Introduction

Concept Overview - Data Based Problem Solving

September 3, 2025

Reach out to us at

ZDS Helps Build Problem Solving Capability of the Future

Full Stack Data Science and Analytics Solutions –
Data Engineering, Data Science (ML and AI) and Business Intelligence

Deep expertise in **Retail (Ecommerce and B&M), Healthcare, CPG, Budget Planning and Optimization** using AI and Analytics Applications

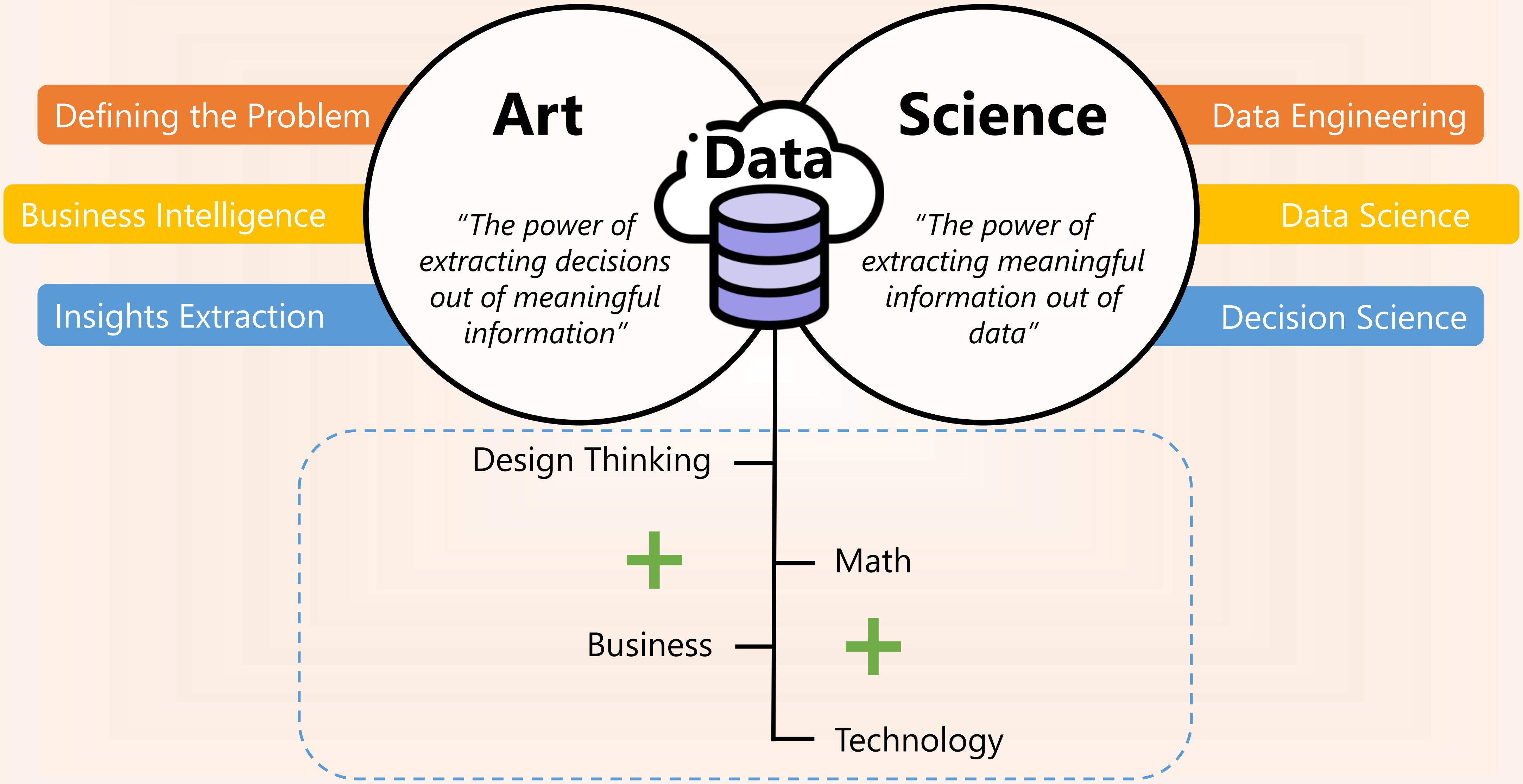
Believe in enabling **"AI for all"** – We've help build **AI** driven solutions for clients with all levels of data maturity and complexity

Highly **Embedded Engagement Model** with the Client Ecosystem –
Engage as one with the client organization

Multiple Fortune 500 Clients Relationships across **US and India**

team's problem solving experience

Enabling Informed Decision Making Through Data



All Elements When Put Together Enable Impactful and Informed Decision Making

Industry Expertise

Media & Marketing

Problems around measuring true ROI, attributing conversions across channels, reducing wasted ad spend, personalizing campaigns at scale, and predicting customer responses.

Product Analytics

Problems solved in include tracking product performance, measuring user adoption, understanding customer behavior and identifying friction points

Retail

Problems around customer analytics, Omnichannel customer purchase behavior, supply chain and logistics, pricing and marketing

BFSI

Cross selling, fraud analytics, customer lifetime value, CRM analytics, claims analysis

CPG

Marketing and promotion design, consumer behavior, halo and cannibalization, supply and optimization

Manufacturing

Demand planning, Manufacturing cycle productivity and efficiency analysis, calibration and management dashboards

collaboration model

Process Mapping

Data Asset Identification

Current BPF Mapping

Data Flow Mapping

DVF Framework

Desirability
Solving the right problems and designing solutions that are useful

Viability
Contributing to long-term growth with the help of sustainable solutions

Feasibility
Designing practical solutions that help strengthen business

Development

Data Assets

- Project Plans
- Data Dictionaries
- Quality Control
- Data Models
- Dashboards
- Analytics Solutions

Consumption

- Opportunity Realization
- Stakeholder Training
- User Acceptance Testing

Access to Ecosystem: People, Processes, Platforms

100% White Box Approach

Co-creation of Consumption Driven Solutions

Capability Tech Stack at

Data Engineering

snowflake
Azure Data Factory
Azure
teradata.
mongoDB
Google Cloud
nosql
Microsoft SQL Server
aws
hadoop HDFS

Machine Learning and AI

R
ML base
python™
jupyter
Cloud AutoML Vision
TensorFlow
DataRobot

Business Intelligence

Qlik
Qlik Sense
ThoughtSpot
Power BI
TIBCO Spotfire®
CLEAR ANALYTICS
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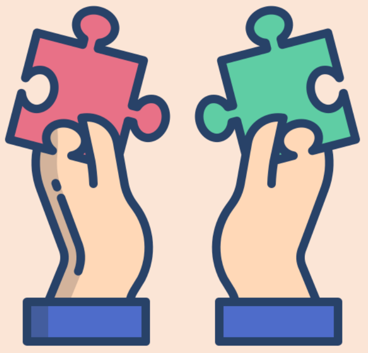
DOMO

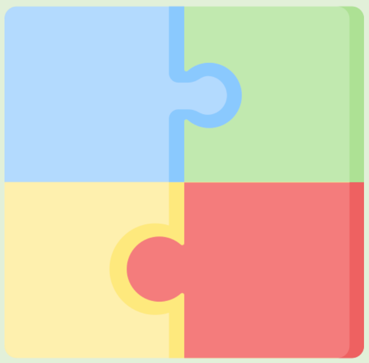
Scaling and Productionization

HTML
AppSheet
CSS
JS
databricks
Azure DevOps
Se

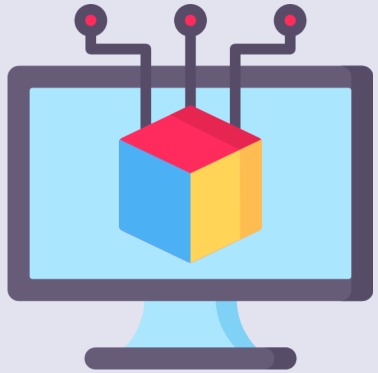
Helps Build Problem Solving Capability of the Future



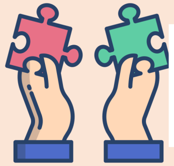
Problem Definition



Solution Design



Productionization/ Scaling



Problem Definition Frameworks

Purpose – Benefit Validation

What do we want to do and why?

What is the benefit of solving this problem?

DVF Framework

What is the **Desired** solution?

Is this solution **Viable** from a time and resource investment standpoint?

Is this solution **Feasible** in the current state?

Interconnection Graphing

How does solving this one problem affect other problem areas in the business?

Solution Design

Data Engineering

helps in comprehensive data engineering solutions to store and maintain integrity and consistency of data

End-to-End Data Architecture Design

Analytical Data Flow Design & Management

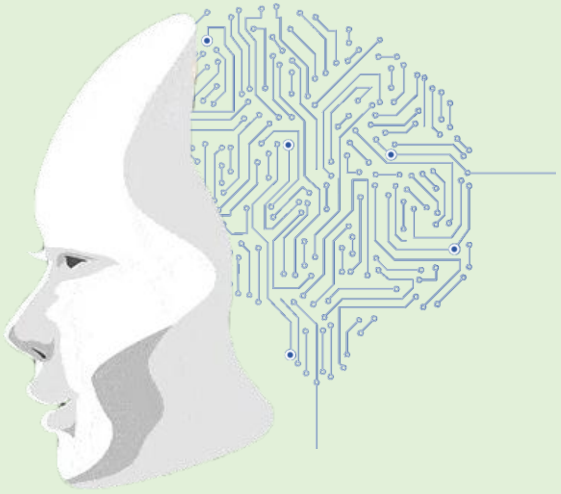
Data Quality Management (DQM):
Completeness, Consistency, Conformity, Accuracy, Integrity, Timeliness

Metadata Management

ETL Process Design and Automation

Data Dictionary Design & Automated Management

Solution Design



Data Science

enables advanced data science solutions combining the powers of math and cutting-edge technology

- Predictive Analytics
- Large Language Models and GenAI
- Deep Learning
- Natural Language Processing
- Computer Vision
- Neural Networks
- Hypothesis Testing
- Fraud Analytics
- Churn Analysis
- Exploratory Data Analysis
- Segmentation & Clustering
- Image Processing

