Real-world Insights from Mining Retail E-Commerce Data

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Goals

- Give you a feel for what e-commerce data looks like
- Show interesting insights with fun teasers from Blue Martini customers’ data
- Show things that worked well for us, including architecture and powerful visualizations
- Next week: share more detailed data mining lessons and challenges (Rajesh Parekh)
Agenda

- Overview of architecture
- Usability
- Web site traffic
- Timeout
- Searches, referrers
- Micro-conversions and utilizing real-estate
- E-mail campaigns
- Multi-channel analysis
- Cross-sells / Associations
- Classification
- Summary
In July of 1998, I gave an invited talk at ICML titled Crossing the Chasm: From Academic Machine Learning to Commercial Data Mining
http://robotics.stanford.edu/users/ronnyk/chasm.pdf

Most talks have one key slide (some have zero 😊)

The key slide was the following slide, which guided the design of the data mining architecture at Blue Martini software
Key Slide in Crossing the Chasm

General Suggestions for the Entrepreneurs

- Team with business people that understand marketing, sales, distribution channels.
- Build a vertical solution (e.g., manufacturing, warranty DB) and use the end user’s vocabulary. Build an application that maximizes profit instead of minimizing RMS.
- Build a GUI based on the task.
- Develop a scalable architecture (e.g., client/server).
- Integrate with other pieces of the process: databases, cleansing tools, reporting tools, post processing, deployment.

Our CEO did this once before

Vertical: e-commerce retail
Integrated Architecture

Business Data Definition (Enterprise Desktop, Remote Desktop)

Stage Data

Customer Interactions (Web, campaigns, Call Center, Wireless, POS)

Deploy Results

Build Data Warehouse (DSSGen)

Analysis (Reporting, Analytics, Visualizations, OLAP)
Advantages of Architecture

- It is well documented that “80% of the time spent in knowledge discovery is spent on data preparation”
- Our architecture shares enough meta data and there is enough domain knowledge to cut that dramatically
- Clickstreams
  - Store from the application server layer to the DB (no need to load from flat files on multiple web servers, conflate, and sessionize)
  - Collect additional information (screen resolution, local time)
  - Tie all activities (registrations, orders) to sessions
  - Log high level “Business Events,” including cart activities, search information, form errors
- More information in *Integrating E-Commerce and Data Mining: Architecture and Challenges, ICDM 01*
  Available at http://robotics.stanford.edu/users/ronnyk
Usability – Form Errors

This was the Bluefly home page

Looking at form errors logged by our architecture, we saw thousands of errors every day on this page

Any guesses?
Improved Home Page

This is the new Bluefly home page

- Search box added
- E-mail box clearly marked as email

- As with many insights, hindsight is 20/20
- The hard part is collecting the right information and reporting on it
Bot Detection

- Bots are automated programs, sometimes called crawlers/robots
  Examples: search engines, shopping bots, performance monitors

- Significant traffic may be generated by bots

- Can you guess what percentage of sessions generated by bots?
  
  23% at MEC (outdoor gear)
  40% at Debenhams

- Without bot removal, your metrics will be inaccurate

- We find about 150 different bot families on most sites. Very challenging problem!
Example: Web Traffic

Note significant drop in human traffic, not bot traffic

Weekends

Registration at Search Engine sites

Internal Performance bot
Heat Maps for Day-of-Week (Same Data)

- Use color to show an additional dimension
  - Green is low traffic
  - Yellow is medium traffic
  - Red is high traffic

- The power of visualizations
  - Weekends are very slow
  - Friday is slow
  - Patterns
    - Sept 11 in green
    - Reduced traffic after Sept 11 (yellow above Sept 11)
    - Sept 3 Labor day in green
Browsing hours

- Traffic by hour (server time)
  Lines show two consecutive weeks
- What do you think it looks like?
- How stable is it across domains/geographies?

Traffic by hour (server time)

- EST
- CST
- GMT

Tokyo
Drill-Down to Hour

- Same heat map idea applies to hourly patterns
- In this case hourly traffic to a web site
- Note Sept 11 effect and its effect for rest of week

Site down at critical hour
• Here is a similar heatmap

• Interestingly, the white square (no traffic) appeared on many sites

• But not in Phoenix, AZ servers

• Why?

Site down?
We found that people purchase hours after visiting the site.
Session Timeout

- Catledge and Pitkow in a well referenced paper determined that the “optimal” session timeout for analysis should be 25.5 minutes.

