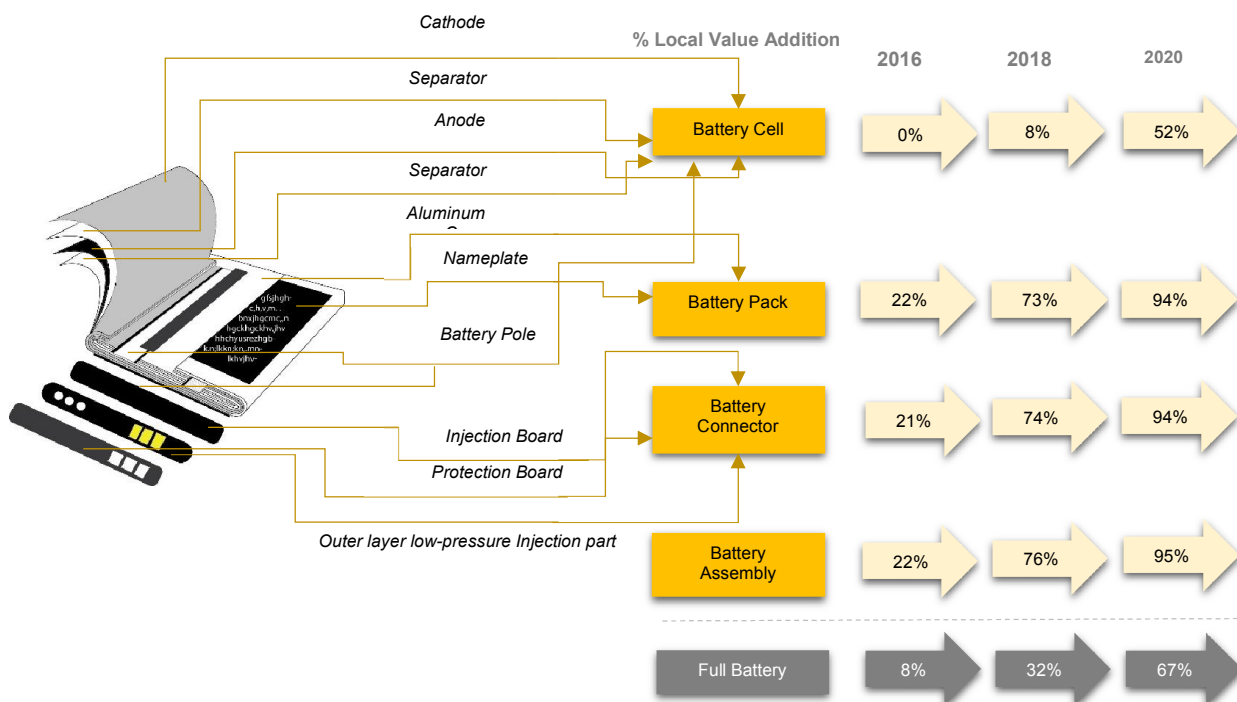
Source: Authors' estimates & Counterpoint Research Data

- Under the current policy for chargers, the charger is being assembled in India though the sub-components of the chargers are not completely sourced locally. For example: only 14% of the total packing, PCB and mechanics are sourced locally whereas sub-components such as electronics parts are still imported thus limiting the meaningful local value addition.
- Furthermore, not all the OEMs have contracted to a supplier or self-started assembling chargers locally (e.g. Salcomp, Elentec and so forth); a few OEMs are still importing chargers.
- The maximum possible contribution of locally sourced components and the local assembly of a charger that could be achieved by end of 2016 is US\$11 million in value terms of the total US\$182 million worth total charger value in 2016, i.e. true localization rate is close to 6%.
- To maximize the full effect of value addition for chargers, first every OEM needs to assemble their chargers locally and secondly, sub-components such as transformers and other electronics needs to be sourced locally.

- To achieve a goal of at least 67% true localization of chargers by 2020, duties needs to be raised on targeted sub-components to enable sourcing from local suppliers. if local suppliers are not available, policies and incentives scheme needs to be designed to attract foreign suppliers to manufacture those sub-components locally forming a small supply chain ecosystem for the chargers
- If successful, the total value of locally sourced charger modules could rise to US\$172 million by 2020 i.e. almost 67% of the total charger components needed in a charger sold locally.
- The above value addition is just from domestic consumption perspective, when India gradually transforms into an export hub, the contribution to GDP will further increase.

3.1.2: Battery

Exhibit 3.4: Battery Sub-Components Local Sourcing Contribution %



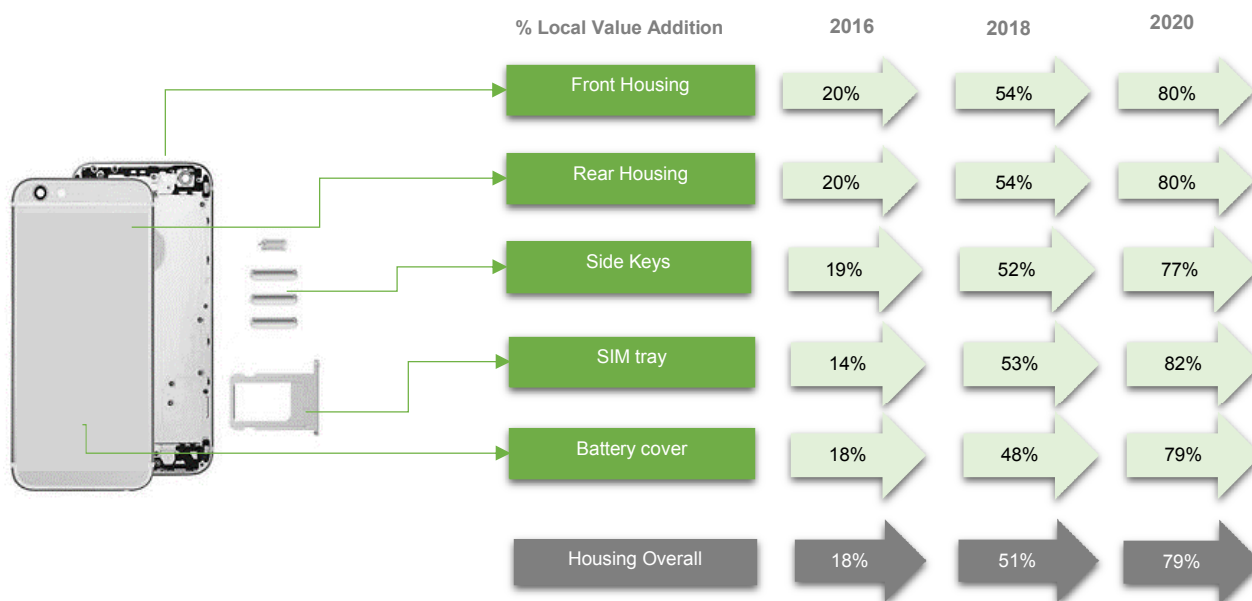
Source: Authors' estimates & Counterpoint Research Data

- Under the current policy for mobile phone battery, the battery is being assembled in India though the sub-components of the battery are not completely sourced locally. For example, only 22% of the total packing, connectors are sourced locally whereas sub-components such as fuel-cell which contribute to 60% of the battery cost is still being imported, thus limiting the true value addition significantly
- Furthermore, not all the OEMs have contracted to a supplier or self-started assembling battery locally (e.g. Intex, Advent and so forth) still a few OEMs are still importing battery as a full component.
- The maximum possible contribution of local assembly of battery could be achieved by end of 2016 and this would be some US\$47 million in value terms of the total US\$554 million worth total battery value in 2016. Clearly, true localization rate is just 8% despite higher duty on importing the battery.
- To maximize the full effect of value addition for batteries, every OEM needs to assemble their batteries locally. And they also need to procure sub-components such as battery cell, battery packs and connectors.
- Implementation of revised policies with higher import duties on sub-components will further encourage true value addition by attracting suppliers locally and from outside to maximize the overall domestic value addition.

