

# Introduction to Computational Advertising

MS&E 239

Stanford University

Autumn 2011

Instructors: Dr. Andrei Broder and Dr. Vanja Josifovski  
Yahoo! Research

# General course info

- Course Website: <http://www.stanford.edu/class/msande239/>
- Instructors
  - **Dr. Andrei Broder**, Yahoo! Research, [broder@yahoo-inc.com](mailto:broder@yahoo-inc.com)
  - **Dr. Vanja Josifovski**, Yahoo! Research, [vanjaj@yahoo-inc.com](mailto:vanjaj@yahoo-inc.com)
- TA: **Krishnamurthy Iyer**
  - Office hours: Tuesdays 6:00pm-7:30pm, Huang
- Course email lists
  - Staff: [msande239-aut1112-staff](#)
  - All: [msande239-aut1112-students](#)
  - Please use the staff list to communicate with the staff
- Lectures: 10am ~ 12:30pm Fridays in HP
- Office Hours:
  - After class and by appointment
  - Andrei and Vanja will be on campus for 2 times each to meet and discuss with students. Feel free to come and chat about even issues that go beyond the class.

# Course Overview

1. 09/30 Overview and Introduction
2. 10/07 Marketplace and Economics
3. 10/14 Textual Advertising 1: Sponsored Search
4. 10/21 Textual Advertising 2: Contextual Advertising
5. 10/28 Display Advertising 1
6. 11/04 Display Advertising 2
7. 11/11 Targeting
8. 11/18 Recommender Systems
9. 12/02 Mobile, Video, and other Emerging Formats
10. 12/09 Project Presentations

# Lecture 9: Emerging advertising formats: mobile, social, coupons, games ...

This lecture is mostly “observational”

# Disclaimers

- This talk presents the opinions of the authors. It does not necessarily reflect the views of Yahoo! inc or any other entity.
- Algorithms, techniques, features, etc mentioned here might or might not be in use by Yahoo! or any other company.
- These lectures benefitted from the contributions of many colleagues and co-authors at Yahoo! and elsewhere. Their help is gratefully acknowledged.

# Plan for today

1. Mobile advertising (60 min)
2. Student preso (15 min)
3. Break
4. Student preso (15 min)
5. Social advertising

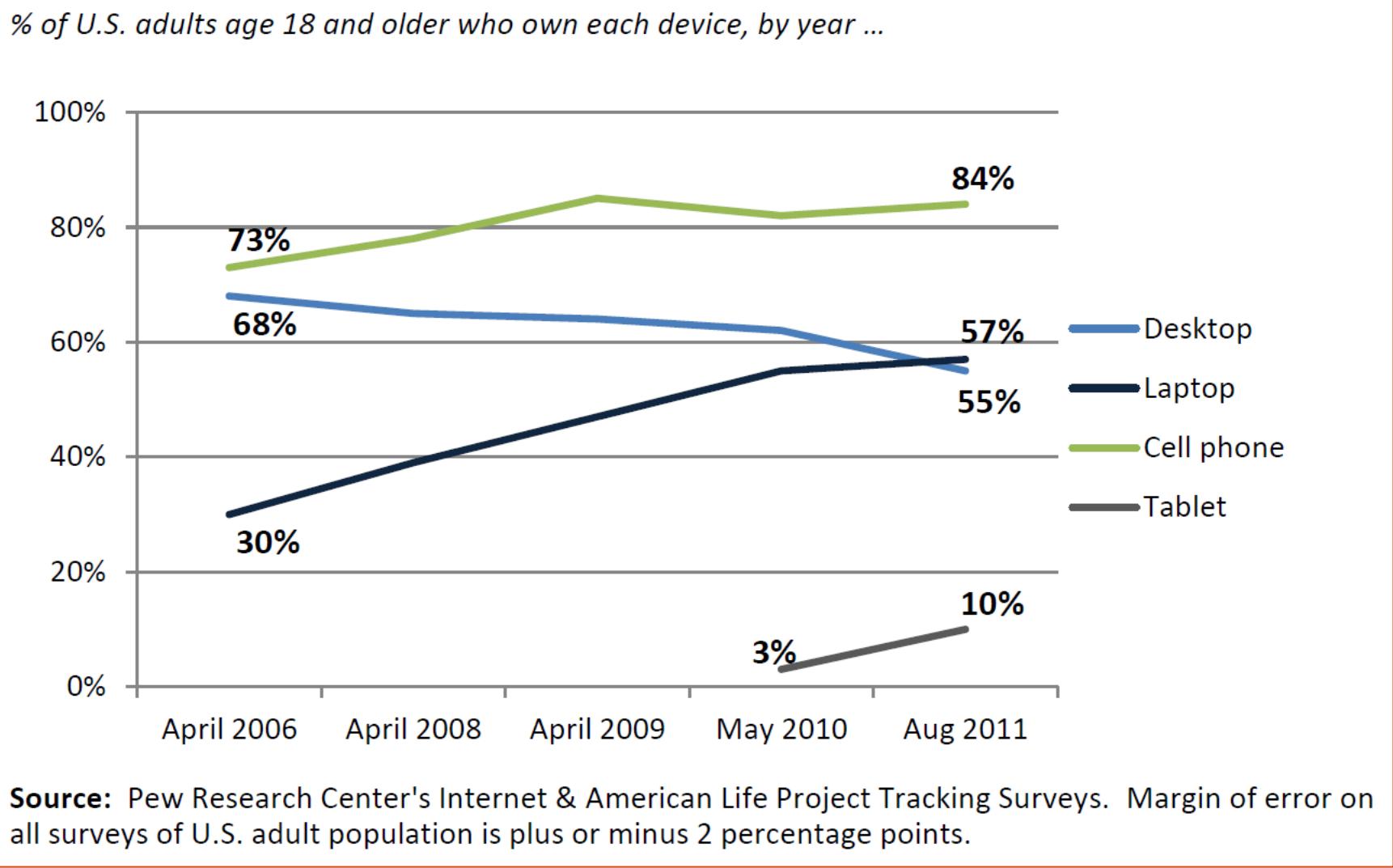
# Mobile Advertising

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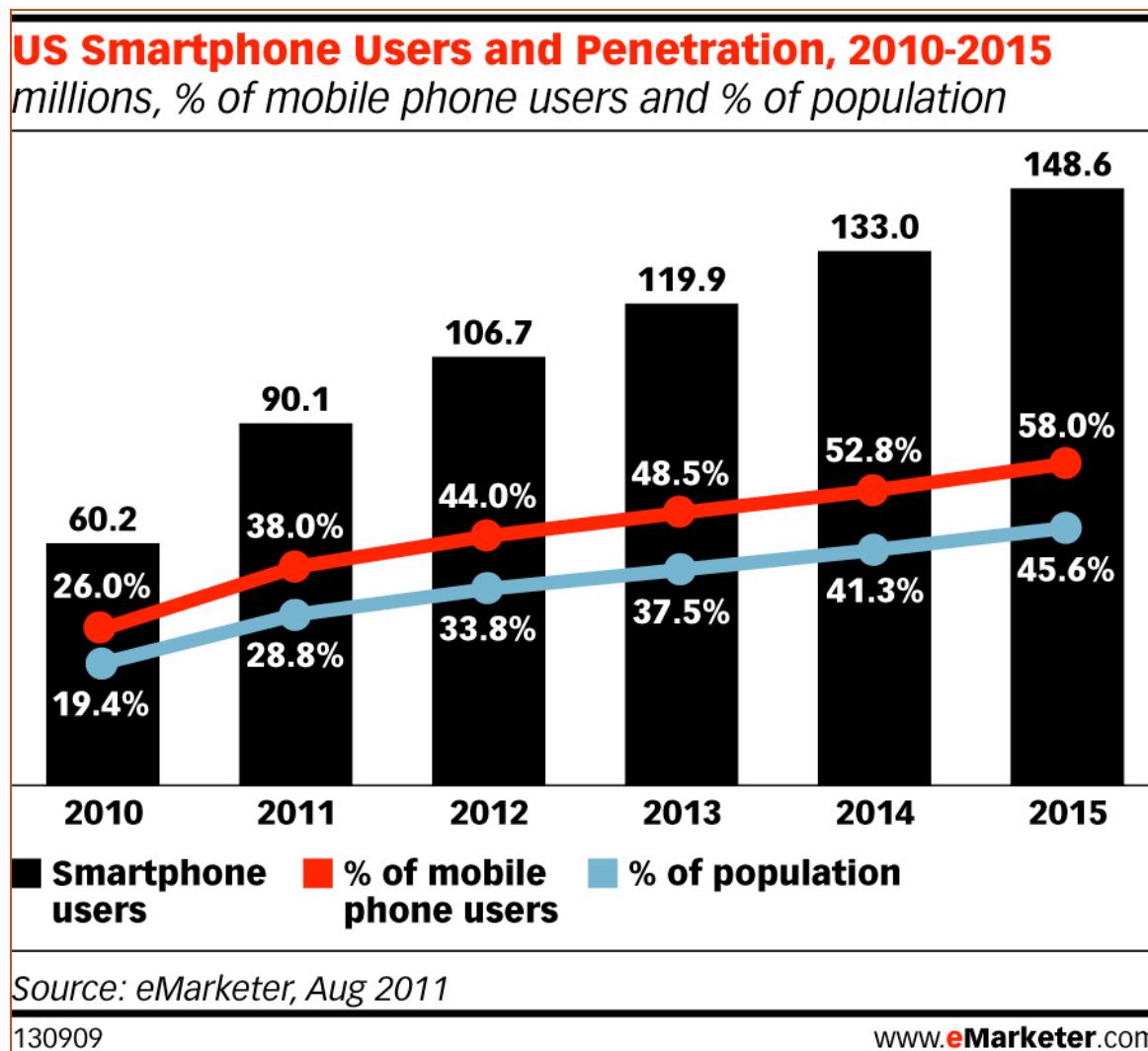
# Example of mobile advertising



# Why mobile advertising is important?



# Smartphone penetration



# Mobile advertising formats

## 1. Messaging

- SMS (a.k.a. texting) = Short Message Service (potentially interactive)
- MMS = Multimedia Message Service (potentially interactive e.g. Motorola at House of Blues )

## 2. Display

- Idle screen
- Embedded
  - In an application
  - In game

## 3. Search driven

- Branded (Google, Yahoo!, etc)
- White label (“Provided” by the telecom)

## 4. Video

## 5. Gray areas

- Browse driven (drop-down menus)
- Mobile coupons
- Etc.

# US mobile ad spending by format

## US Mobile Ad Spending, by Format, 2010-2015

millions and CAGR

	2010	2011	2012	2013	2014	2015	CAGR
Messaging	\$327.3	\$442.6	\$508.3	\$560.2	\$612.0	\$633.0	14%
Banners and rich media	\$202.5	\$376.4	\$594.8	\$883.2	\$1,207.1	\$1,600.0	51%
Search	\$185.0	\$349.4	\$594.8	\$908.4	\$1,291.6	\$1,767.1	57%
Video	\$28.3	\$57.6	\$104.5	\$171.6	\$270.5	\$395.6	69%
<b>Total</b>	<b>\$743.1</b>	<b>\$1,226.1</b>	<b>\$1,802.4</b>	<b>\$2,523.3</b>	<b>\$3,381.3</b>	<b>\$4,395.7</b>	<b>43%</b>

