

Digital Advertising and Marketing: A review of three generations (Part 1) (Part 2: on Friday, April 13)

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I 296A UC Berkeley
Lecture 5, Wednesday February 15, 2012

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Brief Bio James G. Shanahan

- **20+ years in the field AI and information management**
 - Principal and Founder, Boutique Data Consultancy
 - Clients include: Adobe, Digg, SearchMe, AT&T, Ancestry, OfferPal,
 - Teach at University of California Santa Cruz (UCSC), ISM 209, 250, 251
 - Previously
 - Chief Scientist, Turn Inc. (A CPX ad network, DSP)
 - Principal Scientist, Clairvoyance Corp (CMU spinoff; sister lab to JRC)
 - Research Scientist, Xerox Research; cofounder of Document Souls
 - Research Engineer, Mitsubishi Group
 - PhD in machine learning (1998), University of Bristol, UK; B.Sc. Comp. Scienc (1989), Uni. of Limerick, Ireland
- **Now: Machine Learning Consultant (San Francisco)**
 - IF (you have large **data problems** and need a consultant)
THEN {email me at James.Shanahan_AT_gmail.com}
 - Where **problems** ∈ {web search, online advertising, machine learning, ranking, user modeling, statistics, social networks, operations research}

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- Living vicariously!

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Marketing versus Advertising

- **Advertising:**
 - The paid, public, non-personal announcement of a persuasive message by an identified sponsor; the non-personal presentation or promotion by a firm of its products to its existing and potential customers.
 - Advertising is a single component of the marketing process.
- **Marketing:**
 - The systematic planning, implementation and control of a mix of business activities intended to bring together buyers and sellers for the mutually advantageous exchange or transfer of products.
 - Marketing Pie: advertising, market research, media planning, public relations, product pricing, distribution, customer support, sales strategy, and community involvement.
- **Expensive wise:**
 - Advertising > public relations > market research

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Executive Summary

- Advertisers deliver a message to consumers via publishers
- Online advertising revenue growing annually (double digits)
 - €14.7Billion in Europe, €16.3B (\$23B) in USA (2009), €44B (\$65B) worldW
 - 10% of overall ad spend corresponds to online advertising
 - Business Models: CPM, CPC, CPA, dCPM
 - Online advertising is dominated by search, → display, social and mobile
- Key directions
 - Paid search drove the first shift in the early 2000s, rapidly transforming the web and creating/enabling previously unworkable business models. In the coming decade, social, as a category, is poised to do the same thing.
 - Forward markets → **Spot Markets**
 - **Technology:** Economics, IR, ML, OR, Game Theory, Stats, Social Sciences (estimating CTR/AR; auction systems; learning algorithms; targeting display advertising; behavioral targeting; social advertising)
 - **New Directions:** Web 3.0; games; social advertising; exchanges
 - **Gap:** perceived gap between academia and industry?

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Outline (today and Friday, April 13)

- 10 • Introduction
- 50 • **Advertising: supply-demand market pla**
 - Business models, Ecosystem, Market statistics
- 10 • **Advertiser/Publisher Workflow**
- 20 • **Technology and Economics**
 - Forward Markets (Operations research)
 - Spot Markets (ML, IR, Ranking, SNA, Query)
 - Auction Theory and Game Theory
- 20 • **New Directions**
 - BT, Mobile, Video, Social
- 10 • **Challenges in online advertising**
- **Summary**



2:00-3:10 Digital Advertising
3:10-3:40 Social Game Analyti
Raj Pai, CEO, and Jay Bala, C

Knowledge Fusion for Compu
Lokendra Shastri, VP, Analytic

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Lecture 5: Schedule

- 2:00-3:05 Digital Advertising (Jimi)
- 3:10-3:35 Social Game Analytics
Raj Pai, CEO, and Jay Bala, CTO, Claritics
- 3:35-4:00 Knowledge Fusion for Computational Marketing, Lokendra Shastri, VP, Analytics, Infosys

Advertising

- **Advertising is a paid, one-way communication**
 1. Deliver marketing messages and attract new customers
 2. To inform potential customers about products and services and how to obtain and use them.
 3. Branding → Direct action
 - Many advertisements are also designed to generate increased consumption of those products and services through the creation and reinforcement of brand image and brand loyalty (ads contain both factual information and persuasive messages).
 4. Use every major medium
 - To deliver these messages, including: television, radio, movies, magazines, newspapers, video games, the Internet, and billboards

Digital Advertising

- **Online advertising is a form of advertising utilizing the Internet and World Wide Web in order to deliver marketing messages and attract customers** [wikipedia.com]
- **Advertising annoys people! Advertising works!**
 - "Half the money I spend on advertising is wasted; the trouble is, I don't know which half." - [John Wanamaker](#), father of modern advertising. [Credit assignment]
 - "I do not regard advertising as entertainment or an art form, but as a medium of information...". "Ogilvy on Advertising" by [David Ogilvy](#)
- **Goals of Online advertising**
 - A** – Deliver/push an advertiser's message with quantifiable measures of consumer interest
 - A+P** – Generate ROI for the advertiser and revenue for the publisher
 - P+C** – Enable ads as a medium of information (true in the case of search)!

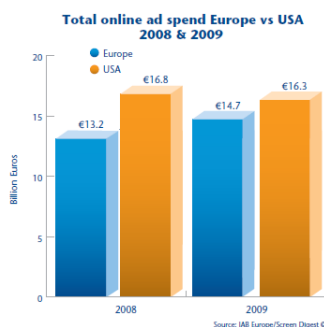
Advertising makes up ~2% of US GDP

"Half the money I spend on advertising is wasted; the trouble is, I don't know which half." - [John Wanamaker](#), father of modern advertising.

Less than 1% of all impressions lead to measureable ROI Despite its problems (Attribution etc.)

- **US GDP = \$14.1 Trillion (Global \$56 Trillion, 56x10¹²)**
- **US Advertising Spend**
 - ~\$275 Billion across all media
 - (2% of GDP since the early 1900s)
- **In 2008, Worldwide online advertising was \$65B**
 - I.e., about 10% of all ad spending across all media [IDC, 2008]
 - \$23 Billion in US; \$2 Billion in China; 2Billion in Latin America;
 - \$20B (Europe); and Russia accounted for \$720 million

Europe versus USA

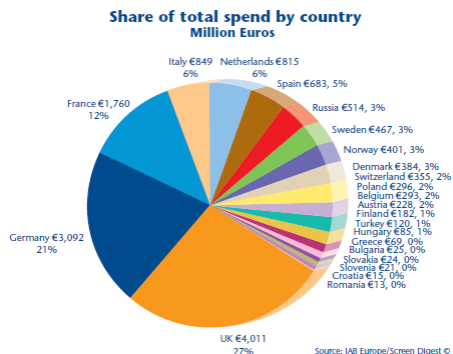


Ad Spending Worldwide

- **Western Europe ad spending was \$18 billion US Dollars (€14.7 billion Euros) in 2009 or 27% of global online ad spending;**
- **The US revenue was \$22.7 billion;**
- **Latin America ad revenue was \$2 billion;**
- **China had a similar revenue of \$2 billion;**
- **\$2 billion in Latin America; and**
- **Russia accounted for \$720 million**

[AdEx – the definitive guide to the size and scale of European online advertising, 2009 Report, <http://www.iabeurope.eu>, (2010)]

Ad Spend Across Europe and Russia



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Ad Spending Breakdown in US

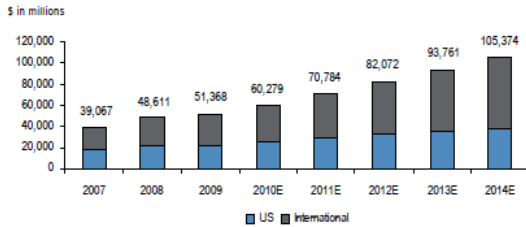
- Sponsored search accounts for 47 percent of 2009 full year revenues (\$10.7 billion);
- Display-related advertising revenues totaled \$8.0 billion;
- Classifieds revenues (products such as YellowPages.com) accounted for 10 percent or \$2.3 billion;

[IAB Report 2010]

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Search And Display Advertising Growth

We Expect Global Online Advertising to Reach \$105B by 2014



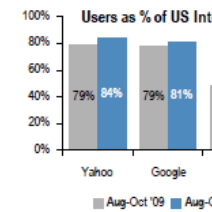
Search + Display advertising only

**Doubling in 4 years
Big international growth**

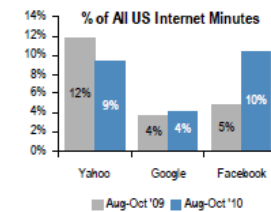
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Reach in terms of users and minutes

Facebook's Expanding User Reach



FB Minutes Surpass Yahoo's



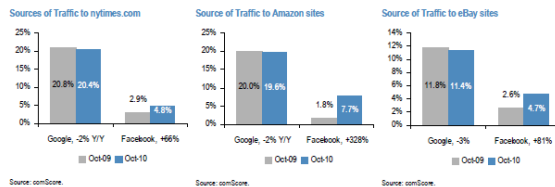
Source: comScore, J.P. Morgan estimates.

