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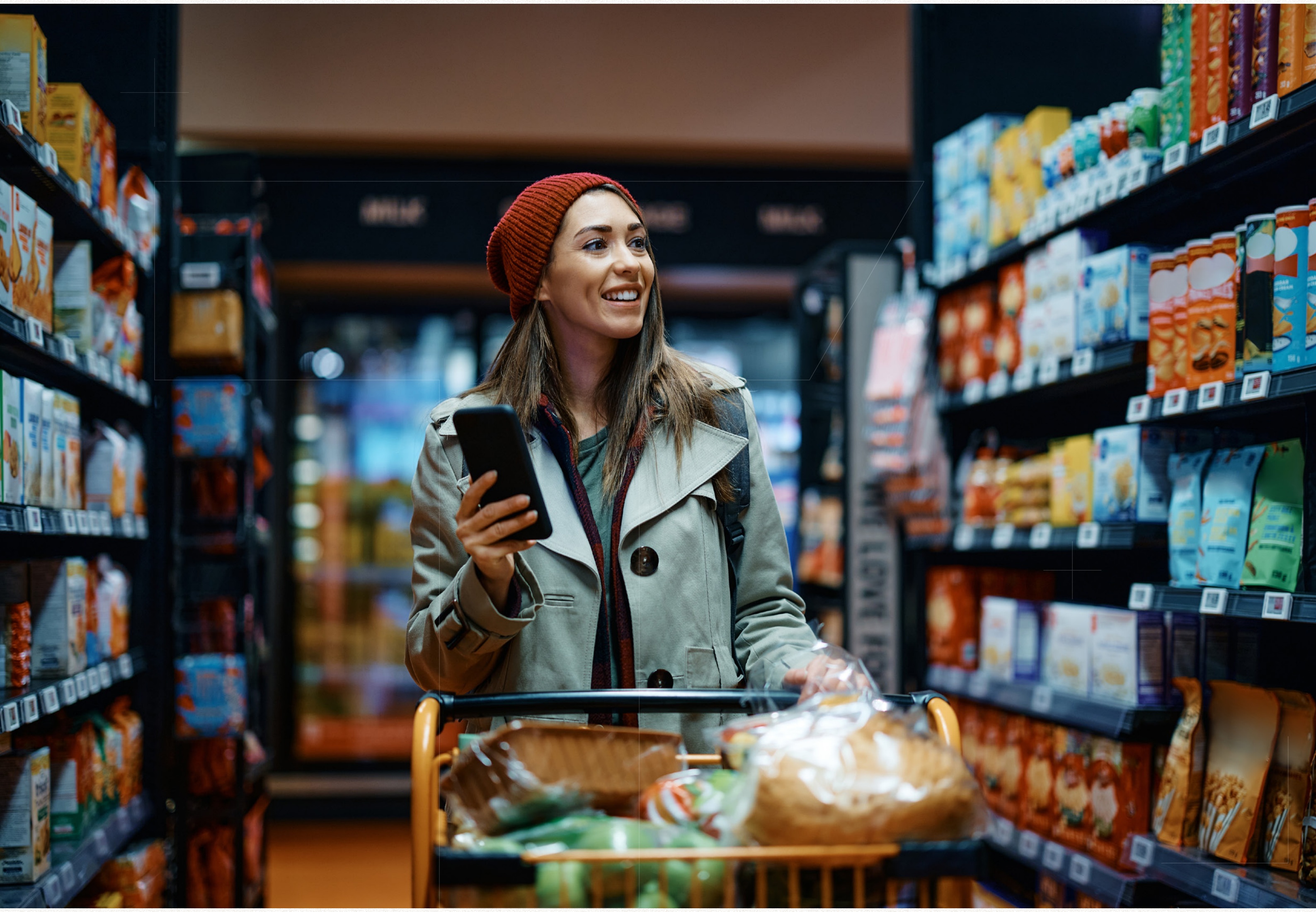

Whitepaper

# PRICED TO PERFECTION

## Optimizing CPG pricing and promotional strategies to drive sustainable growth

Jason Villano
Global Head of Customer Success & Strategy, CPG Practice, Tredence Inc.

