

PRESENTATION

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TATA SEMICONDUCTORS

EXECUTIVE SUMMARY

TATA will require meticulous preparation and research to enter a completely new market like semiconductors. So here is what we recommend:

- **Short-term(~5 years): TATA should concentrate on meeting internal needs and resolving delays. It should therefore focus on creating and increasing its OSAT/ATMP units to address the current deficit.**
- **Mid-Term (5–10 Years): Fabricating facilities of 70–90 nm must be established within the next 5–10 Years. They should first give attention to their own subsidiaries. Kancheepuram, Tamil Nadu, is the best site.**
- **Long term (10–15 years): After meeting its own internal demand, the company can start producing smaller, more expensive 5–7 nm chipsets.**

Silicon and ultra-pure water should be acquired by partnership or acquisition.

Tamil Nadu has sufficient ground water to sustain a UPW plant.



VISION

The TATA grp has always been the flag bearer of the most advanced technologies and now they are entering a new segment. After taking experience in assembling and testing the chips they are diving into the manufacturing sector of chips. The expanding size of Indian market and favourable government policies make the right base for this move. Firstly they should focus on meeting their internal needs of chips and becoming self-sufficient. Once achieved they can then aim to be the leading chip manufacturer not just in india but in the world.



SWOT ANALYSIS

S



STRENGTHS

- Large mobile-phone manufacturing hub.
- Abundant human capital in the IT, design, R&D, and engineering sectors.
- Zero customs duty on import parts and machinery for semiconductor facilities.

W



WEAKNESSES

- Availability of reliable access to power and water.
- Manufacturing capability focused on the final assembly of printed circuit boards.
- Investment limited to design function and very large-scale integration.



O



OPPORTUNITIES

- Government offers incentives to establish new fabrication plants.
- Foreign investment focused on expanding existing facilities in India.
- Demand for connected devices as India rolls out 5G technology.

T



THREATS

- Weak environmental ecosystem and infrastructure for semiconductor manufacturing (e.g. water shortages).
- Competition with other manufacturing hubs that offers greater cost efficiencies and have a first-mover advantage.



MARKET SIZE

Indian Semiconductor Market			
Report Coverage	Details		
Base Year:	2020	Forecast Period:	2021-2027
Historical Data:	2016 to 2020	Market Size in 2020:	US\$ 17.1 Bn.
Forecast Period 2021 to 2027 CAGR:	27.2%	Market Size in 2027:	US\$ 92.13 Bn.
Segments Covered:	by Type	<ul style="list-style-type: none">• Intrinsic Semiconductor• Extrinsic Semiconductor	
	by Material	<ul style="list-style-type: none">• Silicon• Germanium• Carbon• Tin• Others	
	by Application	<ul style="list-style-type: none">• Electronics• Telecommunication• Information & Technology<ul style="list-style-type: none">• Data Processing• Automotive• Industrial Machinery• Others Sports & Fitness	