Source: comScore, J.P. Morgan estimates.

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Traffic Source

- Mainly due to Facebook Connect (single login; seamless experience)

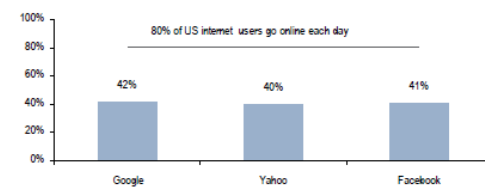


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~40% of userbase visit major sites daily

Google, Yahoo and Facebook Get Visited by ~40% of their User Base Each Day

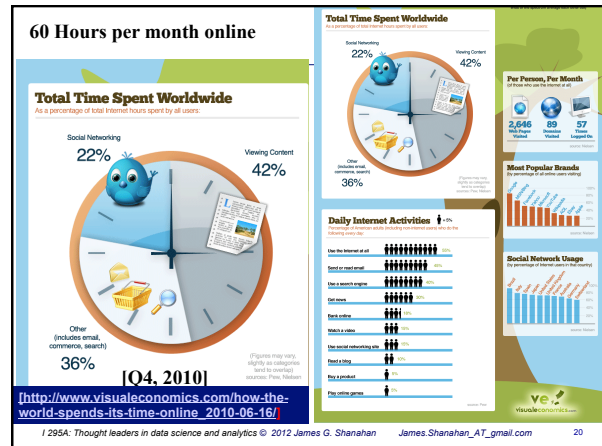
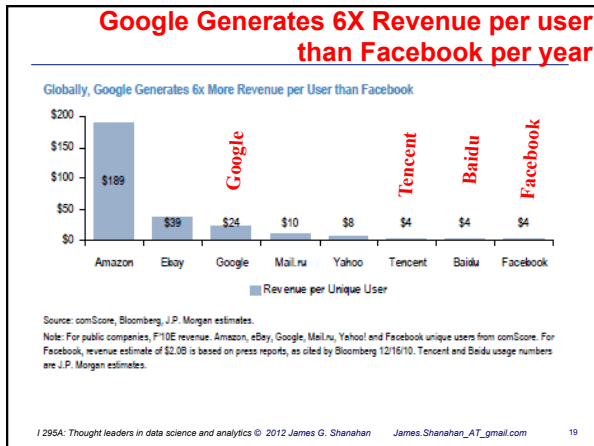
Average # of Daily Visitors/Average # of Monthly Visitors



Source: comScore, J.P. Morgan estimates. Data from Jul-Nov 2010.

Average user is spending 2 hours a day online

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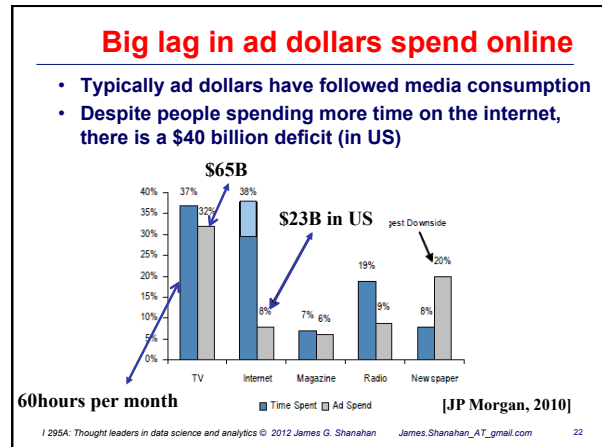
Most Visited Sites WorldWide for 2/2011 (Excludes porn, and some of Google)

Worldwide Country

The 1000 most-visited sites on the web Data: February 2011

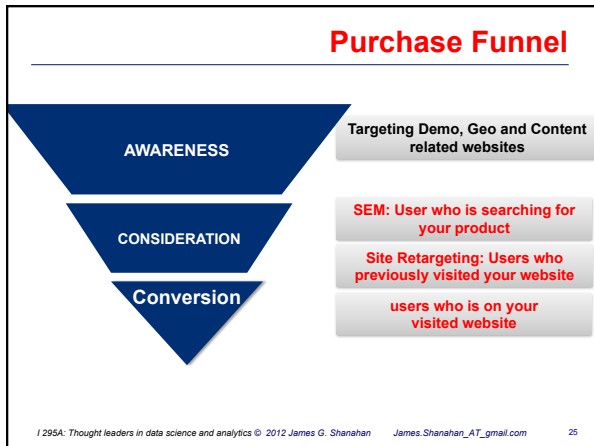
Rank	Site	Category	Unique Visitors (users)	Reach	Page Views	Has Advertising
1	facebook.com	Social Networks	590,000,000	38.1%	770,000,000,000	Yes
2	youtube.com	Online Video	490,000,000	31.5%	85,000,000,000	Yes
3	yahoo.com	Web Portals	410,000,000	26.7%	69,000,000,000	Yes
4	live.com	Search Engines	340,000,000	22.2%	37,000,000,000	Yes
5	wikipedia.org	Dictionaries & Encyclopedias	290,000,000	18.1%	7,100,000,000	No
6	msn.com	Web Portals	260,000,000	16.6%	13,000,000,000	Yes
7	baidu.com	Search Engines	230,000,000	14.9%	120,000,000,000	Yes
8	blogspot.com	Blogging Resources & Services	230,000,000	15.2%	5,300,000,000	Yes
9	microsoft.com	Software	190,000,000	12.5%	3,000,000,000	Yes
10	qq.com	Web Portals	190,000,000	12.2%	39,000,000,000	Yes
11	bing.com	Search Engines	160,000,000	10.2%	5,800,000,000	Yes
12	youku.com	Online Video	99,000,000	6.4%	3,700,000,000	Yes
13	twitter.com	Email & Messaging	98,000,000	6.4%	5,800,000,000	Yes
14	adobe.com	Multimedia Software	98,000,000	6.4%	1,100,000,000	Yes
15	taobao.com	Classifieds	97,000,000	6.3%	9,400,000,000	Yes

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- ## Why the big lag in ad dollars spend online?
- Advertisers and agencies are old fashioned**
 - Don't use mathematically sophisticated systems; human experts
 - Advertisers are broadcast oriented (TV, Newspaper, Radio etc)
 - Huge culture change
 - Real-time versus weekly/monthly
 - They speak the language of audiences and panels (not data mining, machine learning); social scientists
 - Accountability: Internet is still relatively new and largely unknown**
 - Apart from sponsored search (3.5% of online activity) other media types are largely not accountable (credit assignment) and underexploited; (in US \$14B versus \$8B)
 - Poor targeting
 - Guaranteed markets at spot market prices
 - Huge opportunity if history is anything to go by and**
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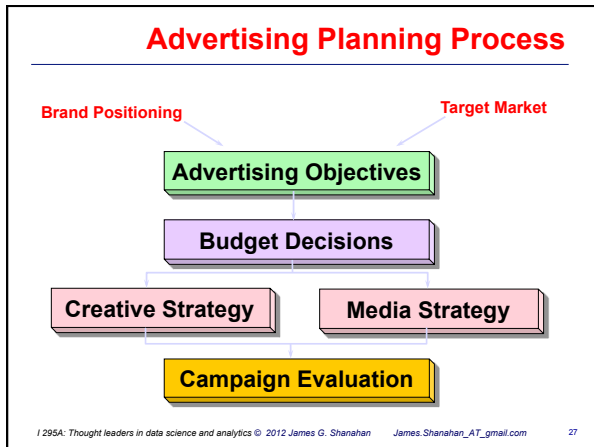


Advertising Stone Soup: Core Skills

- Advertising systems can be basic (stone soup) but adding
 - IR, Nonlinear programming, ML, Econ, Game Theory
 - Gradient descent, Objective functions, probabilities, statistics, analytics, visualization
 - Hacking
 - Large data
 - Will make even better!