- How many visitors at Debenhams
  - Added product to shopping cart
  - Waited over 25.5 minutes
  - Came back to the site in the next 3 hours?

5% (right axis)

That’s a lot of lost shopping carts.
Searches

- Architecture records every search and the number of results
- Top searched keywords (percent of searches)
  - Empty search string (3.9%) returns over 160 results
  - GPS (1.2%)
  - sunglasses (0.8%)

- Top failed keywords in the product category (percent of failed searches)
  - gift certificate(s) (0.98%) (already implemented since study)
  - arc’teryx (0.44%)
  - bear spray (0.44%)
  - pedometer (0.37%)
  - stroller(s) (0.36%)

Recommendation:
- Do not allow empty search
- Create custom pages for often searched keywords

Recommendation:
- Parse search string to remove special characters
- Build extensive thesaurus
- Consider carrying products
Synonyms

- At Publix, an online grocer in the southeast, ‘Bath Tissue’ was among the top selling assortments
- Top failed search?

Toilet Paper
Search Effectiveness at MEC

- Customers that search are worth two times as much as customers that do not search
- Failed searches hurt sales

Visit

Search (64% successful)
Avg sale per visit: 2.2X

10% 90%

Search Last Search Succeeded
Avg sale per visit: 2.8X

No Search
Avg sale per visit: $X

Last Search Failed
Avg sale per visit: 0.9X
Referrers at Debenhams

- **Top Referrers**
  - MSN (including search and shopping)
    - Average purchase per visit = X
  - Google
    - Average purchase per visit = 1.8X
  - AOL search
    - Average purchase per visit = 4.8X
Understand abandonment and conversions

Not just visitor to purchaser, but also the micro-conversions

Shopping Cart Abandonment 62% = 55% + 45% * 17%

Excellent opportunity to identify problematic steps in processes and improve

Also a good way to identify abandoned products, send targeted e-mails if those products are on sale
Page Effectiveness
Percentage of visits clicking on different links

- 14% Top Menu
- 3% Any product link
- 2% New Year
- 8% Exclusive preview
- 2% Happy New Year
- 13% Top Menu
- 9% Any product link
- 0.6% New Year

18% of visits exit at the welcome page
Top Links followed from the Welcome Page:
Revenue per session associated with visits

Note how effective physical catalog item #s are.
Conversion rates are high because

- Call Center (orders but no views)
- Automatic reordering (send me the medicine every month)
- Bundles (you view X, you get Y for free)
- Wizard (at Virgin Wines, they mix you a case; most people don’t even look at the details)
- Quantities over 1 (question of exact definition of conversion)
Teaser - Privacy

• 92% of Americans are concerned (67% very concerned) about the misuse of their personal information on the Internet.
  - FTC Report, May 2000

• 86% of executives don’t know how many customers view their privacy policies.
  - Forrester Report, November 2000

• Q: What percentage of visitors read the privacy statement?
  • A: Less than 0.3%
Direct Mail Campaigns (Why Spam)

Assumptions:

- Response rate: 3%
  (This is 0.6% for credit-card solicitations now, but we’re going to send a wonderful offer for our Widget and get 3% response)
- Average revenue per response: $100
- Profit margin: 20%
  (after all costs, including handling returns, shipping, etc.)

To breakeven, how much should the offer cost per person?

- Think about: creative design costs, letter, brochure, outer envelope, reply envelope, stamp, per-person cost when purchasing list

Cost should be less than 60 cents!

\[ \text{3\%} \times 100 \times 20\% = 0.60 \]

Obviously, it’s not an easy business
That’s why e-mail spam are so “cost effective”
**Campaign Analysis - Debenhams**

- Analyze the effectiveness of campaigns

<table>
<thead>
<tr>
<th>Campaign</th>
<th>Emails Sent</th>
<th>Opens</th>
<th>Click-throughs</th>
<th>Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaign 1</td>
<td>100% (4.8p/email)</td>
<td>22% (22.3p/email)</td>
<td>9.3% (52p/email)</td>
<td>0.07%</td>
</tr>
<tr>
<td>Campaign 2</td>
<td>100% (0.5p/email)</td>
<td>11% (4.8p/email)</td>
<td>3% (17.9p/email)</td>
<td>0.01%</td>
</tr>
<tr>
<td>Campaign 3</td>
<td>100% (0.8p/email)</td>
<td>22% (3.6p/email)</td>
<td>5.3% (15.3p/email)</td>
<td>0.01%</td>
</tr>
</tbody>
</table>
Multi Channel Analysis

Multichannel customers spend 72% more per year than single channel customers

-- State of Retailing Online, shop.org

- If we define a multi channel customer to have shopped on the web and at a store
- How much more do multi channel customers spend at <client> over single channel customers?
- More than twice as much for customers with two or more purchases (you can’t be multi-channel if you haven’t shopped twice).
The following graph shows that for each known number of purchases, the web-channel-only customer is better.