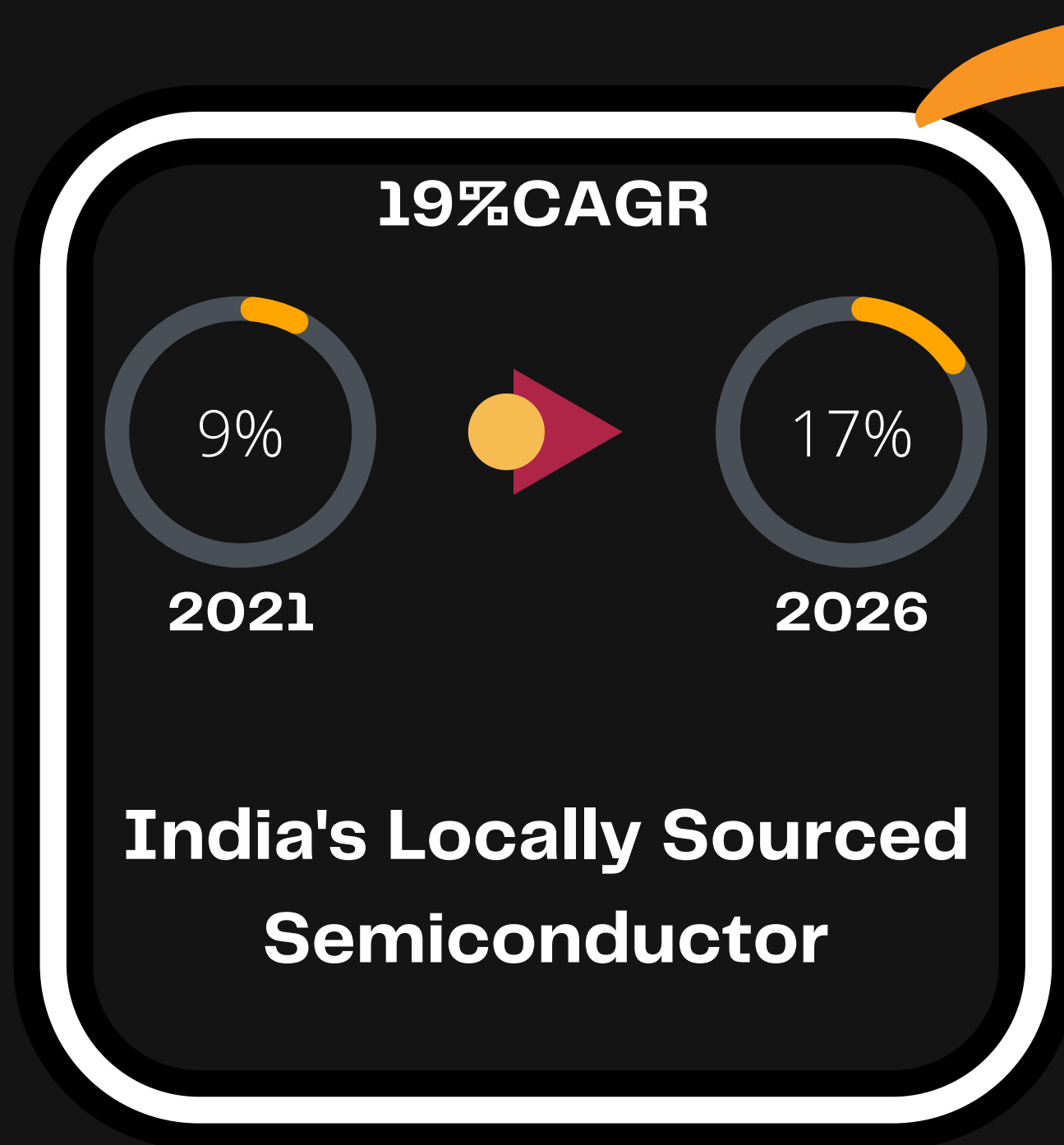
India's Market size of semiconductors was around 17.1 Bn US\$ in 2020 which is expected to reach 92.13 Bn US\$ in 2027. TATA can capture a large portion of this market which is today an import market.





The market size of Tata automobiles itself is around 6000 crores which is supposed to grow in coming years. Tata is also in communication and air conditioning industries which is also a big market. Tata Elxsi is also a big consumer of chips and increasing demand of AI will eventually increase the demand of small nm chips.





Today only 9% of the semiconductor is produced in India and it is supposed to increase to 17% which means many others are also trying. If Tata enters this market these numbers can change drastically. Since there is no established Indian company in this domain. Tata can lead this market.





