Retail Analytics

Thank You!

In all the retail research we've seen on building customer relationships, there are two words which have a great impact on customers…Thank You.

So in this spirit, we want to thank the Target, Twin Cities SAS User Group and KXEN for sponsoring the event.

We appreciate the opportunity to participate here today and hope that you find our presentation interesting and thought provoking.

We will be available after the presentation to discuss detailed questions.

BBG Ergenomics

Introduction – Tom Lemke

Over 30 years of industry experience in Customer Centric Marketing in loyalty, CRM, database and analytics in multiple industries…retail

Consultant to major retailers in the field of leveraging customer data and insights to improve business decision making

Retail experience including:

- CEO & Chief Customer Officer, BBG-Global
- CMO and GM Customer Strategy, Coles Myer Australia
- VP Database Marketing and Internet Commerce, Kmart USA
- Global Retail Consulting Practice Leader, TNS

Business mantra… *Sell More and Spend Less™*

BBG Ergenomics

BBG and **Ergen**omics
Bringing Predictive Selling to Retail

BBG-Global.com

- Retail consultancy focused on improving retailer performance
- Leverage customer-centric marketing strategies and services
- Expertise in customer loyalty, segmentation, analytics, cross-sell and up-selling, assortment optimization and CRM methodologies
- Team of **senior executives with a proven retail background**

Ergenomics.com

- Provider of predictive analytics that helps companies implement advanced analytics and intelligence insights
- Our team consists of **PhD economists and predictive analytics specialists**
- Deliver tailored solutions to improve the bottom line for customer centric companies
- Expertise in the areas of customer retention, cross-sell & up-sell, attrition, risk management, profitability profiling, value enhancement, marketing optimization, and loyalty.

Successful Diverse Projects across the globe:
US, UK, UAE, Eastern Europe, Asia …..