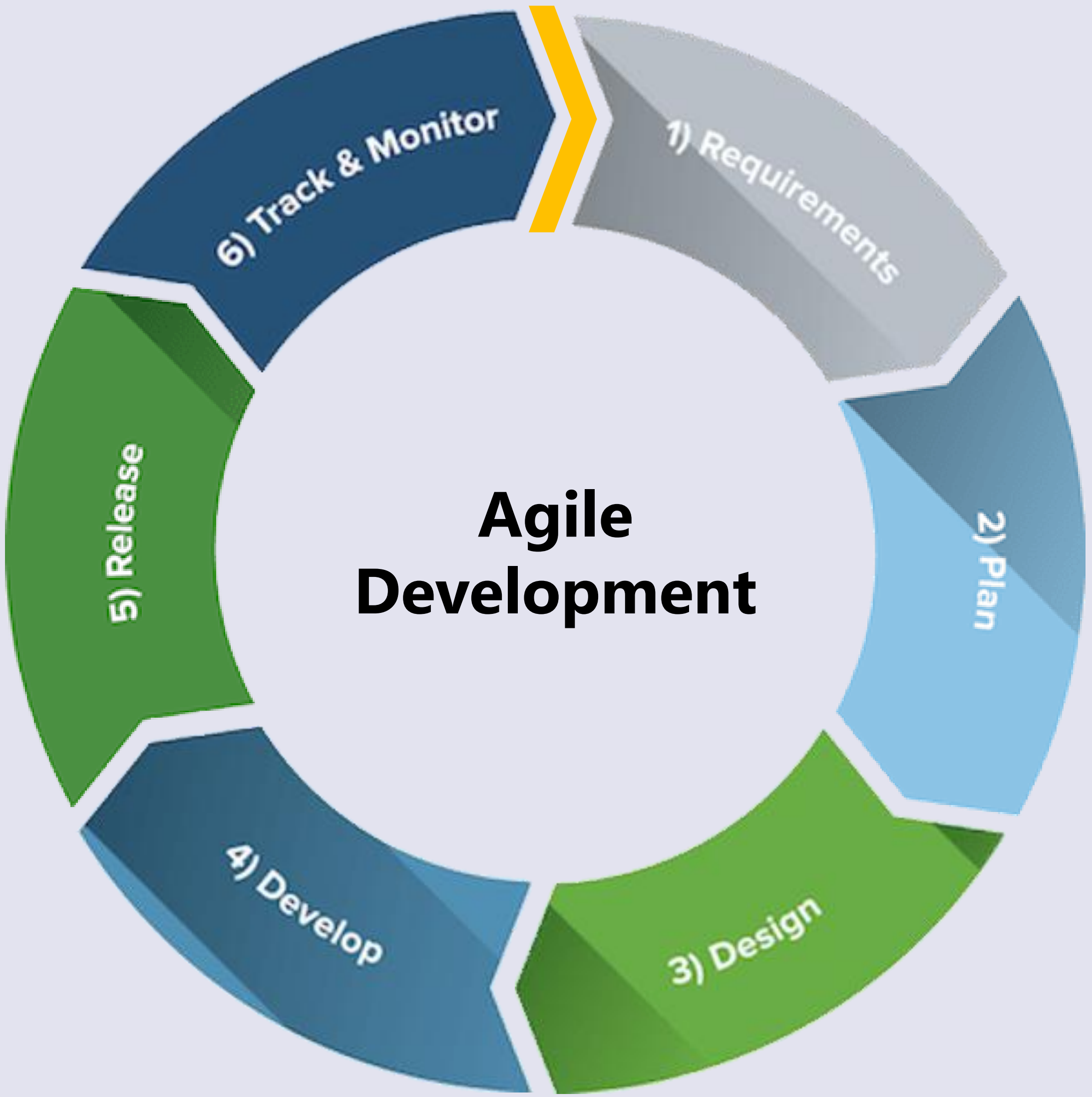
Solution Design

Decision Science

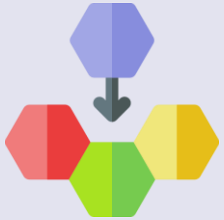
enables key decisions by utilizing intelligent tools and frameworks

- **Intelligent Reporting**
- **Consumption Driven Design**
- **Business Intelligence**
- **KPI & Value-based Impact Estimations**
- **Analytical Roadmaps**
- **Business Process Flow (BPF) & Analytical Data Flow (ADF) charting**
- **Entity & KPI Resolution across Business Functions**
- **Digital Transformation Program - Design and Implementation**

Productionization/Scaling Software Development



SAAS with Agile Ways of Working



Modular Solution

Customization and changing priorities can be effectively met with modular solutions. Furthermore, modular solutions are easily scalable and reproduceable

Scalability

Solutions can be quickly scaled up to any level and in a wide range of capabilities. Scalable solutions enables increased reach across the organization/clients

Faster Iterative Development

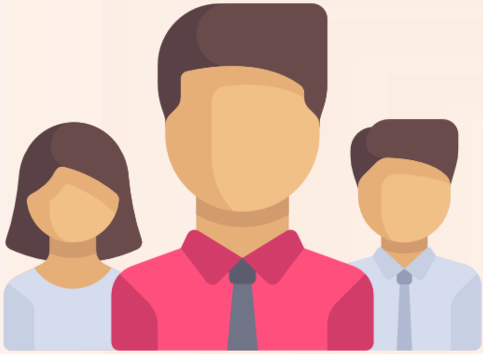
Frequent delivery and iteration of solution helps to achieve faster delivery of final product

Seamless Integration

The solutions are designed to provide seamless integration between multiple platforms and across various data sources

UniZen Program for clients

Current State:



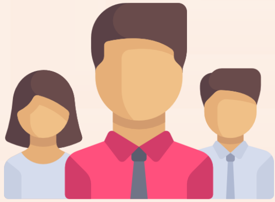
Business Teams

Sharing Problems with low understanding of Data Science and Analytics

Solving Problems with low understanding of Business context and implementation

Analytics Teams

Post Program State:



Business Teams

Seamless Integration of Business and Analytics Context in problem solving by all parties

Analytics Teams

Client Transformation Journeys(1/2)

	Story	What did we do?	What capability did we build for the customer?
Retail Campaign Design and Measurement	Promotion Analysis – **Leading American Discount Retailer**	Helped design and evaluate the experiment to compare multiple promotion tactics for a certain product at the retailer	**Created a campaign design and measurement framework for test and control experiment with advanced analytics**
Budget Recommendation Engine	Budget recommendation tool– **American CPG Agency**	Created a tool to help allocate marketing budget across multiple retailers for a CPG client	**Budget optimization capability – Scenario Simulator and budget recommendation capability**
Revenue Management Simulation	Revenue and cost model implementations – **Leading American beverage brand**	We built a planning simulator to quantify and compare promotional effectiveness and revenue management	**Machine learning based Scenario Simulator – Promotional effectiveness**
Predictive Clinical Trial Enrollment	Enrollment prediction for trial for efficient planning – **Leading American Healthcare Organization**	Leveraged machine learning and stochastic simulations to forecast enrollment performance at both site and trial levels	**Monte Carlo based simulations to enable preemptive actions and corrections in a trial**
Supply Chain Optimization	Forecast Optimization – **Largest Beer Producer in the world**	Developed an enhanced methodology to deliver product-market level forecast – 25% better forecast observed	**Built a framework to account for seasonality and effect of promotion on market demand**
Social Listening Tool – NLP Implementation	Sentiment and Market Analysis – **Leading American Media Agency**	Built an end-to-end Natural language processing engine embedded in an interactive tool to capture Brand sentiment	**Natural Language Processing(NLP) Engine –Topic Modelling – Sentiment Analysis – Brand and Competitor Analysis**

Client Transformation Journeys(2/2)

	Story	What did we do?	What capability did we build for the customer?
AI Insights	Feedback Insights – **Leading American performance management SaaS platform**	Automated the end-to-end collection and analysis of qualitative and quantitative team feedback, reducing manual effort and subjectivity in retrospectives	**Built and Integrated an AI-powered engine for automated feedback ingestion, rule-based analysis, and sentiment/thematic pattern detection**
Ask AI	Sentiment and Market Analysis – **Leading American performance management SaaS platform**	Automated and streamlined executive access to customized, on-demand business insights using AI-powered query flow	**Delivered an AI-driven platform for instant, contextual data analysis, integrating custom query handling and natural language Q&A**
Customer Segmentation and profiling	Promotion Analysis – **Leading American Discount Retailer**	Helped build an AI based customer segmentation and profiling analysis	**Reusable customer segmentation model and Outreach oriented customer profiles**

Retail Campaign Design & Measurement

Designed 4-cell test and learn experiment to understand the impact of sending out offline coupons and the incremental impact of sending out mailers to customers(1/2)

Client Situation

- Leading US retailer has presence both online and offline, with **gadget products** contributing around 80% of overall sales
- Client wanted to launch a nationwide couponing campaign for a few gadget products, targeting Millennial customers throughout US
- Before rolling out the nationwide campaign, client wanted to understand the **impact** of introducing the coupons, and the additional impact of sending mailers

Solution

- Design an experiment in **4 selected DMAs** which are similar to each other and a very close representation of US population
- **4-cell test and learn** design is adopted, with **3 DMAs** receiving different **treatments** each, and the remaining DMA serving as **control**
- All stores in each DMA would either distribute **offline coupons, send mailers** to customers, send **coupons along with mailers,** or receive **no treatment** at all (control)
- Post implementation of treatments, **sales of gadgets** to be analyzed to understand the **impact of each type of campaign** on all customers and target customer segment specifically

Business Impact

Increment in ROI

Identifying successful campaign type enabled client to make smarter budget decisions, leading to an increase of ~4% in gadget revenue

High Customer Satisfaction

Implementation of couponing strategy led to a rise in customer satisfying scores, especially amongst millennials

Scalable and Reusable

Scalable and **robust** solution that can be used to measure effectiveness of all types of marketing campaigns

4-cell test and learn framework helped identify the most successful campaign type (2/2)

Experiment Design

Store Demographics:
- Store size
- Overall sales
- Sales per visit
- Total Households in trading area
- …

Customer Behavior:
- Time spent on website
- Frequency of visit
- Avg spending power
- …

Factors used to identify similar test and control DMAs

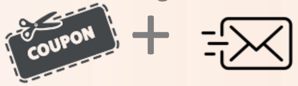
DMA Demographics:
- Age
- Income/Affluence
- Ethnicity
- Urbanicity
- Education Level
- Employment rate
- …