GOALS

SHORT TERM

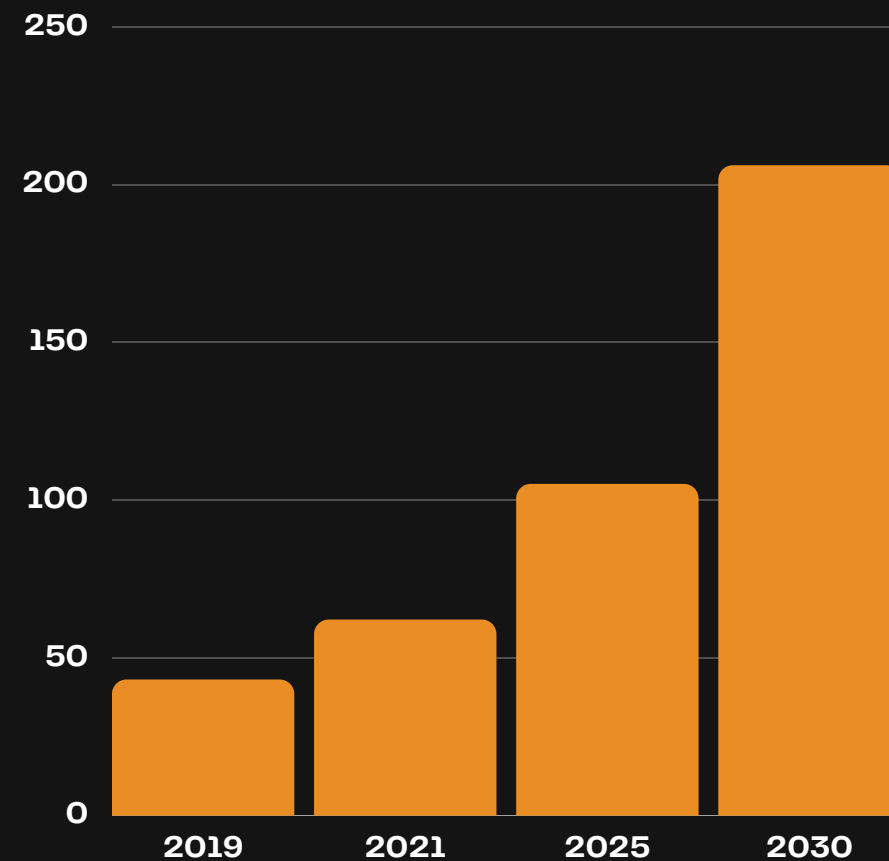
The market value of the semiconductor industry is expected to grow at a CAGR of 19.7% from 2022F to 2026F.

Currently, as a short-term goal, Tata should focus on Developing and expanding its OSAT/ATMP units which would combat the ongoing delays in all semiconductor-dependent sectors. (TATA automobiles are already experiencing an average delay of 28 weeks.)

Due to the imbalance in the semiconductor supply chain, there has been a significant price hike in semiconductors – 10–20% in the past year according to a Bain analyst.



MID TERM



**EV Indian market
summary**

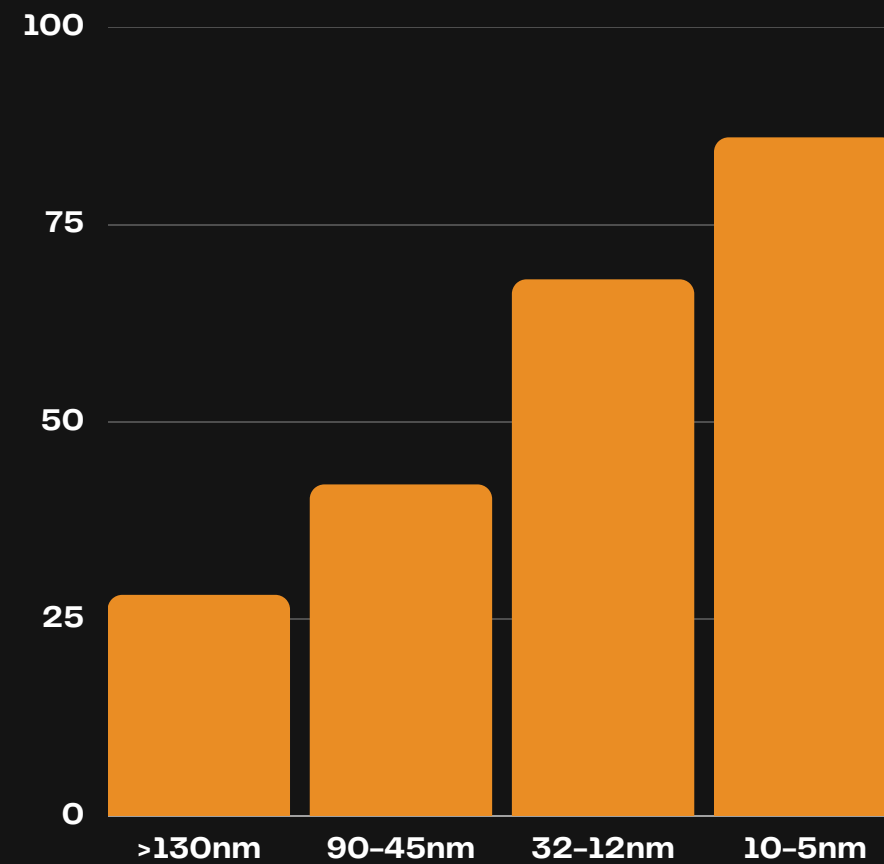
Unless Tata step into the manufacturing lines of semiconductors they won't be able to have a good grip on semiconductors supply to its subsidiaries.