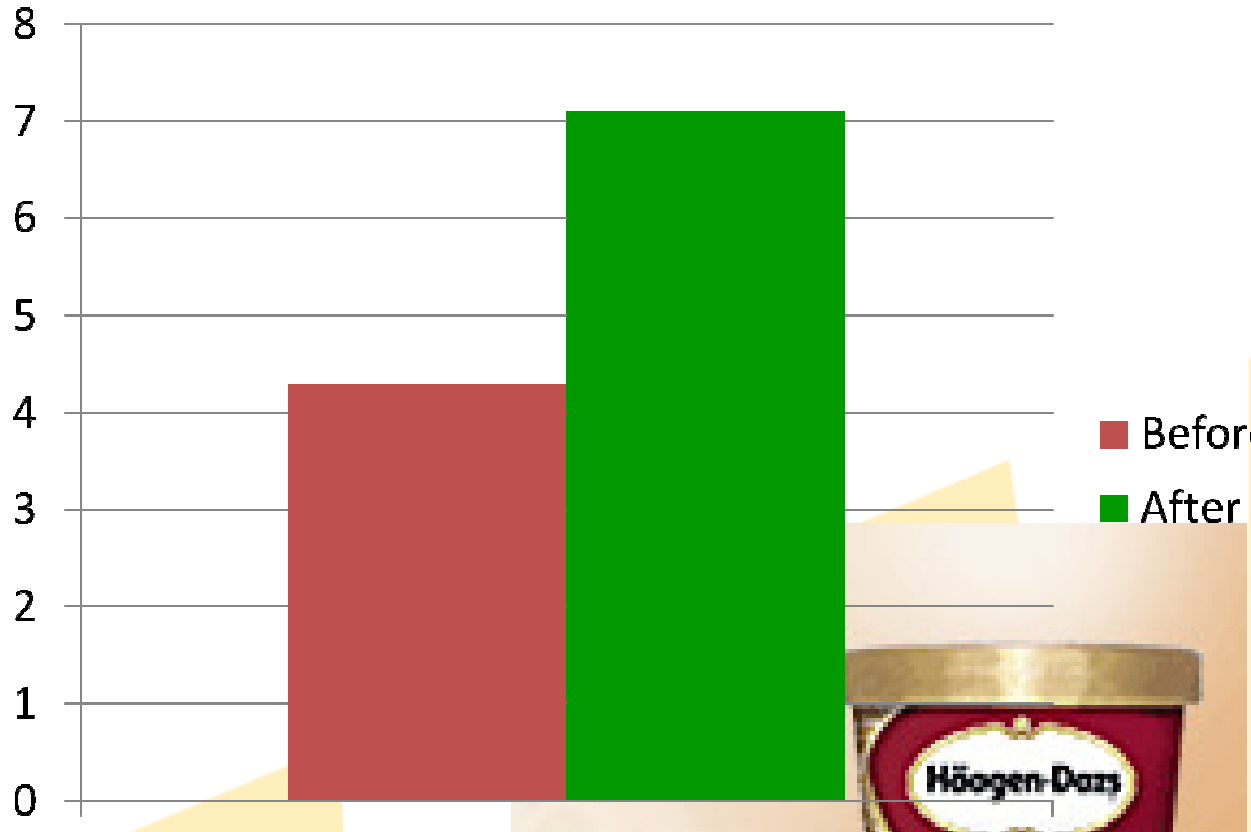
What We Want to Cover

1. Intro to BBG Global / Ergenomics Predictive Selling Partnership
2. Retail Analytics overview
3. What is Game Theory
4. Blending Game theory and Traditional Methods
5. Grocery Data and the Power Index
6. Department Matrix
7. Consumer Departmental Index
8. Cloud Computing Overview
9. Closing & Questions

Our goal, is to show proven accurate statistics as well as how you can use and apply them in everyday challenges such as promotional planning.

Sell More and Spend Less™.

Intuition vs. Data



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Why is understanding data important?

The Pareto Rule Example

Top 20 %
Drive 65% of sales

Mass Retailer USA

Decile	Annual Households	% Sales	Cum % Sales	Annual Visits	Annual Value	Market Basket	Marketing $$ per Customer
1	8,500,000	42.1%	42.1%	59.3	$ 2,269	$ 38.25	$ 80.00
2	8,500,000	23.1%	65.2%	39.3	$ 1,245	$ 31.66	$ 80.00
3	8,500,000	11.6%	76.8%	27.7	$ 625	$ 22.60	$ 80.00
4	8,500,000	7.9%	84.7%	21.3	$ 426	$ 19.96	$ 80.00
5	8,500,000	6.3%	91.0%	16.3	$ 340	$ 20.79	$ 80.00
6	8,500,000	3.4%	94.4%	12.0	$ 183	$ 15.27	$ 80.00
7	8,500,000	2.6%	97.0%	8.0	$ 140	$ 17.52	$ 80.00
8	8,500,000	1.3%	98.3%	6.0	$ 70	$ 11.68	$ 80.00
9	8,500,000	1.0%	99.3%	5.0	$ 54	$ 10.78	$ 80.00
10	8,500,000	0.7%	100.0%	4.0	$ 38	$ 26.95	$ 80.00
Total	**85,000,000**	**100.0%**	**100.0%**	**20.0**	**$ 539**	**$ 26.95**	**$ 80.00**

Bottom 50% only
Drive 9% of Sales

Ad Spend Exceeds
Margin on Sales

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Not All Customers Are Equal

What If We Could Get Our Top 30% to Shop **One More Time per year?**

$1,000,000,000

Our Point of View

Unlocking "Customer Data" Can Become the Retailers Greatest Asset

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Data and Analytics are Changing Retailing

TODAY	TOMORROW
All customers are the same	**All customers are different**
All Marketing Communications are the same	**Marketing Communications differ by segment/customer**
All stores are the same	**Merchandise Ranges change by store**
Total Revenue / Profit Model	**Customer Level Profit Model**
Limited Customer Engagement	**Fully Engaged Customers**

As SAS experts, you are already familiar with how important your work is to improving retail performance…

Game Theory Provides Solutions for Tomorrow

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Game Theory Uses Today

- "Game Theory is the study of the ways in which strategic interactions among rational players produce outcomes with respect to the preferences of those players, none of which might have been intended by any of them."
  Stanford Encyclopedia of Philosophy

- Game Theory is used to predict and explain complex relationships and behaviors in…
  - Biology
  - Economics
  - Information Technology
  - Government Policy
  - Financial Services

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Why Game Theory fits and improves retailing….

- Recognizing that each customer is a player in their unique game enables the Principles of the Game Theory to be applied, so that constantly changing rules are applied in a timely manner to the right game, the right player, and the right group.

- Game Theory states that if there is a game, there are rules, players and groups. If a player wants to join the group, that player wants to gain positively from this alliance. For the group to let this player in, they need to benefit from the addition.

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Game Theory Introduction

Practical Usage:

A customer will not buy a product if the need is not recognized.

A company will not sell unprofitable products.

Game Theory helps grow towards a 100% share of wallet with all existing customers, and offers an iterative research to identify the next most appropriate product for each customer by considering what products they use now, and what they will need in the future.

Game Theory Differentiation

Differentiating Ergenomics from Traditional Methods

- Game Theory produces key scoring variables Faster and more Accurate than traditional methods; provides near real time results that traditional methods cannot obtain.

- Game Theory is Flexible: Requires less data to provide accurate predictions. Does not require a high frequency of transactions or large cumbersome datasets

- Offers a Low barrier to entry: No license, No upfront costs, No infrastructure. Most smaller retailers cannot afford to get into market basket analytics (limited expertise, horsepower).