The Portuguese dish of *sopa de pedra* (stone soup).
http://en.wikipedia.org/wiki/Stone_soup

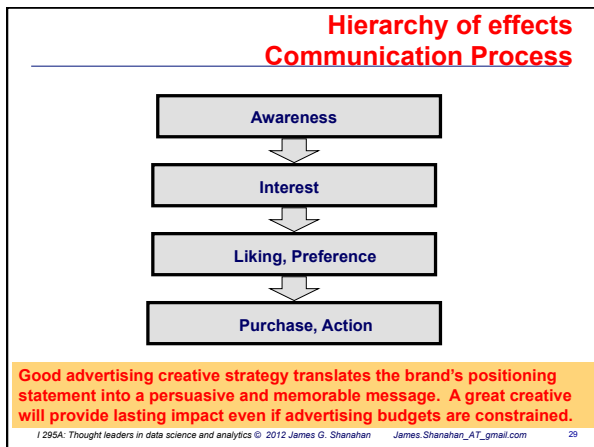
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Advertising Objectives

- Create awareness for new products
- Inform consumers
 - of product features and benefits
 - price changes
 - Important for building primary demand
- Persuasion
 - Build brand preference or change buyer perceptions
 - especially important for building demand in competitive markets.
- Reminder advertising: maintain top-of-mind awareness

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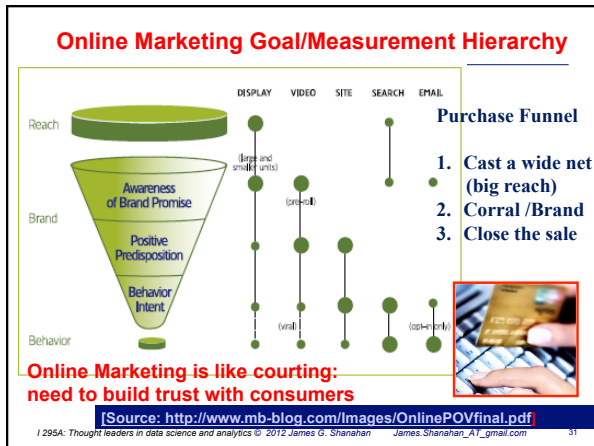


What marketers want?

- Deliver marketing messages to customers
 - Buy products/services (long term vs. short term)

Goal	Activity
Introduce:Reach	Media Planning
Influence:Brand	Ad Effectiveness (CTR, site visits)
Close	Marketing Effectiveness (Transactions, ACR, Credit Assignment)
Network Effect	Referrals/Advocacy

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From Branding to Direct Marketing

Advertising has different goals

Branding

Direct Marketing

It didn't take long for Schwartz to show his stuff. Sun, which had fallen far from its perch as one of the highfliers of the dot-com era, has emerged from a five-year funk to turn in two strong quarters of revenue growth and market share gains. The stock has shot up 38% since late July, and Schwartz looked golden while making the rounds of Wall Street and New York customers in early September. "We think Sun is on the way to turning around," says analyst Ben Reitzes of UBS (UBS), who recently upgraded the

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Marketing Objectives vs. Advertising Stages

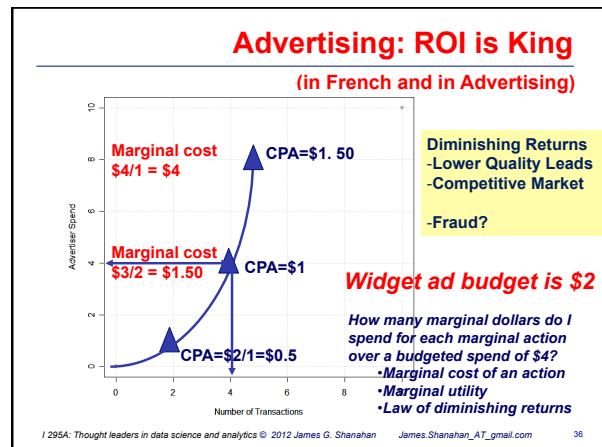
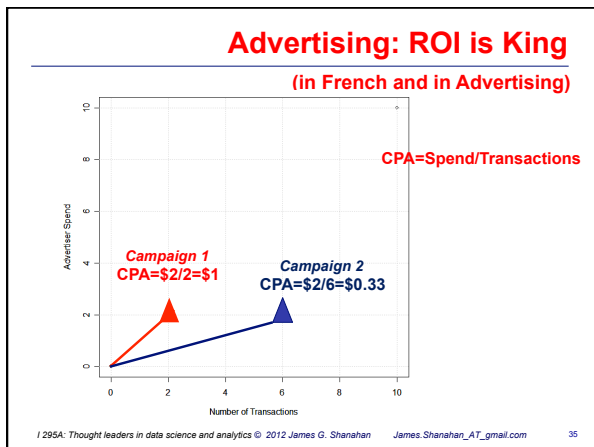
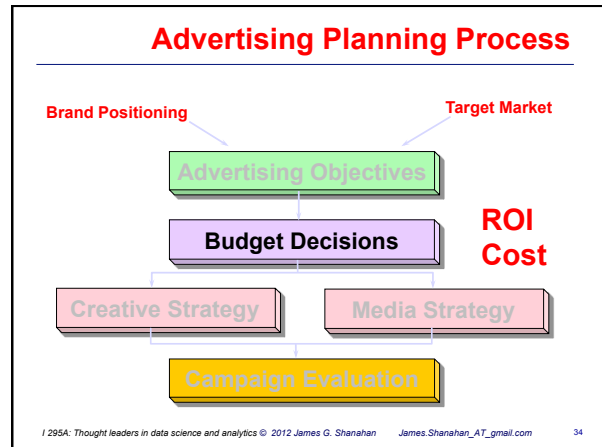
Stages	ARF Media Model	Questions Answered	Metrics and Typical Sources
1	- Vehicle Distribution - Vehicle Exposure - Advertising Exposure	Did anyone see it and how often? Did it get through technical firewalls?	Reach/ Frequency Sources: audience panel, ad servers, email providers
2	- Advertising Attentiveness - Advertising Communication	Do they know of the brand and the message? Did it get through mental firewalls?	Brand survey data points Sources: most commonly third-party survey research companies, could also be inferred from search volume as a related indicator of awareness and interest.
3	- Advertising Persuasion - Advertising Response	Do they think favorably of the brand? Would they consider it?	
4	- Advertising Response - Sales Response	Did they take action on it? Did they click/sign up/tell others/go to the store/buy it?	A variety of behavior metrics (e.g. rollover, play, click-thru, view-thru, sales) Sources: ad technology, adsite/email servers, retail sales

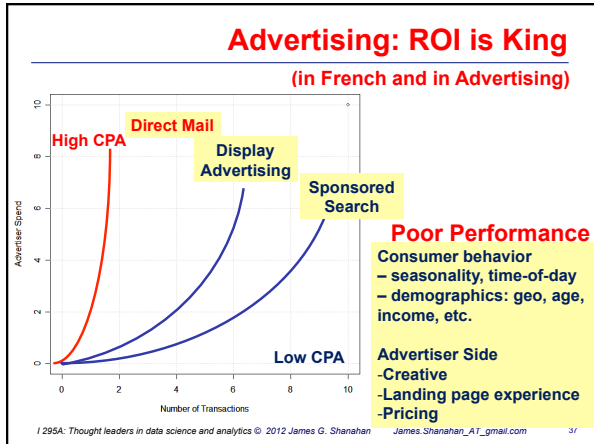
Parallels with existing media

1. Print <-> webpages
2. Direct Response <-> interactivity
3. TV <-> Online-Video

[Source: <http://www.mb-blog.com/Images/OnlinePOVfinal.pdf>]