Kashyap Kasinarasimhan
Senior Director, CPG Strategy, Tredence Inc.

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# Why Understanding Cross-Price Elasticity Is Becoming More Important

Consumer packaged goods (CPG) firms have increased prices multiple times to cover rising wholesale costs, which have soared 35% since 2019.[1] However, retailers and consumers are resisting additional increases.

Consumers are now seeking out greater value in the form of private-label goods, promotional offers, and bulk pricing on competitor brands. Large chains, like Wal-Mart and Tesco, are also pushing back on proposed CPG cost increases,[2] saying consumers are tapped out and can't withstand any more price hikes.

Today's consumer has too many options to fulfill various purchase as well as consumption occasion and behave differently in different purchase intent. For example, a consumer is willing to pay a premium on quick-commerce for speed and convenience for a quick fill-in vs. seeking deals for a monthly pantry loading trip.

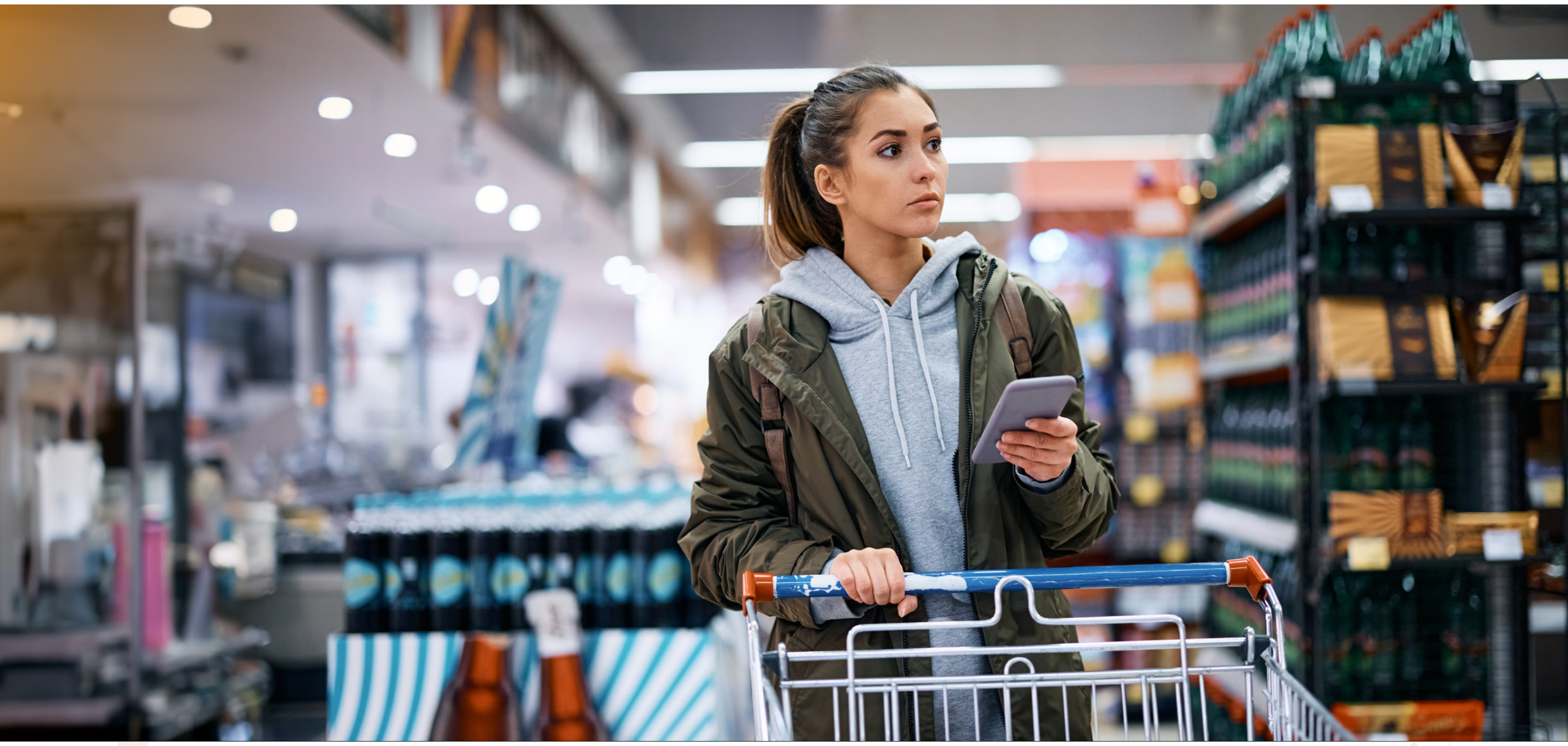
As a result, IT, data, and analytics leaders need to evolve revenue growth management (RGM) capabilities to develop better strategies. One strategy is to develop cross-price elasticity (CPE) capabilities to better navigate this new normal.