Focusing on demanding chips and the acquisition of small firms will give them a boost.

The growth of Electric vehicles in India is expected above 50% CAGR and TATA should capture this market with adequate supply.



LONG TERM



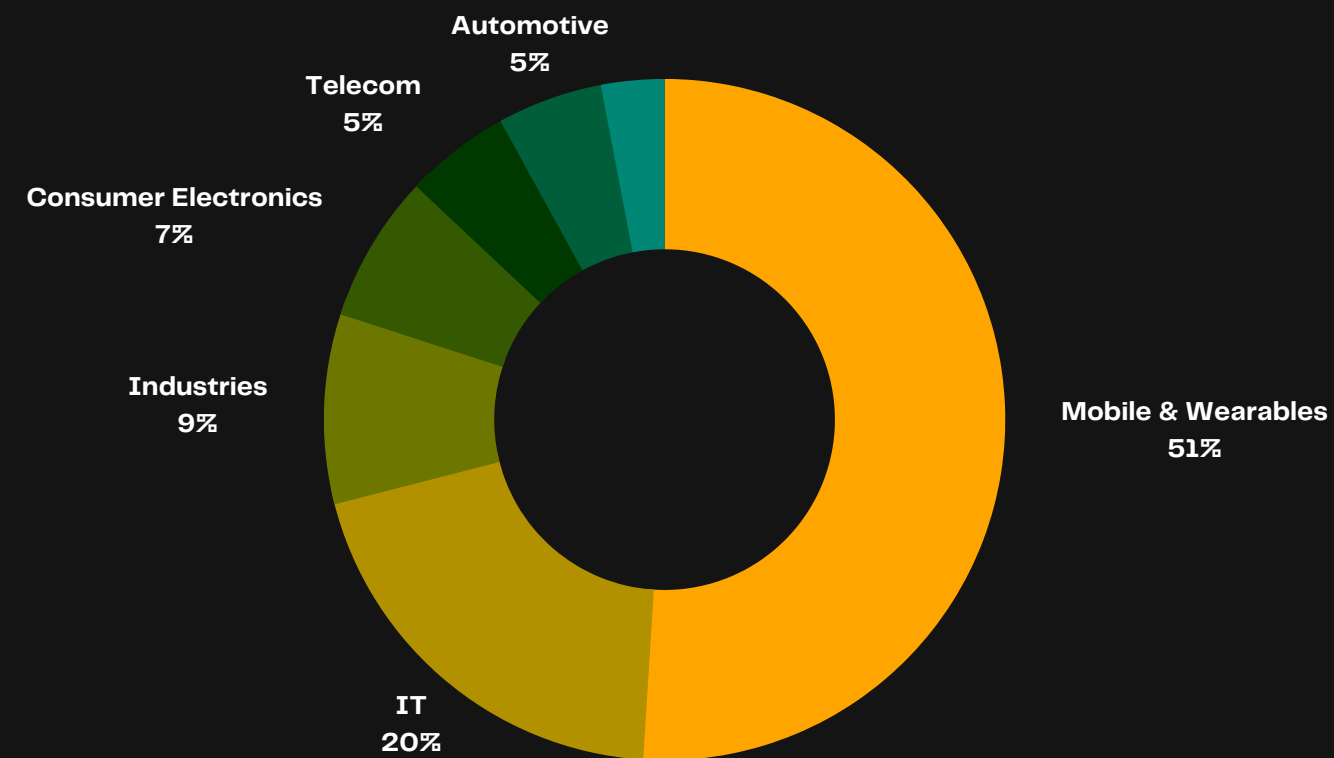
Percentage revenue of
TSMC

The automobile sector constitutes about 5% of the total market for semiconductors and the automobile sector already constitutes a major part of tata's holdings.