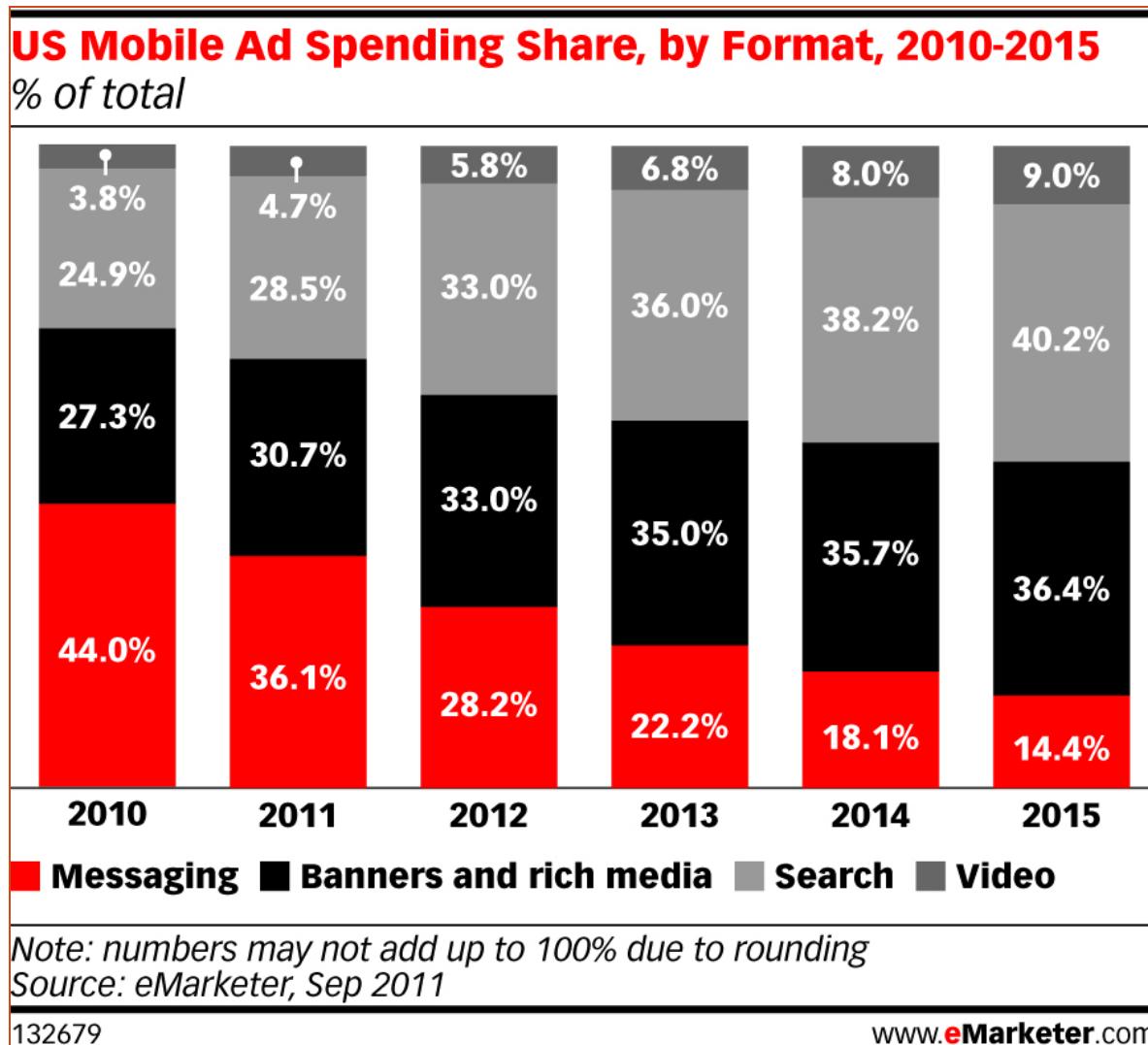
*Note: numbers may not add up to total due to rounding*

Source: eMarketer, Sep 2011

132677

[www.emarketer.com](http://www.emarketer.com)

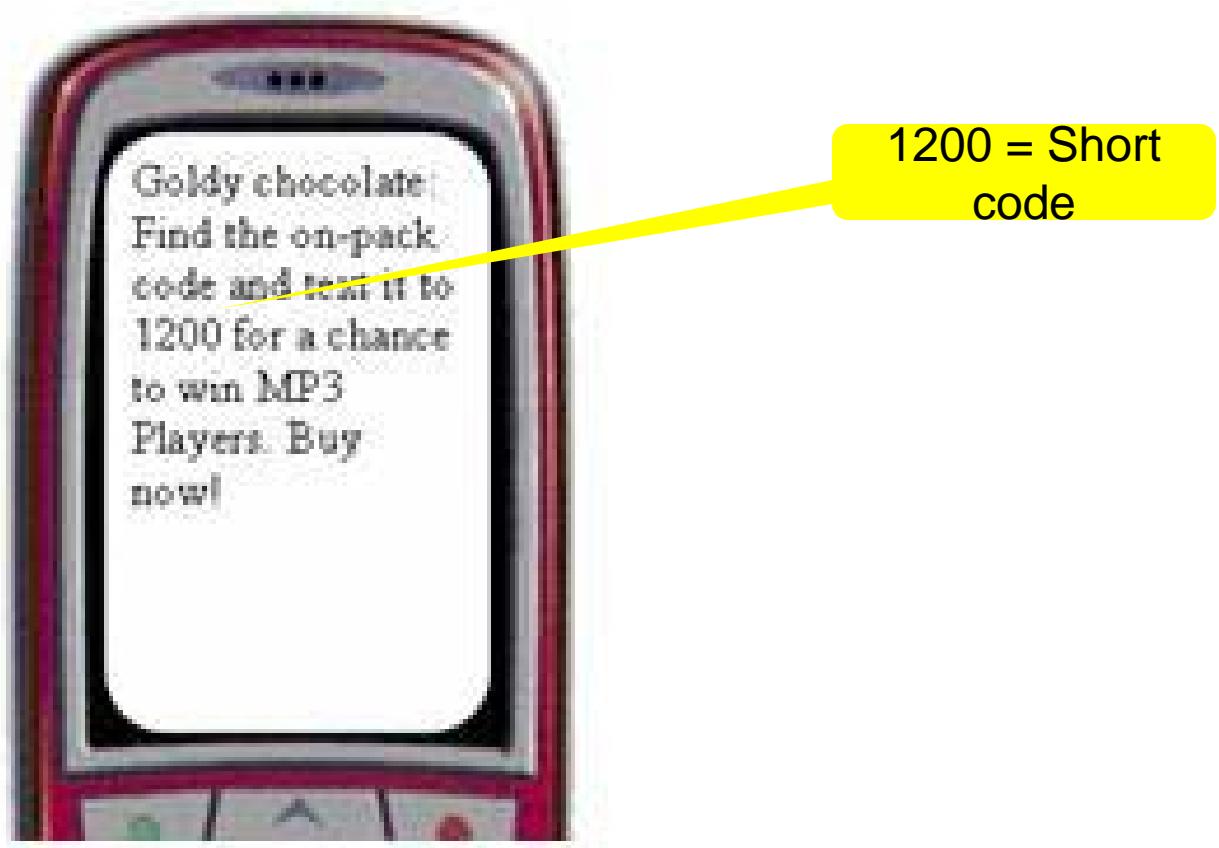
# Spending by format



# Messaging

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# Example of SMS ad



From: Drossos & al: Determinants of Effective SMS Advertising: An Experimental Study, JIAD, 2007.

# Payment types

- CPM type
  - Pay per impression (possible auction)
- CPC type
  - Pay per “reply” → Ad asks you to text something  
e.g. “More info” in reply to SMS
  - Pay per click → Ad contains some URL
  - Pay per call → ad contains some phone number  
that can be dialed

# Example (from zeepmedia.com)

The screenshot shows the Vibes website interface. At the top, there's a navigation bar with 'Vibes' logo, 'Hello, Create an Account or Sign In', and four menu items: 'Welcome' (highlighted in grey), 'How it Works', 'Features & Benefits', and 'My Account'. Below the navigation, a large section title 'Insert an SMS ad' is displayed. A descriptive text follows: 'Reach an engaged, on-the-go mobile audience and only pay when someone responds to your ad.' To the right, a large blue arrow points from a text box containing 'First, write your ad' and instructions to a smartphone screen displaying an inbox message. The smartphone screen shows an 'INBOX' with '1 New' message: 'Today's Weather Alert by YourWeather.com: Sunny and Warm'. Below the inbox, another message reads 'Sign up for MS&E 239!'. To the right of the phone is a cartoon character holding a smartphone.

Vibes

Hello, Create an Account or Sign In

Welcome How it Works Features & Benefits My Account

## Insert an SMS ad

Reach an engaged, on-the-go mobile audience and only pay when someone responds to your ad.

**First, write your ad**  
We'll place it at the bottom of SMS messages.  
Next, you'll choose how people can respond to your ad.

Sign up for MS&E 239!

Now, choose your ad type.

INBOX 1 New

Today's Weather Alert by YourWeather.com: Sunny and Warm

Sign up for MS&E 239!

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# Example (cont)

## Ad Text

5 to 30 characters – Currently 22

Sign up for MS&E 239!



When a recipient replies MORE, we'll send them a new message with more information.

## More Information

10 to 160 characters – Currently 93

Fantastic class! Don't forget to vote for Andrei & Vanja as the best teachers in the world!



## Ad Preview

SMS Message Received  
By Subscriber

Sign up for MS&E 239!  
Reply MORE for info.

## More Info Preview

Tell  
INBOX 1 New

Fantastic class! Don't forget to vote for Andrei & Vanja as the best teachers in the world!

# Conventional marketing using SMS



Photograph © [www.tatango.com](http://www.tatango.com) SMS marketing blog

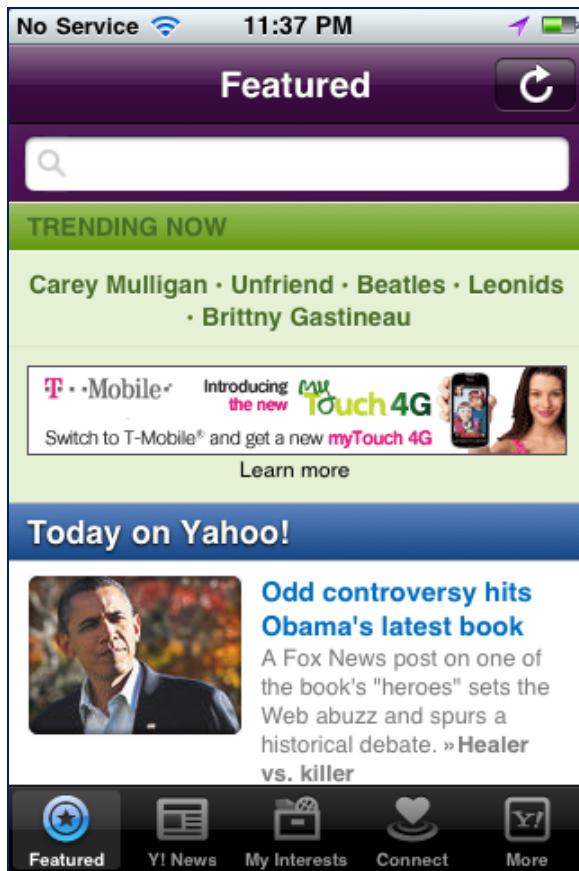
NB: This type of ads on billboards might be banned soon!

# Display

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# Display ads – embedded/in app

## Yahoo News

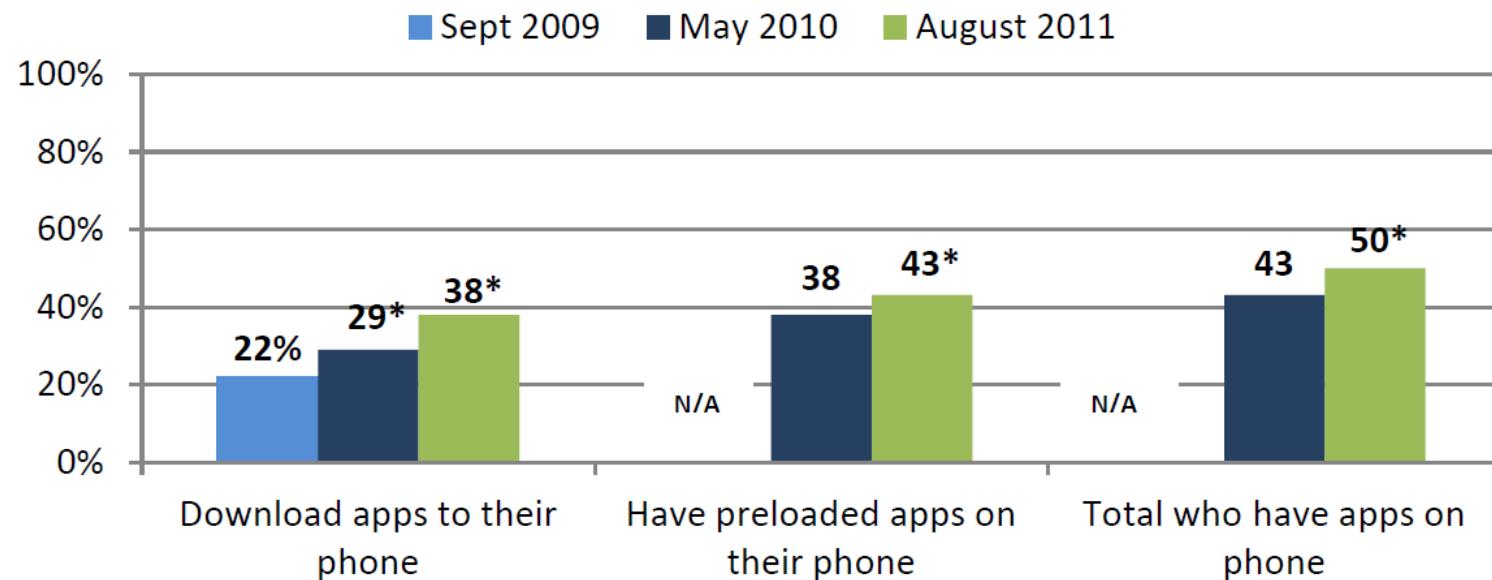


## New York Times



# App penetration

% of U.S. adult cell phone owners in each year who...



**Source:** Pew Research Center's Internet & American Life Project, July 25-August 26, 2011 Tracking Survey. N=1,948 cell phone owners, margin of error is plus or minus 2.6 percentage points. Interviews conducted in English and in Spanish. May 2010 figures from April 29-May 30, 2010 Tracking Survey. N=1,917 cell phone owners, margin of error is plus or minus 2.7 percentage points. Interviews conducted in English only. September 2009 figures from August 18–September 14, 2009 Tracking Survey. N=1,868 cell phone owners, margin of error is plus or minus 2.7 percentage points. Interviews conducted in English only. An asterisk (\*) indicates a significant difference across years at the 95% confidence level.

