ANALYSYS MASON

INDIA INTERNET MONTHLY

Consulting specialists in telecoms, media and digital (internet)

JULY 2019

Featured in this issue

The point-of-sale market is set for rapid growth

Outlook for the e-pharmacy market

The fledgling electric vehicle market is ready to accelerate

Contents

FOREWORD

Welcome to the second (July 2019) edition of Analysys Mason's monthly newsletter on the internet and digital markets in India.

Dear all

Let me start by saying a big thank you for all the positive comments we received on the first edition of this newsletter that we published last month. The comments have been extremely heart-warming and have supported our view that it was time to share non-confidential insights from our vast body of work in the internet/ digital investments space with a wider audience.

In this edition for July 2019, we assess three new sub-sectors within the digital/start-up space that have been the focus of many of our recent discussions with investor clients.

This month's articles focus on:

1. the point-of-sale (POS) devices space, and particularly Jio's entry into this market
2. the e-pharmacy space, the investor interest in this market and last week's USD70 million investment in one of the players
3. the electric vehicle space, which has experienced a lot of investor interest, and one of the leading founders in this market, Aishwarya Kacchal, has co-authored this article.

The digital transaction market, particularly the **POS devices** sub-segment, in India is set for rapid growth thanks to the government's push on adoption of digital technology and financial inclusion of more than 60% of India's rural and semi-urban population. Around 80% of the retail market in India is still unorganised. Tier-2 and Tier-3 cities and rural areas are still highly underpenetrated in terms of POS terminals. As more customers and merchants adopt digital modes for transactions driven mainly by the proliferation of technology and ease of use, the POS sector will be worth USD 400 billion by 2022. This represents growth at a CAGR of 20%, and POS transactions will account for 14% of total private final consumption expenditure in India by 2022.

The **e-pharmacy market** in India is at an early stage with online sales contributing to just 1.5% of total pharmacy retail sales. However, the e-pharmacy market is likely to grow at a CAGR of about 54% to reach about USD2.1 billion by 2023, up from USD370 million in 2019. Growth will be driven by the strong value proposition of e-pharmacies for end consumers, increased investment activity in the sector and the expected government regulations. The unit economics of the e-pharmacy players are expected to improve as discounting reduces and economies of scale are realised in order fulfilment.

The **electric vehicle market** in India is still in a nascent state, accounting for less than 1% of the total number of automobile sales in FY 2019. This is primarily because of high upfront prices, a lack of publicly available battery-charging infrastructure and a lack of good-quality products. However, a few inflection points, such as a well-defined policy roadmap and the entry of established original equipment manufacturers, could propel the adoption of electric vehicles over the next few years. Driven by these inflection points, we expect the market to grow to 7 million units by FY 2024, up from 0.8 million units in FY 2019.

I hope you enjoy reading this month's edition of our newsletter just as much as you seemed to have enjoyed the inaugural edition.

Rohan Dhamija
Partner - India, South Asia and Middle East

The growth of the point of sale sector in India and opportunities for investors

The digital transaction space and POS space in particular is set for rapid growth driven by the government's push on the adoption of digital technology and financial inclusion of more than 60% of India's rural and semi-urban population. The POS space was traditionally dominated by banks, but is now open for independent POS providers and represents a huge opportunity for investors.

The government of India announced demonetisation in November 2016. Since then, a number of initiatives have been undertaken under the Digital India campaign to formalise the cash economy and move towards a cashless society. As a result, the total value of debit and credit card transactions on point of sale (POS) terminals in India increased from USD7.0 billion in January 2016 to USD17.3 billion in January 2019 with a CAGR of 44% (Figure 1), compared to the previous 5-year average growth rate of 28%. Correspondingly, the number of bank-led POS terminals rose from 1.6 million in 2016 to 3.7 million in 2018 with a CAGR of 55%, as shown in Figure 2 (the previous 5-year average growth rate was just 18%).

Both merchants and consumers are expected to increasingly switch to digital payments as the government of India undertakes more initiatives on the dual goals of financial and digital inclusion (Pradhan Mantri Jan Dhan Yojana and the Digital India initiative). Figure 3 shows the results from a survey of 300 merchants across India conducted by Analysys Mason. These show that merchants are now more likely to accept digital payments than before demonetisation, and that their preferred digital payment option is a debit card (82% of respondents, on average), followed by a credit card (18% of respondents, on average). We also found that merchants believe that digital transactions will constitute around 68% of all transactions (in terms of value) by 2022; this is a large increase from the current level of 49% (Figure 4), reflecting the growing importance of digital transactions. On the consumer side, there is already a total of 900 million debit cards in India, and this is expected to grow at a CAGR of 4% between 2018 and 2022. The credit card base in India is expected to grow at a CAGR of 8% during the same period, particularly in the metros and Tier 1 cities.

In the recent past, the POS sector has started to attract a great deal of interest from both strategic and financial investors. Pine Labs, one of the largest independent POS players in India, raised USD125 million in May 2018. Mswipe, another independent POS player, recently raised USD31.5 million in Series E funding from USA-based hedge fund Falcon Edge, B Capital Group, late-stage technology

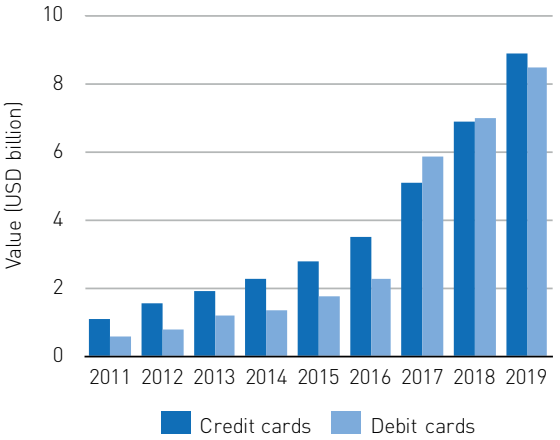


FIGURE 1: ACTUAL DEBIT AND CREDIT CARD TRANSACTION VALUE (USD BILLION), INDIA, 2011–2019 [SOURCE: ANALYSYS MASON, 2019]

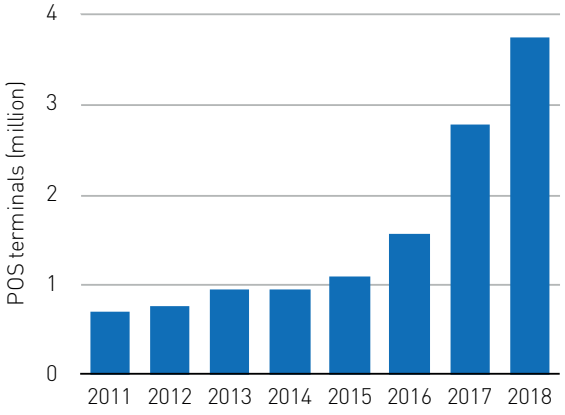


FIGURE 2: ACTUAL NUMBER OF POINT OF SALE TERMINALS (MILLION), INDIA, 2011–2018 [SOURCE: ANALYSYS MASON, 2019]