- With focus on sub-components value addition, overall battery local value addition could rise to 67% by 2020 corresponding to almost US\$448 million out of US\$667 million worth total costs of battery going in to all phones to be consumed in India in 2020.
- The above value addition is just from domestic consumption perspective; when India gradually transforms into an export hub, the contribution to GDP will potentially further increase.

3.1.3: Housing

Exhibit 3.5: Housing Sub-Components Local Sourcing Contribution %



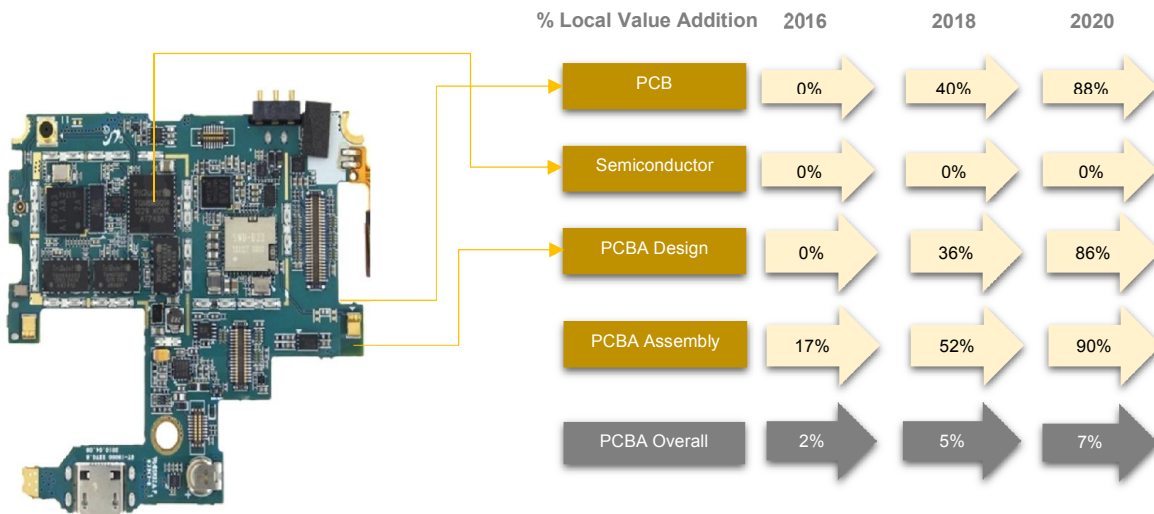
Source: Authors' estimates & Counterpoint Research Data

- Mobile phone housing parts do not attract significant duties compared to chargers or batteries and thus the bulk of these components are imported.
- The total import bill of housing components in 2016 is likely going to be more than half a billion dollars.
- Only a few brands have started designing and manufacturing cases locally. There are a few manufacturers who have invested in molding and CNC machines to manufacture plastic housing parts, which still form a bulk of the housing needs in India. (e.g. Samsung, Mucho Case, Videocon and so forth)
- In the coming years, as the OEMs move to more metallic, polycarbonate or ceramic housings, the need for in-house manufacturing via dedicated supplier partners will become prevalent.
- The maximum possible contribution local assembly of housing could be achieved by end of 2016 is US\$127 million in value terms of the total US\$696 million worth total housing components value in 2016, i.e. true localization rate is just 18%.
- To maximize the full effect of value addition for housings which, like chargers and batteries, has a high possibility to be completely manufactured locally. There is a need for implementation of revised policies with higher import duties and incentive schemes to attract different housing design and manufacturers locally as well as from overseas.

- If successful, overall local value addition rate for housing components could rise 79% by 2020 corresponding to almost US\$821 million out of US\$1 billion worth total costs of housing going in to all phones to be consumed in India in 2020.
- The above value addition is just from domestic consumption perspective, when India gradually transforms into an export hub, the contribution to GDP will further increase.

3.1.4: PCBA Design & Assembly

Exhibit 3.6: PCBA Sub-Components Local Sourcing Contribution %



Source: Authors' estimates & Counterpoint Research Data

- The PCBA is the heart of the smartphone and corresponds to more than half of the total component value going into the phones.
- In 2016 alone, almost US\$6 Billion worth PCBAs will be used in the mobile phones in India. Under the current policy for PCBA, the entire PCBA doesn't attract any significant duties, so the current localization rate stands at mere 2% as only few OEMs have adopted mounting of components on the PCB locally.
- A PCBA includes Flash Memory, Application Processor, Graphics Processor other semiconductor-based active and passive sub-components which are not locally sourced considering a lack of semiconductor foundry and PCB sub-components supplier ecosystem.
- However, investing in PCBA design and (Surface Mount Technology) SMT-level PCBA assembly are important steps towards full-scale manufacturing.
- Furthermore, some components such as the PCB itself can be sourced locally and contribute to some level of value addition.
- The current OEMs have been just using already designed and manufactured PCBA from third party suppliers, however, they now need to invest resources in in-house Industrial Design as well as PCBA design and assembly.

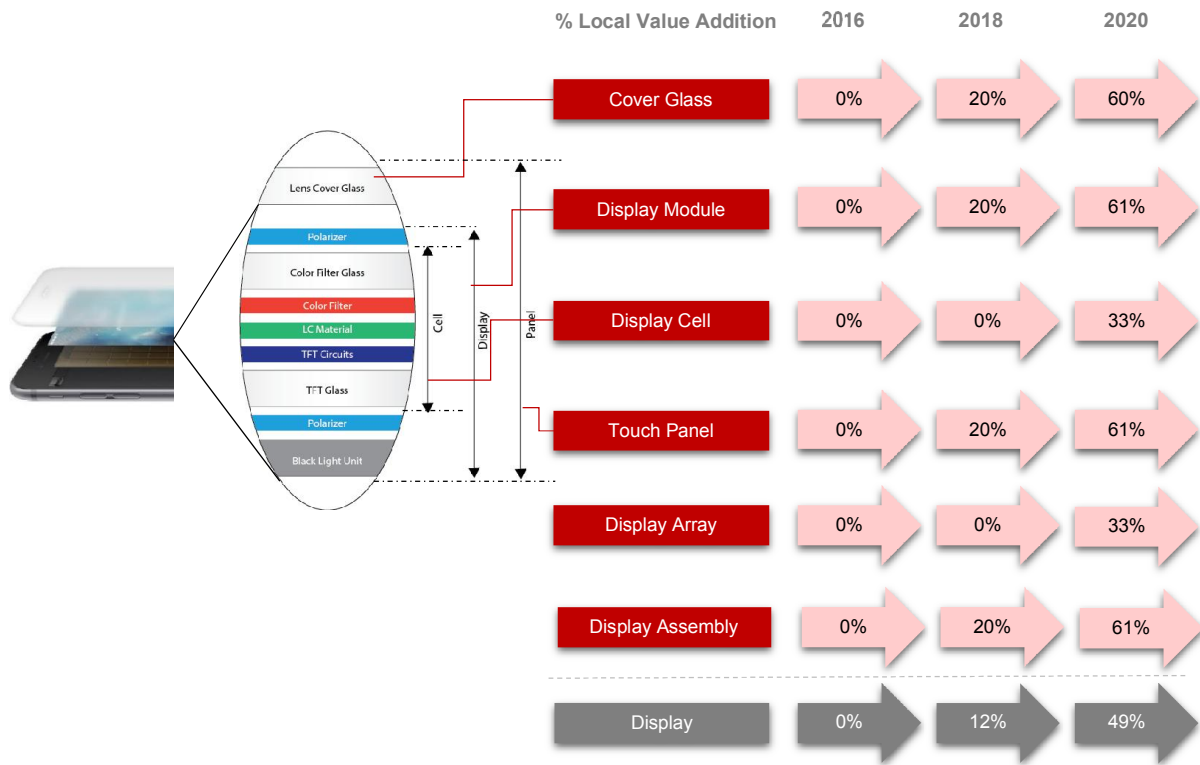
- There are multiple benefits for adopting in-house design and assembly, firstly, it will ensure more control over the overall smartphone design, selection of key components, greater buying power, building Intellectual Property (IP) portfolio and ensuring multiple in-house quality checks and testing as compared to importing a readymade PCBA from a third party ODM from overseas.
- PCBA design and assembly will further catalyze the growth of component supplier ecosystem and makes case for the Phase III Foundry investment and attracting key players to manufacture silicon content and driving higher level of value addition considering PCBA contributes to more than half of the total components value going into the phone.
- PCBA design and assembly with local sourcing of some passive components such as PCB within the PCBA alone will drive the total local value addition to almost US\$ 1 billion by 2020 and will make a strong case to attract foundry players to manufacture the high-cost silicon based PCBA sub-components locally.
- This could alone grow the total value addition for Make in India program directly by 5% and is the most critical first step for the initiative to succeed.