- Allows you to make better business decisions faster and more accurately

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Game Theory and Traditional Techniques Delivers Predictive Decision Making

Understand the relationships between Customers and Product sales:
- How Do They Shop?
- What Do They Buy?

Forecasting Future Merchandise Affinities:
- What Should They Be Buying?
- What Brands Sell Together?

Understand Your Customers:
- Insight Analytics
- What are Their Preferences?

Promotion Planning Opportunities:
- What To Advertise?
- What Price is the Trigger?

Game Theory Can work with traditional techniques to help Build Strategies To Improve Foot Traffic and Retail Sales Across a Total Store Base

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What is Game Theory MBA?

- Game Theory MBA is a modeling technique based upon the theory that if you purchase item A, you are more likely to purchase item B at the same time (Affinity Dynamics).
- Game Theory MBA is generally developed on huge and detailed SKU level data, using advanced Data Mining algorithms and powerful tuning techniques. These yield strong business rules which identify distinct customer purchasing behaviors.
- The results are widely applied in promotion, store displays, up-selling and cross-selling. This applies especially well to non-high frequency retailers
- In retailing, Game Theory MBA can :
  - Tell us which items tend to be purchased together
  - Determine which items to put on special
  - Identify Price Tier Thresholds

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Game Theory Basket Analytics

Some particularly strong relationships (Affinity Strengths) are shown

# TRANS.	Merchandise Relationships	# Trans. Primary	# Trans. Affinity	Affinity Strength	Penetration	Lift
733,585	**EVERYDAY WRAP ==> EVERYDAY CARDS**	**1,295,095**	**2,734,731**	**56.64%**	**1.29%**	**11.78**
733,585	EVERYDAY CARDS ==> EVERYDAY WRAP	2,734,731	1,295,095	26.82%	1.29%	11.78
627,415	**BOTTOMS -- OUTERWEAR ==> TOPS -- OUTERWEAR**	**901,041**	**1,293,799**	**69.63%**	**1.10%**	**30.62**
627,415	TOPS -- OUTERWEAR ==> BOTTOMS -- OUTERWEAR	1,293,799	901,041	48.49%	1.10%	30.62
327,706	COMPACT DISC ==> VIDEO DVD	1,560,498	3,420,898	21.00%	0.58%	3.49
303,817	BRIEFS ==> SOCKS	924,992	1,633,417	32.85%	0.53%	11.44
151,302	PACKAGED ==> NOVELTY -- EASTER	397,979	451,275	38.02%	0.27%	47.93
151,302	NOVELTY -- EASTER ==> PACKAGED	451,275	397,979	33.53%	0.27%	47.93
148,566	GIRLS TOPS ==> GIRLS BOTTOMS	331,021	488,456	44.88%	0.26%	52.28
130,370	CAR CHEMICALS ==> CLEANING/AIR FRESH	407,278	460,320	32.01%	0.23%	39.57
125,863	SEEDLINGS ==> OUTDOOR PLANTS	398,139	673,835	31.61%	0.22%	26.69
124,833	MULTIEGG PACK ==> NOVELTY -- EASTER	292,119	451,275	42.73%	0.22%	53.88
116,656	MULTIEGG PACK ==> PACKAGED	292,119	397,979	39.93%	0.21%	57.09
94,052	COMBOS ==> TACKLE ACCESSORIES	169,248	729,682	55.57%	0.17%	43.33

Observation: Insights build Margin Management If a customer purchases BOTTOMS, 69% of the time they will also purchase TOPS. If a customer purchases EVERYDAY WRAP, then 57% of the time they will also purchase EVERYDAY CARDS.

Take Away- Do not promote Bottoms with Tops, they are purchased together anyway! This will eliminate significant margin erosion.

One year of data was provided.

There are 191,330,206 SKU level records and 56,898,721 transaction level records (i.e. baskets).

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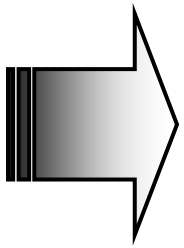
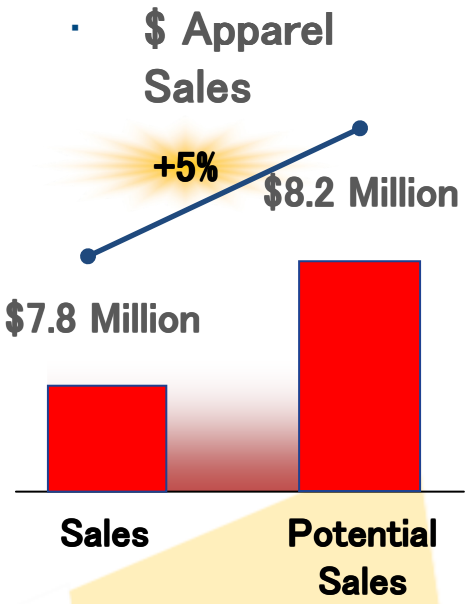
Apparel Opportunity: Predict The Next Jewelry Purchase

Execution

Display Jewelry in close proximity to Apparel.