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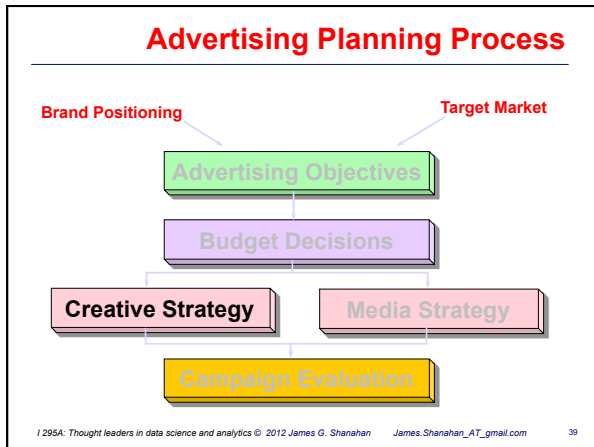


Advertisers: ROI versus CPM

	CPM	ROI per \$1 Spent
Outdoor	\$1-5	
Cable TV	\$5-8	\$6.81
Radio	\$8	\$8.60
Online		\$19.83
–Display \$5-30	\$5-\$30	\$19.78
–Contextual	\$1-\$5	
–Search	\$1 - \$200	\$21.84
Social	\$0.2-\$5	\$12.57
Mobile	\$0.2-\$6	\$7.50
Email		\$44.93
Network/Local TV	\$20	\$6.81
Magazine	\$10-30	\$10.11
Newspaper	\$30-35	\$12.77
Direct Mail	\$250	\$7.34-\$15.28

[ROI based on DMA Power of direct marketing 2010 (USA)]

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- ## Typical Ad Formats
- **Ad Formats**
 - Display
 - An advertiser pays an internet company for space to display a static or hyper-linked banner or logo on one or more of the internet company's pages. For the purposes of this report all forms of internet sponsorship, tenancies, rich media formats have been included in the figure for display advertising.
 - Sponsored Search
 - Classifieds (e.g., online job boards and employment listings, real estate listings, automotive listings, yellow pages).
 - Other (e.g., newsletter advertising, email, mobile advertising and in-game advertising)
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Ad Formats: popunder, image+text

Limited Time Offer:
Earn a **free domestic round-trip** airline ticket
Earn **1 point** for virtually **every dollar** you spend
Fly **any airline** anytime

STATISTICA - Data Mining
Winner of all comparative reviews since 1993 - Free Evaluation CD
www.StatSoft.com

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Ads Formats and sizes

- **Text Ads**
- **Display Ads**
 - Graphical, Flash, Rich Media (sound, video)
- **Different sizes types:**
 - For details see <http://www.iab.net>
 - Rectangular, R and Buttons
- **See IAB for sizes:**

STATISTICA - Data Mining
Winner of all comparative reviews since 1993 - Free Evaluation CD
www.StatSoft.com

CLIVE
468 x 60

Upgrade your Career
FREE information
CLICK HERE

I 295A: Thought leaders in data science [source: www.activeresponsegroup.com] 120x 600

Ad sizes (See IAB)

Wide Skyscraper
160 x 600 pixels

Leaderboard
728 x 90 pixels

Medium Rectangle
300 x 250 pixels

<http://www.iab.net/standards/adunits.asp>

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Online Advertising for Video Content

- Pods: content (chapter), ads (break)**
 - Ad pods: define durations and compositions of ad breaks
 - Pod format: linear vs non-linear (overlay)
 - Pod position: Pre-roll, mid-roll, post-roll
 - Spot positions: 1,2,3 (multiple ads within the same pod position)
- User-level ad-pattern:**
 - manage frequency of breaks to pace ad exposures ad-content-content...
- Timeline for each video: insert cues to determine when ads are**

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IAB Standards

NOTE: All dimensions are in pixels.
Rectangles and Pop-Ups

	Recommended Minimum Initial Download File-weight	Recommended Animation Length (seconds)
300 x 250 IMU - (Medium Rectangle)	View IMU 40k	15
250 x 250 IMU - (Square Pop-Up)	View IMU 40k	15
240 x 400 IMU - (Vertical Rectangle)	View IMU 40k	15
336 x 280 IMU - (Large Rectangle)	View IMU 40k	15
180 x 150 IMU - (Rectangle)	View IMU 40k	15
NEW 300x100 IMU - (3:1 Rectangle)	View IMU 40k	15
NEW 728x300 IMU - (Pop-under)	View IMU 40k	15

Banners and Buttons

468 x 60 IMU - (Full Banner)	View IMU 40k	15
234 x 60 IMU - (Half Banner)	View IMU 30k	15
88 x 31 IMU - (Micro Bar)	View IMU 10k	15
120 x 90 IMU - (Button 1)	View IMU 30k	15
120 x 60 IMU - (Button 2)	View IMU 30k	15
120 x 240 IMU - (Vertical Banner)	View IMU 30k	15
125 x 125 IMU - (Square Button)	View IMU 30k	15
728 x 90 IMU - (Leaderboard)	View IMU 40k	15

Skyscrapers

160 x 600 IMU - (Wide Skyscraper)	View IMU 40k	15
150 x 600 IMU - (Medium Skyscraper)	View IMU 40k	15

Interactive Advertising Bureau (IAB) is comprised of more than 375 leading media and technology companies who are responsible for selling 86% of online advertising in the United States

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Advertising Planning Process

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Forms of Online Advertising

- Advertising online comes in all shapes and sizes and we run into it all the time be it through
 - Websearch
 - Reading the newspaper online
 - Paying the bills
 - Listening to music
 - Watching a video
 - Purchasing a book
 - Mobile device-based apps (phones, Tablet computers)

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Sponsored Search

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Local Search @ AT&T Interactive

Sponsored Listing 1

Sponsored Listing 2

Organic Listing 1

Organic Listing 2

North Sponsored

Organic Business Listings

East Sponsored

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Contextual Advertising on Webpages

Contextual Advertising

Display Contextual Ad

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House Ads at AMEX

House Ads at AMEX

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House Ads at Amazon

House Ads at Amazon

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OA is cavalier! : business models; ad placement; e:b wants to be online

OA is cavalier! : business models; ad placement; e:b wants to be online

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E.g., Business Model CIKM 2008

E.g., Business Model CIKM 2008

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Mobile Web

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Mobile Web

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From Mad Men To Wall Street and beyond!

2007

Banner	Click+Data	Personal	Social
<ul style="list-style-type: none"> Set in New York City, <i>Mad Men</i> begins in 1960 at the fictional Sterling Cooper advertising agency on New York City's Madison Avenue. 			
<p>Human Intensive Lots of guess work Forward Market</p>	<p>Technology Data Driven Forward Market Spot Markets</p>	<p>Data</p>	<p>Personalization</p>
<p>1st Generation</p>	<p>2nd Generation</p>	<p>3rd Generation</p>	

Increasingly →

Advertisers still in broadcast mode

Double digit growth

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From Mad Men To....

- Set in New York City, *Mad Men* begins in 1960 at the fictional Sterling Cooper advertising agency on New York City's Madison Avenue. (Broadcast by AMC Cable Channel)
- The show centers on Don Draper (Jon Hamm), the agency's creative director, and the people in his life in and out of the office.

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Bad Ad Placement? Moral Conscience

[Source: Neatorama.com] [Source: www.livingsweb.com]

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Bad Ad Placement?



[[back to Breaking News index](#)]

Leverage sentiment to avoid?
[Shanahan et al., AAAI Symposium 2005]

One toddler dead, another critical after house fire

Source: AAP|Published: Friday June 29, 11:17 AM

A baby has been killed and a toddler critically injured in a house fire in Perth.

The 15-month-old boy died in the fire, and his two-year-old brother is now in intensive care in the Princess Me

Police say they're still investigating the cause of the blaze, that broke out around 7pm (WST) last night.

But they say it may have started from an open fire.