# Improving Pricing Strategy and Execution

CPG firms can adjust both strategic (everyday value) prices and tactical (promoted) prices across all the channels they sell. However, to develop best-in-class pricing strategies, CPGs need to develop a broad set of data and analytics capabilities. They include:

1 "Wholesale Prices Show Another Big Increase, Signaling Continuing Cost Pressure on CPG Companies," press release, Consumer Brands Association, May 12, 2022, https://consumerbrandsassociation.org/press-releases/wholesale-prices-show-another-big-increase-signaling-continuing-cost-pressure-on-cpg-companies/

2 Eszter Racz," Walmart 'kicks back at CPG manufacturers over price hikes,'" article, Just Food, February 14, 2023, https://www.just-food.com/news/walmart-kicks-back-at-cpg-manufacturers-over-price-hikes/



## Building a data foundation

CPG teams want to create data assets to drive product innovation, distribution, and pricing strategies. They can do so by enriching existing data with alternative datasets, building a harmonized commercial data lake, and creating foundational analytics. These core analytics include developing granular product and customer segments, consumer behavior on various occasions, baseline prices, and elasticities.

### To Achieve their RGM goals, CPGs are building strong foundational Data Strategy to stay ahead of the curve

CPGs are at varying levels of data maturity in Data **Acquisition, Automation** and **Attribution**

| | **GOOD**<br>Internal, Syndicated POS & Panel | **BETTER**<br>Retailer POS & First Party | **BEST**<br>Shopper data, First Party Data, Clean Room |
|---|---|---|---|
| **Data** | ▪ Internal Data – Master data, sell-in, promotion etc.<br>▪ Syndicated POS and Panel Data<br>▪ Consumer Surveys<br>▪ Disjointed and various formats | ▪ Store-level POS Data<br>▪ Chain Shopper Card Data<br>▪ First Party Data<br>▪ Fully Harmonized Internal Product and Customer data | ▪ Integrated Data Model -<br>▪ Store POS + First Party Data + CDP<br>▪ Loyalty Data (Fetch) + Location Data (Placer.ai) + Macro (PESTEL) + Confidential Compute<br>▪ Creating new data domains |
| **Decisions** | ▪ Built on **purchase trends** as seen on aggregated POS data and basic consumer behavior studies | ▪ Study **granular insights** influenced by locality, demography, presence of other stores, etc., and expanded consumer preferences | ▪ Elevate granularity by combining understanding of **deeper consumer insights** on household penetration, buy rate, proportion in basket etc coupled with **macro insights** at zip code level |

**Improved Visibility to Data** ››› **Robust Models** ››› **Better Insights** ››› **Explainable AI**

Exhibit 1: CPG Firms Vary in Terms of Data Maturity

## Enable predictive analytics

With robust data science techniques, CPGs can measure CPE and demand transfers more accurately. Pricing analysts can model and understand the effect of various price and promotion changes before implementing them, which are by channel and by pack reflecting the consumer need state.

