**Cost Analysis of Implementing TAV-Cart Technology in a Shopping Mart**

**Initial Costs**

**1. TAV-Cart Development and Production**

Cost per TAV-Cart: ₹ 15,000

Number of Carts Required: 50

Total Cost for Carts: ₹ 50,000 x 20 = ₹ 7,50,000

**2. Charging Stations Installation**

Cost for Charging Stations: ₹ 2,00,000

**3. Training and Integration Costs**

Training Staff: ₹ 50,000

Integration with Existing Systems: ₹ 1,00,000

**Total Initial Costs**

Total Initial Costs: ₹ 7,50,000 (carts) + ₹ 2,00,000 (charging stations) + ₹ 50,000 (training) + ₹ 1,00,000 (integration) = ₹ 11,00,000

**Annual Maintenance Costs**

Maintenance per Cart per Year: ₹ 5,000

Total Annual Maintenance Cost for 50 Carts: ₹ 5,000 x 50 = ₹ 2,50,000

**Savings from Reduced Labor and Operational Costs**

**1. Labor Cost Savings**

* Reduction in Cashier Salaries
  + Number of Cashier Counters Reduced: 5
  + Cashiers per Counter: 2 (one for each shift)
  + Annual Salary per Cashier: ₹ 1,80,000
  + Total Salary Savings for Cashiers: ₹ 1,80,000 x 2 x 5 = ₹ 18,00,000
* Reduction in Bagger Salaries
  + Baggers per Counter: 1
  + Annual Salary per Bagger: ₹ 1,44,000
  + Total Salary Savings for Baggers: ₹ 1,44,000 x 5 = ₹ 7,20,000

Total Labor Cost Savings: ₹ 18,00,000 (cashiers) + ₹ 7,20,000 (baggers) = ₹ 25,20,000

**2. Reduction in Operational Costs**

Annual Operational Cost per Counter: ₹ 24,000

Total Operational Cost Savings for 5 Counters: ₹ 24,000 x 5 = ₹ 1,20,000

**3. One-Time Equipment Cost Savings**

Cost per POS System: ₹ 50,000

Total Equipment Cost Savings for 5 Counters: ₹ 50,000 x 5 = ₹ 2,50,000

**Total Savings**

Annual Savings from Reduced Labor and Operational Costs: ₹ 25,20,000 (labor) + ₹ 1,20,000 (operational) = ₹ 26,40,000

One-Time Savings from Equipment Costs: ₹ 2,50,000

**Net Savings Calculation**

**1. Year 1 Savings**

Total Initial Savings: ₹ 26,40,000 (annual savings) + ₹ 2,50,000 (one-time equipment savings)

Total Initial Costs: ₹ 11,00,000

Annual Maintenance Costs: ₹ 2,50,000

Net Savings in Year 1: ₹ 26,40,000 + ₹ 2,50,000 - ₹ 11,00,000 ₹ 2,50,000 = ₹ 15,40,000

**2. Year 2 and Beyond Savings**

Annual Savings: ₹ 26,40,000

Annual Maintenance Costs: ₹ 1,00,000

Net Annual Savings from Year 2 Onwards: ₹ 26,40,000 ₹ 1,00,000 = ₹ 25,40,000

**Summary**

Total Initial Costs: ₹ 11,00,000

Total Initial Savings: ₹ 28,90,000

Net Savings in Year 1: ₹ 15,40,000

Net Annual Savings from Year 2 Onwards: ₹ 25,40,000

The retail store will start earning the profits in the initial year of implementation.

Implementing the TAV-Cart technology leads to substantial cost savings, primarily from reduced labor and operational expenses. The initial investment is quickly recovered, resulting in significant ongoing savings for the shopping mart.

