Business Proposal

# Tesla Artificial Intelligence Taxi Service in India

23 December 2020

Michael Gonzales

Management 449 - Dr. Peng Chan

Table of Contents

**Executive Summary**

Tesla should enter the Indian taxi market with a new standard of operation; a self driving, fully autonomous car controlled by Tesla's artificial intelligence-run autopilot utilizing the Tesla Model 3 roadster.

India is the second highest-populated country in the world with a total population of 1,352,642,280 as of 2018. Its seven largest cities include: New Delhi (population: 16,753,235), Mumbai (population: 12,478,447), Bangalore (population: 8,425,970), Hyderabad (population: 6,809,970), Ahmedabad (population: 5,570,585), Chennai (population: 4,681,087), and Kolkata (population: 4,486,679).[1] The median age among the 1.352 billion-person population is 28.4 years with a GDP per capita of $2,005.9.

The Indian taxi market generated nearly $10 billion in revenue in 2018, accounting for 21.4% of the global $46.7 billion taxi industry revenue for that year. By 2025, the Indian taxi industry is expected to reach $25 billion in revenue.

The major competitors include: Uber Technologies, Inc. (38% share), Lyft, Inc. (2% share), Didi Chuxing (1% share), GrabTaxi Holdings Pte, Ltd. (1% share), and ANI Technologies Pvt., Ltd. (Ola) (58% share). Tesla's revenues start at $16,095.5 billion and grow at a projected rate of 30.27% per year to $60,361.88 billion by 2025. Initial operating expenses in 2020 are estimated to be $47,526.03 billion spread between the 175,000 necessary AI Tesla Model 3 roadsters and the 273,438 Tesla Solar Panels. These costs will become sunk costs after 2020, with 2021-2025 maintenance costs being $41.375 million per year. 2020 will see a net profit loss of $31,430.53 billion, but by 2024, Tesla will see a $3,136.43 billion net income which will grow each year.

[1] Non Resident Indians Online: India City Populations

**India Population and Economic Statistics**

Tesla should look to India as a country to expand its rapidly expanding business. India is the second highest-populated country in the world with a total population of 1,352,642,280 as of 2018.[2] India contributes 17.7% of the entire world population following China.[3] The Indian population is spread amongst 4,000 cities. Roughly 300 of the 4,000 cities have a population of 1 million or more, with India's seven largest cities having individual populations of over 3 million. The seven largest cities include: New Delhi (population: 16,753,235), Mumbai (population: 12,478,447), Bangalore (population: 8,425,970), Hyderabad (population: 6,809,970), Ahmedabad (population: 5,570,585), Chennai (population: 4,681,087), and Kolkata (population: 4,486,679).[4] 35% of the Indian population reside in Urban cities; the aforementioned seven are all classified as urban cities. The median age among the 1.352 billion-person population is 28.4 years.[5]

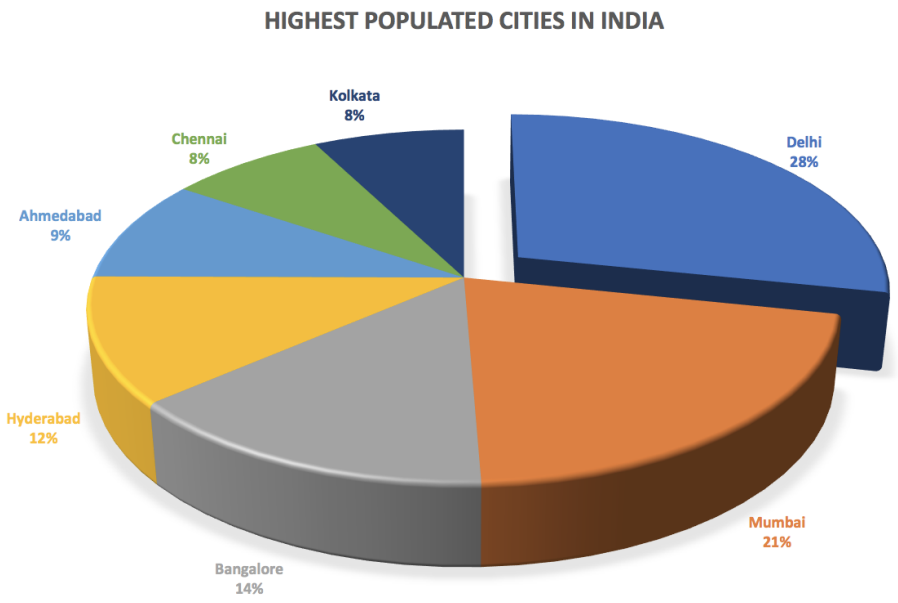


Figure 1: Pie Chart Showing Share of Population Amongst the 7 Most Populated Cities in India