When a Basket Includes Jewelry Sales, Apparel Sales increase 5%

Cross Promote Jewelry To Increase Apparel Sales

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Case Study
Grocery Data

Sample Supermarket Data

About the Study

Historical Data: Sep, Oct and Nov transactions from all stores

Data Elements: Transaction ID, Customer ID, Store ID, Transaction Date, SKU ID, Category ID, Sub Category ID, Department ID, Amount, Quantity

Sample: 3,240 customers, 55 stores, Over 1,000 SKUs, 300 Categories and 21 Departments

Sample Supermarket Data

Transaction ID	Customer ID	Store ID	Transaction Date	SKU ID	Category ID	Sub Category ID	Department ID	Amount	Quantity
262200810169	42004790935	2	16-Oct-08	1200002922	36	1	10	20	4
262200810169	42004790935	2	16-Oct-08	1220010005	83	5	10	5.58	2
262200810169	42004790935	2	16-Oct-08	1300000133	16	15	10	2	1
262200810169	42004790935	2	16-Oct-08	1480000023	14	5	10	2.49	1
262200810169	42004790935	2	16-Oct-08	1480091070	20	7	10	5.39	1
262200810169	42004790935	2	16-Oct-08	2114014194	84	5	10	3	3
262200810169	42004790935	2	16-Oct-08	2114014195	84	5	10	1	1
------	------	------	------	------	------	------	------	------	------
------	------	Sample data contains 100,000 records					------	------	------
------	------	------	------	------	------	------	------	------	------
------	------	------	------	------	------	------	------	------	------
362200418165	9356170987	105	16-Oct-08	1115555555	74	10	310	8.25	2
362200418165	9356170987	105	16-Oct-08	1255487456	16	15	310	5.3	1

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Our Game Theory Analytical method can deliver great results Without Loyalty Consumer data, with Tender Type Refinement

Our 3-Phase Game Theory Approach

- Phase 1 Create the Store Level Power Index
- Phase 2 Create the Department Power Index
- Phase 3 Create the Customer Power Index

Game Theory – **Phase I**
Build the **Ergen**omics Power Index

What is the Ergenomics Power Index?

Each Department contributes to the “Draw” power of a store. The power index created using principals of Game Theory shows how important each department is as a comparison to the other departments.

This process demonstrates the power of evaluating large datasets quickly to determine the relationships of how important the departments are in consumers’ eyes

We can help put these concepts into a measurable value.

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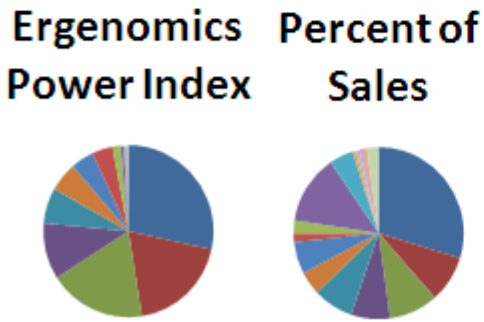
Power Index - Diagnostic Output 1

- Produce is one of the highest shopped departments in the store.
- The Power Index algorithm includes Breadth of Departments Shopped, Size of the baskets and Frequency of visits to the target department.
- This helps to calculate the influences thus impact high Draw Power departments to purchase high profitable departments, i.e. Produce to Meat.

Department	Ergenomics Power Index	Percent of Sales
Grocery	28.42%	29.66%
Produce	19.04%	8.79%
Dairy	18.31%	9.26%
Frozen Food	10.66%	7.26%
Taxable Grocery	6.75%	7.65%
Packaged Meat	5.46%	4.37%
General Mdse	4.39%	6.09%
Bakery	3.91%	1.57%
Deli	1.53%	2.52%
Meat	0.61%	13.03%
Alcohol	0.33%	4.56%
Tobacco	0.19%	0.58%
Floral	0.17%	0.63%
Seafood	0.13%	1.46%
Pharmacy	0.02%	2.24%

Produce and Dairy influence customers purchase of other products. They should get the most attention on marketing and promotions.

Meat generates 13.03% of sales, it only has 0.61% "Draw" power. *This does not mean get rid of Meat department.* It means use high Power Index drivers to sell more Meat by determining the buying behavior.



Game Theory – **Phase II**
the **Ergen**omics Department Matrix

What is Ergenomics Department Matrix?
aka. The Departmental Affinity Index

We know each Department contributes to the "Draw" power of a store. But we need to know which departments draw other department purchases in the basket.