# Pricing Module – Foundational & enhanced use cases

| Foundational | Outputs |
| --- | --- |
| **Automated Price Zones**<br>▪ Create Pricing profile for store segments which have similar demographic and economic conditions | Look-alike store clusters for pricing strategy |
| **Automated PPG & Dynamic PPAs at Price Zone level**<br>▪ Create automated PPGs using Price/Pack and product Attributes; have dynamic PPAs at Price Zone level | Compare own and competitor PPGs; Granular PPAs at Prize Zone level |
| **Baseline & Forecasts**<br>▪ For Category, Brands and Competitor Brands<br>◆ Feature Engineering –incremental features for models and elasticity<br>◆ Constraints and guardrails aligned with commercial policy | Forecast Demand on baseline consumption. Impact of seasonality and Features like - Price Gap to Competition, Macro / Socio Factors |
| **Price Elasticity**<br>▪ Create Price Elasticity and Pricing Equation for Category, Brands and Competitor Brands<br>▪ Forecast volumes for Category, Brands and Competitor Brands | Determine price elasticity; Utilize equation to predict promo / non promo volumes |

| Enhanced | Outputs |
| --- | --- |
| **Cross-elasticities and Halo Effect**<br>▪ Determine impact of price changes on competitor demand<br>▪ Determine impact of promotion and other Halo effects | Determine Packs where there is significant demand transfer due to price changes |
| **Pricing Recommendation and Optimization**<br>▪ Create PPG X Price Zone level recommendations for price changes with optimal price points | Understand the optimal price points and identify packs with pricing opportunities |
| **Pricing Simulation**<br>▪ Leveraging the Pricing Equation to simulate different price points and measure impact | Simulate price points and understand effect on other metrics |
| **Pricing for New Products**<br>▪ Generate Pricing for New Products: Internal / External benchmarks | Optimal price point for new products |

Exhibit 2: Foundational and Advanced Pricing Analytics Capabilities

## Creating prescriptive analytics

Analytics tools provide pricing optimization and recommendations, enabling CPG teams to set new prices that consider customer price zones and product levels. They can also connect these analytics with demand forecasts to project sales volumes over certain timeframes, implementing the right supply plans during promotions.

### Promotion Module – Foundational & enhanced use cases

| Foundational | Outputs |
|---|---|
| **Base & Incremental Sales Analysis**<br>- Base and incremental sales trends and analysis leveraging baseline sales equation | - Total Incremental sales and Promo Efficacy evaluation<br>- Volume Decomp by Base and Incremental |
| **Lift & ROI Measurement through Promotion Equation**<br>- Create Promotion Equation to measure Lift & ROI - by seasonality, by tactic type<br>- Constraints and guardrails in line with commercial policy | - Understand which type of events / tactics provide best performance during different weeks in the year<br>- Channel Coherency, Price Gaps, Volume Conditionality and Margin thresholds |
| **Promo Event Performance Evaluation**<br>- Promo event performance evaluation by ROI & Lift<br>- Promo 52-week calendar view – self vs. competition analysis | - Segment events based on Lift & ROI |
| **Customer Profitability**<br>- Measure Customer Profitability | - Retailer Margin and Absolute Profit Analysis; Dead Net NSI analysis |

| Enhanced | Outputs |
|---|---|
| **Cross-Promo Impact and Halo Effect**<br>- Determine impact of promotions by competition | - Impact of Promotions by competition and other Halo effects; volume switch |
| **Promo Simulation**<br>- Leveraging the Promo Equation to simulate different promo constructs and measure impact | - Change future low RoI / Lift promotions |
| **Promo Planning**<br>- Develop an optimal promo calendar | - Automated full-year promo calendar |

Exhibit 3: Evolving from Foundational to Advanced Promotion Analytics Capabilities

With a solid data foundation and predictive and prescriptive analytics, CPG firms can now model, test, and execute a wide variety of scenarios that were previously difficult or impossible to analyze.