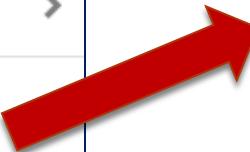


# In app advertising: AroundMe

No Service 11:21 PM

AroundMe

- Apple Retail Stores >
- Banks/ATM >
- Bars >
- Coffee >
- Favorites >
- Gas Stations >
- Hospitals >
- Sharon Park Dr - Menlo Park



No Service 11:20 PM

AroundMe Banks/ATM Show Map

**American Express—Savings**  
CDs & High Yield Savings Accounts. Competitive Rates, No Minimums. AmericanExpress.com/PersonalSavings Ad by Google

**Wells Fargo** 230 yd >  
325 SHARON PARK DR MENL...

**Bank of America** 234 yd >  
2180 Sand Hill Rd Menlo Park

**Square 1 Bank** 459 yd >  
2420 Sandhill Rd #100 Menlo Park

**Elevation Partners LLC** 1 mi >  
2800 Sand Hill Road # 160 Menl...

**Silicon Valley Bank** 1 mi >  
3000 Sand Hill Rd # 3-150 Menl...

**Blood Center Stanford...** 2 mi >  
800 Welch Road Palo Alto

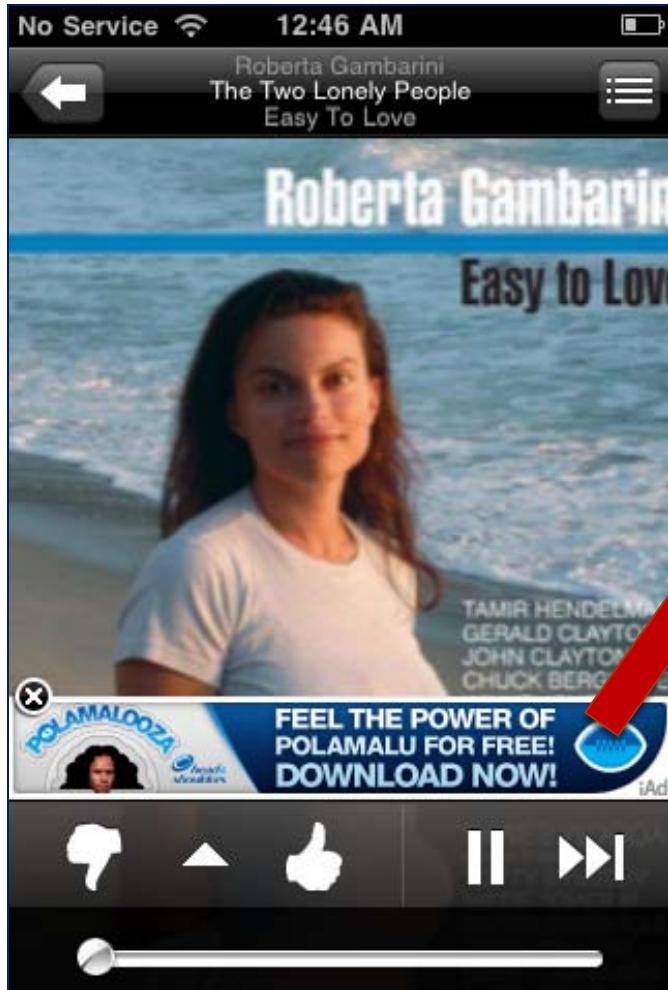
Sharon Park Dr - Menlo Park

# Gray area – paid participation in drop down menus

- Examples
  - What's nearby?
    - Various categories of stores and services (Movies, ATMs, Taxi, etc)
    - Buzzwords:
      - LBS = Location Based Services
      - LBA = Location based advertising
  - Taxonomy
    - Travel needs
  - Storefinder
    - Nearest outlet by brand
- So far no/little personalization, will probably change



# In app: Pandora



From the App Store

**Polamalooza**  
P&G Productions  
Sports  
**FREE**

47 Ratings

It's not a big deal to have a smart phone anymore, but it's a ridiculously big deal to have Polamalooza on your smart phone. Make your man-do fuller and thicker with funny little pictures, track progress for instant smack-talking... [More ▾](#)



SECOND DRIVE

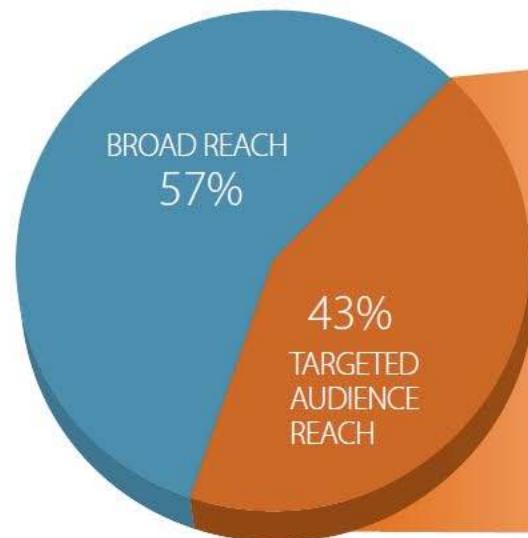
# Polamalooza



# Mostly targeted

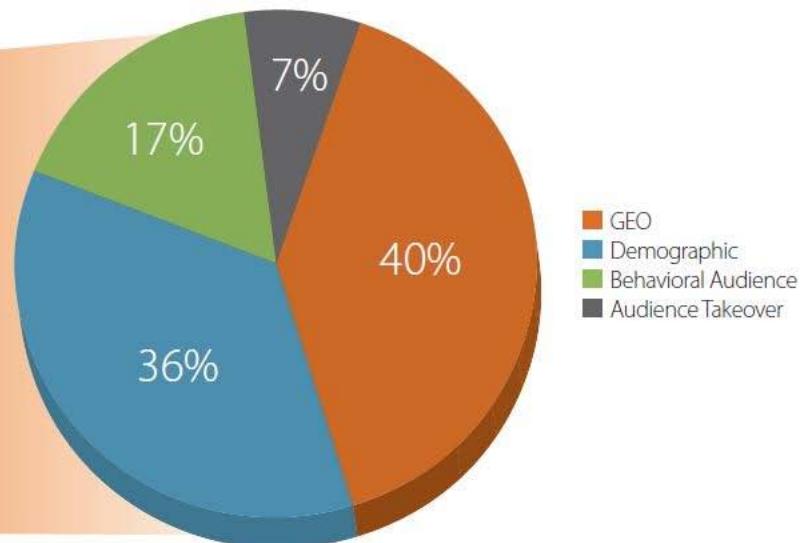
Campaign Targeting Mix – July 2010 Average

CHART A



Targeted Audience Mix – July 2010 Average

CHART B

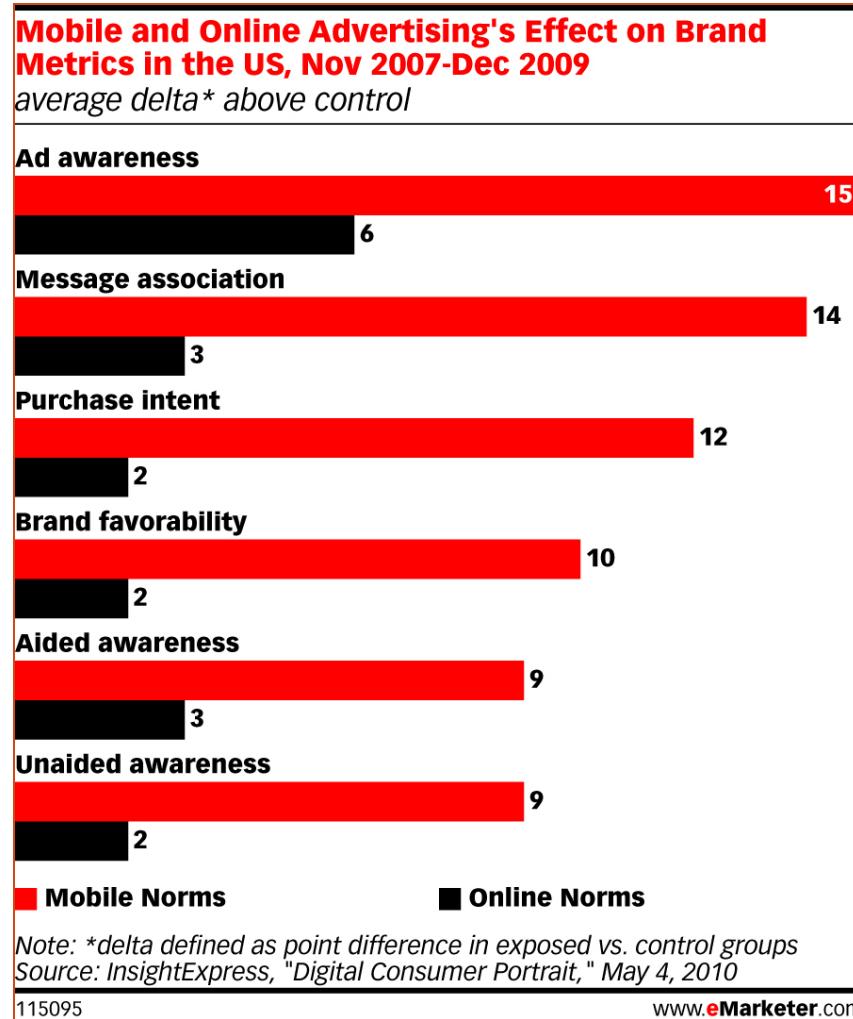


Source: Millennial Media, July 2010, via MarketingCharts.com

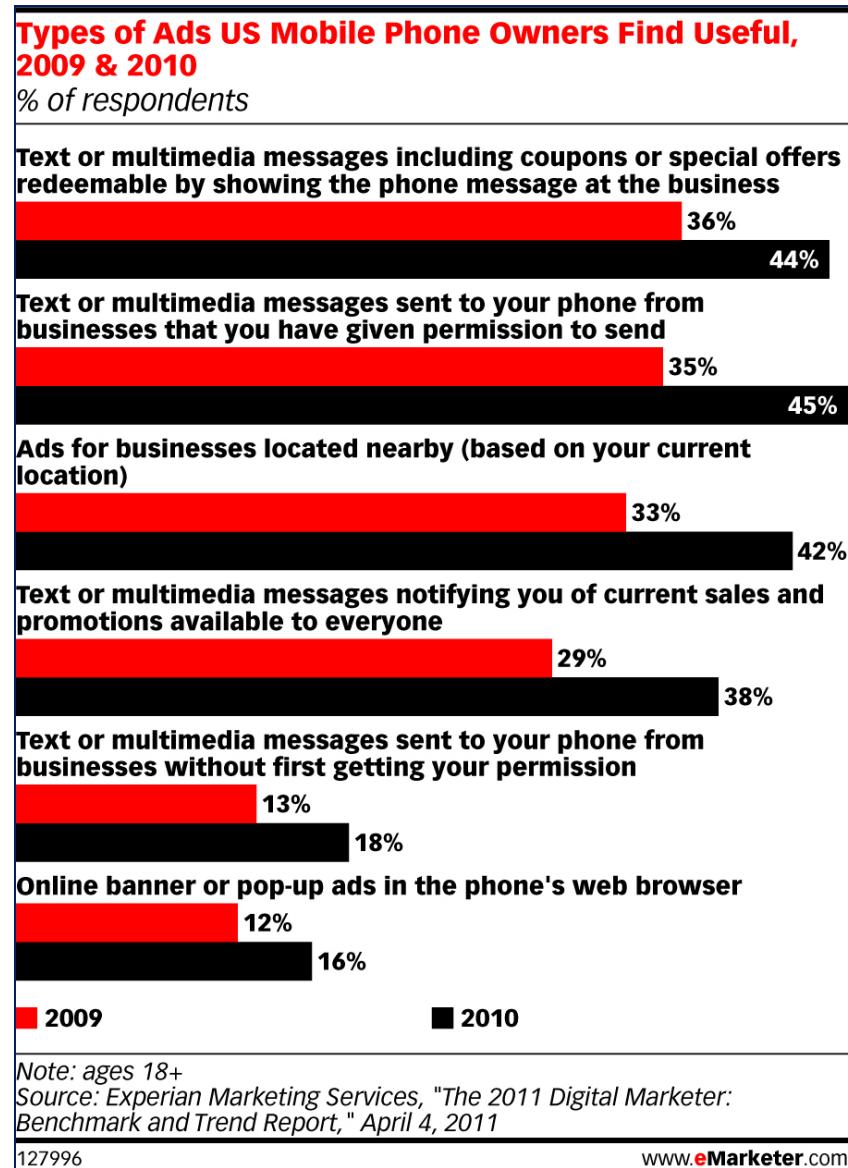
# The consumer point of view

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# Mobile ads are more effective than online ads



# Ads are increasingly viewed as useful



# User activities

## Mobile Content Usage

3 Month Avg. Ending May 2010 vs. 3 Month Avg. Ending Feb. 2010

Total U.S. Age 13+

Source: comScore MobiLens

	Share (%) of Mobile Subscribers		
	Feb-10	May-10	Point Change
Total Mobile Subscribers	100.0%	100.0%	N/A
Sent text message to another phone	63.8%	65.2%	1.4
Used browser	29.6%	31.9%	2.3
Used downloaded apps	27.9%	30.0%	2.1
Played games	21.8%	22.5%	0.7
Accessed social networking site or blog	18.2%	20.8%	2.6
Listened to music on mobile phone	13.1%	14.3%	1.2

# Great user engagement with ads!

According to JWire, Q1 2010:

- Over 50% engaged with an ad seen inside an application within the last 30 days
- Over 18% made a purchase driven by an ad seen within the last 30 days

(Seem high!)