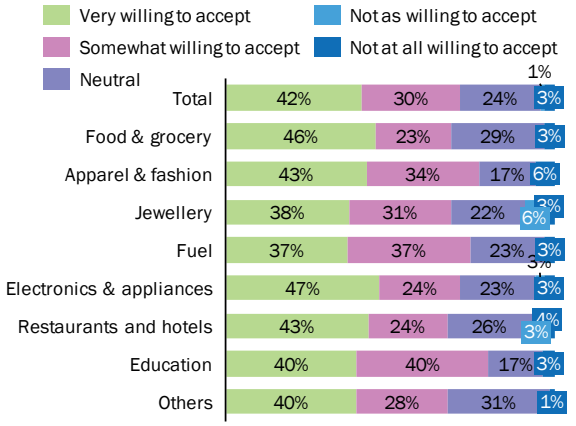


FIGURE 3: WILLINGNESS OF MERCHANTS TO ACCEPT DIGITAL PAYMENTS AFTER DEMONETISATION [SOURCE: ANALYSYS MASON, 2019]

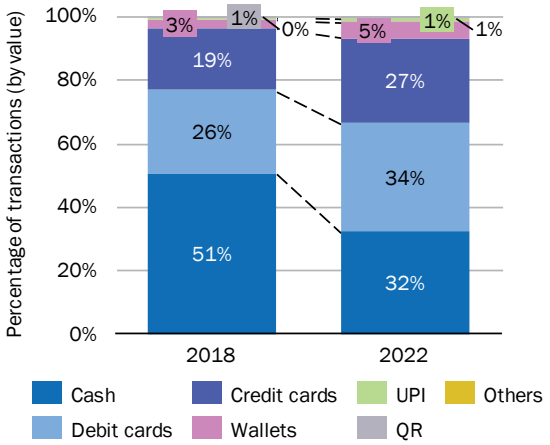


FIGURE 4: BREAKDOWN OF THE PAYMENT TYPES USED IN CURRENT (2018) AND FUTURE (2022) TRANSACTIONS (IN TERMS OF VALUE) [SOURCE: ANALYSYS MASON, 2019]

investment firm Epiq Capital and consumer-focused fund DSG Consumer Partners. The Bengaluru-based firm Innoviti Payments solutions raised USD11.55 million in March 2019 in Series B funding led by venture debt firm Trifecta Capital. Flipkart's PhonePe acquired Zopper retail, a hyperlocal point of sale platform for small and medium-sized businesses.

At first glance, it may be puzzling to understand why these relatively small independent POS companies are attracting investor attention in a space that is traditionally dominated by large banks. However, there are a number of reasons that explain the rationale behind these investments.

The estimated size of the POS opportunity in India is very large

POS transactions accounted for a little over 11% of the USD1689 billion total private final consumption expenditure (PFCE) in India in 2018. The PFCE has been growing at a CAGR of 12% for the last 10 years. The results of our analysis suggest that disposable incomes and interest rates are the two key predictors of consumption expenditure per capita across economies. Using these results, we estimate that the per capita expenditure in India will grow by 12.4% year-on-year from 2018 to 2022, leading to an overall growth in the PFCE of 13.6% year-on-year, from USD1689 billion in 2018 to USD2814 billion by 2022.

The growth in the number of POS transactions is linked to several demand-side as well as supply-side drivers such as literacy rate, internet penetration and number of credit/debit cards per capita. Using these as predictors in a regression model (as shown in Figure 5), we forecast that the POS transaction value per capita in India will grow at a CAGR of 19%, from USD143 in 2018 to USD286 by 2022. We therefore estimate that the total POS transaction market will grow from USD189 billion in 2018 to USD394 billion in 2022 (Figure 6), assuming population growth of 1.4% year-on-year). This corresponds to an impressive CAGR of 20%, and indicates that POS transactions will account for 14% of the total PCFE in India by 2022. This also translates into an increase in the number of bank-led POS terminals from 3.7 million in 2018 to 6.8 million by 2022 (Figure 7), at a CAGR of 16%.

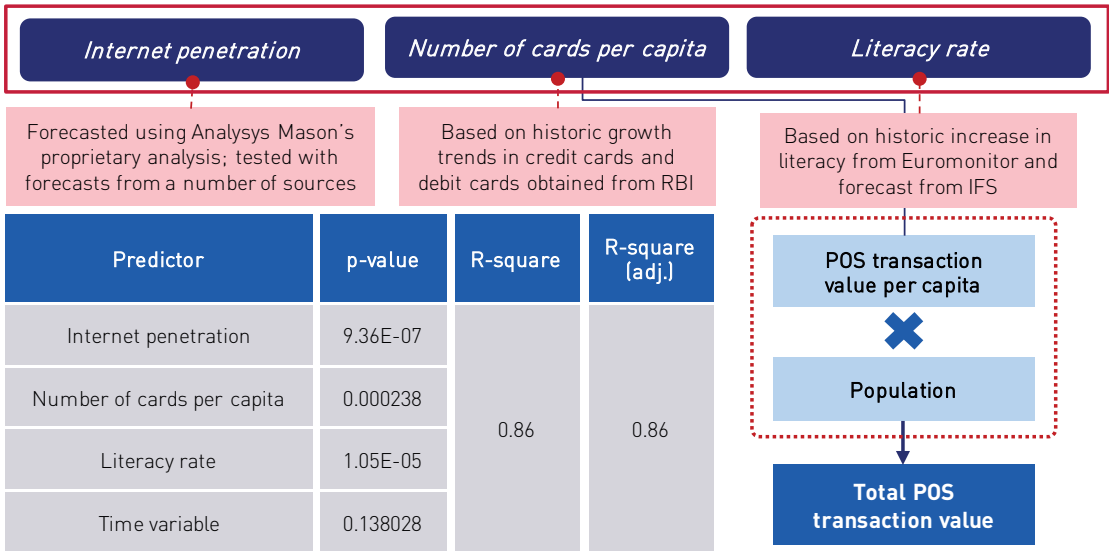
Merchants in metros and large cities are already well-penetrated with POS terminals, so the next wave of growth for POS transactions is expected to come from outside the top-10 largest cities, where POS transaction penetration remains low. Only 20% of the total POS transaction value comes from these smaller cities as of 2017. Going forward, this figure is expected to grow at a CAGR of 30% to reach 30% by 2022.

Independent POS providers have distinct competitive advantages over banks

There are two broad categories of players in the POS market: banks and independent POS providers. 72% of all POS terminals in India are from banks (mainly Axis, HDFC, ICICI and SBI) and the remaining 28% come from independent POS providers. Pine Labs and Mswipe are the market leaders among the independent POS providers (Figure 8).

Traditionally, banks have been the major players in the POS market in India given their massive scale and reach. Indeed, the penetration of independent POS players in Tier 2 and Tier 3 cities is still relatively limited because these players do not have adequate numbers of on-field staff to support merchants in these cities. Therefore, banks continue to dominate in Tier 2 and Tier 3 areas.

However, the competition between banks and independent providers is relatively intense in the metros and Tier 1 cities. Independent POS providers have been able to gain market share in these areas predominantly because of their quality of service. Price (formed of the transaction fee (also known as the merchant discount rate or MDR), installation fee and



Predictor	p-value	R-square	R-square (adj.)
Internet penetration	9.36E-07	0.86	0.86
Number of cards per capita	0.000238		
Literacy rate	1.05E-05		
Time variable	0.138028		

FIGURE 5: REGRESSION METHODOLOGY AND RESULTS FOR FORECASTING POS TRANSACTION VALUE PER CAPITA [SOURCE: ANALYSYS MASON, 2019]

servicing fee) is a key determinant in merchants' decision-making process when choosing a POS service provider, but the findings of our survey (Figure 10) suggest that ease of use and speed of installation also play a big part.