After gaining expertise in the larger chipset TATA can move its focus onto smaller chips like 5-7nm as it will give more revenue. Today this market is 86% covered by the Taiwanese company TSMC.

The monetary difference in the costs of larger and smaller chip designing and construction is about 900 million dollars.





**India's Semiconductor Market
Share by Sector in 2021**

In the long term, TATA can capture the mobile & wireless network market and even become a leader in this segment. Today this type of chip is manufactured by only a few companies, and all those chips are imported to India. Tata should try to become a substitute for them not only in India but overall in the international market. It will also benefit the end users as this monopoly market will have a new competitor.



Road Map

COLLABORATION

Multiple small companies should collaborate with big companies for development and assembly.

OSAT's SUPPORT

Create network of OSAT that can drive the testing and assembly requirements

FOCUS

Focus on semiconductor technology that are affordable to build and high on demand.

PRIVATE INVESTMENT

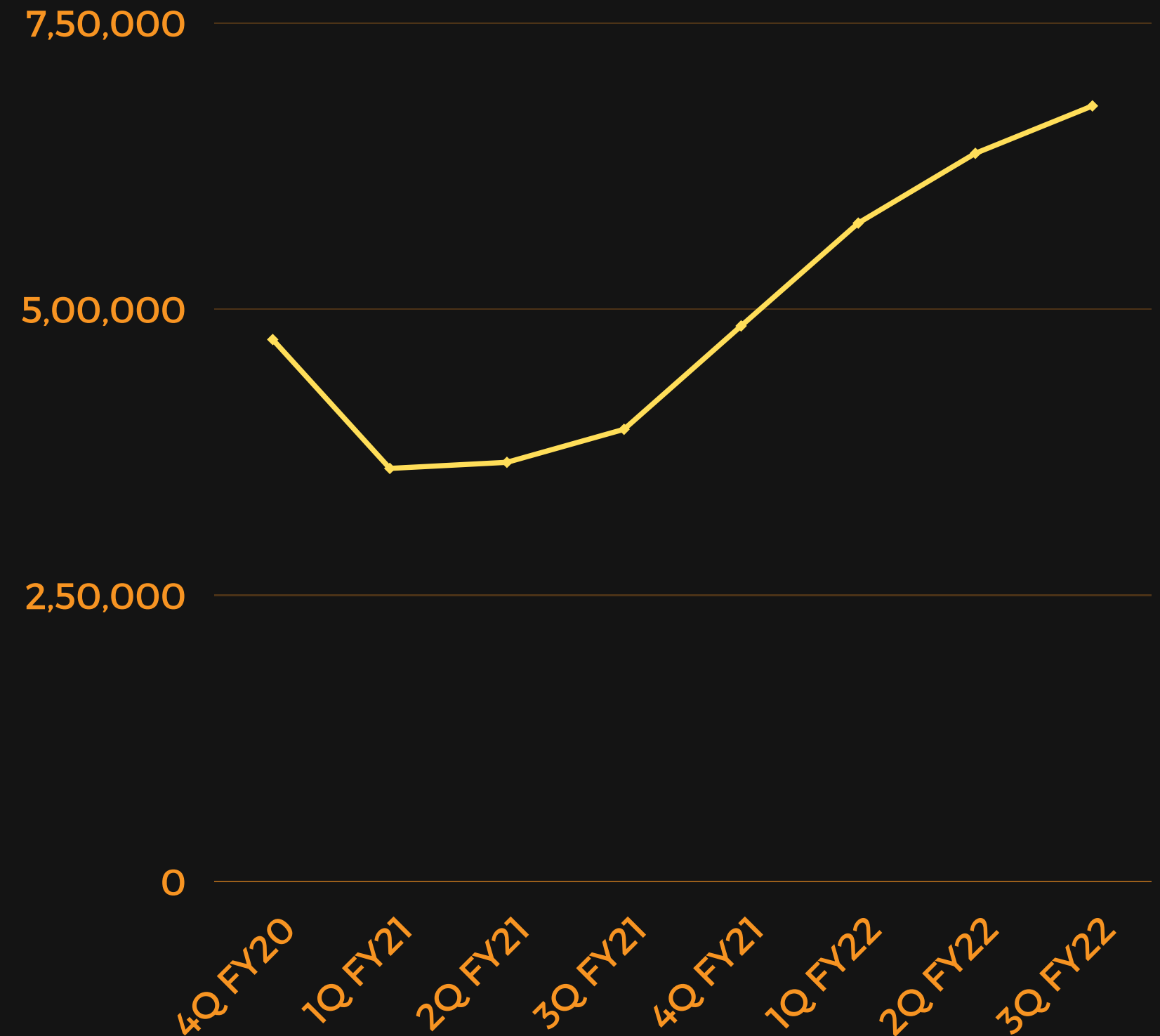
Tata should seek investments by taking advantage of Government initiatives and scheme.