The matrix shows the buying power for Cross Departmental Affinities; how they relate

Game Theory applies to more than the Grocery Sector, a practical example would be in apparel where there are very quick changes due to colors, designs and styles etc. Game Theory helps to distill how these changes impact other merchandise (Jewelry, Shoes, Accessories). Game Theory can be utilized in retail sectors where the quantity of transactions is relatively small.

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Departmental Matrix - Diagnostic Output 2

The matrix shows influence between departments.

For example Packaged meat and Produce have a High Affinity
Dairy has a high affinity to Packaged Meat.
These clues can lead to stronger marketing campaigns.

With Game Theory, Category Affinities can also be easily evaluated.

MATRIX	Grocery	axable Grocer	Meat	Seafood	Packaged Meat	Deli	Bakery	Alcohol	Dairy	Frozen Food	General Mdse	Floral	Tobacco	Pharmacy
Produce	0.947	0.779	0.171	0.260	0.762	0.557	0.799	0.130	0.923	0.859	0.704	0.298	0.319	0.140
Grocery		0.771	0.169	0.258	0.754	0.551	0.791	0.129	0.914	0.850	0.697	0.295	0.319	0.138
Taxable Grocery			0.139	0.212	0.620	0.453	0.650	0.106	0.751	0.699	0.573	0.242	0.260	0.114
Meat				0.047	0.136	0.100	0.143	0.023	0.165	0.153	0.126	0.053	0.057	0.025
Seafood					0.207	0.151	0.217	0.035	0.251	0.233	0.191	0.081	0.087	0.038
Packaged Meat						0.443	0.636	0.104	0.735	0.683	0.560	0.237	0.254	0.111
Deli							0.465	0.076	0.537	0.499	0.410	0.173	0.186	0.081
Bakery								0.109	0.771	0.717	0.588	0.249	0.267	0.117
Alcohol									0.125	0.117	0.096	0.040	0.043	0.019
Dairy										0.828	0.679	0.287	0.308	0.135
Frozen Food											0.631	0.267	0.287	0.125
General Mdse												0.219	0.235	0.103
Floral													0.099	0.043
Tobacco														0.047

Both Produce and Dairy have Stronger Relationships with Packaged Meat.

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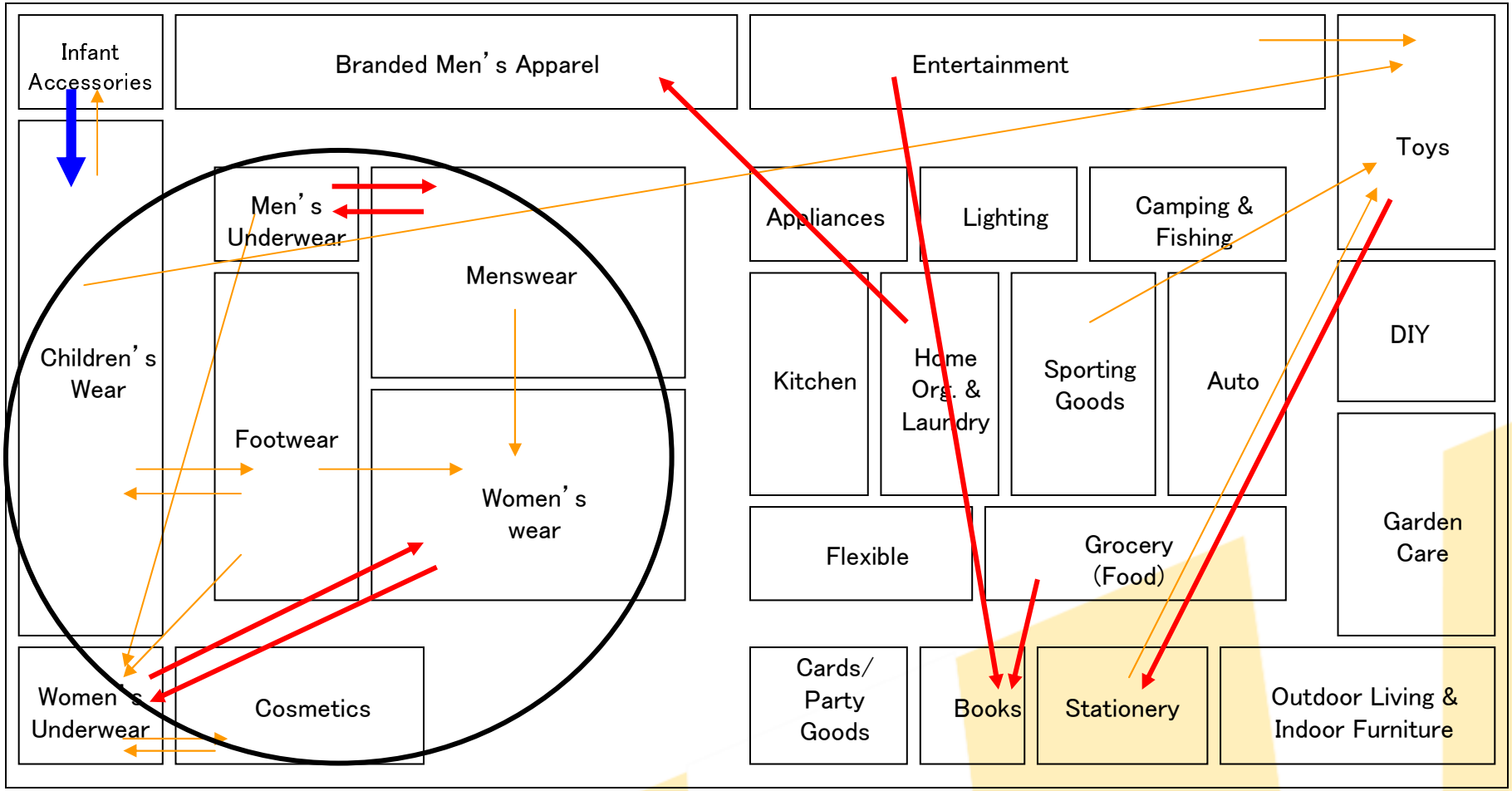
Department Affinity Matrix on the Floor



