

# Business Analyst

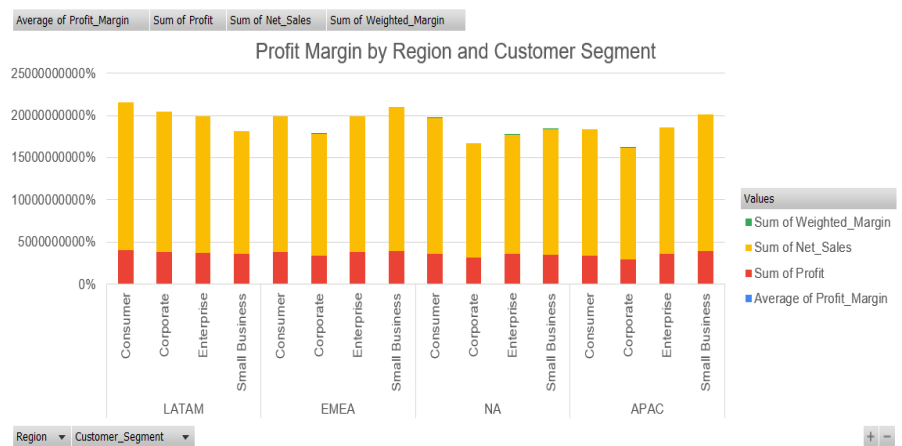
Task Code : TW-TSK-BA-25-01

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## Problem 1: Profitability Analysis by Segment & Region

### 1.1 — Which region × customer-segment has the highest profit margin?

Sum of Net_Sales	Sum of Weighted_Margin
₹ 64,90,54,180.57	117.9025951
₹ 17,48,51,435.39	29.29848787
₹ 16,62,22,361.16	31.25636634
₹ 16,15,56,978.46	27.72872167
₹ 14,64,23,405.56	29.61901918
₹ 63,72,93,022.50	115.2429421
₹ 16,16,22,506.90	30.35555427
₹ 14,40,66,390.72	29.70568952
₹ 16,09,66,293.17	27.53079242
₹ 17,06,37,831.71	27.65090589
₹ 58,65,09,099.22	113.3258998
₹ 16,00,22,246.35	30.0985965
₹ 13,63,86,789.28	25.22423842
₹ 14,16,30,724.21	32.38756641
₹ 14,84,69,339.40	25.61549845
₹ 59,49,99,941.75	109.2065836
₹ 15,00,82,083.93	26.63086685
₹ 13,25,37,884.30	26.47720876
₹ 15,01,96,776.58	27.76255301
₹ 16,21,83,196.94	28.33595497
₹ 2,46,78,56,244.05	455.6780205



#### Insight:

EMEA → **Enterprise** is the top region-segment combination by average profit margin (≈ **23.94%**) with total profit ≈ **38.56M** and net sales ≈ **161.0M**. APAC and LATAM

Enterprise/Consumer segments also show strong margins (≈23–23.5%). The highest-margin groups are fewer in count but produce concentrated profit contribution.

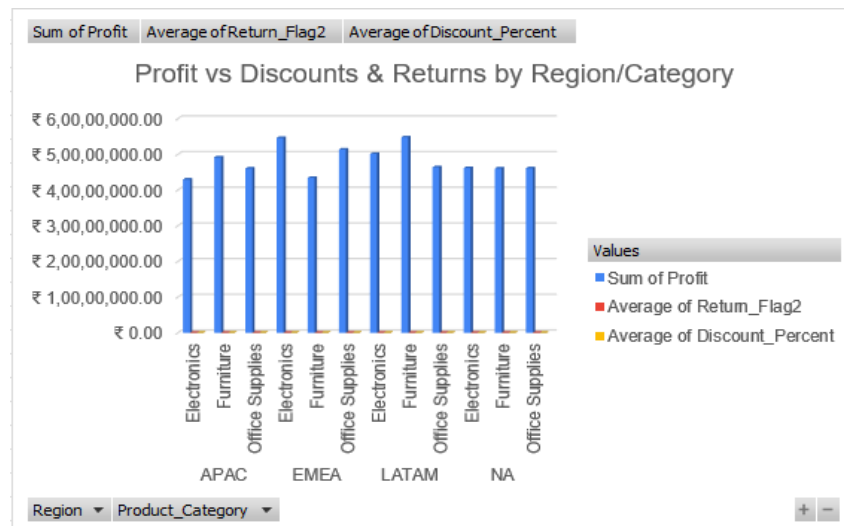
**Chart text summary:** a grouped-bar of avg profit margin by (region → segment) would show EMEA Enterprise peaking, with Consumer/Small Business trailing slightly.

