Lancaster Centre for
Forecasting

Lancaster University
Management School

Practitioners' Workshop, October 2015: Promotional Modelling and Forecasting

Selected slides from a Practitioners' Workshop held in London, October 2015 – including presentations by forecasting specialists at SAS and Nielsen

Lancaster Centre for Forecasting, UK

nielsen

MANAGING THE MARKETING MIX

James Oates
6th October 2015

MAXIMISING MEDIA AND PROMOTIONAL INVESTMENTS

An evolving challenge – evolving Nielsen approaches

The challenge of promotional and media investment

Measuring price and promotional activity effectively in the context of the full marketing mix

Meeting the challenge of an increasingly complex media landscape

Driving granular precision
measurement to aid investment

MONTH
DAY
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OCT 26 1985 09 00
DESTINATION TIME
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Back to the Future...

GETTING FORECASTS RIGHT – ITS INCREASINGLY COMPLEX

Speed of change

- Markets are different and demand questions are increasingly fast paced, quickly changing environment.

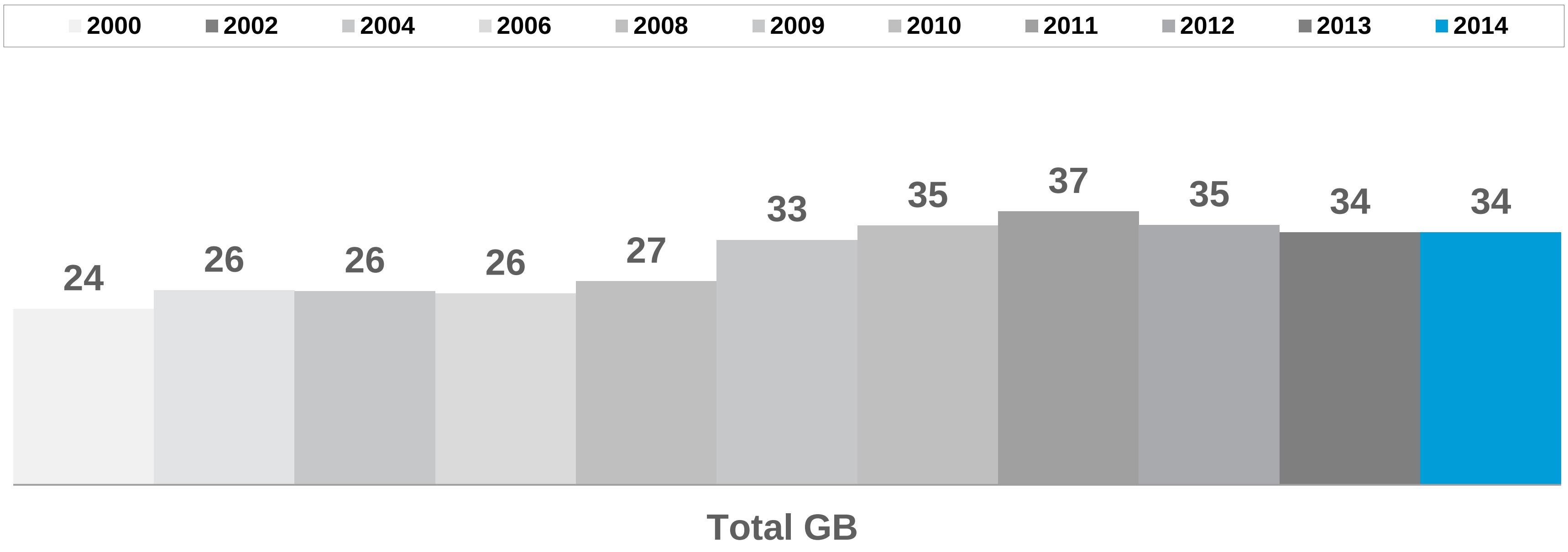
Longer term vs short term business decisions

- Address the need to prepare key business decisions, and allocate budgets and investments strategically
- These decisions may involve longer term investments such as production capabilities that won't pay back in the short term

Opportunity and risk assessment

- Investing in areas that promise significant growth
- Set up activation plans to mitigate risks from flat or declining segments

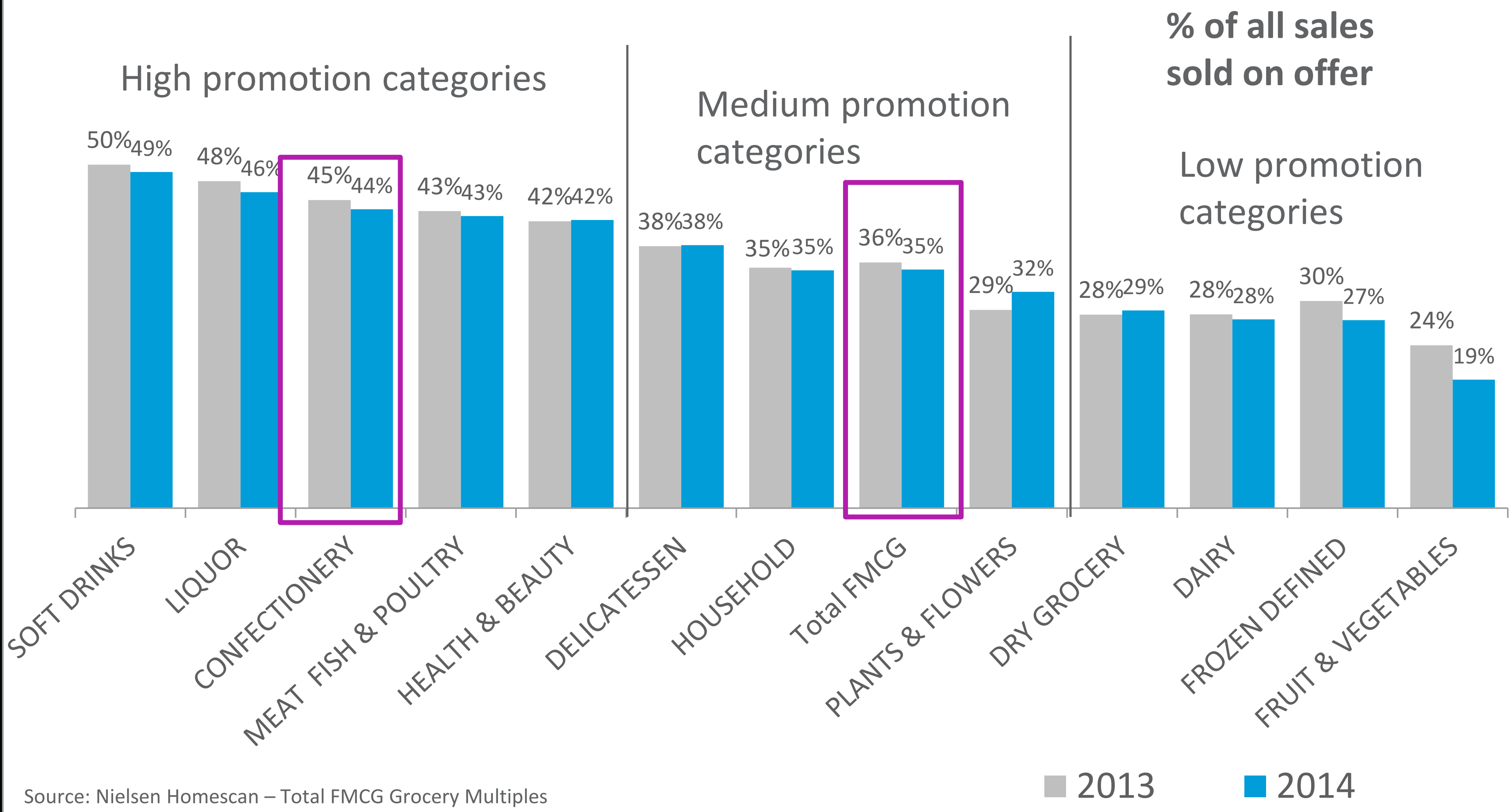
% OF ALL SPEND WITH AN OFFER PEAKED IN 2011, BUT REMAINS HIGHER THAN BEFORE THE 2008 RECESSION



% of Spend on Offer – Total Food and Drink

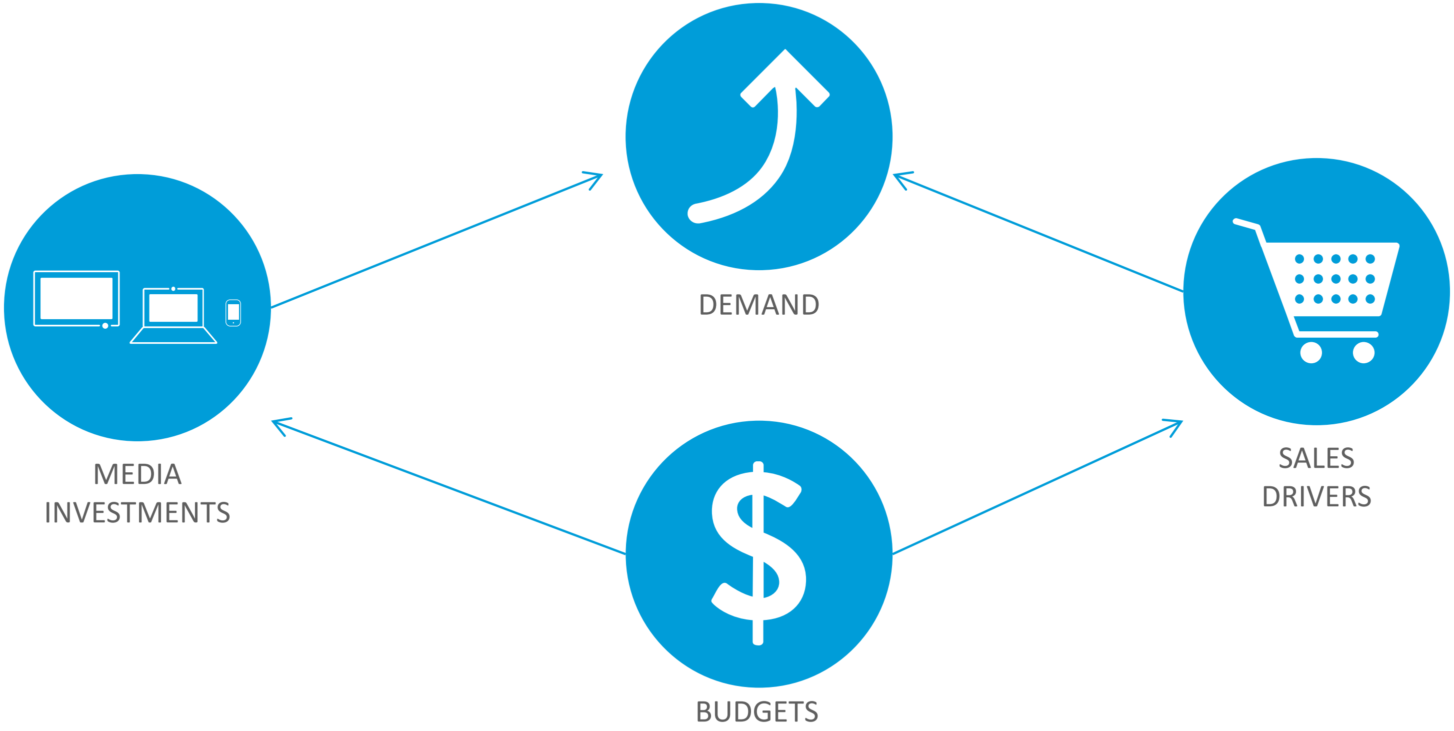
Source: Nielsen Homescan Total GB 52w/e periods to 3rd January 2015
Value Sales bought on offer as % Total Food and Drink Value Sales NB: Non trip projected data prior to 2011

UK PROMOTIONAL RELIANCE IN KEY CATEGORIES NO RETAILER REALLY WANTS TO/CAN TAKE THE PRESSURE OFF BRANDS



Source: Nielsen Homescan – Total FMCG Grocery Multiples
52 w/e 26th April 2014 vs 52 w/e 27th April 2013

