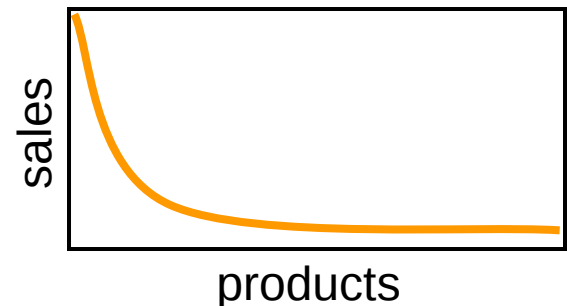


Extreme Customer Lifecycle Management for Long Tail Retailers



Low production and distribution costs, together with new information technologies, allow retailers to offer millions of products. In such large collections, when products are ordered by descending sales volume and charted, a power-law distribution emerges whereby a few products sell extremely well and most products have few sales. The right-side of this distribution is called a “Long Tail.”

Selling in Long Tails presents a number of challenges including providing “filters” to help customers find what they want. Common filter technologies include keyword search, product similarities, and customer recommendations. This talk will provide an overview of Long Tail retail and discuss simple and advanced techniques of using the KXEN Analytic Framework to develop filters.





Speaker's background

Doug Bryan is a KXEN technical director specializing in customer lifecycle management applications of predictive analytics. Prior to joining KXEN he managed a development team in the Data Mining and Personalization Group at Amazon.com that was responsible for product similarity and recommendations data for all of Amazon's products and customers. Previous roles also include text mining at SPSS, senior manager at Accenture Technology Labs, and lecturer in computer science at Stanford University. He has published three textbooks and dozens of papers.

Doug Bryan
KXEN, Technical Director
doug.bryan@kxen.com
1-847-769-7243

How Endless Choice Is Creating Unlimited Demand

The Long Tail



Why the Future of Business
Is Selling Less of More

CHRIS ANDERSON

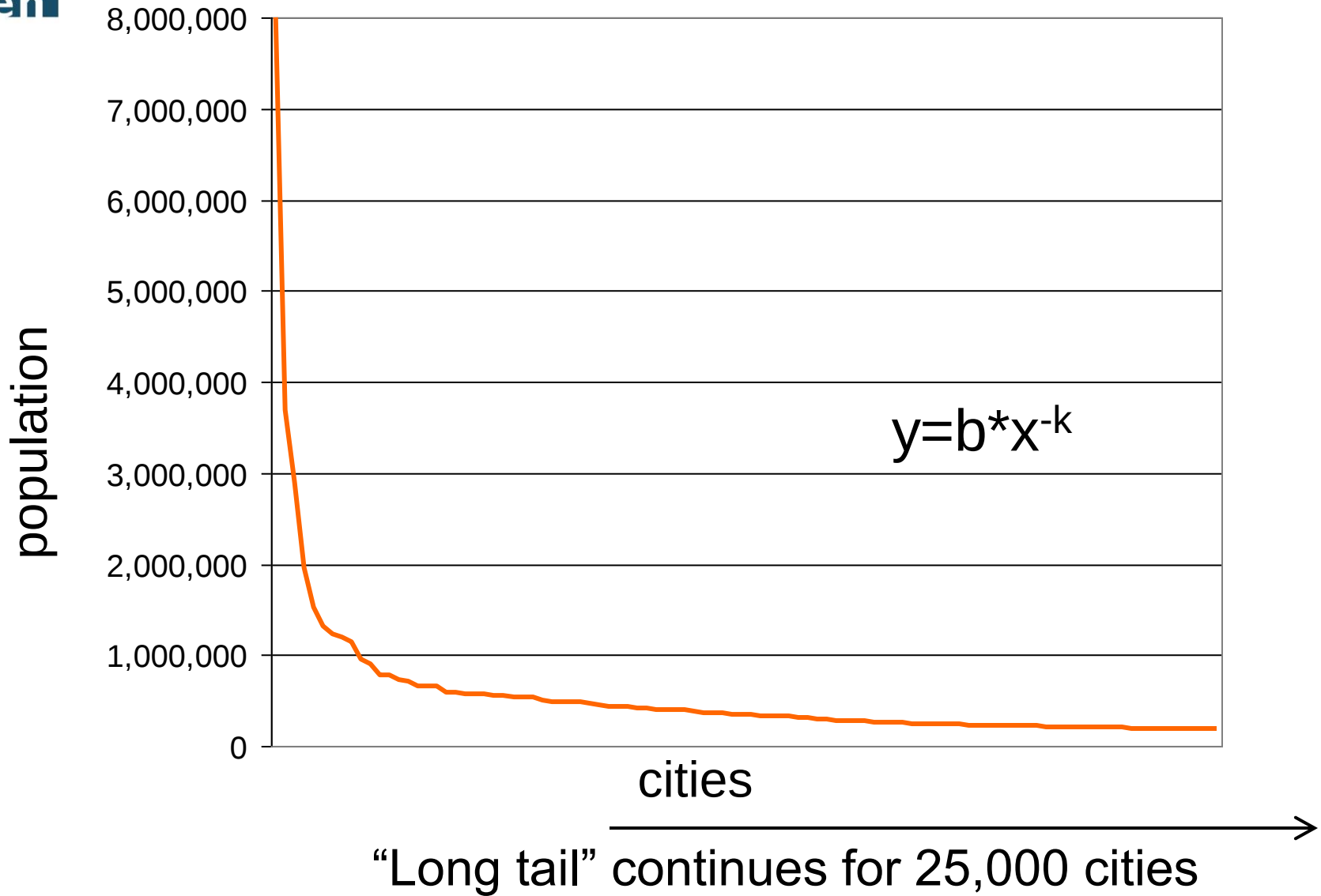
"Anderson's insights influence Google's strategic thinking in a profound way.

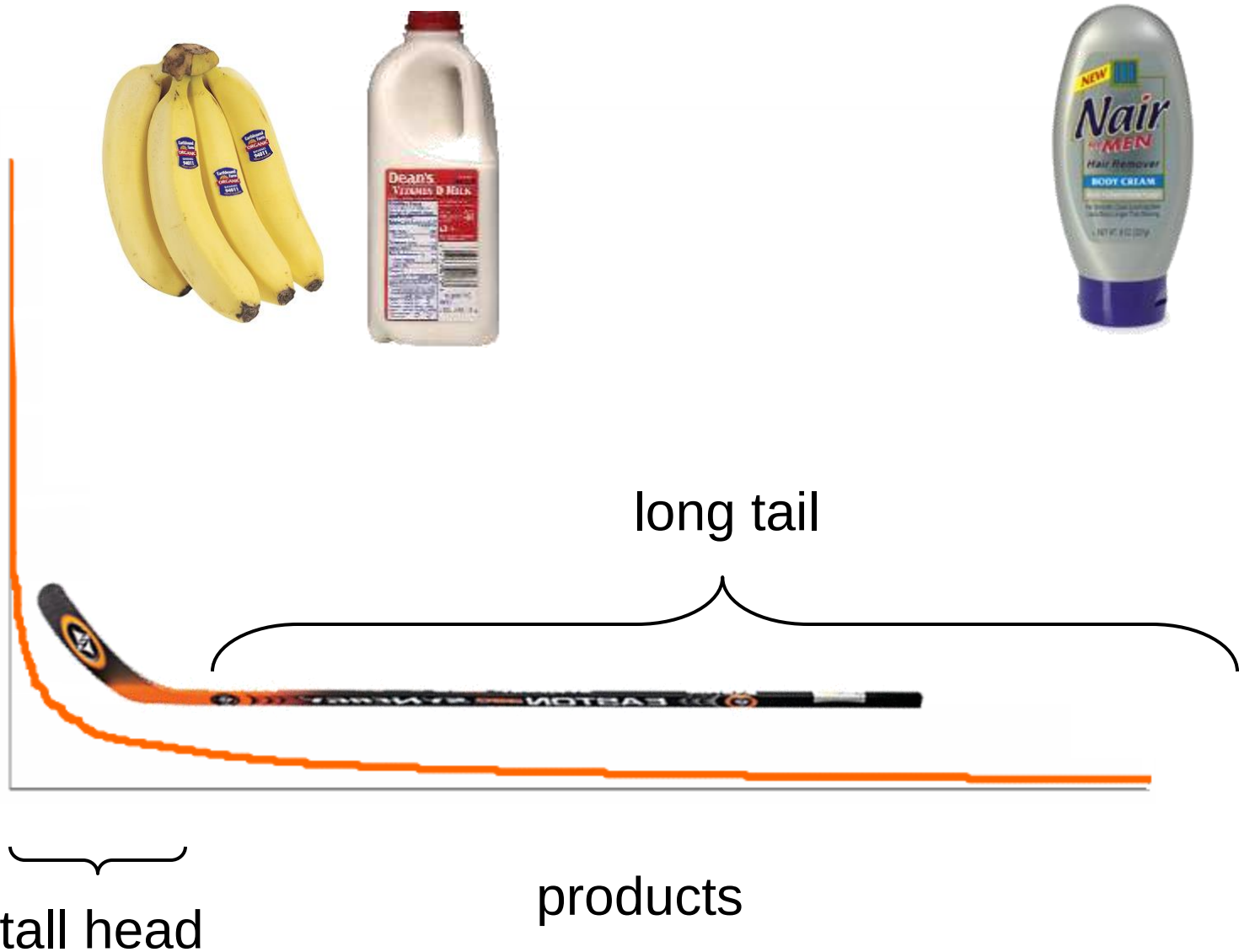
READ THIS BRILLIANT AND TIMELY BOOK."