#### Recommendation:

Prioritize targeted expansion and premium offerings for EMEA Enterprise (and APAC Enterprise). Preserve high-margin product assortments for these segments and test modest price increases or bundle-upsells before adding discount-driven acquisition.

## 1.2 — Loss-making regions or product categories due to discounts / returns?

Row Labels	Sum of Profit	Average of Return_Flag2	Average of Discount_Percent
APAC			
Electronics	₹ 4,29,55,258.66	52.08%	8.32%
Furniture	₹ 4,91,47,245.91	49.40%	7.50%
Office Supplies	₹ 4,60,38,291.04	53.53%	8.12%
EMEA			
Electronics	₹ 5,45,87,214.69	48.28%	8.26%
Furniture	₹ 4,34,19,892.72	45.28%	8.51%
Office Supplies	₹ 5,13,56,600.29	45.88%	7.85%
LATAM			
Electronics	₹ 5,01,37,417.12	45.14%	9.00%
Furniture	₹ 5,47,63,670.49	55.68%	8.89%
Office Supplies	₹ 4,63,78,726.72	53.22%	7.27%
NA			
Electronics	₹ 4,61,75,480.40	43.03%	7.91%
Furniture	₹ 4,60,40,342.45	48.50%	9.15%
Office Supplies	₹ 4,60,82,565.71	52.15%	8.34%
Grand Total	₹ 57,70,82,706.20	49.35%	8.26%



### Insight:

No region shows net negative total profit — all regions are profitable (total profits: LATAM ≈151.28M, EMEA ≈149.36M, APAC ≈138.14M). However, **return rates are very high** across the board (region return rates ≈46–51%), and product categories have elevated return rates (Office Supplies ≈51%, Furniture ≈49%, Electronics ≈47%). Average discounts are modest (~7–8%) but combined with high returns they erode margin.

**Chart text summary:** stacked-bars of return-rate and avg-discount by region/category highlight high return bars overlapping moderate discount levels.

### Recommendation:

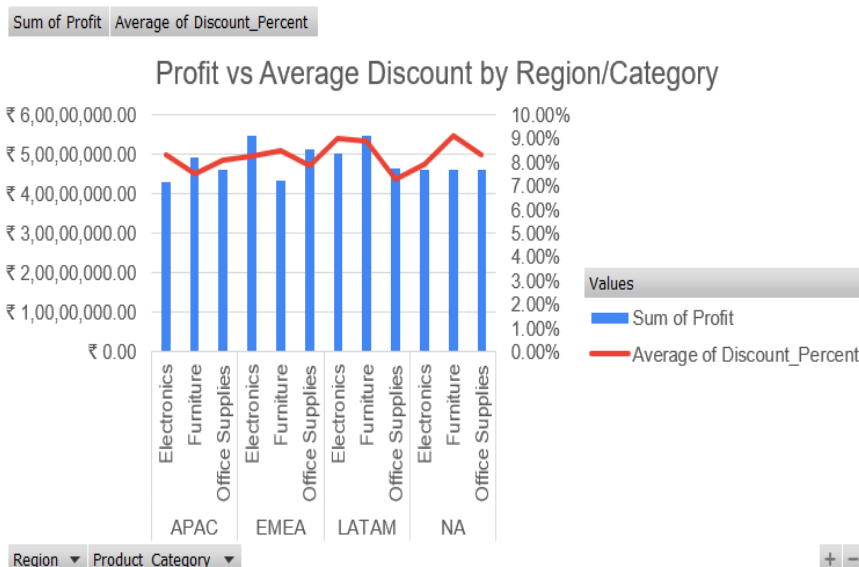
Investigate root causes of returns (product quality, SKU descriptions, shipping damage).

Implement stricter return checks, improve product pages, and pilot a “no-questions” return window only for low-risk SKUs while tightening on high-return SKUs.

