



Retail Analytics Research Council Symposium

Executive Summary

Tom Davenport | IIA Co-Founder and Director of Research

Ananth Raman | UPS Foundation Professor, Harvard Business School

Marshall Fisher | UPS Professor, Wharton School of the University of Pennsylvania

Dhruv Grewal | Toyota Chair of Commerce & eBusiness, Professor of Marketing, Babson College

Lori Schafer | Author & Executive Advisor for Retail, SAS

Mary Delk | Director, Deloitte

Paul Butcher | Marketing Strategy Lead for Retail, Intel

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Background

IIA's Retail Analytics Research Council (RARC) marks the first research engagement at the intersection of retail and analytics. This ongoing Council has initially involved 13 organizations, two ARC sponsors (Deloitte and EYC), and six underwriters (SAS is the Founding Underwriter and Accenture, Dell, Intel, SAP, and Teradata are all Premier Underwriters). There are 16 RARC faculty.

In Phase I, IIA's RARC has produced:

- 9 Research Briefs
- 1 Leading Practice Brief (with more in progress)
- 3 Moderated Phone Briefings (with summaries of each)

In addition, there have been multiple company visits and interviews, and preliminary benchmarking has been completed. And this is just the beginning. An ongoing Retail Analytics Research Council is planned that will conduct research, benchmarking, and regular events.

Symposium Context

The first-ever IIA Retail Analytics Research Council summit was held on November 16, 2011, at the Harvard Club in Boston, Massachusetts. This symposium brought together analytical leaders from different areas of the retail industry.

The format for this symposium emphasized interactive peer-based learning. IIA faculty members and analytics practitioners shared observations, conclusions, and best practices from their experiences.

Key takeaways are provided from each of the symposium's discussions.

Key Insights from RARC

Tom Davenport spoke for the RARC faculty in sharing eight key findings that have emerged thus far from the RARC.

- 1. There are analytical opportunities in many areas of retail.** Because retail is a sector with lots of customers, products, and transactions, analytics are a natural fit. Still, until a few years ago, little analytical activity existed in retail. But the opportunity is huge. The challenges are how to figure out what to do, how to direct an organization's analytical efforts, and how to afford it all.
- 2. Reporting still rules, but this is changing.** Currently, perhaps 90-95% of analytics in retail is reporting. But predictive analytics are advancing in marketing and optimization is getting more attention in assortments, pricing, and supply chain.
- 3. Several key elements are needed to move analytics forward in retail.** These elements include awareness and support of senior

executives; analytics leaders in organizations, perhaps CAOs (Chief Analytics Officers); and a significant focus on education and adoption by old-line, front-line retailers.

- 4. Businesses with more refined analytical capabilities pose a significant threat to companies that lack such capabilities.** Online and catalog retailers have an advantage versus traditional retailers because it is easier for these companies to engage in analytics and they grew up with analytics. Also having an advantage are companies whose senior management has committed to analytics.
- 5. There is much talk about analyzing social media.** However this is still in the experimental stages.
- 6. There is much interest in using analytics to create effective offers.** But doing so requires major investments to gather information about customers, products, offer details, and the purchase context, including SoMoLo information (social, mobile, location).
- 7. The world's leading retailers have made analytics a boardroom issue.** For example, Walmart has presented analytics to its board.
- 8. Retail has not yet addressed the issue of customer privacy and targeting preferences.** While the prevailing view of those in the retail sector is that customers want targeted offers and discounts, recent research indicates that consumers, including young people, do not want their personal information or purchase history used to create targeted offers. For more information about this research, see: www.ftc.gov/bcp/workshops/privacyroundtables/Turow.pdf.

The Big Ideas

- Use of analytics in retail is growing, with many retailers adopting analytics across their enterprise.
- Analytical organizations are both centralized and decentralized, with tradeoffs for each model.
- Regardless of model, what matters is close linkage between analysts and the business and collaboration among analysts for consistency in approaches and tools

SESSION 1

Organizing for Analytics in Retail

Tom Davenport led a discussion focused on how retailers are structuring their analytics groups and the tradeoffs associated with different types of organizational structures.

From Silo to Enterprise Wide

A participant observed that 10 years ago, few retailers had analytics groups or capabilities. But over the past decade the retail sector has become more analytical. Existing retailers have gone through an evolutionary process while new retailers have been born analytical.

