Entry Strategies and Ecosystem Adaptation for Taiwanese Component/PC Firm (2 / 2)

INTRODUCTION

Following our previous report, *"Entry Strategies and Ecosystem Adaptation for Taiwanese Component/PC Firms,"* this 2026 Q1 update examines India's transition from a traditional assembly hub into a high-tech semiconductor powerhouse. Driven by labor costs roughly one-third of China's and strategic PLI schemes, India is successfully attracting landmark ATMP/OSAT projects from global leaders like Micron and Tata Electronics. This report analyzes how Taiwanese firms are shifting from simple assembly to sophisticated localization—leveraging technology transfers and joint ventures to navigate wage pressures and technical skill gaps within the evolving Indian ecosystem.

Key Coverage:

- **Cost Dynamics:** Comparative analysis of labor, energy, and infrastructure costs.
- **Semiconductor Evolution:** India's strategic shift from PC assembly to ATMP/OSAT.
- **Localization Strategies:** Case studies on Micron, Foxconn, and Pegatron.
- **Strategic Frameworks:** Evaluating PLI impacts and joint venture models for Taiwanese entrants.

4. Cost structure, competitiveness & localization economics

◆ ***Labor Cost***

- India offers a major labour cost advantage for electronics manufacturing, particularly in labour-intensive activities such as PC assembly, PCB assembly, and consumer electronics production, helping firms significantly reduce operating costs.
- Manufacturing wages in India are roughly $1.4–$3 per hour, compared with about $6–$7 per hour in China, providing a substantial cost advantage for global electronics companies expanding production in the country.

  (https://odrindia.in/economy/2025/09/22/indias-kit-and-assemble-economy-myths-metrics-and-dependencies-2014-2025/)

- A typical manufacturing laborer earns about ₹5.6 lakh annually (≈₹272/hour) in 2025, with entry-level manufacturing roles averaging about ₹4.2 lakh per year. (https://www.salary.com/research/in/manufacturing-laborer-salary)
- Electronics manufacturing salaries vary widely depending on skill level; industry hiring data shows ₹2.8–4.6 lakh/year for entry roles and up to ₹22–31 lakh/year for senior technical positions in electrical/electronic manufacturing.

  (foundit Insights Tracker - Oct'25 Trends)
- Large electronics clusters (Tamil Nadu, Karnataka, Uttar Pradesh) benefit from abundant semi-skilled labor pools and migration from other states, enabling large-scale assembly operations at relatively low cost.
- However, firms may face rising wage pressure and skill shortages in advanced electronics manufacturing (PCB design, semiconductor packaging, automation engineering), requiring investment in training and partnerships with technical institutes.

◆ ***Energy / Electricity Cost***

- Industrial electricity tariffs in India generally range between ₹6–₹8 per kWh depending on the state and voltage level, although the exact tariff varies by distribution company and industrial category. For example, Rajasthan approved an industrial energy charge of ₹6.50/kWh for large industrial consumers, while Tamil Nadu's industrial tariff was about ₹7.5/kWh in FY2026, illustrating the typical range across Indian states.
- Several Indian states provide electricity-related incentives to attract electronics manufacturers; for example, Uttar Pradesh's Electronics Manufacturing Policy offers 100% exemption from electricity duty for up to 10 years, while many manufacturers are increasingly adopting open-access renewable power procurement, which can lower electricity costs by around 10–25% compared with conventional grid tariffs (https://uplc.up.gov.in/en/article/up-electronics-manufacturing-policy https://www.mercomindia.com/open-access-solar-power-cheaper-than-grid
- Stable power supply is generally available in major electronics hubs (Bengaluru, Chennai, Noida), though smaller industrial areas may require backup generators or energy-storage systems.

◆ ***Land / Real Estate Cost***

- Industrial land prices in India vary widely depending on location and infrastructure; for instance, industrial plots in electronics hubs around Bengaluru, Chennai, and Hyderabad can cost roughly ₹1–3 crore per acre, whereas emerging manufacturing states such as Uttar Pradesh and Odisha offer industrial land at about ₹25–75 lakh per acre, providing

lower entry costs for greenfield electronics manufacturing projects. (https://www.india-briefing.com/news/; About Us - Invest India)

- Government-developed industrial parks under the Electronics Manufacturing Clusters (EMC 2.0) Scheme provide plug-and-play infrastructure such as roads, utilities, testing facilities, and common logistics services, which can reduce initial project costs by roughly 15–20% compared with standalone greenfield developments by sharing infrastructure and services among multiple firms. (https://emc2.stpi.in/; https://kpmg.com/in/en/blogs/2025/05/from-assemblers-to-innovators-indias-22919-cr-push-to-dominate-electronics-components.html)
- State incentives frequently include stamp-duty exemptions, land-lease subsidies, and discounted land allotments (often for 30–99-year leases), lowering initial capital expenditure for foreign investors.