[Source: LivingWeb.com]

A Bitter-Sweet Advertising Moment!



Web Images Groups News Froogle more »

irwin steve dead

Search

Search: the web pages from the UK

Web

Steve Irwin Dead

www.ebay.co.uk

Find Steve Irwin Dead! Buy Steve Irwin Dead on eBay

News results for **irwin steve dead** - View today's top stories

Great croc hunter salutes Irwin - News24 - 5 hours ago

Close friend explains the circumstances of Steve's death - ABC Online - 10 hours ago

Croc Hunter Steve Irwin dead in accident - The Age - 12 hours ago

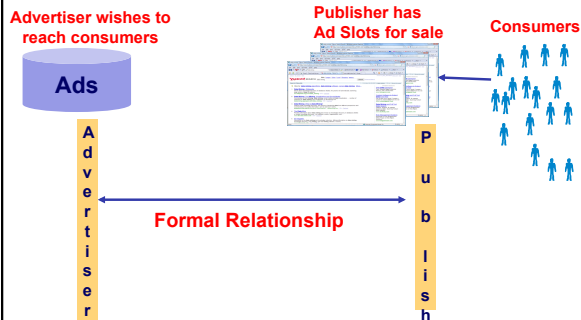
Key Trends

- Social will transform advertising as much as CPC did back in the late 1990s
- Sponsored Search is saturated
- Mobile is still embryonic
- Privacy is becoming a commodity

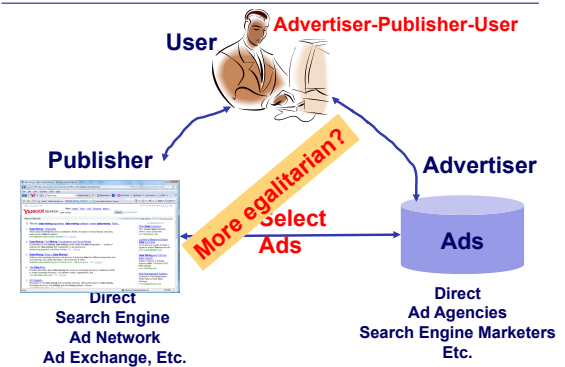
Outline

- Introduction
- Online advertising ecosystem
- Business models
- Creating an online ad campaign
- Technology and Economics
- New Directions
- Challenges in online advertising
- Summary

Formal Relationship between Adv and Pub



Online Advertising



Business Models

Advertisers: CPM, dCPM, CPC
 Publishers: CPA

- **CPM (Cost Per Thousand)**
 - Advertisers pay for exposure of their message to a specific audience. (*M* in the acronym is the Roman numeral for one thousand)
- **CPC (Cost Per Click) aka Pay per click (PPC)**
 - Advertisers pay every time a user clicks on their listing and is redirected to their website.
- **CPA (Cost Per Action) or (Cost Per Acquisition)**
 - The publisher takes all the risk of running the ad, and the advertiser pays only for the amount of users who complete a transaction, such as a purchase or sign-up.

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Business Models: Hybrids

Advertisers: CPM, dCPM, CPC
 Publishers: CPA

- **dCPM Pricing** a newer hybrid pricing model
- **dCPM pricing optimizes a campaign towards the sites and site sections that perform best for the advertiser, dynamically paying the most efficient CPM for the value of the inventory to the advertiser.**
- **dCPM campaigns are driven by two parameters, your Maximum/Average Bidding CPM and your CPA target.**
 - As a campaign runs, it "learns" which sites and site sections deliver the CPA targets while staying within your Max CPM requirements.
- **E.g., Average CPM of \$10; CPA of \$1**

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Formal Relationship between Adv and Pub

Advertiser wishes to reach consumers

Advertiser

Ad Slots for sale

Publisher

Consumers

Formal Relationship

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From Mad Men To Wall Street and beyond!

1st Generation

Banner

Human Intensive
Lots of guess work
Forward Market

2nd Generation

Click+Data

Technology
Data Driven
Forward Market
Spot Markets

3rd Generation

Personal

Personalization

Social

2007

Data

Increasingly

YoY: Double digit growth

Advertisers still in broadcast mode

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Ad Placement used to be simple circa late 90s

salon.com

Search

Yahoo! SEARCH

Site Presented By

First Generation

Don't have a cow!

Famous animal lover Jeffrey Moussaieff Masson, the author of "The Face on Your Plate," talks about why you should consider giving up the burgers – and the Franchise

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Advertising: a supply-demand marketplace

DEMAND

Advertiser wishes to reach consumers

Advertiser

SUPPLY

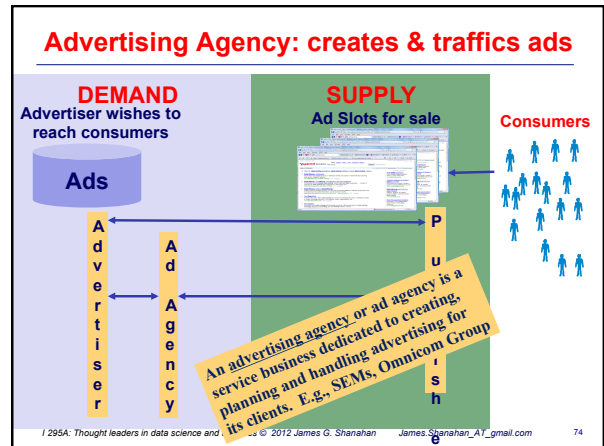
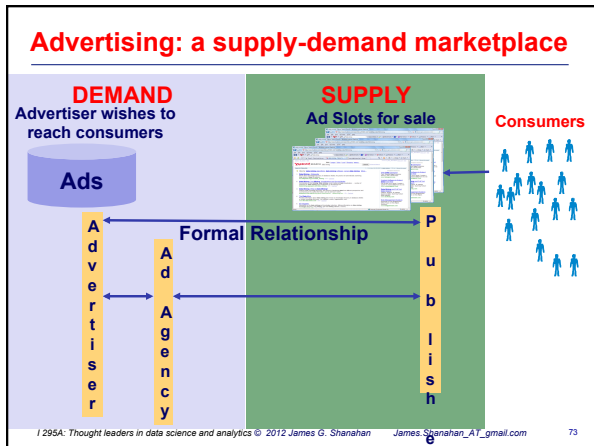
Ad Slots for sale

Publisher

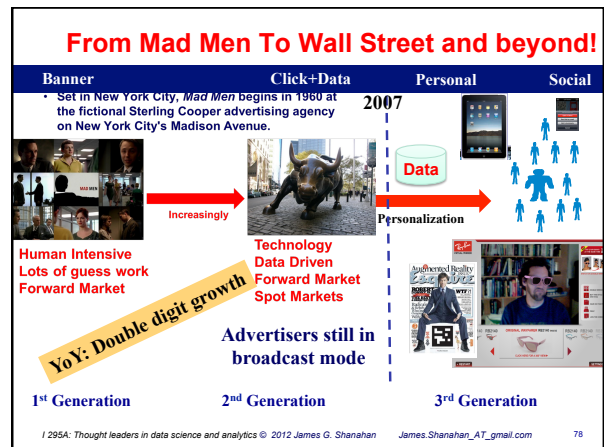
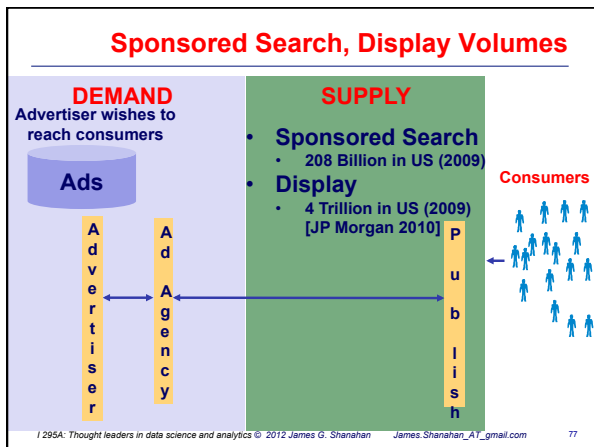
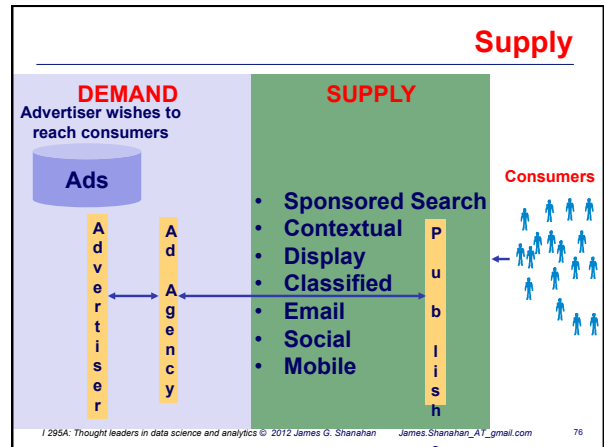
Consumers