It is unlikely that independent POS providers will be able to compete with banks for large merchant accounts, but the small and medium-sized merchant market is open to either type of player and is growing at an impressive rate. The most important factor when choosing a POS service provider for these merchants is the cost (that is, the MDRs). Independent players are well-positioned to offer these merchants lower rates than those from banks.

Independent players also differentiate themselves from banks by offering a suite of value-added services to merchants such as billing system integration, support for other digital payments, EMI services, multi-bank compatibility, advanced analytics and merchant financing (Figure 9). These additional value-added services are increasingly influencing merchants' POS provider choices, especially in sectors such as food and grocery, as is evident from the survey results shown in Figure 10.

The unit economics for independent POS providers are significantly better than those for banks

The unit economics argument favours independent players in the POS market (Figure 11). Banks tend to follow the traditional model whereby they acquire a merchant account, provide POS terminals, provide operational support and maintenance and are responsible for handling the overall merchant relationship. However, independent POS providers are increasingly following the service provider model whereby the merchant is acquired by a bank and passed on to an independent service provider that supplies the POS terminal. There are some independent POS providers that are predominantly aggregators, meaning that they both acquire the merchant and provide the POS services themselves.

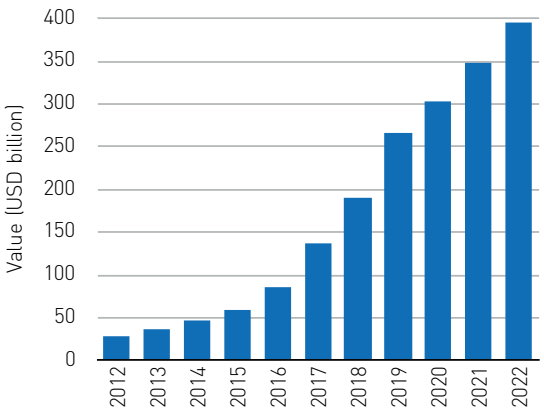


FIGURE 6: FORECASTED POS TRANSACTION VALUE (USD BILLION), INDIA, 2012–2022 [SOURCE: ANALYSYS MASON, 2019]

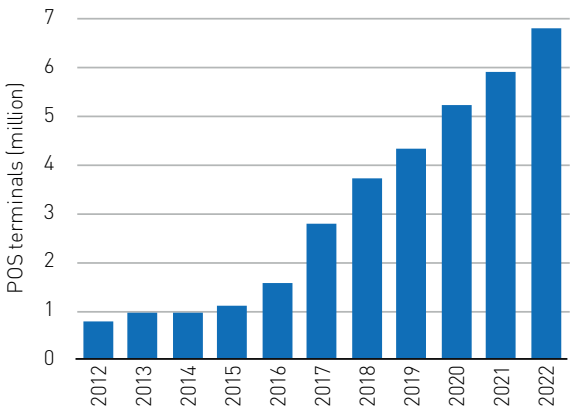


FIGURE 7: FORECASTED NUMBER OF POS TERMINALS (MILLION), INDIA, 2012–2022 [SOURCE: ANALYSYS MASON, 2019]

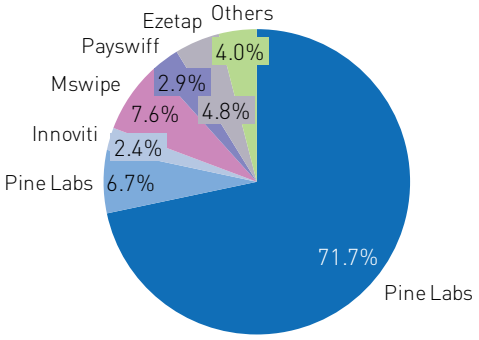


FIGURE 8: MARKET SHARE IN TERMS OF THE NUMBER OF POS TERMINALS, INDIA, APRIL 2019 [SOURCE: ANALYSYS MASON, 2019]

Both the service provider and aggregator models have benefits and drawbacks. Banks are happy to partner with service providers because this enables them to outsource the unprofitable/loss-making payments business while still managing the merchant relationship. HDFC is already deploying this model in some cases. Service providers benefit from this model because they do not have to pay for the cost of customer acquisition. This cost is large, and as a result, the COGS is far higher for banks and aggregators than for service providers. However, aggregators own the merchant relationship and can upsell services and bundled products thereby improving their top-line. Aggregators also have the opportunity to expand quickly if the right merchant segments are targeted and acquired successfully. The staff and SG&A costs are higher for service providers because of the limited scale, but we estimate that these will decrease over time as independent providers achieve scale and operational efficiency.

The favourable regulatory environment in India provides further impetus for the growth of the POS sector

It is prudent to look consider how regulations can affect the POS sector. The RBI introduced a regulatory sandbox (RS) framework in its recent report on regulations in the fintech sector. The RS provides an environment for innovative technology-led entities to test new products or services on a limited scale prior to a wider launch. This will allow POS providers to test their products in the market with the regulator's permission. The RBI is also considering ways in which to bring payment gateway operators under its regulatory domain. This will make the whole POS ecosystem more secure.

MDRs are another key part of POS regulations. Debit card MDRs were revised by the RBI recently (with effect from 1 January 2018) and are expected to remain stable for the next 2–3 years. After this time, debit card MDRs will be set based on the particular merchant's category with a view to giving a further boost to the use of debit cards for purchasing goods and services across a wider network of merchants. A differentiated MDR for asset-light acceptance infrastructure and a cap on the absolute MDR per transaction will also be prescribed. Credit card MDRs are determined at market rates, and no intervention from the RBI is expected anytime soon.

Threats to POS from other digital payment instruments and RIL's entry in the sector are overstated

Going forward, the adoption of mobile wallets and UPI is expected to increase, but their use cases will become complementary to those of POS terminals. This is because the merchant segments that are targeted by each digital

		Pine Labs	Innoviti	Mswipe	Ezetap	SBI	HDFC
Billing system integration	Integration of merchant's billing system with POS system	●	◑	◑	◑	○	○
Support other digital payments	Includes integration with UPI, wallets	●	●	◑	●	○	◕
EMI services	EMI for consumers transacting on POS machines	●	◑	◔	◑	○	◑
Multi-bank acquiring	Ability to route transactions through multiple acquiring banks so that the merchant bears lower MDRs	●	◑	○	◑	○	◔
Real time MIS	Generation of live reports so that the merchant has real time visibility of transactions processed	◑	◑	◑	◑	○	○
Acquirer fallback	Ability to route transactions through a different acquiring bank in case the merchant's primary acquirer's servers are down	●	●	○	○	○	○
Auto reconciliation	Automatically reconciling daily accounts without the need for manual intervention	◑	◑	◑	◑	○	◑
Lending	Lending facilities provided to merchants	◑	◔	◑	○	◕	●

● Player has the best market offering ◕ Player significantly better than market ◑ Player on-par with market ◔ Player below-par with market ○ Player has no offering

FIGURE 9: COMPETITIVE ANALYSIS FOR MAJOR POS PLAYERS, INDIA [SOURCE: ANALYSYS MASON, 2019]