CPGs can leverage thousands of machine learning (ML) models for store clusters (price zones), product segments (price per gram, or PPGs), baseline forecasts, their own and CPEs, and halo effects to measure the transfer of demand from one brand to another due to price change or promotion or even elasticities by different fulfillment channels for the same retailer. They can measure potential impacts at a price zone and product segment level, determining how much sales loss will be temporary and how much will be long-term. They can also simulate other price points before accepting or adjusting the models' recommended prices.

With granular price zones, CPGs can now develop and easily implement different pricing strategies which historically have been standard at a retailer or banner level. They also can drive ROI and lift from tactical pricing strategies like promotions: After implementing new prices, they can use frameworks and advanced artificial intelligence (AI) techniques to evaluate results and plan future promotions. AI models identify which promotions to run, change, and eliminate, as well as what the promotions should be.

## Data Science Approach for Trade Promo Optimization

### Feature Engineering

**Dependent Variable**
- Sales

**Independent Variable –**
- Feature Ad
- Presence of Display
- Distribution
- Own promo price (TDP)
- Competitor Price
- Seasonality
- Relevant economic, demographic, social, variables

**Techniques**
- Feature transformation
- Interaction
- One-hot encoding

### Forecast Volumes

**Data Split**
- A clean split of train, validation and out-of-time test

**Modelling**
- Multiple modeling techniques
- Hyperparameter tuning

**Validation – Best model selection**
- Best model selection using out-of-time test-set

**Techniques**
- GAM model
- Log-log regression
- Tree based models

### Scenario Planning

**Constraint Identification**
- Seasonal
- Promotional
- Depth of Discount
- Factor combination

**Scenario generation**
- Plausible Scenario Generation

**Output generation**
- Best model Scoring
- Objective calculation (Revenue, Margin etc.)

**Techniques**
- Simulation

### Optimization

- Budget allocation
- $X Mn trade saving
- Maximize profitability (ROI, Margin, Customer margin)
- Opportunity assessment in trade term planning / Negotiations

**Techniques**
- Linear Programming
- Mixed-Integer Linear programming
- Heuristics based solution

Exhibit 4: A Data Science Approach to Optimize Promotions

# Advanced Pricing Capabilities Help CPGs Navigate the New Normal

### Optimizing price through cross-price elasticity

Instead of just analyzing their own price elasticity, CPG teams can evaluate CPEs to understand how price changes will impact competitor sales before making them.

### Navigating shrinkflation

CPGs can use analytics to determine which products are good candidates for reducing size and volume, while maintaining sticker price. By doing so, they can continue to capture sales from price-sensitive consumers who otherwise might defect to other brands.

## Balancing Inflation and Growth with Sustainable Pricing

Techniques to understand Consumer Behavior towards Shrinkflation: reducing volume at same price / pack

| Approach | Description | Data Science - Tools & Techniques |
|---|---|---|
| Establish Price per volume | Analyze historical tactical pricing approaches to establish Price / volume. Determine consumer response to change in volume | **Traditional and modern pricing models like GAM, linear and Orthogonal ML**<br>**Challenges**<br>• Many crucial variables like consumer preferences, brand loyalty, perceivable weight reduction and marketing strategies may be unmeasurable |
| Using Lookalike product and historical event similarity | Analyze Historical Data with similar action and the resultant demand transfer | **Traditional and modern pricing models like GAM, linear and Orthogonal ML in conjunction with neighborhood search**<br>**Challenges**<br>• Dependence on Historical Data where similar price action was taken in the same product or a similar product<br>• Other variables like macroeconomic factors may have changed over time, which would affect the effective applicability of the model to current scenario |
| Test – Control Analysis | Analyze Post Facto changes by taking into consideration promo vs non-promo prices to determine price range and impact on price elasticity for a pack size | **Four Cell Ancova, Difference-in-difference model**<br>**Challenges**<br>• Need significant investments and time to analyze Post Facto Changes<br>• Lookalike market identification for effective test vs. control analysis |
| Consumer Research | Analyze data collected through Consumer Research to determine price elasticity of their products and identify optimal pricing and packaging strategies | **Van Westendorp Pricing Model, Surveys, Choice Card or Conjoint Analysis**<br>**Challenges**<br>• Defining multiple segmented sampling strategy based on Market, Price Gaps and Competitor products |