Analytical Evolution	Born Analytical
<ul style="list-style-type: none"> – Initially a “pocket” of analytics – With success, one pocket grows to multiple pockets – Analytics develops credibility, critical mass, executive support 	<ul style="list-style-type: none"> – Increasingly, venture capital firms mandate that their portfolio companies have analytical capabilities – As a result, many startups and Internet companies are born analytical (e.g. Zappos)

In both instances, retailers are now increasingly focused on making analytics an enterprise-wide capability. Two common organizational models were discussed—centralized and embedded in the business—with tradeoffs associated for each.

	Centralized	Part of Business Units
<i>Positive</i>	<ul style="list-style-type: none"> – Consistency of methods, approaches, tools, technology – Easy sharing of best practices 	<ul style="list-style-type: none"> – Analysts closely linked with business
<i>Negative</i>	<ul style="list-style-type: none"> – May not be integrated with business and decision processes – Staff function with limited impact 	<ul style="list-style-type: none"> – Difficulty sharing analytical methods, approaches, best practices – When highly decentralized, can result in different hardware, software

Considerations for Centralized or Embedded

The discussion about the tradeoffs associated with different structures for analytics groups yielded the following comments:

- When analytics groups are centralized, as is often the case, they typically report through the Strategy function. Alternatives include reporting to the CEO, the CFO, or through IT.
- Several participants felt that a centralized analytics group would result in a staff function that lacks respect and credibility. Examples were shared of centralized analytics groups that failed due to lack of business support.
- Some participants believe a better model is for analysts to be embedded as part of the business. If this occurs, an orchestration needs to occur so that disparate silos across the organization are connected.

- One idea was for a “hybrid model” where some analytical activities are centralized and others are embedded in the business. For example, all hardware, software, and infrastructure/platform decisions might be centralized. Also, creation of organization-wide standards would be centralized for areas like talent analytics. An example was shared of a large company with a “federated model” and a central competency center.
 - Some participants suggested that the specific organizational structure doesn’t matter; either structure can work. What matters is:
 - Being connected to the business. More important than the organizational structure are the relationships between analytics groups and the business.
 - Working on important, meaningful business problems and being part of the business process for key organizational decisions.
 - Having executive sponsorship and achieving early wins.
 - Collaborating with other analysts to share approaches and best practices.
 - Having a career path for analysts.

Other Important Points

- **Analogous to Six Sigma.** One participant sees a parallel to the evolution of Six Sigma. For Six Sigma to take hold in an organization requires executive sponsorship and a centralized organization to help develop capabilities. But for Six Sigma to have business impact requires having it embedded throughout the business.
- **Internal capabilities or consultants?** Companies often have consultants do analytical projects and never build their own analytical capabilities. Because the world is changing so quickly, it may always be necessary to have consultants who can provide an external perspective and share real-world best practices.
- **Who owns the data?** In the past, the CPG firms controlled the key data. Now, retailers own the critical data.

The Big Ideas

- Retailers must use data in new ways to understand and market to consumers. This is a necessity because of changes in the shopping experience where consumers have more information and control.
- A mashup is occurring between retail and social media. Major technology companies (Facebook, Google, Apple) as well as a host of startups are impacting the retail landscape. At the same time, traditional retailers are using and acquiring social media capabilities, creating a big mashup.
- Retailers are looking at different types of social media data and metrics. These include descriptive metrics about usage, data about key influencers, and sentiment analysis about what consumers are saying and thinking.

SESSION 2

Customer-Driven Marketing & Social Media

Mary Delk, an RARC faculty member from Deloitte, shared insights from recent research around what customers expect and how retailers are connecting with them through customer-driven marketing. Lori Schafer, of the RARC faculty and SAS, described the changing landscape for social media, summarized the types of social media metrics being used, and led a conversation about customer-driven marketing.

Research Highlights

- **Consumers want everything from retailers.** They want value, relevance, and stewardship. This includes stewardship of the environment and of their data. Consumers want to know that retailers get them, which is shown through the relevance and the personalization of offers. Also, consumers now expect that retailers will provide a consistent, seamless experience both online and offline.
- **Consumers are in control.** Marketing's evolution can be thought of in phases:
 - **Retailer driven.** This was “push marketing” where retailers pushed out whatever messages, products, and offers they wanted. Retailers looked at transaction data to inform their decisions.
 - **Customer centric.** In this phase, retailers could combine their transaction data with customer data to tailor their marketing. With customer-centric marketing, marketing became more about engagement and interaction with customers.
 - **Customer-driven marketing.** Today, consumers are clearly in control. They can buy what they want, when they want, from whomever they want. They can get input from friends and easily compare prices or other features. Retailers have the challenge of integrating different types of data to better understand

consumers and to customize their marketing. In addition to transaction and customer data, the types of data that are integrated include structured and unstructured data, behavior data, call center data, satisfaction data, and social media data. The opportunity is for retailers to maximize the use of new sources of data.