Product Attributes:
- Product sales
- Competitor products
- Product pricing
- …

DMA 1
Group – Test group 1
Treatment – Coupons are distributed in stores

DMA 2
Group – Test group 2
Treatment – Customers are sent promotional emails

DMA 3
Group – Test group 3
Treatment – Coupons are distributed along with emails



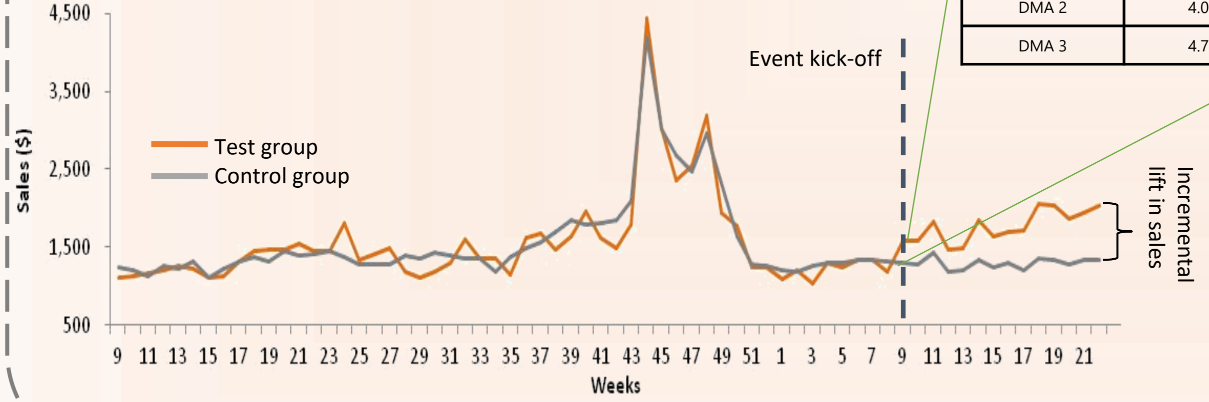
DMA 4
Group – Control group
Treatment – No promotion

No Promotion

Experiment Measurement

Incremental Lift Measurement

Lift % = ΔTest Sales - ΔControl Sales**



DMA	Incremental Lift
DMA 1	4.5%
DMA 2	4.0%
DMA 3	4.7%

** Δ is calculated by analyzing pre and post campaign metrics*

Basket Metrics Analysis

*(Test Group** vs. Control Group)*

Sales/HH: 4.2%
Baskets/HH: 2.3%
Units/HH: 2.5%
Basket Value: 5.7%
Basket Size: 4.3%
Avg Unit Price: 2.6%

Sales/HH: 0.2%
Baskets/HH: -0.4%
Units/HH: 0.4%
Basket Value: 0.5%
Basket Size: 0.1%
Avg Unit Price: 0.3%

*** DMA 1 basket metrics are shown as example*

Findings:

✓ Email campaign and coupon campaign both show incremental lift in gadgets sales. However, using both campaigns together does not improve the lift by much

✓ Coupon redeeming baskets have a higher value, with more high-ticket items than non coupon redeeming baskets. This implies couponing campaign encourages customers to shop more

✓ The team also found that the incremental lift is highest among Millennials and recommended a specialized campaign for the segment

Budget Recommendation Engine

Developed a recommendation engine to optimize budget spent on product promotion campaigns across multiple retailers, for a leading coffee brand (1/2)

Client Situation

- Leading coffee brand **designs campaigns** to promote their products across all retailers
- Existing budget allocation strategy looked at **sales within the retailer** and split budget amount proportionately. Higher the sales, more is the budget allocated
- The client required a **sophisticated tool** to incorporate more factors into the allocation strategy and split the budget **efficiently across retailers and tactics**

Solution

- **Understanding when to spend**: Distributing budget at hand across quarters to ensure efficient returns throughout the year
- **Understanding where to spend**: Allocating budget to various retailers based on factors other than just sales, such as growth, category saturation, brand presence, return on investment, and presence of target customers
- **Understanding how to spend**: Analyzing previous performance of campaign tactics, to calculate returns on ad spend (ROAS) and spend allocated budget effectively
- Designing a **user friendly and flexible** tool, which combines the capability of **data driven insights and business intuition**, allowing for manual intervention at every step

Business Impact of new solution

Intelligent Budget Allocation

The client now has a highly intelligent and sophisticated recommendation engine, incorporating data decisions and business heuristics, to help allocate budget better

Efficient Split with High Returns

With added intelligence, the new budget allocation strategy is highly efficient, and led to and average increase of **4% ROI across retailers**

Scalable and Reusable

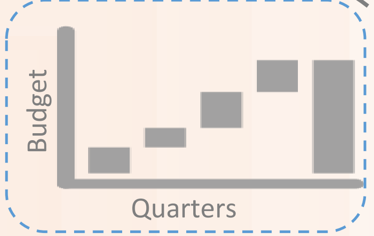
Scalable and **user-friendly** solution that can be used as an effective prioritization framework and resource allocation

Designed a three-pronged engine with end to end recommendation capabilities (2/2)

01 Distribution of budget across quarters:

Quarterly budget is allocated in proportion to quarterly sales

Sales - $15M | Sales - $13M | Sales - $10M | Sales - $17M



02 Distribution of budget across retailers:

Data Driven Levers

Score 1: Selling power of retailer

Score 2: Growth of retailer over last 2 years

Score 3: Brand presence within category

Score 4: Category Saturation in retailer

Score 5: Return on Investment

Score 6: Share of Wallet of target customer segment

Data

Amalgamation of the scores for each retailer, plus assignment of business weightage to the levers
=
Normalized Composite Score

+

Business Intervention

- Assign weightage to data levers
- Prioritization of budget based on business priorities
- Customization capability at every step leading to a transparent solution

Budget allocation is finalized based on business intervention combined with data driven levers

03 Distribution of budget across tactics:

Budget for a tactic is allocated in proportion to ROAS

Retailer 1 (Q1 budget) = $200K

Tactic 1	Tactic 2	Tactic 3	Tactic 4	Tactic 5	Tactic 6
$50K	$20K	$30K	$70K	$10K	$20K

Revenue Management Simulation

Resource Growth Management strategy plans have been built around answering questions in 8 major business areas for one of the Largest Beverage Brand

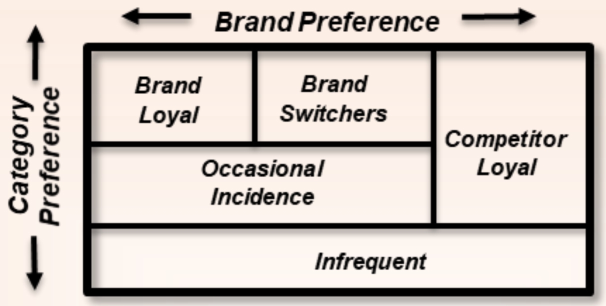
We built a planning simulator to quantify and compare promotional effectiveness

01 Data Gathering & Prep

Gather all sources of data and perform ETL queries

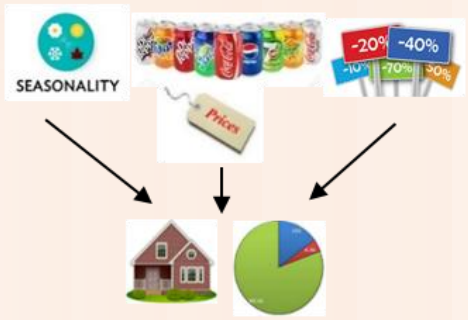
02 Segmentation & Clustering

Remove outliers and create behavioral segments using K-mean clusterings



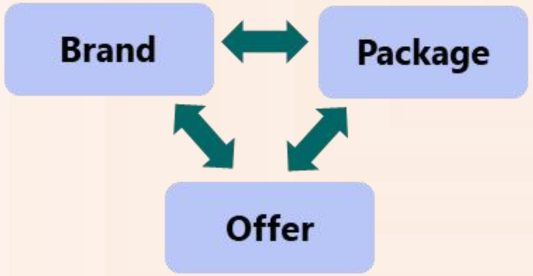
03 Model Building

Build models for each retailer, category, segment level



04 Model Insights

Understand brand, package, and offer preferences per segment



05 Prepare Simulator

Gather, generate, and load required files for simulator

- *Current Promotion Plan*
- *Re-planning dataset*
- *Redemption Rate dataset*

Lookup tables

06 Re-planning

Leverage model insights to run scenarios

Supply Chain Optimization

Developed a modular **analytical framework** to better quantify the effects of **consumer & trade promotions** leading to an increase in **forecast accuracy** (1/2)

Client Situation

The client is a **Fortune 500** global **alcoholic beverage manufacturer** with presence in over 100 countries through a network of wholly/partially owned bottlers

The client were encountering **low forecast accuracy** primarily due to the inability to accurately **quantify effects** of consumer and trade **promotions**

The client wanted to develop a **modular framework** that would help **quantify promotional lifts** and improve **forecast accuracy**

Solution

- Calculation of **seasonality indices** at a market and product level
- **Decomposition** of demand to remove the trend and seasonality components, isolating the effect of promotions on demand
- Evaluation of **historical performance** of promotions based on factors like the promotion type, region, category, timing and duration
- **Prediction** of lift expected from upcoming promotions

Business Impact of new solution

Improved Accuracy

The project helped quantify the lift for over **25 promotions** that were rolled out across **200 products** resulting in a **25% improvement** in forecast accuracy

Continuous Improvement

The forecast was continuously monitored and refreshed based on learnings from actual data. This closed loop approach has enabled a cycle of **continuous improvement in the forecast quality**

Scalable and Modular

The solution framework was developed in a manner that enabled it to be **scaled to other markets** in a rapid manner

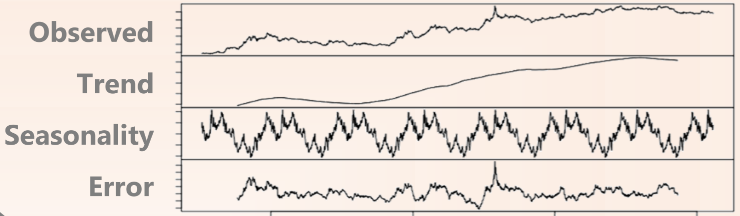
A **promotional lift model** was implemented as an extension to the existing forecasting system (2/2)

01 Calculation of seasonality indices at a market and product level:

Market Level Seasonality Indices

Product Level Seasonality Indices

02 Decomposition of demand to remove trend and seasonality components, isolating the effect of promotions on demand:



Isolate effect of promotions on demand

03 Evaluation of historical performance of promotions based on various factors:

Historical Performance Evaluation

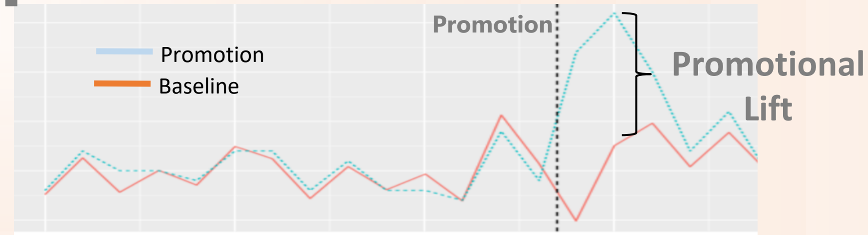
Promotion Type

Category

Region

Timing & Duration

04 Prediction of lift expected from upcoming promotions:



A forecast adjustment factor was developed to capture the seasonality and promotion effects by period