◆ ***Utilities & Infrastructure Costs***

- Industrial parks often provide shared utilities—water treatment plants, effluent management systems, testing labs, and logistics infrastructure—reducing operating costs for electronics manufacturers.
- Logistics and transport costs remain moderately higher than in East Asian supply-chain hubs due to port congestion and inland freight distances, but improvements in highways, freight corridors, and port infrastructure are gradually lowering logistics costs.
- Proximity to major ports (Chennai, Mundra, Nhava Sheva) or airports (Bengaluru, Hyderabad) can significantly reduce lead times and export logistics expenses for electronics components and PC assemblies.
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■ **Currency Risk, Inflation, and Foreign-Exchange Constraints (India)**

◆ **Exchange-rate volatility**

- The Indian Rupee has shown gradual depreciation against the US Dollar in recent years, moving from roughly ₹74–75/USD in 2021 to around ₹82–93/USD during 2024–2026**.** These movements are influenced by oil prices, global interest-rate cycles, and foreign capital flows.
- Many electronics manufacturers in India import semiconductors, chipsets, display panels, and high-precision components priced in US dollars. When the rupee weakens, the rupee cost of imported components rises, directly increasing production costs for PC assembly and electronics manufacturing plants.

- A 5–10% depreciation of the rupee can significantly raise procurement costs if imports are large. For example, if a plant imports $100 million worth of components annually, even a ₹3–5 depreciation per USD can increase costs by hundreds of millions of rupees**.** **(**https://www.rbi.org.in/; https://www.imf.org/en/countries/ind)

◆ **Inflation: Moderate but persistent**

- India's consumer price inflation averaged about 4.6% in FY2024–25, remaining close to the 4% medium-term target set by the Reserve Bank of India, which operates within a 2–6% tolerance band. This relatively stable inflation environment helps maintain predictable input costs for manufacturing firms compared with many emerging markets. (https://www.pib.gov.in/PressReleasePage.aspx?PRID=2122148&reg=3&lang=2#:~:text=Posted%20On:%2016%20APR%202025,inflation%20rate%20since%20August%202019)
- Inflation in India is strongly influenced by food prices (around 45% weight in the CPI basket) and energy costs, meaning fluctuations in agricultural output, monsoon conditions, or global oil prices can temporarily push inflation higher.
- For electronics manufacturers, moderate inflation mainly affects wages, transportation, utilities, and logistics costs, rather than imported electronic components that are usually priced in foreign currencies.
- The Reserve Bank of India manages inflation through monetary policy tools such as repo rate adjustments and liquidity control, aiming to stabilize price levels and maintain macroeconomic stability for investors.

◆ **Foreign-Exchange Constraints**

- Foreign-exchange transactions in India are regulated under the Foreign Exchange Management Act (FEMA) and administered by the Reserve Bank of India. While most electronics manufacturing investments are allowed under the automatic FDI route, firms must comply with reporting requirements for capital inflows, external commercial borrowings, royalty payments, and profit repatriation.
- Multinational companies must complete periodic filings such as FC-GPR and FLA returns for foreign investment and ensure transactions follow RBI guidelines. These administrative requirements can increase compliance costs and require dedicated financial management.

- India imports a large share of semiconductors, display panels, and electronic components, which are typically priced in US dollars. This creates foreign-exchange exposure for manufacturers when paying overseas suppliers.
- Large capital inflows or outflows can affect exchange-rate stability. Electronics firms importing components or repatriating profits may face exchange-rate risks and transaction-cost fluctuations if global financial conditions change.
- Many multinational manufacturers operating in India manage foreign-exchange exposure by using hedging instruments (forward contracts or currency swaps), maintaining foreign-currency accounts, and gradually localizing supply chains to reduce dependence on imported components.