—ERIC SCHMIDT, CEO, GOOGLE

- **Long Tails markets and their challenges**
- **Recommendations modeling**
- **Long Tail myths**

Population of the 100 largest U.S. cities





Long tail marketing is not new

SEARS, ROEBUCK & CO., (Incorporated), Cheapest Supply House on Earth, Chicago.

BOYS' FANCY DRESS SHIRTS.

SIZES 12½ TO 14 NECK MEASURE.

No. 257. **BOYS' FINE FANCY LAUNDERED DRESS SHIRTS**, white body with fancy colored percale bands. Beautiful striped and checked patterns, black, blue, pink, brown, etc. Sizes 12½ to 14½. Always mention size when ordering. **\$0.48**
 Three for **\$1.35**

No. 258. **BOYS' FINE FANCY SHIRTS**, have extra fine quality imported French percale. Extra fine checked and figured in a rich assortment of the newest and best patterns of this season. Nothing finer made in boys' fancy shirts made with attached collar and cuffs. Extra fine dress finish. If you are looking for something particularly new and dressy, don't overlook these garments. They will give you perfect satisfaction in every way. Sizes 12½ to 14½.
 Price each **\$0.50**
 Three for **\$1.50**

No. 259. **BOYS' LAUNDERED SELEGNEE SHIRTS**, Made from finest colored French percale, open front with attached collar and cuffs. New and fashionable stripes, figures, plaids and pin checks; white ground with colorings of black, red, pink, blue, etc. Sizes 12½ to 14½. This dressy finish. Always mention just what size you want.
 Price each **\$0.50**
 Three for **\$1.50**

Men's Fancy Colored Laundered Dress Shirts.

THE VERY LATEST UP-TO-DATE PATTERNS.

Sizes 14½ to 17. Detachable Collars and Cuffs.

A magnificent Assortment of the Season's Newest and Best Creations, made by America's Greatest Manufacturers. Every garment Made and Trimmed in Fine Custom Style and Guaranteed to give Perfect Satisfaction. Every Design is New—not an old or slightly Pattern in our Shirt line this Season.

OUR PRICES WILL APPEAL TO ALL SHREWD BUYERS.

THE HANDSOMEST ARRAY OF PATTERNS IN THE WHOLE WORLD.

No. 260. **WE OFFER THESE EXCELLENT SHIRTS AT JUST ABOUT ONE-HALF WHAT YOU CAN ELSEWHERE AS WELL THEM. THEY ARE MADE FROM**

FINEST FRENCH PERCALE
 Open front and back. Fast colors and excellent finish. Two extra fine percale cuffs and one pair cuffs are included with each shirt.

NEW AND NOBBY PATTERNS
 Next stripes and checks, white ground lined with black, red, blue or pink percale. Also handsome new-to-day plaid stripes. The newest and most fashionable of the this season. Sizes 14½ to 17.

Each **\$0.95**
 Three for **\$2.85**

ALLOW 15c EXTRA WHEN ORDERING SINGLE SHIRTS SENT BY MAIL AND ALWAYS STATE SIZE DESIRED.

\$1.25 FOR A FRENCH PERCALE SHIRT

No. 261. **Men's Fancy Colored Laundered Shirts**. Made from the very best quality French percale. Open front back, with two detachable collars and cuffs and 3 turn down one pair cuffs to match.

Handsome Patterns in the World

Stripes, checks, plaids and fancy in a rich and glossy assortment of reds, blues, pinks, greens, etc. etc. in every style and color, made to order. Sizes 14½ to 17. Always state size.

Our price each **\$1.25**
 Three for **\$3.75**

In 1897 the Sears & Roebuck catalog brought 200,000 products to rural America

- 67 kinds of tea
- 38 kinds of coffee
- 60 kinds of soap

MEN'S LAUNDERED NEGLIGEE SHIRTS.

SIZES 14½ TO 17. Strictly High Grade, Up-to-Date Garments, Made for Fine Trade. They are the Ideal Negligee Shirts and Always Give Complete Satisfaction.

OUR 45c TRUE MERIT SHIRT.

No. 262. **MEN'S FINE FANCY LAUNDERED PERCALE NEGLIGEE SHIRTS**. Attached collar and cuffs and detachable buttons. Assorted striped and checked patterns, white ground with contrasting colors of black, red, blue, etc. Black bias to fit. Finely made and finished. Each **\$0.45**

Men's Extra Size Laundered Shirts.
 SIZES 17½, 18, 18½ AND 19.

No. 263. **MEN'S LAUNDERED NEGLIGEE SHIRTS**. Made from fine French percale. Fast colors. Very handsome assorted colored stripes. Open front with attached turn down collar and cuffs. Detachable buttons. Large breast pocket. Extra well made. **\$0.95**
 Price each **\$0.95**
 Three for **\$2.85**

OUR FAT MEN'S SPECIAL, \$1.25.

No. 264. **MEN'S EXTRA SELECTED LAUNDERED PERCALE SHIRTS** made extra large for fat men. A handsome assortment of new and fashionable patterns in beautiful stripes, checks and fancy figures. Open front with attached collar and cuffs; extra well made and finely finished.

58c FOR A \$1.00 SHIRT.

No. 265. **THE HANDSOMEST OF PATTERNS**. Men's Laundered French percale shirts, attached collar and cuffs, fast colors in new and novel effects, pin checks, broken and half line stripes. Double rock and hand laundered buttonholes. Equal to any \$1.00 shirt made. Light colors, blues, pinks, browns, etc., predominant in the line. Sizes 14½ to 17.
 Each **\$0.58**

95c FOR THIS \$1.50 SHIRT.

No. 266. **THIS FINELY LAUNDERED NEGLIGEE SHIRT** will appeal to the tastes of all lovers of high class goods. It is made from finest imported French percale. Colors are not printed, but woven through the material and checked patterns and combination stripes. Predominating colors being white, blue, red, black. One of the best wearing shirts ever made. Sold at retail usually at \$1.50.
 Our special price each **\$0.95**

A 4025

SEARS, ROEBUCK AND CO.