The solution was implemented in a phased manner to cover all the geographic zones

Diligent monitoring and closed loop approach has enabled a cycle of continuous improvement in the forecast quality

Predictive Trial Enrollment

Predictive Trial Enrollment is the ability to predict enrollment into a trial over time allowing for greater accuracy in planning the duration and other aspects of the trial

Client Situation

- There is a need for efficient trial planning and management to optimize spend and outcomes
- Currently, high manual effort and cost goes in trial enrolment a lot of which is wasted due to inefficient planning
- The client required a real-time platform to track the progress of a trial and make proactive measures

Approach

- Data extracts from MDM/iAWARE, and convert to raw data csv, clean, filter, integrate and enriched with Geocoding
- Feature engineering to create site-level targets and model preprocessing into training and validation data sets
- Model development using Monte Carlo Simulations though h2o package within Python, top models for each target variable saved

Business Impact

Efficient trial planning

Ability to accurately predict trial enrollment **prevents the need to rescue** trials due to poor enrollment compared to predictions

Real time tracking

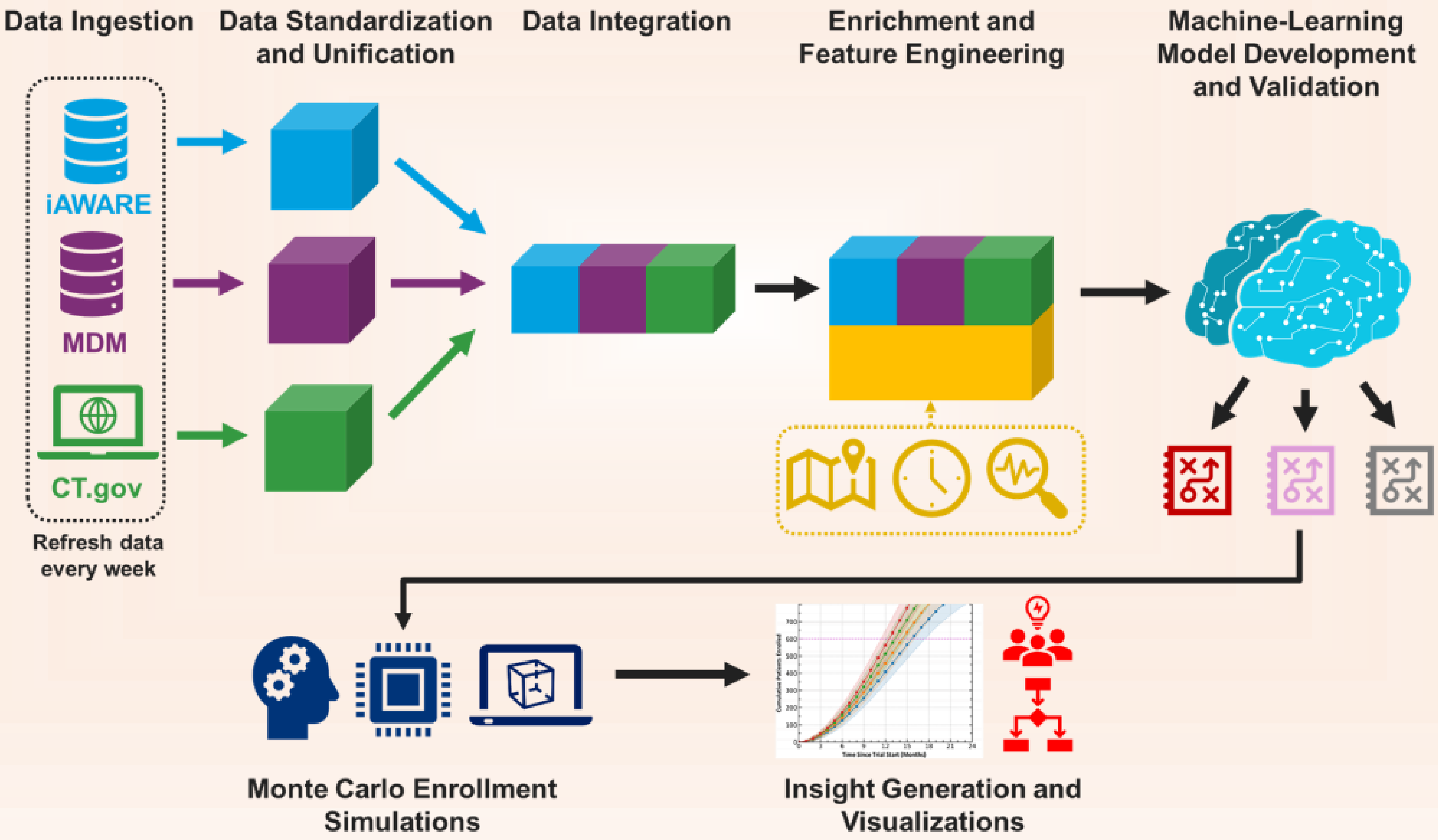
Flag any major discrepancies would allow teams to initiate an investigation and potential mitigation measures in a timely manner

Therapy area agnostic

The model is developed to work for all indications in a TA post validation and testing

Predictive Trial Enrollment model utilizes Monte Carlo simulations to generate highly valuable insights

PTE analytical pipeline leverages machine learning and stochastic simulations to forecast enrollment performance at both the site and trial levels



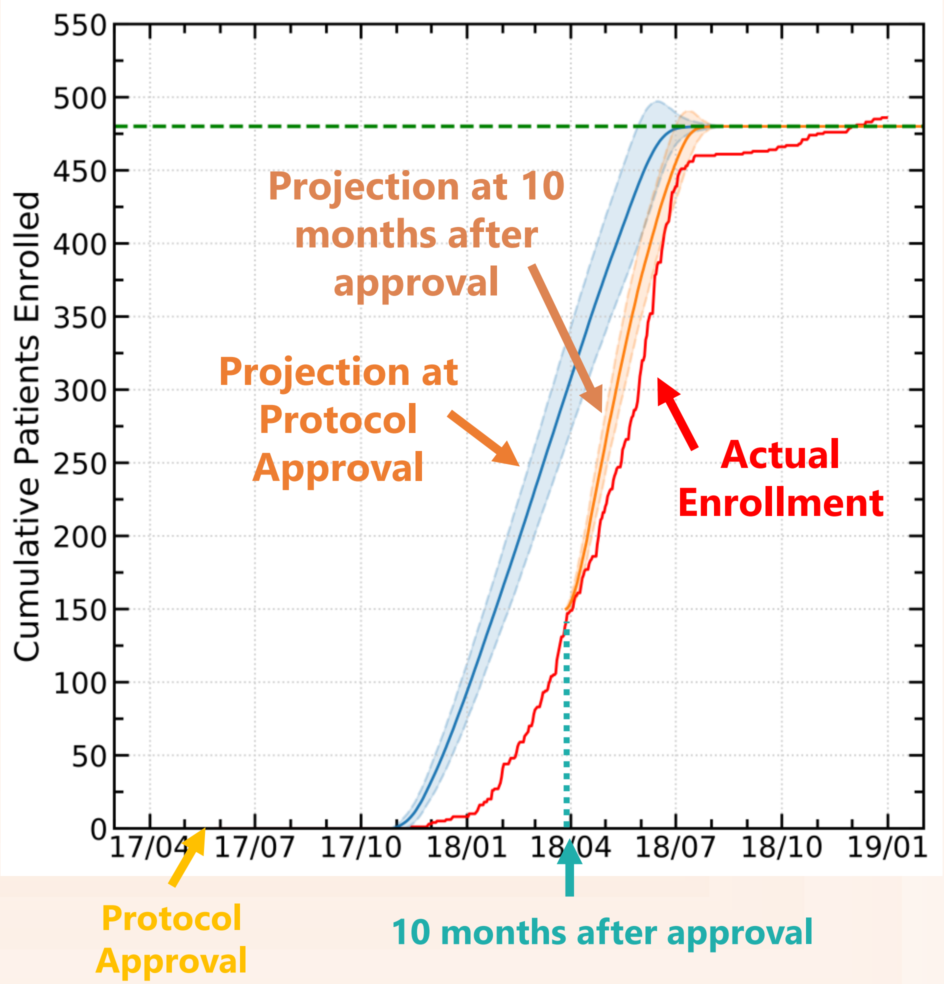
Enrollment Simulations for Multiple Myeloma

What does the enrollment curve look like after 10 months - 31% enrolled

- **Enrollment curve** formed by predictions using 10 months (31% enrolled) of MMY3012
  - No data beyond the first 10 months was used
- **Curve** follows similar trend as **actual enrollment** until ~90% of enrollment completion
  - **Actual enrollment** curve exhibits new behavior beyond ~90% completion

What did CDS learn from the PTE-PoC?