[2] Worldometer: India Population
[3] Worldometer: India Population
[4] Non Resident Indians Online: India City Populations
[5] Worldometer: India Population

India, as of 2018, maintains a GDP of $2.713 million.[6] Spread amongst its 1,352 billion person population, the GDP per capita is $2,005.9.[7] India is reliant on the Primary Sector, the top tier of its three-tiered occupational sector -Primary, Secondary, and Tertiary. The primary sector is roughly 52% of India's total GDP.[8] The primary sector includes agriculture, forestry, fisheries, hunting, mining and quarrying. Indian civilians employed in the primary sector reside in the most densely-populated cities and utilize cars, motorbikes, taxis, busses, or walk to travel to places of employment.

[6] Worldbank: India's GDP -2018
[7] Worldbank: GDP per Capita -2018
[8] Basic Features of Indian Economy

**Indian Taxi Industry Statistics**

Worldwide, the taxi industry brings in $46.7 billion annually.[9] Currently, the global taxi industry is in a decline with an estimated decrease in growth of -43.7%.[10] The decline is contributed by the Covid-19 pandemic, which has diminished the need for ride-share programs in thousands of cities. Health and personal well-being is another factor related to the Covid-19 pandemic. Although there has been a drastic decrease in industry-generated revenue within the global taxi industry, experts expect substantial growth to occur with an estimated growth rate of 6.5% starting in 2021 and a global revenue of $94.4 billion by 2025.[11]

The Indian taxi industry is a part of the fast-growing Asia-Pacific taxi market. As of 2018, the Asia-Pacific market accounts for more than 70% of the global taxi market.[12] The Indian market generated nearly $10 billion in revenue in 2018, accounting for 21.4% of the global taxi industry revenue for that year. By 2025, the Indian taxi industry is expected to reach $25 billion in revenue.[13]

The current Indian population is adamant about the use of vehicles in day to day activities. As of 2017, there are 253 million active cars registered with the Indian government for taxation purposes.[14] The preferred choice of commuting in India, backed by a 60% approval rating from the Indian population, is personal or shared vehicles.[15] Capital and Northern cities, such as New Delhi and Mumbai, prefer the use of 4-wheeled vehicles whereas people in Southern cities, such as Hyderabad and Chennai, prefer the use of 2-wheeled motorbikes.

[9] The Business Research Company
[10] The Business Research Company
[11] The Business Research Company
[12] Mordor Intelligence: Indian Taxi Market
[13] Mordor Intelligence: Indian Taxi Market
[14] Statista: Number of vehicles in operation across India from financial year 1951 to 2017
[15] Statista: Number of vehicles in operation across India from financial year 1951 to 2017

Currently, gas prices are near a modern all-time high for India. Current gas prices, as of December 2020, are $4.40 per US gallon.[16] The Covid-19 pandemic has caused a significant spike in gas prices in India, with just around a $1 hike in overall gas prices. With the pandemic, the Indian government has established a tight tax pinch on imported gasoline which has aided in the resulting price increases.[17] The increasing prices in gasoline from both pre-Covid and current pandemic levels has resulted in an increase in demand for taxi services throughout the major cities in India.

[16] Global Petrol Prices: India
[17] India Today: Gas Prices

**Indian Taxi Competitors**

The taxi industry in India consists of a few major ride-share companies spread between Indian companies and foreign companies. These companies include: Uber Technologies, Inc., Lyft, Inc., Didi Chuxing, GrabTaxi Holdings Pte, Ltd., and ANI Technologies Pvt., Ltd. (Ola). The overall characteristic of the Indian taxi industry is moderately fragmented, meaning it is a highly competitive and sought-for industry without any leading, major competitors.[18] Ola holds a majority market share of the Indian taxi industry at 58% followed by Uber's 38% share with the remaining three major competitors vying for the remaining 4%.[19] Ola currently operates in 125 cities throughout India. Uber has a presence in 36 Indian cities.