CHEAPEST SUPPLY HOUSE ON EARTH

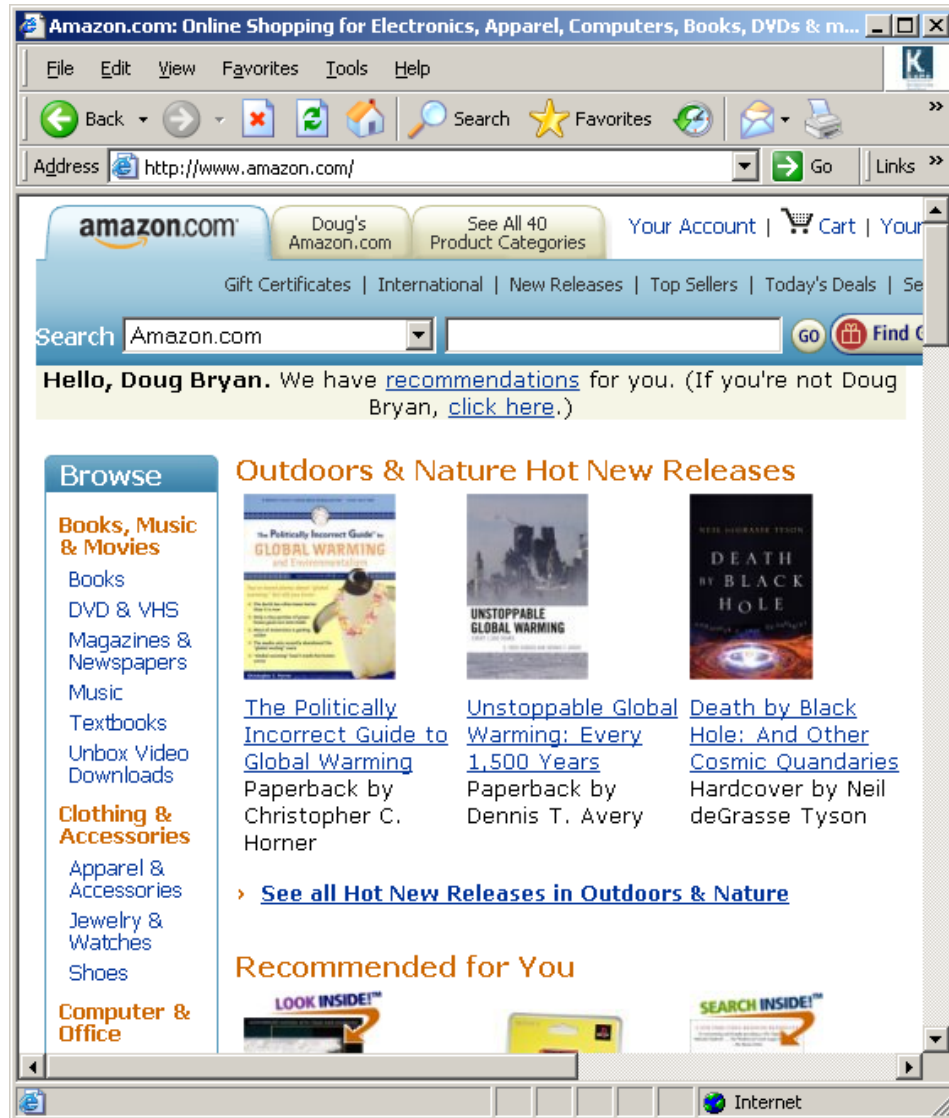
OUR TRADE REACHES AROUND THE WORLD.

INCORPORATED UNDER THE LAWS OF ILLINOIS. CAPITAL AND SURPLUS OVER TWO MILLION DOLLARS. PAID IN FULL.

REFERENCE BY SPECIAL PERMITS TO:

NATIONAL CITY BANK
 NEW YORK
 METROPOLITAN NAT'L BANK
 CORN EXCHANGE NAT'L BANK
 CHICAGO

Reduced production and distribution costs cause long tail growth

Amazon.com: Online Shopping for Electronics, Apparel, Computers, Books, DVDs & m...

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Go Links

Address http://www.amazon.com/ Go

amazon.com Doug's Amazon.com See All 40 Product Categories Your Account Cart Your Account

Gift Certificates International New Releases Top Sellers Today's Deals Sell

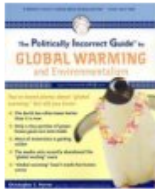
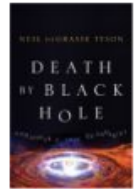
Search Amazon.com GO Find

Hello, Doug Bryan. We have [recommendations](#) for you. (If you're not Doug Bryan, [click here](#).)

Browse

- Books, Music & Movies
 - Books
 - DVD & VHS
 - Magazines & Newspapers
 - Music
 - Textbooks
 - Unbox Video Downloads
- Clothing & Accessories
 - Apparel & Accessories
 - Jewelry & Watches
 - Shoes
- Computer & Office

Outdoors & Nature Hot New Releases

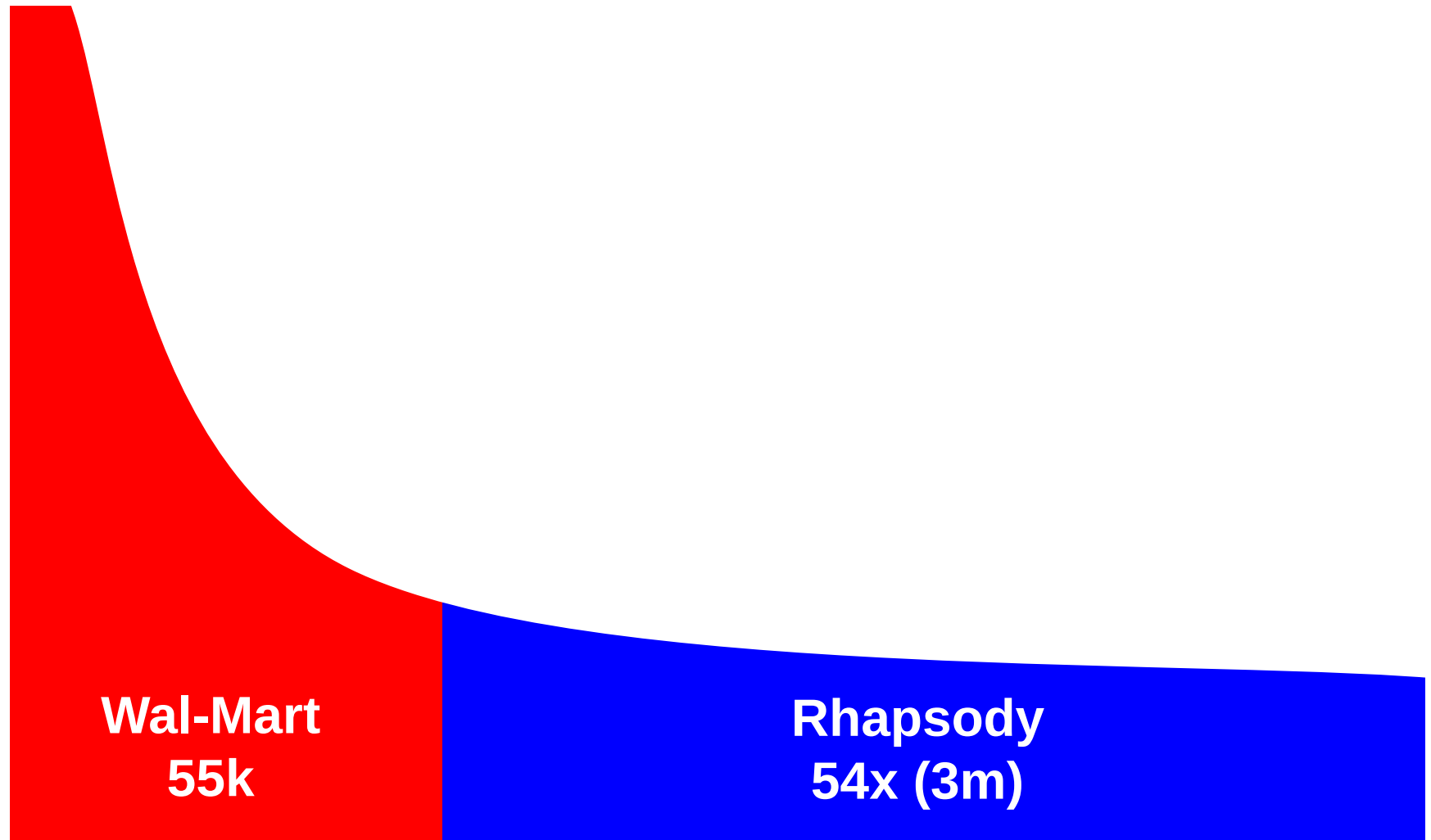
 The Politically Incorrect Guide to Global Warming Paperback by Christopher C. Horner	 Unstoppable Global Warming: Every 1,500 Years Paperback by Dennis T. Avery	 Death by Black Hole: And Other Cosmic Quandaries Hardcover by Neil deGrasse Tyson
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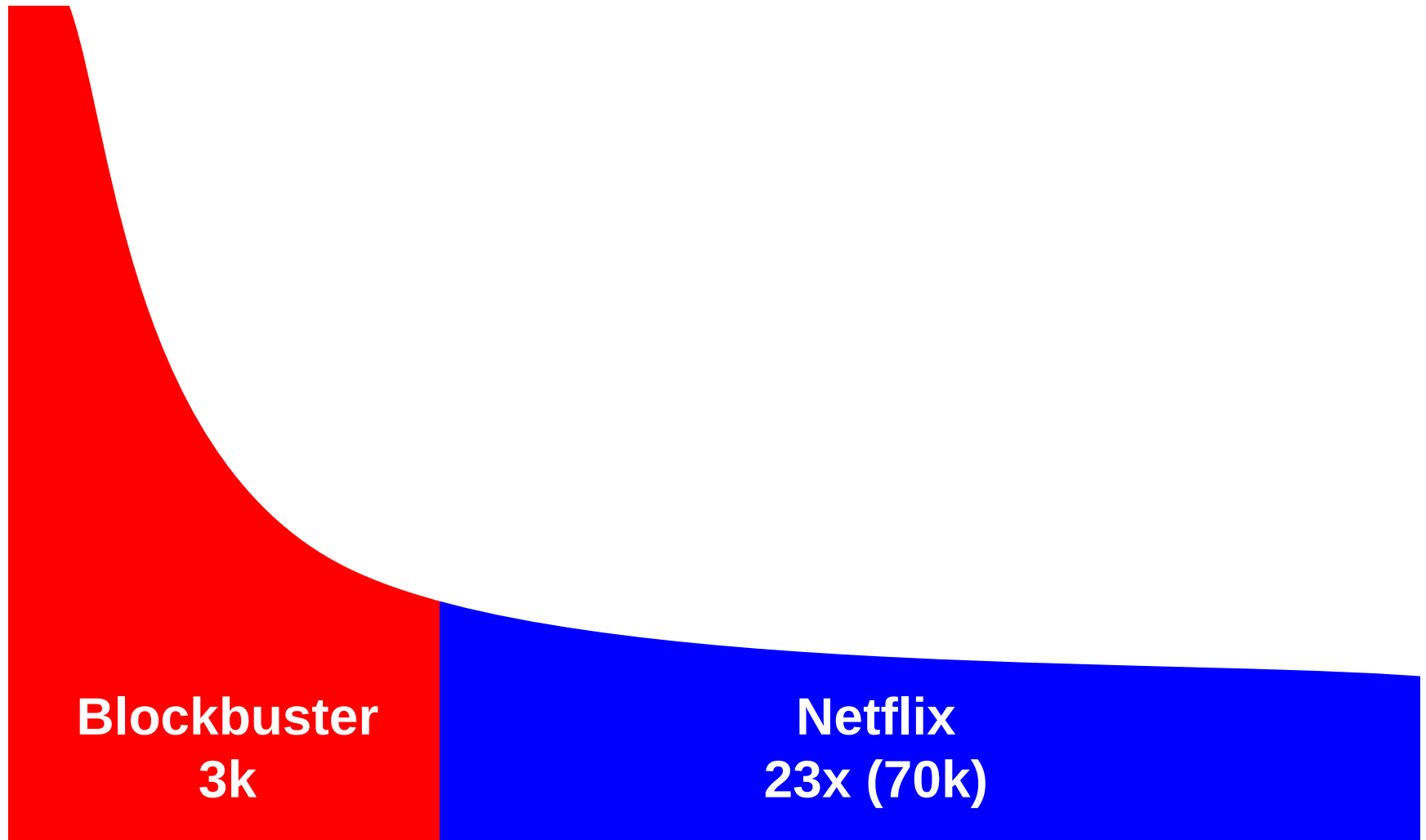
See all Hot New Releases in Outdoors & Nature