# Coupons & codes

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# Mobile coupons

Credit: <http://www.ccwap.com/>



# Is there a QR code in your future?

- QR Code = two-dimensional bar code created by Japanese corporation Denso-Wave in 1994
- Easy to read with and from smart mobile phones.



**Yahoo! Academic Relations and  
the Stanford EE Computer  
Systems Colloquium Present:**

## **Loopage**

**Douglas Crockford**  
JavaScript Architect  
Yahoo! Inc.



**Date: Wednesday, October 13<sup>th</sup> 2010**

**Time: 4:15pm**

**Location: NEC Auditorium, Gates Computer Science  
Building B03**

Software development is hampered by a specific set of design mistakes that were made in the first programming languages and repeated in everything that has been done since. And, somewhat miraculously, JavaScript is going to make it right, radically transforming the way we write applications. Again. In the Loop of History, it has all happened before, but it has never happened like this.

For a sneak peak at the content of this talk (and five earlier talks), all on the future of JavaScript, see Doug Crockford's blog: <http://yuiblog.com/crockford/>.

**Douglas Crockford** is a senior JavaScript Architect at Yahoo! He is well known for his work in introducing JavaScript Object Notation (JSON). He has also worked on the computerization of media at Atari, Lucasfilm, and Paramount. Crockford was the founder and CEO of Electric Communities from 1993 to 2001, and the founder and CTO of State Software (also known as Veil Networks) from 2001 to 2002. Crockford is the author of JavaScript: The Good Parts ISBN 978-0596517748.



**YAHOO!**

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# QR Codes on TV

## TV ad from BlueFly



# BlueFly landing page



# 2D Code (PDF417?) used as coupon



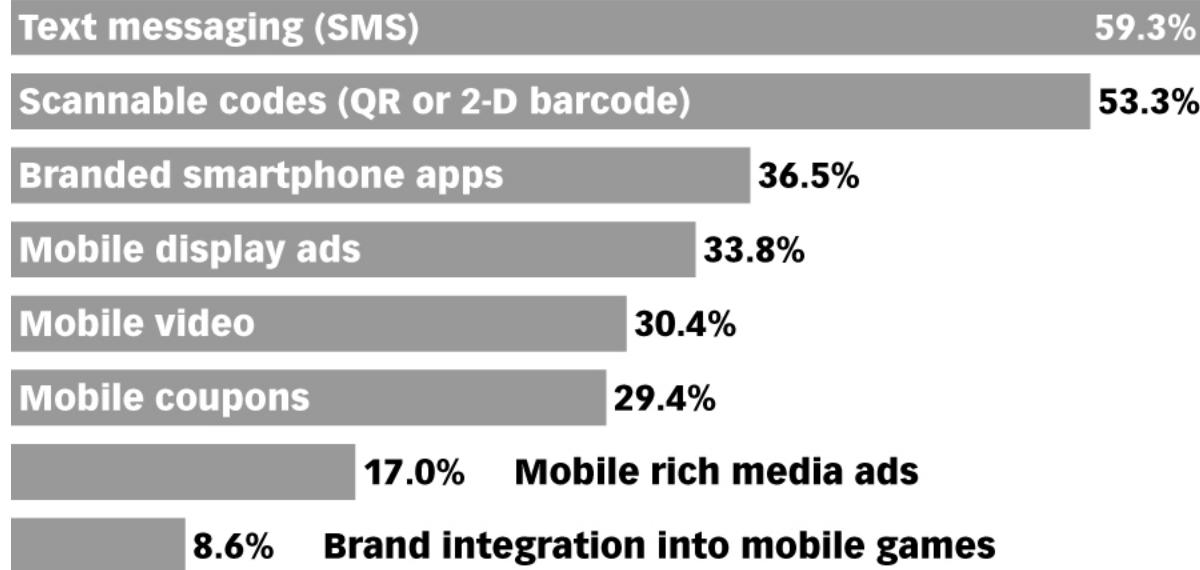
# Mobile coupons use by marketers

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## Mobile Marketing Tactics Used by US Marketers, May 2011

% of respondents

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Source: Chief Marketer, "2011 Mobile Marketing Survey," June 13, 2011

129521

[www.eMarketer.com](http://www.eMarketer.com)

# Consumer usage of mobile coupons

## US Adult Mobile Coupon Users, 2010-2013

	2010	2011	2012	2013
<b>Adult mobile coupon users (millions)</b>	<b>13.3</b>	<b>19.8</b>	<b>28.7</b>	<b>35.6</b>
—% change	90.8%	49.0%	44.8%	24.0%
—% of adult mobile phone users	6.5%	9.5%	13.5%	16.5%

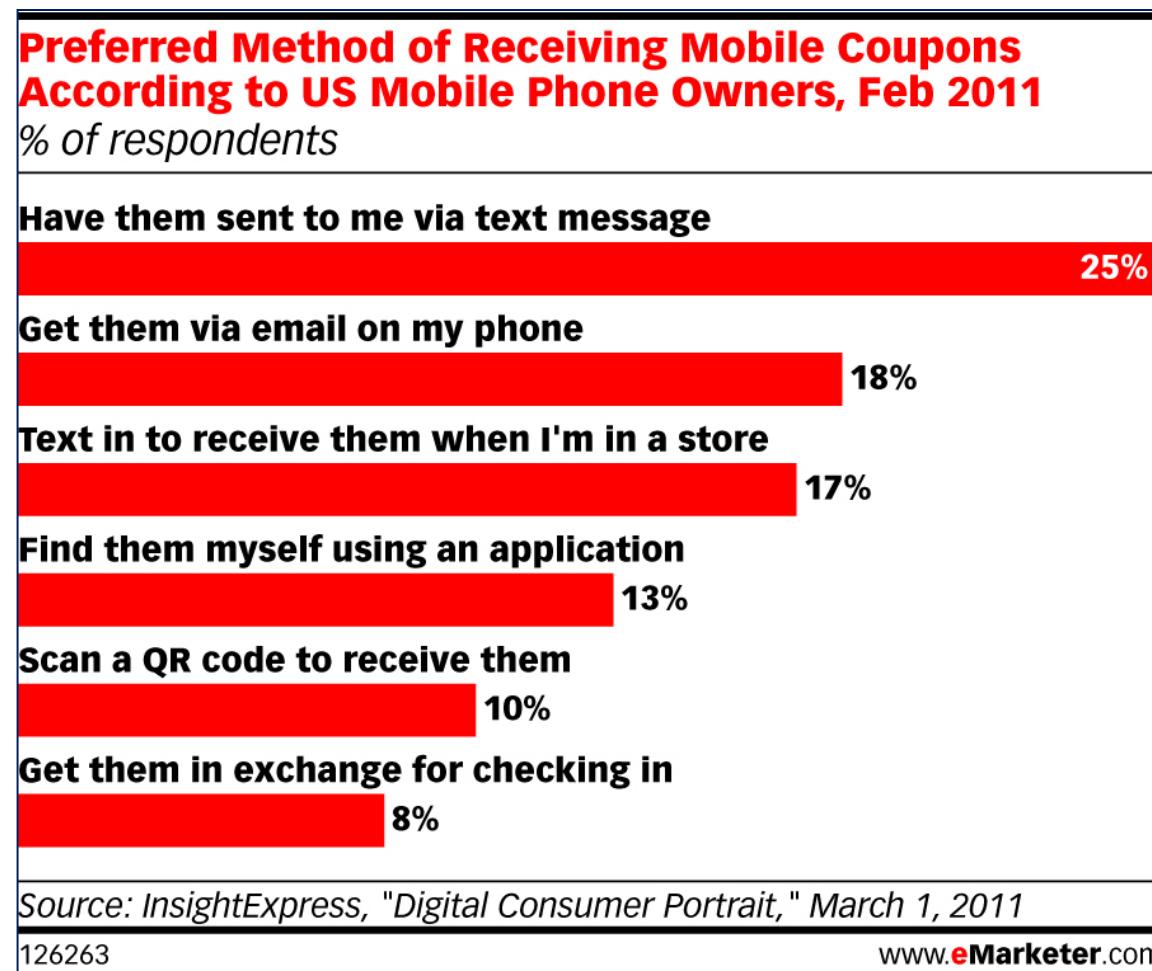
*Note: ages 18+; used mobile phone (includes smartphones) in the past year to redeem coupon/code obtained from SMS, application, mobile internet and/or QR code for online or offline shopping; includes group buying coupons purchased via mobile phone*

*Source: eMarketer, Aug 2011*

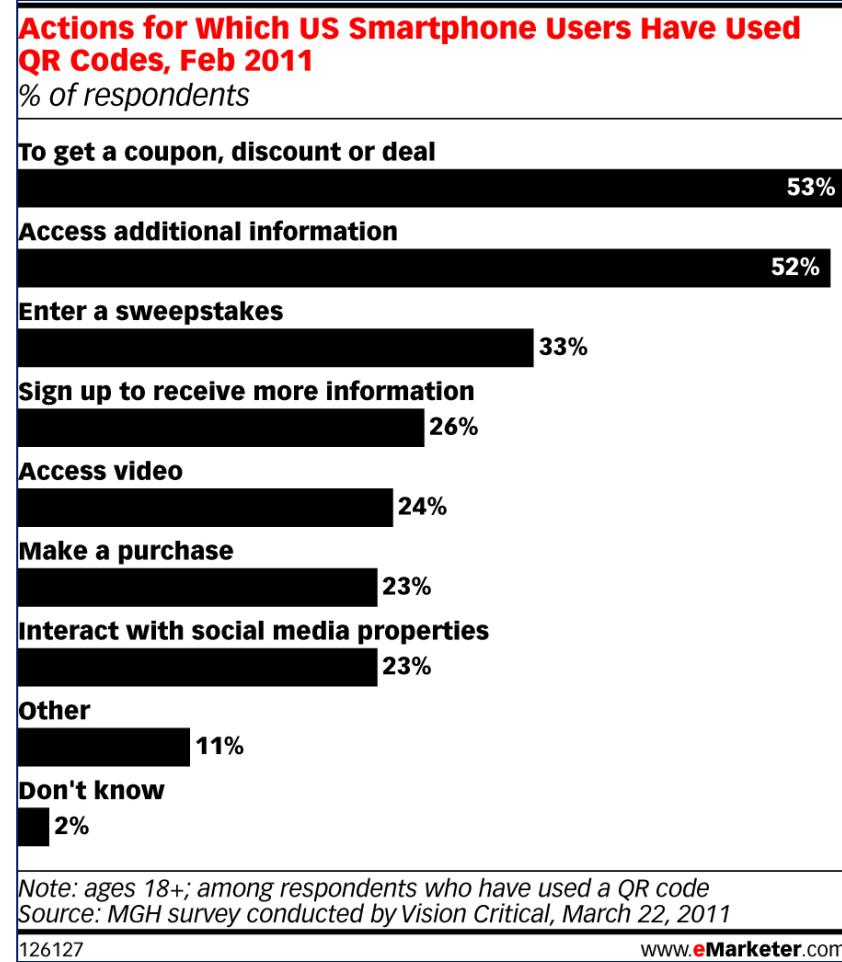
130919

[www.emarketer.com](http://www.emarketer.com)

# Preferred method to get them



# QR Codes



# Back to computational advertising ...

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# Previous lectures: Finding the “best ad” as an IR problem

1. Analyze the “query” and extract query-features
  - Query = full context (content, user, environment, etc)
2. Analyze the documents (= ads) and extract doc-features
3. Devise a scoring function = predicates on q-features and d-features + weights
4. Build a search engine that produces quickly the ads that maximize the scoring function

# Sample features & typical matching approaches

- Query over the ad space
  - Words, meaning, user demographics + interests, language, browser, bandwidth, etc. etc.
- Ad
  - Words, meaning, industry, advertiser, campaign, past performance, economics, etc. etc.
- Search over the ad space
  - Must support wide queries (hundreds of features)
  - Need high efficiency (branch & bound, early termination, etc)
- Ranking
  - Machine learning from very large & noisy logs
  - Explore/exploit

# Specific features (and targeting dimensions) for mobile advertising

- **High precision demographics**
  - Billing address, subscription plan, monthly charges, credit history, SMS habits, etc.
- **Location**
  - Geo (GPS or tower triangulation)
  - Location functionality: Shopping mall, at home, airport, etc
  - Personal context: working, on vacation, etc
- **Social context**
  - Alone, with colleagues, with family, with friends, travelling, ...
  - Who else in your plan,
- **Language**
- **Device model, capabilities, OS, installed apps (?)**,
- **Bandwidth**
- **Operator**
- **Time of day**
- **Speed (walking vs. driving)**
- **Recent history**
- **Page orientation, number of scrolls, etc.**
- **Specific application data (e.g. music tastes)**
- **Etc**

# On-deck vs. off-deck

- “On deck” advertising
  - The publisher is the wireless operator
    - Operator provided content and services
    - Full complement of targeting features
    - Has operator data
    - Might not have interest data
  - “Off deck” advertising
    - Arbitrary mobile web pages
    - Fewer features
    - Might have personal interest data

# Other consideration in the mobile environment

(See w3c initiative <http://www.w3.org/Mobile/> )

- Device limitations (display, colors, processing powers, etc)
- Keep it small
- Use network sparingly
- Help & guide user input (typing is a pain)
  - Predictive text completion
  - Voice input (Provided by all “majors” e.g. <http://mobile.yahoo.com/search/iphone>, [http://www.google.com/mobile/google-mobile-app\\_exp/index.html](http://www.google.com/mobile/google-mobile-app_exp/index.html) and of course Siri <http://www.apple.com/iphone/features/siri.html> )
- Mobile is not miniature web!!