## 2. Impact of Discounts on Profitability

### 2.1 — Relationship between discount % and overall profitability

Row Labels	Sum of Profit	Average of Discount_Percent
<b>APAC</b>	<b>₹ 13,81,40,795.61</b>	<b>7.96%</b>
Electronics	₹ 4,29,55,258.66	8.32%
Furniture	₹ 4,91,47,245.91	7.50%
Office Supplies	₹ 4,60,38,291.04	8.12%
<b>EMEA</b>	<b>₹ 14,93,63,707.70</b>	<b>8.20%</b>
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Furniture	₹ 4,34,19,892.72	8.51%
Office Supplies	₹ 5,13,56,600.29	7.85%
<b>LATAM</b>	<b>₹ 15,12,79,814.33</b>	<b>8.40%</b>
Electronics	₹ 5,01,37,417.12	9.00%
Furniture	₹ 5,47,63,670.49	8.89%
Office Supplies	₹ 4,63,78,726.72	7.27%
<b>NA</b>	<b>₹ 13,82,98,388.56</b>	<b>8.47%</b>
Electronics	₹ 4,61,75,480.40	7.91%
Furniture	₹ 4,60,40,342.45	9.15%
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<b>Grand Total</b>	<b>₹ 57,70,82,706.20</b>	<b>8.26%</b>



#### Insight:

Discount vs profit correlation is **weakly negative** (corr ≈ **-0.092**). Orders with **no discount** have the highest avg profit per order; modest discounts (≤10%) generate higher volumes but slightly lower average profit per order. Overall, heavy discounting isn't strongly boosting total profit; it slightly reduces margin.

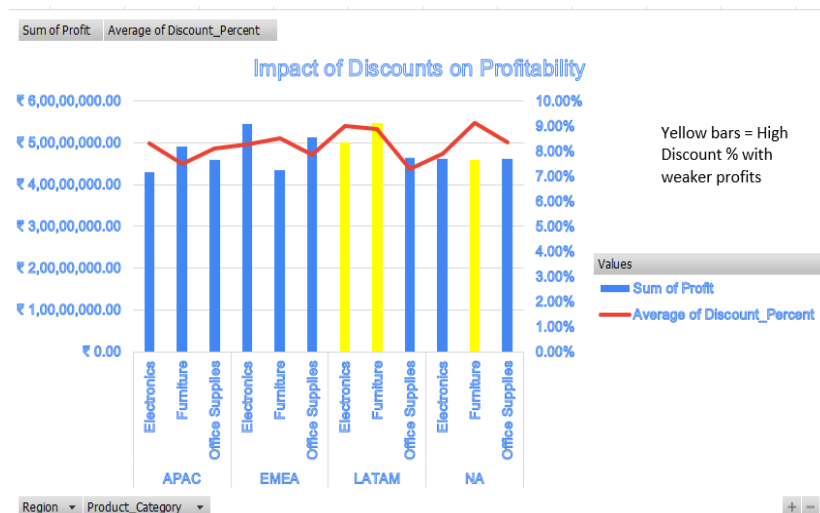
**Chart text summary:** scatter of Discount vs Profit shows a slight downward slope; a bar chart of avg-profit by discount bins shows 0% > ≤5% > ≤10%.

### Recommendation:

Use discounts sparingly and target them for acquisition or clearance only. Favor targeted promo codes, customer-segment specific discounts, or bundle discounts over sitewide percent offs.

## 2.2 — Cases where discounts increased sales volume but reduced net profits

Row Labels	Sum of Profit	Average of Discount_Percent
<b>APAC</b>	<b>₹ 13,81,40,795.61</b>	<b>7.96%</b>
Electronics	₹ 4,29,55,258.66	8.32%
Furniture	₹ 4,91,47,245.91	7.50%
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Electronics	₹ 4,61,75,480.40	7.91%
Furniture	₹ 4,60,40,342.45	9.15%
Office Supplies	₹ 4,60,82,565.71	8.34%
<b>Grand Total</b>	<b>₹ 57,70,82,706.20</b>	<b>8.26%</b>



### Insight:

Discount bin ≤10% has the **highest order count** (525) and elevated net sales but its **total profit is lower** than the zero-discount bin on a per-order basis (zero-discount avg profit per order is highest). This indicates discounts lift unit volume but reduce per-order profitability enough to lower average profit.