Formal Relationship

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- ### Ad Agency
- An ad agency is a service business dedicated to creating, planning and handling advertising for its clients.
 - E.g., Search Engine Marketing (SEM), Search Engine Optimization (or SEO), paid placement, and paid inclusion
 - E.g., Efficient Frontier
 - Services include designing and build ad creative, landing page, optimization, media purchase etc.
 - Saatchi & Saatchi
 - An agency may represent many advertisers
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2nd Generation

- Late 1990s
- Online payment models:
 - CPC, CPA business models
- Increasingly quant driven
- Supply can be fragmented → Ad Networks
 - Outside of search supply can be fragmented
 - Publishers maybe small and not have a sales team

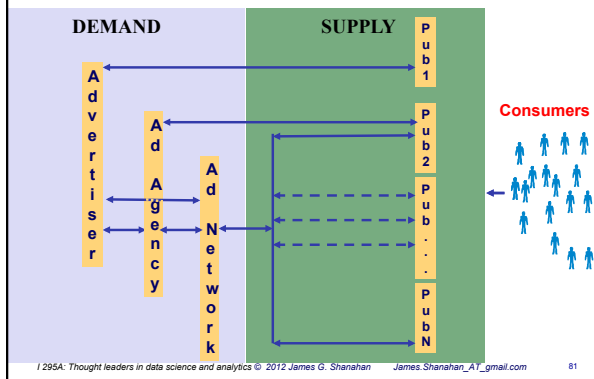
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Supply can be fragmented → Ad Networks

- Supply can be fragmented outside of search
- Publishers maybe small and not have a sales team
- Led to the development of different types of marketplaces
 - Publishers bring their produce for sale
 - Advertisers (or their representatives) come to buy
 - Ad Networks
 - and later
 - Ad Exchanges, Yield mgt and Demand side platforms

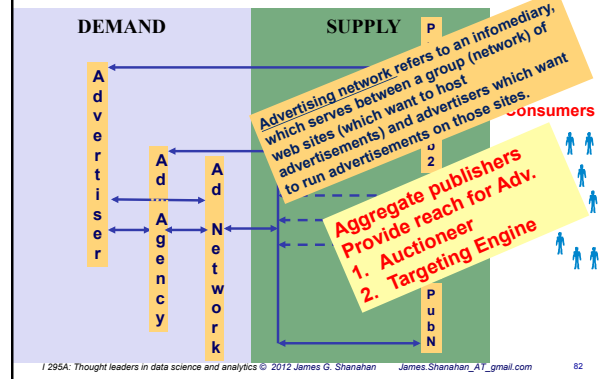
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Advertising Network: Aggregates Publishers



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Advertising Network: Aggregates Publishers



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Ad Network

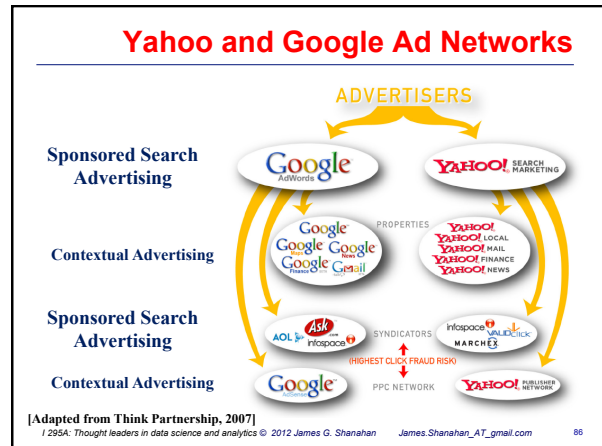
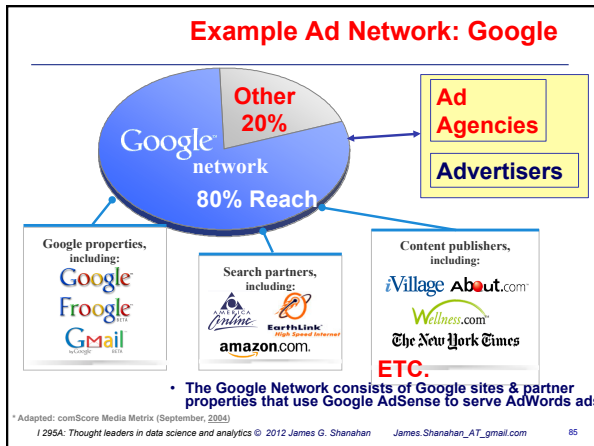
- Key function is the aggregation of ad space **supply** from publishers and matching it with advertiser **demand**.
 - Aggregate webpage space where online ads can be embedded and, in addition, providing both targeting and auctioneering capabilities.
- Ad networks were one of the first big directions taken to make this traditional market economy more efficient
 - they took an economy of scale tack creating a huge marketplace that aggregated the supply of ad space from publishers
 - Advantage for advertisers
 - increased reach, reduced (economy of scale) pricing, reduced media-buyng effort, targeting and analytics.

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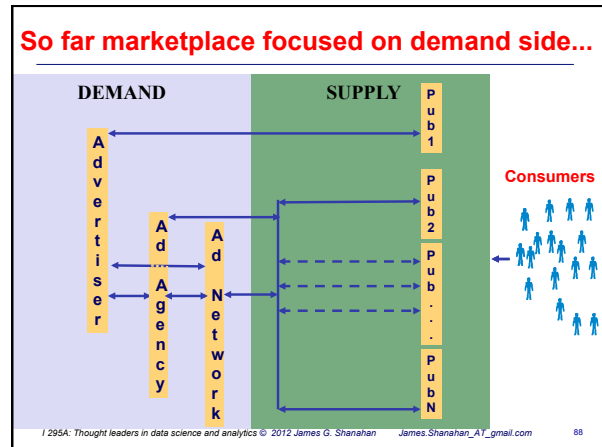
Ad Network: Optimize ROI and Revenue

- Their sole objective
 - Optimize ROI for the advertiser and revenue for the ad network.
- Today over 350 ad networks
 - Some of the bigger ad networks include Google, Yahoo, and Microsoft.
- DoubleClick (acquired by Google in 2007) was one of the first online ad networks, 1996-97 [<http://en.wikipedia.org/wiki/DoubleClick>].