- **In this era of customer-driven marketing, there are three important ways that retailers must be connected with consumers.**
 - **Technically connected.** Consumers want to be connected via the Internet and through an array of smart, mobile devices.
 - **Socially connected.** Consumers are constantly connected to social networks, which are fundamentally changing the consumer shopping experience. It is now more collaborative, as consumers are influenced by and influence others.
 - **Behaviorally connected.** It is important for retailers to understand not just what consumers are buying, but why they are buying it.

A Retail/Social Media Mashup

“Omni-channel consumer” is the hot term in retail. It conveys that consumers want to be able to shop and communicate through multiple channels. They want to chat with friends, glance at reviews, get information about products, and compare prices at any time, even using their Amazon app while in Best Buy to see if they are buying the best product at the best price. And both retailers and technology companies want to be part of this omni-channel shopping process. Consider the actions of the following players:

- **Today's technology leaders.** Amazon, Google, Apple, and Facebook are seen as technology companies, but they are all retail companies, seeing potential in the sector.
- **Startups.** Numerous startups are focused on all aspects of the retail experience. This includes companies that deal with social reviews (like Yelp), group buying (Groupon), geolocation (Foursquare), as well as social shopping, social fashion, flash sales, and social gaming. (60% of the time on Facebook is spent on social gaming.)

- **Traditional retailers.** Retailers like Walmart, Nordstrom, and Tesco understand the importance of social media and don't want to be left behind. They are developing social media capabilities and are acquiring startups that bring cutting-edge capabilities and talent. In just the past few months Walmart, as part of its @Walmart Labs strategy, has acquired Kosmix, OneRiot, and Grabble.

What is occurring is a giant mashup of established and new technology companies, social media technologies, and traditional retail players.

Social Media Metrics

Social media is definitely a marketing tool for retailers, but it is about more than just marketing. It can be used for customer service, recruiting, merchandising, and more. Exactly how a retailer uses social media and what it measures are based on its objectives. The most common types of social metrics being used by retailers are:

- **Descriptive statistics.** These are metrics that describe a company's online activities. This might include the number of people who like the company on Facebook or the number of followers on Twitter. It also can include the number of individuals who receive an email and who click through to a url.
- **Social network statistics.** New technologies enable a retailer to determine who the key online influencers are. Technologies determine influence based on the size of a person's network, how many people follow that individual, and how many people re-tweet a person's postings. By knowing who the key influencers are, a company can monitor their activities and reply if necessary.
- **Text analytics.** Since social media is unstructured data, text analytics tools are used to gather relevant information, categorize it, and mine it. The output is an analysis of the sentiment about a product or brand, including positive and negative sentiment. A retailer might use sentiment analysis to gauge reaction to a potential new product.

Participant Discussion

- **Customer differentiation.** One way to use customer data is to help decide which segments of customers a retailer wants to make happy and which it doesn't mind upsetting. Once a retailer knows this, it will treat different segments differently, stocking the items that its important customers want and not minding if less important customers are dissatisfied with the product selection.
- **Listening to customers.** An important use of social media by retailers is to actively listen to customers to understand what they are thinking.
- **Learning from non-buyers.** Most analytics activities focus on those customers who actually make a purchase. But what about people who walk into a retail store but don't buy? Or those who visit an online site, put something in their shopping cart, but then don't purchase? Much can be learned from these would-be customers.

The Big Ideas

- Assortment decisions can dramatically impact retailers' bottom line. Deciding which products to add, which to delete, and how much to vary the product assortment in different locations (localize) can make a huge difference in sales and profitability.
- Historically, retailers have lacked the tools to make good assortment decisions. Retailers have not had good analytical tools to estimate the demand for new products and have made many disastrous assortment decisions.
- Analytical techniques that estimate demand for a product based on product attributes can make a huge difference. Such techniques are not perfect

SESSION 3

Assortment Optimization, Shelf Space Allocation, and Localization

Marshall Fisher described how retailers can use analytics to optimize their product assortment and make decisions about localizing the products offered in different stores.

Beginning in the mid-1980s, Professor Fisher began looking at the use of data in retail. He saw abundant data—about sales, prices, promotions, and more—but was surprised to learn how many decisions were made based on intuition and how much data went unused. He sees this changing as tools are developed to help retailers better use data to make decisions, like determining their product assortment.

What's Missing in Assortment Planning?