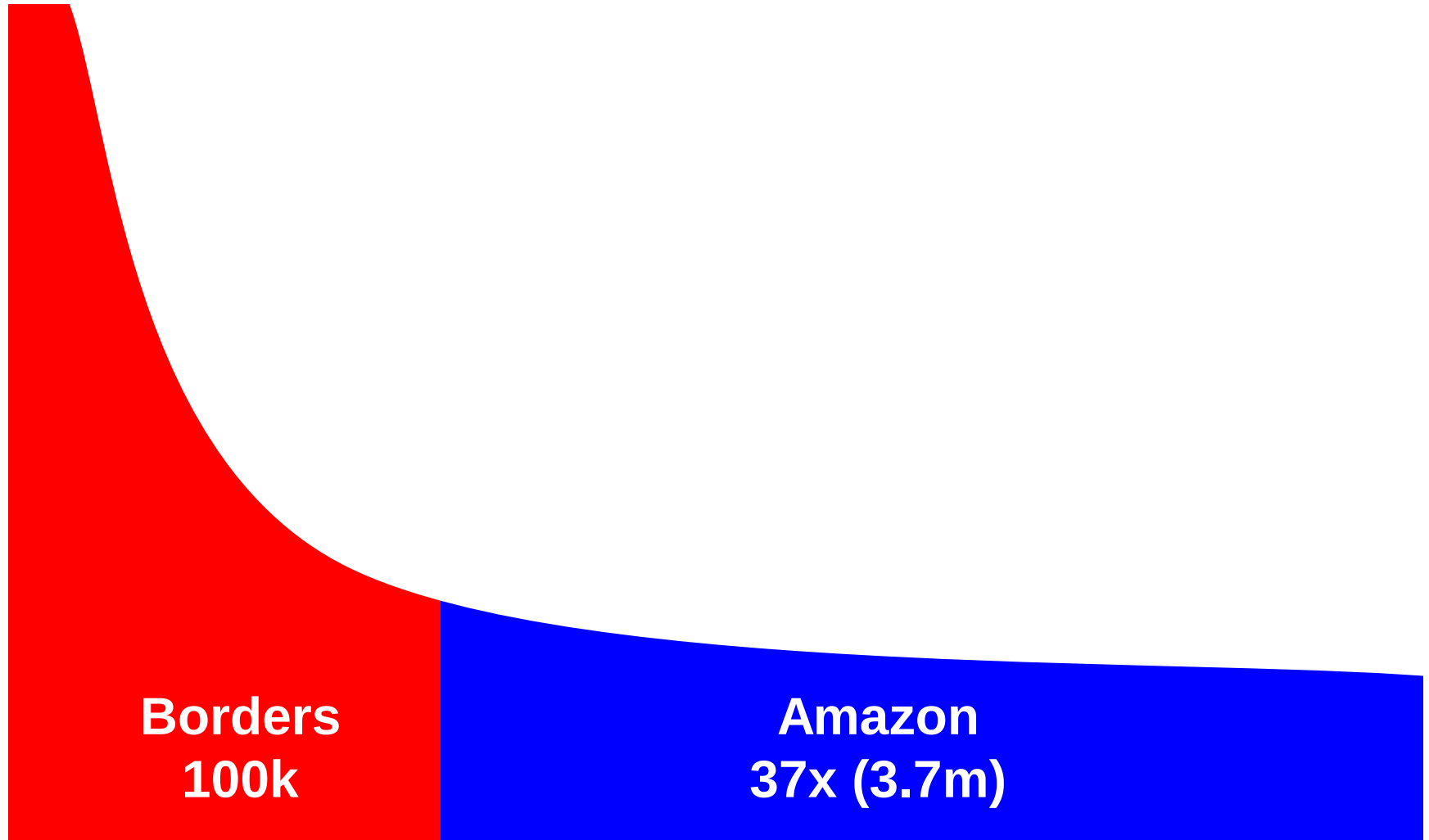
Recommended for You

LOOK INSIDE! SEARCH INSIDE!