Therefore, our intuition tells us that the web channel is the best channel, right?

Wrong!
Bug?

- Multi-channel customers have higher total spending
- This is an example of Simpson’s paradox
Simpson’s Paradox

- A woman sues Stanford for sex bias
- She shows that the school admits 70% of males but only 56% of females
- Stanford agrees with these percentages
- Shows that in every department they accept a higher percentage of females than males

- What is amazing is that this can happen
- What is more amazing is that it happened in practice
Subtle Difference in Conversation

- Alice to Bob: I’m applying to Stanford next year
- Bob to Alice: Sorry to hear that; I know they’re accepting more males than females

VS

- Alice to Bob: I’m applying for department X at Stanford next year
- Bob to Alice: Lucky you, I know they’re accepting more females than males in department X

And it doesn’t matter what X is!
Here is a Simplified Version

The web channel dominates the multi-channel with web in both 2-purchases and >5 purchases.
Product Affinities

- Which products sell well together
- Discovered using the association algorithm
- For closing the loop, associations can be used to make cross-sell recommendations at the website
## Product Affinities at MEC

<table>
<thead>
<tr>
<th>Product</th>
<th>Association</th>
<th>Lift</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbit Sleeping Pad</td>
<td>Orbit Stuff Sack</td>
<td>222</td>
<td>37%</td>
</tr>
<tr>
<td>Bambini Tights Children’s</td>
<td>Bambini Crewneck Sweater</td>
<td>195</td>
<td>52%</td>
</tr>
<tr>
<td>Silk Crew Women’s</td>
<td>Silk Long Johns Women’s</td>
<td>304</td>
<td>73%</td>
</tr>
<tr>
<td>Cascade Entrant Overmitts</td>
<td>Polartec 300 Double Mitts</td>
<td>51</td>
<td>48%</td>
</tr>
</tbody>
</table>

- Minimum support for the associations is 80 customers
- Confidence: 37% of people who purchased Orbit Sleeping Pad also purchased Orbit Stuff Sack
- Lift: People who purchased Orbit Sleeping Pad were 222 times more likely to purchase the Orbit Stuff Sack compared to the general population
Minimum support for the associations is 50 customers

Confidence: 41% of people who purchased Fully Reversible Mats also purchased Egyptian Cotton Towels

Lift: People who purchased Fully Reversible Mats were 456 times more likely to purchase the Egyptian Cotton Towels compared to the general population
Building a customer signature is a significant effort, but well worth the effort.

A signature summarizes customer or visitor behavior across hundreds of attributes, many which are specific to the site.

Once a signature is built, it can be used to answer many questions.

The mining algorithms will pick the most important attributes for each question.

Example attributes computed:
- Total Visits and Sales
- Revenue by Product Family
- Revenue by Month
- Customer State and Country
- Recency, Frequency, Monetary
- Latitude/Longitude from the Customer’s Postal Code
Migration Study - MEC

- Customers who migrated from low spenders in one 6 month period to high spenders in the following 6 month period.

<table>
<thead>
<tr>
<th>Oct 2001 – Mar 2002</th>
<th>Spent over $200</th>
<th>Spent $1 to $200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 2002 – Sep 2002</td>
<td>Spent over $200 (5.5%)</td>
<td>Spent under $200 (94.5%)</td>
</tr>
</tbody>
</table>
Key Characteristics of *Migrators* at MEC

- During October 2001 – March 2002 (Initial 6 months)
  - Purchased at least $70 of merchandise
  - Purchased at least twice
  - Largest single order was at least $40
  - Used free shipping, not express shipping
  - Live over 60 aerial kilometers from an MEC retail store
  - Bought from these product families, such as socks, t-shirts, and accessories
  - Customers who purchased shoulder bags and child carriers were LESS LIKELY to migrate

**Recommendation:**
Score light spending customers based on their likelihood of migrating and market to high scorers.
Customer Locations Relative to Retail Stores

Heavy purchasing areas away from retail stores can suggest new retail store locations

No stores in several hot areas: MEC is building a store in Montreal right now.
Distance From Nearest Store (MEC)

- People farther away from retail stores
  - spend more on average
  - Account for most of the revenues
Other Results at MEC (See Appendix)

- Free shipping changed to flat-fee (C$6 flat charge)
  - Orders - down 9.5%
  - Total sales - up 6.5%

- Gear Swap (buy/sell used gear)
  - Visit-to-Purchase very low: 0.34% vs. 2.1% for non gear-swap
  - However, these visitors converted to purchasing customers (over multiple visits) at a rate 62% higher than visitors who never visited gear swap!