# Web search vs. mobile search

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# Web User Needs – Types of Queries (Lecture 3)

- Type of queries [Brod02, RL04]
  - **Informational** – want to learn about something (~40% / 65%)  
*Swine Flu prevention*
  - **Navigational** – want to go to that page (~25% / 15%)  
*Alitalia US*
  - **Transactional** – want to do something (web-mediated) (~35% / 20%)
    - Access a service
    - Downloads
    - Shop  
*New York weather*
  - Gray areas
    - Find a good hub
    - Exploratory search “see what’s there”  
*Rome hotels*

# Main historical trend in web search

Answer the user query via syntactic matching (matching words) in web pages

Answer the user need via (maybe trivial but effective) semantic match wrt multiple info sources

# Yahoo! 2007: britney spears

Web | [Images](#) | [Video](#) | [Directory](#) | [Local](#) | [News](#) | [Shopping](#)

**YAHOO! SEARCH**

[My Web BETA](#)

Search Results Results 1 - 10 of about 66,800,000

Also try: [britney spears pictures](#), [britney spears lyrics](#) [More...](#)

**Y! Britney Spears Artist Page** - [Downloads](#) - [Videos](#) - [Photos](#) - [Buy CDs](#)  
[Yahoo! Shortcut](#) - [About](#)

1. **[Britney Spears](#)** - [Translate this page](#)  
official site with chat, email, tour information, merchandise, and more.  
Category: [Rock and Pop > Britney Spears](#)  
[www.britneyspears.com](http://www.britneyspears.com) - 2k - [Cached](#) - [More from this site](#) - [Save](#) - [Block](#)
2. **[Britney.com](#)**   
Jive Records' official site.  
Category: [Rock and Pop > Britney Spears](#)  
[www.britney.com](http://www.britney.com) - 10k - [Cached](#) - [More from this site](#) - [Save](#) - [Block](#)
3. **[World of Britney](#)**

# Yahoo! 2009: britney spears

Hi, Guest | Sign In | Help

Make Yahoo! your homepage | Mail

**YAHOO!** Web Images Video Local Shopping More ▾

**britney spears**

Search Options ▾

Search Pad

SearchScan - On

300,000,000 results for **britney spears:**

Show All

Video Sites

... baby  
... news  
... photos  
... rumors  
... lyrics

 Watch Music Videos

**Britney Spears - Official Site**  
[www.britneyspears.com](http://www.britneyspears.com)  
[Albums](#) | [Lyrics](#) | [Photos](#) | [Videos](#)

Play Full-Length Tracks

▶ Circus  
▶ Piece Of Me  
▶ Gimme More  
▶ Break The Ice

More Britney Spears songs

**Britney Spears - News Results**

 WATCH: Britney Spears' New Menage Clip Spin - Oct 30 03:23pm  
[Britney Spears new video for '3': Bring on the leotards!](#)  
New York Daily News - Oct 30 02:11pm  
[Countdown to Britney Spears' "3" Video Is Over](#) E! Online - Oct 30 09:12am  
[More Britney Spears Headlines](#)

**Britney Spears**

Official site for pop star Britney Spears features a blog with the latest news updates about Britney as well as videos, photos, and music posts.

[www.britneyspears.com](http://www.britneyspears.com) - 375k - [Cached](#)

Photos Videos  
Tour Music  
Blog Archives

[more results from britneyspears.com »](#)

**THE CIRCUS STARRING BRITNEY SPEARS 2009 TOUR INFORMATION**

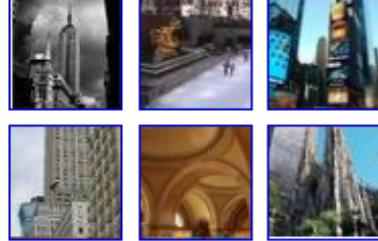
# Google 2009: new york city

Web Images Videos Maps News Shopping Gmail more ▾ Search settings | Sign in

Google new york city Search Advanced Search

Web Show options... Results 1 - 10 of about 201,000,000 for new york city [definition]. (0.17 seconds)

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[New York, NY](#) maps.google.com Sponsored Links  
  


[New York City - Wikipedia, the free encyclopedia](#)  
A leading global city, New York exerts a powerful influence over worldwide commerce, finance, culture, fashion and entertainment. As host of the United ...  
[Lower Manhattan in 1660 - Weather Averages - The Five Boroughs](#)  
[en.wikipedia.org/wiki/New\\_York\\_City](#) - Cached - Similar - Filter

[名人介紹New York city好去處](#)  
想知道New York city名人, 最鍾意去的地方?  
立即到 Google 地圖查看啦!  
[maps.google.com.hk](#)

[New York City.com Hotels](#)  
Save more at the authentic NYC site  
All hotel & Broadway 1-888-VISIT-NY  
[www.newyorkcity.com](#)

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# Bing 2009

## hotels san francisco

Web Images Videos Shopping News Maps More | MSN | Hotmail

Sign in | United States | Preferences

bing™

hotels san francisco

ALL RESULTS ALL RESULTS 1-10 of 44,600,000 results · Advanced

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Historic gr&eur. Minutes to Union Sq. & Fisherman's Wharf. Book now!

[Listings for hotels near San Francisco, CA](#)

1. [Palace Hotel](#) · Website · (415) 512-1111 · [Directions](#)  
2. [Sir Francis Drake Hotel](#) · Website · (415) 392-7755 · [Directions](#)  
3. [Radisson](#) · Website · (415) 392-6700 · [Directions](#)  
4. [Cathedral Hill Hotel](#) · Website · (415) 776-8200 · [Directions](#)  
5. [Phoenix Hotel](#) · Website · (415) 776-1380 · [Directions](#)  
6. [Hotel Rex](#) · Website · (415) 433-4434 · [Directions](#)  
7. [Hotel Del Sol](#) · Website · (415) 921-5520 · [Directions](#)  
8. [Hotel Nikko San Francisco](#) · Website · (415) 394-1111 · [Directions](#)  
[more listings](#)

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[www.sanfrancisco.com/hotels](#) · Cached page

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[Hotels in San Francisco](#)

Smart Accommodations in California Free internet & breakfast bar. [www.hiexpress.com](#)

[See your message here](#)

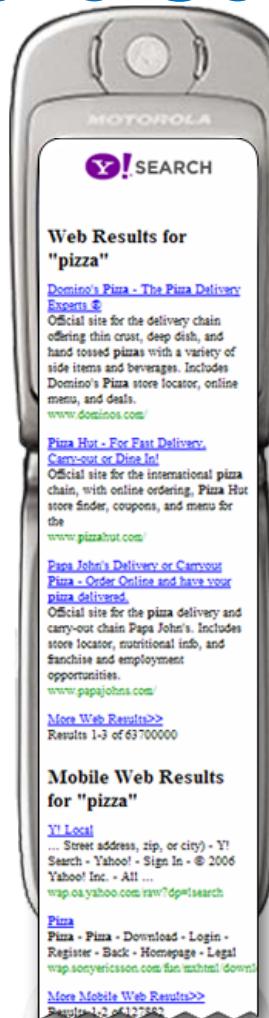
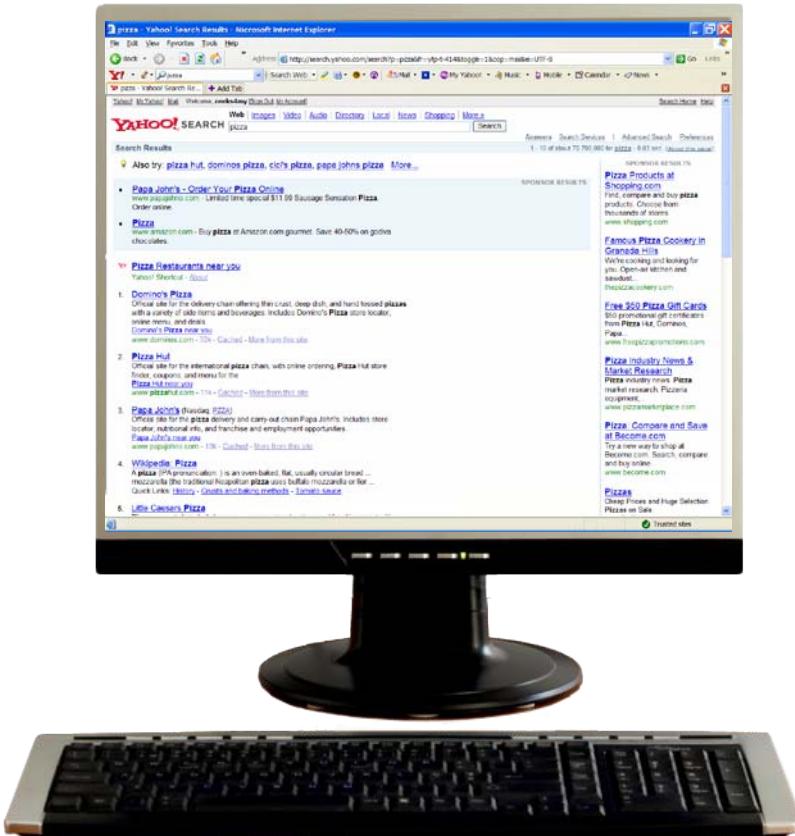


# Mobile Search: Answer consumer's immediate needs

## PC Search



## Mobile Search



# Finding the Right Ad for Sponsored Search – Web vs. Mobile

- Remember our example of advanced match:
  - Suppose your ad is:
    - “Good prices on Seattle hotels”
  - On the web:
    - Can bid on any query that contains the word Seattle
  - Mobile:
    - Can bid on any query made in Seattle by roammers (non-Seattle residents)

# Finding the Right Ad – Web vs Mobile (cont)

- Problems
  - **Web**: What about query “Alaska cruises start point”?
  - **Web**: What about “Seattle's Best Coffee Chicago”
  - **Mobile**: What about a query made from inside Seattle Sheraton hotel?
- Some better targeting possibilities
  - **Web**: Bid on any query related to Seattle as a travel destination (**hard!**)
  - **Mobile**: Bid on any query made by a roamer in the first two hours after arrival at Seattle airport (**easy! – with the right info**)

# Disruptive technologies

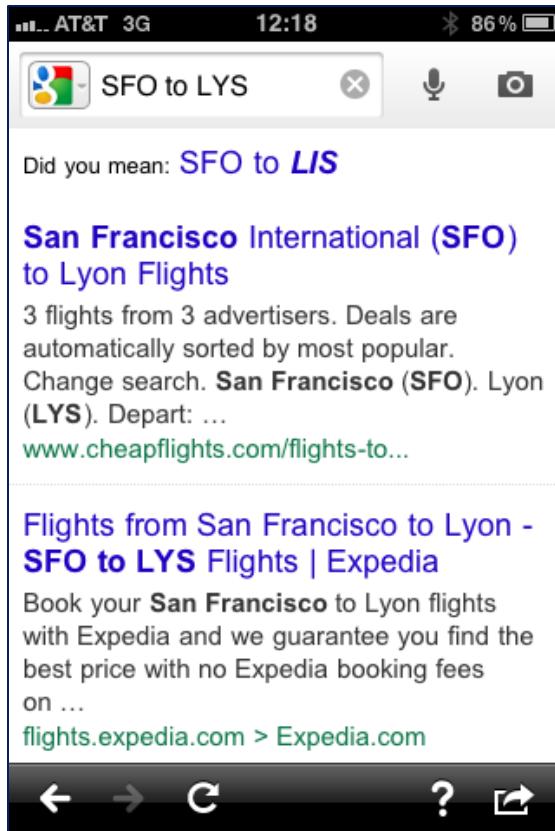
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(mentioned in Lecture 1)

# What can change the game?

- Disintermediation of the “web search paradigm”
  - Use specific apps: e.g. Kayak rather
- Instant location aware “push” couponing
  - One time use coupons sent via SMS/MMS to handset
- Handset as contactless credit/cash card
  - Interaction with point-of-sale via optical readers (one way), bluetooth (two way), or wireless network
  - Direct purchase (tickets, take-out food, etc) -- see Starbucks
- Smartphone becoming standard phones
  - High precision GPS in all phones
- Ipads & equivalents becoming “standard”
- Lots of things we haven’t thought about ...