Exhibit 5: Using Pricing Analytics to Evaluate Shrinkflation, "Weight-in / Weight-out", and New Product Release Opportunities

## Understanding channel shifts

CPGs can use analytics to understand how demand is shifting across online and offline channels due to trends such as hybrid work and consumer financial pressures.

# Optimizing channel specific prices while catering to shift in Consumer Channel Preferences

- Capture changing Consumer Preferences in post-Covid market given hybrid work setup
- Determine opportunity for CPGs to meet their consumers where they shop

| Approach | Description | Data Science - Tools & Techniques |
|---|---|---|
| Sense Consumer Preference in Channel Shift | Optimize channel mix by analyzing consumer preference across channels, modelling on historical data and measuring the shift from the predicted demand trends | **Demand Equation**<br>**Challenges**<br>• Historical demand data between channels might be skewed owing to significant shifts in buying preferences post Covid |
| Identify Price Elasticity across Channels | Implement effective pricing strategies for each channel by deriving the channel specific price elasticity | **Channel specific Price Elasticity Models**<br>**Challenges**<br>• Availability of channel wise 12-months pricing data post Covid |

Exhibit 6: CPGs are Considering Consumer Switching as they Set Product Prices across Channels

## Pricing new products

CPG teams want to determine the best price for new products to ensure they are well-received by consumers. Techniques very similar to measuring Shrikflation (Exhibit 5) can be evaluated for new product pricing as well. New products can be in the form of Line Extensions, Brand Extensions, or a Whitespace in a new category. CPGs need to identify look-alike products, the weight of brands, and historical response to similar introductions to determine optimal pricing for new products and introduce in the right test markets before a larger rollout.

## New Product Pricing – Where is the new product landing?

| Line Extension | Brand / Segment Extension | Whitespace Fulfillment |
|---|---|---|
| • Pack size / count<br>• Flavor / Color / Nutritional Value<br>• Packaging / Limited edition | • Targeted Brand Buyers<br>• Conflicting Pricing<br>• Unique positioning: Kids, Sports Enthusiasts | • Entry into new category<br>• Entry into a product line |