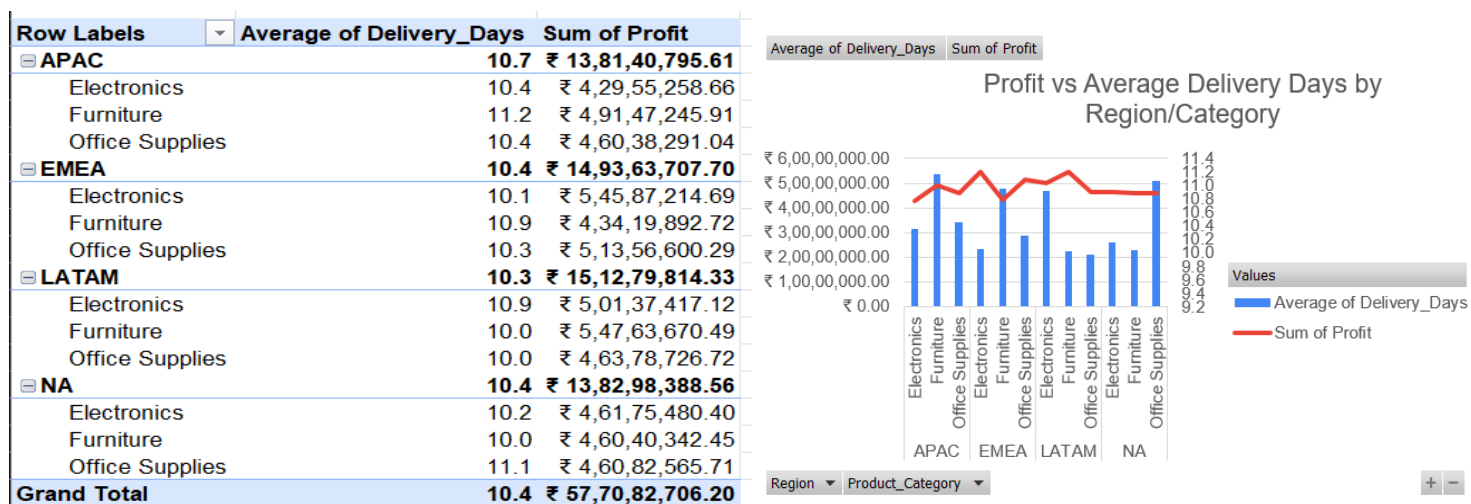
**Chart text summary:** line/bar pair — orders by discount bin (peak at  $\leq 10\%$ ) vs total profit by bin (zero-discount highest per-order profit).

### Recommendation:

If discounts are needed to grow volume, focus on SKUs where the incremental volume more than offsets margin loss (low incremental cost items), and measure lift using A/B tests to ensure discounts are profitable overall.

## 3. Operational Efficiency (Delivery Time vs Profitability)

### 3.1 — Compare Delivery Days across regions and categories



### Insight:

Average delivery days are similar across regions (LATAM  $\approx 10.31d$ , EMEA  $\approx 10.41d$ , APAC  $\approx 10.67d$ ) and across categories (Electronics  $\approx 10.38d$ , Office Supplies  $\approx 10.43d$ , Furniture  $\approx 10.53d$ ). There's no dramatic regional or category outlier for delivery times.

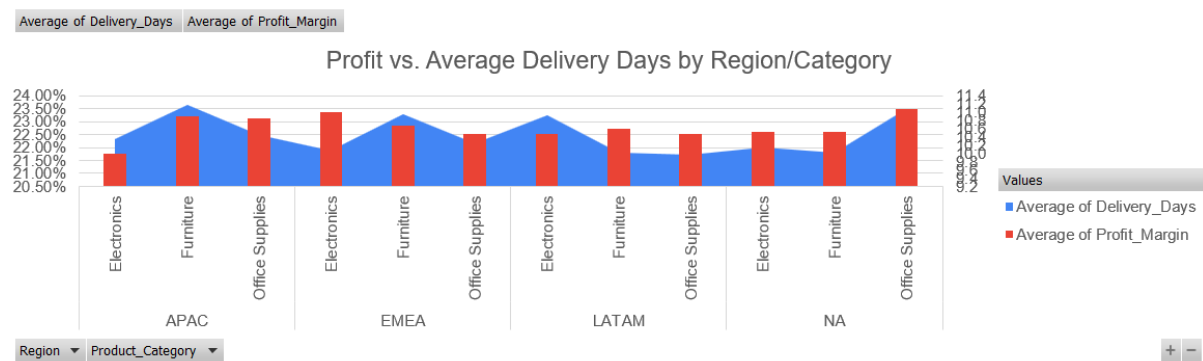
**Chart text summary:** small-range bar chart of avg delivery days by region/category shows clustered bars near 10–11 days.