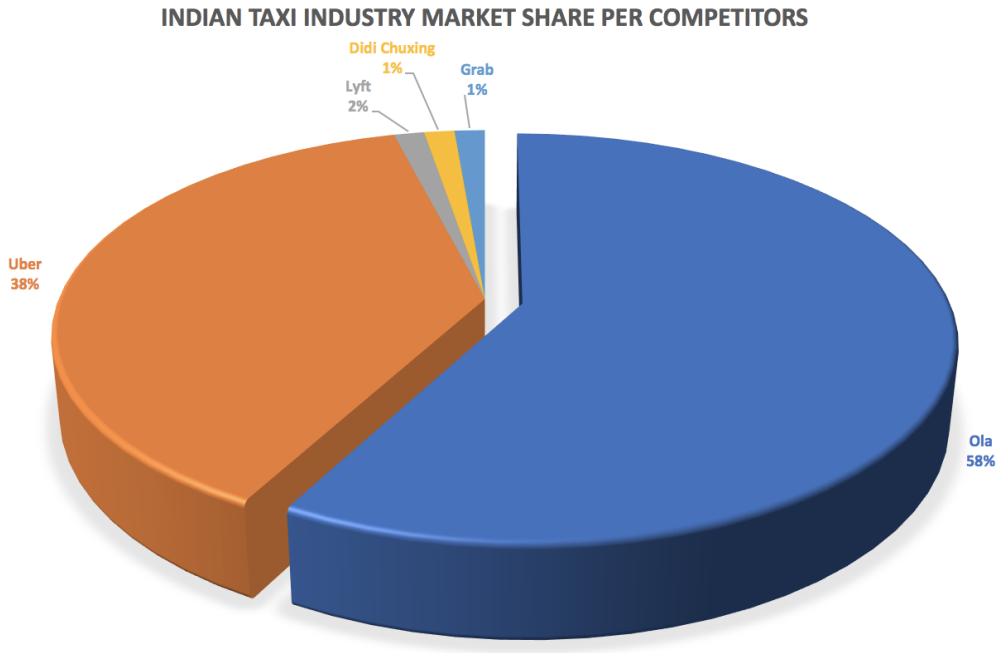


Figure 2: Pie Chart Showing Market Share of the 5 Most Prominent Ride-Share and Taxi Services

[18] Mordor Intelligence: Indian Taxi Market
[19] Mordor Intelligence: Indian Taxi Market

Taxi amounts vary per Indian state depending on demand for taxis as well as the registered amount of taxis. The total registered number of taxis among the top seven highest-populated cities in India is 1.483 million taxis of which the total is spread among (in thousands): New Delhi (taxi amount: 137.77), Mumbai (taxi amount: 306.99), Bangalore (taxi amount: 292.32), Hyderabad (taxi amount: 79.68), Ahmedabad (taxi amount: 125.46), Chennai (taxi amount: 404.29), and Kolkata (taxi amount: 136.81).[20] The total number of taxis is distributed between the 5 major competitors in the Indian taxi industry respective to market share.

The fares for a taxi differ between cities. The average taxi fare between the top seven highest-populated cities -including taxi start and 1 extra kilometer of travel- is $1.05.[21] The fare for a single taxi ride going one kilometer is, on average, one quarter or 25% of the cost of one gallon of gas in India. Four, one kilometer taxi rides is the same as one gallon of gas. The biggest problem people in India face is the standard of living relative to salary. The limited salary people make has grown the demand for taxis in India due to the hundreds of dollars saved when comparing a one kilometer taxi ride to an entire car's amount of gas.

[20] Statista: Number of registered taxis across India in financial year 2017, by state
[21] Numbeo: Taxi Fare in India

**Tesla Artificial Intelligence (AI) and Autonomous Taxi Service**

Tesla should enter the Indian taxi market with a new standard of operation; a self driving, fully autonomous car controlled by Tesla's artificial intelligence-run autopilot utilizing the Tesla Model 3 roadster.

Tesla will export its brand of Tesla Model 3 roadsters to India. Each car would be equipped with a cash/card reader. Each taxi can be hailed by the Tesla Taxi app. Currently, smartphone growth in India has reached 28% of the entire population in India with the majority of users residing in the top seven highest-populated cities.[22] This increase in mobile users has prompted domestic taxi companies to transition away from the original taxi-teller machines that accepted cash payments to card payments or hail-by-phone methods to acquire a taxi ride.