**Key Considerations**

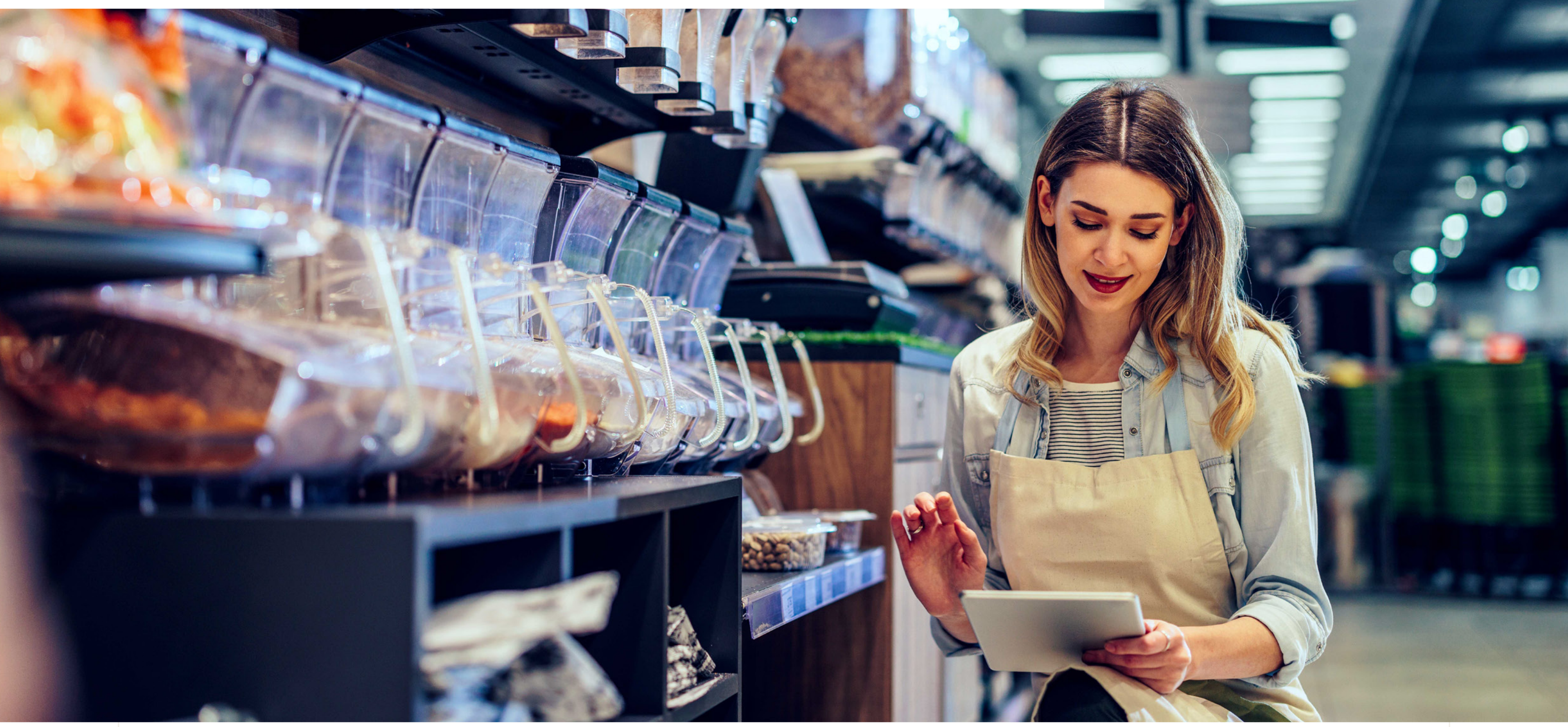
Look-Alike Products » Similar Target Groups » Brand Strength » Incremental or Cannibalistic

Exhibit 7: New Product Scenarios and Considerations for Pricing

Enabling these use cases can help CPG firms drive significant value from their pricing and promotion strategies. They can eliminate low-performing promotions, drive ROI and sales lift by optimizing promotions and distribution, and reduce cost to serve. When scaled globally across large product portfolios, analytics can create a significant advantage: unlocking revenues and cost savings across multiple areas that can be funneled back into product innovation and marketing initiatives.

# Real-World Success Stories

Learn how other enterprises have leveraged CPE to drive revenues and cost savings.



# Global FMCG Firm Accelerates Planning by 3X

Leaders at a top-three fast-moving consumer goods (FMCG) firm wanted to identify CPE across different product groups, retailers, and timeframes. The team started with their Food Category in the Frozen Aisle, encompassing ~3000 SKU-market combinations. Tredence delivered a cross-price modeling solution that provided robust data, modeling tools, and scenarios for the product line. The solution's causal ML model evaluates key data points, performs a regression analysis, and synthesizes findings for every product in a market.

**1,200+**
**Opportunities that can create value in the category**

**90-95%**
**Fit achieved for all SKUs using the causal model**

**3X**
**Reduction in planning by optimized pipelines**

# Global CPG Firm Optimizes $400M Promotion Budget

Leaders at a premier consumer products company sought to develop a platform that would measure the effectiveness of its trade promotion spending down to the individual campaign level.