- Visits where an FYI page (For-Your-Information) page was viewed had a Visit-to-Purchase conversion of 7.1%
Other Results at Debenhams (See Appendix)

- People who got the timeout page for a high percentage of their sessions are less likely to migrate (to heavy spenders)
- Revenue due to wedding list item purchases is clearly affected by summer weather
  - Weddings are more common in the summer in the UK
  - In June/July, 65% of revenues were generated through the wedding list
Summary (I)

● E-commerce matches the needs of data mining
  – Huge datasets (both rows and columns)
  – Clean data (collected electronically)
  – Very actionable (easy to do controlled experiments)
  – Easy to measure return-on-investment

● Having a unified architecture (collection, transformation, analysis) saves much of the transformations needed (the 80% factor) and provides access to more data

● Customers need to crawl before they walk before they run. Must have simple reports
Summary (2)

- Focused on specific vertical – e-commerce retail
  - Enabled us to write out-of-the-box reports
    - Easy for clients to get initial metrics and insights
    - Encapsulate our expertise in this domain
  - Focuses sales force, easier to demo with right vocabulary

- Provide visualization to show patterns
  (not discussed, but useful: interactive visualization)

- Many lessons, both at the business level and at the more data mining technical level to be reviewed by Rajesh Parekh
Resources

- WEBKDD workshops
- **http://www.kohavi.com**
  - Mining E-commerce Data, the Good, the Bad, and the Ugly, invited talk at KDD 2001 industrial track
  - Mining Customer Data, Etail CRM Summit, 2002
  - Integrating E-Commerce and Data Mining: Architecture and Challenges, ICDM 2001
  - E-metrics Study providing stats for multiple sites, Dec 2001
  - Applications of Data Mining to Electronic Commerce, special issue of Data Mining and Knowledge Discovery journal
  - Real World Performance of Association Rule Algorithms, KDD2001
- **http://www.bluemartini.com/bi** - case studies, live demo
Appendix

- Here are additional slides with some interesting insights
RFM Analysis

- **RFM – Recency, Frequency, Monetary**

- **Example**

- **Insights from Debenhams**
  - Anonymous purchasers have lower average order amount
  - Customers who have opted out [of e-mail] tend to have higher average order amount
  - People in the age range 30-40 and 40-50 spend more on average
RFM Analysis (Debenhams)

- Recency, Frequency, and Monetary calculations are used extensively in retail for customer segmentation
- Implemented the Arthur-Hughes RFM Cube
  - R, F, and M scores are binned into 5 equal sized bins
  - Each dimension is labeled 1 (best) – 5 (worst)
- Interactive visualization using Filter Charts
- Look at charts instead of cell-tables
Complete RFM

Recommendation

Targeted marketing campaigns to convert people to repeat purchasers, assuming they did not opt-out of e-mails.

More frequent customers have higher average order amount.

Majority of customers have purchased once.
Interacting with the RFM visualization

- Explore sub-segments with filter charts

- People in the age range 30-40 and 40-50 spend more on average

- Anonymous purchasers have lower average order amount
RFM for Debenhams Card Owners

Debenhams card owners
Large group (> 1000)
High average order amount
Purchased once (F = 5)
Not purchased recently (R=5)

Recommendation
Send targeted email campaign since these are Debenham’s customers. Try to “awaken” them!
Customers who have Opted Out

- Customers who have opted out tend to have higher average order amount

**Recommendation**
Send targeted emails to prevent email fatigue

**Recommendation**
Log changes to opt out settings and track unsubscribes to identify email fatigue
Free Shipping Offer (MEC)

- Free shipping stopped on Aug 14, 2002
- A flat $6 Canadian Dollars shipping charge introduced
- Express shipping at higher charge continues
- Observations
  - Total sales - up 6.5%
  - Revenue (excluding shipping and tax) - up 2.8%
  - Orders - down 9.5%
  - Average Sales per Order – up 18%
Free Shipping Offer (Cont.)