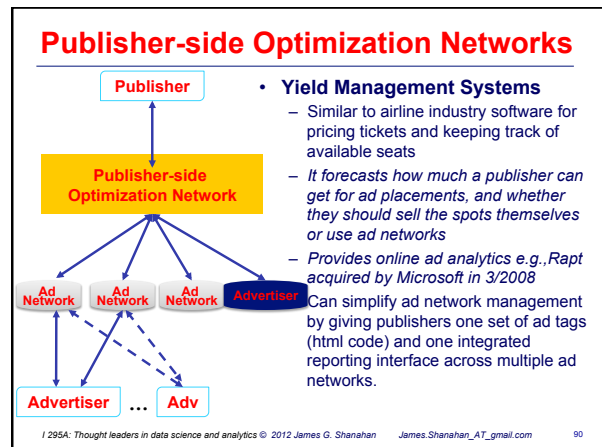
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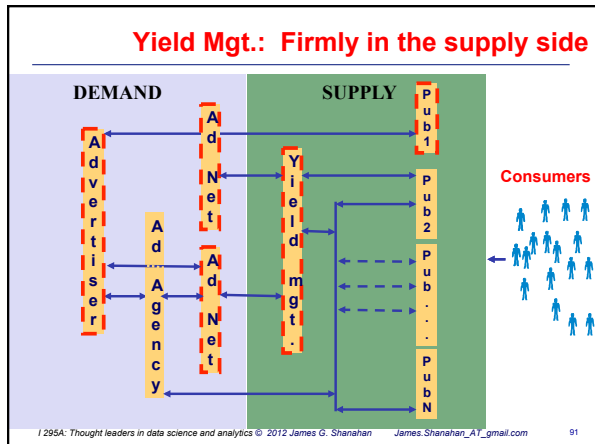


- ### 3rd Generation
- **New more efficient market places**
 - Ad Exchanges
 - Data exchanges
 - **More intuitive demand and supply systems loaded with analytics and optimizations**
 - Demand side platforms
 - Better Yields (yield mgt)
 - **Audience-based targeting**
 - **Mobile, Social**
 - **Very complex pipeline**
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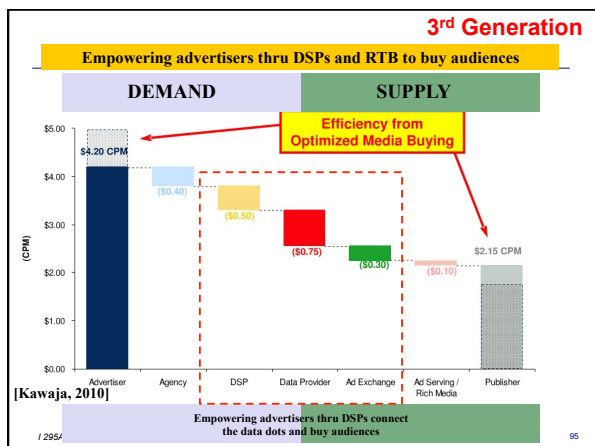
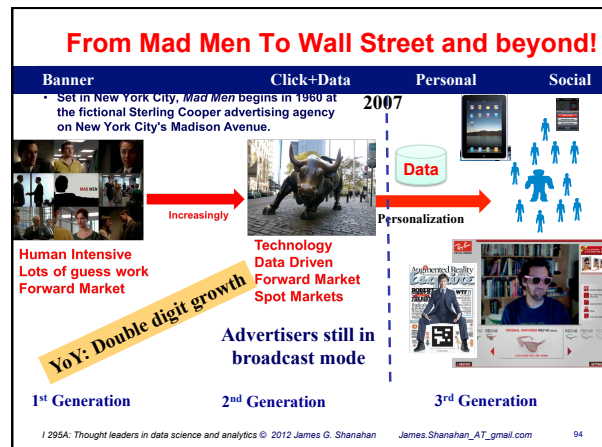
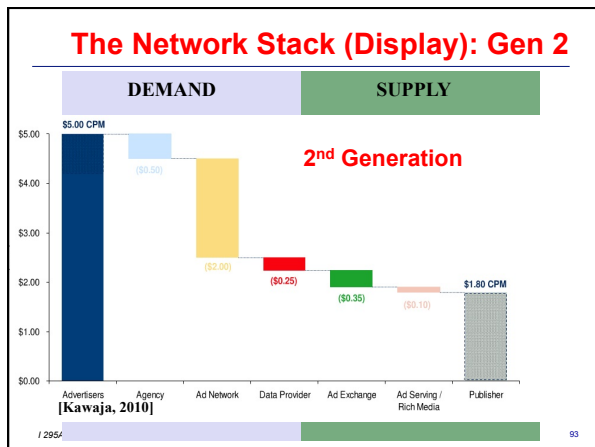


- ### Publisher side: Yield Management
- **Yield management, also known as revenue management**
 - **The process of understanding, anticipating and influencing consumer behavior in order to maximize revenue or profits from a fixed, perishable resource**
 - such as airline seats or hotel room reservations;
 - **The challenge is to sell the right resources to the right customer at the right time for the right price.**
 - **This process can result in price discrimination, where a firm charges customers consuming otherwise identical goods or services a different price for doing so**
 - Airline ticket: refundable; change fees; Saturday night stay
- [Wikipedia.org]
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- ### As a publisher I can sell inventory...
- **As a publisher (e.g., NYTimes, Google, MS) sell directly**
 - Sell my inventory directly; let advertiser's (or advertiser surrogates) reserve with guaranteed payments [Premium pricing]
 - Remnant inventory; Low-cost advertising space that can be relatively undesirable or otherwise unsold (usually sell as revenue share)
 - **Via Publisher-side Optimization networks (Yield Managers)**
 - Work directly with publishers; E.g., Pubmatic, Rubicon, AddKick
 - Select advertiser/network that offers best revenue
 - **Via Ad Exchanges (e.g., RightMedia.com, AdECN, AdX)**
 - Remnant; Media aggregators with auction and primitive exclusion policies (e.g., no alcohol ads, may provide category of page/site)
 - **Via Ad networks (e.g., Google, Yahoo.com, Rocket Fuel)**
 - Arbitrage and remnant;
 - Media aggregators and advertiser aggregators with targeting and auction mechanism
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- ### Demand side: The Media Buyer's nightmare
- (especially for trafficking display campaigns)
 - In the past, if this media buyer (on behalf of the advertiser or agency) wanted to buy media, they would work with a provider like Right Media, ValueClick, Google or one of the tens of thousands of publishers and ad networks out there.
 - Ad buys were achieved by either inputting rules-based buying instructions on various fragmented interfaces, working with an account rep, or using an API to communicate with an ad server.
 - Once these buying instructions were defined, a provider would serve an ad, and make a buy, when an impression occurred on that particular network or site fit within the defined criteria.
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The Media Buyer's Nightmare: optimizing

- **Media buyer would analyze, optimize**
 - Buyers could then login to run reports, optimize campaigns or make minor tweaks and changes. Media buyers (and their clients) who needed mass impression inventory would have to perform this task over dozens, if not hundreds, of sources to achieve scale, since in this highly fragmented space no provider has a dominant share of the inventory.
- **A big agency could work with as many as a thousand digital media vendors when you count the publishers, exchanges, ad networks, and intermediaries.**
 - Suddenly, buyers were logging into numerous interfaces, pulling and collating disparate reports and are left trusting dozens of black boxes to run their ads in the right places. Very simply, the fragmentation in the display space made digital media buying a nightmare.
 - Moreover, the vendor was in control of where the ads ran, which inhibited transparency and targeting for the buyer.

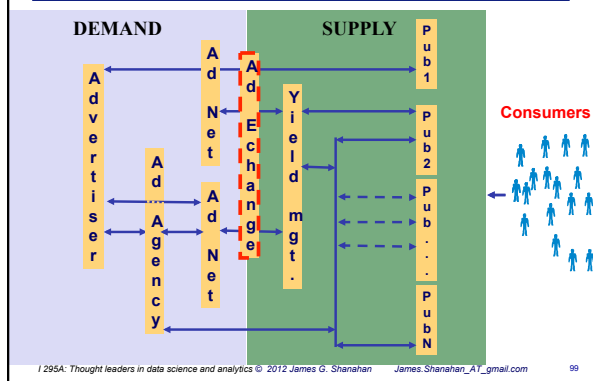
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Real-Time Bidding (RTB) Exchanges

- **RTB changes the media buyer's nightmare.**
- **Instead of each individual media buyer having to learn and rely on a incongruous collection of their vendors' ad software, they can instead use a single DSP (defined in a moment) to manage buying all in one place.**
 - This (DSP) single platform aggregates multiple inventory sources, making it possible to target very narrowly defined audience segments at scale using a single standard without fear of overlap.
 - Buyers can now use data they have collected and developed about their customers' target users and communicate with those users directly as individuals.
- **The modes of buying shift from targeting inventory sources to targeting individual users, and in turn, audiences.**

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Ad Exchange: auctioneer-centric marketplace