The Tesla Taxi app would allow users to hail via phone. Once a taxi is hailed, it would leave from its previous position, whether it was located at the Tesla Taxi headquarters or parked on the street, and drive to pick up the passenger(s). It would only stop if payment had been received via the mobile app or the user had selected *pay at pickup*. Once at the pickup location, the Tesla taxi would not leave until payment had been received. The touch screen would effortlessly guide the rider to choose the choice of payment and lay out a step by step process to complete the transaction.

The AI within the Tesla Model 3 roadster would pick the best and fastest route to the rider(s)'s intended destination. Once the ride is complete, the rider(s) will be instructed to exit the vehicle or purchase a new ride. If no new ride is purchased within a 30 minute wait at any location, the taxi will drive back to the Tesla Taxi headquarters. Due to limited locations to charge, the taxis will only be able to charge back at the Tesla Taxi headquarters. The AI onboard

[22] Mobility Foresights: On-Demand Taxi Market in India 2019-2025

the Tesla Taxi will calculate the remaining drivable distance with time extensions on the way and remaining battery percentage to accurately and safely deliver the rider to his or her desired destination as well as return back to the Tesla Taxi headquarters for a full recharge without running out of operational battery power.

At the Tesla Taxi headquarters, maintenance workers will override the autopilot and manually drive the car to its charging location where it will receive a full charge. As it is charging, any required maintenance will be made. This includes cleaning of the interior and collecting cash deposits from the onboard cash-teller. Any other noticeable issues will also be taken care of if necessary.

Charging stations will be powered by Tesla Solar Panels installed on the roof and various other locations around the Tesla Taxi headquarters. The use of Tesla Solar Panels will allow Tesla Taxis to run off the Indian power grid and not rely on electricity from Indian power stations. The solar panels will fully charge all Tesla Model 3 roadsters per city as well as save additional power that is not being used for any operating activities.

**Artificial Intelligence**

Artificial Intelligence (AI) was first proposed in 1956 by John McCarthy at the Dartmouth Summer Research Project on Artificial Intelligence Conference. His speech wished for an agreed method to create artificial intelligence. From 1957 to 1974, hundreds of AI patents and advancements flourished throughout the world.[23] As of today, hundreds of companies have both created new methods and have utilized old methods of artificial intelligence.

One important country that has sparked spectacular advancements in AI technology is China. Pony.ai is China's dominant player in driverless cars. It began with a $267 million investment by Ontario Teachers' Pension Plan Board and has grown to a $5.3 billion company. Pony.ai utilizes an artificial intelligence app that hails AI-driven cars to the rider's location. The cars transport the rider to their respective destination through the fastest and safest route. [24]

India also utilizes AI in its business sectors. The main use of AI in India is healthcare systems and human resource (HR) systems as well as consumer-based simplisticity advancements . The use of AI in the healthcare system involves early and accurate detection of breast cancer at a much cheaper cost through Hapti.ai.[25] The Indian startup market has seen a steep rise in AI-influenced startups with roughly 11,000 startups conceived in the last 6 years.[26] Other instances of AI usage in India is language detection and processing through Discovery AI, farming solutions for the entire agriculture sector from CropIn, HR functionality to facilitate non-employee-facing activities by Bash.ai, and many more consumer oriented AI functionalities.[27]

[23] The History of Artificial Intelligence
[24] CNBC: Chinese Driverless Car Firm Pony.ai Valued At $5.3 Billion After New Cash Injection
[25] Analytics Insight: Top 10 Disruptive AI Startups in India 2020
[26] Analytics Insight: Top 10 Disruptive AI Startups in India 2020
[27] Analytics Insight: Top 10 Disruptive AI Startups in India 2020

As of 2020, there are no current implementations of AI-powered cars resulting in driverless taxi services, but there are rumors of potential major ride-share companies estimating the potentials for driverless ride-share programs.