EVALUATING THE MARKETING MIX IS AT THE HEART OF GETTING FORECASTS BASED ON HISTORY RIGHT



DEMAND

MEDIA INVESTMENTS

SALES DRIVERS

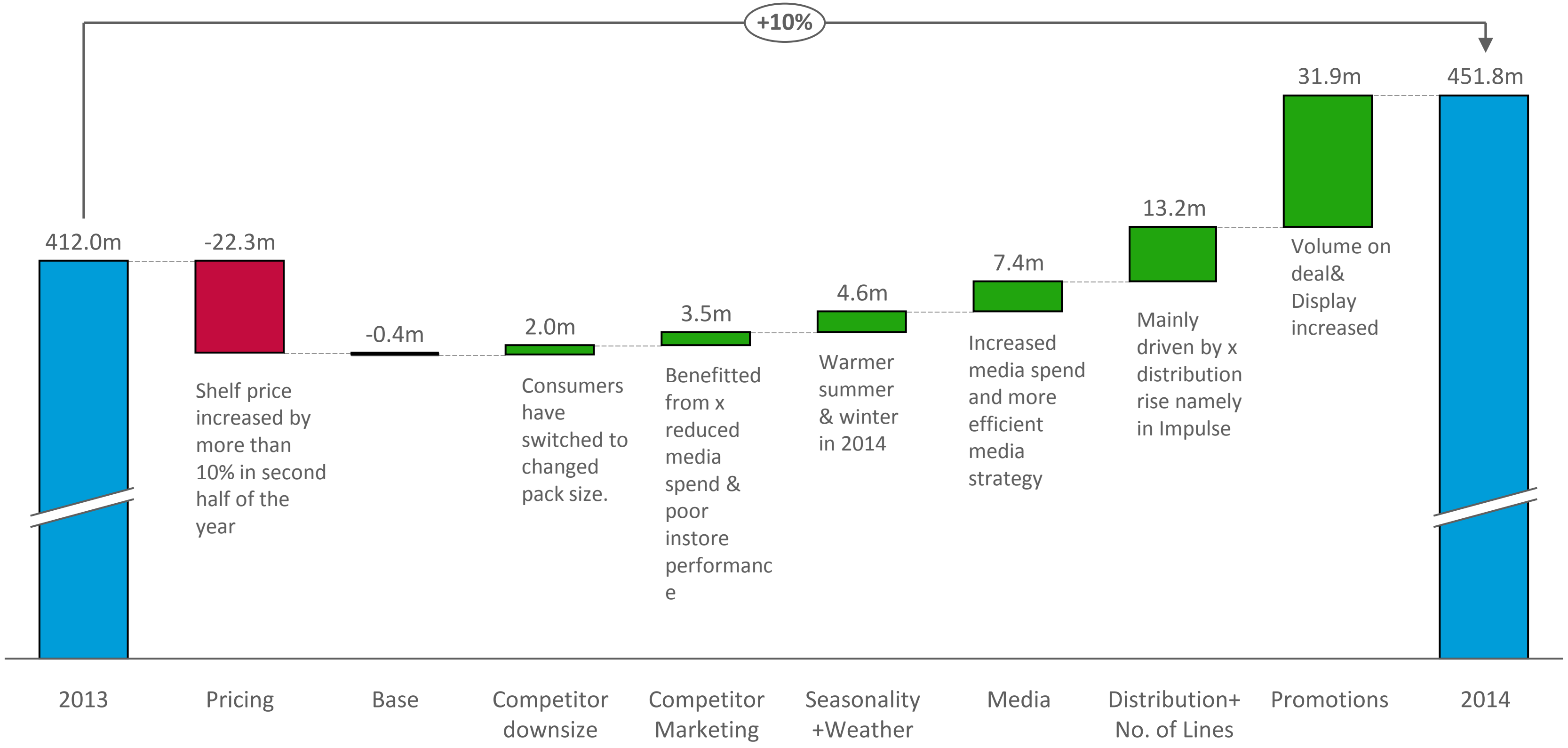
BUDGETS

Tension between sales and marketing functions

Market Mix provides the basis for evaluating above and below the line

GETTING BEHIND THE BUSINESS DRIVERS ABOVE AND BELOW THE LINE

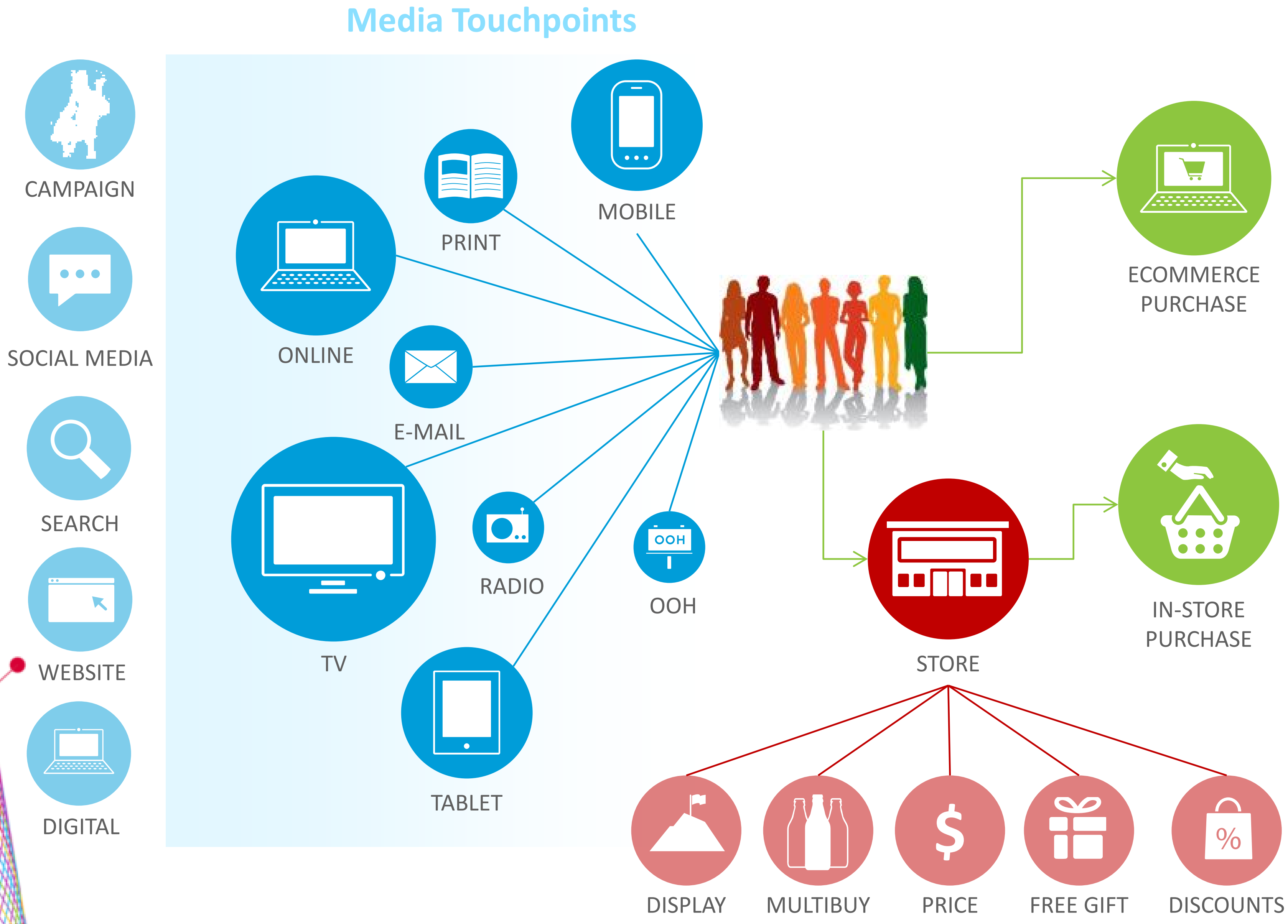
Sales Drivers (Vol Ltrs), National



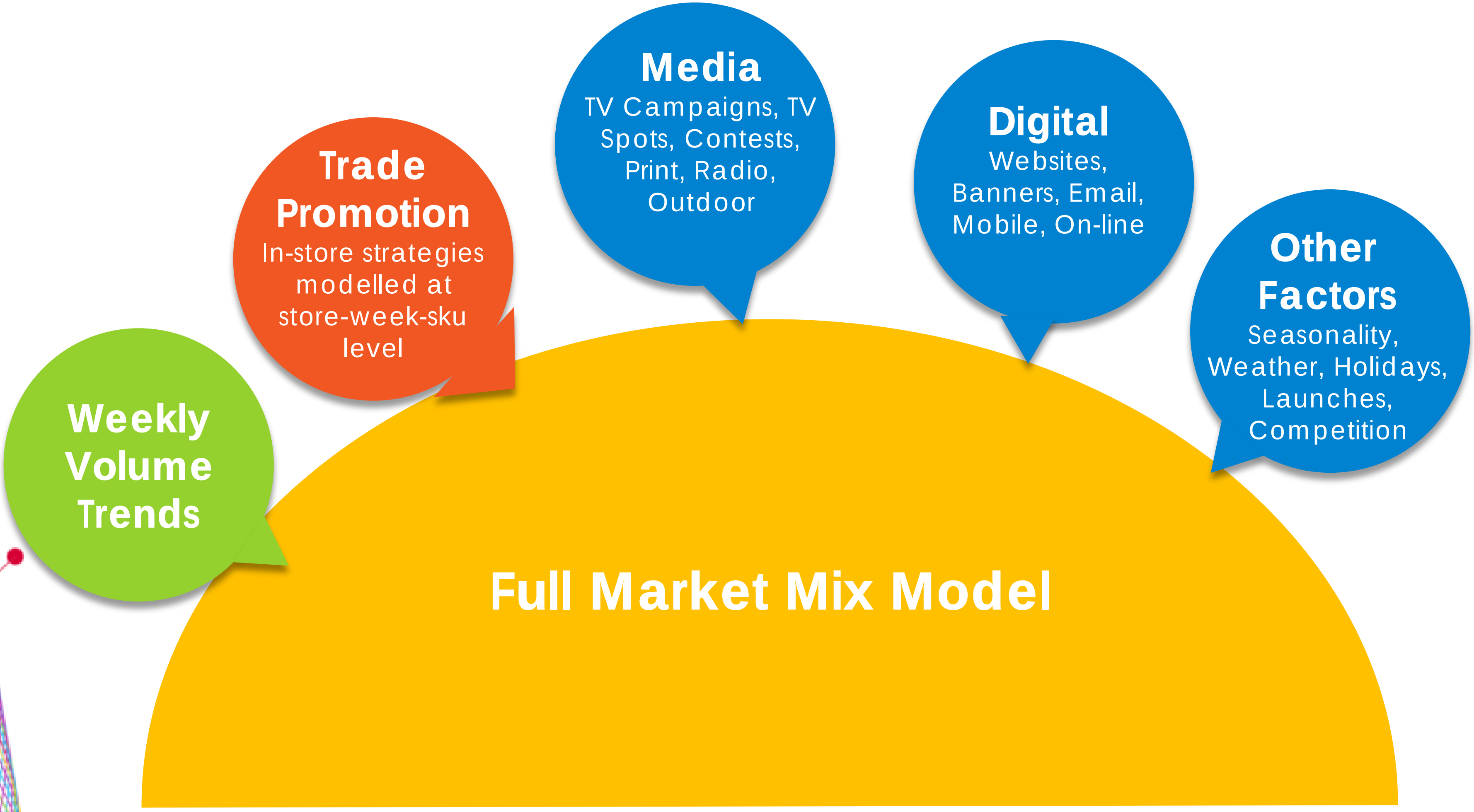
Contribution to growth	Pricing	Base	Competitor downsize	Competitor Marketing	Seasonality +Weather	Media	Distribution+ No. of Lines	Promotions
	-56%	*-1%*	*5%*	*9%*	*11%*	*19%*	*33%*	*80%*

ACTION: Continue to invest in Media & support in-store to continue driving growth.

MODELS NEED TO DEVELOP TO CAPTURE THE COMPLEXITY WE ALL FACE DAY TO DAY


Media Touchpoints
CAMPAIGN
SOCIAL MEDIA
SEARCH
WEBSITE
DIGITAL
PRINT
MOBILE
ONLINE
E-MAIL
TV
RADIO
OOH
TABLET
ECOMMERCE PURCHASE
STORE
IN-STORE PURCHASE
DISPLAY
MULTIBUY
$
PRICE
FREE GIFT
%
DISCOUNTS

NIELSEN HAS DEVELOPED A TWO STAGE APPROACH TO MEASURE THE IMPACT OF TRADE INVESTMENTS VS MEDIA EFFECTIVELY



Weekly Volume Trends

Trade Promotion
In-store strategies modelled at store-week-sku level

Media
TV Campaigns, TV Spots, Contests, Print, Radio, Outdoor

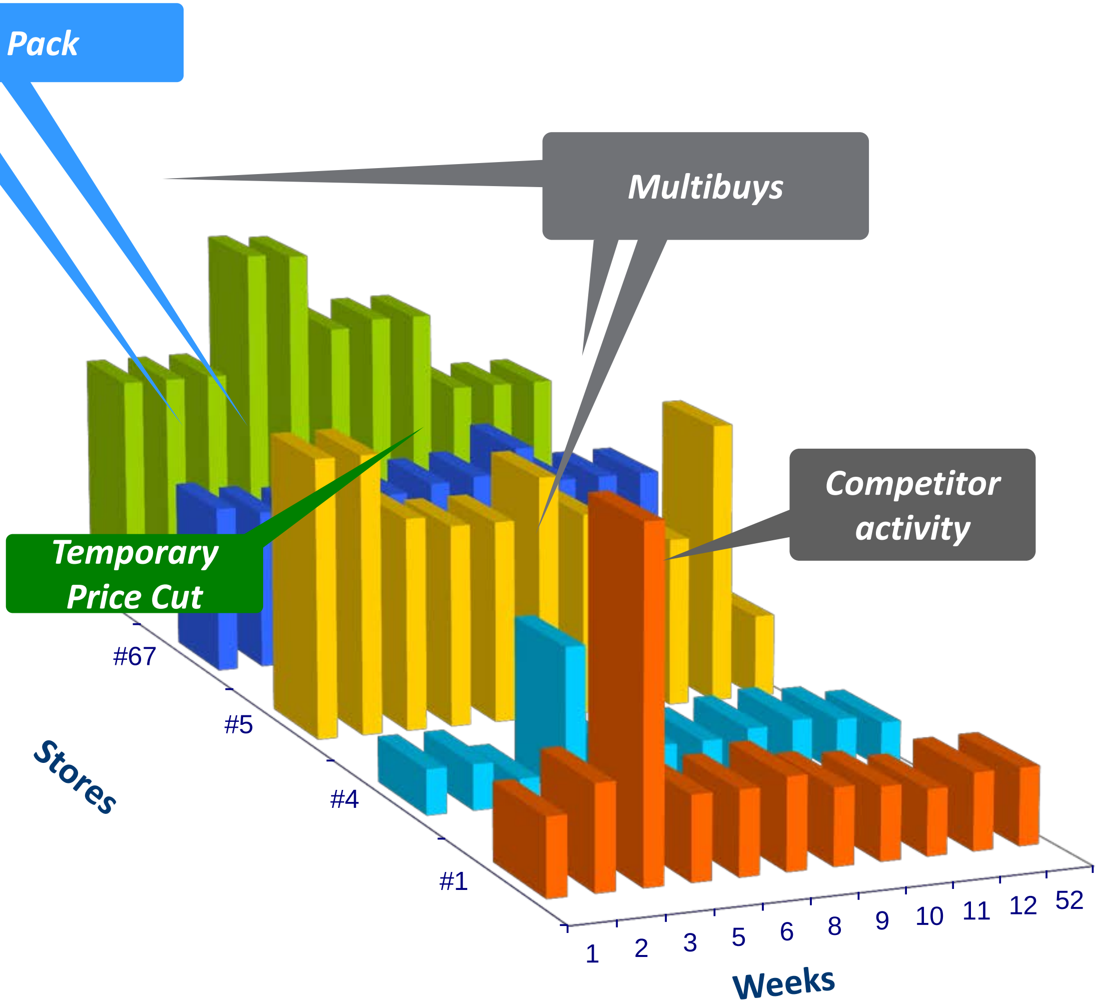
Digital
Websites, Banners, Email, Mobile, On-line

Other Factors
Seasonality, Weather, Holidays, Launches, Competition

Full Market Mix Model

In-store Activity is Overwhelming – multiple offers

Measuring all marketing at the point of influence increases accuracy, granularity and feasibility of measurement



Why do we work at store level?

