Leveraging External Market Data to Power Internal Business Decisions: Uncovering Pricing, Sentiment, and Ingredient Insights for Smarter Growth

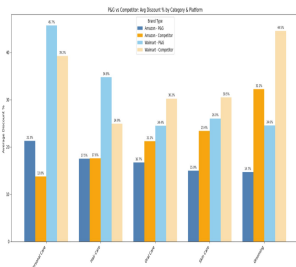**P&G**   **UNIVERSITY of CINCINNATI**

Can External Data Be Used for Internal Business Decisions?

What happens outside shapes what happens inside

- Can we leverage deeper discounts and price consistency to compete more effectively across e-retailers?
- Do competitor prices reveal missed margin opportunities?
- Is current market positioning still aligned with evolving shopper behavior and competitive benchmarks?
- In what ways can customer sentiment data unlock competitive market advantage?
- How do ingredient choices compare to what's trending across clean and safe products in the category?

Do we really have public data that's useful?

Criteria	Bright (Amazon-Walmart)	Bright (TikTok Shop)	Kalodata	Keepa API
Product-level Pricing Data	✅	✅	✅	✅
Brand & Category Segmentation	✅	⚠️	⚠️	⚠️
Amazon-Walmart Cross-platform Comparison	✅	❌	❌	❌
Discount & Price Difference Tracking	✅	✅	✅	✅
Sales / Volume Information	❌	✅	✅	❌
Influencer Metrics	❌	✅	✅	❌
Data Quality (Completeness)	✅	⚠️	⚠️	⚠️
Competitive Pricing Analysis Support	✅	⚠️	⚠️	✅
Ingredient or Product Attribute Insights	✅	⚠️	⚠️	❌

What Amazon & Walmart know that P&G doesn't ?

amazon / Walmart — Real-time behavior signals, dynamic response to price changes, rating and reviews

P&G — Doesn't know customer behavior towards competitors and reviews

Data Preparation & Exploration

- **Reading Data:** Imported raw data files for pricing, product metadata, and reviews
- **Focused Filtering:** Isolated Skin Care category to align with business scope
- **Summary Statistics:** Explored key variables to assess value distributions and data health
- **Data Cleaning:** Dropped null columns and removed duplicate records for SKUs/products
- **Column Selection:** Identified relevant features: price, discount, brand, category, rating, sentiment
- **Data Transformation:** Standardized currency across platforms (USD)
- **Data Transformation:** Labeled brands as P&G vs. Competitor
- **Data Transformation:** Created high-level category tags to group granular product descriptions
- **Data Transformation:** Engineered new variables: discount %, price gap, and relative price metrics

Average Discount % by Category and Platform

- Walmart out-discounts Amazon across both P&G and competitors.
- Personal Care (P&G): Highest Walmart discount at 45.7% – signals strong promo push.
- Grooming: Competitor discounts far exceed P&G on both platforms.
  - Walmart: 44.5% vs. 24.6%
  - Amazon: 32.2% vs. 14.7%
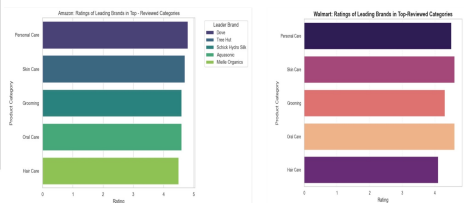- Skin Care: Competitor discounts remain consistently higher.

Avg Relative Price Gap % between Amazon and Walmart

- Personal & Hair Care show the widest price gaps across both P&G and competitors.
- Grooming (Competitors): Amazon prices are 53.4% higher than Walmart – the steepest disparity.
- Oral Care: P&G prices on Amazon are 18.9% higher vs. 10.1% for competitors.
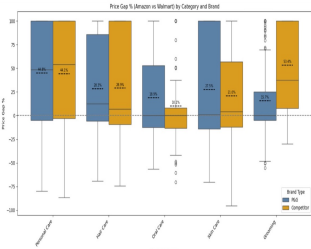
Are Price Levels Consistent across Platforms and Competitors?

- P&G priced higher in *Grooming* and *Skin Care* categories
- Walmart maintains lower prices than Amazon across most categories
- P&G pricing lacks consistency across platforms – signals need for alignment

Where do Price Gaps occur across Platforms?

- Avg. price gap shown between Amazon and Walmart (P&G vs Competitors)
- Larger gaps for P&G in *Skin Care* and *Grooming*
- Signals need for cross-platform price alignment for P&G

What are P&G's Core Strengths ?