3.2: Phase II: Components with Mid Possibility of Local Sourcing

The proposed phase two for essential smartphone components which needs to be considered for a revised Make in India policy reform to drive target value-addition to close to 30% level are the following:

3.2.1: Display

Exhibit 3.7: Display Sub-Components Local Sourcing Contribution %



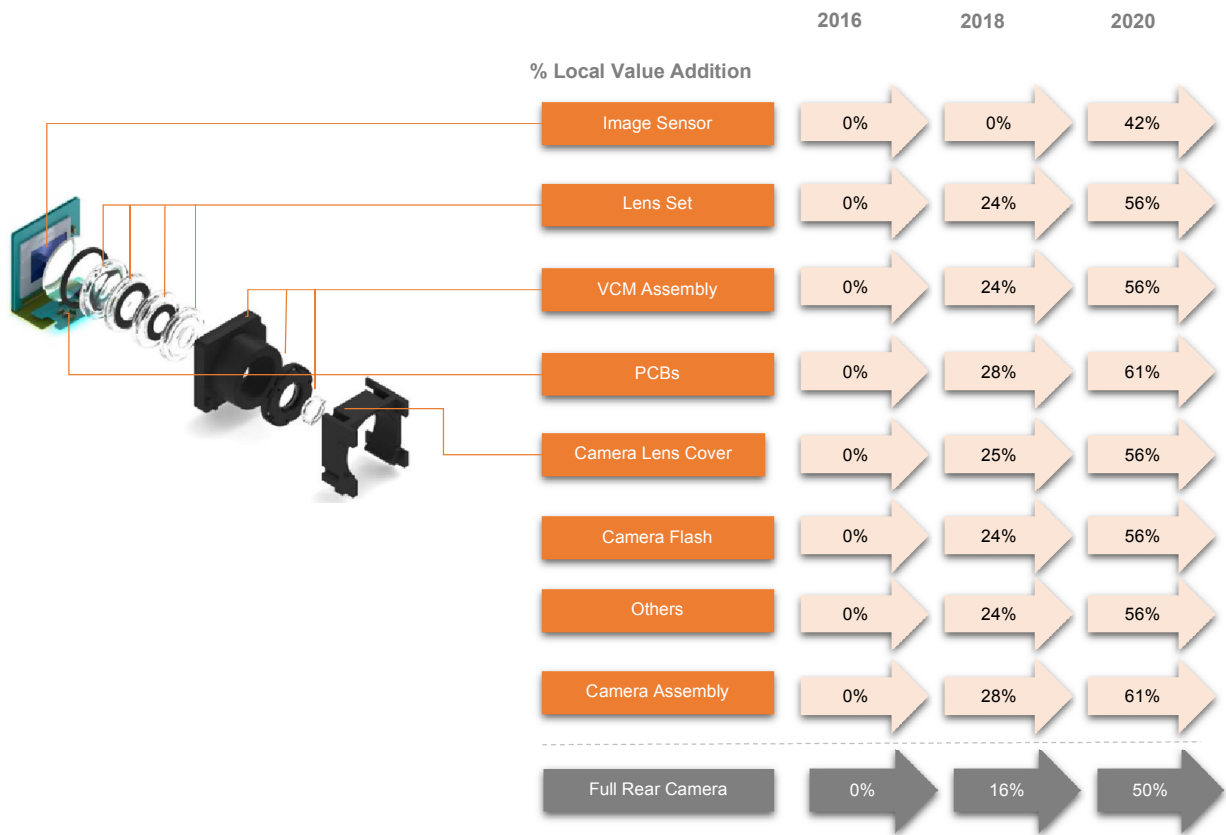
Source: Authors' estimates & Counterpoint Research Data

- Mobile phone displays contribute to roughly 16% of the total component costs for a phone and is the second most expensive component after the PCBA.
- However, current duty structure allows the display to be imported as it is in a SKD format with none of the sub-components sourced locally.
- The total cost of displays going into the mobile phones in India will be close to US\$1.9 billion in 2016 and is expected to almost double by 2020 as demand for smartphones and average size and resolution of the displays grow.
- We believe building a display manufacturing ecosystem is critical to maximize the total local value addition. Attractive policies and incentives will be needed for the key global display suppliers to drive investment in display manufacturing fabs in India.

- This will be a big boost for the component ecosystem as achieving scale won't be a problem with growing demand not only for huge smart devices market but also can expanded to enterprise displays, monitors, televisions and so forth.
- A display fab deployment normally can drive direct and indirect employment of more than 30,000 people and can have a huge impact on a state as well as central GDP metrics.
- We propose the display fabs roll out should be the key focus post 2018 in the Phase II of "Make in India" policy reforms to attract multiple suppliers to drive a vibrant component ecosystem, maximize local value addition and significantly reduce the import bill.

3.2.2: Cameras:

Exhibit 3.8: Display Sub-Components Local Sourcing Contribution %



Source: Authors' estimates & Counterpoint Research Data

- Cameras (Front and Rear) have become the key components within a smartphone from a use-case perspective.
- Currently, cameras contribute roughly 7% of the total BoM costs and roughly \$800 million in total costs contribution to the number of phones sold in India in 2016. This will almost double to \$1.6B by 2020.
- Camera modules are also made up of multiple sub-components from image sensors, lens set, VCM assembly, other active and passive components.
- Local assembly of the camera module along with local sourcing of some of the components need to be encouraged to drive some level of value addition.
- If the assembly of camera modules are encouraged in the proposed phase two with right policy reforms, then could drive more than \$800 million in in local value addition in 2020 from zero in 2016 with a localization rate of 50%.