Affinity Strength Level : → > 30% → 20%~30% → 15%~20%

Logical explanation of the department matrix

Game Theory – **Phase III**
the **Ergen**omics Consumer Index

What is the Ergenomics Consumer Matrix?
aka. Departmental Affinity Index
The Consumer Index shows the buying power from each consumer. This tells you What Department is important to Which Consumer.
The Consumer Index displays the probability of which department (in rank order) the consumer will most likely purchase next.

Analytics Environment Today:
-Merchandise Segmentation or Customer Segmentation and CRM / RFM

Game Theory
-Blending Merchandise & Customer Segmentation and CRM / RFM

-It is a Three dimensional score by including time as an aggregate to see total product and consumer, in other words: Game Theory takes time into account, but does not necessarily score variances over time

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Consumer Index - Diagnostic Output 3

Today there is a lot of time, effort, energy and resources spent trying to look at general merchandise basic stock, where people buy day-in and day-out with little change.

Game Theory has the ability to do time series to evaluate seasonal behaviors, however what we are showing here is the ability to encompass large groups of data and score that data in a two dimensional plane where consumers are matched to product and it rates those two in an easily digested decision.

CUSTOMER	Produce	Grocery	Taxable Grocery	Meat	Seafood	Packaged Meat	Deli	Bakery	Alcohol	Dairy	Frozen Food	General Mdse	Floral	Tobacco	Pharmacy
Tom Lemke	0.229	0.461	0.419	0.330	0.792	0.697	0.552	0.123	0.342	0.599	0.952	0.567	0.472	0.912	0.128
Emmett Cox	0.115	0.926	0.499	0.328	0.065	0.747	0.900	0.282	0.489	0.040	0.861	0.457	0.810	0.498	0.606
Murat Ergen	0.331	0.497	0.213	0.836	0.398	0.404	0.222	0.120	0.103	0.427	0.757	0.764	0.315	0.324	0.515

Least likely to buy | Likely to Buy | More Likely to Buy | Most Likely to Buy

This table tells you What is important to Who. And What is not important. You can now Optimize your marketing dollars by Targeting the right consumer with the right offer

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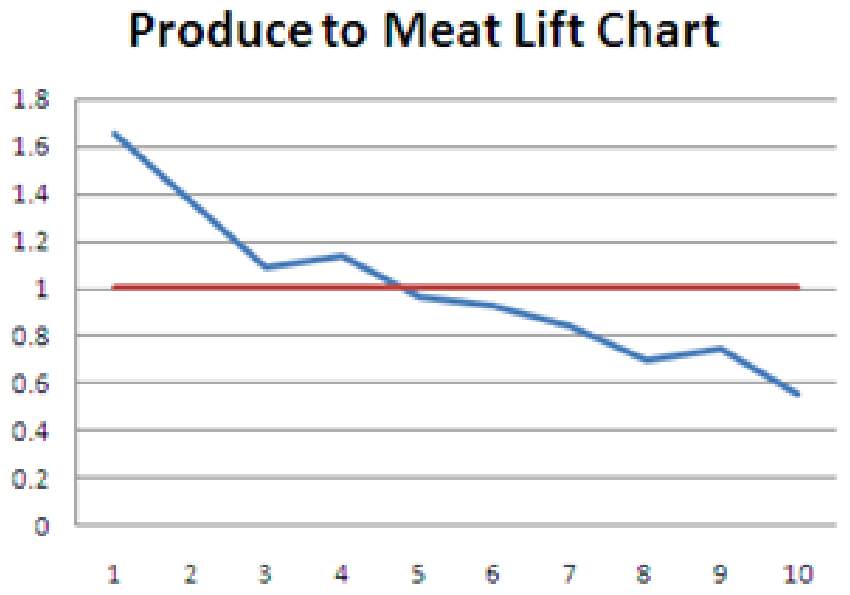
Gain Chart and Cumulative Lift