**Cost Analysis for Implementing RFID-based Ecosystem in a Retail Store in India**

**1. Cost of Making Smart Carts**

Components (RFID Reader, Display, Battery, etc.): ₹ 20,000

Manufacturing and Assembly: ₹ 10,000

Total Cost per Cart: ₹ 30,000

Number of Carts: 50

Total Cost for Carts: 50 x 30,000 = ₹ 15,00,000

**2. Cost of RFID Tags for Products**

Cost per RFID Tag: ₹ 10

Number of Items: 10,000

Total Cost for Tags: 10,000 x 10 = ₹ 1,00,000

**3. Cost of RFID Readers**

* **Fixed RFID Readers:**
  + Cost per Reader: ₹ 1,00,000
  + Number of Readers: 10
  + Total Cost for Fixed Readers: 10 x 1,00,000 = ₹ 10,00,000
* **Handheld RFID Readers:**
  + Cost per Reader: ₹ 50,000
  + Number of Readers: 5
  + Total Cost for Handheld Readers: 5 x 50,000 = ₹ 2,50,000

**4. Software and Infrastructure**

RFID Middleware and Management Software: ₹ 15,00,000

Network Infrastructure Upgrades: ₹ 5,00,000

Integration with Existing Systems: ₹ 10,00,000

Total Cost for Software and Infrastructure: ₹ 30,00,000

**5. Maintenance and Training**

Annual Maintenance: ₹ 5,00,000

Training for Staff: ₹ 1,50,000

Total Maintenance and Training Cost: ₹ 6,50,000

**6. Contingency**

Unforeseen Costs (10% of total): 55,00,000 \* 10% = ₹ 5,00,000

**Total Initial Implementation Cost**

Smart Carts: ₹ 15,00,000

RFID Tags: ₹ 1,00,000

RFID Readers: ₹ 12,50,000

Software and Infrastructure: ₹ 30,00,000

Maintenance and Training: ₹ 6,50,000

Contingency: ₹ 5,00,000

Total Initial Cost: ₹ 70,00,000

**Potential Savings and Profit Analysis**

**1. Operational Savings**

Savings due to automated checkouts: ₹ 12,00,000 per year

Reduction in Shrinkage (Theft/Loss):

Improved inventory control: ₹ 8,00,000 per year

Total Operational Savings: ₹ 20,00,000 per year

**2. Increased Sales**

Enhanced Customer Experience:

Potential increase in sales due to better customer satisfaction: ₹ 10,00,000 per year

**3. Total Annual Benefits**

Total Savings and Increased Sales: ₹ 30,00,000 per year

**4. Annual Costs**

Maintenance and Training: ₹ 6,50,000

Depreciation of Equipment (20% of total initial cost): 70,00,000 \* 20% = ₹ 14,00,000

Total Annual Costs: ₹ 20,50,000 per year

**Total Profit/Loss Per Year**

Total Annual Benefits: ₹ 30,00,000

Total Annual Costs: ₹ 20,50,000

Net Profit: ₹ 30,00,000 - ₹ 20,50,000 = ₹ 9,50,000 per year

**Net Profit Analysis**

**Year 1**

Initial Cost: ₹70,00,000

Annual Benefits: ₹30,00,000

Annual Costs: ₹20,50,000

Net Profit/Loss: ₹30,00,000 - ₹20,50,000 = ₹9,50,000

Net Saving Year 1: -₹70,00,000 + ₹9,50,000 = -₹60,50,000

**Year 2 Onwards**

Annual Benefits: ₹30,00,000

Annual Costs: ₹20,50,000

Net Profit: ₹30,00,000 - ₹20,50,000 = ₹9,50,000 per year

Net Saving Year 2 Onwards: ₹9,50,000 per year

**Summary**

Initial Implementation Cost: ₹70,00,000

Annual Benefits (Savings + Increased Sales): ₹30,00,000

Annual Costs: ₹20,50,000

Net Annual Profit: ₹9,50,000

Net Saving Year 1: -₹60,50,000

Net Saving Year 2 Onwards: ₹950,000 per year

By Year 8 the initial cost will be covered and the retail store will start earning the profits

Implementing an RFID-based ecosystem in a retail store incurs high initial costs, but the annual savings and increased sales result in a positive net annual profit from Year 2 onwards.