## Tesla Taxi Program Business Model

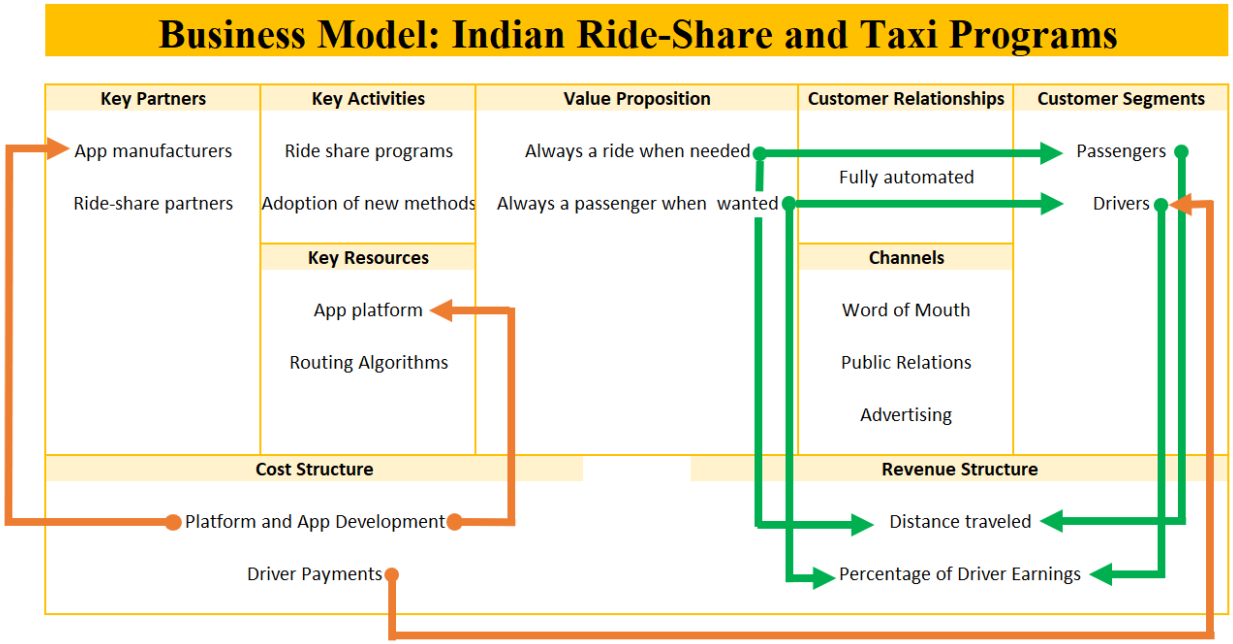


Figure 3: Business Model for Indian Ride-Share and Taxi Programs

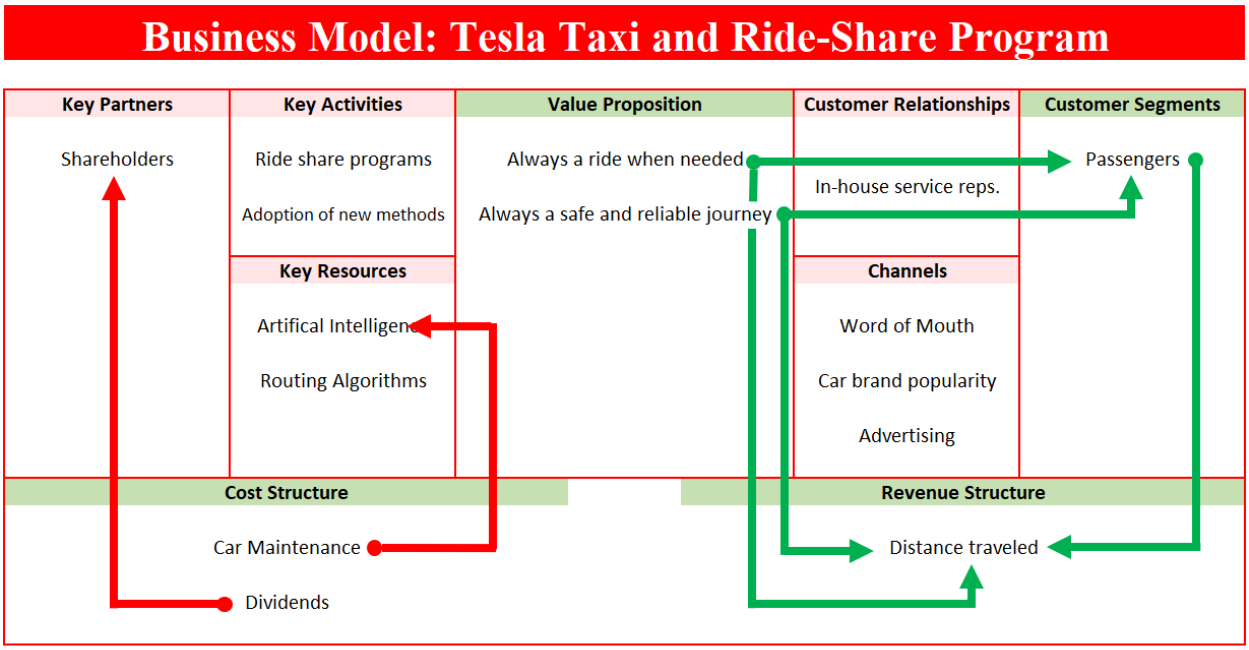


Figure 4: Business Model for Tesla Taxi and Ride-Share Program

The disruption occurs in the increase of ride availability for riders with an increase in space within the vehicle resulting in a more rider-friendly environment. There is also a decrease

in the customer segment for the company as AI does not have a sentient-want for business which eliminates an expense of driver payments. The cost structure is also simplified with a majority of the expenses going towards car maintenance and dividends to the shareholders who are backing the financial goals of Tesla.

Tesla's business model would rely on the cost saving techniques acquired by the savings on drivers for the taxi service and Tesla's personal gain of electricity through the use of its solar panels. The cost-savings related to electricity is enough to advocate for an equal-to-market price for a taxi ride. It would require 273,438 solar panels to efficiently and effectively power all 175,000 Tesla Taxi AI Model 3 roadsters. It is estimated to cost Tesla, on average, $0.28 to produce one solar panel, resulting in a total of $26.031 million in manufacturing expenses.[28] Tesla Solar Panels do not need regular maintenance, just occasional washings. It would cost, after initial installment, based on a yearly cleaning salary per team of 250 cleaners at $15,000 a year, roughly $3.750 million.

Initially, an equal market price will be needed to attract riders to the Tesla Taxi AI ride-share program apart from the allure of autonomous taxi vehicles. As previously mentioned, the average taxi fare between the top seven highest-populated cities -including taxi start and 1 extra kilometer of travel- is $1.05.[29] The starting ride price, on average between the top seven highest-populated cities is $0.77 with an additional one kilometer being, on average, $0.28. It would be beneficial for Tesla to advertise a starting ride price, on average between the seven highest-populated cities of India, of matching the $1.05 taxi fare per one kilometer journey.