  (https://www.rbi.org.in/scripts/Fema.aspx; https://www.rbi.org.in/; https://www.investindia.gov.in/foreign-direct-investment-policy)

- **Break-even horizon and capital investment sizing**
  - **Capital Investment Scale Varies by Segment**
    Capital investment requirements differ significantly depending on the level of value addition in the electronics value chain—ranging from final product assembly to component manufacturing and semiconductor fabrication. Assembly-focused operations require relatively lower investment, while upstream component production demands significantly higher capital.
  - For example, stablishing a medium-scale PCB or PCBA manufacturing facility typically requires about US$1.5–3 million, covering SMT production lines, automated placement machines, reflow ovens, testing equipment, and clean-room infrastructure for electronics manufacturing.
  - Capital investment increases with higher production capacity, automation levels, and advanced PCB technologies (e.g., multilayer or HDI boards), as these require more sophisticated machinery and process controls.

    https://www.accio.com/plp/pcb-manufacturing-plant-cost-in-india

    https://www.gssmt-parts.com/what-is-the-cost-of-setting-up-a-pcb-smt-production-line.html

- **Capital Investment for Advanced Electrical and Electronics Manufacturing**
  - Large-scale manufacturing plants in electronics and electrical equipment sectors—such as multilayer PCB production, semiconductor packaging, power

electronics, and advanced electrical components—can require investments of about ₹1,500–3,700 crore (≈US$180–450 million) depending on technology level and production capacity.

- For example, a PCB manufacturing facility planned in Andhra Pradesh involves an investment of around ₹1,800 crore to expand domestic electronics component production.

- Such capital-intensive investments indicate that upstream electronics or electrical component manufacturing requires significantly higher investment than assembly operations**,** which many foreign firms initially adopt before expanding into higher-value manufacturing.

  https://www.imarcgroup.com/pcb-manufacturing-plant-project-report

- **Break-Even Period and Cost Competitiveness in Electronics Manufacturing**

  - Due to high fixed costs and the need to scale production, many electronics manufacturing projects in India reach operational break-even within 4–7 years, depending on production volumes, export demand, and localization levels.

  - Incentive programs such as the Production Linked Incentive Scheme (PLI) and the Electronics Manufacturing Clusters Scheme can shorten the break-even period by providing capital subsidies, infrastructure support, and performance-linked financial incentives.

  - Electronics plants generally become cost-competitive once large production volumes are achieved. High output allows firms to spread fixed costs (machinery, utilities, and labor training) across more units, improving profitability.

- **Incentives and Investment Support for Electronics Manufacturing**

  - India's electronics incentives, including the Electronics Component Manufacturing Scheme (ECMS) and Production Linked Incentive (PLI) schemes, reduce investment risk by providing financial support (e.g., 25% capital expenditure incentives in ECMS) and targeting over ₹59,000 crore to boost component production.

  - These policies foster domestic manufacturing, reduce payback periods, and have already attracted over ₹1.46 lakh crore in total investments.
    Incentives are directly linked to turnover and quality benchmarks (e.g., Six Sigma), ensuring that benefits are earned through operational performance.

  - These measures encourage high-value-added manufacturing rather than just assembly, driving up productivity and global competitiveness. PLI schemes have

already triggered over ₹1.61 lakh crore in investments and led to immense export growth, particularly in mobile phones and IT hardware.

- **Economies of scale thresholds needed to be viable**
    - Electronics manufacturing is highly capital-intensive, meaning firms must achieve large production volumes to spread fixed costs (machinery, tooling, utilities, and skilled labor training) across many units. Without sufficient scale, per-unit manufacturing costs remain high and profitability becomes difficult. (https://ipfonline.com/news/detail/industrynews/why-electronic-components-are-central-to-indias-electronics-ambitions/18601)
    - Rapid growth in production scale in India: India's electronics industry produced about ₹9.5 trillion worth of electronics in FY2023-24, nearly five times higher than a decade earlier, reflecting the importance of scaling production to achieve global competitiveness. (https://www.livemint.com/industry/electronics-pli-china-korea-taiwan-assembling-phones-manufacture-drones-wearables-boat-noise-foxconn-dixon-apple-xiaomi/amp-11750583664237.html)
    - Demand for electronics components and sub-assemblies in India was about US$45.5 billion supporting US$102 billion of electronics production, and is expected to reach US$240 billion by 2030 as the country aims for US$500 billion in electronics manufacturing output. This expanding market allows manufacturers to reach viable scale more quickly. (https://timesofindia.indiatimes.com/business/india-business/indias-electronic-manufacturing-may-reach-500-billion-by-2030-cii-report/articleshow/111208232.cms?)