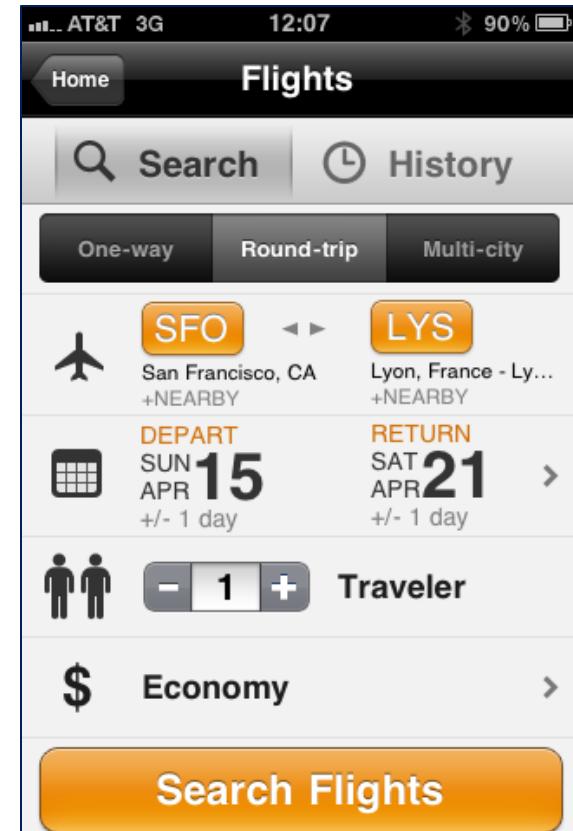
# Search vs specific app



Google search

A screenshot of the Expedia mobile landing page for flights from San Francisco (SFO) to Lyon (LYS). The top bar shows AT&T 3G, 12:19, and 85% battery. The search bar contains "SFO to LYS". The main content includes a "BUILD YOUR TRIP" form, a "San Francisco to Lyon Flight Map" showing the route, and sections for "Popular Lyon Airlines" and "Hotels near SFO Airport".

Expedia landing page



Kayak

# Starbucks store card

<http://www.starbucks.com/coffeehouse/mobile-apps/starbucks-card-mobile>



# What might die (as consumer appliances/features)

- Portable GPS navigators
- Low end cameras (still and TV)
- Random small devices
  - Compasses
  - Watches, Metronomes, Alarm clocks
  - Music tuners, Noise meters,
  - Remote controllers
  - Level bars ( [http://www.ihandysoft.com/level\\_free.html](http://www.ihandysoft.com/level_free.html) )
  - Many other, possibly with additional sensors (e.g. temp, weight) or accessories (e.g. health sensors, car connections)
- Laptops ?
- Phone numbers (paradigm should be “I want to initiate a voice com with person X, at whatever device they desire”)

# Mobile + sensor

<http://www.ot-2.com/>

**Standard interface to  
car computer (OBD) +  
WiFi server**



**Display on Iphone**



# “Square” credit card reader

Start accepting credit cards today.

Sign up and we'll mail you a free Square Card Reader.

Email address

Create password  Confirm password

Sign Up For Square

2.75% per swipe for all cards  
One simple rate, all major credit cards.

Next-day payout  
Automatic direct deposits to your bank account.

FREE Free reader, free app  
For iPhone, iPad and Android.

Fast setup  
Take your first credit card payment in minutes.

VISA MasterCard DISCOVER

News Pricing Security Help Center Jobs Legal Store Locator

A hand holds a blue Visa credit card above a white iPhone. A white Square card reader is attached to the top of the iPhone. The iPhone screen shows a payment interface with a total of \$22.00 for "Cupcakes (One Dozen)".

# What can change the game?

## Inference from noisy data

- What can you infer from lots of people reporting their position every few seconds?
  - Real time traffic ... (see <http://www.waze.com/> )
  - Opening hours ...
  - Night clubs going out of fashion ...
  - Very accurate life-style predictions
  - Amazing gossip ☺

It is hard to predict the future,  
especially before it happens ...

Top Ten Consumer Mobile Applications for 2012  
[Gartner, 11/2009] – which panned out?

1. Money Transfer
2. Location-Based Services
3. Mobile Search
4. Mobile Browsing
5. Mobile Health Monitoring
6. Mobile Payment
7. Near Field Communication Services
8. Mobile Advertising
9. Mobile Instant Messaging
10. Mobile Music

# Summary

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# Summary

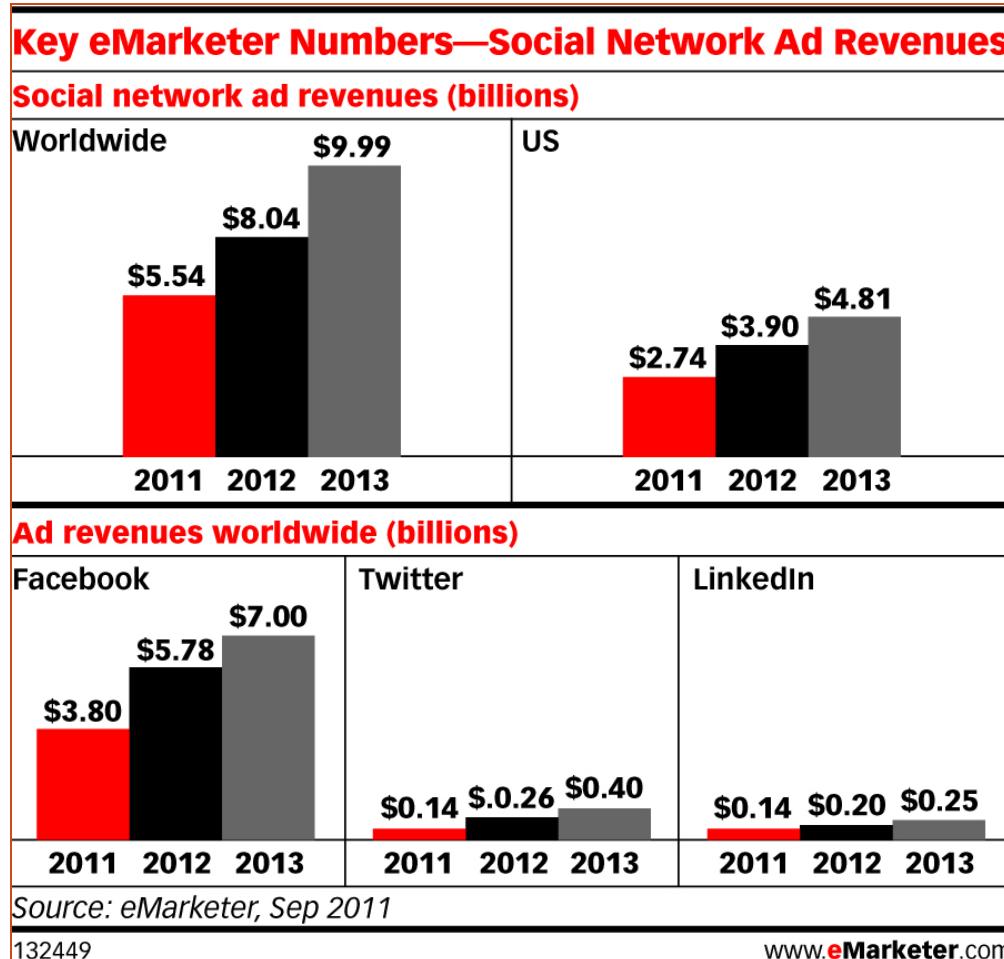
- Highlights
  - Mobile advertising is growing
  - Technical aspects:
    - Requires immediacy
    - Enables LBA
    - Many new matching features
  - Plenty of innovation opportunities
  - Computational advertising techniques essential, very fertile area for research
- Lowlights ...
  - Very fragmented market ...
    - Lots of small players
    - Lots of self proclaimed experts
    - Lots of VC money chasing very few ideas ...
  - Strange role for telecom providers ...
  - Need to deal with wide variety of hardware, operating systems, bandwidth, etc
  - Fluid legal landscape wrt regulation, privacy, etc.

# Further readings

- Oldie but goodie general intro  
[http://www.iab.net/media/file/mobile\\_platform\\_status\\_report.pdf](http://www.iab.net/media/file/mobile_platform_status_report.pdf)
- Mobile barcodes  
[http://www.scanlife.com/pdf/scanlife\\_trend\\_report\\_q3\\_2011.pdf](http://www.scanlife.com/pdf/scanlife_trend_report_q3_2011.pdf)
- The Google “Understanding Smartphone Users” report – download from  
<http://www.thinkwithgoogle.com/insights/library/studies/?>  
(many other interesting studies)  
Or <http://www.thinkwithgoogle.com/insights/uploads/23601>
- General sources:
  - <http://www.mobilemarketer.com>
  - <http://www.mobilemarketingwatch.com/>

# Social Advertising

# Social ad revenue



# Percentage of total

## US Social Network Ad Revenues, 2009-2013

billions and % of total US online ad spending

	2009	2010	2011	2012	2013
<b>Social network ad revenues</b>	<b>\$1.44</b>	<b>\$2.00</b>	<b>\$2.74</b>	<b>\$3.90</b>	<b>\$4.81</b>
Total US online ad spending	\$22.70	\$26.00	\$31.30	\$36.80	\$41.20
<b>Social network % of total</b>	<b>6.3%</b>	<b>7.7%</b>	<b>8.8%</b>	<b>10.6%</b>	<b>11.7%</b>

Note: includes paid advertising appearing within social network sites, social network games and social network applications; excludes spending by marketers that goes toward developing or maintaining a social network presence

Source: eMarketer, Sep 2011

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[www.emarketer.com](http://www.emarketer.com)

## Social Network Ad Revenues Worldwide, 2009-2013

billions and % of total online ad spending worldwide

	2009	2010	2011	2012	2013
<b>Social network ad revenues</b>	<b>\$2.38</b>	<b>\$3.56</b>	<b>\$5.54</b>	<b>\$8.04</b>	<b>\$9.99</b>
Total online ad spending worldwide	\$55.20	\$68.40	\$80.20	\$94.20	\$106.10
<b>Social network % of total</b>	<b>4.3%</b>	<b>5.2%</b>	<b>6.9%</b>	<b>8.5%</b>	<b>9.4%</b>

Note: includes paid advertising appearing within social network sites, social network games and social network applications; excludes spending by marketers that goes toward developing or maintaining a social network presence

Source: eMarketer, Sep 2011

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[www.emarketer.com](http://www.emarketer.com)

# Top sites

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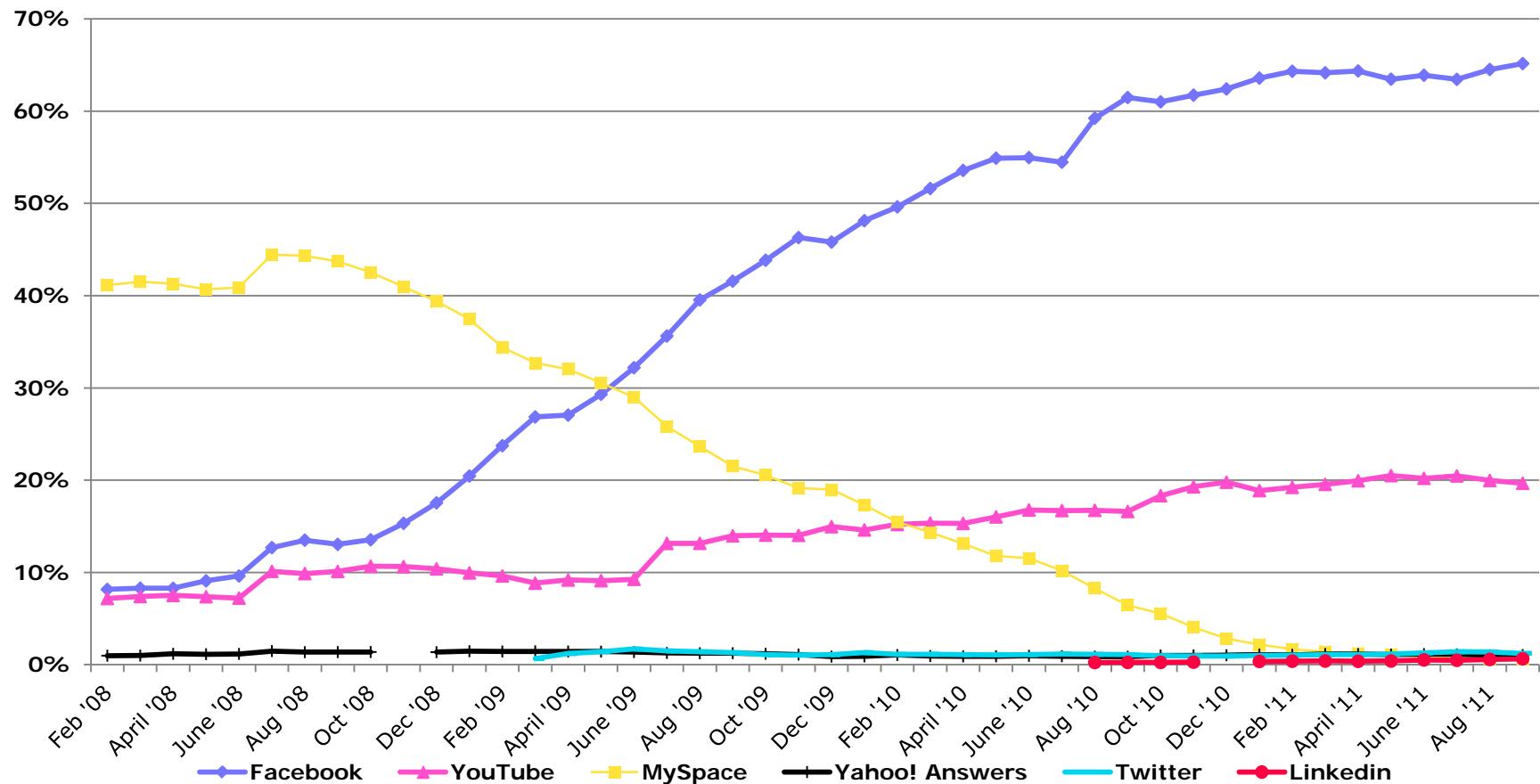
## Top 10 US Social Media Sites, Ranked by Visits, Week ending Sep 24, 2011 millions and % share