### Recommendation:

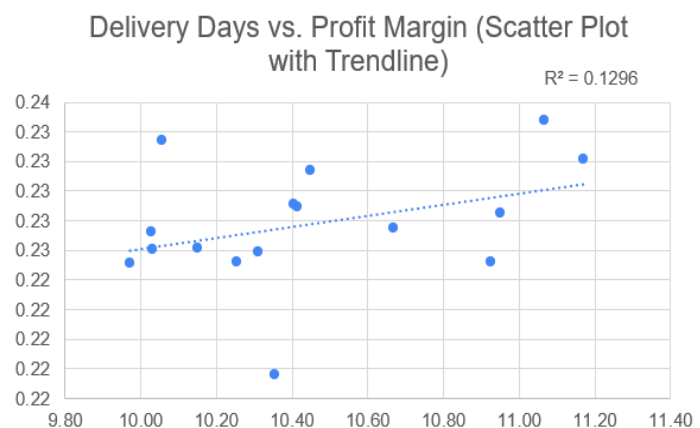
Still aim to shave 1–2 days via logistics optimization (preferred carriers, batch routing) for categories with bulky items (Furniture) to reduce damage/returns and improve NPS.

### 3.2 & 3.3 — Are longer delivery times negatively correlated with profit margins?

Row Labels	Average of Delivery_Days	Average of Profit_Margin
<b>APAC</b>	<b>10.7</b>	<b>22.75%</b>
Electronics	10.4	21.76%
Furniture	11.2	23.22%
Office Supplies	10.4	23.13%
<b>EMEA</b>	<b>10.4</b>	<b>22.91%</b>
Electronics	10.1	23.35%
Furniture	10.9	22.85%
Office Supplies	10.3	22.52%
<b>LATAM</b>	<b>10.3</b>	<b>22.59%</b>
Electronics	10.9	22.52%
Furniture	10.0	22.73%
Office Supplies	10.0	22.51%
<b>NA</b>	<b>10.4</b>	<b>22.89%</b>
Electronics	10.2	22.61%
Furniture	10.0	22.61%
Office Supplies	11.1	23.48%
<b>Grand Total</b>	<b>10.4</b>	<b>22.78%</b>



Average of Delivery	Average of Profit_Margin
10.67	0.23
10.35	0.22
11.17	0.23
10.45	0.23
10.41	0.23
10.06	0.23
10.95	0.23
10.25	0.23
10.31	0.23
10.93	0.23
10.03	0.23
9.97	0.23
10.41	0.23
10.15	0.23
10.03	0.23
11.07	0.23



#### Insight:

Correlation between delivery days and profit margin is **negligible** (corr  $\approx$  -0.04). Slight negative sign suggests longer delivery might marginally reduce margin (likely via returns/damage), but effect size is small in this dataset. The operational-profitability relationship exists but is not a dominant driver.

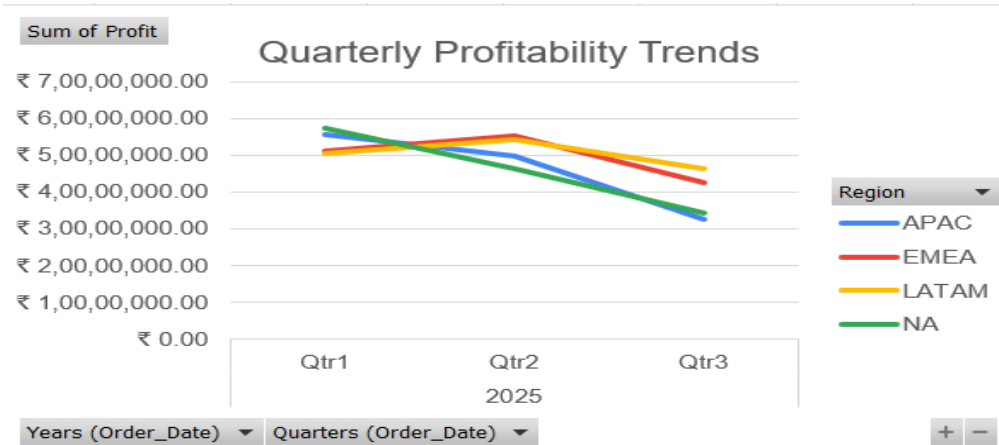
**Chart text summary:** scatter of Delivery\_Days vs Profit\_Margin with near-flat trendline.