The Game Theory model results show
1) Consistent responders selection
2) A significant response lift to increase profitability

-The chart is a statistical proof of the case study using the little data available
- Improve sales and stem the flow of wasted resources, and energy
- Drive low margin product buyers to buy high margin products
- This is done for every profitable combination and available for what if scenarios

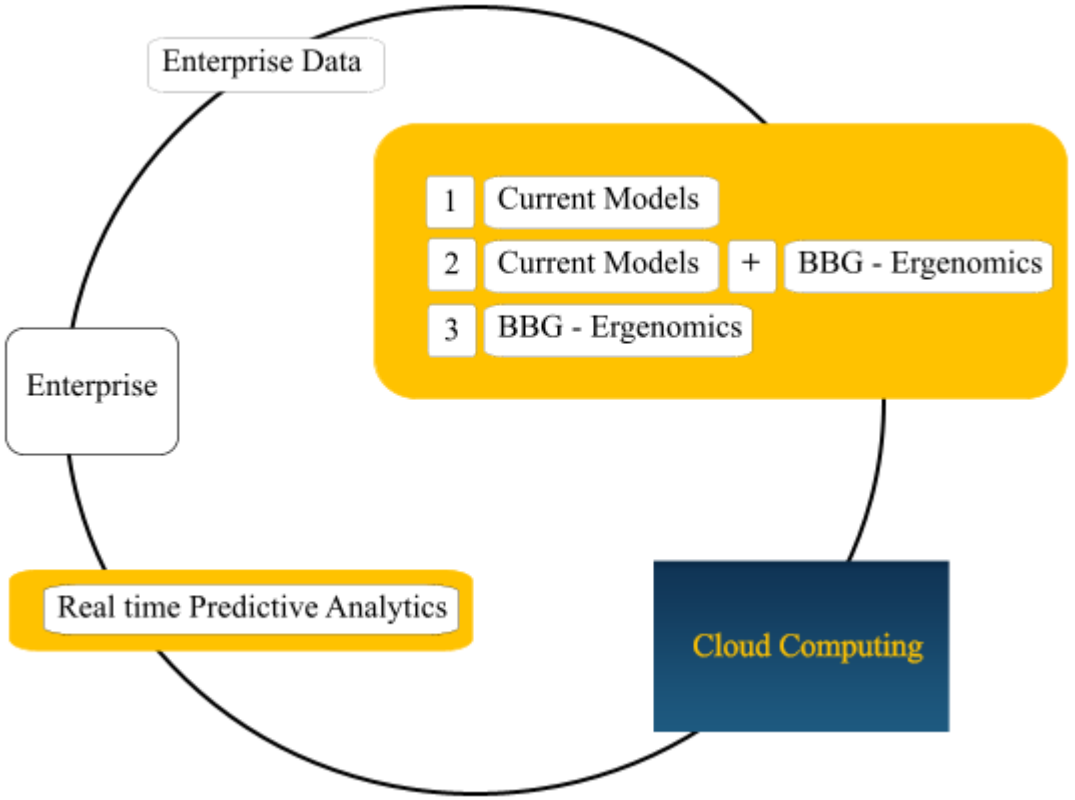


10 deciles: 1-4 are profitable and are more likely to buy meat
5-10 are not likely to buy meat. Don't waste your marketing $$$