It is not only about distinguishing between total sales/price and base sales/price but avoiding Aggregation Bias

Example 1: Masked Variation

	Week 1	Week 2
Store 1		
Price	$4.00	$5.00
Sales	100	90
Store 2		
Price	$5.00	$4.00
Sales	90	100
Market Level Aggregate		
Price	$4.47	$4.47
Sales	190	190

Price Change at the store level

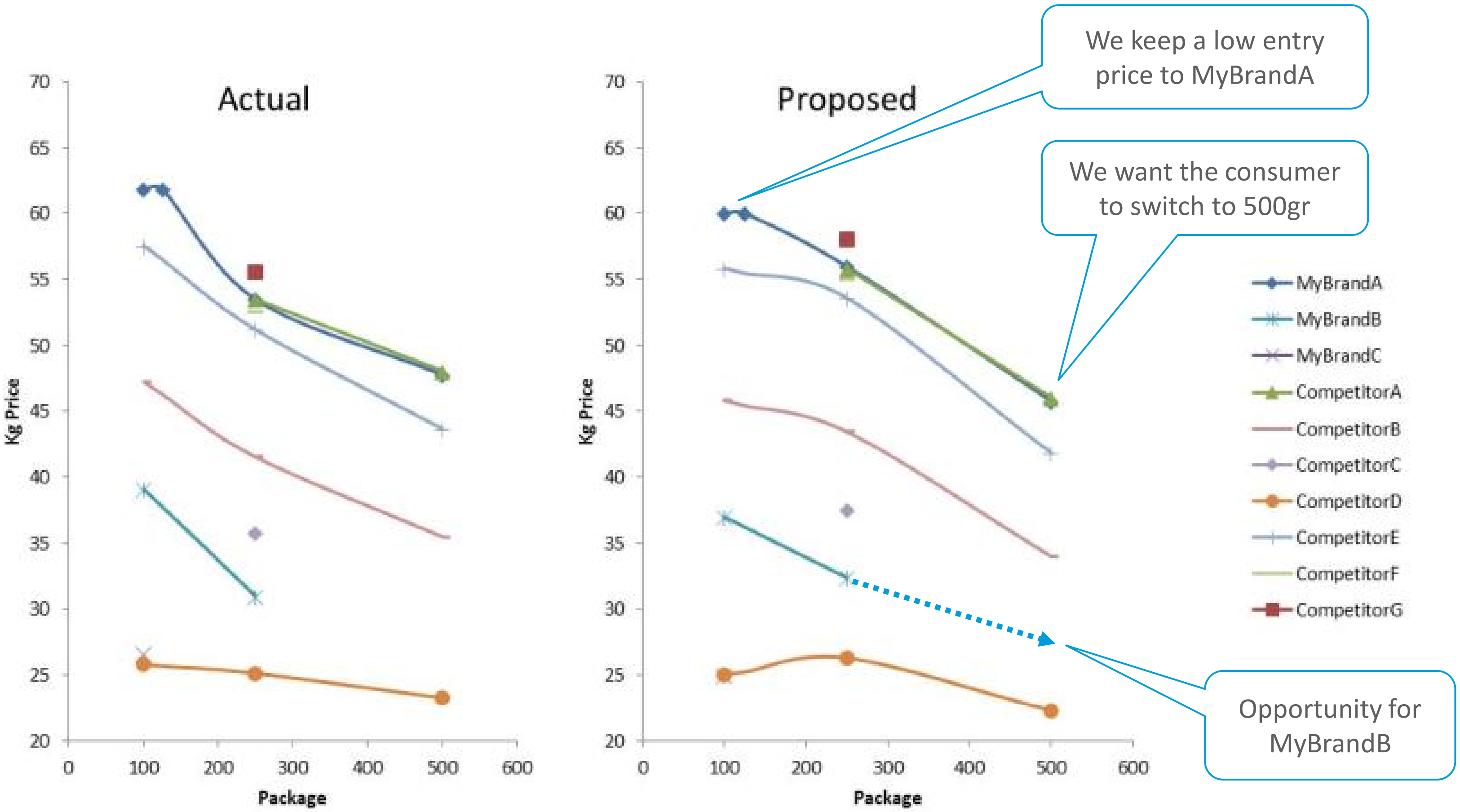
No Price Change at the market level

- In this example, aggregated data suggests that price is unchanged between week one and week two.
- However, sales changed in both stores as a result of price changes.
- A model based on disggregated data would supports robust price elasticity work.

Price Pack Strategy — Base Sales

Regular Price Structure Optimized

- Aligned with Business Strategy
- Cross interactions taken into account



We keep a low entry price to MyBrandA

We want the consumer to switch to 500gr

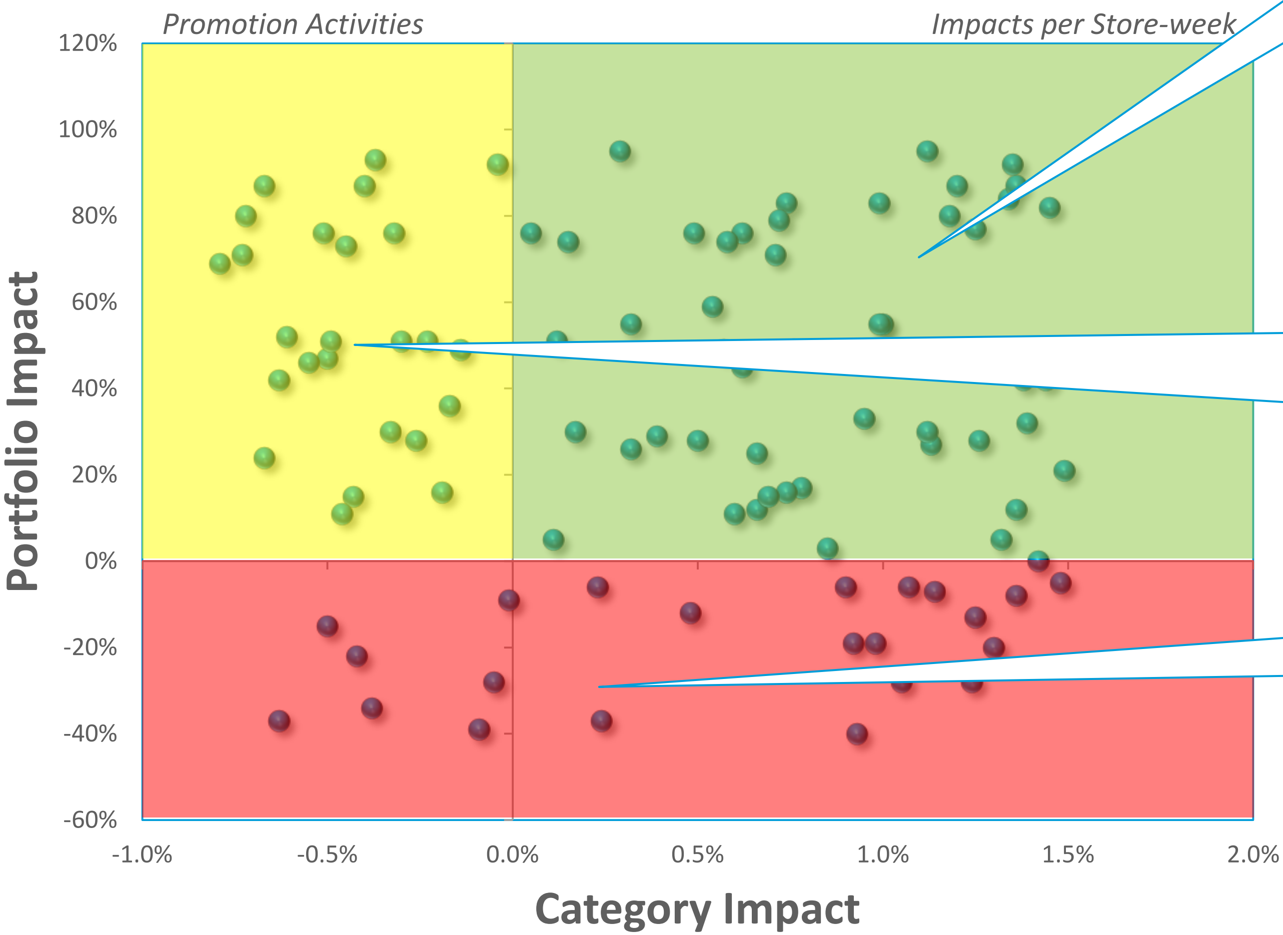
Opportunity for MyBrandB

Volume	Value	Profit
+13.2%	+7.1%	+2.5%

Promotional Strategy — Incremental Sales

Promotional Activity Impact

- How to make my Portfolio and the Category Grow
- Be aware and careful of cannibalization



High Priority Investment

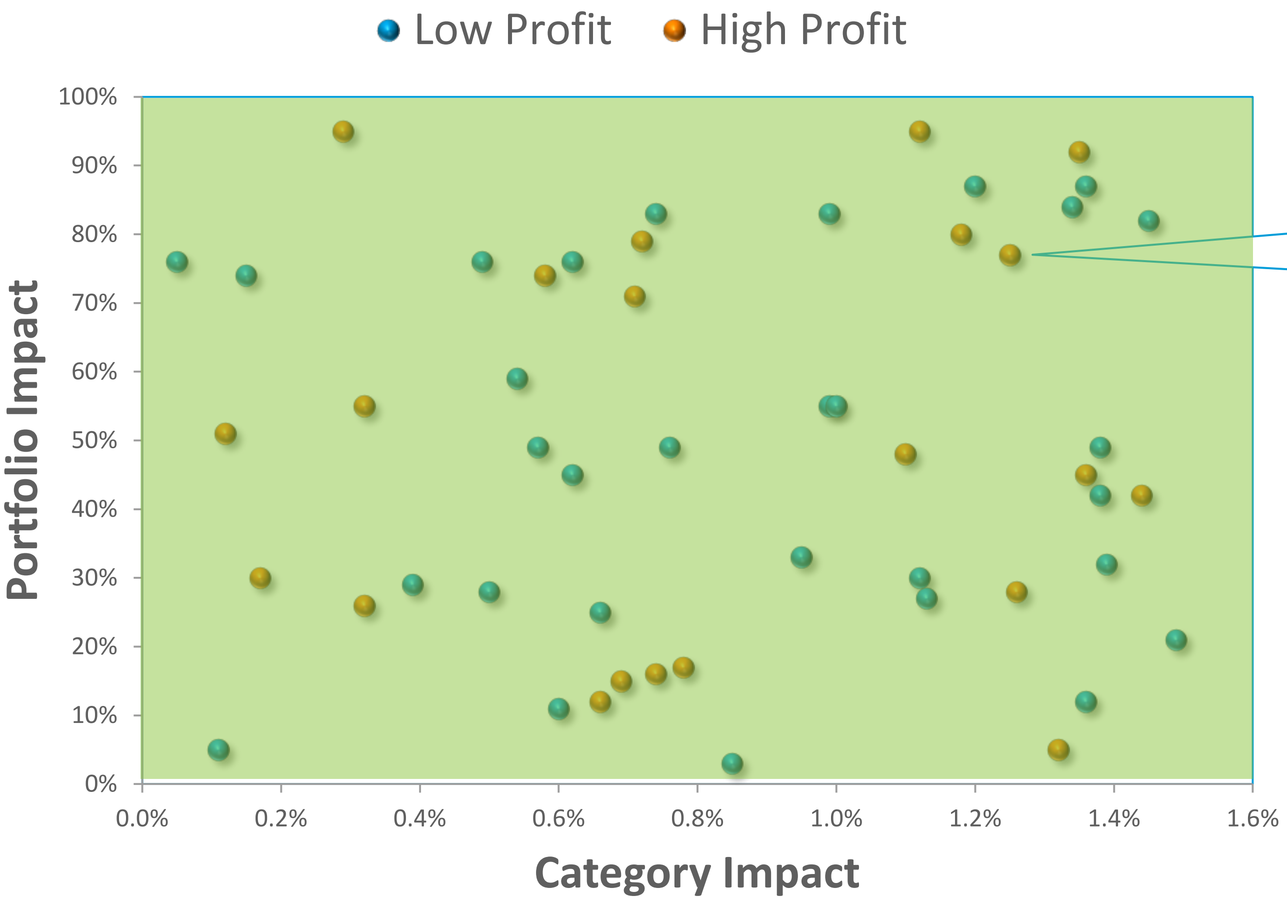
Share increase but won't make your customer happy. Consider only the high Portfolio impact

Discard

Promotional Strategy — Incremental Sales

Promotional Activity Impact

- How to make my Portfolio and the Category Grow
- Be aware and careful of cannibalization

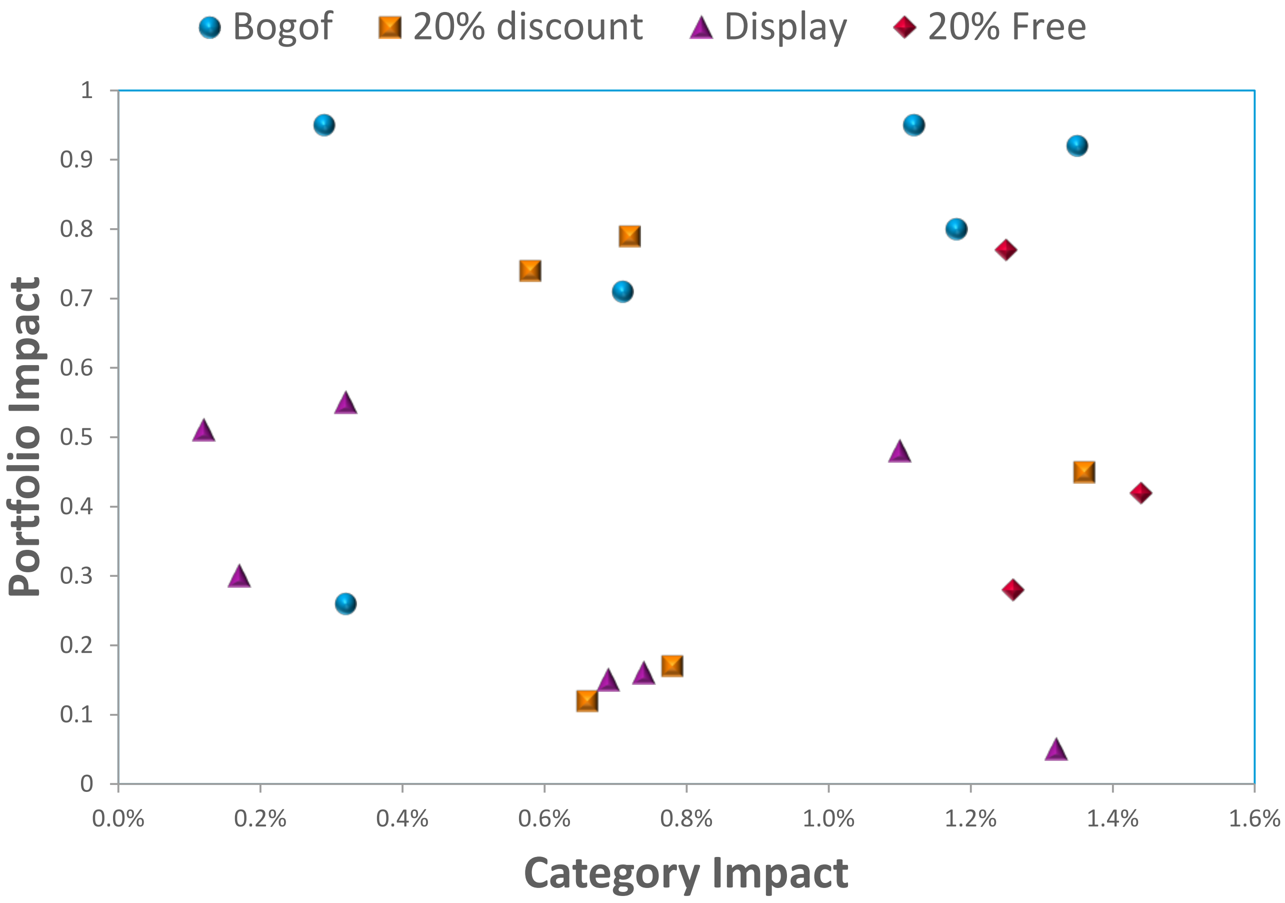


Focus on High profitable activities

Promotional Strategy — Incremental Sales

Promotional Activity Impact

- How to make my Portfolio and the Category Grow
- Be aware and careful of cannibalization