	Visits	% share
1. Facebook	1,758.1	64.85%
2. YouTube	530.1	19.55%
3. Twitter	33.1	1.22%
4. Yahoo! Answers	28.0	1.03%
5. Tagged	19.7	0.73%
6. LinkedIn	17.8	0.66%
7. Myspace	16.3	0.60%
8. Google+	15.0	0.55%
9. myYearbook	10.6	0.39%
10. iVillage	10.3	0.38%

Note: excludes mobile traffic or traffic from the Google Notification Bar

Source: Experian Hitwise as cited in company blog, Sep 26, 2011

# Landscape (shares of visits)

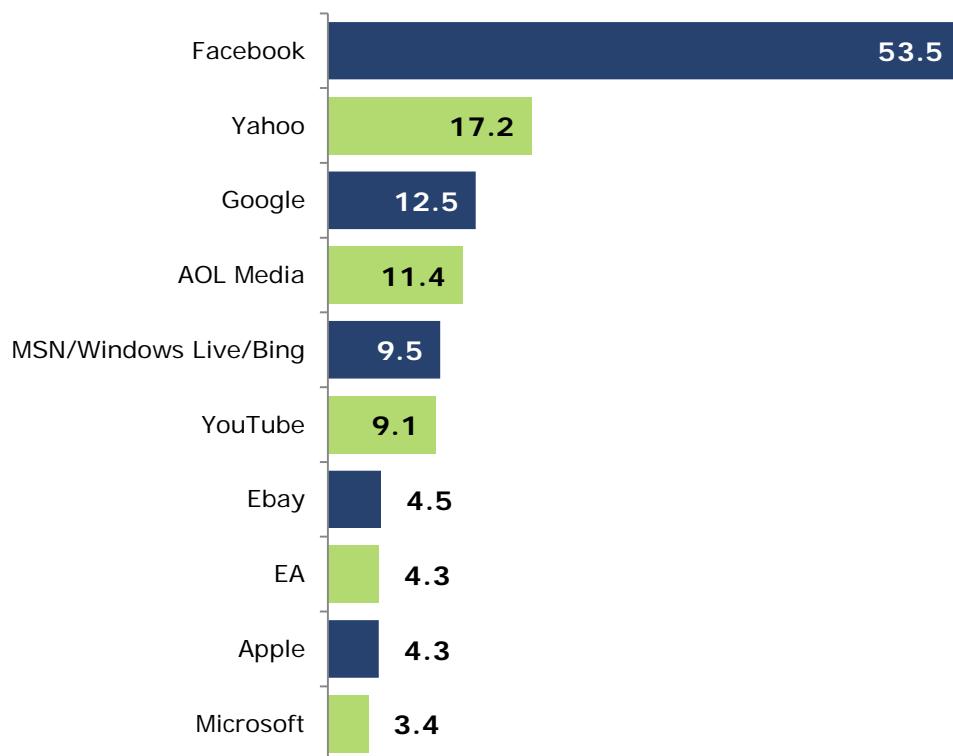


# Top brands by aggregate time spent

## Top 10 U.S. Web Brands by Aggregate Time Spent

U.S. web users monthly minutes in billions, home and work

Source: The Nielsen Company



We start with a big number first: 53.5 billion minutes per month. Facebook is dominating the web brands.

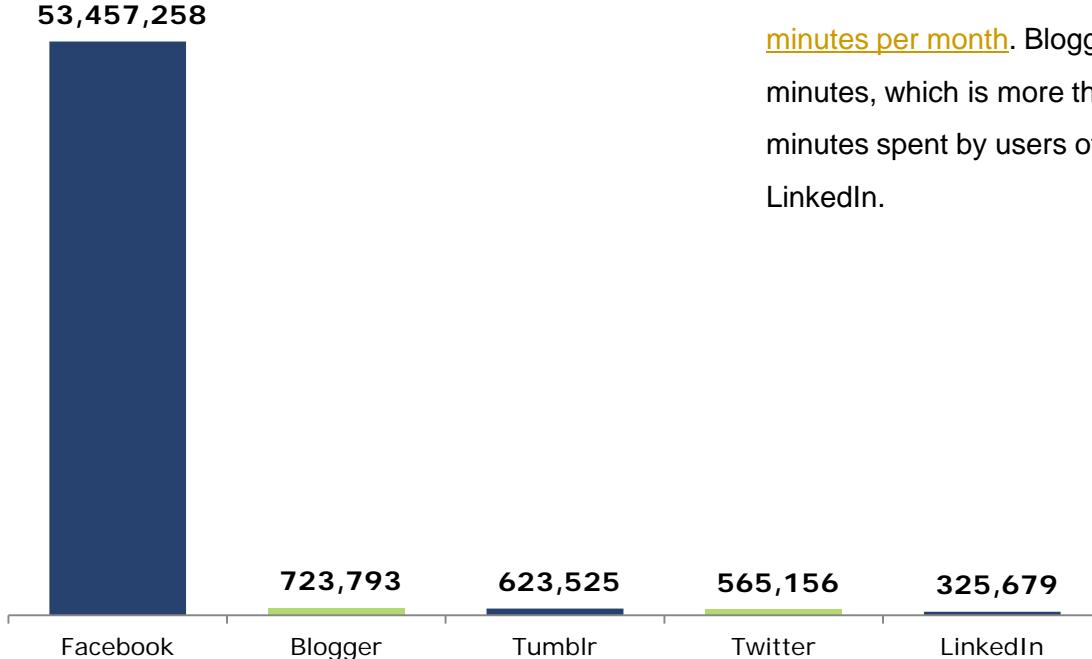
In looking at a data snapshot of monthly aggregate time spent on a site for Facebook and the ROW (rest of the web), Facebook has toppled some big names. The Nielsen Company data show that even Yahoo users come in a distant second with an average of 17.2 billion minutes per month, less than one-third Facebook's total.

YouTube ranks sixth, claiming 9.1 billion user minutes per month.

Source: "The Social Media Data Stacks", MarketingCharts.com, via HubSpot.com

# Facebook dominates monthly minutes

**Top 5 U.S. Social Networks and Blogs**  
Total minutes (000), home and work, May 2011  
**Source:** The Nielsen Company



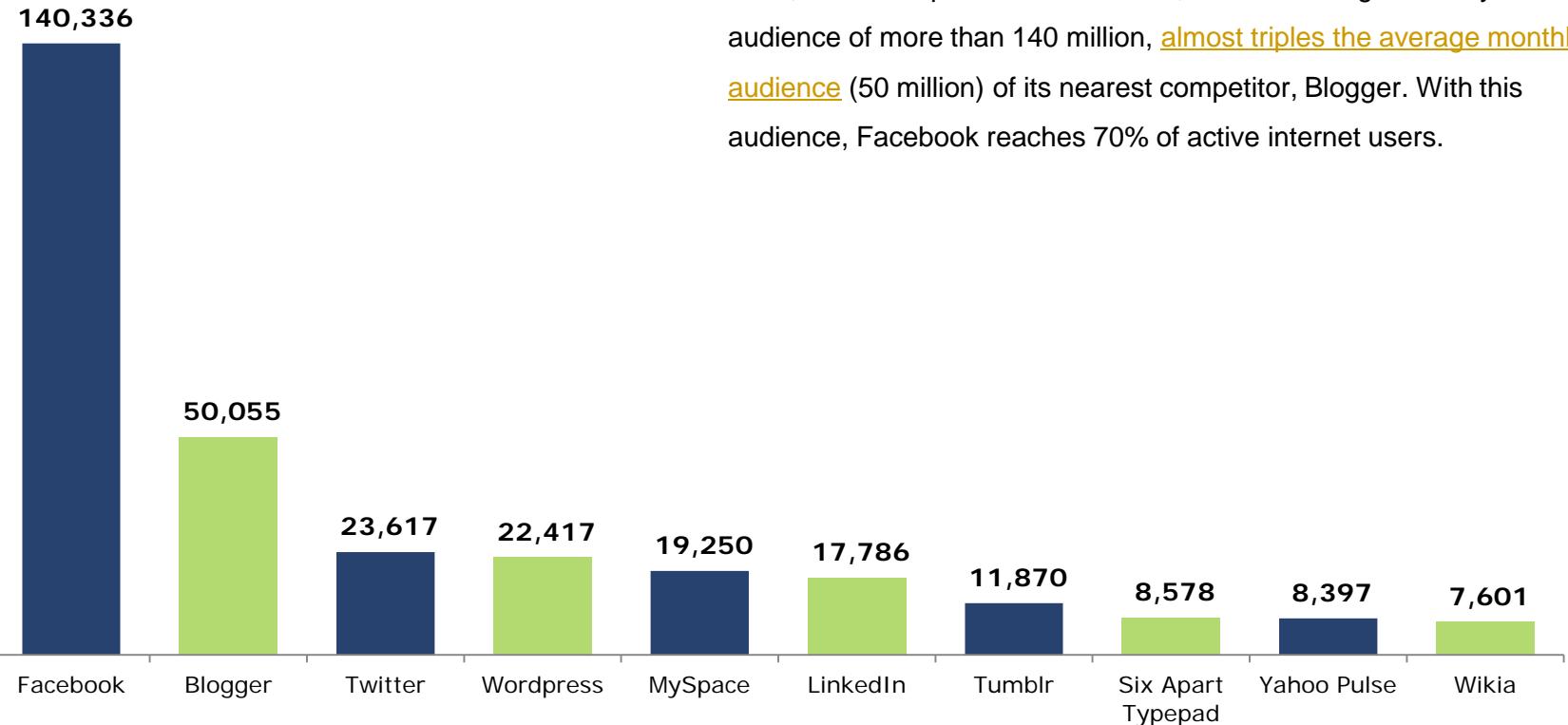
Looking specifically at social networking/blogging sites, the others trail Facebook much more dramatically. [None even come close to 1 billion minutes per month](#). Blogger ranks second with about 724 million monthly minutes, which is more than double the roughly 325 million monthly minutes spent by users of number five social networking/blogging site LinkedIn.