Cloud Computing

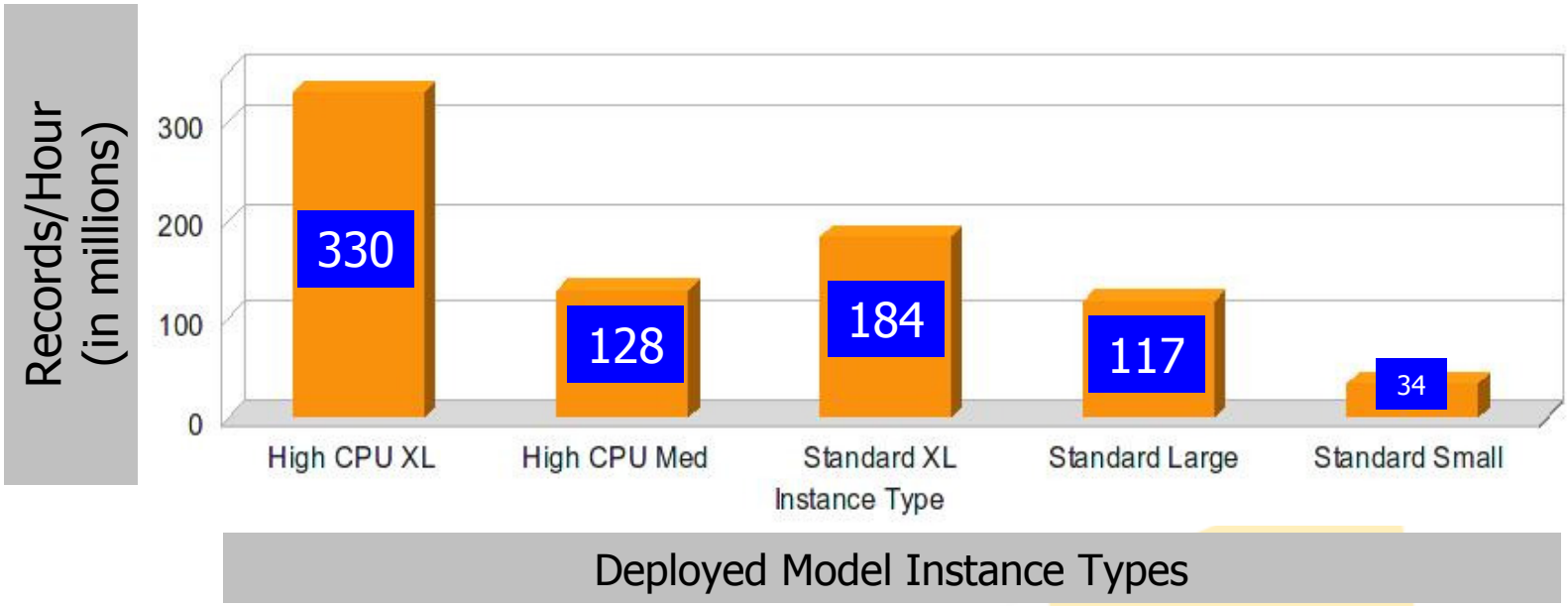
What is Cloud Computing?

- Cloud Computing is a high performance, extremely flexible computing environment accessible through secure web services.
  - Ultra high performance
  - Virtual computing environment with private instant management
  - Resizable computational capacity
  - Instantly Scalable
  - Secure
  - Reliable
  - Automatic failover
  - Software as a Service
  - Pay as you Go



BBG-**Ergen**omics Retail Analytics Performance on the Cloud

Processing more than 300 million records/transactions per hour



24 input variable model, In the High-CPU XL instance,
113 Million scored records per hour. That's 31.5K records per second.

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Cloud Computing & Game Theory In Action

1. In-Store Promotion
2. Holidays
3. Store Optimization
4. Shelf Display
5. Advertising
6. Fresh Food

Adjacencies Build Up Accessory Purchases

Develop Seasonal Flex Space to optimize Limited Shopping Period

Emphasize Product Assortments Based on Demographics

Shelf and Space Management: Right Product In the Right Aisle to Build on Affinities

What products have natural affinity:
What Not to Promote Together.

Add On Accessories: Secondary Placement.
Wine Glasses w/Wine; Egg Substitute w/Fruit.

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Leverage CRM-RFM Infra-Structure to Further Drive Merchandising Opportunities

Overall Summary

- Game Theory is a technique that provides a number of benefits to retail analytics including:

1. Faster Turnaround—Game Theory Analytics provides faster turnaround time between Raw Data and Clear Actions
2. More Accurate--Game Theory requires Less Data to develop Forecasts and Pattern Detection. Does not rely heavily on Transaction Frequency making this method more accurate…especially for non-high frequency retailing
    - Game Theory provides additional scoring variables that can be included in traditional CRM / RFM models making them even more accurate
3. More Flexible--These solutions work across many retail sectors: Grocery, Mass, Department Store and Specialty Retail…both high and non-high frequency

…and Less Expensive since it leverages Cloud computing

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Game Theory provides *Predictive Selling* that allows you to *Sell More and Spend Less™*

Our Game Theory Proof Challenge

- Can Game Theory work for you? Proving it is easy
- Identify a project where you have successfully used other analytics techniques
- Engage our team to deliver tailored predictive solutions to provide a head-to-head test
- We will execute mutually agreed deliverables and timeline. Duration ranges from 9 to 14 weeks.
- We will integrate your business model into our own proven solutions. This option allows you to utilize our sophisticated solutions and prove it's benefits. The outputs are typically delivered within 5 weeks

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No-Risk Guarantee

- For a limited time, BBG-Global and Ergenomics will offer a money-back guarantee on selected head-to-head test projects
- Based on a successful outcome, we would require your commitment to additional projects to continue helping you improve your retail business analytics abilities
- Our goal is simple…to help you…

Sell More and Spend Less™

Thank you!

BBG

Sell More and Spend Less™

Ergenomics
predictive selling

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