Internet







Top 1000 CDs

off-line

80% sales

online



Information technology
filters help customers find
products in the Long Tail

33% sales

Top 20 ringtones

newspaper best-sellers list

80% sales

online search



40% sales



New Releases percentage of sales

in-store

90%

online

70%

Netflix

30%



Top 20% of products

catalog

84% sales

online

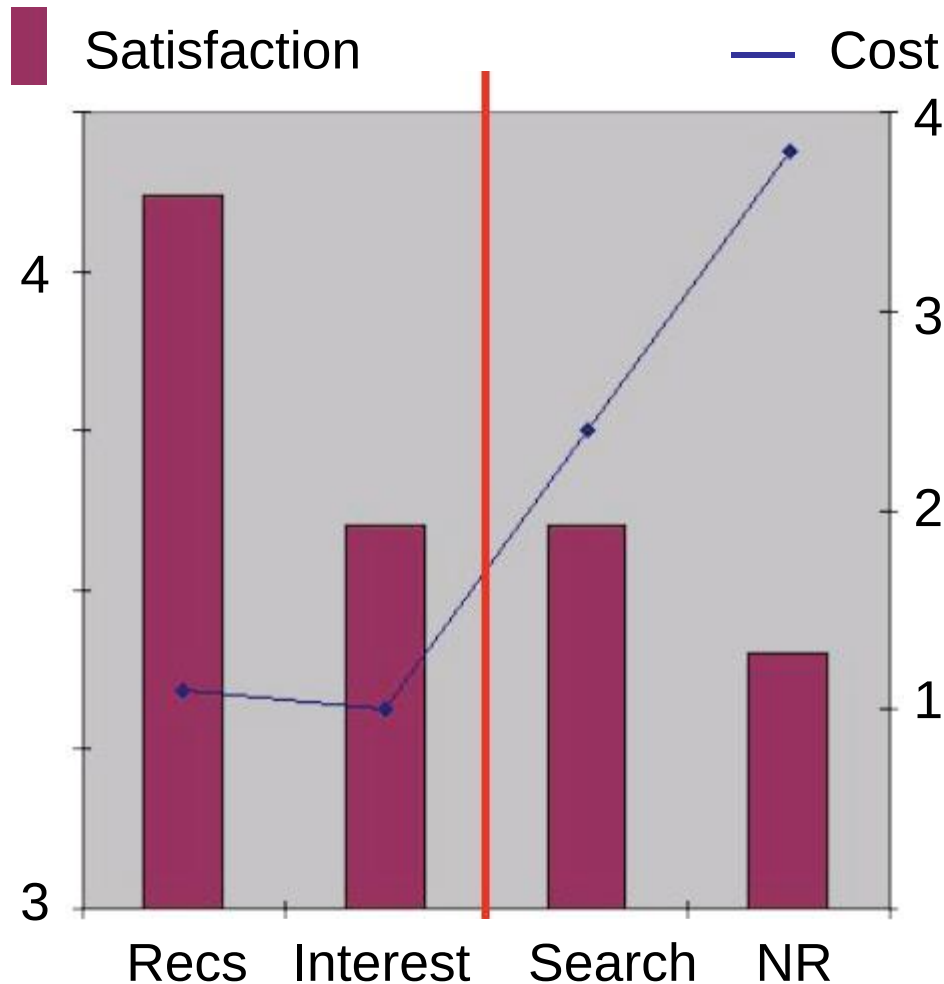


Information technology
filters help customers find
products in the Long Tail

71% sales



NETFLIX



- Customer satisfaction for recommendations is 15% higher than for search
- Satisfaction/cost is 150% higher for recommendations than for search

choicestream®

Create consumer loyalty with 'the service that knows me.'

Target promotions highlighting relevant content, products and services to drive action and motivate up-sell.

75% Sales Conversion

30+% Lift in Customer Acquisition



Increase ARPU and retention by highlighting relevant content at the top of the deck.

Boost ARPU by increasing purchases as consumers find relevant content more easily.

Promote 'viral' community by helping consumers find and share ideas with like-minded people.

Increase usage through personalized search and 'more like this.'



< 2%

> 30%

sales conversion

amazon.com®

Customers who bought The Long Tail: Why the Future of Business Is Selling Less of More also bought:



 [Naked Conversations: How Blogs are Changing the Way Businesses Talk with Customers](#)
by Robert Scoble, Shel Israel

Price: **\$16.47**
[Used & new](#) from \$13.24



 [Blue Ocean Strategy: How to Create Uncontested Market Space and Make Competition Irrelevant](#)
by W. Chan Kim, Renée Mauborgne

Price: **\$19.77**
[Used & new](#) from \$13.99



 [The Wisdom of Crowds](#)
by James Surowiecki

Price: **\$11.20**
[Used & new](#) from \$7.93



 [Waiting for Your Cat to Bark?: Persuading Customers When They Ignore Marketing](#)
by Bryan Eisenberg, et al.

Price: **\$13.59**
[Used & new](#) from \$6.00

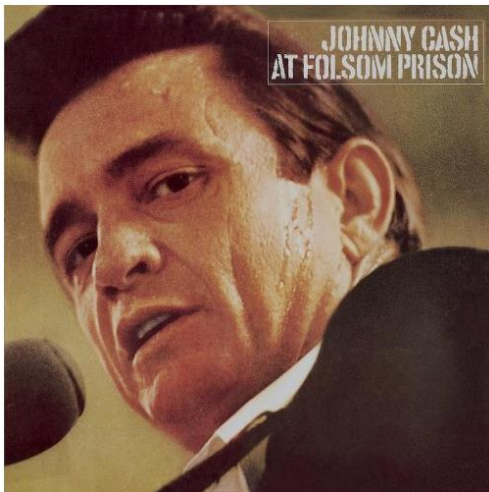
Every [top online retailer] is cross-selling and up-selling by proactively suggesting related items. --- Cisco study, Aug. 2006



So what? Why provide recommendations?

- **increase customer satisfaction**
- **lower costs**
- **increase conversion rates**
- **increase customer acquisition**
- **every top online retailer is doing it**

- the tail is very long and growing
methods must scale
- unstable
methods must be high velocity
- help customers find it!
real-time recommendations



Recommandation system

Netflix

- **5M active customers**
 - Ship 1.4M disks per day from 40 locations
- **1.4B ratings since 1997**
 - 2M ratings per day
 - 1B predictions per day
- **Item-to-item analysis with many data-conditioning heuristics**
- **2 days to retrain on new ratings**

Out of Africa (1985)



Add



Average of 347,312 ratings: 3.7 stars

DETAILS



Parental guidance suggested. Some material may not be suitable for children.

At A Glance

Friends

Member Reviews

Critics

More Like This

Hoping to forge a better life, Denmark native Karen Blixen ([Meryl Streep](#)) enters a marriage of convenience with a baron. The couple moves to Nairobi, where Karen finds herself trapped in a loveless marriage as her husband returns to a life of philandering and drinking. Then Karen crosses paths with free-spirited hunter Denys Finch Hatton ([Robert Redford](#)): Will their relationship blossom into love, or is Karen headed for heartache?