With limited capacity and shelf space, retailers face critical decisions in deciding which products to stock. An example: a consumer electronics retailer has space in its stores for 82 flat panel TVs, but there are more than 2,500 flat panel products available. So, retailers must regularly decide which products to delete, which categories to expand, and how much to localize each store.

In making such decisions, estimating consumer demand for specific products is the most important factor. Yet, retailers acknowledge that they aren't very good at doing this. A significant gap exists in retailers' needs and their capabilities and tools.

Bad assortment planning decisions based on an inability to effectively estimate demand can result in disasters. Two examples: 1) Walmart decided to cut 15% of the SKUs at its stores, which seemed a reasonable idea but proved disastrous, as it significantly hurt traffic and sales; 2) a grocer changed its assortment by deleting 20% of its dry grocery items and expanding the number of fresh products offered. Sales declined by 40% and the company went bankrupt.

Clearly, retailers need better tools and methods to estimate the demand for new items, to understand the impact of deleting existing items, and to decide how much to localize the assortment in different stores. They need to understand which possible new product is likely to have the highest sales, and what the impact will be if a product is deleted (will a customer switch to another item in the store, or will a customer shop elsewhere? If so, what is the total lifetime value of that lost customer?).

To Estimate Demand, Focus on Attributes

Professor Fisher described an analytical technique for estimating the demand of a SKU that has not been sold before. The key: understanding a product category's key attributes, looking at current sales based on product attributes, and using this data to estimate the demand for products based on the attributes. He used an example where tires are purchased based on size, brand, and mileage warranty. Looking at product sales based on these attributes shows which attributes are demanded, identifies where there are holes in a product assortment, and enables an estimate of a product based on its attributes.

In the tire example, Professor Fisher recommended that a tire retailer delete 47 SKUs and add 47 new one. The retailer changed its assortment by deleting and adding 11 of the recommended SKUs, which lifted revenue 5.8%. His analysis also showed how much revenue could be increased through localization. (In this example, 80% of the value came from getting the assortment right and 20% from localization.)

Using Analytics to Shift Power in Retailing

Historically, manufacturers have had the information about what consumers want. But by understanding the key attributes in a category and by using analytics to estimate demand for products with different sets of attributes, retailers can increasingly demand specific products from manufacturers and can also work to create their own private label products that have specific attributes. This represents a shifting of power in the retail sector.

The Big Ideas

- Analytics can be used to improve retailers' operations, supply chains, and productivity. Staples is using analytics to plan its fulfillment and employee scheduling to improve productivity and decrease costs.
- Consistent with the Service Profit Chain, Staples see profits as linked with employee satisfaction. It is simultaneously focused on improving both productivity and employee satisfaction. Analytics on both are factors in the company's staffing strategy.
- Staples' staffing strategy project requires both deep analytical knowledge and deep domain knowledge. Without both, the project could not have taken place.

SESSION 4

Applied Research — from Staples and Sam's Club

Harvard Business School Professor and RARC faculty member, Ananth Raman, introduced presenters from Staples and Sam's Club (Walmart) who described specific applications of analytics in their businesses.

Professor Raman pointed out that labor costs are 53% of all retail operating expenses (excluding the costs of the products sold). Because labor costs in retail are so significant, retailers have been extremely focused on improving labor productivity—and have done a remarkable job. From 1990 through 2010, labor productivity increased at a rate of 5% per year and overall labor productivity doubled during that period. Despite these gains in productivity, retailers continue to demand more and more from their people.

PART I

Workforce Optimization at Staples

While Staples began as a traditional brick-and-mortar retailer, its delivery business is now larger than its traditional retail business. In this presentation Vik Gopalakrishnan from Staples described how the company has used analytics in creating the staffing strategy at its fulfillment centers. The goals of the staffing strategy at Staples' fulfillment centers are to:

- **Maximize productivity.** The goal: consistently increase sales per labor hour.
- **Be a Great Place to Work.**

Objective –To optimize staffing strategy to achieve maximum productivity & "great place to work" environment



Using Analytics to Increase Productivity

Maximizing productivity requires understanding the:

- **Customer order profile.** There are different segments of customers with different ordering habits.
- **Business requirements.** To satisfy customers, business rules have been created for order times and pull times in order to hit delivery windows (e.g. an order received by 5:30 pm will be delivered the next day).
- **Fulfillment center capabilities.** To deliver what customers need while maximizing productivity, the fulfillment centers look at areas such as cycle time, throughput, and capacity. To maximize productivity, some tasks are automated.
- **Local labor pool.** Fulfillment centers employ full- and part-time labor, with different scheduling on different days

Staples has used analytical tools to look at when orders come in, when picking is getting done, and whether staffing is optimal. A finding is that picking is often done so quickly that staffing could be reduced and Staples could still deliver on its business requirements.