It is estimated each Tesla Model 3 roadster costs $35,000 to produce.[30] With the total market size of 1.483 million, Tesla should pursue an 11.8% market share in the Indian taxi

[28] NREL: Solar Manufacturing Costs
[29] Numbeo: Taxi Fare in India
[30] LA Times: Tesla Business Model

market. The 11.8% market share would pull from the 58% Ola share, 38% Uber share and the remaining 4% from the remaining 3 competitors. 175,000 Tesla Model 3 Roadsters will be imported into India and distributed based on demand to the 7 most populated cities resulting in 25,000 Tesla Model 3 AI-powered roadsters per city. This will cost Tesla $6,125 billion to achieve. The expense would not be recaptured by rider revenues. Instead, it would be spread among the rider revenues and stock market revenues as well as cost-saving techniques with the loss of drivers and use of Tesla Solar Panels. Currently, Tesla holds a revenue of $24.58 billion in stock.[31] Maintenance on a Tesla Model 3 is, on average, $216 per service. For a year with a one-required-maintenance-per-year policy, it would cost Tesla $37.8 million in maintenance costs.[32]

The Indian government designates income tax based on the amount of income gained by a company per every 1 Crores (10,000,000 Rupees) with an additional surcharge per every 1 to 10 Crores.[33] Tesla would, at initial inception date, be charged a corporate income tax of 25% with the possibility of a 7% to 12% surcharge based on estimated increase in income per 1 to 10 additional Crores.[34] In the initial inception year, Tesla would pay $0 in government income taxes, but by 2024, Tesla would be paying $1,842.03 billion. The income tax would grow relative to the amount of earnings after operating expenses is taken into account.