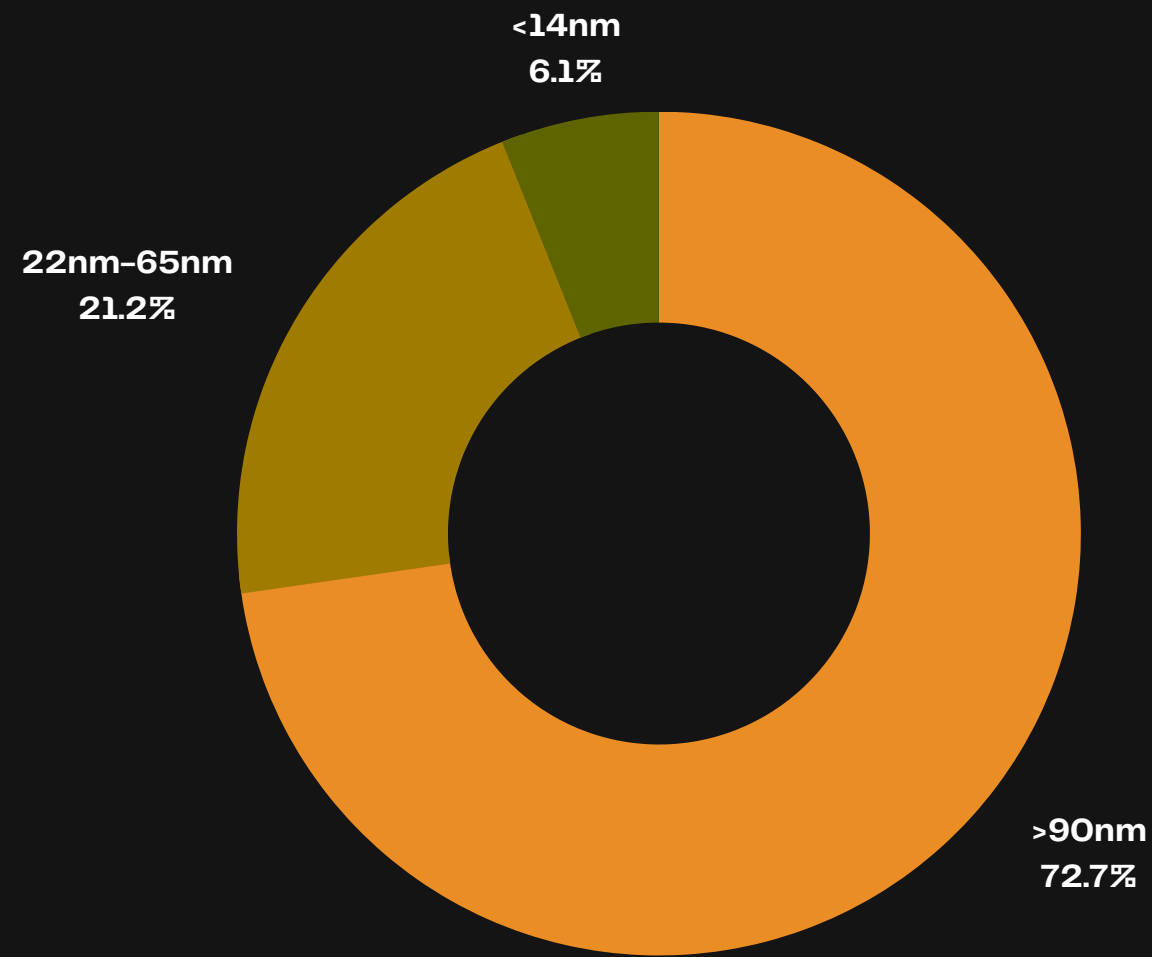


STRATEGIES

Chip Size

Tata's sales in automobile sector are increasing in recent years it has reached 0.7 Million, hence it requires a large number of chips for its production, and in this industry 70–80 nm chips are more required, so focusing on this can reduce its dependence on other firms.





Semiconductor requirement in automobile industry

Since Tata is a major player in the Automobile sector, this industry requires a chip size of 50nm–90nm. Setting up fab plants is by no means cheap or easy. The lithography tools required in a fab for 80 nm technology would take the cost tally up to \$2 billion. Tata manufactures automobiles of around 55000 per month. It would require 40 to 50 lithography machines to conduct that level of manufacturing, which means that the machines that are employed will have a significant impact on the entire cost. 40–50 of the ArF lasers would cost \$5 billion.



Government of India

GOI has announced a package of 7600 crores.

- **The First scheme is design-linked incentives for companies that focus on designing chips.**
- **The scheme sets a target of nurturing 100 design companies and commits to growing at least 20 of them to have a turnover of Rs 1500 crore over five years.**
- **The second scheme provides incentives for specialized fabs used to manufacture silicon semiconductor chips.**
- **Companies with investment threshold of Rs 100 cr with capacity of 500 wafer/month, 150/200mm wafer size.**
- **Government will provide financial support by reimbursing 30% of expenditure.**



Which would
be the right
location ?

Manufacturing semiconductors chips require a large amount of Pure water Kanchipuram is situated on the banks of river Palar fulfilling its water demands.

These units also require uninterrupted power supply. Tamil Nadu gives it an edge in renewable sources of energy, as both Solar and Wind can support the requirement of the state up to 50%.

Kancheepuram is also 90 km away from the business hub and port city of Chennai giving it an added advantage.

KANCHEEPURAM
Tamil Nadu



Feasibility

Concept

- Setting up OSAT unit
- Setting up a manufacturing unit Acquisition and partnership
- Getting the right location– India itself!
- Growth in Network sector
- Growth in automobile sector

Development

- The estimated cost to set up is \$300million, annual revenue is \$128billion overall.
- More than 50% revenue of tata connections comes from outside India and Tata keenly exploring the 5g sector
- In-house production of chips will increase profit, cut down shortages.