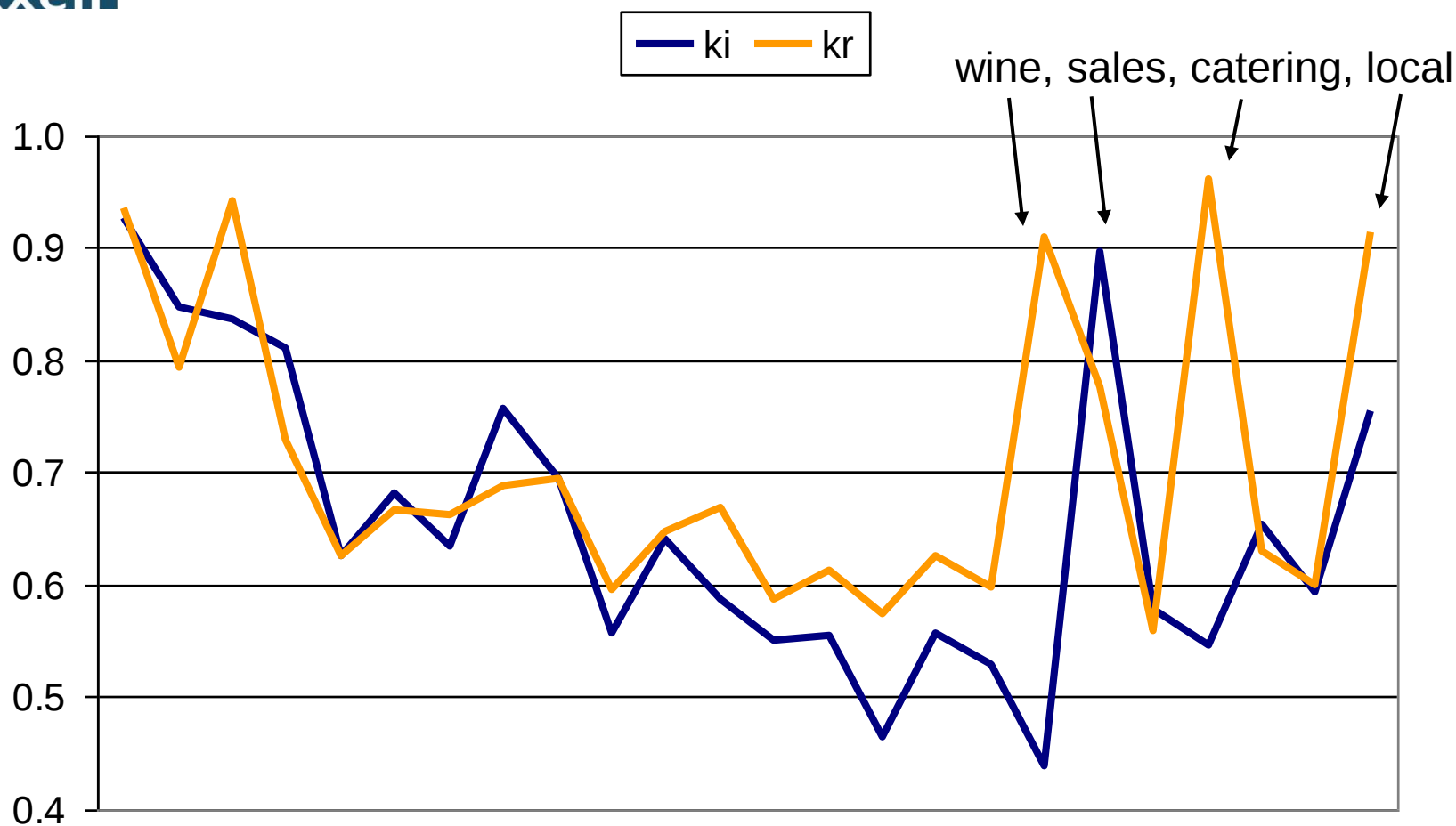
[Watch the Preview](#)

ENJOYED BY MEMBERS WHO ENJOYED

[The English Patient](#)[Sophie's Choice](#)[The Way We Were](#)[Howards End](#)[Gorillas in the Mist](#)

- Long Tails markets and their challenges
- Recommendations modeling
- Long Tail myths

- A single model that, given a customer, returns the next best product
- Approach 1: One propensity model per product and select the product with the highest score
 - Insufficient data for Long Tail products



Frequency (descending)

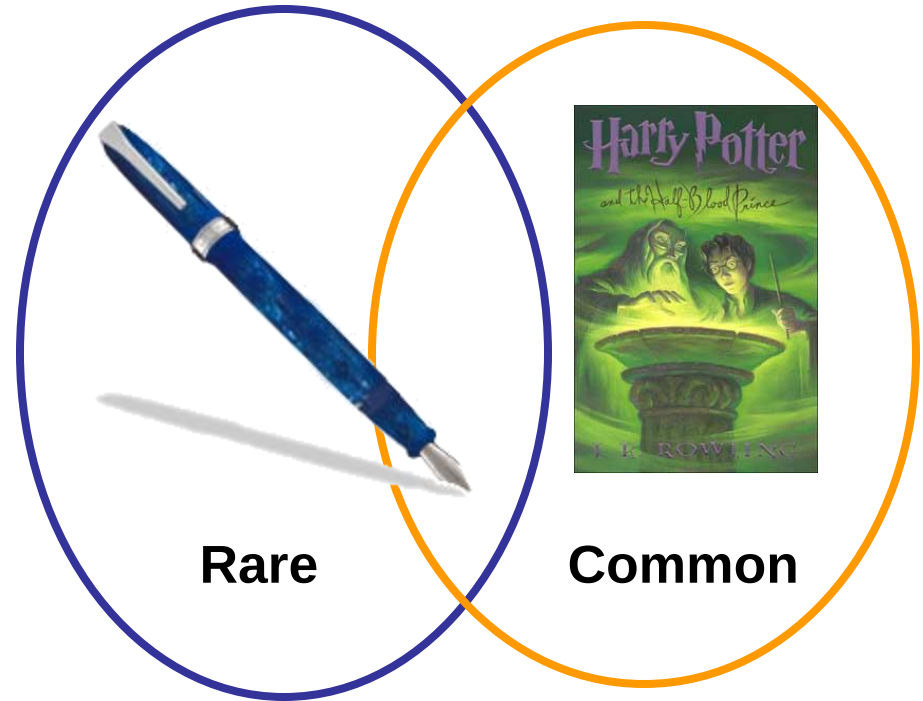
24 grocery store departments

- A single model that, given a customer, returns the next best product
- Approach 1: One propensity model per product and select the product with the highest score
 - Insufficient data for Long Tail products
- Approach 2: Association rules between past purchases and potential future purchases
 - Insufficient data for Long Tail products

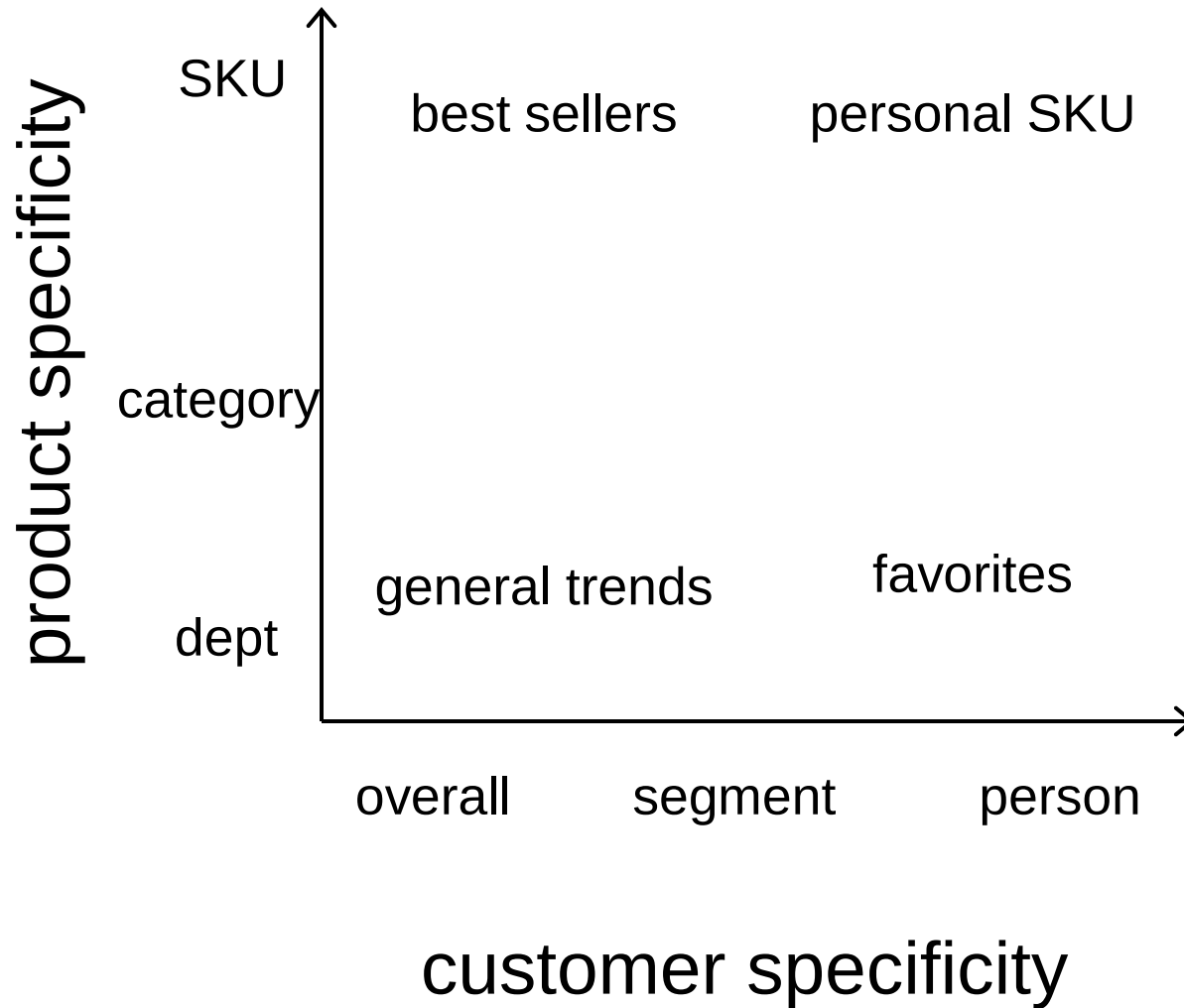
Customers who buy crème
brûlée torches also buy small
ceramic baking cups