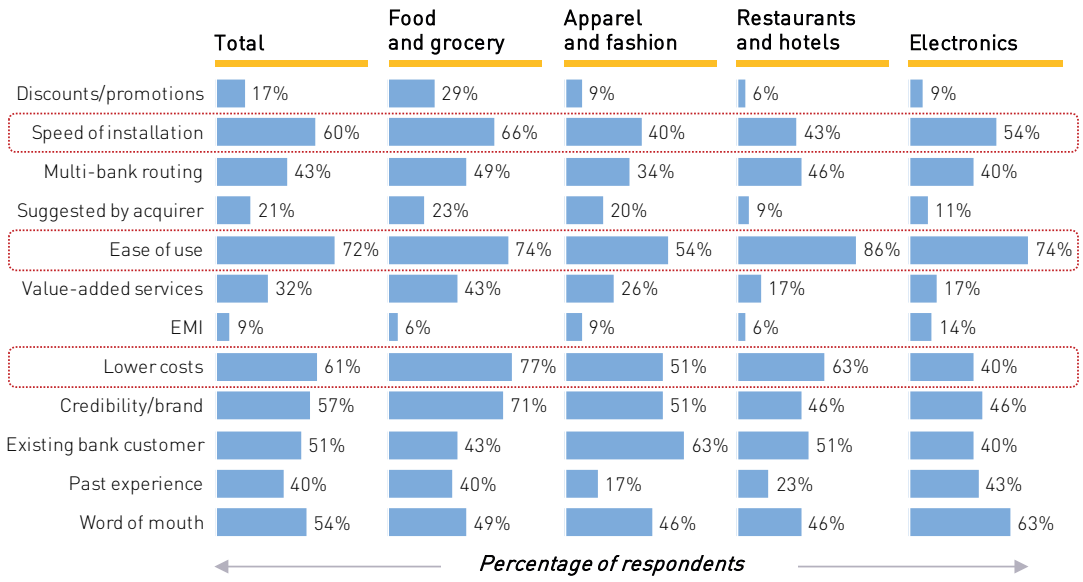


FIGURE 10: PERCENTAGE OF RESPONDENTS CITING THE FOLLOWING REASONS AS THEIR PRIMARY DRIVER WHEN CHOOSING A POS PROVIDER, INDIA [SOURCE: ANALYSYS MASON, 2019]

payment instrument is different; POS terminals are expected to remain relevant among large and medium-sized merchants, while UPI, mobile wallets and QR codes are expected to be used by smaller merchants.

The future entry of Reliance (RIL) into the POS space has been a major talking point in the sector for quite some time. Reliance has plans to provide its own POS terminal to small merchants in a bid to penetrate the 'kiranas' or 'mom-n-pop' stores with its online-to-offline model; this terminal will accept Reliance's own wallet (Jio Money) along with BHIM/UPI payments and other wallets and QR codes. RIL is partnering with HUL in order to acquire merchants for its POS devices, and is targeting the kirana stores that form around 90% of the unorganised food and grocery sector in India. However, given RIL's focus on kiranas, the medium-sized and large merchants, especially those in sectors other than food and grocery, are expected to remain unaffected.

Conclusion

The POS terminal space in India is growing at a rapid pace thanks to the huge size of the unorganised retail sector, the increasing penetration of internet and smartphones, the ready adoption of smart payment technologies from both the customers and the merchants and the active push by the government towards a cashless society. Independent POS players can take over a significant portion of the market, despite the traditional dominance of banks, provided that they have the correct customer segmentation, enhanced product offerings including a suite of value-added services, positive unit economics and good customer service.

	Bank-led	Aggregator	Service provider
Total revenue (R) per terminal per month	100%R	100%R	100%R
One-time fee (amortised)	-	5%R	5%R
Monthly fee	11%R	5%R	50%R
MDR	89%R	90%R	45%R
Total cost per terminal	120%R	112%R	77%R
COGS	106%R	85%R	19%R
Staff costs	8%R	19%R	40%R
SG&A	6%R	8%R	18%R
EBITDA	–20%R	–12%R	23%R

FIGURE 11: UNIT ECONOMICS COMPARISON FOR BANK-LED POS PROVIDERS AND INDEPENDENT POS PROVIDERS [SOURCE: ANALYSYS MASON, 2019]

E-pharmacies in India: global and local trends point to a positive future

Recent big-ticket investments in the e-pharmacy space globally, a strong value proposition for end consumers and expected favourable government policies are likely to drive exponential growth in India's e-pharmacy market. The article discusses the market potential, the competition and the way to profitability for this market in India.

Amazon acquired US-based e-pharmacy company PillPack for USD753 million in 2018, in a move that sent shockwaves through the pharmaceutical industry around the world. The ripples were felt in India as well, resulting in a series of big-ticket investments in the year following the acquisition. The Government of India is due to implement a new regulatory framework and guidelines relating to online pharmacies that should help to further stimulate this sector. This article assesses the state of the e-pharmacy industry in India, the drivers of its growth and its future prospects.

Online pharmacies can address the gaps left by the traditional pharmacies in India

India's pharmaceutical sector is the third-largest in terms of volume in the world and the thirteenth-largest in terms of value. The retail pharmaceutical market in India was worth around USD24 billion in 2018 and is growing rapidly. However, the sector is facing several challenges due to low industry margins, rising price pressure, poor documentation and tracking, non-compliance with laws (selling medicine without prescriptions), poor inventory management and a limited ability to stock all available stock-keeping units (SKUs). The retail pharmacy sector needs technical solutions if it is to overcome these challenges and increase efficiency.

This need gap provides a perfect opportunity for e-pharmacy players to add value. E-pharmacies offer a way for customers to order medicines from the comfort of their homes, at discounted prices with just a few clicks. The sector has tremendous potential for growth, fuelled by an increasing number of patients with chronic diseases, such as diabetes, hypertension etc., which require regular medication. In addition, the e-pharmacy market will be boosted by the increasing availability of smartphones, digital payments and health insurance, and the rising levels of disposable income.

We expect the e-pharmacy sector to flourish in India for three main reasons.

Online pharmacies add value for consumers

Five factors are attracting consumers to e-pharmacy solutions (see Figure 1).

Convenience. Customers who require regular medication value the ability to have medicines delivered to their doors.

Accessibility/availability. E-pharmacies can offer a wide range of SKUs to their customers by aggregating supply – such scale is difficult to achieve for local pharmacies.

Affordability. E-pharmacies can source products directly from manufacturers and can, therefore, offer more-significant discounts than local pharmacies.

Information and education. E-pharmacies can provide knowledge to customers to help them to make informed decisions.

Compliance and authenticity. The authenticity of drugs can be assured because e-pharmacies store all records digitally, which effectively reduces the risk of counterfeit medicine.