Tredence built an agile and scalable AI/ML solution, migrated data to the cloud, and leveraged the Hyperscaler platform to build ML models at the SKU and customer levels. Then, Tredence established baseline metrics, so users could evaluate historical promotions, simulate scenarios, and plan new promotions by forecasting ROI.

**+80K**
**Build out unique ML models across 13 countries and 1,100 SKUs**

**~$400M**
**Total promotion budget in scope**

**90-95%**
**Improve promotions ROI year-over-year**

**3X**
**Reduction in planning by optimized pipelines** [3]

# Drive More ROI from Promotions This Year

Your trade promotions team can use data, AI/ML models, scenarios, and recommendations to drive more value from product pricing and promotions.

Make the best decision for every pricing and promotion change while scaling results across SKUs, campaigns, product portfolios, and markets. Improve ROI and drive cost savings that make campaigns more profitable and provide data to defend promotions budgets and increases.

3 "Prescriptive Insights to Drive Effective Trade Promotions Effectiveness for a Global CPG Company," case study, Tredence, 2022, https://www.tredence.com/assets/case-studies/driving-effective-trade-promotions-effectiveness-with-prescriptive-insights.pdf

## So, why choose Tredence as your partner?

Tredence works with top global CPGs to solve last-mile data and AI challenges. We partner with CPGs to drive pricing and promotion strategies, strategically allocate budgets, and ensure sustainable growth.

### Tredence

#### Provides deep industry expertise

**We work with eight of the world's top 10 retailers and eight of the top 10 global CPG firms.** We have a deep understanding of the industry, business challenges and goals with pricing and promotions.

#### Offers data science expertise

Our industry and data science teams enable specific pricing use cases that incorporate first-and third-party data. They provide a robust view into expected consumer behavior and competitor activity, enabling CPG firms to make informed decisions and increase ROI.

#### Delivers industry robust accelerators

We provide accelerators across price, promotion, mix management, trade architecture, and innovation. These accelerators enable CPG firms to determine cross-price elasticity and profitable price pack architectures (PPAs), optimize promotion planning, identify assortment gaps, classify trade spending & determine ROI, and identify white spaces that can be exploited to unlock new sources of demand.

#### Offers horizontal accelerators

Tredence provides data quality, pipeline, lineage, and testing accelerators that can help develop a sustainable data foundation.

# Improve Revenue Visibility and Control with Cross-Price Elasticity Capabilities

CPG firms run dynamic businesses, constantly evolving products, pricing, and promotions to address new market, business, and consumer developments.

CPG teams that improve their understanding of cross-price elasticity can exploit both strategic and tactical pricing to drive growth. They can optimize pricing across SKUs, implementing granular assortment strategies. In addition, CPGs can use insights to optimize pricing strategies across product portfolios and regions, focus product innovation and growth strategies, and increase their competitiveness with advanced data science and AI techniques.

## Ready to learn more?

We're offering a complimentary 60-minute discovery call to help you evaluate the ROI potential of developing cross-price elasticity capabilities at your company.

**Contact us to learn more.**
www.tredence.com/industries/cpg

## About the Authors


### Jason Villano
Global Head of Customer Success & Strategy, CPG Practice, Tredence Inc.


As Tredence's Global Head of Customer Success and Strategy, Jason and his team merge technology and business to enhance CPG engagement with AI solutions. With 20 years in the food and beverage industry, notably at Coca-Cola, he firmly believes AI will revolutionize CPG operations, delivering expanded insights and actions that drive quantifiable value.


### Kashyap Kasinarasimhan
Senior Director, CPG Strategy, Tredence Inc.


With 19 years in the CPG industry, Kashyap specializes in advanced analytics and insights to boost business performance. Focusing on end-user applications, he has leveraged AI/ML solutions across functions like Revenue Growth, Sales, Marketing, and Supply Chain. A strategic thinker with strong managerial skills, Kashyap has led initiatives that substantially impacted companies' financial outcomes.



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