Analytical tools (a linear program) have also been used to plan workforce composition (the number of full- and part-time workers) and the shift duration for each worker. Staples believes that staffing plans based on these business requirements and the use of analytics

can reduce labor costs in fulfillment centers by 8%, a hypothesis now being tested.

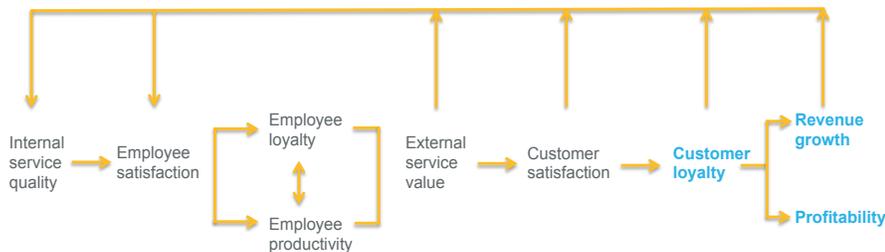
Being a Great Place to Work

Staples buys into the idea of the Service Profit Chain, shown below. The idea is that satisfied employees are loyal and productive, which leads to better customer service, higher customer satisfaction, greater customer loyalty, and growth in revenue and profit. As Professor Raman said, "You can't treat employees like crap and expect them to treat clients well." Employee satisfaction is a key driver for customer satisfaction.

(To learn more, see: <http://hbr.org/2008/07/putting-the-service-profit-chain-to-work/ar/1>.)

By marrying the goals of maximizing productivity while also being a 'Great Place to Work', Staples' staffing decisions recognize that employees are human and are not interchangeable parts. The company requires that its staffing plans and scheduling satisfy workers and fit with their lives.

Staples: A 'Great Place to Work'



The Big Ideas

- In-store digital signage is a potential way to enhance customers' shopping experience, message to customers, and possibly boost sales.
- New video analytics technologies enable determination of a customer's profile, providing an ability to target messaging and offers. In an initial test, this technology worked pretty well.

PART II

Applied Research: Digital Signage at Sam's Club

Representatives from Sam's Club (which is part of Walmart) shared findings from applied research about the use of analytics regarding in-store digital signage.

Understanding the Potential of Digital Signage

Sam's Club has 47 million members, did \$47 billion in sales in 2010, and has 400 million visits per year. A team at Sam's Club is focused on pioneering new shopper media technologies to drive breakthrough sales gains. This includes working on intelligent in-store digital signage and digital offers.

One research project conducted by Sam's Club looked at how digital signage affects consumers' shopping experience, consumers' in-store behavior, and sales. Elements of this research project included:

- Installing digital signs (flat screen TVs) in two stores.
- Running a series of video spots (with audio) on this digital signage featuring various items (like DVDs) and creating awareness of new items and services (like flu shots).
- Using new anonymous video analytics (AVA) technology. AVA technology detects a consumer's face and determines their gender and age bracket. This technology respects a consumer's privacy and collects no personally identifiable information. (Longer term, AVA technology may be able to determine other things, such as a raised eyebrow, potentially indicating a customer's interest or curiosity.)
- Targeting the video spot shown based on the AVA results. For example, a young female consumer might be shown one video spot while an older male might be shown another.
- Measuring the results both qualitatively and quantitatively.

While still early, the experience thus far has produced important learnings, meriting further research:

- Digital signage can add value and relevance to customers' shopping experience by introducing new items or special promotions.
- The logistics related to digital signage are extremely important. This includes where in the store digital signs are placed and the height of the signs.
- While many consumers notice the digital signs, the average viewing time is short, at just a few seconds.
- AVA technology appears promising. It was effective in being able to identify customers' gender and age.
- The initial digital signal research did not show increased sales. However, as an initial pilot, the experience was positive and there is optimism that with refinement, digital signage may be able to boost sales.

IIA Membership



IIA is the only research firm dedicated exclusively to the growing analytics industry. Founded on the premise that analytics is the most compelling competitive differentiator in industry today, IIA defines the path to analytical excellence by guiding enterprises on how to best fund, staff, manage, evaluate, and refine their analytics programs.

Our collaborative research approach offers the benefits of a professional association, the inspiration of a face-to-face network, and the reliability of a world-class research library and faculty team.