Amazon

Category	Leader Brand	Top Reviews	Rating
Teeth Whitening Strips	Crest	93301.0	4.6
Men's Razor Blade Cartridges	Gillette	56563.0	4.7
Men's Cartridge Razors	Gillette	38206.0	4.7
Children's Toothpaste	Crest	33135.0	4.8
Men's Disposable Shaving Razors	Gillette	28915.0	4.5
Manual Facial Cleansing Brushes	Olay	24908.0	4.4
-in- Shampoo & Conditioner	Head & Shoulders	15149.0	4.8

Walmart

Category	Leader Brand	Top Reviews	Rating
Stock up on Body Wash	Olay	102384.0	4.2
Women's Body Wash	Olay	98467.0	4.2
Personal Care	Olay	66936.0	4.5
All Body Wash	Olay	64776.0	4.5
Skin Care Products for Fine Lines and Wrinkles	Olay	25595.0	3.9
Olay Skincare	Olay	19999.0	3.9
Whitening Toothpaste	Crest	17356.0	4.6

- **Stronghold in Core Categories:** P&G dominates Amazon in Oral Care and Grooming (Crest, Gillette), backed by high customer ratings (4.5–4.8), indicating strong brand equity.
- **Platform-Specific Gaps:** On Walmart, despite high review volumes, Olay underperforms in rating (3.9–4.2), signaling a gap in perceived value among price-sensitive shoppers.

Face-Off: Category Leaders on Walmart vs. Amazon

- P&G leads on Walmart with Crest (Oral Care) but loses ground on Amazon where niche DTC brands like Aquasonic, Schick, and Billie dominate.
- Dove leads Personal Care on both platforms, a clear signal of consistent competitive pressure that demands sharper brand storytelling from P&G.
- Amazon favors niche, digital-native brands , while Walmart leans toward trusted mass-market names, reflecting its value-focused shopper base.

Sentiment Analysis Pipeline: Preparing Text Data for Insight

Extract Text Reviews: Parsed raw review text from Amazon & Walmart platforms → **Clean & Normalize Text:** Removed special characters, lowercased and stripped whitespace for consistency → **Sentiment Scoring:** Applied sentiment analysis model VADER → **Captured:** Average Sentiment Score, Polarity Class: Positive / Negative / Neutral

Average Sentiment Score: Measuring Overall Customer Perception

- Walmart is a Sentiment Stronghold: P&G outperforms on Walmart vs. Amazon across most categories.
- Grooming Opportunity: Competitor sentiment is weak on Amazon → position P&G to win here.
- Hair, Personal Care Category Gap: P&G sentiment lags on Amazon → needs attention.

Key Harmful Ingredients Driving Consumer Perception

Category	Ingredient	Type	P & G Usage	Competitor Usage	Safe Alternative
Hair Care	Dimethicone	Harmful	High	High	Squalane
Oral Care	Sodium Lauryl Sulfate	Harmful	High	Medium	Cocamidopropyl Betaine
Skin Care	Propylene Glycol	Harmful	Medium	High	Glycerin

Clean alternatives selected based on high adoption in competitor SKUs and known safety profiles

- Dimethicone → Common in conditioners but flagged for buildup
- Sodium lauryl sulfate → Harsh cleanser that may irritate skin
- Propylene glycol → Preservative tied to sensitivity/allergies

Ingredient Safety Gap: Risk vs Opportunity

- Safe ingredients lead, especially in Skin Care, but P&G uses harmful ones twice as often highlighting a branding gap.
- Platform Differences: Safe ingredients consistently dominate on both Amazon and Walmart, especially in Skin Care.
- Harsh ingredients shows an opportunity for P&G to lead with cleaner, safer formulations.
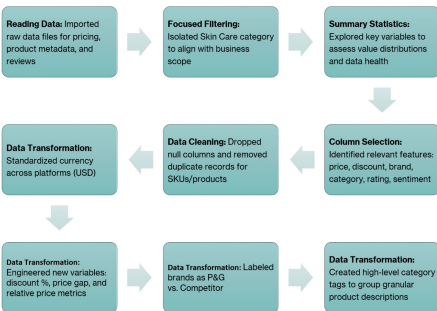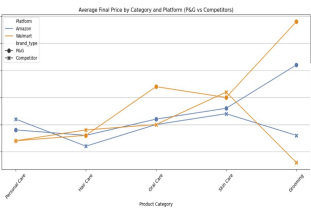
Overall Strategic Recommendations for P&G

- **Amplify Discount Strategy** → Deepen discounts in Amazon-lagging categories and expand high-discount SKUs on Walmart to match competitor aggressiveness.
- **Tighten Cross-Platform Pricing** → Reduce Amazon–Walmart price gaps and address high-variance SKUs to build trust and pricing consistency.
- **Strengthen Platform-Specific Positioning** → Leverage Walmart's lead in Oral & Grooming; boost digital presence for hero brands (Olay, Pantene, Venus) on Amazon.
- **Capitalize on Sentiment Insights** → Reinforce P&G's strength in Hair & Oral Care on Walmart; address negative sentiment via SKU audits and targeted improvements.
- **Leverage Ingredient Superiority** → Promote clean, safe formulations and reformulate high-risk SKUs to stand out as the trusted brand in Skin, Oral, and Grooming.

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