- As of early 2026, India's electronics manufacturing sector has scaled significantly, with production growing six-fold since 2014-15 to reach ₹11.3 lakh crore (approx. USD 136 billion) in FY 2024-25. (https://www.ibef.org/news/electronics-manufacturing-has-grown-sixfold-and-exports-have-grown-eightfold-in-the-last-11-years#:~:text=Over%20the%20past%2010%20years,largest%20export%20category%20for%20India)

  Entering India through high-volume segments such as mobile phones, IT hardware, consumer electronics, and PCBA manufacturing helps companies reach economies of scale faster and benefit from government incentives and a growing domestic market. For

Taiwanese companies, achieving viability requires navigating high-volume PLI thresholds and localizing components.

■ Cost of quality assurance, rework, and yield management

For Taiwanese electronics firms entering India, optimizing costs is critical as India focuses on strengthening quality standards (STQC) and indigenous manufacturing under PLI schemes. Key cost drivers include investing in local quality testing, managing higher initial rework due to skill gaps, and improving yield through localization of component sourcing.

- India is strengthening technology quality standards through the Standardisation Testing and Quality Certification Directorate (STQC) under the Ministry of Electronics and Information Technology. Companies must ensure products comply with certification requirements such as those issued by the BIS before selling in the Indian market.

- Firms often incur expenses for product testing, certification documentation, and regulatory approvals**,** which may involve either accredited third-party laboratories or internal compliance teams. Many manufacturers establish in-house testing laboratories to reduce long-term costs, avoid high third-party testing fees, and minimize delays caused by shipping products to external testing facilities.

  https://www.stqc.gov.in/

  https://www.bis.gov.in/?lang=hi

- During the early stages of production setup, firms may experience higher rework and scrap costs—estimated at about 5–10% higher than mature manufacturing sites in Taiwan—mainly due to workforce training curves and process stabilization. Implementing technologies such as Automated Optical Inspection (AOI) can significantly reduce defect rates and rework expenses despite higher initial capital investment.

- To improve production yields, many companies are increasingly transitioning from imported components to local sourcing (2024–2025 trend). Local sourcing helps reduce supply-chain disruptions, shipping delays, and damage during transportation.

- Yield management investments often focus on training local engineers, strengthening supplier quality systems, and stabilizing supply chains, which over time lowers defect rates and reduces the overall cost per unit.

  https://www.mckinsey.com/industries/industrials/our-insights

  https://www.electronics.org/

https://www.investindia.gov.in/about

5. Partnership models: JVs, acquisitions, contract manufacturing, or greenfield

Partnership Models for Market Entry in India

Joint Ventures (JV)

- Foreign firms collaborate with Indian manufacturers to share capital, technology, and production infrastructure while creating a new entity. This model helps companies reduce entry risks and leverage local supply chains and regulatory knowledge.
- For example, in 2025 a joint venture between Foxconn and HCL Group received approval for a semiconductor assembly and testing plant worth about ₹3,706 crore (≈US$435 million) in Uttar Pradesh, highlighting growing India–Taiwan collaboration. (https://www.reuters.com/world/india/india-approves-hcl-foxconn-joint-venture-semiconductor-unit-2025-05-14/)

Pros and Cons of Joint Ventures with Indian EMS / OEM Firms

Pros

- *Faster market entry and local ecosystem access*

  Partnering with established Indian EMS or OEM firms allows foreign companies to quickly access manufacturing infrastructure, supplier networks, and regulatory approvals, reducing entry barriers compared with building a new plant.

- *Shared investment and reduced risk*

  Joint ventures allow partners to share capital investment, operational costs, and project risks, which is particularly useful in capital-intensive sectors such as electronics and semiconductor production.

- *Technology collaboration and supply-chain localization*

  India is increasingly promoting technology transfer partnerships with foreign firms, including Taiwanese companies, to strengthen domestic component manufacturing and supply chains.