Promotional Strategy — Incremental Sales

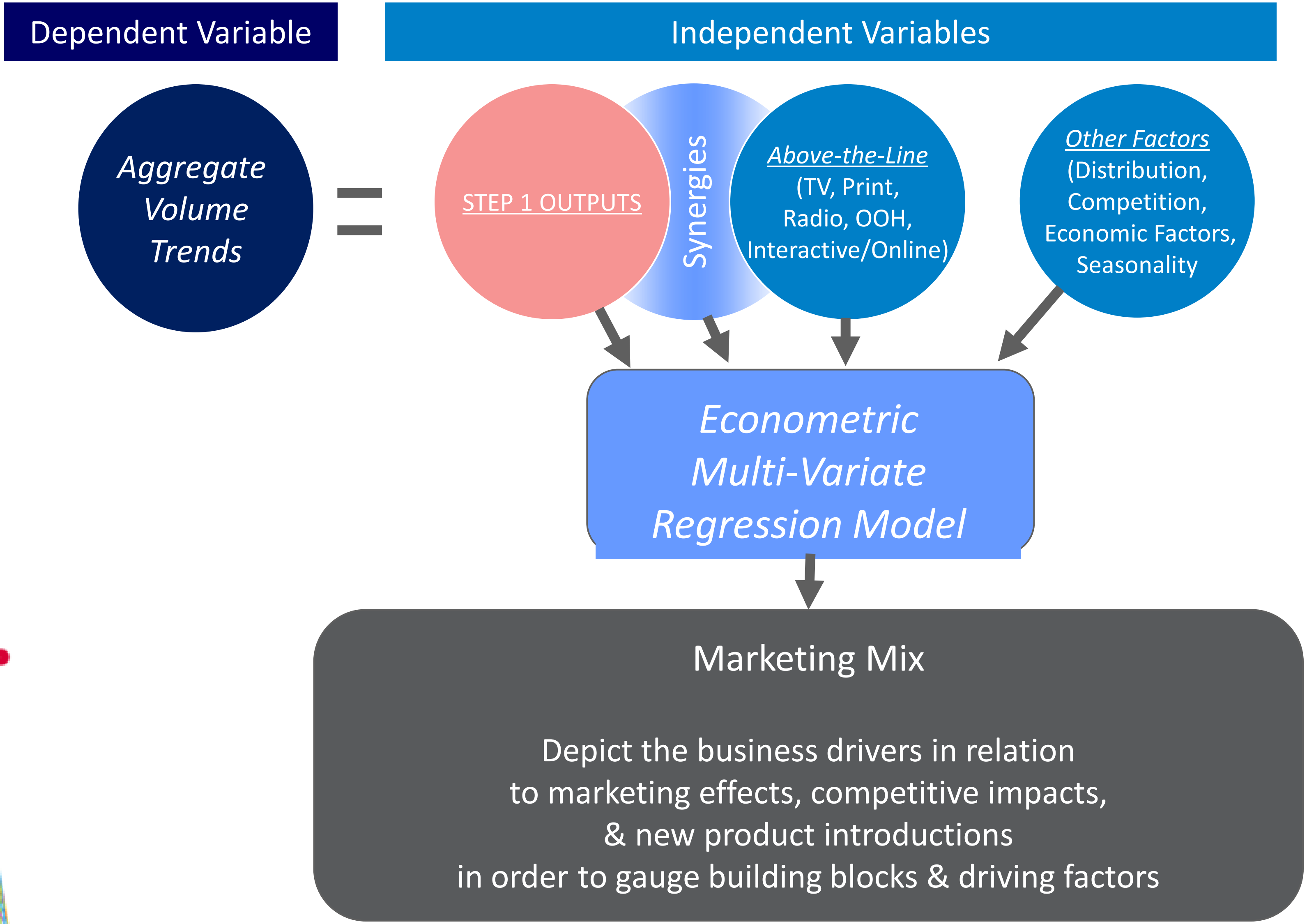
Promotional Activity Impact

- How to make my Portfolio and the Category Grow
- Be aware and careful of cannibalization

Item	Promotion	Portfolio Impact	Category Impact	Profit Per week
MyBrandA_m	40% Disc.	-18.5%	+0.0%	-$77,253
MyBrandC_s	Display	-12.3%	+0.1%	-$32,505
MyBrandA_b	Event	-5.2%	-0.2%	-$24,119
MyBrandB_m	35% Disc.	-5.1%	-0.0%	-$4,275
MyBrandB_s	Multipack	-4.6%	+0.2%	-$18,734

Item	Promotion	Portfolio Impact	Category Impact	Profit Per week
Portfolio	Event	+92%	+1.3%	+$98,355
MyBrandA_s	BOGOF	+87%	+1.2%	+$94,918
MyBrandB_m	20% Free	+53%	+0.4%	+$91,265
MyBrandA_s2	BOGOF	+52%	+0.8%	+$87,772
MyBrandB_m	20% Disc.	+36%	+0.1%	+$72,984

STEP 2: ANALYZE AT THE AGGREGATE LEVEL TO MEASURE ABOVE-THE-LINE MARKETING



Dependent Variable

Independent Variables

Aggregate Volume Trends

=

STEP 1 OUTPUTS

Synergies

Above-the-Line
(TV, Print, Radio, OOH, Interactive/Online)

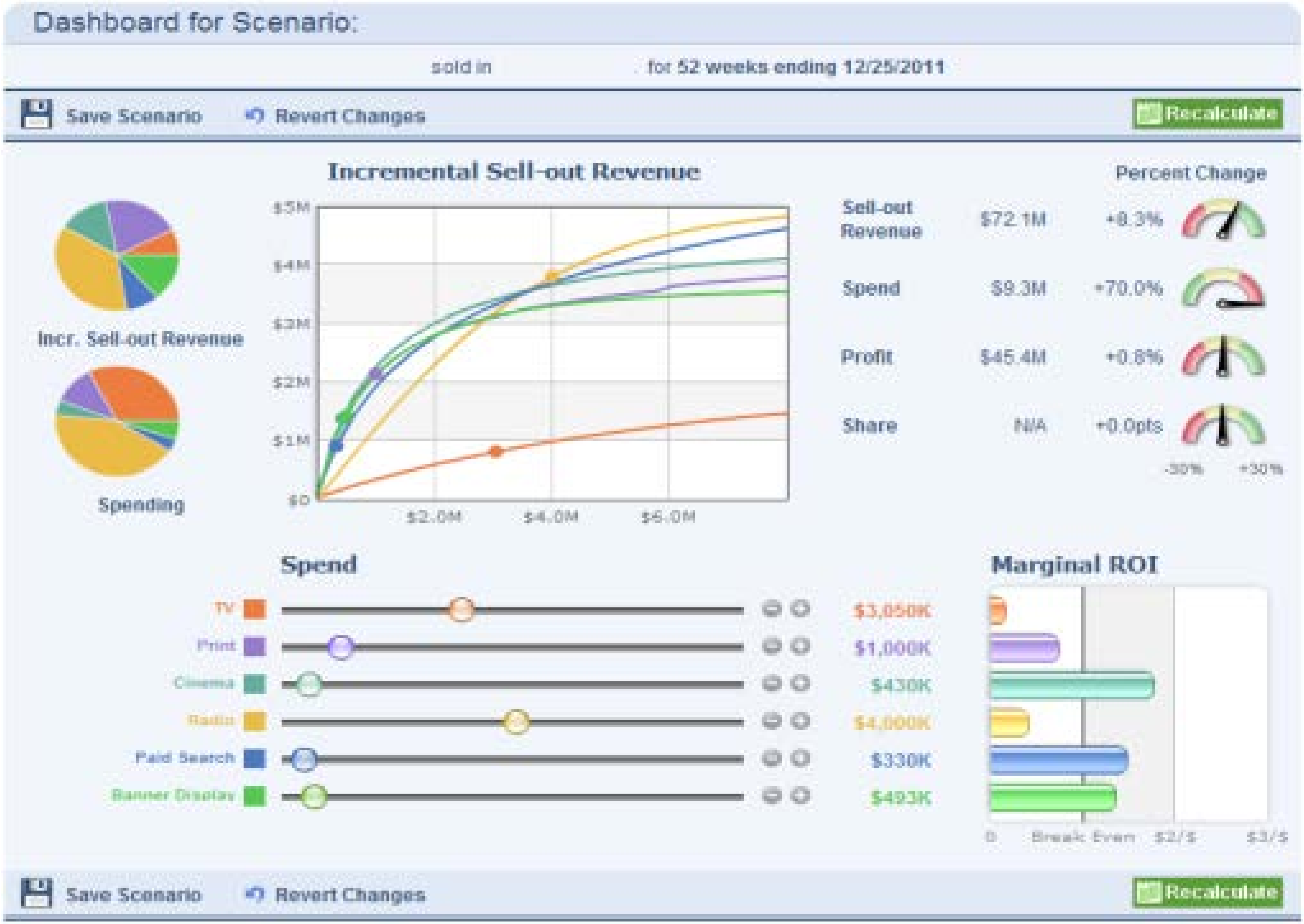
Other Factors
(Distribution, Competition, Economic Factors, Seasonality

Econometric Multi-Variate Regression Model

Marketing Mix

Depict the business drivers in relation
to marketing effects, competitive impacts,
& new product introductions
in order to gauge building blocks & driving factors

UNLOCKING THE VALUE OF MEDIA THROUGH OPTIMISATION



Dashboard for Scenario:

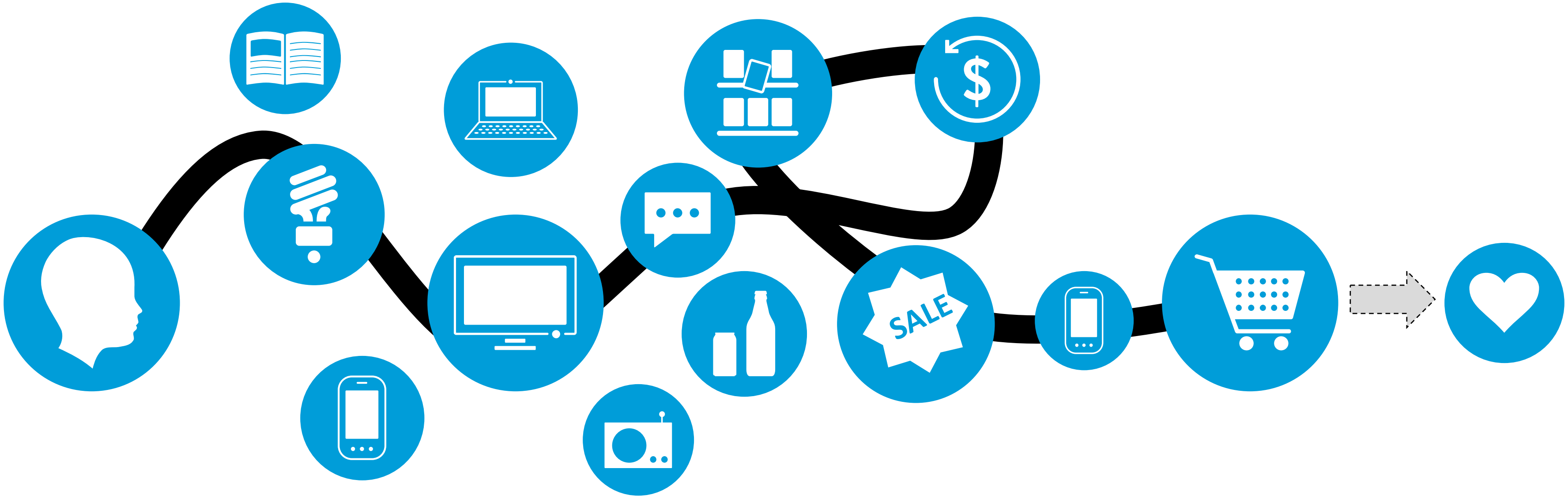
sold in for 52 weeks ending 12/25/2011

Save Scenario
Revert Changes
Recalculate
Incr. Sell-out Revenue
Spending
Incremental Sell-out Revenue
$5M
$4M
$3M
$2M
$1M
$0
$2.0M
$4.0M
$6.0M
Percent Change
-30%
+30%
Spend
Marginal ROI
0
Break Even
$2/$
$3/$
Save Scenario
Revert Changes
Recalculate

		Percent Change
Sell-out Revenue	$72.1M	+8.3%
Spend	$9.3M	+70.0%
Profit	$45.4M	+0.8%
Share	N/A	+0.0pts

Spend	
TV 🟧	$3,050K
Print 🟪	$1,000K
Cinema 🟩	$430K
Radio 🟨	$4,000K
Paid Search 🟦	$330K
Banner Display 🟩	$493K

FRAGMENTATION IS A FACT
TOUCHPOINTS INTERACT



DEMAND

PRE-STORE
Consideration

IN-STORE
Activation

PURCHASE

LOYALTY

Measurement challenge

- Better inputs to improve confidence in business decisions
- New approaches to drive learning
- Getting more granular – people and store level

DIGITAL MEDIA CONSORTIUM
A DRIVE TOWARD INDUSTRY BEST PRACTICE

nielsen

Publishers

facebook

Google

CATALINA

Advertisers

Kellogg's

Kimberly-Clark

kraft foods

Mondelēz International

Nestlé

P&G

Unilever

Marketing Effectiveness Analysis

store level

132 MMMs

14 brands

network analysis

Google Paid Search
Facebook
Synthetic Data Tests

Catalina
Network Analysis
Fit and Holdout Assessment

Test	Varieties
Geography	National, DMA
Platform	Desktop, Mobile, Tablet, Combined
Gender	Female, Male, Combined
Metric	Impressions, Reach, Clicks, Ad Position

Outcomes

Accuracy

- Proven Metrics
- Thresholds for campaign design

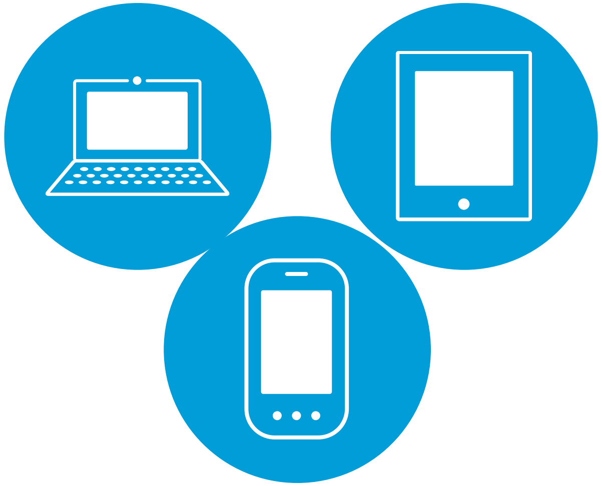
Methodology

- Reach and Frequency
- Measurement of direct + indirect effects

Efficiency

- Better Data
- Standardized Formats and Process

EMERGING MEDIA CAPTURE – MOVING FORWARD



Google

- Model **market level impressions** weighting by **ad position** and separating **mobile** and **desktop** activity
- **Impressions** perform better than clicks