- **PTE is suited to predict enrollment trends between 30-90% of the trial enrollment progress**
- How does PTE predict site-level enrollment?
  - Direct enrollment prediction not feasible due to lack of data
  - Indirectly infer enrollment by predicting screening counts and success rates
- How does PTE compare against actual results?
  - Enrollment simulations closely aligned with actual enrollment 30-90%
  - Comparable to linear models of enrollment



Social Listening Tool

Social Listening Tool (SLT) helps to effectively measure impact of marketing campaigns and consumer sentiment across brands (1/4)

Client Situation

Client is a leading US media and marketing agency. They spend about **$400MM per year** on digital marketing and advertisement from the US alone.
This investment of time and dollars is made to induce consumers to buy from the brands running these marketing campaigns. To increase ROI through speed and focused marketing it is important to understand what the customer experiences when targeted by a marketing campaign

Business Requirements

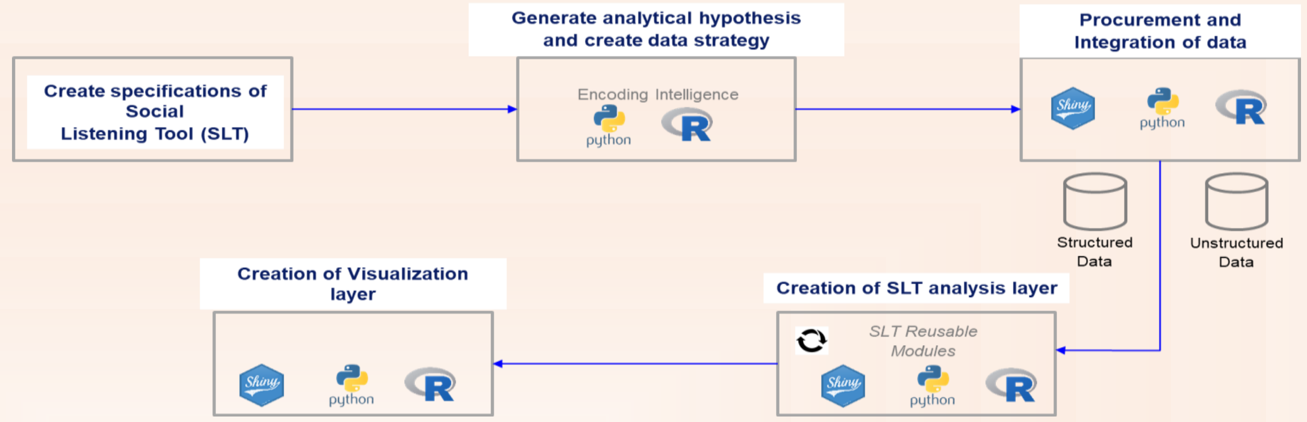
- Ensure robust input by accurately integrating various structured and unstructured data sources required for Consumer sentiment and Purchase Decision Hierarchy (PDH)
- Enables inputs for effective campaign design and real time spend optimization
- Enable effective consumption through an automated dynamic visualization tool

Business Decisions Enabled

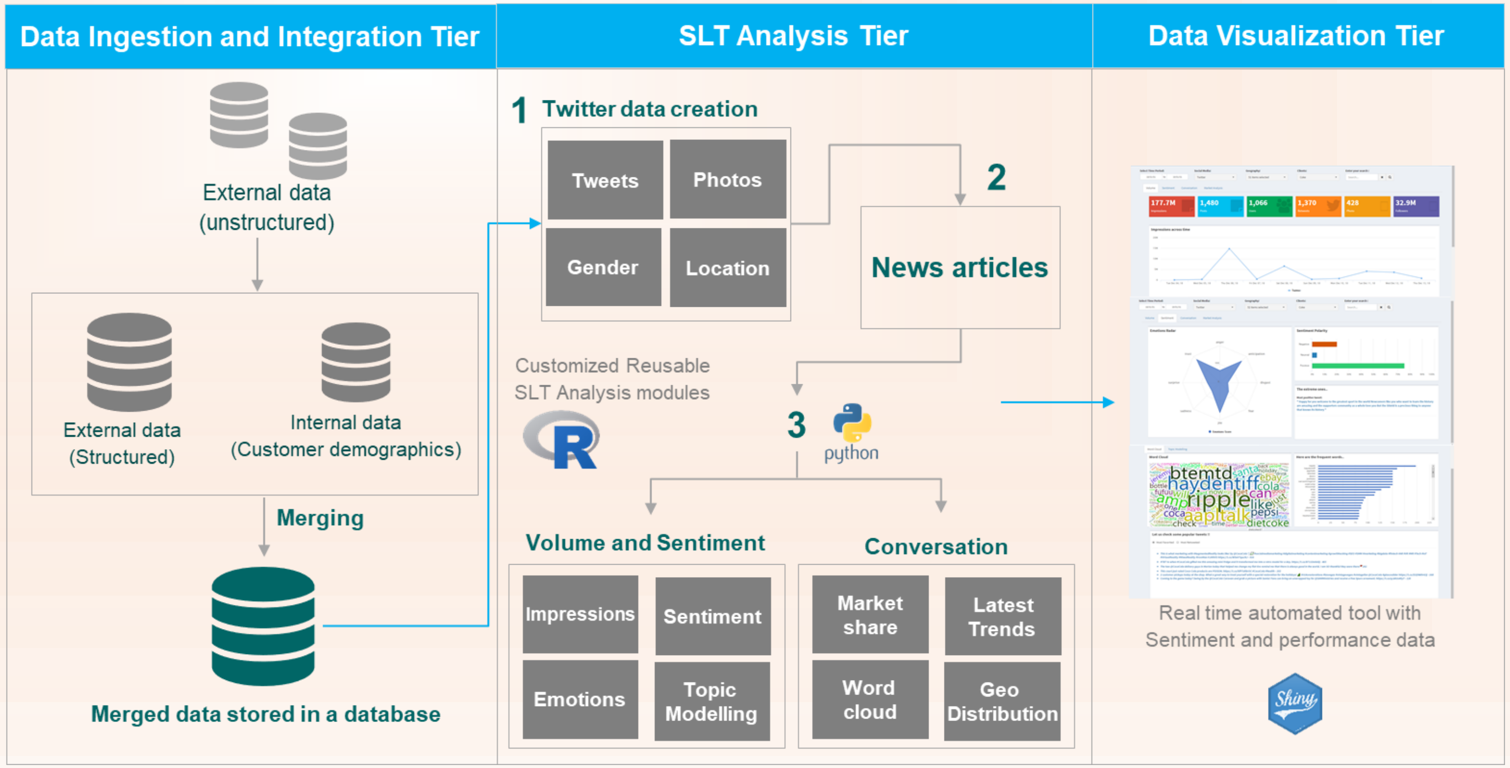
- Enables effective marketing budget decisions by understanding the impact on consumer sentiment
- Helps in identification of opportunity areas for business development by reading the consumer sentiment towards various brands
- Enables design of on optimal marketing campaign with focused content and message
- Helps in keeping track of the competitor activity and plan counter marketing strategies

Social Listening Tool analytical workflow and backend architecture (2/4)

Analytical workflow



Backend Architecture

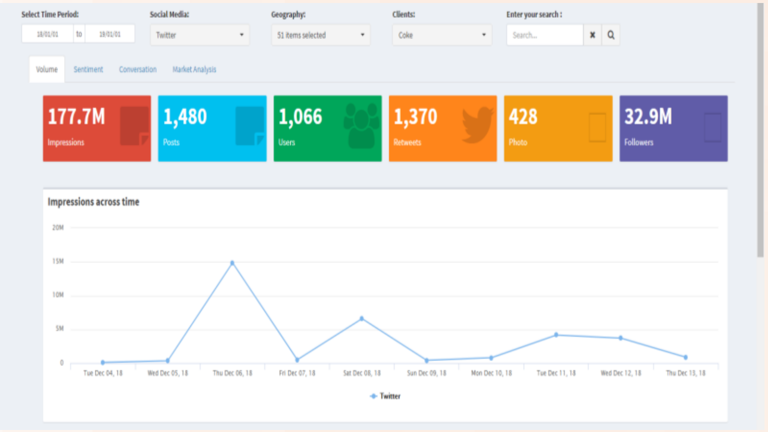


Social Listening Tool analytical workflow and backend architecture (3/4)

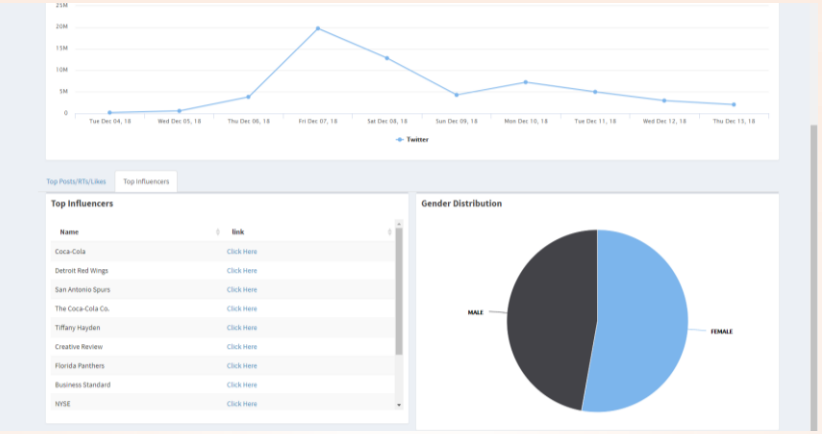
Key Features	Tool component	Analysis component
Brand reach assessment	Potential reach of the brand at overall level along with across gender and geography	Used aggregation algorithm to calculate potential reach and mapping each tweet to retweets, shares, quotes and followers
Top influencer identification – Reach based mapping	Ability to view the list of profiles which have the maximum impressions for their posts	Used ranking methodology to identify active profiles with the most liked, commented and retweeted posts-
Sentiment analysis and Emotion’s radar	Implementing emotional radar for easy consumption of top emotions towards the selected brand	Performed sentiment analysis on each words used in a tweet and rolled up the results on the identified emotions leveraging Natural language processing (NLP)
The extreme tweets in terms of sentiments	Ability to see the list of top tweets which were identified as extreme in terms of emotions	Clustering each tweets in positive, negative and neutral. Selecting the most scored tweets from each clusters
Word cloud for most popular words	Ability to see the most used words related to the selected brand	Identifying the most used words for a brand using text mining after removing filler words
Topic Modeling for most spoken topics	Ability to identify topics that are being talked about	Using supervised learning, extracting themes from each tweet and cluster similar tweets into a topic
News and Most recent trends	Ability to see what’s new in the market for the selected brand and its competitors	Used NewsAPI to extract multiple new articles and performed text mining to extract useful information

Social Listening Tool – Interactive Tool Snippets (4/4)