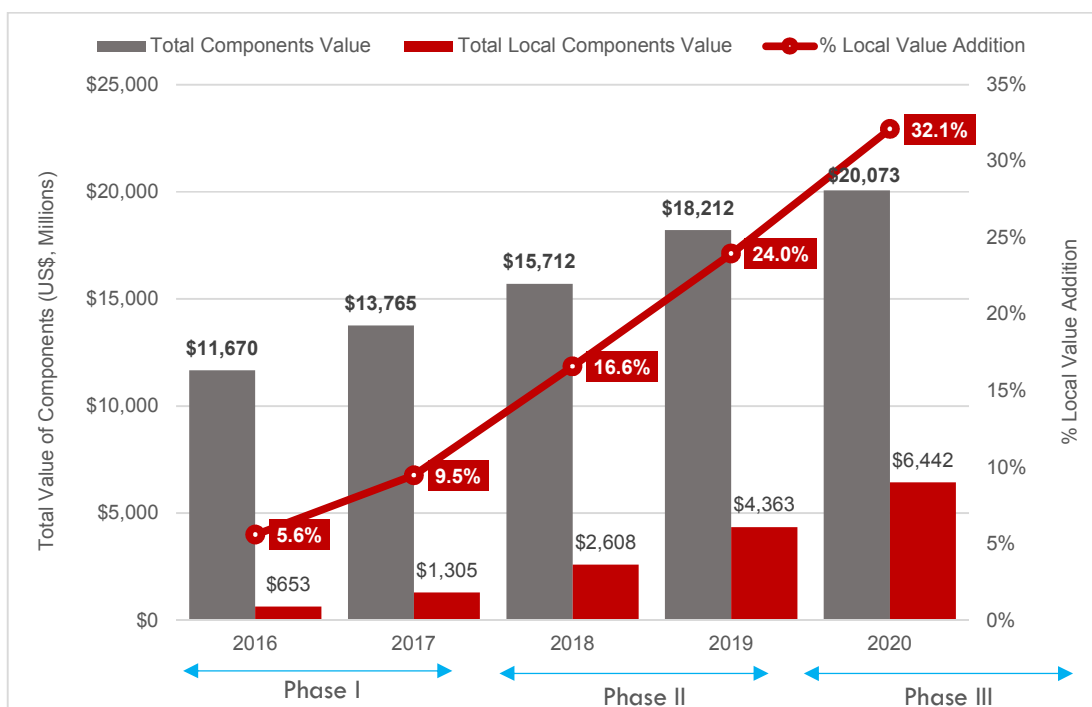
3.3: Phase III: Components with Low Possibility of Local Sourcing

- The success of building a component ecosystem attracting multiple suppliers in the Phase I and II will be critical to drive policies and investments in Phase III.
- The proliferation of PCBA design and SMT level assembly locally will set foundation and drive a need for local sourcing of semiconductor components. The Government's role, along with a thriving component ecosystem, will be crucial to attract multi-billion dollar investments in building an advanced silicon wafer fab in India.
- Having advanced semiconductor fabs locally will elevate India near the leading technologically powerful economies. In the next five years, there will be a point when semiconductor imports will be greater than oil imports. Hence it will be critical to have local semiconductor fabs that will not only cater to domestic electronics manufacturing demand, but can also to the export demand.
- The scale India can generate thus will be next only to China or even on par, once major electronics manufacturing shifts to India. The fab will be geared to produce semiconductor chips from memory to processors to sensors and other integrated circuits and controllers not only for smartphones but extending to billions of Internet of Things (IoT) applications.
- While there is a strong case for significant domestic consumption, exporting chips from India to other parts of the world will also add to the enormous potential scale India, as an export hub, can offer.
- The semiconductor chips in the mobile phones will contribute more than \$5 billion, or more than 40% of the total component costs, for the total number of phones to be sold in India in 2016.
- This value is going to reach \$10 billion by 2020 with the proliferation of advanced smartphones directly adding to the imports bill.
- More than \$42 billion worth semiconductor components are going to be used in mobile phones over the next five years.
- With the rise of the connected everything in IoT era post 2020, this is going to even grow significantly further. This makes a strong case for government and key players to accelerate activities to lay the foundations of building semiconductor fabs locally.

3.4: Summary:

- Mobile phone manufacturing in India needs to transform from a low-value-addition driven assembly to a high-value-addition industry driven by complex, high-end manufacturing.
- To achieve, the government should implement policy reforms which will enable a swifter move from SKD to CKD level manufacturing. The focus should be on setting thresholds for local sourcing right from design, which will enhance and build a more robust supplier and manufacturing ecosystem.