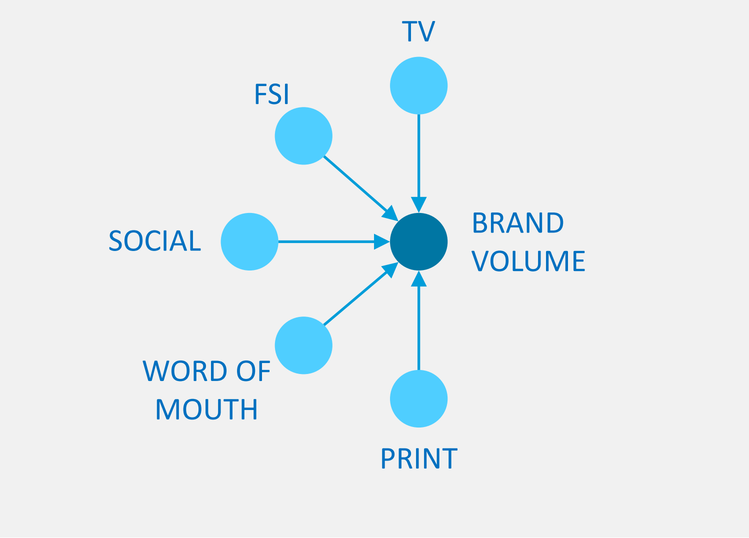
- Model **market level impressions** separating **mobile** and **desktop** and by **gender** if significant activity exists
- **Impressions** and **reach** perform better than clicks

facebook

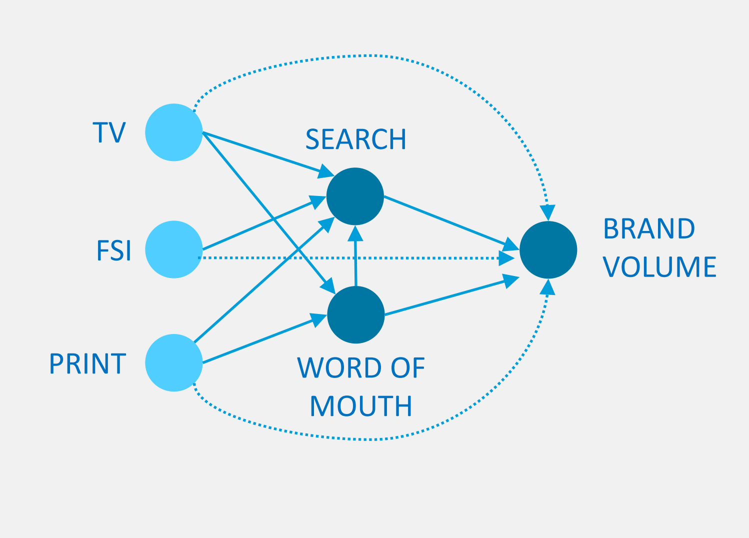
MODELS REFLECTING REAL BEHAVIOUR

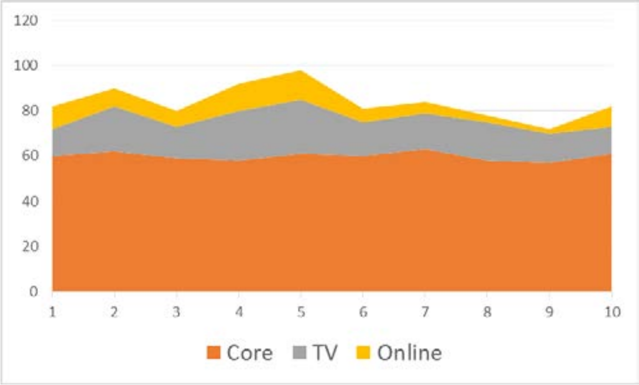
A network learning approach identifies multiple paths to purchase, which can be used to attribute sales due to direct and indirect impact

Conventional MMM

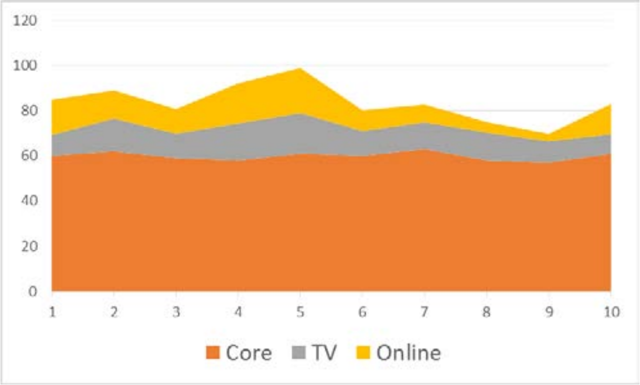

TV
FSI
SOCIAL
BRAND VOLUME
WORD OF MOUTH
PRINT

Network Analysis


TV
SEARCH
FSI
BRAND VOLUME
PRINT
WORD OF MOUTH

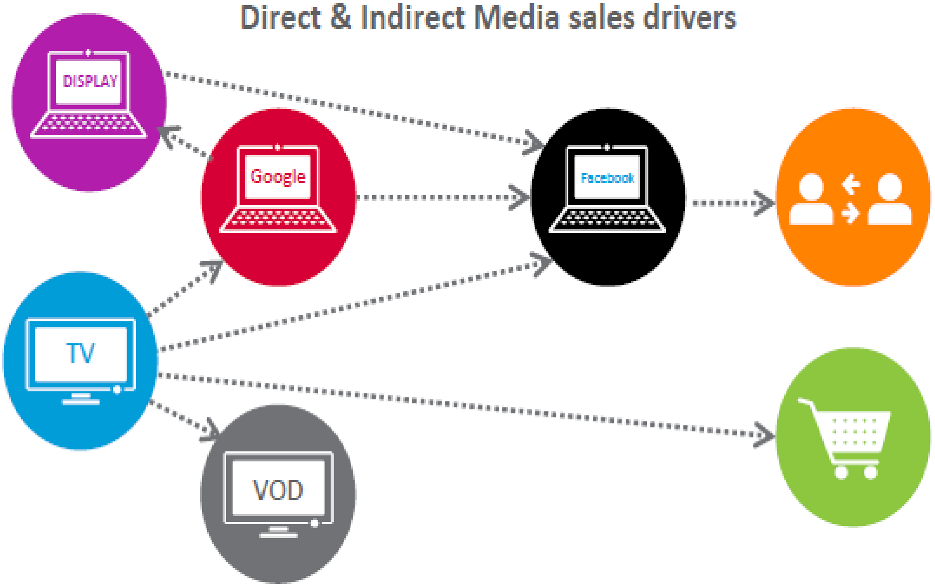


adjust contributions

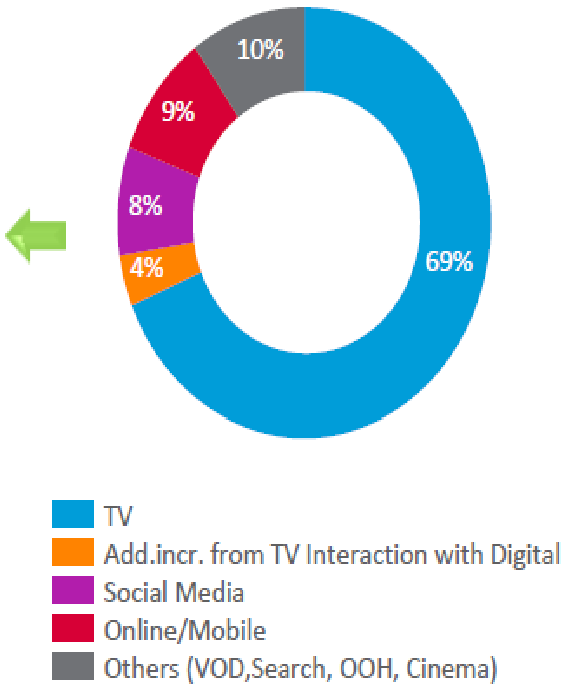


TV AND DIGITAL DIRECTLY & INDIRECTLY INFLUENCE SALES

Direct & Indirect Media sales drivers



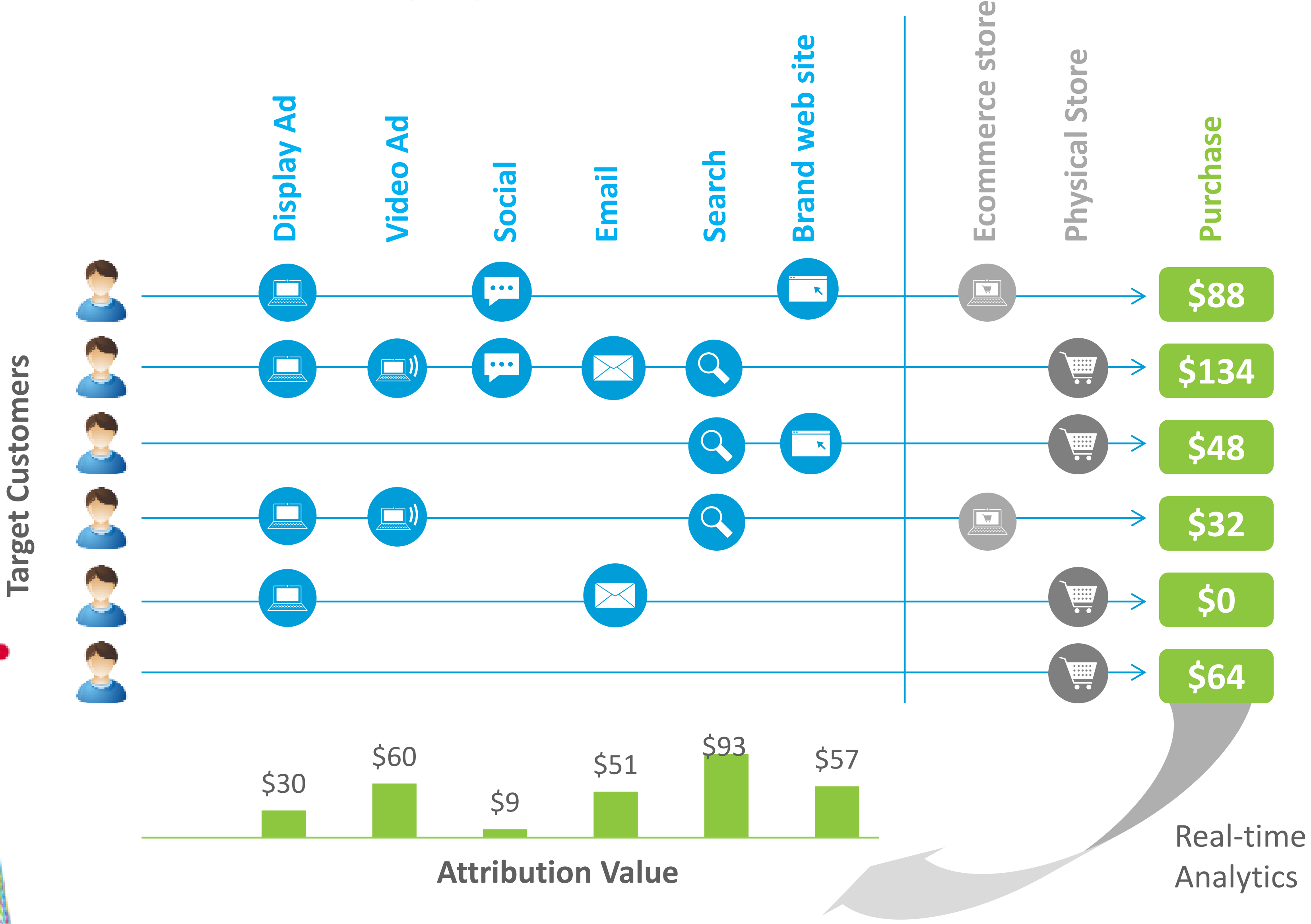
Total Media Volume by vehicle ('12-13)



- TV GRPs drive social impressions & search clicks
- Search clicks drive Facebook impressions
- Google Search clicks drive sales (*Users on path to purchase*)

1. Increasing TV GRPs will lead to more Facebook impressions.
2. Increasing Facebook impressions drive Google search clicks.
3. Amplify interaction by giving digital with a similar look & feel to traditional media

WHAT IS NEXT?
ATTRIBUTING VALUE TO INDIVIDUAL EXPOSURE TO MEDIA AND IN STORE


Display Ad
Video Ad
Social
Email
Search
Brand web site
Ecommerce store
Physical Store
Purchase
Target Customers
$88
$134
$48
$32
$0
$64
$30
$60
$9
$51
$93
$57
Attribution Value
Real-time Analytics

STORE ATTRIBUTION OPENS UP FURTHER OPPORTUNITY TO RATIONALISE SPEND

What is the profile of my store?

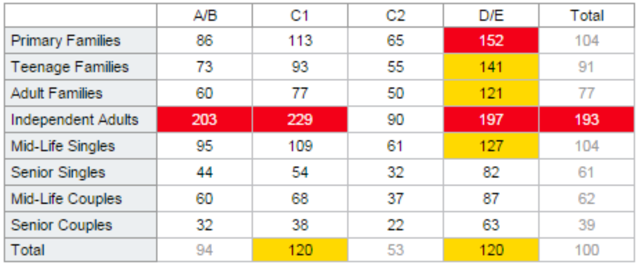
Who is the shopper?

Where do they live?

Category / Brand

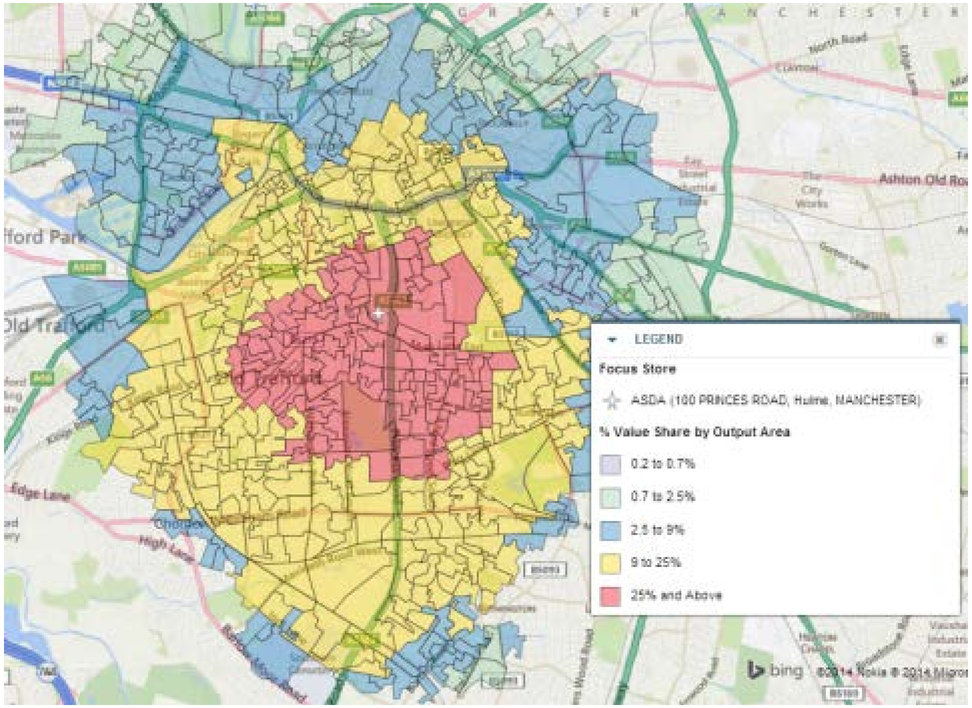
Which stores have the greatest opportunity?