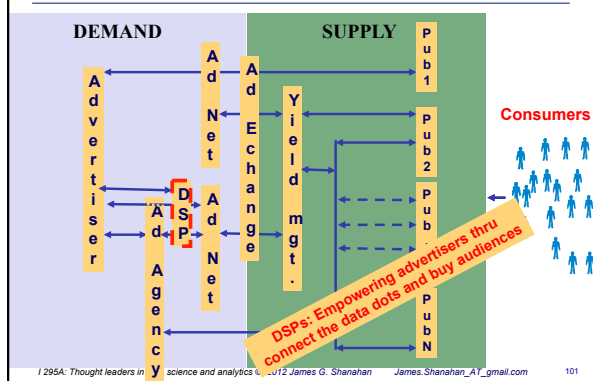
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Demand Side Platform (DSP)

- **At its core, a DSP is software for transparent automated media buying across multiple sources using unified targeting, data, optimization and reporting.**
- **Empowering advertisers thru DSPs connect the data dots and buy audiences**

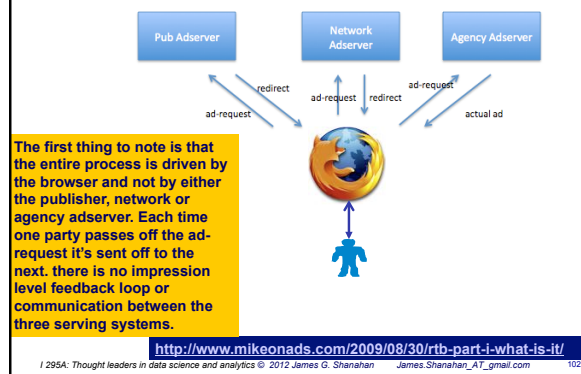
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User Browses a Webpage



<http://www.mikeonads.com/2009/08/30/rtb-part-i-what-is-it/>
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Real time Bidding

```

    graph TD
      Pub[Pub Adserver] -- ad-request --> NA1[Network Adserver-1]
      Pub -- ad-request --> NA2[Network Adserver-2]
      NA1 -- price --> Pub
      NA2 -- ad-request --> DSPs
      DSPs -- actual ad --> Pub
      Pub -- redirect --> User((User))
  
```

- Previously the ad gets served in real-time - as soon as the page is opened by the end user. For the most part, it's been a "futures" or "reserved" world to-date where buyers of online display ad media bid on publisher placements in the future.
- And, the advertiser must blindly trust, for example, that certain targeting parameters for any buy are implemented correctly by the selling publisher or ad network.
- What RTB will enable with ad networks and exchanges is:
 - The purchase of individual impressions using the "buy" side's data to analyze the impression and bid accordingly in real-time.
 - The optimization of real-time bidding using real-time conversion data.

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Ad Exchanges: a new SD Marketplace

- **The ad exchange is a real time marketplace**
 - with an auction-based system where the participants - advertisers and publishers - transact on a common platform to purchase and sell online graphical advertising.
- **Currently, publishers sell remnant inventory**
 - on the exchange for advertisers to purchase through bidding on a user-friendly interface.
- **Ad Exchanges do not compete with ad networks**
 - targeting technologies, or publishers, but rather serve as a more efficient way for the exchange of inventory within these groups
- **Googles acquired DoubleClick, Yahoo acq RightMedia, etc.. \$11 in M&A in 2007**

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Why Ad Exchanges?

- **No discrimination (everyone can play almost)**
 - Elimination of intermediaries and their margins
 - Interests of smaller niche players safeguarded as existing relationships and budget sizes exert no influence and each bidder has equal access to the media
- **More efficient**
 - Transparent and dynamic pricing landscape due to open bidding process
 - Reduced operational friction due to improved clarity of placement of ad serving on a website
 - Enhanced efficiency due to simplification and standardization of business processes
- **Improved liquidity of ad inventory**
- **Increased role of technology to automate and provide a common platform**

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DSPs Ties it all together

- **A DSP needs to be able to connect to many different inventory sources to create a huge pool of inventory of tens of billions of impressions a day.**
 - Most likely this involves using RTB or some other solution where the DSP can see the impression without the requirement to buy it.
- **The DSP must be able to provide global frequency capping across all the inventory sources**
- **The DSP should provide unified optimization, analytics, reporting and impression attribution. This is one of the most valuable pieces to a good DSP.**
- **The DSP should enable its users to leverage 1st, 2nd and 3rd party data across the entire pool of impressions.**
 - This means that clients should be able to map their user data, work with the DSP's data and buy third party data. This data should be usable in highly complex multivariate targeting routines.

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DSPs Ties it all together

- A DSP should be completely transparent in all aspects of the media and data buying process.
- There should be an interface that enables the buyer to manage all of their campaigns and transparently see costs, data, sites, conversions and impression attribution.
- The DSP should have cookie mapping and data sharing systems in place to enable integrations with third party data suppliers, agency data, analytics companies and client data. This process should be possible both on and off line.
- There should be no conflicts that would cause the DSP to do anything not in the best interests of its clients. This includes data, publishers, partners and exchanges.

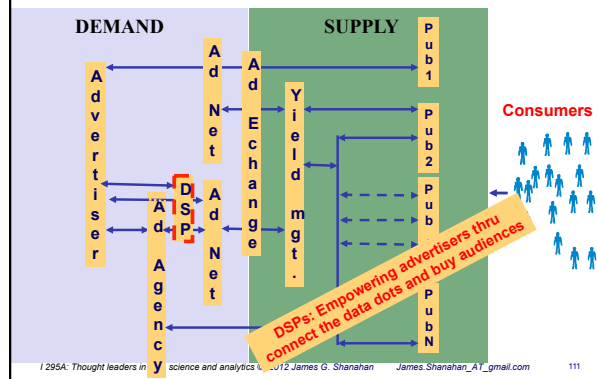
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DSPs Provides Analytics and Decisioning

- DSPs generally calculate the value of each impression in real-time individually relative to the various characteristics of the impression.
- This process enables efficient and effective media buying.

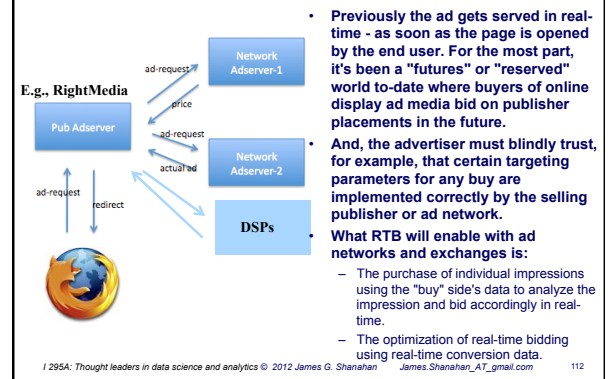
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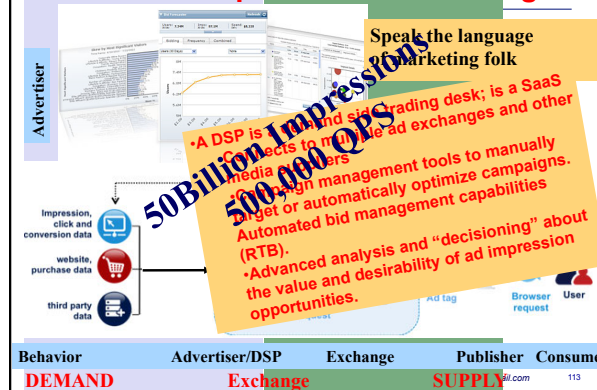
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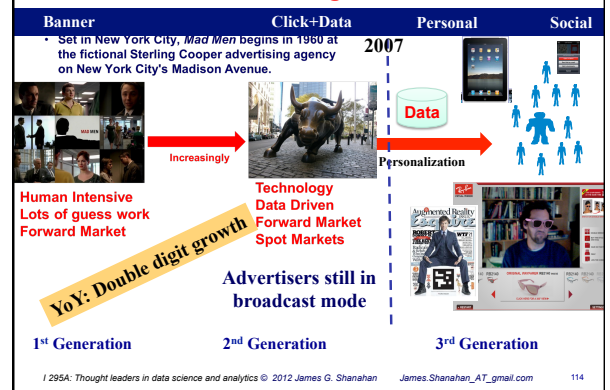
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Demand side platform <-> Exchanges



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Social Advertising: A new Generation?



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- **End of Lecture**