**Recommendation:**

Optimize delivery reliability rather than speed alone: reduce variability and delivery exceptions (missed windows, damages) for measurable margin gains, but prioritize fixes where delivery issues co-occur with high returns.

**3.4 — Quarterly profitability trends:**

Sum of Profit		Column Labels				
Row Labels		APAC	EMEA	LATAM	NA	Grand Total
2025		₹ 13,81,40,795.61	₹ 14,93,63,707.70	₹ 15,12,79,814.33	₹ 13,82,98,388.56	₹ 57,70,82,706.20
Qtr1		₹ 5,57,20,448.21	₹ 5,11,08,305.36	₹ 5,04,06,427.10	₹ 5,73,87,973.40	₹ 21,46,23,154.07
Qtr2		₹ 4,98,96,795.65	₹ 5,55,06,379.18	₹ 5,43,38,643.31	₹ 4,64,68,428.83	₹ 20,62,10,246.97
Qtr3		₹ 3,25,23,551.75	₹ 4,27,49,023.16	₹ 4,65,34,743.92	₹ 3,44,41,986.33	₹ 15,62,49,305.16
Grand Total		₹ 13,81,40,795.61	₹ 14,93,63,707.70	₹ 15,12,79,814.33	₹ 13,82,98,388.56	₹ 57,70,82,706.20



**Insight:**

Quarterly total profit shows decline over time in the sample year: **2025Q1 ≈214.6M, 2025Q2 ≈206.2M, 2025Q3 ≈156.2M** — notable drop in Q3. Avg profit margin remains stable around 22.6–22.9%. The Q3 dip suggests seasonality, lower volumes, or rising returns/discounts in that quarter.

**Chart text summary:** line chart of total profit by quarter shows a downward trajectory from Q1→Q3.

**Recommendation:**

Diagnose Q3 drivers (promotions, supply issues, returns spike). Prepare seasonal plans (promos timed to margin-safe SKUs, inventory rebalancing) and run Q3-specific retention/marketing to recover volume without heavy discounting.