- The distribution shows fewer orders from low spenders (probably a good thing)
- No impact on rest of buyers

Fewer low spenders (<= $50)
Free Shipping Offer (Cont.)

- Breakdown of orders by shipping method
- More people used express shipping, probably because the delta to ship express wasn’t as large (from C$6 instead of from C$0)

Free/Standard Shipping

Express Shipping

![Graph showing breakdown of orders by shipping method](image-url)
Gear Swap Pages (Cont.)

**Recommendation:**
Link back to MEC Shopping from Gear Swap
GEAR SWAP - Cycling

Looking for a used bike to take on your next outdoor adventure? MEC's OutdoorGearSwap.com is the place to buy, sell, and trade used bikes and other cycling gear.

Kona Lavadome

Description: 15” green, great bike, like new. Perfect for petite lady or teen wanting to get into mountain biking. Rock Shocks front suspension, Shimano LX components, new brake pads, 1 1/2 inch travel on front tire.

Date: Feb 10
Name: Nicky
Contact Info:
604-904-9456
Email: toymbrnk@hotmail.com

2002 TIME ATAC CARBON PEDALS

ON For Sale 150 cad
Definitions for Gear Swap Analysis

- A visitor is defined as someone who is registered (MEC member) or is identified by a cookie
  - Note that in the Blue Martini system a registered user will have all of his/her cookies combined into a single visitor ID
- Comparing visitors who viewed gear swap with those who did not
  - Several non-bot sessions have 1 request that just visited the MEC homepage (Main/home.jsp)
  - To get to the Gear Swap section you have to click at least twice
  - To make a fair comparison we have excluded all 1 request sessions that just visited the MEC homepage (Main/home.jsp) from the following analysis
Distribution of Gear Swap Visitors

- Visitors who viewed Gear Swap pages had a 62% higher visitor to purchaser conversion ratio as compared to those who did not view Gear Swap.

### Overall
- Visitors: X
- MEC members: Y
- Purchasing Customers: Z

### Visitors who ever viewed Gear Swap
- Visitors: 14.3% of X
- MEC members: 20.8% of Y
- Purchasing Customers: 21.1% of Z

### Visitors who never viewed Gear Swap
- Visitors: 85.7% of X
- MEC members: 79.2% of Y
- Purchasing Customers: 78.9% of Z
Distribution of Orders (the real ROI)

Overall

Orders: \( X \)
Average Basket Value: \( \$Y \)

Visitors who ever viewed Gear Swap

Orders: \( X \)
Average Basket Value: \( 1.05 \times Y \)

Visitors who never viewed Gear Swap

Orders: 3,875 (78.3%)
Average Basket Value: \( 0.98 \times Y \)
Distribution of Visits

- Although, Gear Swap visitors have lower visit-to-purchase conversion than non Gear Swap visitors, they visit more often and their overall visitor-to-purchase conversion is higher.

**Overall**

<table>
<thead>
<tr>
<th>Segment</th>
<th>Visits:</th>
<th>Visit to Purchase Conversion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors who ever viewed Gear Swap</td>
<td>24.8% of X</td>
<td>1.94%</td>
</tr>
<tr>
<td>Visitors who never viewed Gear Swap</td>
<td>75.2% of X</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

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**Effectiveness of FYI Pages**

- People viewing FYIs are more likely to purchase

<table>
<thead>
<tr>
<th>Viewed FYI</th>
<th>Did Not View FYI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits: 6.2% of all</td>
<td>Visits: 93.8% of all</td>
</tr>
<tr>
<td>Purchases: 23% of all</td>
<td>Purchases: 77% of all</td>
</tr>
<tr>
<td>Visit-to-Purchase: 7.1%</td>
<td>Visit-to-Purchase: 1.2%</td>
</tr>
<tr>
<td>Avg. Sales per Visit: 6.1X</td>
<td>Avg. Sales per Visit: $X</td>
</tr>
</tbody>
</table>

*Recommendation:*
Controlled experiment to study the effect of FYIs
FYIs (Cont.)