How can you engage with them?



	A/B	C1	C2	D/E	Total
Primary Families	86	113	65	152	104
Teenage Families	73	93	55	141	91
Adult Families	60	77	50	121	77
Independent Adults	203	229	90	197	193
Mid-Life Singles	95	109	61	127	104
Senior Singles	44	54	32	82	61
Mid-Life Couples	60	68	37	87	62
Senior Couples	32	38	22	63	39
Total	94	120	53	120	100

Each individual store has its own ‘trading area’ based on the likelihood of shoppers visiting the store (drive times, store size, available spend, population density etc…)


LEGEND
Focus Store
ASDA (100 PRINCES ROAD, Hulme, MANCHESTER)
% Value Share by Output Area
0.2 to 0.7%
0.7 to 2.5%
2.5 to 9%
9 to 25%
25% and Above
bing
©2014 Nokia © 2014 Microsoft

Source Spectra: Based on consumer panel and census model

Demand : Most Important Categories by Store *(Distribution & Space)*

WHICH CATEGORIES ARE THE MOST IMPORTANT?

Category potential demand by store

Who is the shopper?

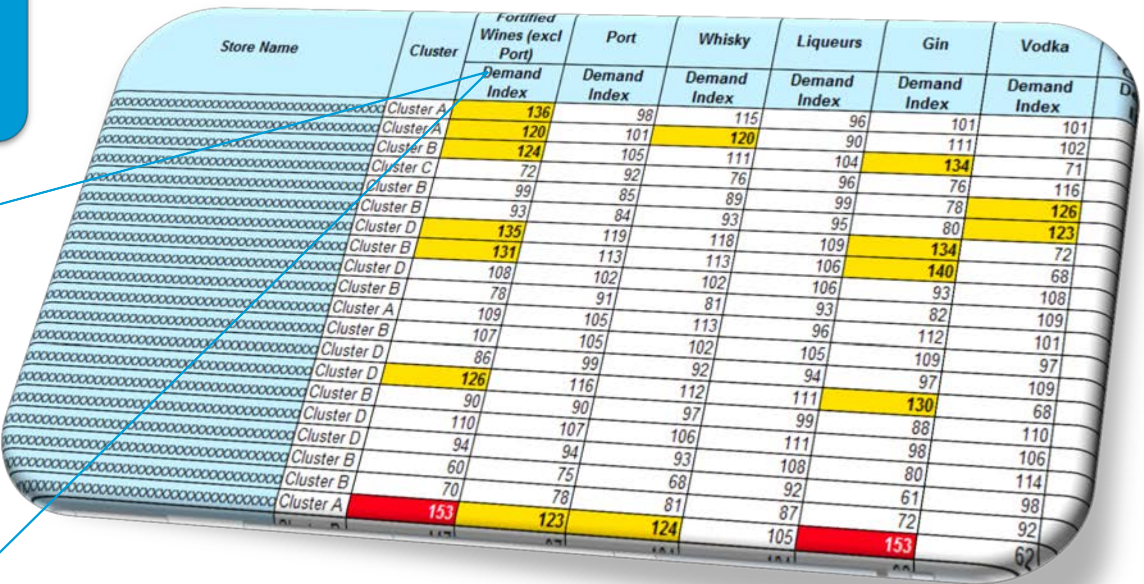
Where do they live?

Category / Brand

Which stores have the greatest opportunity?

How can you engage with them?

Demand by Store



Store Name	Cluster	Fortified Wines (excl Port)	Port	Whisky	Liqueurs	Gin	Vodka
		Demand Index	Demand Index	Demand Index	Demand Index	Demand Index	Demand Index
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster A	**136**	98	115	96	101	101
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster A	**120**	101	**120**	90	111	102
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	**124**	105	111	104	**134**	71
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster C	72	92	76	96	76	116
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	99	85	89	99	78	**126**
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	93	84	93	95	80	**123**
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	**135**	119	118	109	**134**	72
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	**131**	113	113	106	**140**	68
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	108	102	102	106	93	108
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	78	91	81	93	82	109
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster A	109	105	113	96	112	101
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	107	105	102	105	109	97
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	86	99	92	94	97	109
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	**126**	116	112	111	**130**	68
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	90	90	97	99	88	110
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	110	107	106	111	98	106
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster D	94	94	93	108	80	114
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	60	75	68	92	61	98
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster B	70	78	81	87	72	92
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	Cluster A	**153**	**123**	**124**	105	**153**	62

Source Spectra: Based on consumer panel and census model

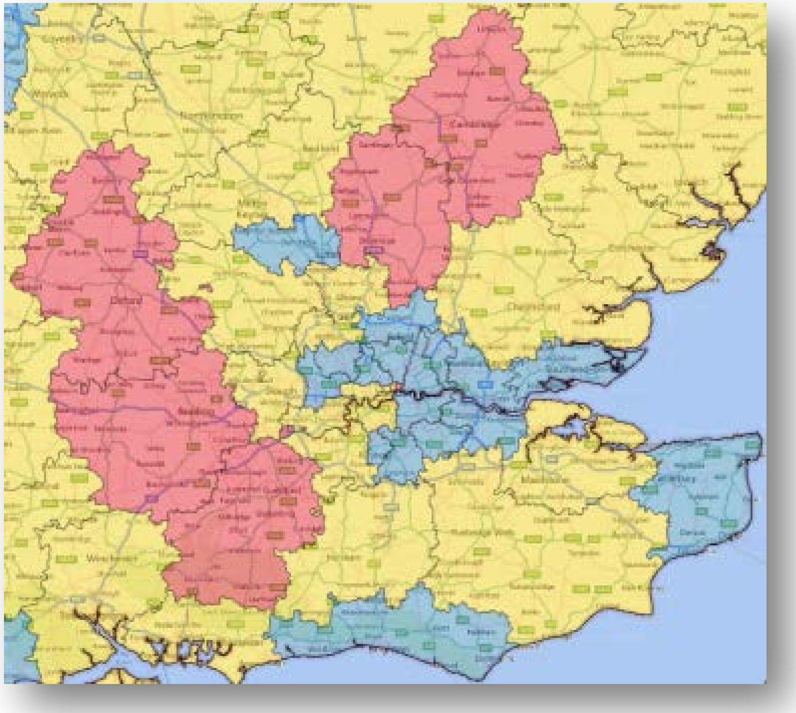
MAXIMISING LONDON & SE OPPORTUNITIES

Comparing the competitive landscape based on ‘demand’

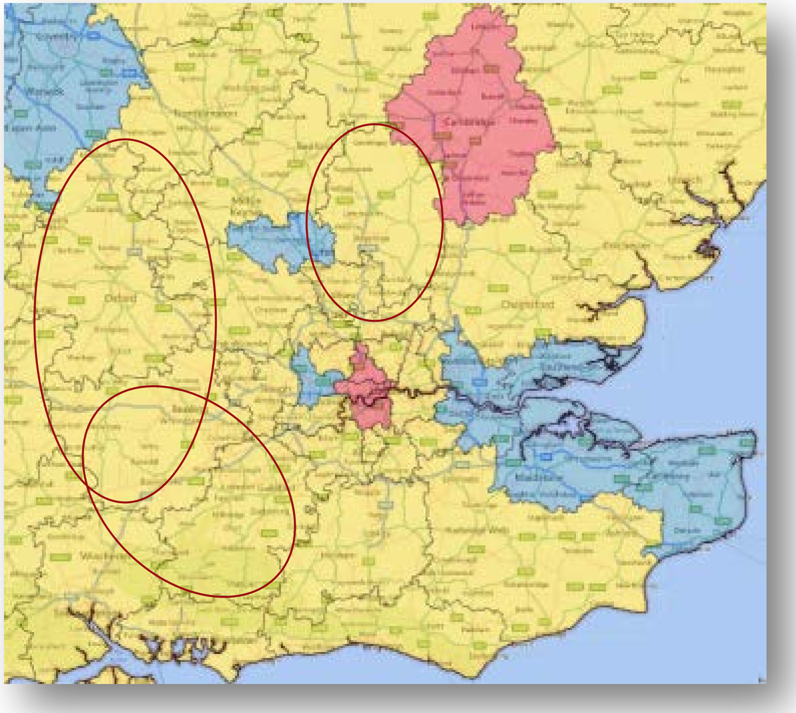
Demand Index

- 🟦 99 and below
- 🟨 100 - 119
- 🟥 120+

Total Brand A Demand
London & SE

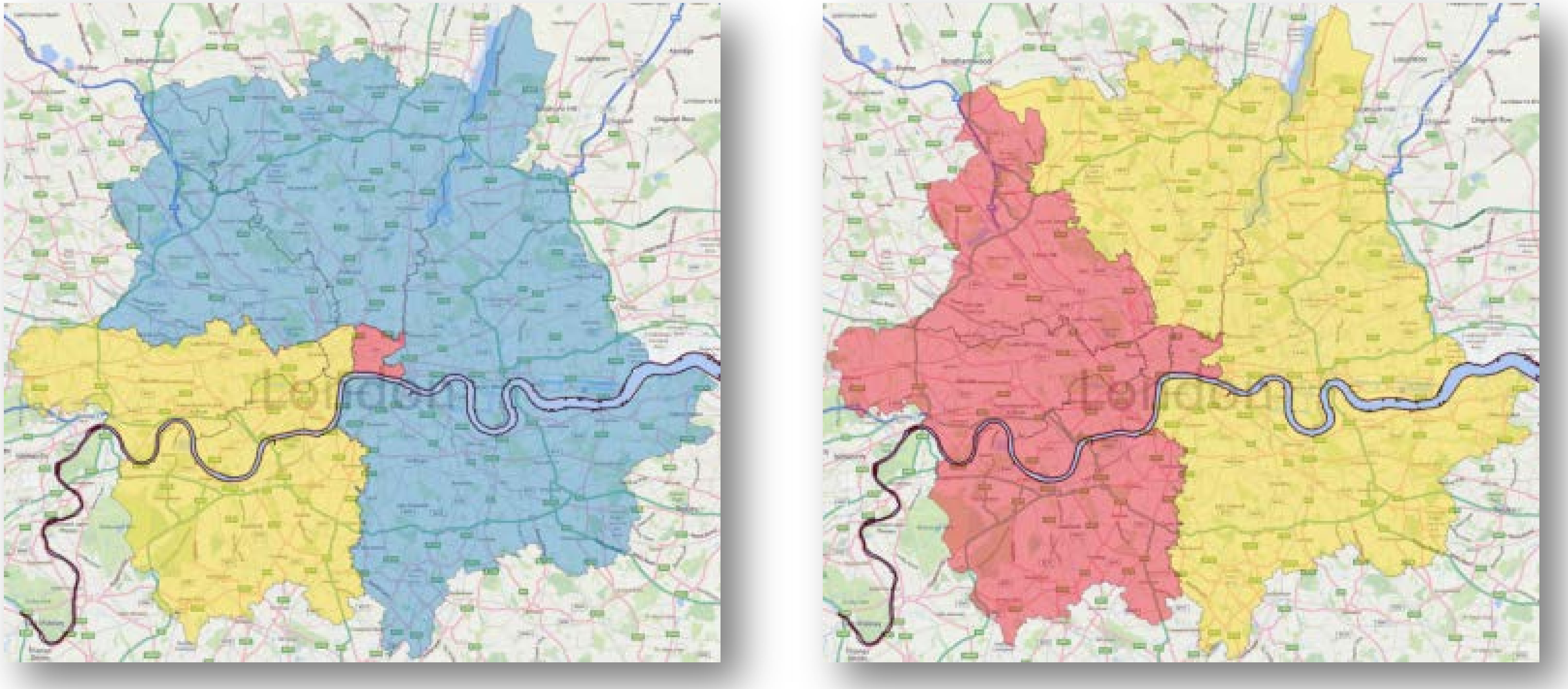


Total Brand B Demand
London & SE



PRICE & PROMO MECHANIC COULD SUPPORT BRAND A IN LONDON

Competitors growth 'opportunity' is stronger



Total Brand A Demand London

Demand Index

- 🟦 99 and below
- 🟨 100 - 119
- 🟥 120+

Total Brand B Demand London

Target the 'right' activity in the best locations

MAXIMISING MEDIA AND PROMOTIONAL INVESTMENTS

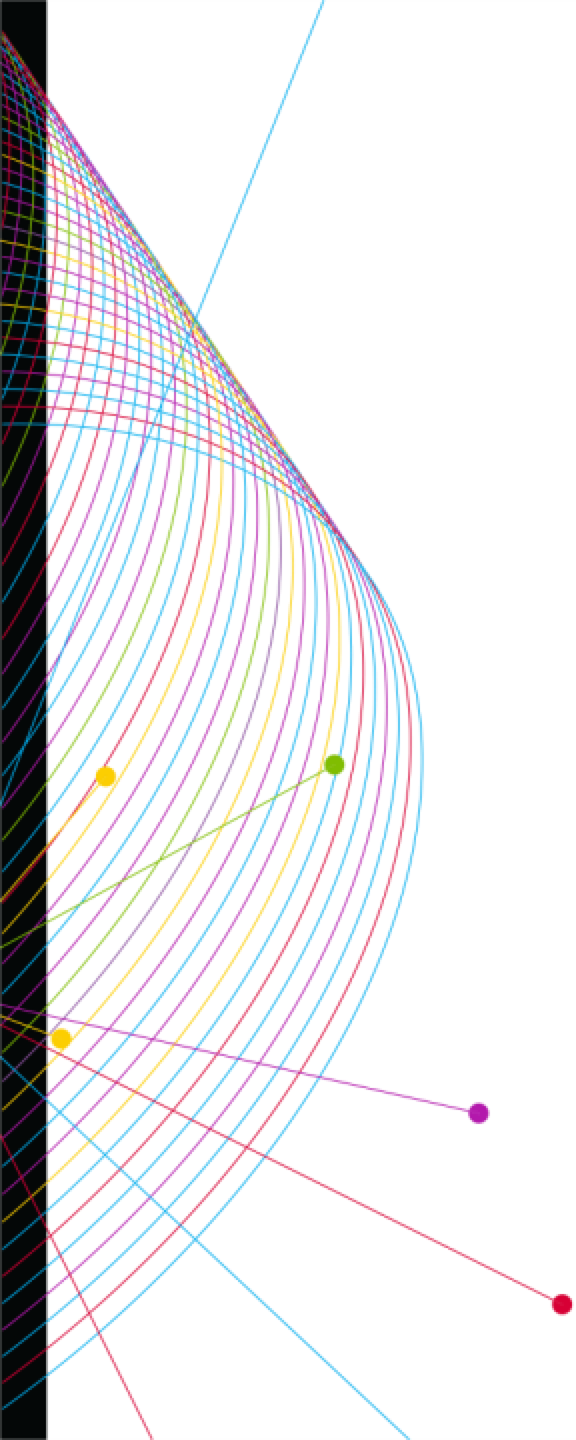
An evolving story

The promotional drug remains a key investment challenge in the UK.