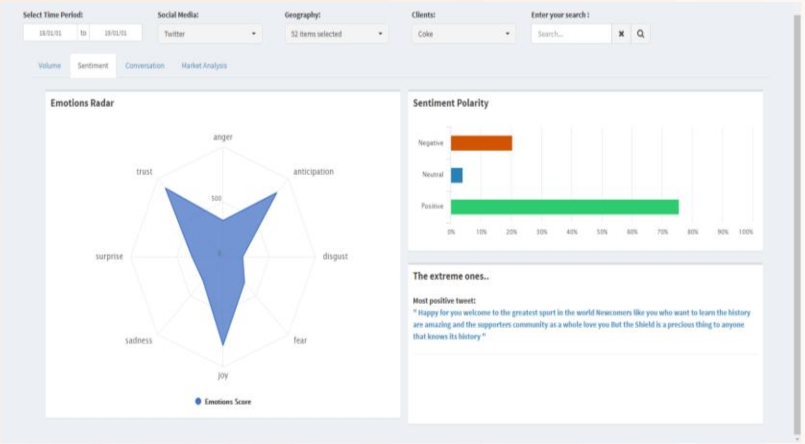
Social media engagement summary



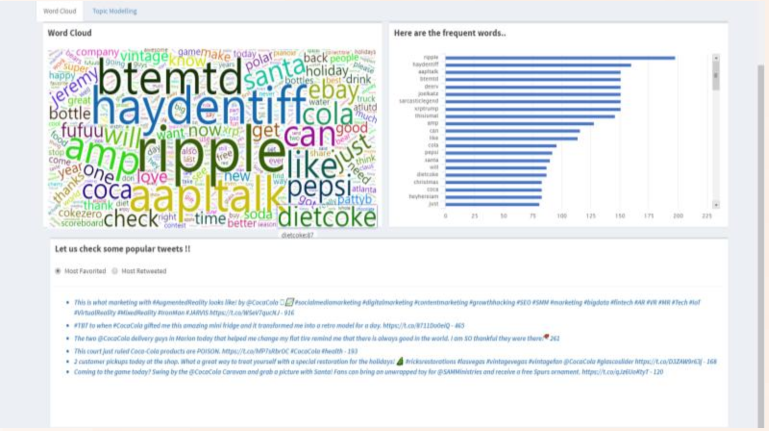
Engagement distribution



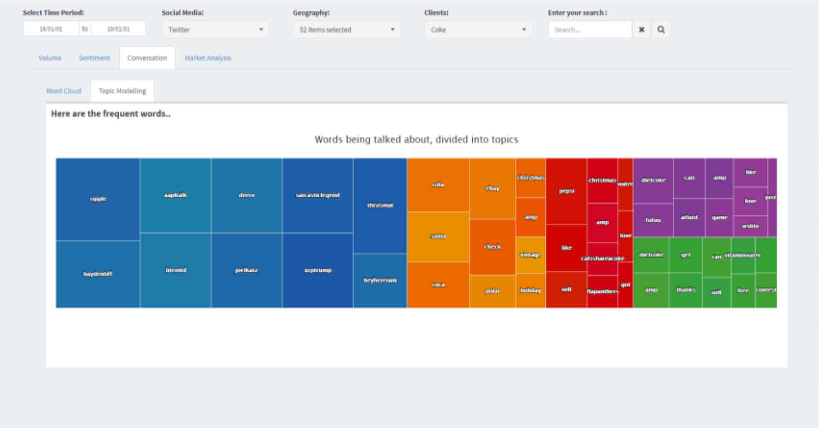
Sentiment and Emotion Analysis



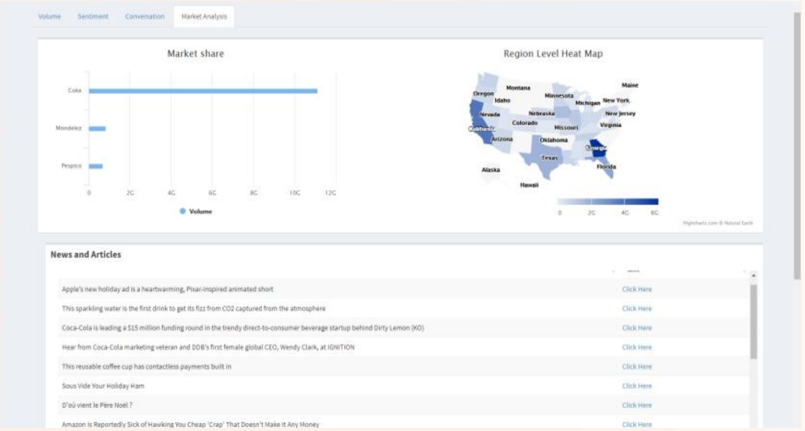
Word cloud and top posts



Topic modelling



Market analysis



AI Insights

"Making retrospective meetings more insightful, un-biased and less inconsistent"

Business Problems & Our Approach

	
Manual collection of qualitative and quantitative team feedback was time-intensive	Seamless integration with existing tools and workflows using Azure Functions and Data Factory for end-to-end automation
High dependency on SM/PO interpretation introduced bias	Rule engine applied business logic for objectivity
Unstructured feedback made it hard to identify patterns across sprints	AI-based summarization detected themes & team sentiments consistently

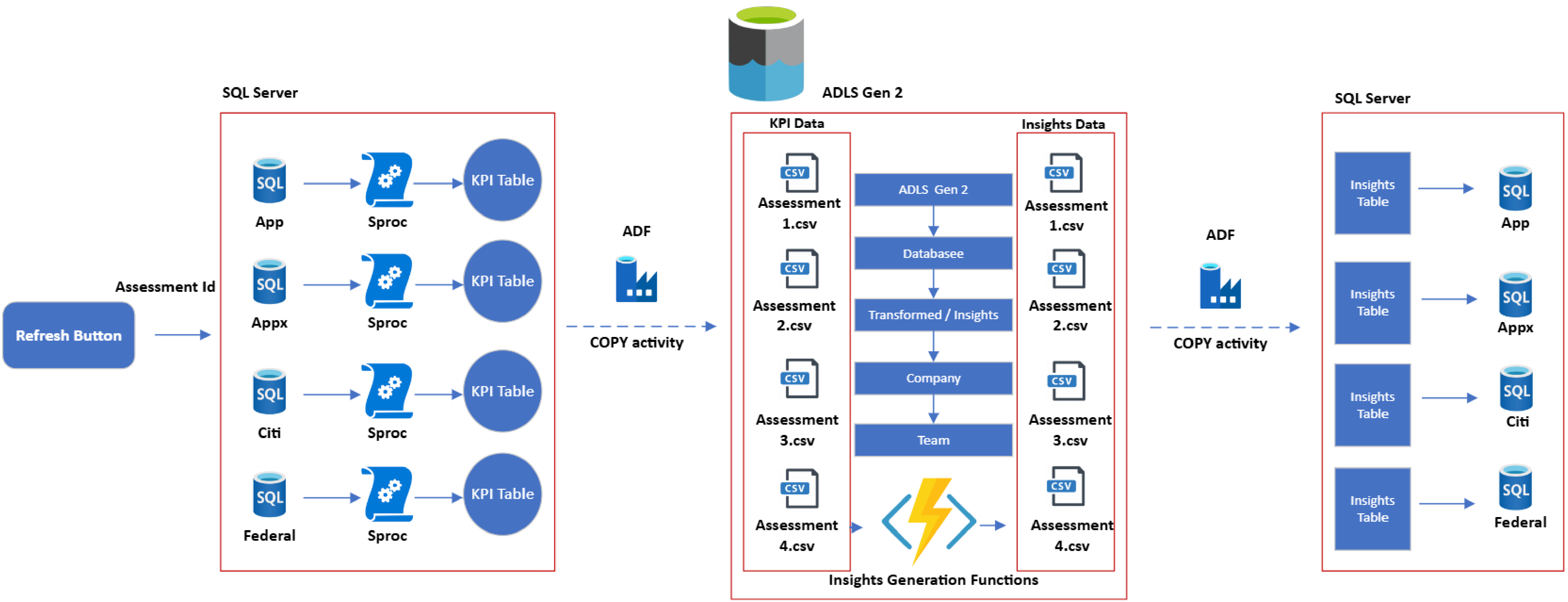
Strategic - Business Impacts

Achieved an 80% reduction in Scrum Master/Product Owner preparation time for retrospectives.

Established an actionable feedback loop that significantly improved team velocity and alignment.

Realized a 70% improvement in the quality and depth of team-level insights.

Ai Insights Architecture



Ask AI

"*Helping executives make faster, data-driven decisions with easy access to custom insights – data in seconds instead of days*"

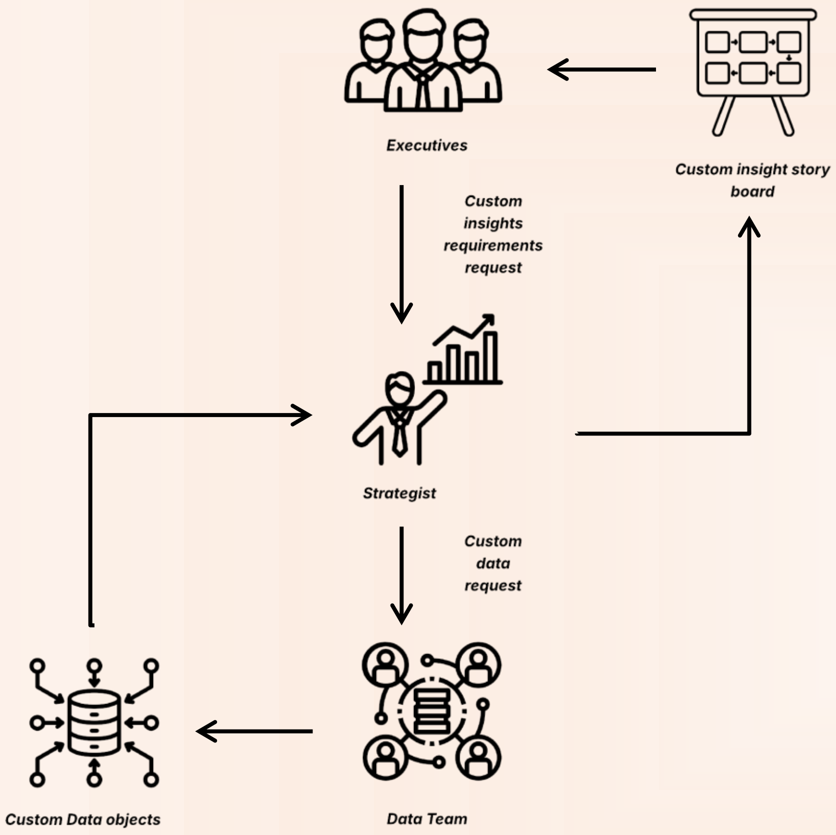
Business Requirements

Executive leaders within client organizations need to access ad hoc, context-specific, and highly customized data insights on team performance and organizational agility

CSM teams need to deliver monthly reports explaining the current state of agility.