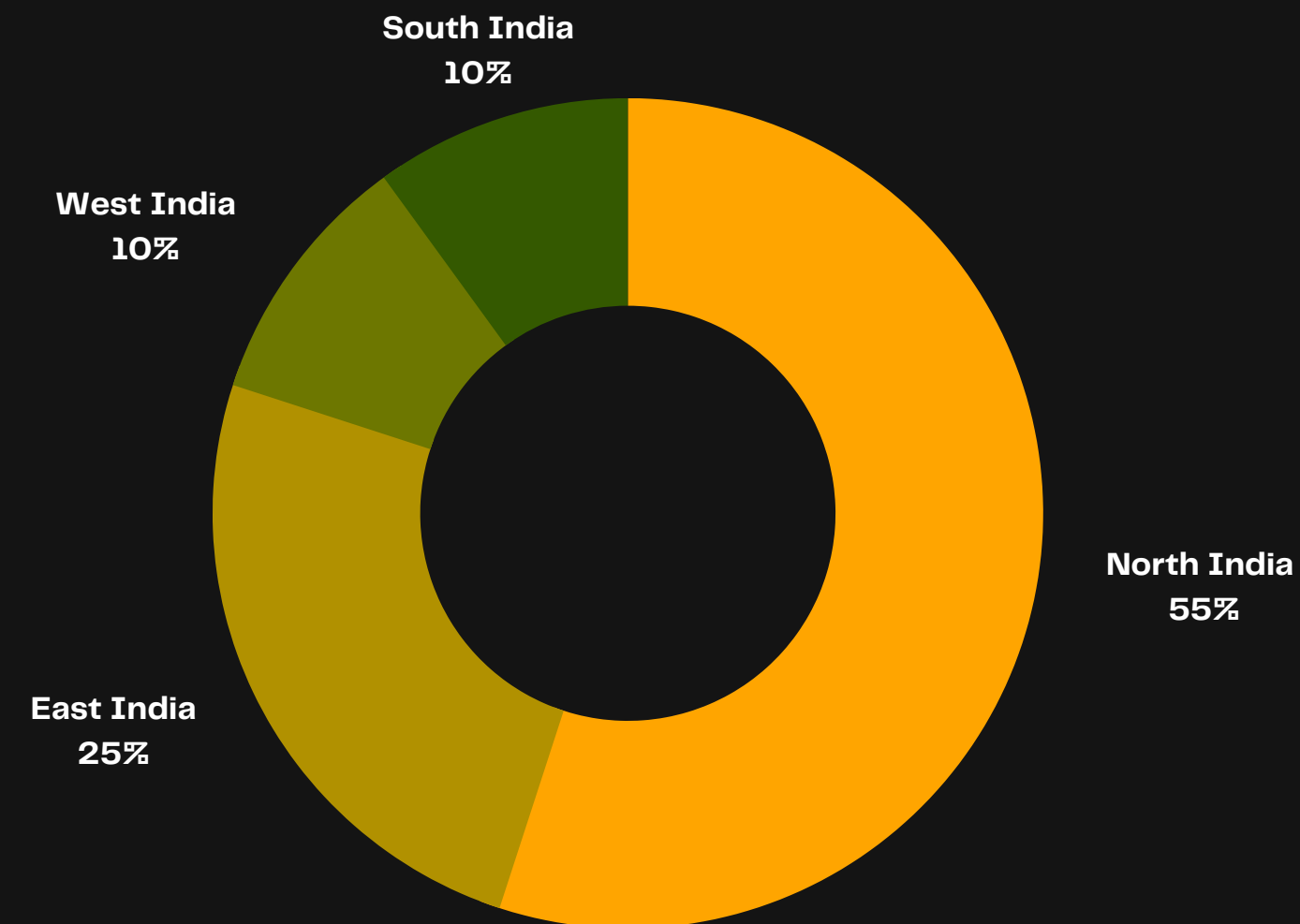
Availability of Raw Materials

Tata should try to make partnerships or acquire companies that are manufacturing silicon in India.

Silicon is the biggest hurdle without this manufacturing of semiconductors is not possible.

Tata should acquire India's leading producers of silicon so that in India its production never becomes slow.





Regional Production of Silicon

Since large chunks, almost 80% of silicon is produced in northeast India. Tata should establish a production unit in this region to take benefit of getting raw materials easily. All this raw material should be transported to places where Tata's Production units are placed.



Ultra Pure Water

Government data shows that states like Andhra Pradesh, Madhya Pradesh, Tamil Nadu and Maharashtra have adequate groundwater, so choosing Tamil Nadu for the UPW units will be a good option. It would be easy to transfer water to the main plant.

Sl. No.	States / Union Territories	Total Annual Replenishable Ground Water Resource(In Billion Cubic Meter)	Percentage with respect to Total Annual Replenishable Ground Water Resource
1	Andhra Pradesh (undivided)	35.89	8.3
2	Arunachal Pradesh	4.51	1
3	Assam	28.52	6.6
4	Bihar	29.34	6.8
5	Chhattisgarh	12.42	2.9
6	Tamil Nadu	21.53	5
7	Goa	0.24	0.1
8	Gujarat	18.57	4.3
9	Haryana	10.78	2.5
10	Himachal Pradesh	0.56	0.1
11	Jammu & Kashmir	4.25	1
12	Jharkhand	6.31	1.5
13	Karnataka	17.03	3.9
14	Kerala	6.69	1.5
15	Madhya Pradesh	35.04	8.1





Thank You