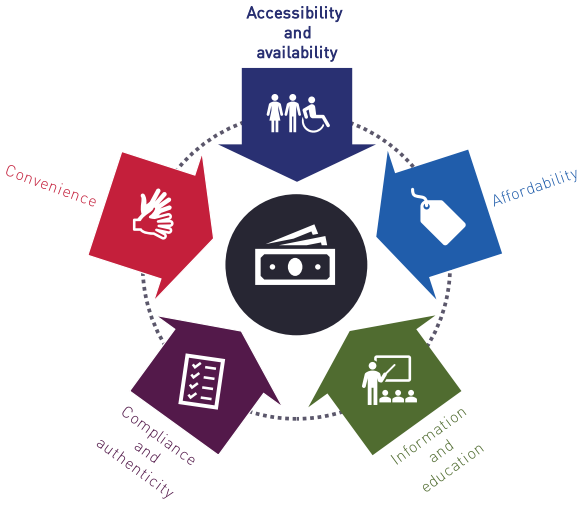


FIGURE 1: FACTORS OFFERED BY E-PHARMACY COMPANIES THAT CONSUMERS VALUE [SOURCE: ANALYSYS MASON, 2019]

The e-pharmacy sector in India has caught the attention of investors

The growth potential and opportunities in the e-pharmacy sector have attracted interest from investors. The key players in the sector such as PharmEasy, 1mg, NetMeds and Lifcare have recently raised significant capital. For instance, PharmEasy has secured funding of USD100 million while 1mg has secured USD80 million. With increasing interest from big investors such as Softbank (according to public sources), the sector can expect an upward trend in investment.

Government policies and regulation look favourable

The e-pharmacy sector in India is positive about new regulations that are likely to come into effect by the end of 2019. The government released draft regulations in 2018, which were well received by the sector. The draft guidelines allow for the Drug Controller General of India (DCGI) to regulate the e-pharmacies and for online retailers to sell drugs all over the country with a single licence (as opposed to having separate licences, and retail presences in every state). This will make it easier to do business, relieve cost burdens and help the players to expand into more regions.

Given that the e-pharmaceutical sector will make it easy for people to access affordable medicines, and that it has government and investor support, revenue is expected to grow strongly at about 54% CAGR in the next 4 years to reach about USD2.1 billion in 2023, when the sector will account for around 5% of revenue in the overall pharmaceutical sector (see Figure 2).

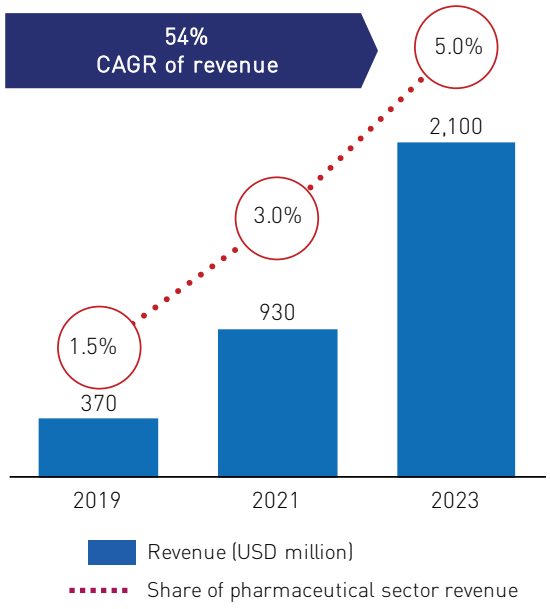


FIGURE 2: REVENUE OF THE E-PHARMACY SECTOR AND SHARE OF PHARMACEUTICAL MARKET REVENUE, INDIA, 2019, 2021 AND 2023 [SOURCE: ANALYSYS MASON, 2019]

Competitive landscape

Around 85% of the e-pharmacy market in India is dominated by four major players. Medlife accounts for around 30% of revenue in the market followed by PharmEasy, 1mg and

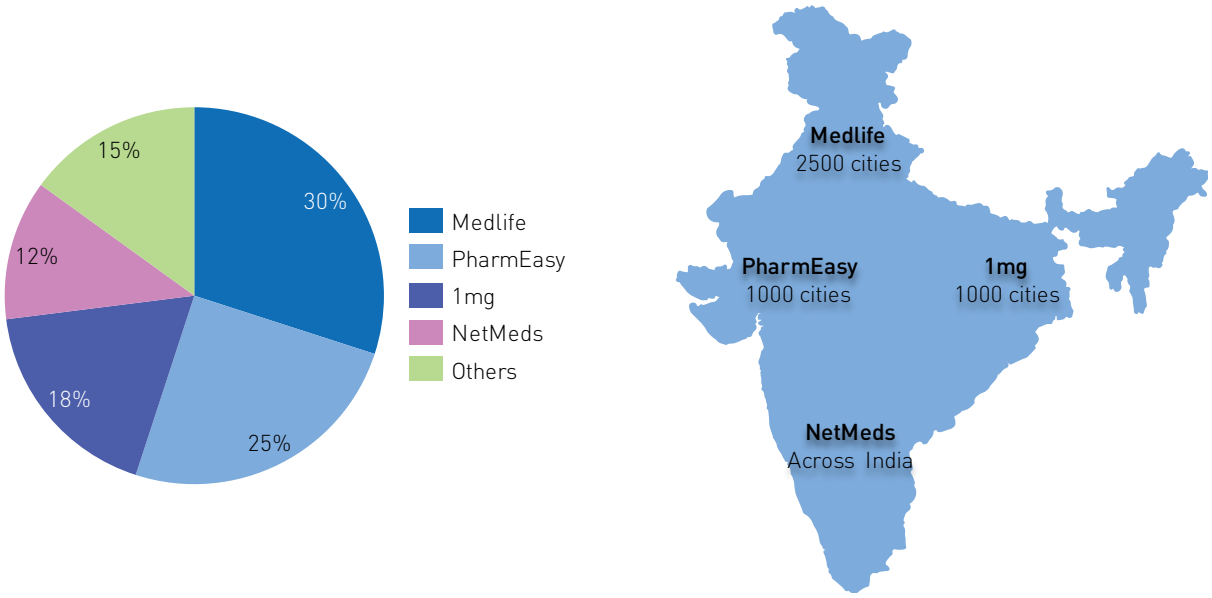


FIGURE 3: REVENUE MARKET SHARE AND REACH OF KEY E-PHARMACY PLAYERS, INDIA, 2019 [SOURCE: ANALYSYS MASON, 2019]

NetMeds. Other players include CareOnGo, Lifcare, mChemist, MedsOnWay and Myra. E-pharmacy players have a major presence in metros, but they plan to expand their reach in Tier 2 and Tier 3 cities as well. Customer acquisition is mainly driven by a high level of discounts and promotions.

E-pharmacy players are also looking forward to offering a wide range of complimentary services. The aim is to become a one-stop solution for all healthcare needs. Such services include online consultations, doctor appointments, partnerships with diagnostics centres, sample collection, online health blogs, medicine refills and subscriptions. These services aim to attract and retain customers, and increase options for revenue generation. Medlife, PharmEasy and 1mg offer diagnostic laboratory tests and sample collection. Medlife and 1mg offer online doctor consultations through their websites and apps, and Medlife offers offline doctor appointments.

The unit economics for online pharmacies are expected to improve

The e-pharmacy sector in India is in a nascent stage and all the players are burning huge amounts of cash in discounts and promotions. The aim is to gain a customer base and drive change in customer behaviour towards the online purchase of medicines, a model tried and tested by players in the e-commerce and food delivery sectors. The unit economics are expected to improve in future because discounting will reduce and scale efficiency will kick in for supply chain and warehousing (see Figure 4).

The e-pharmacy sector is at the stage that the e-commerce and online food delivery sectors were at 5 and 2 years ago respectively. The lessons from these sectors will be invaluable as the e-pharmacy market in India seeks to build on the increasing number of investments and the favourable regulatory changes.