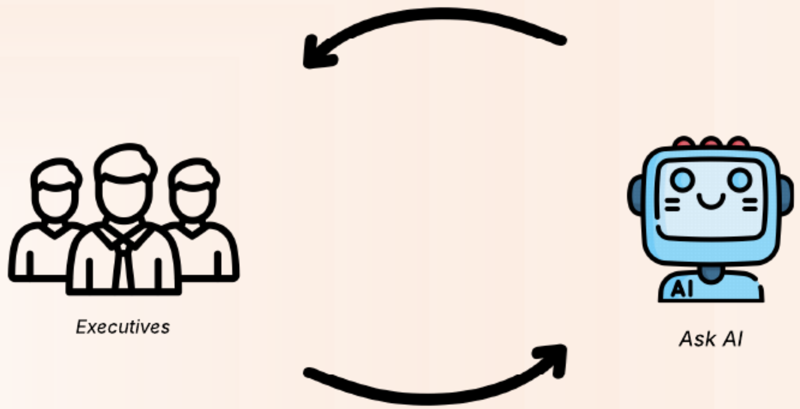
A forum equipped with deep product knowledge to efficiently support customers in understanding the product vocabulary

OLD APPROACH



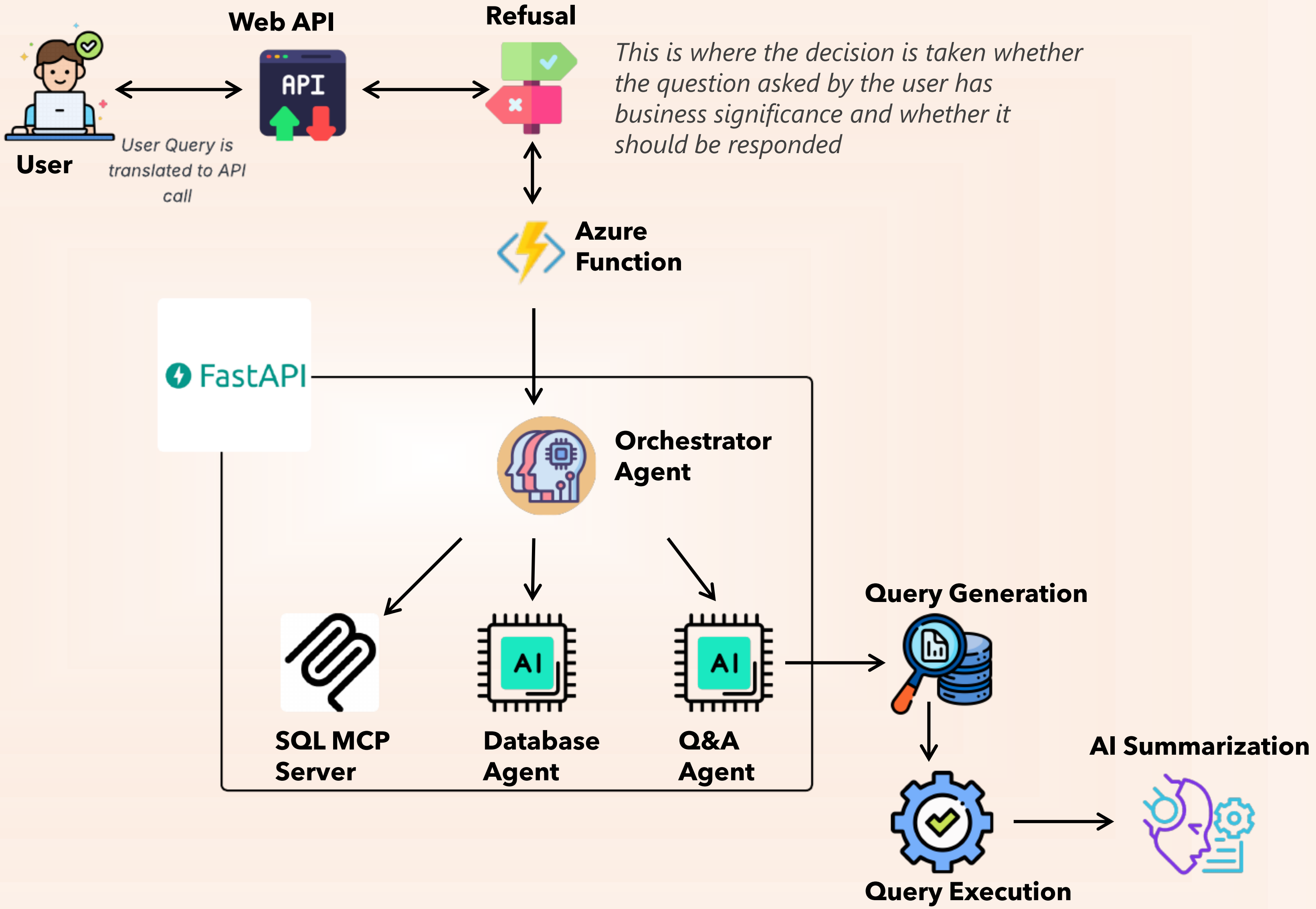
The whole process took 2+ days

NEW APPROACH



Less than 20 seconds

Ask AI User Query flow



Customer Segmentation and Profiling

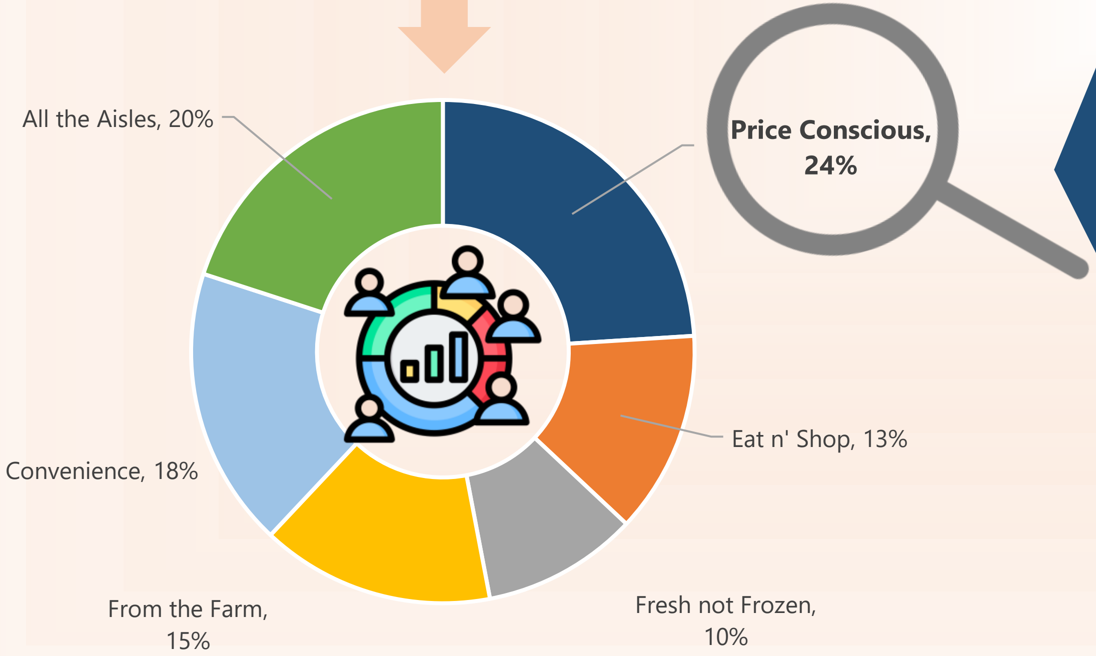
Key Questions - Behavioral Segmentation & Profiling

Behavioral Segmentation

Customer Segmentation & Persona Creation by Shopper1st:

- ❑ *Price Conscious* – Focus on Private Label, Look for Discounts
- ❑ *Fresh not Frozen – Buy fresh produce, do not buy frozen or prepared food*
- ❑ *Segment C – Description*
- ❑ ……….

Rule Based Tagging of persona descriptions to loyalty customer base of 2.2 MM



Customer Base

Profiling of Segments

Key Questions to be answered about each segment

Who is the customer? How are they different from an average customer?

What and how do they shop? How is their purchase behavior different from others?

How do their baskets and trip types look like? Can we cross-sell or up-sell products based on this?

How can we target these customers? Can we identify upcoming lifestage and plan ahead?

Are these customers online-savvy? Can they be targeted with online campaigns? How likely are they to respond?

Can we identify similar baskets or purchase patterns Amongst non-loyalty customers and target them too?

Who is the customer?

Segment - Price Conscious Customers

Summary

Price Conscious | All Retailer

Spend per HH
-5% $1,342 | $1,413

Units per HH
-6% 343 | 366

Average Unit Retail
1% $4 | $4

Visit per HH
-3% 27 | 28

Units per Basket
-4% 12 | 13

Spend per Basket
-3% $49 | $50

Price Conscious customers are essentially **Caucasians** belonging to the **middle income group.** They are usually comprised of the **older age groups** with more **number of children.**

This segment generally over indexes in the **Com Bread, Deli, and Frozen** departments

Over Index

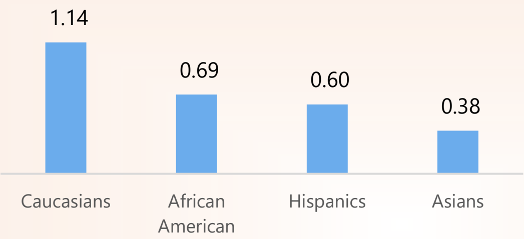
Social:
Country Comforts
Middle America
Landed Gentry
Lifestage:
Mainstream Families
Cautious Couples
Conservative Classics

Under Index

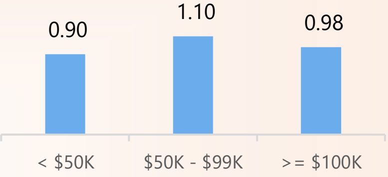
Social:
Urban Cores
Midtown Mix
Urban Uptown
Lifestage:
Sustaining Families
Young Achievers
Striving Singles

Who are they?

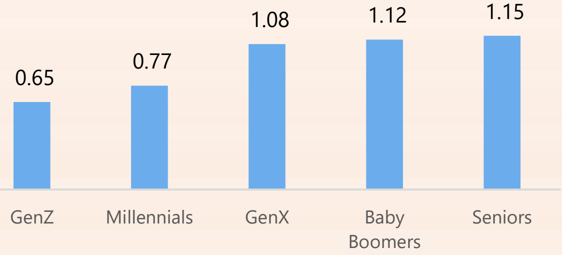
Ethnicity



Income Groups



Age Groups



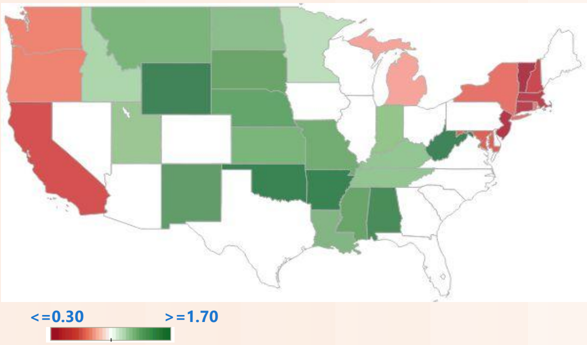
Household Size / Number of Children

Household Size – 4+ (1.15)

Children – 4+ (1.47)

Where are they from?