  (https://optimatech.net/advantages-disadvantages-of-electronic-manufacturing-services-india-vs-china/)

Cons

- *Management and cultural differences*

Differences in corporate culture, management style, and decision-making priorities between partners can slow strategic decisions and create operational conflicts.

- *Intellectual property and control concerns*

  Foreign firms may face risks related to technology sharing, confidentiality, and partial loss of operational control, since major decisions must be jointly approved.

- *Complex governance and exit challenges*

  Joint ventures involve shared governance structures and contractual obligations, making it harder to exit or restructure the partnership if business objectives change.

  (https://plutuseducation.com/blog/top-10-joint-venture-companies-in-india/)

Acquisition or minority stake in existing local firms

- Acquiring or investing in an existing Indian EMS or OEM firm provides immediate access to manufacturing facilities, workforce, supplier networks, and regulatory approvals**.** This avoids the long timelines involved in building a greenfield plant (often 18–36 months).
- A minority stake (10–49%) allows foreign companies to test the Indian market while limiting financial exposure. It also helps understand local supply chains, labour laws, and state-level incentives before committing larger investments.
- Local firms already participating in schemes like the PLI can help foreign investors quickly qualify for subsidies and tax benefits offered by the Government of India to boost electronics manufacturing.
- Foreign electronics manufacturers can introduce advanced manufacturing processes, automation technologies, and product design capabilities, while Indian partner firms contribute local market knowledge, regulatory familiarity, and established distribution networks.
- This collaboration can lead to higher value-added manufacturing in India, particularly in sectors such as smartphones, PC components, and semiconductor assembly and testing.
- Several global electronics supply-chain companies have expanded their presence in India as part of the China+1 diversification strategy and to benefit from incentives under the Production Linked Incentive Scheme.
- India’s electronics production exceeded $115 billion in FY2024, with exports surpassing $29 billion, making acquisitions or equity investments in local EMS firms increasingly attractive for foreign investors.

https://www.ibef.org/industry/electronics-system-design-manufacturing-esdm

https://www.investindia.gov.in/team-india-blogs/top-seven-esdm-clusters-india-foreign-electronics-investment

India–Taiwan partnerships in the electronics and semiconductor sector

Taiwanese Company	Indian Partner	Type of Investment	Stake Structure	Sector / Project	Strategic Purpose
Foxconn	Vedanta Limited	Joint Venture	~40% Foxconn	Semiconductor manufacturing project	Enter India's semiconductor manufacturing sector and share capital risk
Foxconn	HCL Group	Joint Venture	~40% Foxconn	OSAT semiconductor packaging & testing	Build semiconductor assembly ecosystem in India
Pegatron	Tata Electronics	Partial acquisition / JV restructuring	60% Tata, 40% Pegatron	iPhone assembly plant in Tamil Nadu	Scale smartphone manufacturing and strengthen Apple supply chain
Inventec	Dixon Technologies	Joint Venture	40% Inventec, 60% Dixon	Manufacturing laptops, PCs and servers	Expand IT hardware manufacturing under "Make in India"
Powerchip Semiconductor Manufacturing	Tata Electronics	Joint Venture	Strategic partnership	Semiconductor fabrication plant in Gujarat	Establish India's domestic chip manufacturing

Taiwanese Company	Indian Partner	Type of Investment	Stake Structure	Sector / Project	Strategic Purpose
Corporation					ecosystem
Allegiance International	Government of Karnataka	Strategic investment partnership	Project investment (~₹1000 crore)	Indo-Taiwan Industrial Technology Innovation Park	Attract Taiwanese electronics and semiconductor firms to India

Sources:

https://hcl.com/media_management/hcl-group-and-hon-hai-technology-group-foxconn-join-hands-to-set-up-semiconductor-manufacturing-unit-in-uttar-pradesh/

https://www.taiwannews.com.tw/news/5973634

https://www.business-standard.com/companies/news/dixon-inventec-form-joint-venture-to-manufacture-pcs-and-servers-in-india-125050100837_1.html

https://telecom.economictimes.indiatimes.com/news/devices/taiwans-allegiance-invests-1000-crore-in-karnatakas-semiconductor-park/125798735

Contract manufacturing / outsourcing vs owning facilities

- Outsourcing electronics manufacturing to EMS provides helps firms reduce operational costs, utilize existing infrastructure, and scale production efficiently. EMS firms also manage supply chains, component sourcing, and production processes, enabling faster product launches and improved time-to-market.
- Contract manufacturers provide integrated solutions including design, manufacturing, testing, and supply-chain management, allowing OEMs to focus on product innovation and marketing.
- Outsourcing manufacturing can expose firms to intellectual property risks, as external partners gain access to proprietary designs and technologies.
- Maintaining consistent production quality and oversight can also be challenging when relying on third-party manufacturers.

