Case Study (SMP program) by Prof. Aalok Kumar

1. **Background:** Apex-Tech Manufacturing Ltd., headquartered in Pune, India, is a mid-sized manufacturer of smart consumer electronic devices. Founded in 2011, Apex-Tech has grown rapidly due to the surge in demand for Internet of Things (IoT) products across Indian and Southeast Asian markets. Its product portfolio includes smart thermostats, wearable health trackers, AI-enabled kitchen appliances, and Bluetooth home security systems. By 2024, the company had reached an annual turnover of INR 650 crore with around 1200 employees across manufacturing, logistics, product design, sales, and support functions. The company operates a vertically integrated supply chain, owning most parts of its production and distribution systems from sourcing components to final product delivery. The key dataset is given below.

Operational metric	In-House (Pune)	Assembly Outsourced (Vietnam)	Full Supply Chain Outsourced (Malaysia)
Annual Fixed Cost (INR Cr)	25	15	10
Variable Cost per Unit (INR)	150	180	210
Average Lead Time (Days)	5	10	18
Defect Rate (%)	1.5	2.5	3.2
Maximum Monthly Capacity	50,000 units	75,000 units	100,000 units
Inventory Holding Cost (%)	12%	8%	6%
Responsiveness (1-5 scale)	4.5	3.2	2.8
Flexibility Score (1-5 scale)	4.2	3.8	3.0

The following key functions are given below.

A. Operations & Manufacturing Function

The Operations division is headquartered in Pune and currently runs a 200,000 sq. ft. manufacturing facility, which houses both component assembly and final product packaging lines. The plant operates in two shifts and has a monthly production capacity of around 50,000 units.

Key responsibilities of the operations team include:

- Inbound logistics coordination for imported electronic components from Taiwan and South Korea.
- Production planning for batch-based manufacturing (make-to-stock).
- Assembly line scheduling and labor management (300 shop-floor workers).
- Inventory control using a semi-automated ERP.

- Packaging and dispatch to distribution centres.

Despite its legacy systems and experienced team, the operations team is increasingly strained by:

- Capacity bottlenecks during peak seasons (Diwali, New Year sales).
- Increased labor costs, especially for skilled electronics assembly technicians.
- Frequent rework needs due to manual component fitting.
- High dependency on local subcontractors for overflow orders.

The plant runs at 85–90% utilization, but downtime and defect rates are increasing as product variants multiply.

B. Procurement & Supply Chain Function

The Supply Chain department manages vendor relationships, sourcing, inventory, warehousing, and outbound distribution. Key supply chain features include:

- Global sourcing of high-value components such as chips, sensors, and PCBs from suppliers in Taiwan, China, and Japan.
- Local sourcing of plastic casings, wires, screws, and packaging material from vendors within Maharashtra and Gujarat.
- Just-in-time inventory model for costly imported items, while holding a 3-week buffer for locally sourced materials.
- Inbound shipping through Mumbai Port and distribution through a centralized warehouse near Pune.

The key supply chain challenges include:

- Rising import tariffs and customs delays.
- High freight costs for air shipments when production is delayed.
- Poor demand forecasting accuracy (avg. forecast error ~25%).
- High inventory holding costs due to safety stock for variable lead times.

Currently, Apex-Tech uses a hybrid inventory model, combining centralized inventory control with regional dispatch for bulk orders to major e-commerce platforms and retail partners.

C. Product Design and Innovation Function

The Product Innovation Division (PID) is a core competency of Apex-Tech. It consists of 80 professionals, including hardware designers, embedded software engineers, and user experience (UX) teams. This division reports directly to the Chief Innovation Officer (CIO) and plays a key role in Apex-Tech's market differentiation.

Key processes and capabilities include:

- In-house prototyping and testing lab for new devices.
- Rapid iteration cycles using Agile Scrum methodology.

- Close collaboration with third-party app developers.
- Intellectual Property management (12 product patents filed).

However, the design team often faces delays in new product launches due to a mismatch between design complexity and manufacturing readiness. Many innovations are design-led, but the manufacturing team struggles to adapt production lines without significant downtime or quality issues.

This is causing increasing friction between R&D and operations and has led to executive-level discussions about whether outsourcing might make manufacturing more responsive and scalable.

D. Finance and Cost Structure

From a cost standpoint, ApexTech's current operating structure includes:

- Annual fixed overheads of INR 25 crore, including salaries, utilities, depreciation, and administrative costs.
- Per-unit variable cost of around INR 150, covering material, labor, energy, and packaging.
- Inventory carrying cost of 12% per annum.
- Monthly logistics cost of around INR 1 crore for both inbound and outbound freight.

Financial analysts at ApexTech estimate that outsourcing final assembly to a contract manufacturer in Vietnam could reduce fixed costs by 40%, while outsourcing the full supply chain (procurement + assembly + logistics) to a Malaysian third-party logistics (3PL) firm could cut fixed overheads by 60%.

However, these benefits come at the cost of increased variable costs (per unit cost rising to INR 180–210), longer lead times, and reduced responsiveness to rapid changes in market demand.

E. Human Resource and Culture

ApexTech has cultivated a strong engineering-driven culture with a commitment to product quality and problem-solving. The company has a relatively flat hierarchy, and decision-making is collaborative at the senior level. The company values:

- Control over quality.
- Operational transparency.
- Responsiveness to customer feedback.

Outsourcing parts of operations could impact workforce morale, especially in the operations team, and may result in resistance to change. HR is already raising concerns about the impact of layoffs and transitioning jobs offshore.

2. Strategic Decision Making Context

In the face of intensifying competition and demand volatility, the Board has asked the CEO and senior executive team to evaluate ***three*** strategic options:

Option 1: Retain Full In-House Manufacturing

- Pros: High control, high responsiveness, lower defect rate, aligns with company culture.
- Cons: High-cost structure, limited scalability, over-reliance on internal capacity.

Option 2: Outsource Final Assembly to Vietnam

- Pros: Reduced fixed cost, increased monthly capacity, moderate control retained.
- Cons: Higher per-unit cost, longer lead times, moderate defect risk, dual coordination burden.

Option 3: Outsource Full Supply Chain to Malaysian 3PL

- Pros: Major cost reduction, high scalability, vendor handles end-to-end logistics.
- Cons: Low control, high lead time, highest defect rate, cultural alignment challenges.

The decision must be made in the next quarter as the company prepares to launch a new line of AI-integrated kitchen appliances by Q3.

3. Decision Imperatives

ApexTech's executive team must now balance:

- Cost reduction vs. control
- Quality vs. scalability
- Responsiveness vs. efficiency
- Strategic autonomy vs. operational dependency

Please discuss below decision dilemma and suggest appropriate solution.

Q1. How should Apex-Tech balance short-term cost savings from outsourcing with long-term strategic capabilities like innovation, quality control, and supply chain agility?

Q2. What operational and geopolitical risks does Apex-Tech face in outsourcing to Southeast Asia, and how can the company build resilience into its supply chain?

Q3. How will outsourcing impact internal stakeholders such as operations teams, engineers, and HR and what change management strategies are necessary?

The following assumption you can consider:

- Annual production volume = 600,000 units
- Assume average cost of rework = ₹100/unit
- Any other assumptions relevant to case