1	Oklahoma	1.88
2	Arkansas	1.86
3	Wyoming	1.64
4	West Virginia	1.64
5	Alabama	1.60



Omnichannel

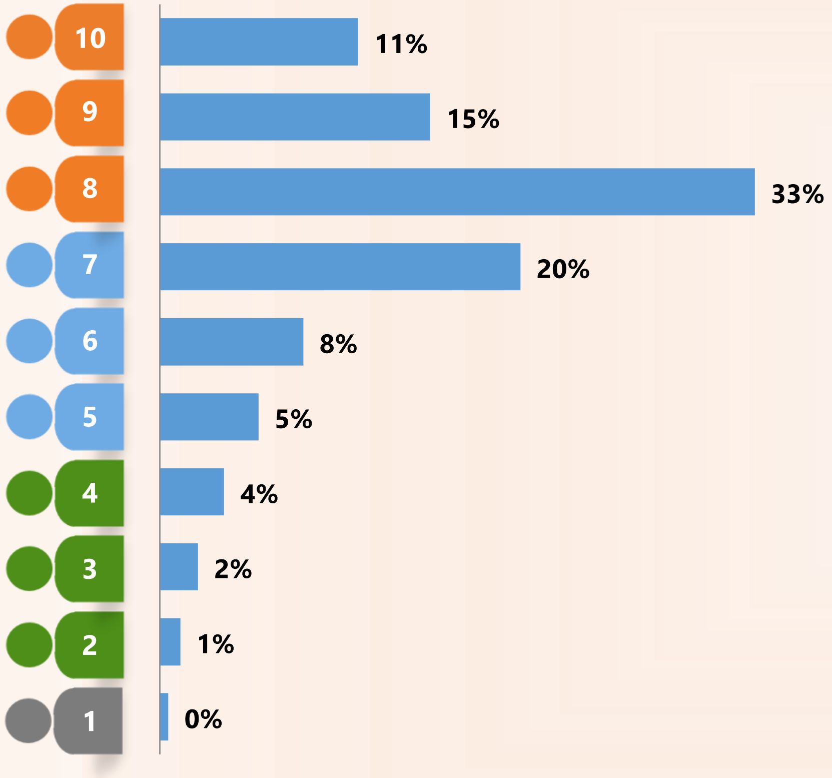
26%

Of Customers are Omni Channel Shoppers

How do they shop?

Segment - Price Conscious Customers

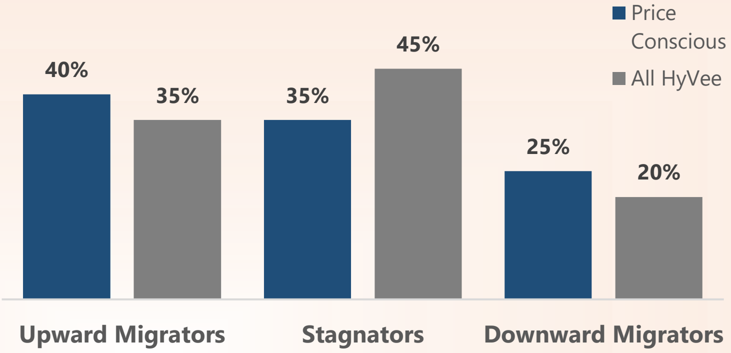
Deciles



*Price Conscious customers mostly fall under **7th-8th deciles**. **Above average spenders** with **potential of growth.***

Further analysis: How can we push the customers to spend more and climb up the decile ladder

Migration from LY



Upward Migrators — *Customers with >20% spend increase from LY*

Stagnators — *Customers between -20% to 20% change from LY*

Downward Migrators — *Customers with >20% spend decrease from LY*

*Price Conscious customers show **more upward migration behavior** than an average customer. Possibility to influence change is higher here*

Further analysis: What are the upward migrators doing differently? Can we learn and push similar behavior?
Example Insight – Upward migrators buy 95% of time there's a discounted product. Push more discounts to downward migrators and stagnators

Migration from other segments

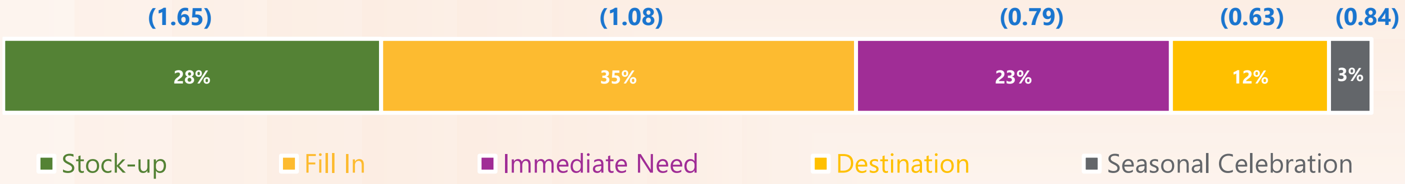
	Top 3 Incoming Segments	% HH	$ Sales
1	Convenience	4.1%	$467Mn
2	All the Aisles	3.3%	$321Mn
3	From the Farm	1.3%	$133Mn

	Top 3 Outgoing segments	% HH	$ Sales
1	Eat n' Shop	6.0%	$144Mn
2	Fresh not Frozen	3.9%	-$100Mn
3	Occasional H&W Convenience Shoppers	0.5%	-$102Mn

What do they buy?

Segment - Price Conscious Customers

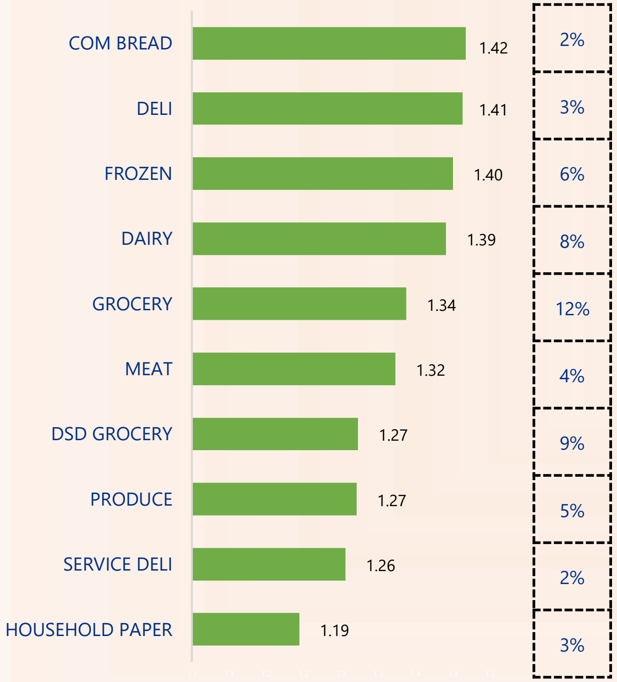
Trip Type



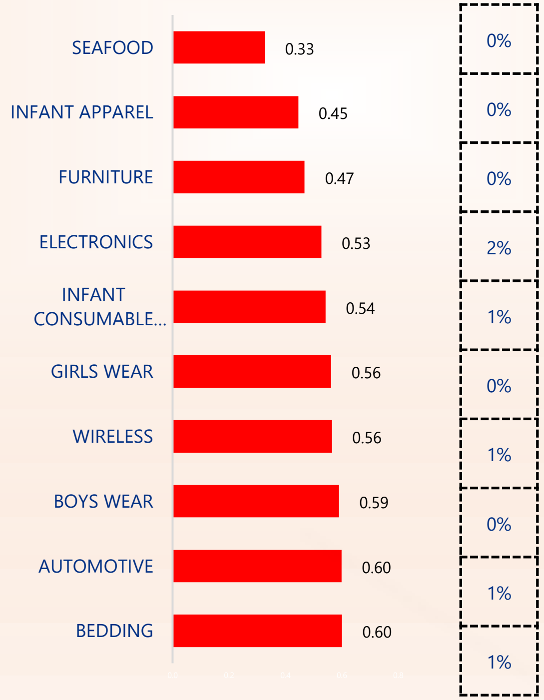
Private Brands

Sales Contribution: 22%
Sales Contribution Index: 1.07
Customer Penetration: 100%
Customer Penetration Index: 1.09

Top 10 Departments



Bottom 10 Departments



The index values shown signify how much more or less likely customer in that segment will purchase in that department as compared to all other traced customers

Price Conscious customers buy a lot of corn bread, deli and frozen products, while buying les of automotive, bedding and boys wear. Big ticket items such a furniture and electronics are also less frequently purchased.

Discounts and marketing efforts can be applied to big ticket items to appeal to the price conscious customers

Index = $\left(\frac{\textit{Sales of Department X in Segment y}}{\textit{Sales of all Departments in Segment y}}\right) / \left(\frac{\textit{Sales of Department X in all Segments}}{\textit{Sales of all Departments in all Segments}}\right)$

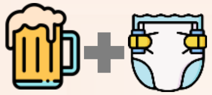
Index   Sales Contribution

How can we target them?

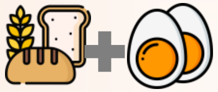
Segment - Price Conscious Customers

Market Basket (Affinity Analysis)

Analyze all type of baskets

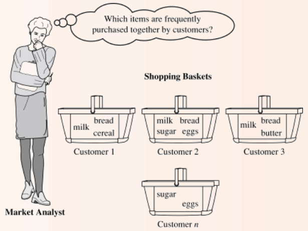


Beer + Diapers



Bread _ Eggs

Identify items most frequently purchased in the same basket



Rule: $X \Rightarrow Y$

$$Support = \frac{frq(X,Y)}{N}$$

$$Confidence = \frac{frq(X,Y)}{frq(X)}$$

$$Lift = \frac{Support}{Supp(X) \times Supp(Y)}$$

Rule	Support	Confidence	Lift
$A \Rightarrow D$	2/5	2/3	10/9
$C \Rightarrow A$	2/5	2/4	5/6
$A \Rightarrow C$	2/5	2/3	5/6
$B \& C \Rightarrow D$	1/5	1/3	5/9

*Result from this analysis can help **up-selling and cross-selling** associated products to these customers*

Basket Lookalike Modelling

Baskets purchased by price Conscious segment

Similar baskets purchased by Non-Loyalty customers: Can we offer POS offers to customers purchasing similar baskets?

Thank You!