- India's electronics manufacturing sector is expanding rapidly as global firms diversify supply chains away from China and increase production in India.
- The EMS sector is growing strongly, supported by demand for high-volume electronics production and government manufacturing incentives.

Electronics Manufacturing Outsourcing and Market Trends

- Outsourcing electronics manufacturing to EMS providers helps firms reduce operational costs, use existing infrastructure, and scale production quickly. The global EMS market was valued at about $580–600 billion in 2024 and is projected to exceed $800 billion by 2030, reflecting strong demand for outsourced manufacturing and supply-chain management.

  https://www.marketresearchfuture.com/reports/intelligent-pills-market-1032

- Contract manufacturers often provide integrated solutions such as design, manufacturing, testing, and supply-chain management. Industry reports show that over 70% of electronics OEMs outsource at least part of their manufacturing operations to EMS providers to focus on product development and marketing. https://www.deloitte.com/us/en/insights/industry/manufacturing/global-manufacturing-outlook.html

- Outsourcing manufacturing can expose firms to intellectual property risks, since external partners may access proprietary designs and technologies. Surveys indicate that around 40–50% of companies cite IP protection as a major concern when outsourcing manufacturing globally.

  https://www.deloitte.com/us/en/services/consulting/articles/global-outsourcing-survey.html

- Taiwanese electronics companies are increasingly expanding manufacturing in India as part of a supply-chain diversification strategy beyond China. India's electronics production crossed about $115 billion in FY2024, up from around $48 billion in FY2017, indicating strong growth and making the country an attractive destination for Taiwanese firms seeking new manufacturing bases.

  https://www.ibef.org/industry/electronics-system-design-manufacturing-esdm

Contract manufacturing / outsourcing vs. owning facilities

- Partnering with local EMS providers allows firms to start production quickly without building factories. The global EMS market was about $600 billion in 2024 and is expected to exceed $1 trillion by 2032, showing the growing importance of outsourced electronics manufacturing.

  https://www.fortunebusinessinsights.com/press-release/global-electronic-manufacturing-services-ems-market-10943

- Asia–Pacific accounts for around 45% of the global EMS market, and India is among the fastest-growing electronics manufacturing locations, making it attractive to begin with contract manufacturing partnerships before transitioning to owned facilities as local demand and supply chains mature.

  https://www.marketresearchfuture.com/reports/electronic-manufacturing-services-market/market-size

- Modern EMS firms provide design, prototyping, assembly, testing, and logistics services, enabling electronics companies to focus on innovation and marketing while outsourcing production operations. Over 55% of OEMs globally rely on outsourced manufacturing to reduce operational complexity.

  https://www.globalgrowthinsights.com/market-reports/electronics-manufacturing-services-ems-market-121352

- Establishing wholly owned plants offers greater control over quality, intellectual property, and advanced technologies, which is important for high-value sectors such as semiconductors or precision electronics. However, this approach requires significant capital investment and longer setup timelines compared with contract manufacturing.

- India’s electronics manufacturing market is growing rapidly.
  India’s electronics production has expanded from about $48 billion in 2017 to around $115 billion in FY2024, making it one of the fastest-growing manufacturing ecosystems and an attractive destination for foreign electronics investors.

Risk sharing through joint ventures and partnerships

- Joint ventures and strategic partnerships help companies share investment costs, technology development expenses, and market-entry risks when expanding into new countries.