Revenue	**100%**	Revenue in the e-pharmacy sector is expected to increase exponentially in the coming years.
Gross margins	**30%**	E-pharmacies source most of the products directly from manufacturers and therefore get higher margins than the retail stores, which typically get a margin of between 18% and 20%.
Warehousing and delivery costs	**30–40%**	This is a major cost for any e-commerce business, but it is likely to reduce significantly (~15% of revenue in steady state) with operational scale, which will improve the business economics.
Discounts, promotions and advertising	**25–30%**	All the major players are offering high discount rates to attract new customers, but this will come down to ~10% as has been the case in mature internet verticals.
Overheads (such as IT, salaries, offices)	**5–10%**	As the number of orders increases, the percentage of overhead costs is likely to reduce significantly to less than 5% of revenue.
Contribution margin	**(30–50%)**	Efficiencies in warehousing and delivery costs and reduced discounts are likely to improve the future contribution margin, which is expected to turn positive in the medium term (around 4–5 years).

FIGURE 4: ANALYSYS MASON'S ESTIMATE OF THE CONTRIBUTION MARGIN FOR AN E-PHARMACY BUSINESS [SOURCE: ANALYSYS MASON, 2019]

The fledgling electric vehicle market in India is ready to accelerate

The government in India has taken several steps to boost the country's fledgling electric vehicle market, but a clear policy roadmap is missing. This article discusses the obstacles related to adoption of electric vehicles in India and a few inflection points that can propel future growth.

India accounts for the fourth-largest share of worldwide revenue from the automobile industry, which grew at a CAGR of approximately 7% between 2013–2018.[1] India is also responsible for the fourth-highest level of global CO2 emissions (it accounted for 7% of global emissions in 2018).[2] According to a recent report by the World Economic Forum, seven of the world's most-polluted cities are in India, and the transport sector is one of the largest contributors of air pollution in the country.

Driven by the alarming rise in air pollution, the government in India is supporting (among other measures) initiatives to curb vehicular pollution in the country, and electric vehicles[3] (EVs) have emerged as a potential solution. The EV market in India is still in a nascent state, with total sales reaching 759 600 units in FY2019,[4] which represents less than 1% of the total number of automobile sales.[5] EV sales are being led by two-wheeler and three-wheeler vehicles, while the four-wheeler category has shown negligible take-up (see Figure 1). Several factors explain the low penetration of EVs in India including high upfront prices, the lack of publicly available battery-charging infrastructure, the low driving range of EVs and a lack of good-quality products in the market.

Total cost of ownership of EVs in India is favourable for two- and three-wheelers but not for four-wheelers

From the customers' perspective, the total cost of ownership (TCO) of a vehicle is a key factor in the decision to purchase. Due to subsidies and tax incentives offered by the government in India, the market price of two-wheeler and three-wheeler EVs is comparable to that of conventional internal combustion engine (ICE) vehicles. Moreover, the cost of running and maintaining EVs is lower. The TCO of EVs in the two-wheeler and three-wheeler category is therefore lower than that of their ICE counterparts. This is one of the main reasons why these two categories are leading the adoption of electric vehicles.

In the four-wheeler category, the market price of EVs is 70–100% higher than that of their ICE counterparts, despite implementation of government subsidies and tax incentives. Moreover, the battery, which accounts for around 30% of the price of an EV vehicle price, needs to be replaced within 3–5 years. Therefore, the current TCO of a four-wheeler EV over a 6-year period of ownership is approximately 20% higher than that of an ICE four-wheeler (see Figure 3). This, coupled with their low driving range, makes EVs a far less-attractive option than ICE vehicles and this is reflected in the low adoption of EVs in the four-wheeler category. However, battery prices have been falling rapidly and this trend is expected to continue in the future (see Figure 2). The fall in battery prices could make the TCO of EVs equivalent to that of ICE vehicles in about 5 years (see Figure 3).[6]

The government has taken several steps to promote EV adoption, but a clear policy roadmap is missing

Several government initiatives have been proposed by the Indian government to mitigate the obstacles around adoption of EVs in the country. The following are examples of these plans.[7]

- Implementation of FAME 2 (Faster Adoption and Manufacturing of Electric Vehicles), a scheme with a total budget of USD1.5 billion to be spent between 2019–2022 to incentivise the purchase of two- and three-wheelers for public transport, or for commercial use and set-up of public charging stations.

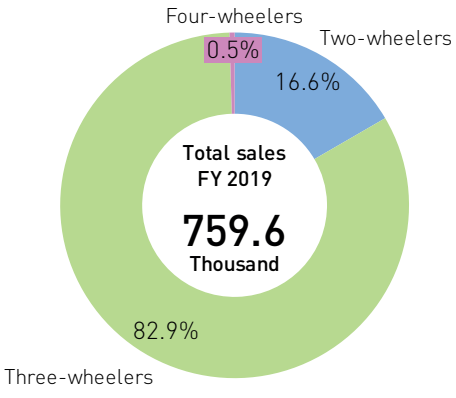


FIGURE 1: SALES OF ELECTRIC VEHICLES IN INDIA (SHARE OF UNITS SOLD), FY2019 (SOURCE: AUTOCAR INDIA)

[1] India Brand Equity Foundation (March 2019), Automobile Industry in India.

[2] Quartz India (27 March 2019), India's CO2 emissions are growing faster than the US' or China's.

[3] EV refers to battery-powered electric vehicles.

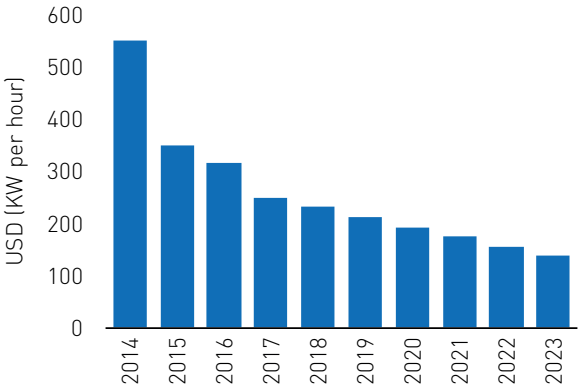


FIGURE 2: LITHIUM-ION BATTERY PRICES, WORLDWIDE, 2019 [SOURCE: BLOOMBERG NEW ENERGY FINANCE AND ANALYSYS MASON]

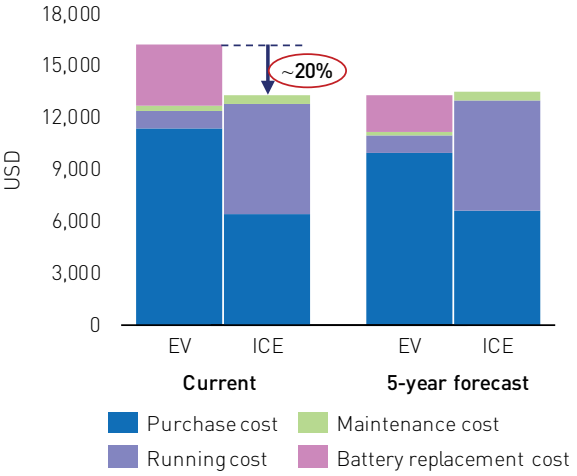


FIGURE 3: TOTAL COST OF OWNERSHIP OF EVs COMPARED WITH ICE VEHICLES, INDIA, 2019 [SOURCE: ANALYSYS MASON]

- Application of a lower tax rate of 12% on EVs compared with a tax rate of 29% and above on conventional vehicles.
- Reduction in Goods and Services Tax (GST) on Lithium-ion batteries from 28% to 18%.
- Delicensing of public EV battery charging stations.
- Exemption from the requirement of permits for commercial EVs.