Customers who buy
expensive pens also buy
Harry Potter

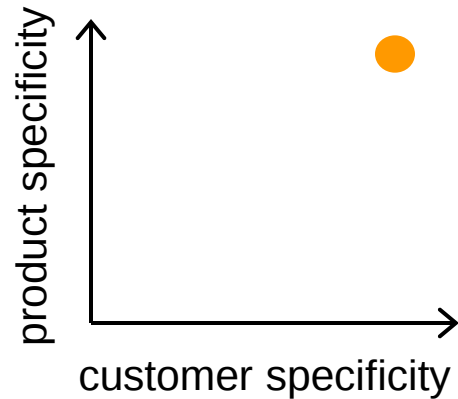


- A single model that, given a customer, returns the next best product
- Approach 1: One propensity model per product and select the product with the highest score
 - Insufficient data for Long Tail products
- Approach 2: Association rules between past purchases and potential future purchases
 - Insufficient data for Long Tail products
- Approach 3: Solve a simpler problem by relaxing the goal

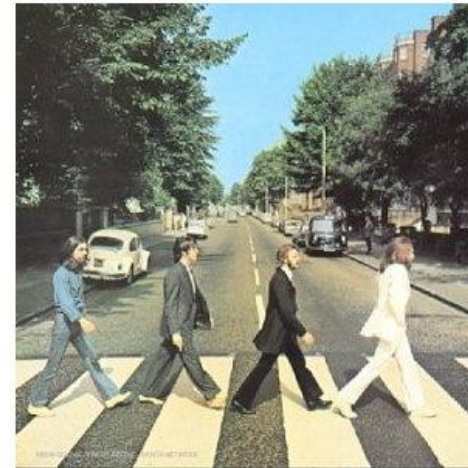


Use the most specific model that is reliable.

Customer specificity x Product specificity

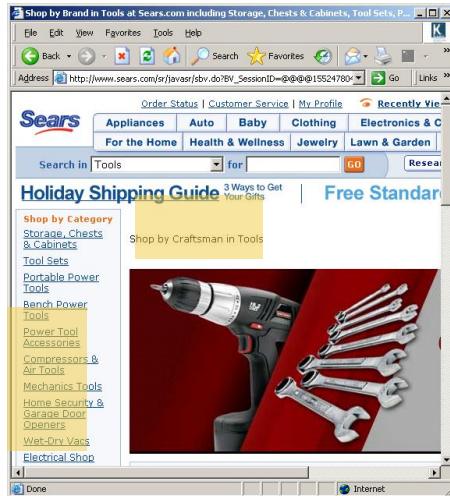


- **Customer**
 - current basket
 - current session
 - recent sessions
 - recent purchases
 - behavioral cluster
 - demographic cluster
 - overall
- **Product**
 - SKU
 - sub-sub category...
 - category
 - department
 - store
- **f(ki, kr, confid. interval, rule support, rule confidence...)**
- **Intervention**
 - interactive media?
 - self-service?
- **Goal**
 - click-through
 - convert
 - profit
 - NPV





Customer x Product x Media



RSS



“Across all touch points,” Matt Harris, Barclays



Customer x Product x Media



- Requires hundreds of propensity models for subcategories, categories, departments...
 - Requires association rules between millions of products
 - All updated frequently
-
- KXEN provides the automation and scalability to accomplish this

- Long Tails markets and their challenges
- Recommendations modeling
- Long Tail myths

**Customer insights from Long Tail marketing may be used to
optimize channel constraints outside of the Web**

in-store shelf space:



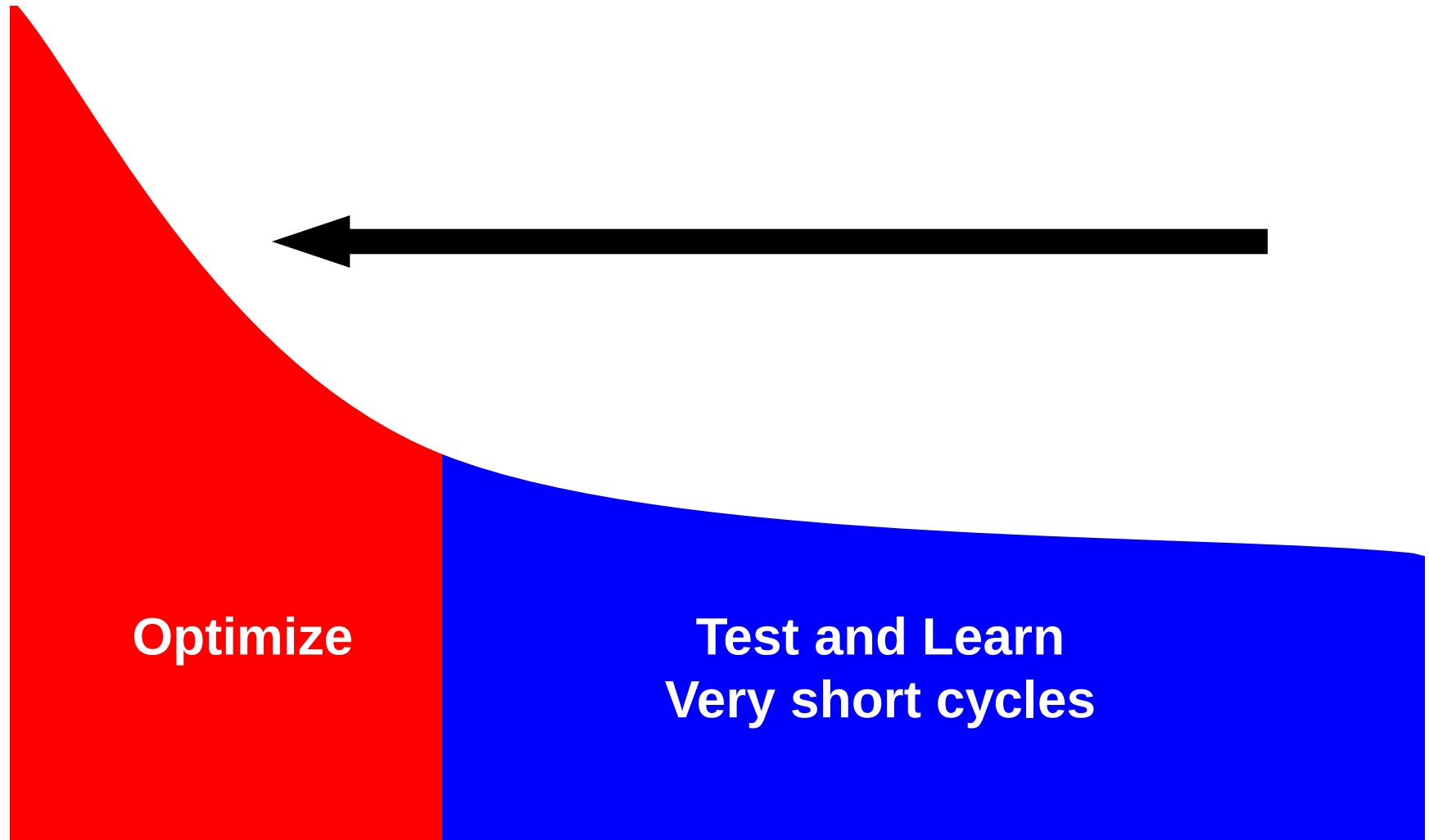
online shelf space:





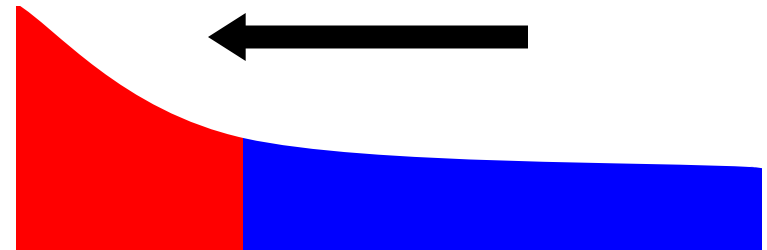


**Strategic implication:
Use the Long Tail to inform the Tall Head**





- Budweiser will not be the best selling beverage forever
- In 2005 Anheuser-Busch formed a separate division, Long Tail Libations, to develop, test, and market new products



WIKIPEDIA

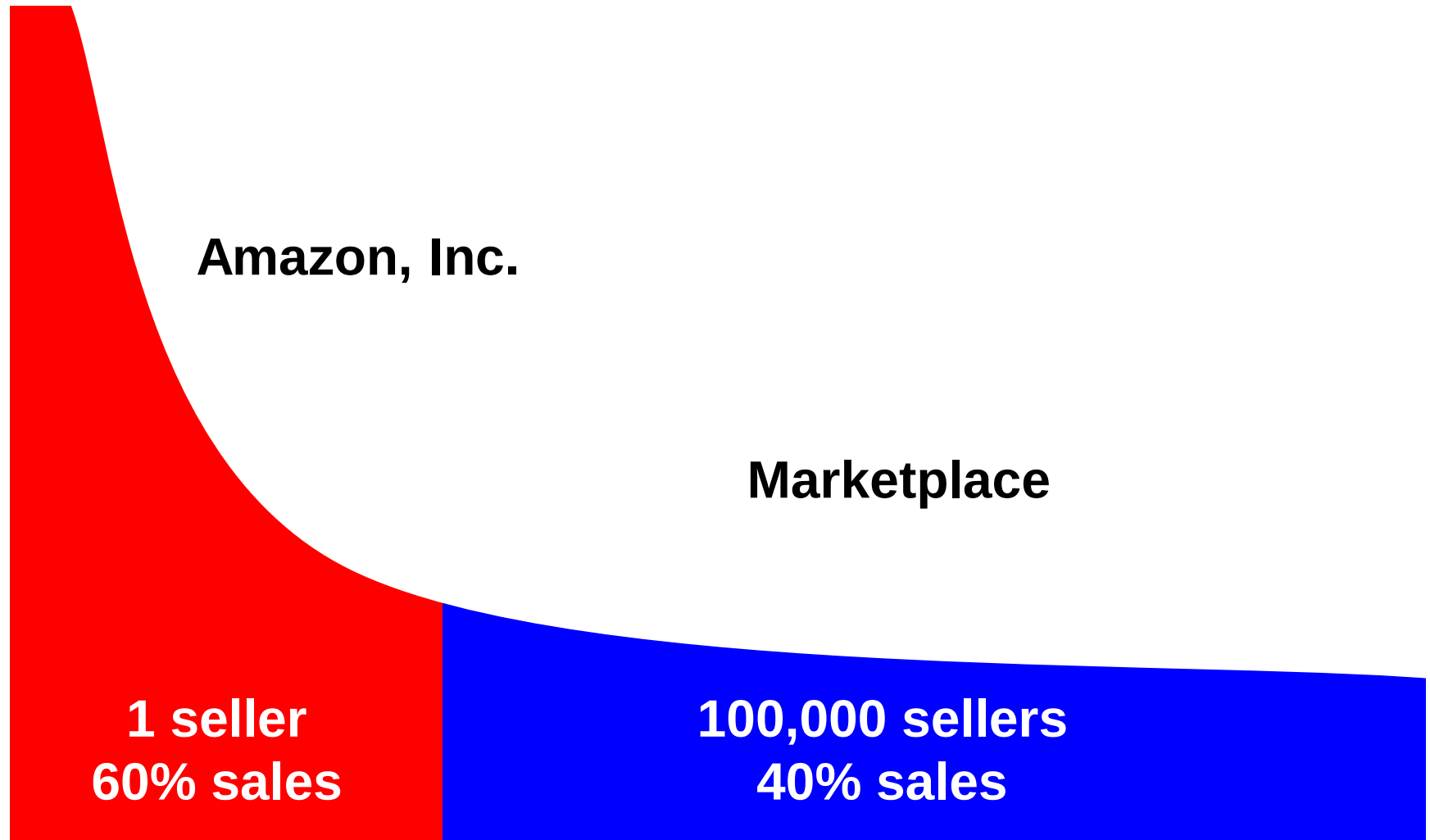


- There is always a trade-off between control and agility

<u>Wikipedia</u>	<u>Britannica</u>
20,000 amateurs	50 experts
4 errors/article	3 errors/article
fix errors in 4 minutes	1 year

P&G

- “Velocity is always king!”, Matt Harris, Barclays
- Increasingly customers have control
- “Begin to let go,” A.G. Lafley, CEO Procter & Gamble





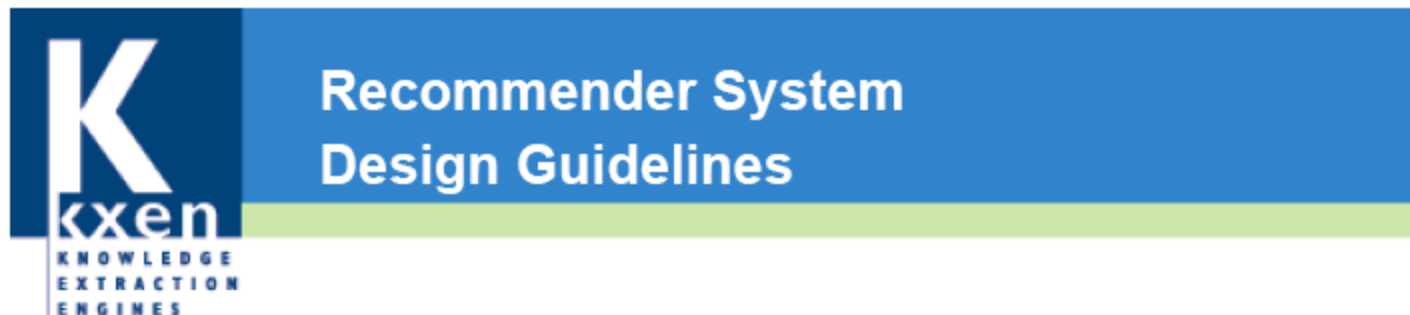
- **Give customers more control, let them do more work**
- **Selection: what color to sell in Paris**
- **Ratings: what's good**
- **Recommendations: what goes together**
- **Next: open innovation**
 - <http://www.myspace.com/fashionindie>
 - <http://clothing.stores.ebay.com>



2005 sales: £ 40m (US\$76m, €60m)

- Long Tail markets include thousands or millions of products
- Merchandisers measure customer behavior using statistical methods, and respond with recommendations to help customers find what they want
 - increase customer satisfaction
 - lower costs
 - increase conversion rates
 - increase customer acquisition
 - keep up with competitors
- Long Tail markets are growing and unstable, so methods must be scalable and high velocity
- Rapid “test and learn” in the long tail informs the tall head
- “Begin to let go” and give the customer more control

Getting started...



The methods offered by KXEN are ideally suited for building customized recommender systems. However, in addition to choosing the appropriate method (classification, clustering, or associations), there are numerous “business-logic” related design choices that must be made. This document is intended as a guide for organizations implementing a recommendation system with the KXEN Analytic Framework.

Design Dimensions

There are four major dimensions that must be taken into account when designing a recommendation system – purpose, item description, persistence, and history.

- **Purpose** – The reason the recommendations are being made. The three commonly encountered purposes are Cross-sell/Up-sell, Conversion, and Loyalty.
 - *Cross-sell/Up-sell* – Entice the user to increase the number of items purchased in addition to the items already selected or previously purchased. The business goal is to increase revenue. and a proper system should be