- For electronics companies entering India, collaborating with local firms can reduce the capital required for manufacturing facilities while providing access to established supply chains, distribution networks, and knowledge of regulatory and labour frameworks. This model is particularly beneficial in electronics manufacturing and semiconductor sectors, where initial investments and operational risks are relatively high.
- However, cross-border collaborations also face challenges such as geopolitical uncertainty, supply-chain disruptions, and coordination between partners. According to a study by Boston Consulting Group, only about 23% of executives believe they are fully prepared to manage geopolitical and operational risks in joint ventures, highlighting the importance of strong governance structures and risk-management frameworks.
- To mitigate these risks, companies entering India often establish clear governance mechanisms and partnership agreements. Well-defined roles, transparent decision-making processes, and formal dispute-resolution mechanisms help ensure balanced decision-making and effective management of financial, operational, and strategic risks in collaborative ventures.

  https://www.bcg.com/ja-jp/publications/2024/steering-joint-ventures-through-geopolitical-storms

  Governance structures critical for cross-border collaborations

- Clear governance frameworks—such as joint management committees, defined decision-making authority, and transparent reporting systems—help partners coordinate strategy, manage operational risks, and reduce conflicts in joint ventures. These mechanisms ensure that both partners have clarity over responsibilities, financial commitments, and performance monitoring.
- Geopolitical and operational risks are influencing joint-venture governance models. According to research by Boston Consulting Group, about 33% of companies globally are reconsidering, restructuring, or renegotiating their joint-venture arrangements due to geopolitical uncertainty, regulatory challenges, and supply-chain disruptions. This highlights the growing need for adaptable governance frameworks in international partnerships.

  Clear governance mechanisms also improve accountability and long-term collaboration outcomes. Establishing formal oversight structures, dispute-resolution mechanisms, and regular partner reviews can help maintain alignment between partners and support sustainable operations in cross-border ventures.
  https://www.bcg.com/ja-jp/publications/2024/steering-joint-ventures-through-geopolitical-storms

Clear intellectual property (IP) ownership agreements

- Background IP refers to the pre-existing technology, patents, or know-how that each partner brings into a partnership, while foreground IP refers to new technologies or innovations developed during the collaboration. Clearly defining these rights helps avoid disputes and ensures each partner retains control over its core technologies.
- Ambiguous IP ownership in international technology partnerships can lead to loss of control over proprietary innovations. In cross-border agreements, unclear clauses regarding deliverables, derivative works, or licensing rights may result in unintentional transfer of intellectual property or unauthorized use by partners, which can weaken a company's competitive advantage.
- Structured IP agreements are particularly important in electronics and semiconductor collaborations. Legal frameworks typically specify ownership rights, licensing terms, and usage restrictions for jointly developed technologies, and may limit joint ownership to prevent commercialization conflicts across jurisdictions.
- For Taiwanese electronics companies entering India, establishing strong IP governance mechanisms—such as detailed technology-transfer agreements, clearly defined licensing structures, and strict confidentiality clauses—can help protect proprietary manufacturing processes, chip designs, and advanced production technologies while still enabling effective collaboration with Indian partners in joint ventures or contract manufacturing arrangements.

https://www.mayerbrown.com/en/insights/publications/2025/10/cross-border-tech-deals-safeguarding-innovation-without-slowing-the-business

https://lawsquare.in/strategic-alliances-in-technology-addressing-ip-ownership-and-licensing-challenges/

Case studies of successful foreign entrants in India's electronics sector

- **Apple Inc.**

- Apple began assembling iPhones in India in 2017, initially through partners like Foxconn, Pegatron, and Wistron.
- Production expanded rapidly under the PLI scheme, rising from about $2 billion in FY2022 to about $22 billion in FY2025. (https://timesofindia.indiatimes.com/technology/tech-news/india-sets-new-record-for-iphone-exports-and-its-in-billions-and-with-iphone-17-it-may-add-another-billion/articleshow/124507581.cms)

- iPhone exports reached about $23 billion in 2025, making smartphones India's largest export category for the first time. (https://economictimes.indiatimes.com/industry/cons-products/electronics/indias-iphone-exports-hit-23-billion-in-2025-as-smartphones-become-top-export-segment/articleshow/128687555.cms)
- Apple's ecosystem has created around 175,000 direct jobs in India through suppliers and manufacturing partners. (https://government.economictimes.indiatimes.com/news/economy/apple-hits-1-lakh-crore-worth-iphone-exports-from-india-in-2024-industry/117200003)
- Success factors: contract manufacturing partnerships, export-oriented production, and supply-chain diversification from China.