Pricing and Promotional analytics are becoming more focussed on the depth of execution and below the line activity in the store.

Execution at store level and the potential to adapt investment by local market condition is increasing and shaping our measurement

Digital investment and individual usage of devices challenges traditional measurement – more granular inputs, more personal in its approach



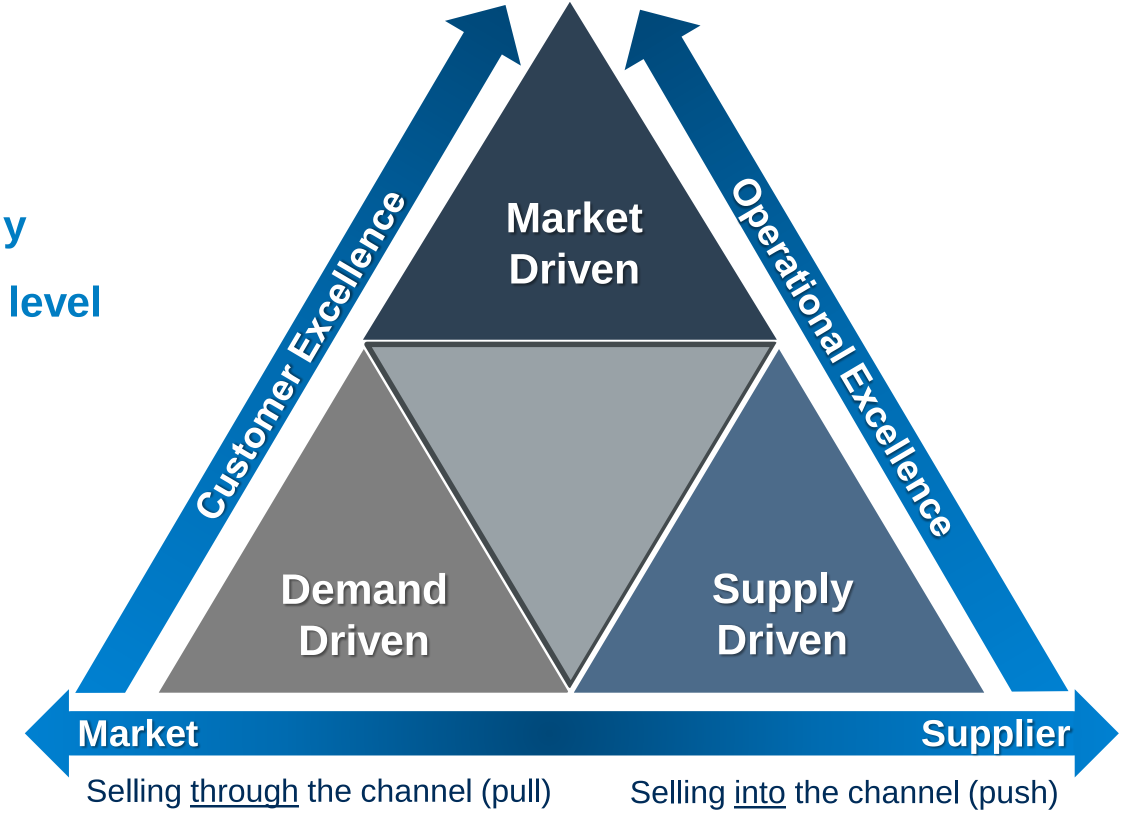
USING DOWNSTREAM DATA TO IMPROVE FORECAST ACCURACY

JULIAN BRIDLE
JOHN SPOONER

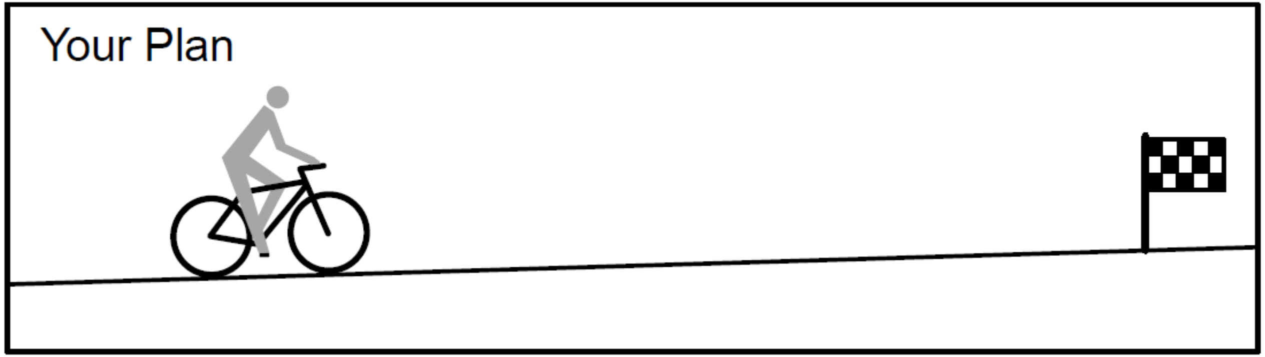
THE POWER TO KNOW.

SAS FORECASTING | INNOVATION & THOUGHT-LEADERSHIP

- **Sense demand faster**
- **Align demand with supply**
- **Higher customer service level**
  - Higher availability
  - Lower inventory cost
  - Lower waste
  - Lower working capital

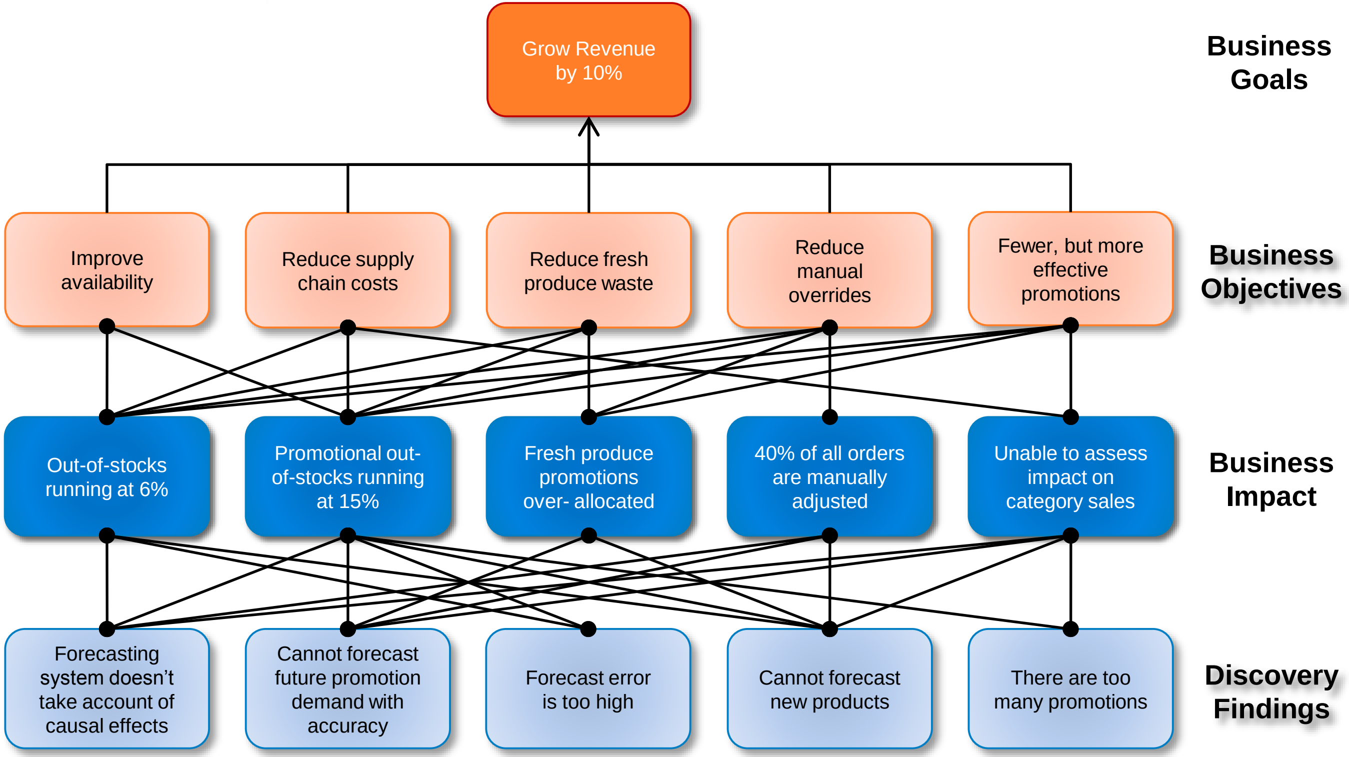

Customer Excellence
Market Driven
Operational Excellence
Demand Driven
Supply Driven
Market
Supplier
Selling through the channel (pull)
Selling into the channel (push)

SAS FORECASTING | IT IS NEVER A SMOOTH JOURNEY…



SAS FORECASTING

TYPICAL CHALLENGES



Grow Revenue by 10%
Business Goals
Improve availability
Reduce supply chain costs
Reduce fresh produce waste
Reduce manual overrides
Fewer, but more effective promotions
Business Objectives
Out-of-stocks running at 6%
Promotional out-of-stocks running at 15%
Fresh produce promotions over- allocated
40% of all orders are manually adjusted
Unable to assess impact on category sales
Business Impact
Forecasting system doesn’t take account of causal effects
Cannot forecast future promotion demand with accuracy
Forecast error is too high
Cannot forecast new products
There are too many promotions
Discovery Findings

SAS FORECASTING CHALLENGES

- Worldwide, 8-10% of items are out-of-stock at any one time
- 16% of Out-of-Stocks are caused by inadequate shelf capacity.
- 47% of Out-of-Stocks are a result of poor demand forecasting and ordering
- Promotional out-of-stock rate = 17.1%
- UK grocery promotional levels are the highest in Europe, with 55% of food items and 59% of non-food sold on promotion

> *"Price is a lever for demand. It impacts supply and can impact customer perception of the retailer, both directly and indirectly through levels of supply"*

The Next generation of Pricing, Retail Systems Research

Sources

All detail "Retail Out-of-Stocks: A Worldwide Examination of Extent, Causes, and Consumer Responses."
D. Corsten (Kuehne-Institute for Logistics, St. Gallen, Switzerland) & T. Gruen (University of Colorado, USA), except 1 Gruen, Corsten, and Bharadwaj 2002

IRIWorldwide - 'Price and promotion in Europe: FMCG industry at a tipping point'.

SAS FORECASTING | EVENTS & PROMOTIONS

- An activity that stimulates demand by offering the consumer an incentive to purchase a product.
  - Events
    - Usually holistic, e.g. Halloween, Easter, Period 1
  - Campaigns
    - Usually holistic, e.g. TV, media, Direct Mail, Range Launch
  - Promotions
    - A price-discounting mechanic usually specific to a brand or other group of products, e.g. 25% off, BOGOF, Buy 2 for X
  - Support
    - Supporting mechanics, e.g. Circular, In-store Display

WHY RUN PROMOTIONS?

- ***Inform*** prospective customers about the benefits of a product or brand
- ***Influence*** feelings, beliefs or behaviour
- ***Persuade*** customers to purchase the product instead of another product that may also satisfy the same need.
- ***Remind*** customers of the benefits to encourage loyalty

granini
Copiii iubesc fructele
De ce e bun morcovul?
De ce e bună lămâia?
De ce e bună portocala?
Fructele iubesc
granini

granini
granini
Alege
cel mai intens gust de lămâi şi mentă
Fructele iubesc
granini

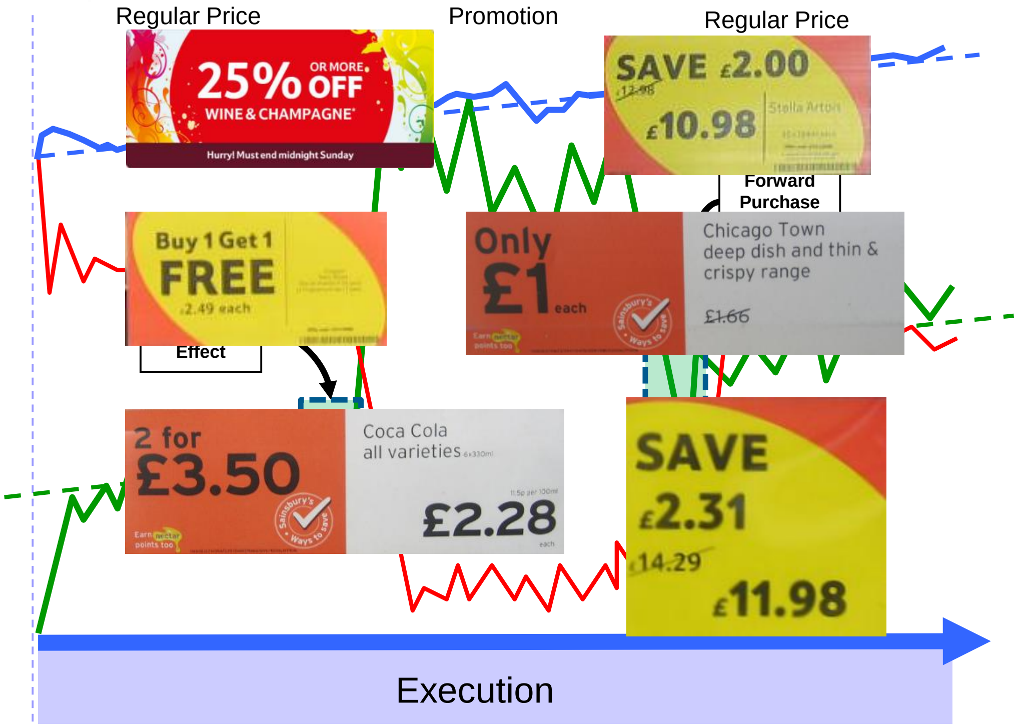
PROMOTION GOALS

- Generate sales and stimulate growth
  - Support new product introductions
  - Gain trial & multi-point purchases
  - Build brand perception / enhance image
  - Up-trade consumer to more profitable products
  - Switch from inferior competitive brands
  - Support failing products
  - Clearance

new
AKTIONSPREIS
0.99
0.88
AKTIONSPREIS
2 FOR
£1.49
BUY 1 GET 1 FREE
CHEAPEST FREE
SAVE £1.60
£3.39
granini

SAS FORECASTING

ANATOMY OF A PROMOTION



Product A

Competitive Product B

Combined Sales

SELECTING THE CORRECT MECHANIC

- Which Mechanic is more appealing to the consumer?