What is missing, however, is a well-defined policy roadmap with practical timelines to provide guidance to original equipment manufacturers (OEMs) for roll-out of EVs. In 2017, the Indian government, as part of the National E-Mobility Programme, set a target of electrifying 100% of the country's vehicles by 2030, but later decided to scale back this plan. Additionally, a government think tank in India, NITI Aayog, recently proposed 100% electrification of three-wheelers by 2023, and 2025 for two-wheelers under 150cc. However, OEMs have deemed these targets unrealistic because they have recently made significant investments in existing product lines (to comply with the Bharat Standard-VI emission norms) for ICE vehicles. They contend that it is commercially unviable to transition to 100% EV manufacturing within such a short time frame.

Small-scale players and start-ups currently account for a major share in the EV market in India

The electric two-wheeler market in India is dominated by Hero Electric and Okinawa Autotech, which together account for around 80% of the units sold in this category (see Figure 4). Some of the other dominant players in this category are Ampere, Avon and Lohia. These companies offer electric scooters at prices comparable to that of ICE two-wheelers, but most of their products are equipped with low-capacity lead acid batteries, which offer only a limited driving range. Electric scooter start-ups Ather Energy and Twenty Two Motors have both recently entered the market with premium electric scooters that are equipped with high-capacity Lithium-ion batteries and smart features such as smartphone connectivity, remote diagnostics and parking assist. However, the production capacity of these start-ups is limited and they are expected to need a few years to scale up.

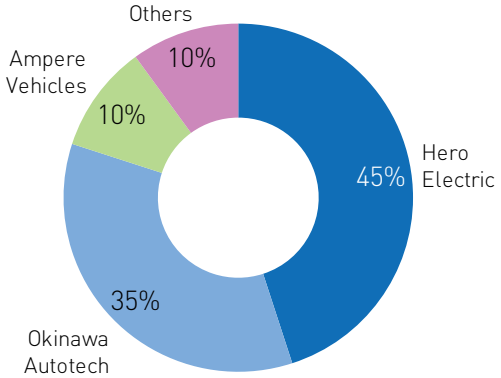


FIGURE 4: SHARE OF MARKET FOR ELECTRIC TWO-WHEELER VEHICLES IN INDIA, 2019 [SOURCE: ANALYSYS MASON]

The market for electric three-wheelers is highly fragmented, with more than two-thirds of the market being dominated by local unorganised players (see Figure 5). A limited share of the market has been captured by organised players such as Kinetic Green and Lohia Auto. Delhi is the largest market for this segment, driven by incentives being promoted by the state government in response to rising air pollution in the capital. Electric three-wheelers are typically classified by battery capacity; that is, less than 101 ampere hours (Ah) or more than 101Ah. Currently, the low-cost of vehicles in the <101Ah category forms the bulk of the market because of the dominance of unorganised players, which primarily deal in this category. However, with the recent emergence of organised players and the increasing demand of products with a higher distance range, the 101Ah category is expected to grow at a faster rate in the future.[8]

[4] Autocar India (1 May 2019), EV sales in India cross 7.5 lakh mark in FY2019.

[5] The Economic Times (11 February 2018), Electric vehicle sales to see double-digit growth till 2020: Report.

[6] Assumptions for the calculation of TCO include: ownership period of 6 years and distance driven per year of 15 000km; replacement of battery for EVs once during the 6 year ownership period; constant price of electricity, fuel (petrol/diesel) and EV components (except for battery) during the forecast period; marginal increase in price of ICE vehicles during the forecast period due to implementation of Bharat Standard-VI emission norms in 2020

[7] Mercom India (18 April 2019), 10 Drivers of EV Market in India.

[8] Prescient & Strategic (P&S) Intelligence (January 2019), India Electric Rickshaw Market Overview.

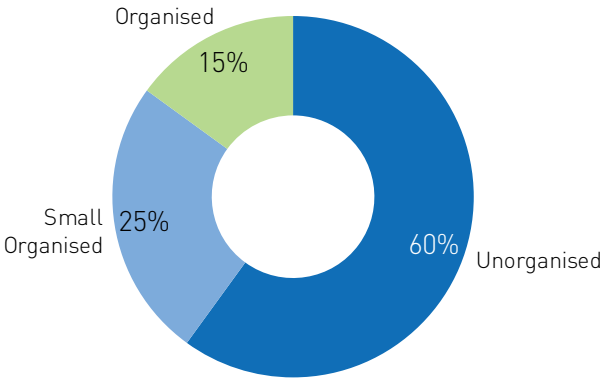


FIGURE 5: SHARE OF MARKET FOR ELECTRIC THREE-WHEELER VEHICLES IN INDIA, 2019 [SOURCE: ANALYSYS MASON]

In the passenger car segment, Mahindra is the only supplier of EVs to date. It offers only two products, with prices starting at USD11 500, which is much higher than that of ICE four-wheelers. However, competition is expected to intensify with the entry of other established passenger vehicles such as Maruti Suzuki, Hyundai and Tata before the end of 2020.

A few inflection points could propel the adoption of EVs in India

A few inflection points are expected to drive the adoption of EVs in the Indian market. These are shown in Figure 6 and are discussed in more detail below.

- **Clear government policy.** A well-defined policy with realistic timelines will direct the strategic initiatives of OEMs. This will ensure the timely investment in production capacity and mobilisation of other players in the value chain.
- **Public charging infrastructure.** The widespread availability of public charging infrastructure will address the issue of the limited driving range of EVs. This will help meet the needs of long-distance commuters such as commercial fleet owners.
- **Entry of established OEMs.** The entry of established OEMs with a high production capacity will increase supply of products in the market. This will also ensure that high-quality products are offered in the market and that customers have a wider portfolio of products to choose from, resulting in higher adoption of EV vehicles.
- **Mandated government targets for EV penetration.** Mandates by government to electrify a certain percentage of all vehicle sales in India will drive investments from OEMs in the EV space, leading to increased growth in the market.
- **Reduction in TCO to the level of ICE vehicles.** With a reduction of the price of batteries prices over time, the TCO of an EV is expected to become comparable with that of an ICE vehicle, especially in the four-wheeler segment. This will bridge the affordability gap between EV and ICE vehicles for end consumers and make EVs a viable alternative to ICE vehicles.
- **Adoption of EV vehicles by fleet operators such as private cab companies and government agencies.** The cost of running of EVs is much lower than that of their ICE counterparts, and therefore high-usage customers such as fleet operators will be the early adopters of EVs. This adoption could be further accelerated through government mandates, perhaps by following a similar model to the one adopted for the migration of diesel vehicles to compressed natural gas (CNG) vehicles.

As the above inflection points play out over the next few years, we expect the EV market to grow to 7 million units by FY2024 from 0.8 million units in FY2019 (see Figure 7).

Two-wheelers and three-wheelers are expected to lead the growth in the EV market for the following reasons.

- The market segments for electric two-wheelers and three-wheelers are currently more mature than the market for electric four-wheelers, and these two markets have more suppliers, higher product availability and parity in pricing with their ICE counterparts.