2. Samsung Electronics

- Samsung established its Noida smartphone factory in 2018, one of the largest mobile phone manufacturing plants in the world.
- The plant significantly expanded India's smartphone production capacity and serves both domestic and export markets.
- In recent years, Apple and Samsung together accounted for about 94% of India's smartphone exports, showing the dominance of foreign entrants in the sector. (https://www.reuters.com/world/china/india-plans-fresh-incentives-phone-production-boost-apple-samsung-2026-03-12/)
- Success factors: strong domestic market demand, export-oriented production strategy, and large manufacturing scale.

3. Foxconn

- Foxconn has been assembling electronics in India since the mid-2010s, primarily for Apple products.
- It is now one of the largest electronics manufacturing investors in India, operating large facilities in Tamil Nadu and Karnataka.
- Foxconn accounts for about half of India's iPhone export shipments, highlighting its key role in the country's electronics supply chain.
- It plays a major role in Apple's India supply chain; in FY2024–25 Apple's iPhone production in India surged 60% to ₹1.89 lakh crore, with about ₹1.5 lakh crore worth of

exports, and Foxconn's Tamil Nadu facility accounted for nearly 50% of the overseas shipments from India.

- Success factors: global supply-chain integration, long-term partnerships with global brands, and access to government incentives.

  https://www.ndtv.com/india-news/production-of-apple-iphones-in-india-surges-60-to-rs-1-89-lakh-crore-in-2024-25-8153872?utm

4. Pegatron

- Pegatron, a major Taiwanese contract manufacturer and Apple supplier, began iPhone assembly operations in Tamil Nadu in 2022 as part of Apple's supply-chain diversification strategy beyond China. The facility produces around 4–5 million iPhones annually and employs roughly 9,000–10,000 workers, contributing to both domestic supply and exports. (https://economictimes.indiatimes.com/tech/technology/tata-electronics-seals-deal-for-60-stake-in-pegatron-tamil-nadu-iphone-plant/articleshow/115392580.cms)

- In 2025, Tata Electronics acquired a 60% stake in Pegatron Technology India, forming a strategic partnership in which Tata provides local manufacturing scale and supply-chain integration while Pegatron contributes technical expertise and operational management. (https://timesofindia.indiatimes.com/business/india-business/tatas-buy-60-in-pegatrons-india-unit-for-iphone-plant/articleshow/117538860.cms)

- Pegatron's plant accounts for around 10–12% of India's iPhone export shipments, making it an important part of Apple's growing manufacturing ecosystem in India alongside Foxconn and Tata Electronics. (https://www.ndtv.com/india-news/production-of-apple-iphones-in-india-surges-60-to-rs-1-89-lakh-crore-in-2024-25-8153872)

- Success factors: partnership with a local industrial group, integration into Apple's global supply chain, and leveraging India's manufacturing incentives and export growth.

5. Micron Technology

- Micron Technology announced a $2.75 billion semiconductor assembly and testing facility in Sanand, Gujarat, one of the first major semiconductor manufacturing investments in India under the government's semiconductor incentive program.

(https://timesofindia.indiatimes.com/gadgets-news/microns-2-75-billion-semiconductor-plant-construction-begins-in-gujarat/articleshow/103921152.cms)

- The project is expected to create around 5,000 direct jobs and about 15,000 indirect jobs, while supporting the development of India's semiconductor packaging, testing, and supply-chain ecosystem.
- The facility will initially focus on assembly, testing, marking, and packaging (ATMP) of memory chips used in electronics such as smartphones, servers, and automotive systems, strengthening India's role in global semiconductor supply chains.

Key takeaways

- The experiences of companies such as Apple Inc., Samsung Electronics, Foxconn, Pegatron, and Micron Technology show that India has emerged as a significant manufacturing destination for global electronics firms seeking to diversify supply chains beyond China.
- Successful entrants typically adopted collaborative manufacturing models, including contract manufacturing partnerships, joint ventures, or strategic alliances with local firms, which helped reduce initial investment risks and accelerate market entry.
- Government initiatives such as the Production Linked Incentive (PLI) scheme have played a crucial role in attracting foreign investment, supporting large-scale manufacturing, boosting exports, and strengthening India's electronics and semiconductor ecosystem.
- These cases suggest that Taiwanese electronics companies can benefit from partnerships with local firms, leveraging India's incentives, and integrating into global supply chains, enabling them to scale production while managing operational and market-entry risks effectively.