Exhibit 3.9: Total Local Value Addition Forecast under Phased Plan

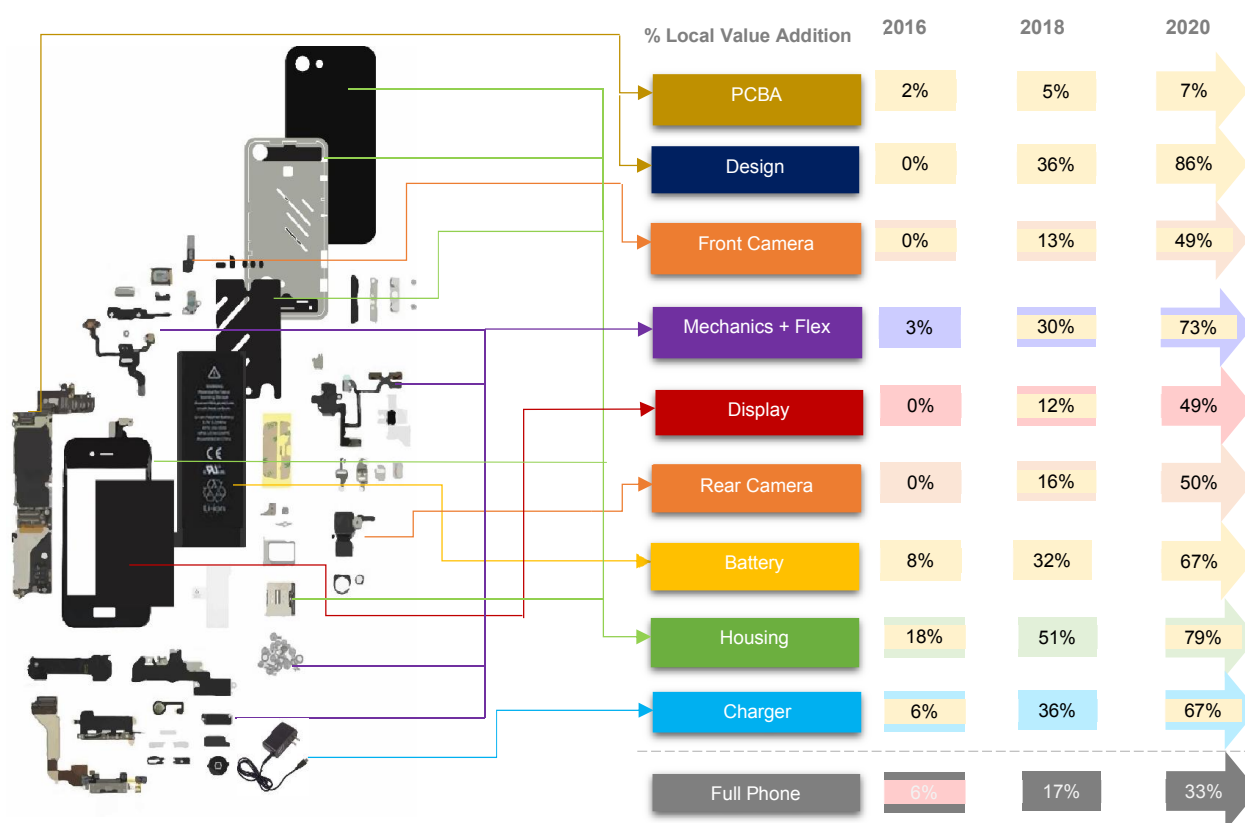


Source: Authors' estimates & Counterpoint Research Data

- The higher local value addition can be achieved in a phased manner with the Phase 1 being OEMs investing resources in overall Industrial, PCBA and software design of mobile phones followed by PCBA assembly.
- The Phase 1 should also focus on revising the duty structure for some components such as chargers, battery, housing, accessories, packaging to maximize the local sourcing of sub-components and materials than importing them to maximize the local contribution of the total components value going into the phones
- A solid foundation via phase one should allow further localization of other higher contributing in a mobile phone such as cameras and displays in Phase 2. These two components will be critical to drive an inflection point in the total local value addition within the country closer to 30% level. With every phase, the amount of local value addition is bound to grow significantly higher and so would be the contribution to economy in terms of number of direct and indirect jobs.

- The Phase 3 which involves manufacturing of semiconductor components locally can maximize the local value addition beyond the 30% level, depending upon the semiconductor fab players India can attract from outside as well as domestically. This phase of building a silicon wafer fab will warrant significant investments from the players, skilled professionals, level of advancement in technology and processes, related intellectual property and special incentives from government to make it possible. This will contribute handsomely towards reducing the import bill.
- We estimate the proposed phased approach could drive the total localization rate from 6% in 2016 to the target 32% level by end of 2020. This translates to local sourcing and assembly related value addition of close to US\$6 billion in 2020, up almost 10x from current levels.
- The following summarizes the level of local value addition possible for key mobile phone components adopting the proposed phased approach. Local manufacturing of batteries, housing, mechanics, and chargers could reach higher rate of localization quickly relative to PCBA or Display or Cameras. However, the PCBA, Display and Camera alone even with relatively lower localization rate but will contribute to more than half of the total local value addition by 2020.

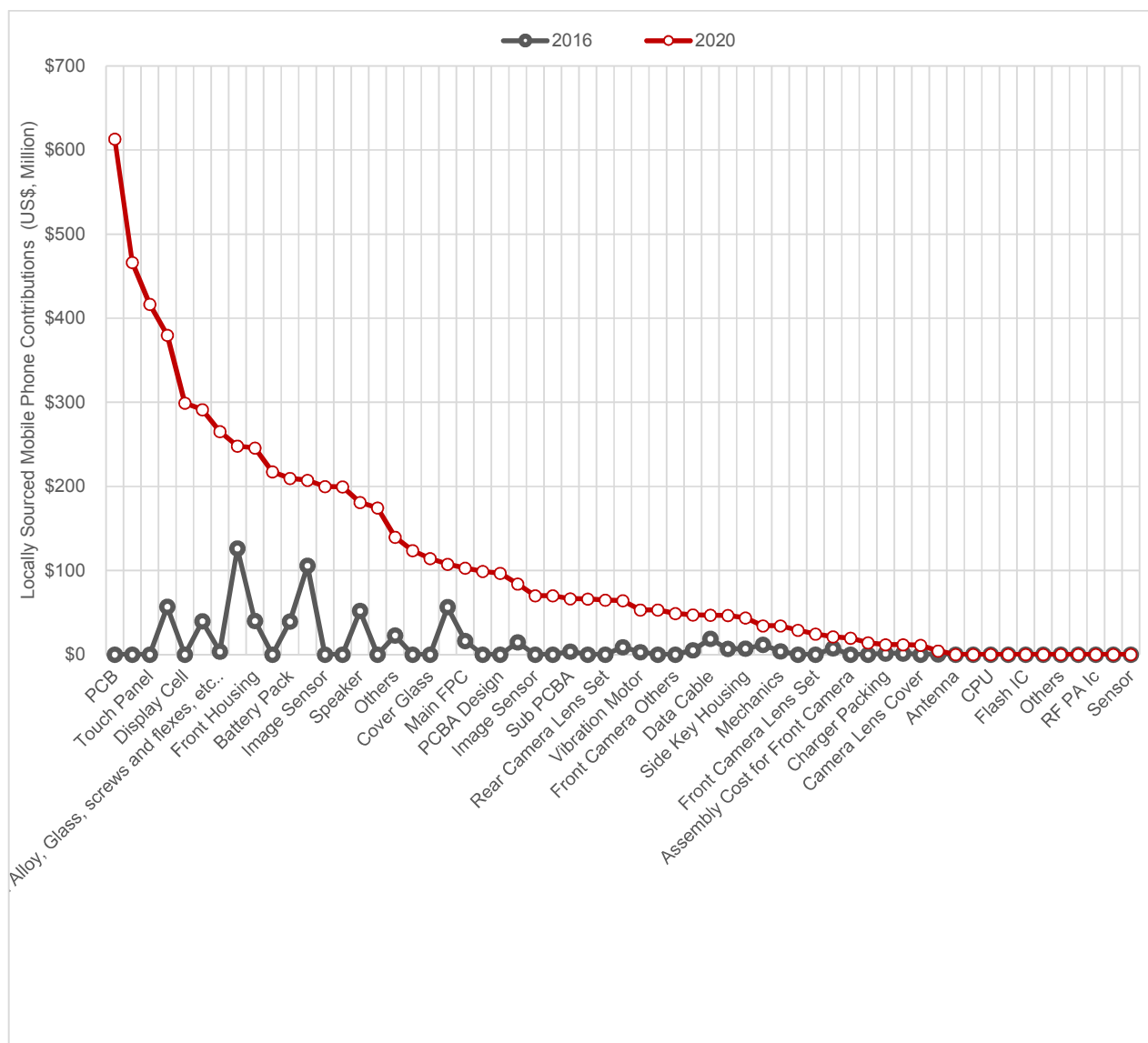
Exhibit 3.10: Make in India: Total Local Value Addition Forecast by Component under Phased Plan



Source: Authors' estimates & Counterpoint Research data

- We have identified 60 key contributors towards the total component value in a phone and have forecasted the possible value addition with the proposed phased plan for each of these components.
- By 2020, key components contributing handsomely in value terms to local sourcing reducing the import bill burden will be PCBA Design & Assembly, Display Modules, Battery, Packaging and accessories, Housing and so forth.
- PCB, Display Module and Touch Panel sub-components alone could contribute to almost US\$1.5 billion worth of the total local value addition by 2020.