~~£1.59~~ **£1.19**

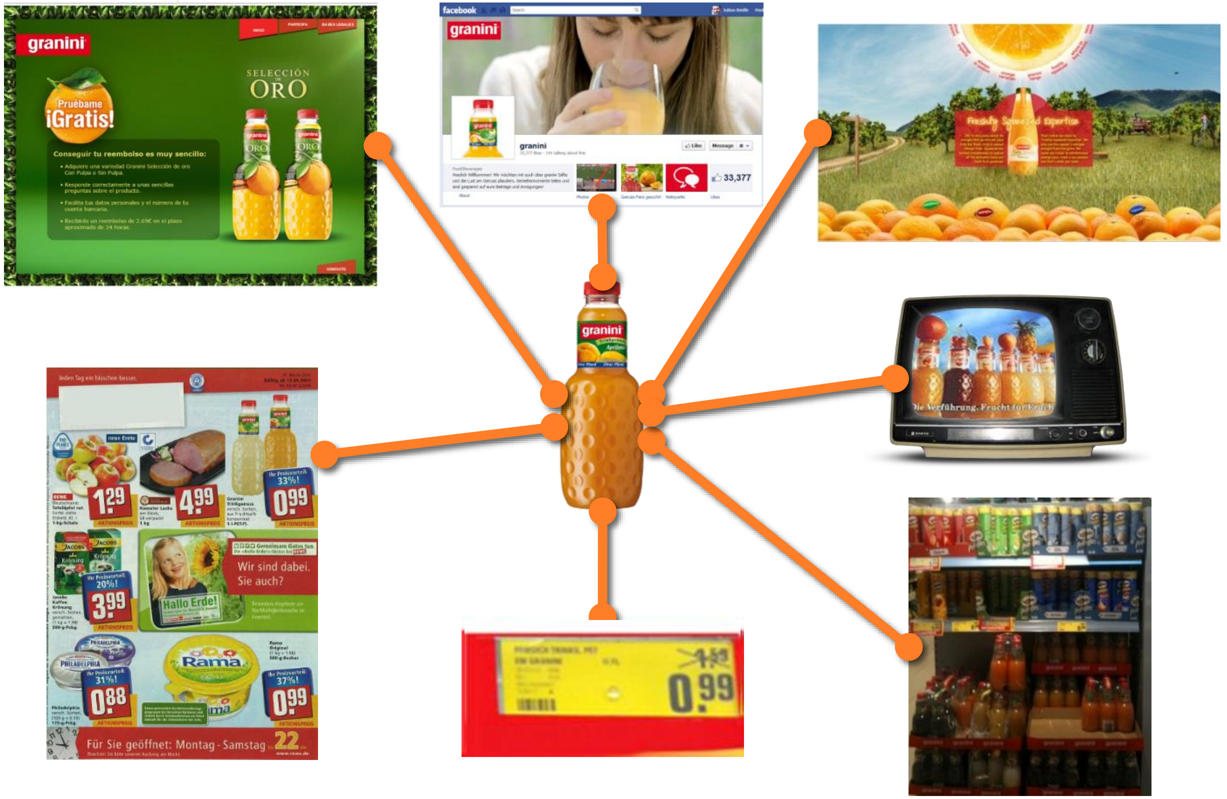
Buy 3
Get 1 Free

25% Off

Save £0.40

SAS FORECASTING

PROMOTIONS ARE COMPLEX



Conseguir tu reembolso es muy sencillo:

- Adquiere una variedad Granini Selección de oro Con Pulpa o Sin Pulpa.
- Responde correctamente a unas sencillas preguntas sobre el producto.
- Facilita tus datos personales y el número de tu cuenta bancaria.
- Recibirás un reembolso de 2.49€ en el plazo aproximado de 24 horas.

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Pruébame
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SELECCIÓN DE ORO
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PARTICIPA
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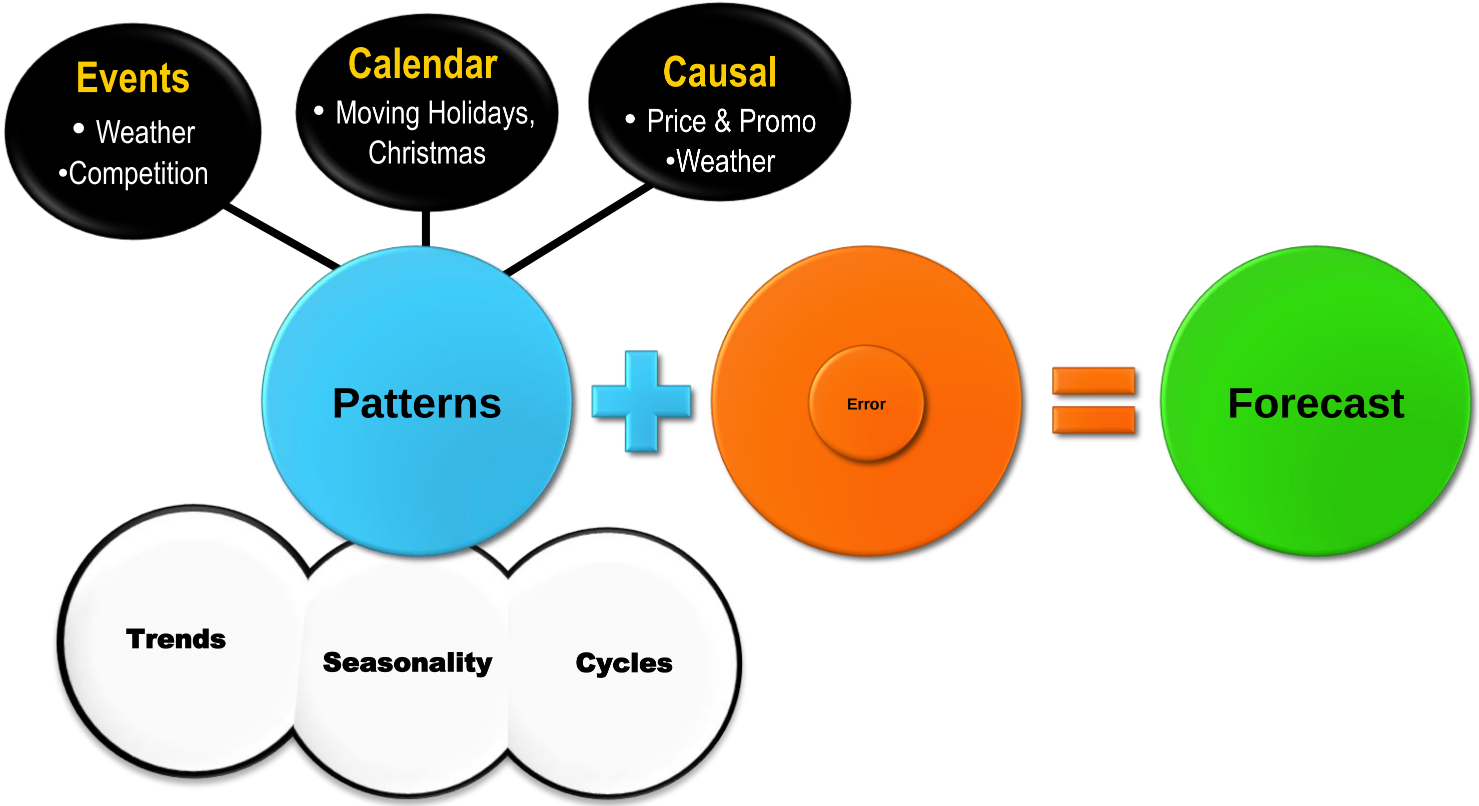
33,377
Freshly Squeezed Expertise
Die Verführung. Frucht für Frucht
Jeden Tag ein bisschen besser.
1,29
4,99
0,99
3,99
0,88
0,99
Wir sind dabei. Sie auch?
Hallo Erde!
Rama
PHILADELPHIA
Für Sie geöffnet: Montag - Samstag
22
0,99

SAS FORECASTING | IMPACT OF A PROMOTION

- Capacity planning
  - Promoted products
  - Cannibalised products
- Replenishment
- Temporary switch in demand
- Rewards already loyal customers
- Margin reduction
- Lack of visibility across the organisation
- Consumer perception – positive / negative

FORECASTING | FORECASTING CHALLENGES NEED SOPHISTICATED MODELS



Events
- Weather
- Competition

Calendar
- Moving Holidays, Christmas

Causal
- Price & Promo
- Weather

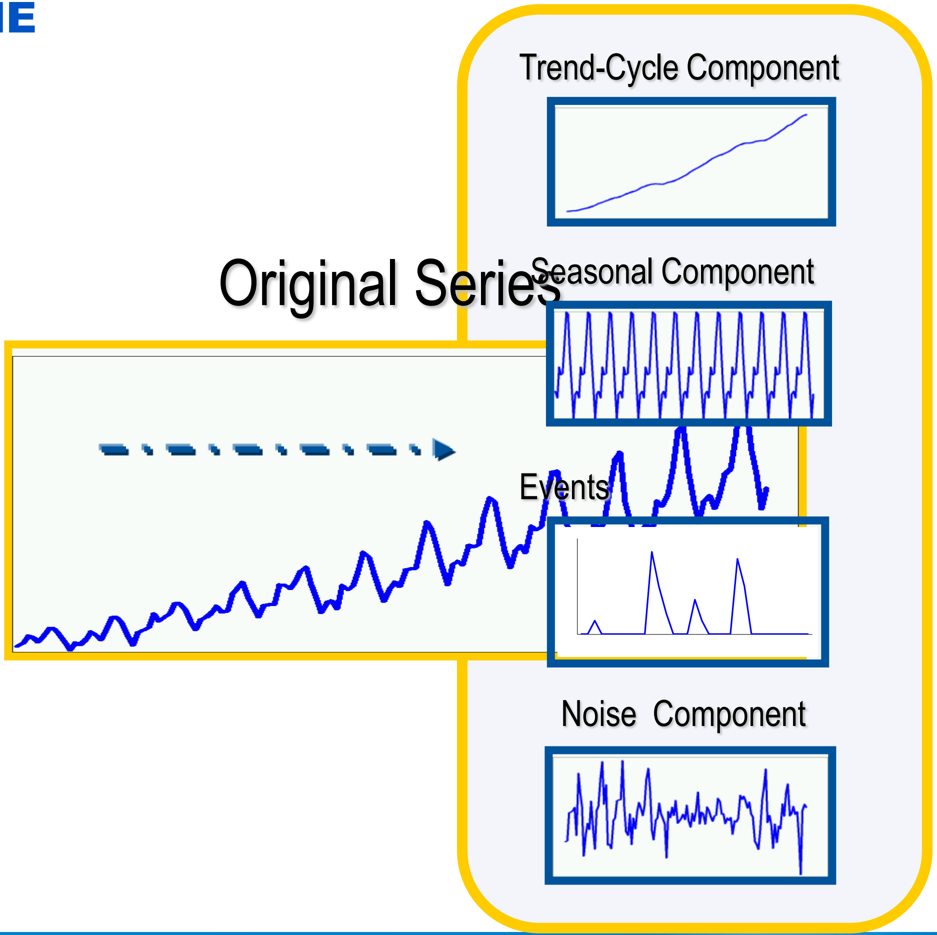
Patterns + Error = **Forecast**

Trends

Seasonality

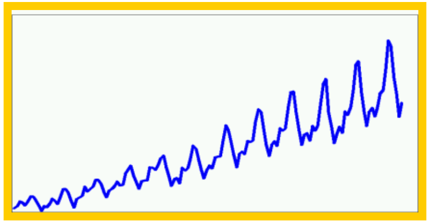
Cycles

A FORECASTING ENGINE

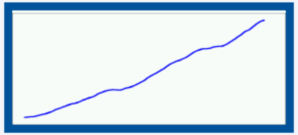


A FORECASTING ENGINE

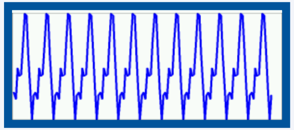
Original Series



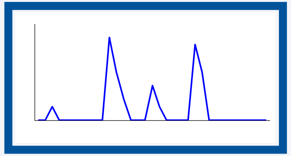
Trend-Cycle Component



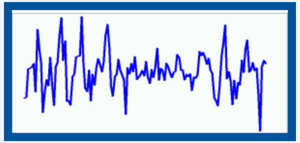
Seasonal Component



Events or Promotions

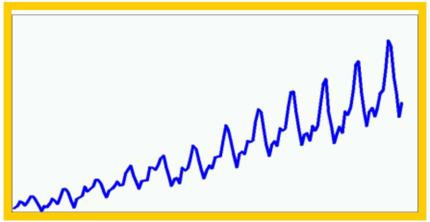


Noise Component

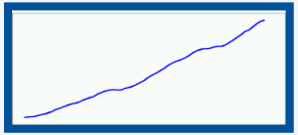


THE FORECASTING ENGINE

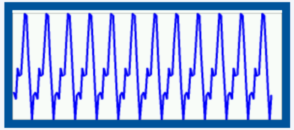
Original Series



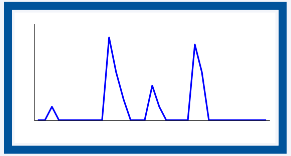
Trend-Cycle Component



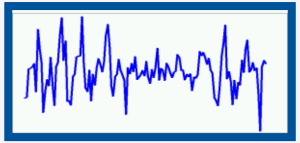
Seasonal Component



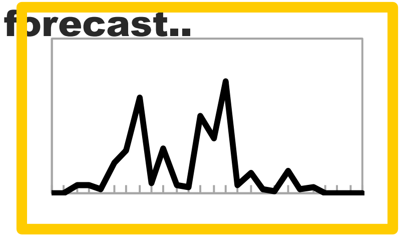
Events or Promotions



Noise Component



These forecast components are then re-combined to produce a total forecast..

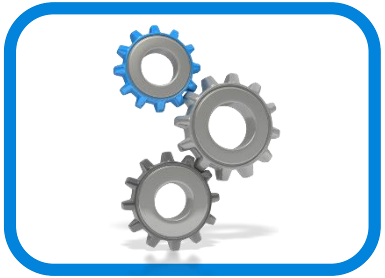


FORECASTING

THE RIGHT ANALYTICS FOR THE JOB

Millions of Forecasts Needed

Scalable



Need Results Quickly

Automated

Lack Skilled Resource

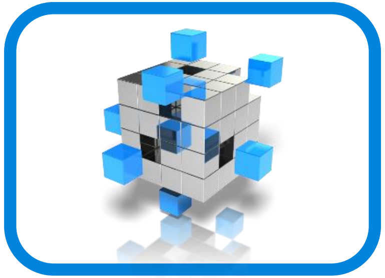
Managed by Exception

Models Not Known

Automatic Model Selection

Events & Drivers Affect Accuracy

Event & Causal Factors Incorporated



Inaccurate Forecasts Used

Extensive Modelling Capabilities

Waitrose

SAS® Modelling and Predictive Analytics

> “We can look at past events and see if mistakes were made, and put them right next time. Or look at successes and try to replicate them. SAS is very good at providing visibility on the forecasts, to measure accuracy.”

Gail Richmond
Manager - Branch Ordering Development

Daily 4 million store / sku combinations
Fast and accurate demand forecasts
Stockholding reduced by 8%
Wastage reduced by up to 4%
Higher product availability