[31] Google Finance: Tesla Inc (TSLA : NASDAQ)
[32] Motor1.com: Tesla Service Costs
[33] Cleartax: Corporate Tax in India
[34] Cleartax: Corporate Tax in India

| Tesla Taxi 2020-2021 5 Year Planned Income Statement | | | | | | |
|---|---|---|---|---|---|---|
| **Projected Income Statement** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| Revenues | $ 16,095.50 | $ 20,967.61 | $ 27,314.50 | $ 35,582.60 | $ 46,353.46 | $ 60,361.88 |
| Cost of Goods Sold | - | - | - | - | - | - |
| Gross Profit | **16,095.50** | **20,967.61** | **27,314.50** | **35,582.60** | **46,353.46** | **60,361.88** |
| Operating Expenses | 47,526.03 | 41,375.00 | 41,375.00 | 41,375.00 | 41,375.00 | 41,375.00 |
| EBIT | (31,430.53) | (20,407.39) | (14,060.50) | (5,792.40) | 4,978.46 | 18,986.88 |
| Income Tax Expense | - | - | - | - | 1,842.03 | 7,025.15 |
| Net Income | ***$ (31,430.53)*** | ***$ (20,407.39)*** | ***$ (14,060.50)*** | ***$ (5,792.40)*** | ***$ 3,136.43*** | ***$ 11,961.73*** |
| Simplified to represent billions in revenues | | | | | | |

Figure 5: Tesla Taxi Projected 5 Year Income Statement

The 5 year predictive income statement is based on the aforementioned revenues of the taxi program, costs of the 175,000 Tesla Model 3 roadsters and 273,428 Tesla Solar Panels, and government income tax. The revenues also include a projected 30.27% increase per year to match the Indian taxi industry's estimated revenue growth of 300% up to 2025. Government income taxes will not come into effect until 2024 due to the net loss to Tesla in its operations in India. The government does not tax foreign companies on income made outside of India.[35]

[35] Cleartax: Corporate Tax in India

## References

**India population and income**

https://www.dacollege.org/smat/commerce-SEM-IV-INDIAN-ECONOMY.pdf

https://www.nriol.com/india-statistics/biggest-cities-india.asp#:~:text=There%20are%204%2C000%20cities%20and,population%20more%20than%203%20million.

https://www.statista.com/statistics/664729/total-number-of-vehicles-india/#:~:text=In%20a%20country%20with%20the,or%20shared%20vehicles%20for%20commute

https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=IN

https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=IN

https://www.worldometers.info/world-population/india-population/

**Taxi Industry**

https://www.thebusinessresearchcompany.com/report/taxi-and-limousine-services-market#:~:text=The%20global%20taxi%20and%20limousine,CAGR

https://www.mordorintelligence.com/industry-reports/taxi-market

https://mobilityforesights.com/product/on-demand-taxi-market-in-india/

https://www.numbeo.com/taxi-fare/country_result.jsp?country=India

https://www.statista.com/statistics/665327/number-of-registered-taxis-india-by-states/#:~:text=The%20taxi%20market%20in%20India,still%20in%20the%20unorganized%20sector.

**Gas**

https://www.globalpetrolprices.com/India/gasoline_prices/

https://www.indiatoday.in/business/story/explained-why-fuel-prices-are-rising-sharply-in-india-1747786-2020-12-08

**Tesla car**

https://www.google.com/finance/quote/TSLA:NASDAQ

https://www.latimes.com/business/la-fi-model-3-design-profits-20181017-story.html

https://www.motor1.com/reviews/406938/tesla-maintenance-cost/

**Tesla Solar Panels**

https://www.nrel.gov/analysis/solar-manufacturing-cost.html

**AI in India**

https://www.analyticsinsight.net/top-10-disruptive-ai-startups-in-india-2020/

https://indianexpress.com/article/opinion/columns/artificial-intelligence-raise-2020-summit-india-economy-6708678/#:~:text=Analysts%20predict%20that%20AI%20can,jobs%20to%20the%20Indian%20economy.

**AI Companies in other countries**

https://www.cnbc.com/2020/11/06/china-driverless-car-firm-ponyai-valued-at-5point3-billion-after-funding.html

**AI in general**

http://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

**Indian Business Taxes**

https://cleartax.in/s/corporate-tax