Exhibit 3.11: Mobile Phone Sub-Components Local Sourcing Contribution Value (US\$, Millions)



Source: Authors' estimates & Counterpoint Research Data

Section: IV



Impact of
Local Value Addition

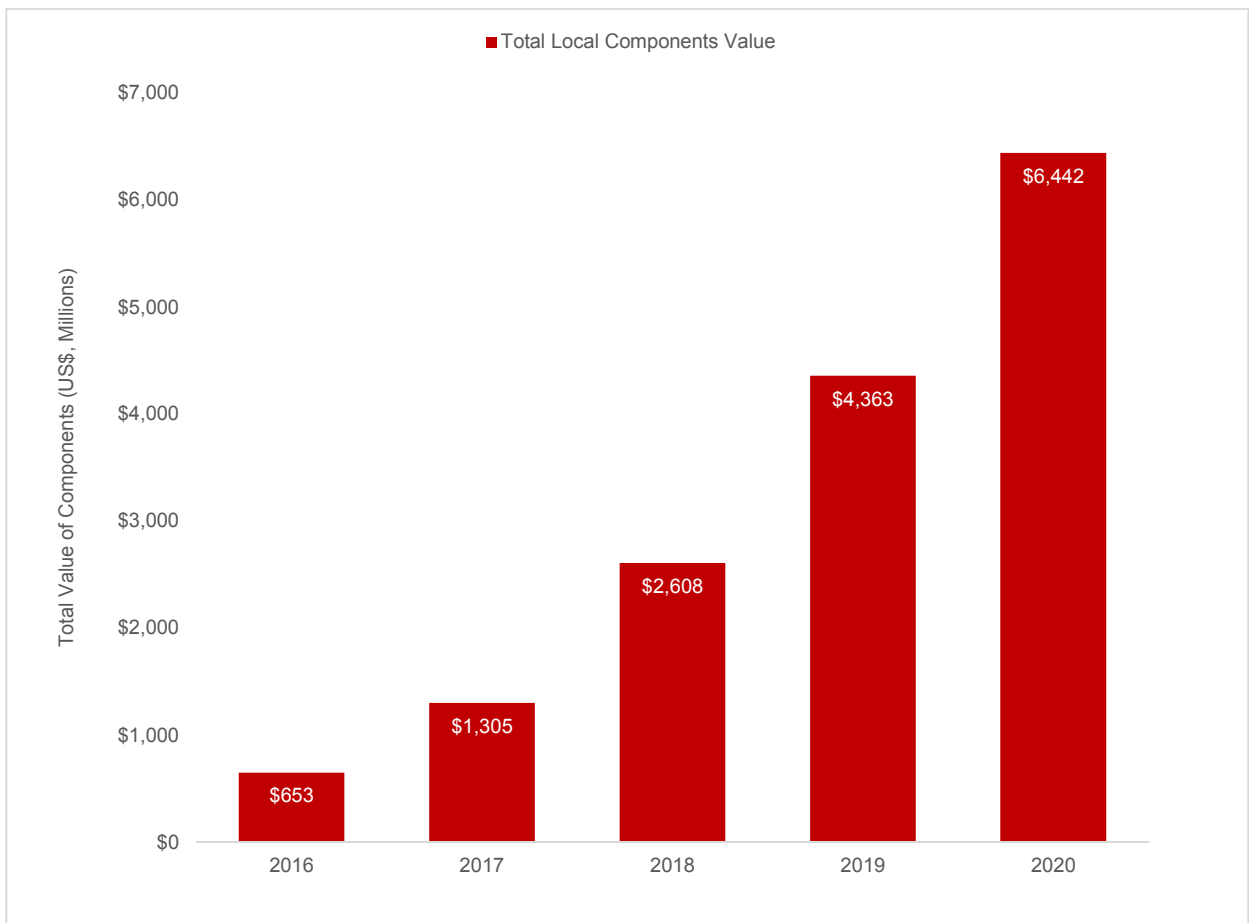
4.0: Impact of Local Value Addition

4.1: Economic Benefits:

India will benefit from higher degree of localization of manufacturing under this phased plan approach. The economic benefits ranges from significant Foreign Exchange (FOREX) savings in over the next five years to the millions of direct and indirect jobs which will be generated, healthily contributing to the Gross Domestic Product (GDP) of the economy.

4.1.1 FOREX Savings

Exhibit 4.1: Make in India: FOREX Savings under Phased Plan

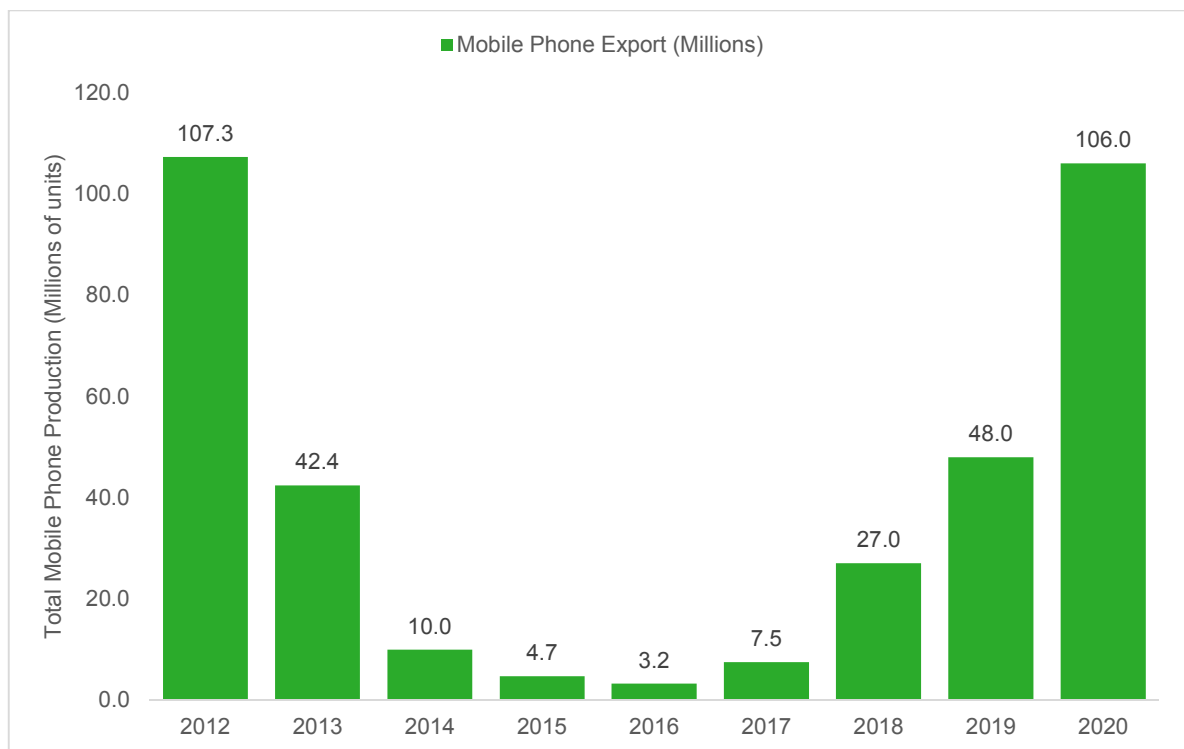


Source: Authors' estimates & Counterpoint Research Data

- With the proposed phased plan, a minimum US\$16 Billion worth components can be sourced locally over the period of five years (2016-20).
- With effective policies from the government and a higher adoption of local sourcing of mobile phone components, the total value addition should surpass the target of 30% by 2020.

- With the success of Phase 3 post 2020, the value addition can reach as high as 50% over the next ten years accounting to a run-rate of US\$10 billion of FOREX savings per year and that too just from the local mobile phone sales consumption perspective.
- The trade balance sheet will get an additional boost once these manufacturers start exporting mobile phones volume in scale. We estimate the total mobile phone exports because of the Make in India program will crossing 100 million units with close to US\$8 billion in value by 2020, up from 3 million units and close to an estimated US\$400 million in value in 2016.