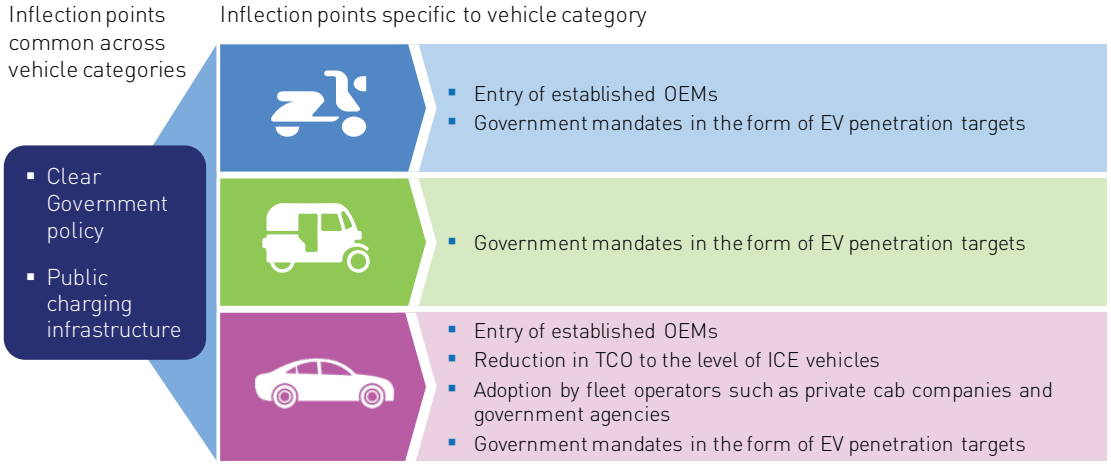


FIGURE 6: INFLECTION POINTS FOR ADOPTION OF EVs IN INDIA [SOURCE: ANALYSYS MASON, 2019]

- The TCO for EVs compared with ICE vehicles is already favourable for two-wheelers and three-wheelers. However, it will take around 5 more years for the TCO for four-wheeler EVs to become more favourable.
- One of the most-significant constraints associated with products that are currently available is the low driving range, especially in the entry-level segment. Unlike four-wheelers, the use case for two-wheelers and three-wheelers is mainly local, short-distance commuting. This makes EVs a more-viable alternative in both the two-wheeler and three-wheeler categories. Circumstances could change with advances in battery technology and the development of a public charging infrastructure, but these development will take a few years.

Innovative EV-based business models are emerging worldwide; this is a good starting point to drive take-up of EVs in India

A number of innovative business models have been emerging in the EV market worldwide. These business models aim to attain economic feasibility by working around the existing constraints of EVs (such as their high upfront costs and low driving range) and maximise their advantages (such as low running costs). The business models for usage of EVs include the following.

- **Ownership model.** Customers own the electric vehicle that comes with the battery. The battery can be recharged at public charging stations and needs to be replaced after its lifetime (about 3–5 years) by the customer. OEMs such as Hero Electric and Mahindra operate using this model.

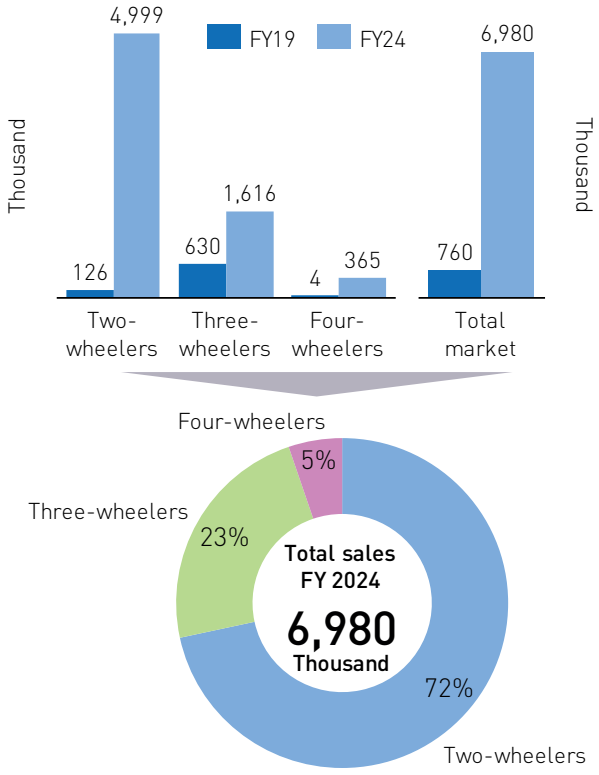


FIGURE 7: ELECTRIC VEHICLE SALES IN INDIA (UNITS SOLD IN FY2019 AND FY2024; SHARE OF UNITS SOLD IN FY2024) [SOURCE: ANALYSYS MASON, 2019]

- **Shared mobility model.** This model relies on a shift from ownership to usership. Players that use this model offer several variations within shared mobility, including the following.
  - **Ride-hailing services.** This model allows customers to book a private, point-to-point ride on a an on-demand basis. The EVs are operated and maintained by the fleet owner. Some players also offer pooled ride-hailing services, where multiple customers can share a journey. This model offers an advantage to both fleet operators and end consumers. For fleet owners, the asset utilisation is high and the cost of running the EVs is lower than an ICE vehicle. End consumers benefit from the services provided by fleet operators because they do not incur the high upfront investment in EVs. Players such as Didi offer EVs as a part of their ride-hailing services. In India, Ola plans to launch its EV fleet in the three-wheeler segment over the next few years.
  - **Vehicle sharing services.** This model is an alternative to private vehicle ownership. Players such as Zipcar allow customers to rent an EV for a certain period of time. Other players, such as Car2go and qQuick, offer one-way vehicle sharing services, which allows customers to pick up the vehicle from one location and drop it off at another. This model offers several advantages including the low cost to end consumers because they do not need to own or maintain the EVs. In addition, the costs incurred by fleet operators in operating EVs is low compared with ICE vehicles. Some players, such as Getaround, also allow customers to rent a vehicle from their peers. The major advantage for the peer-to-peer vehicle sharing model is that it offers improved asset utilisation for customers that rent their EVs to peers.
- **Battery-swapping/battery-leasing model.** This model allows customers to purchase the EV without the battery. Customers lease the battery on a monthly rental and can swap their battery at battery swapping stations when a recharge is required. Players such as Renault, Better Place and Gogoro offer this model. This model allows players to reduce the TCO by removing the high cost of the battery. Moreover, battery swapping stations offer a quick way to replace drained batteries with charged ones, and customers do not incur the battery replacement cost at the end of the lifetime of a battery. However, standardisation of the batteries is one of the potential challenges that this model faces.

The adoption of these innovative business models can provide a good starting point to drive take-up in the EV market in India.

Analysys Mason wishes to thank Aishwarya Kachhal for his contributions to this article. Aishwarya is the Founder and CEO of qQuick.in, an e-mobility start-up with the aim of making mobility accessible, affordable, flexible and electric.

About Analysys Mason (including an overview of our internet transaction advisory experience)

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3. **First port of call** for diligence of Internet assets for marquee investors globally
4. Provided advice on investments worth over **USD15 bn** over last 5 years

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- Full commercial diligence of multiple **ed-tech** firms in India
- Assessment of the **fintech** (**online mutual funds, trading, and insurance**) in India, with a focus on two emerging companies

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