- Setting up controlled experiments to study the cause-effect relationship of FYI
  - Select a handful of products (say 6) for introducing FYIs
  - Randomly show the new FYIs to 50% of the visitors viewing these products and don’t show the FYIs to the other 50% of the visitors
  - At the end of the trial period (say 2-3 weeks) measure the visit-to-purchase conversion of the two groups
  - Determine if there is a significant difference in the visit-to-purchase conversion of the two groups
Debenhams Migrators: Timeout

Some attributes are more useful when combined with other attributes

For each visitor we computed the number of sessions which went to the page timeout.jsp

This was binned as shown on the X axis of the chart

The height shows the number of visitors in each bin and color shows the percentage of those visitors who migrated

Just looking at this variable alone it is difficult to tell what the pattern is
Migrators: Timeout

By combining the number of timeout sessions with the total number of sessions for each visitor a pattern emerges.

In this heatmap the X axis shows the total number of sessions, the Y axis shows the number of timeout sessions, and color shows the percentage of migrators at each pair of values.

The green along the diagonal shows that people who got the timeout page for a high percentage of their sessions are less likely to migrate.
The number of sessions a visitor has is a good indicator of whether or not they will migrate.

However there are some inconsistencies that are apparent. For example, why does the percent of visitors who migrate drop at 19 sessions?

We can construct new attributes based on the relationship we saw between the number of timeouts and the number of sessions.

Two more attributes can be created:

- Number of sessions that did not time out
- Percentage of sessions that did not time out
Migrators: Timeout

Number of sessions without timeout is a good predictor of migration

Percentage of sessions without timeout is also a good indicator of migration

* 68,000 visitors with no timeout sessions have been filtered out
Revenue due to wedding list item purchases clearly affected by summer weather, when weddings are more common in the UK.
Acxiom

- BMS supports ADN – Acxiom Data Network
- Seamless integration: get username/password
  Note: Acxiom recently changed their interface, so you will need a patch
- Comprehensive collection of US consumer and telephone data available via the internet
  - Multi-sourced database
  - Demographic, socioeconomic, and lifestyle information.
  - Information on most U.S. households
  - Contributors’ files refreshed a minimum of 3-12 times per year.
  - Data sources include: County Real Estate Property Records, U.S. Telephone Directories, Public Information, Motor Vehicle Registrations, Census Directories, Credit Grantors, Public Records and Consumer Data, Driver’s Licenses, Voter Registrations, Product Registration Questionnaires, Catalogers, Magazines, Specialty Retailers, Packaged Goods Manufacturers, Accounts Receivable Files, Warranty Cards
Example - Income

- Graph showing incomes for a company that targets high-end customers based on POS purchases
- Income of their customers in blue
- The US population in red

Note highest bracket (30% vs. 5% for US)
Debenhams set session timeout to 10 minutes to reduce memory footprint.
9.5% of visitors with an item in the cart lost it when they came back within 3 hours

Look for upcoming article by us on developer summarizing this

RFE filed to automatically extend sessions with carts

RFE filed to remove bot sessions (one-click) immediately to reduce memory footprint

Recommended timeout duration is 60 mins
2.5% of sessions with an item in cart will experience timeout
World Wide Revenue Detail

Although Debenhams online site only ships in the UK, we see some revenue from the rest of the world.

UK – 98.8%
US – 0.6%
Australia – 0.1%

NOTE: About 50% of the non-UK orders are wedding list purchases
Acxiom Integration

- Web behavior is one axis
- Demographic information is another
- Blue Martini provides an extremely tight integration with Acxiom:
  - Sign an agreement to get a password
  - DSSGen will pull information from Acxiom over the internet as a part of building the data warehouse or as an option for an existing warehouse
  - ZERO effort. No tapes, no customizations needed
Consumer Demographics

- Using Acxiom, we compared online shoppers to a sample of the population
  - People who have a Travel and Entertainment credit card are 48% more likely to be online shoppers (27% for people with premium credit card)
  - People whose home was built after 1990 are 45% more likely to be online shoppers
  - Households with income over $100K are 31% more likely to be online shoppers
  - People under the age of 45 are 17% more likely to be online shoppers
Demographics - Income

- A higher household income means you are more likely to be an online shopper

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $15,000</td>
<td>0.5</td>
</tr>
<tr>
<td>$15,000-$19,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$20,000-$29,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$30,000-$39,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$40,000-$49,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$75,000-$99,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$100,000-$124,999</td>
<td>1.0</td>
</tr>
<tr>
<td>$125,000 OR MORE</td>
<td>5.0</td>
</tr>
</tbody>
</table>
Demographics – Credit Cards

- The more credit cards, the more likely you are to be an online shopper