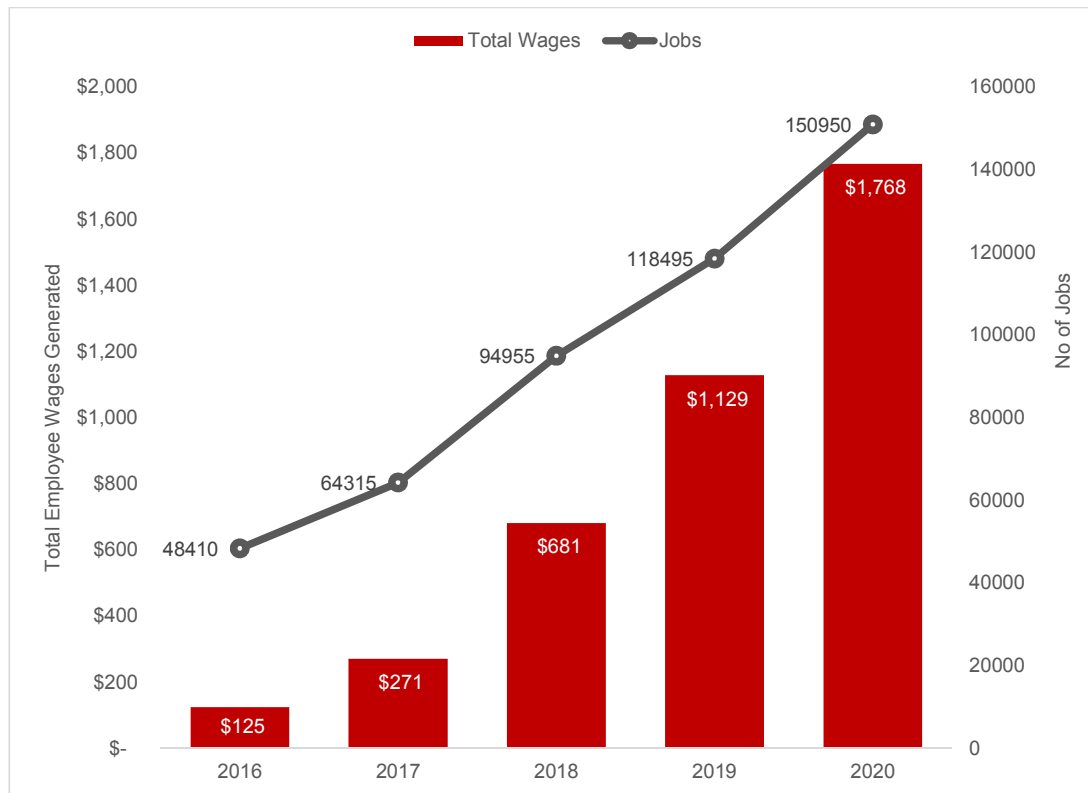
Exhibit 4.2: Make in India: Mobile Phone Export Shipments Forecast



Source: Authors' estimates & Counterpoint Research Data

4.1.2 Employment Growth

Exhibit 4.3: Make in India: Employment Opportunities under Phased Plan



Source: Authors' estimates & Counterpoint Research Data

- Adopting the proposed phases for maximizing local value addition to manufacturing will open a plethora of opportunities for skilled, unskilled, direct and indirect jobs.
- Localization of every component and sub-component broadens the supplier landscape and opens new manufacturing and supply opportunities. This ranges right from the number of manufacturers setting up factories to component suppliers setting up assembly units to fabs. This has a multiplying effect generate more and more jobs every year.
- We estimate that under the phased approach, the total direct jobs related to mobile phone manufacturing sector will grow almost three times over the next five years from 48k jobs in 2016 to more than 150k jobs in 2020. The indirect jobs for this sector will be more than a million in 2020.
- At the same time, due to greater emphasis on domestic R&D centers, local design and software development, advanced component manufacturing units will drive the average industry employee wage almost five times by 2020. This amounts to total annual wages for the sector to grow to US\$1.8 billion by 2020 up from \$125 million in 2016. This is almost a 14x increase which will help contribute to the nation's GDP.

4.2 Mobile Ecosystem Benefits

Exhibit 4.4: Make in India: Benefits to Key Stakeholders in the Mobile Phone Ecosystem



The proposed phased approach for Make in India initiative will help build a robust local mobile phone manufacturing ecosystem and offer several benefits to every stakeholder in the mobile manufacturing value chain. This program while presents multiple opportunities for suppliers, OEMs to maximise value but also makes the landscape competitive enough. Competitive environment fosters affordable priced as well as differentiated offerings, thus benefitting the consumers. Furthermore, the success of this program will boost the economy and thereby create a healthy macroeconomic environment for everyone in the mobile ecosystem.

Section: V



Recommendations

WIRELESS

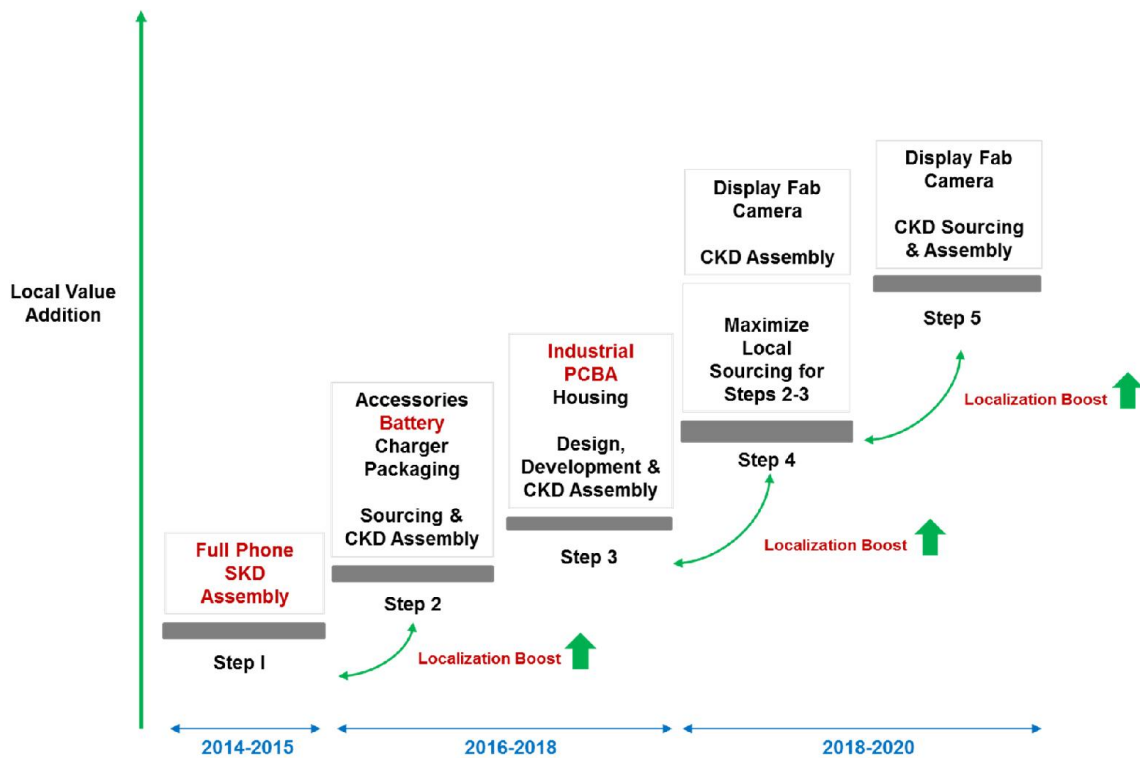
5G

PRE-5G ANCHOR BOOSTER ARCHITECTURE

MOBILE EDGE COMPUTING,
STORAGE,
AND ACCESS

5.0: Recommendations

Exhibit 5.1: Detailed Steps Recommendations within the Phased Approach



For Government:

- After the shutdown of Nokia manufacturing units, real manufacturing has picked up only due to the differential duty structure created by the government between the import of CBUs and the mobile phones manufactured locally. The industry saw an incentive to kick start local manufacturing and the local assembly has taken off. The government needs to maintain a similar duty differential under GST regime via tax refunds that can be proportional to the local value addition. This will incentivize manufacturers to continue to add more value locally. We have broken down our three phases further into five steps which should give further insight into critical components which when locally designed, sourced and manufactured will boost the amount of localization.
- Exports of phones from India declined from its peak of 107 million units in 2012 to 3 million today. With such a severe decline, the government needs to push favorable export incentives. Differential duty rebate should be extended to OEMs exporting from India with a higher contribution of local value addition. Further Market Access Initiative (MAI) and Marketing Development Assistance (MDA) schemes need to be extended to these OEMs in the regions like Africa and South East Asia which have a high demand for mobile phones.

- In parallel, the phone design activities need to be promoted. The design activities are pivotal in the overall development and sustenance of the component ecosystem. There is a need to identify gaps in terms of skill set with respect to full scale mobile phone design, development and manufacturing. There needs to be a push to increase investments in relevant training programs at the grass roots level for skill development in the field of electronics and information technology. These programs, which currently range from ITI level to PhD, can further be mapped as per common skill sets and should be prioritized first.
- Once the SMT level manufacturing has picked pace, the government should gradually incentivize component manufacturers to set up their manufacturing units as per the High, Mid and Low component categorization discussed earlier in the report. As per our estimates, close to \$1.3 billion for forex savings with estimated value addition of 9.5% can potentially be achieved next year. However, this value can further rise if more components players start their operations in India earlier than estimated. Hence, government should incentivize component suppliers on a basis of start of the operations considering the opportunity cost involved in terms of FOREX savings looking at the current growth rate of phone market.
- Government should focus in bringing academia and Industry together for research and collaboration in futuristic technologies like 5G, artificial intelligence, augmented reality, Hardware research and others. There should be government funded programs running in premier institutes focused specifically on core futuristic technology. This will also strengthen Indian IPR regime which is aiming to be conducive to technological advancements in line with global trends.
- Strengthening the domestic tech and digital startup ecosystem not only from incentives point of view but also aiming to provide global know how through cross country skill development programs.
- From phase 2 onwards, government should try to diversify the spread of manufacturing clusters across states as this could cause a severe imbalance in individual state GDPs.

For Component Suppliers:

- Component suppliers having long term investment plans with respect to manufacturing should at minimum start their local marketing, sales, distribution and support subsidiary in India. This will help suppliers better understand the changing policies and incentives apart from serving as a support unit of the OEMs.
- Industrial, PCBA and software design and development are the first critical steps every manufacturer should develop in-house locally. This will drive interest in other smaller component suppliers to setup operations locally.
- Display and camera manufacturing are the next key components which can be easily assembled (and eventually manufactured) in India. The domestic market is big enough for the manufacturers to setup their units.

For Phone OEMs:

- Local sourcing of sub-components for components such as batteries, chargers and accessories should be strongly encouraged to drive “true value addition”.
- It is time brands should start investing and building design and intellectual property level expertise within India. This will help them to differentiate and innovate apart from having better control on their product offerings.
- Partnering with Indian start-ups to bring local but relevant solutions to users shifting from feature phones to smartphones. This will help OEMs address key areas such as vernacular support, apps ecosystem, and digital payment segment.
- OEMs should strike partnerships with academia and industry (suppliers) for training of their unskilled workforce.

Section: VI



Methodology

6.0: Methodology

The premise of Make in India initiative is to drive the domestic manufacturing, reduce the import bill, create more jobs, develop domestic manufacturing expertise not only to satisfy huge domestic demand but also for driving exports in future. From mobile phone perspective, the rise in import duties for the import of fully manufactured phones in 2014 and specific components in 2015 budget cycle, has prompted many mobile phone brands, ODMs and OEMs to begin setup their manufacturing operations in India. The current manufacturing of mobile phone across major OEMs is just around assembling the semi-knocked-down units of the components of mobile phones exported by ODM and supply chain partners from China, Taiwan or Japan. Thus, the total value addition to the economy in the country from domestic assembly perspective is limited to assembly costs and a few accessories as majority of the components for a phone are still imported by majority of the OEMs instead of sourcing it locally.

More than USD 17 Billion worth phones were sold in 2015, with total import value of those phones (with components) corresponding to roughly USD 11 Billion in 2015. This calls for an introspection by analyzing the mobile phone and its components and the potential to source the components locally by identifying local suppliers as well as attract major component players to setup manufacturing of their components in India. To better understand the potential and impact, we have drilled down to the Bill of Materials of a mobile phone analyzing more than 50 key components which makes up a mobile phone unit in a box and contributes to 95% of the total BoM cost with 5% of the costs being taxes and other depreciation, insurance costs.

The process we have developed to analyze the BoM cost is as follows:

Step 1: Identify a best-selling model in different price bands.

Step 2: Examine and list the different components which constitutes each of those best-selling phones. Further break down the key components such as PCBA, battery, charger, camera and display and identify internal constituting components e.g. PCBA is made up of Apps Processor, Baseband, Memory, GPU and so forth or Charger made up of PCB, Packaging, Mechanics, Electronics and so forth.

Step 3: After identifying these components, estimate cost of each of the components through primary and secondary research – talking to supply chain, OEMs, ODMs and so forth.

Step 4: Cross check the component costs benchmarking with other competitor models and so forth.

Step 5: Calculate assembly/manufacturing costs for different key components as well as the mobile phone as a whole.

Step 6: For calculating assembly costs for key manufacturers in India, different CAPEX, OPEX costs for the operations have been modelled for each manufacturer for the representative samples to derive assembly cost for the sample model.

Step 7: Once the BoM costs are calculated, based on our industry interviews, secondary research we identify which components have higher probability to be locally sourced. The components are thus labelled as high, mid, low based on near, mid or long term probability of local value addition possibility respectively.

- **Step 8:** These BoM costs will be extrapolated and forecasted with respect to all the Make in India phones volumes to map the proposed roadmap of increasing local value addition every year and amount of value being generated locally reducing the import bill and nurturing a healthy component ecosystem.

Section: VII



Glossary

7.0: Glossary

BoM: Bill of Materials

SKD: Semi Knocked Down

CKD: Complete Knocked Down

ASP: Average Selling Price

LTE: Long Term Evolution

OEM: Original Equipment Manufacturer

ODM: Original Design Manufacturer

EMS: Electronic Manufacturing Services

GDP: Gross Domestic Product

PCB: Printed Circuit Board

PCBA: Printed Circuit Board Assembly

CAPEX: Capital Expenditure

OPEX: Operational Expenditure

M-SIPS: Modified Special Incentive Package Scheme

EPS: Employee Provident Scheme

ESI: Employee State Insurance

EMC: Electronics Manufacturing Cluster

SMT: Surface Mount Technology

SOC: System-on-Chip

R&D: Research & Development

IoT: Internet of Things

TRAI: Telecom Regulatory Authority of India

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