## 4. Customer Return & Retention Risk

### 4.1 — Which segments/regions/products have highest return rates?

Row Labels	Average of Return_Flag	Sum of Return_Flag
<b>APAC</b>	<b>51.67%</b>	<b>248</b>
<b>Consumer</b>	<b>50.00%</b>	<b>58</b>
Electronics	59.33%	16
Furniture	38.64%	17
Office Supplies	59.52%	25
<b>Corporate</b>	<b>61.36%</b>	<b>75</b>
Electronics	60.36%	25
Furniture	62.73%	27
Office Supplies	62.16%	33
<b>Enterprise</b>	<b>45.00%</b>	<b>54</b>
Electronics	33.33%	12
Furniture	53.52%	25
Office Supplies	40.48%	17
<b>Small Business</b>	<b>49.59%</b>	<b>61</b>
Electronics	59.46%	22
Furniture	35.14%	13
Office Supplies	59.06%	26
<b>EMEA</b>	<b>46.52%</b>	<b>234</b>
<b>Consumer</b>	<b>50.75%</b>	<b>68</b>
Electronics	65.31%	32
Furniture	40.48%	17
Office Supplies	44.19%	19
<b>Corporate</b>	<b>41.09%</b>	<b>53</b>
Electronics	35.56%	16
Furniture	40.00%	16
Office Supplies	45.72%	19
<b>Enterprise</b>	<b>46.09%</b>	<b>53</b>
Electronics	43.30%	18
Furniture	51.52%	17
Office Supplies	43.30%	18
<b>Small Business</b>	<b>48.00%</b>	<b>60</b>
Electronics	46.15%	18
Furniture	51.28%	20
Office Supplies	46.61%	22
<b>LATAM</b>	<b>51.34%</b>	<b>268</b>
<b>Consumer</b>	<b>51.59%</b>	<b>65</b>
Electronics	50.00%	17
Furniture	48.34%	23
Office Supplies	55.36%	25
<b>Corporate</b>	<b>51.41%</b>	<b>73</b>
Electronics	40.38%	21
Furniture	54.35%	25
Office Supplies	61.36%	27
<b>Enterprise</b>	<b>53.97%</b>	<b>68</b>
Electronics	54.55%	24
Furniture	56.82%	19
Office Supplies	50.00%	25
<b>Small Business</b>	<b>48.44%</b>	<b>62</b>
Electronics	37.78%	17
Furniture	64.10%	25
Office Supplies	45.45%	20
<b>NA</b>	<b>47.88%</b>	<b>237</b>
<b>Consumer</b>	<b>54.07%</b>	<b>73</b>
Electronics	52.06%	25
Furniture	58.97%	23
Office Supplies	52.06%	25
<b>Corporate</b>	<b>43.75%</b>	<b>49</b>
Electronics	36.11%	13
Furniture	45.35%	17
Office Supplies	48.72%	19
<b>Enterprise</b>	<b>46.32%</b>	<b>63</b>
Electronics	39.13%	18
Furniture	42.22%	19
Office Supplies	57.18%	26
<b>Small Business</b>	<b>46.43%</b>	<b>56</b>
Electronics	42.86%	15
Furniture	47.83%	22
Office Supplies	45.33%	15



#### Insight:

**Consumer** segment and **APAC** region show the highest return rates (~51.6% for Consumer and APAC). Many individual SKUs show very high return rates (top examples: Electric Stapler 62.5%, Standard Stapler ~60.8%, A4 Ream Pack ~60.5%, Dining Table ~60%). High-return SKUs span Office Supplies, Furniture and Electronics.

**Chart text summary:** horizontal bar of return\_rate by SKU/segment/region shows Consumer and APAC at top, with several SKUs >60%.



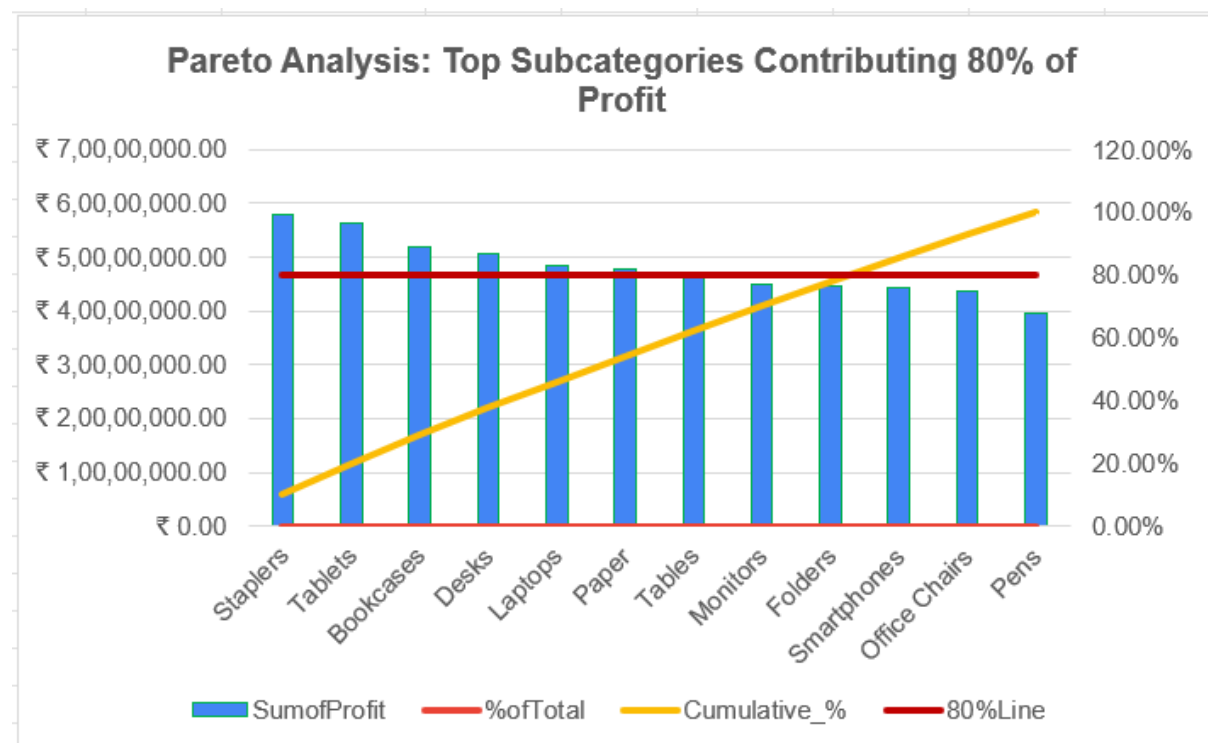
### Recommendation:

Flag high-return SKUs for immediate review — check product spec/packaging/quality, adjust imagery/descriptions, consider temporary removal, stricter QC on fulfillment, or restuctured return policy for specific SKUs.

## 5. Product Category & Subcategory Deep-Dive

### 5.1 — Pareto 80/20 within Electronics, Furniture, Office Supplies

Product_SubCategory	SumofProfit	%ofTotal	Cumulative_%	IN80	80%Lir
Staplers	₹ 5,79,79,289.39	10.05%	10.05%	Yes	80.00%
Tablets	₹ 5,63,05,336.46	9.76%	19.80%	Yes	80.00%
Bookcases	₹ 5,20,21,694.77	9.01%	28.82%	Yes	80.00%
Desks	₹ 5,05,14,853.60	8.75%	37.57%	Yes	80.00%
Laptops	₹ 4,83,47,380.09	8.38%	45.95%	Yes	80.00%
Paper	₹ 4,76,51,744.26	8.26%	54.21%	Yes	80.00%
Tables	₹ 4,71,87,468.78	8.18%	62.38%	Yes	80.00%
Monitors	₹ 4,49,99,547.71	7.80%	70.18%	Yes	80.00%
Folders	₹ 4,44,86,060.71	7.71%	77.89%	Yes	80.00%
Smartphones	₹ 4,42,03,106.61	7.66%	85.55%	No	80.00%
Office Chairs	₹ 4,36,47,134.42	7.56%	93.11%	No	80.00%
Pens	₹ 3,97,39,089.40	6.89%	100.00%	No	80.00%



**Insight:**

Pareto analysis shows the top ~3 subcategories per category contribute ~77–79% of profit (close to the 80% target):

- **Electronics:** Tablets, Laptops, Monitors → cumulative ≈ **77.2%** of Electronics profit.
- **Furniture:** Bookcases, Chairs, Tables → cumulative ≈ **77.4%**.
- **Office Supplies:** Staplers, Paper, Folders → cumulative ≈ **79.1%**.  
A small set of subcategories capture most profits; remaining SKUs are low-margin/low-impact.

**Chart text summary:** cumulative bar or Pareto line per category shows steep accumulation across the top 2–3 subcategories.

**Recommendation:**

Concentrate assortment, promotions, inventory and supplier negotiations on the top subcategories to maximize ROI. For tail SKUs, consider delisting, higher pricing, or cost-cutting measures (drop-shipping, lower-stock).

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**Overall Summary — Key Findings & Business Recommendations:**

1. **Top performers:** EMEA Enterprise (≈23.9% margin) and APAC/LATAM Enterprise/Consumer segments are highest-margin targets — allocate premium offers and expansion budget there.
2. **Returns are the dominant drag:** Return rates are alarmingly high (~46–52% by category/region), eroding profits more than discounts; prioritize return-reduction initiatives.
3. **Discounts must be surgical:** Discounts weakly reduce profitability (corr -0.09); they lift volume but not profit per order — move to targeted promos and A/B test discount efficacy.
4. **Operational fixes over speed:** Delivery days are similar across regions; delivery variability and exceptions (leading to returns/damage) are a higher priority than shaving a single day.
5. **Pareto-focused assortment:** 2–3 subcategories per main category produce ~77–79% profit. Focus inventory, promotions, and supplier negotiations on these.
6. **Quarterly dip to address:** Q3 profit drop requires investigation (seasonality, returns or promotions). Implement Q3-specific margin-safe campaigns and inventory rebalancing.