# Visitors to top sites

## Top Network & Blog Sites

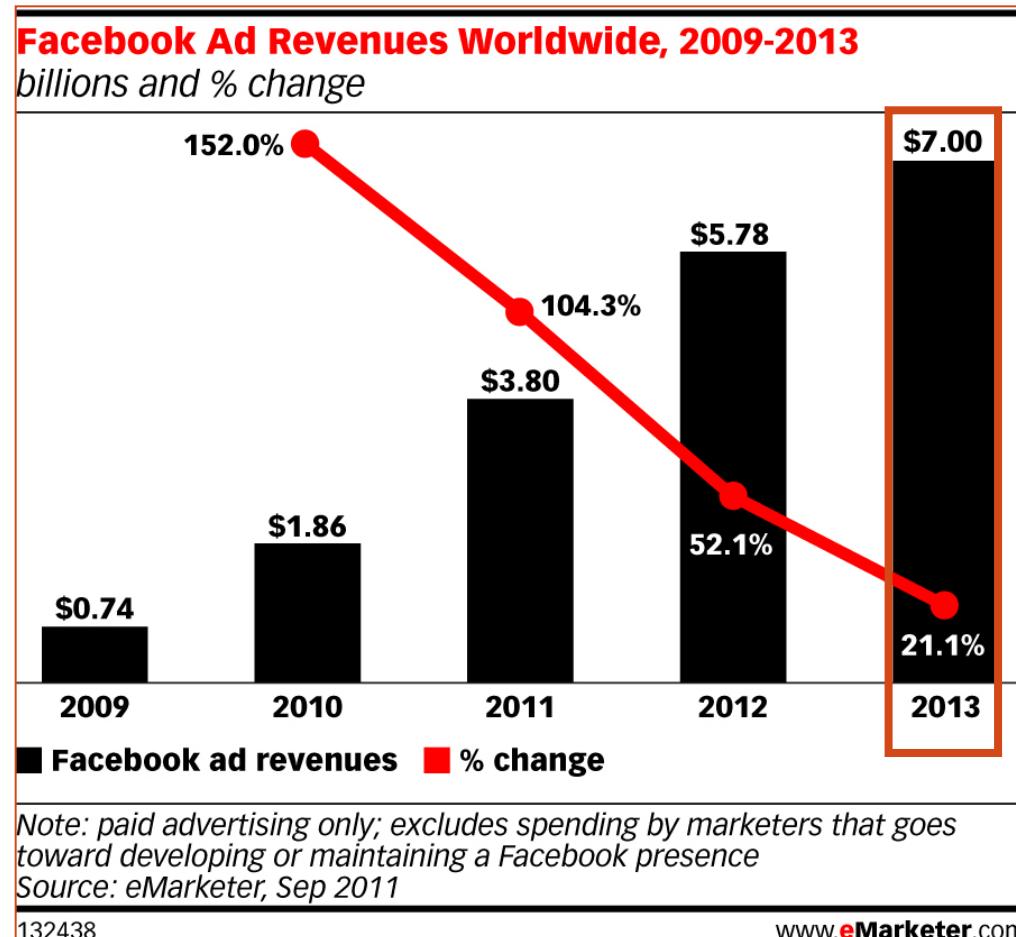
Average monthly unique visitors (000), Q3 2011

Source: The Nielsen Company



Looking at the top 10 U.S. social networking/blogging sites during Q3 2011, Nielsen reports that Facebook, with an average monthly audience of more than 140 million, almost triples the average monthly audience (50 million) of its nearest competitor, Blogger. With this audience, Facebook reaches 70% of active internet users.

# Facebook



# Comparative Trends

## Change in Ad Spending on Select Social Networks According to US Advertisers/Marketers, Feb 2011

% of respondents

	Increase significantly	Increase somewhat	No change	Decrease
Facebook	40%	49%	6%	5%
YouTube	33%	49%	13%	4%
Twitter	26%	51%	13%	8%
LinkedIn	20%	51%	18%	9%
foursquare	10%	36%	23%	14%
Flickr	6%	37%	31%	17%

Note: n=500 AAF Ad Club members; in the next 3-5 years; numbers may not add up to 100% due to rounding

Source: The Creative Group and American Advertising Federation (AAF), "The Creative Team of the Future," July 12, 2011

# Low CTR

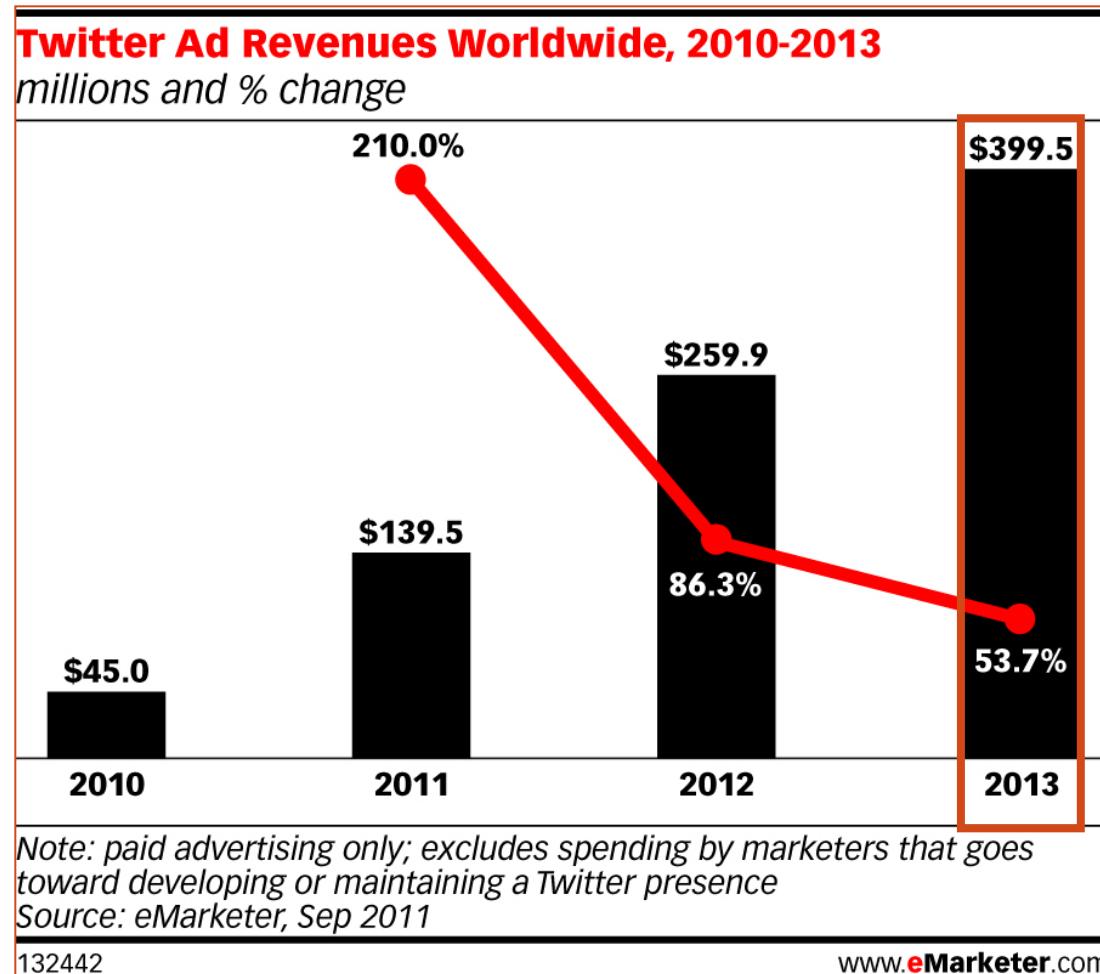
## **Clickthrough and "Like" Rate\* of Facebook Display Ads Among US Internet Users, by Age and Gender, 2011**

	Clickthrough rate		"Like" rate*	
	Male	Female	Male	Female
18-29	0.025%	0.026%	41%	39%
30-39	0.024%	0.028%	38%	38%
40-49	0.026%	0.031%	38%	40%
50+	0.030%	0.034%	36%	36%
<b>Total</b>	<b>0.026%</b>	<b>0.029%</b>	<b>39%</b>	<b>38%</b>

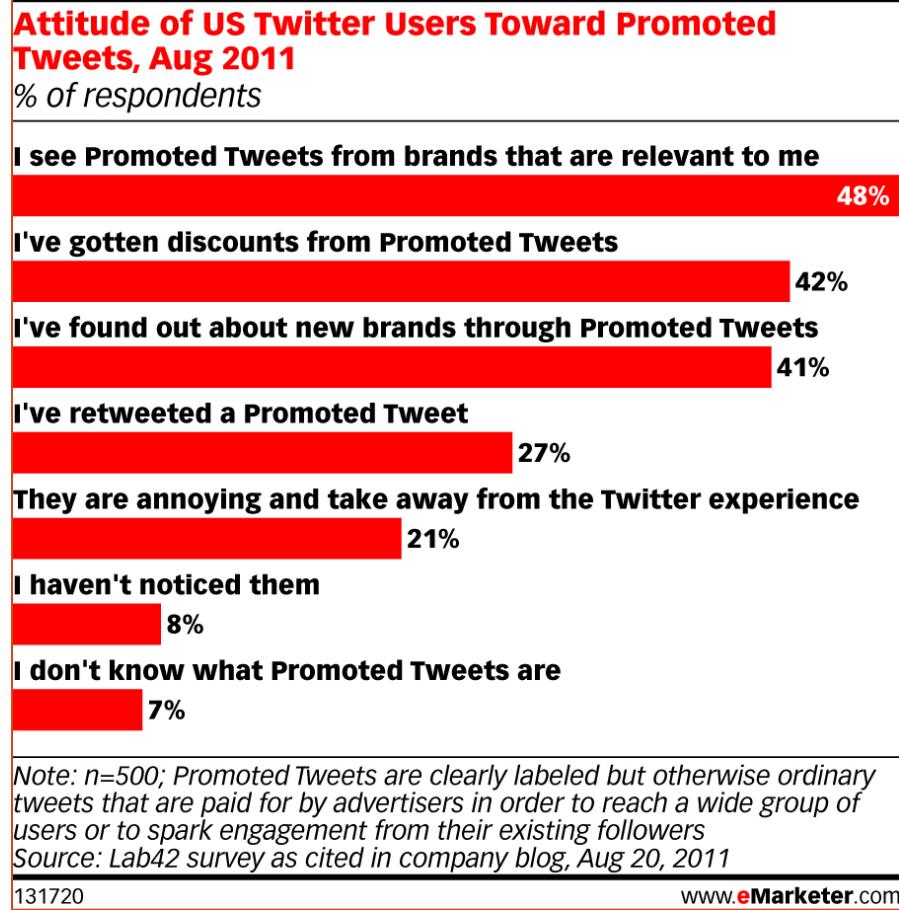
*Note: \*based on people who had clicked on the ad*

*Source: SocialCode, Aug 30, 2011*

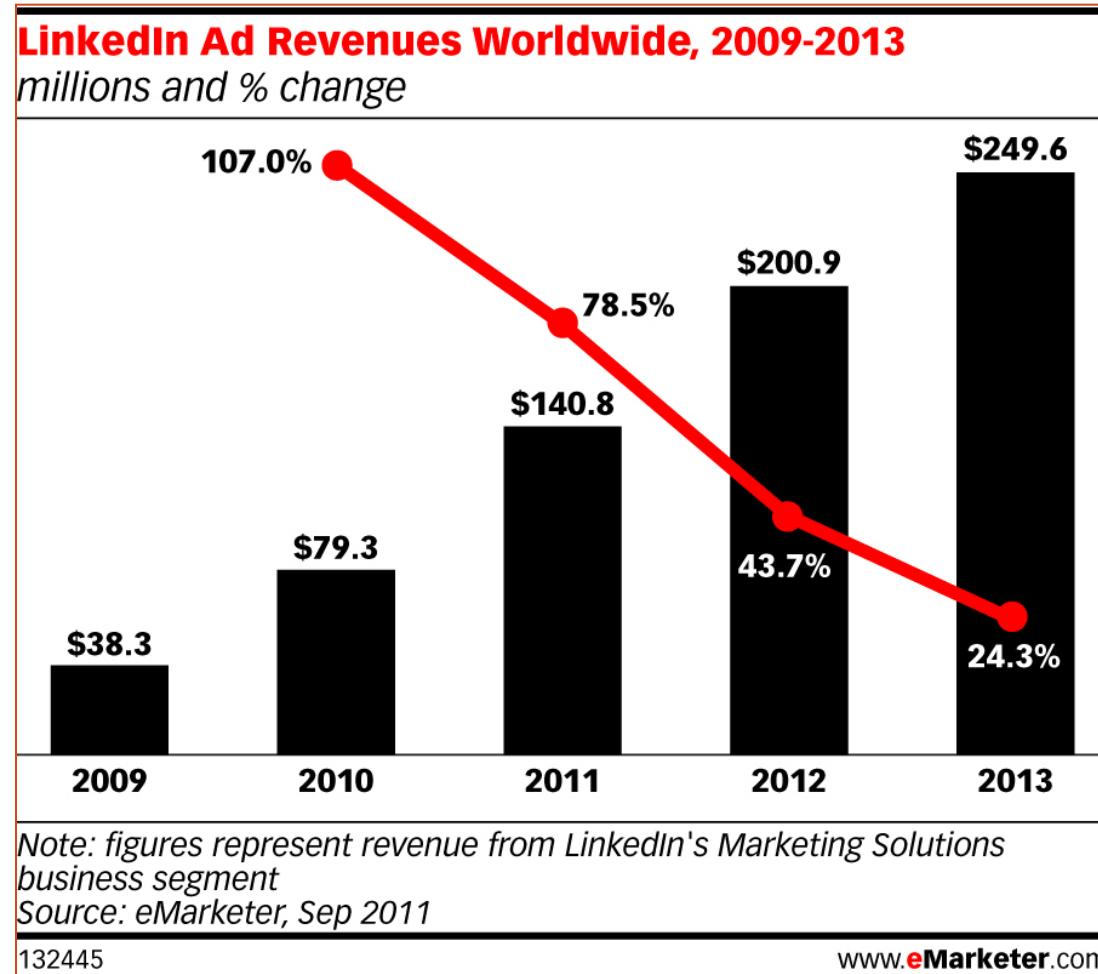
# Twitter



# Mixed feelings



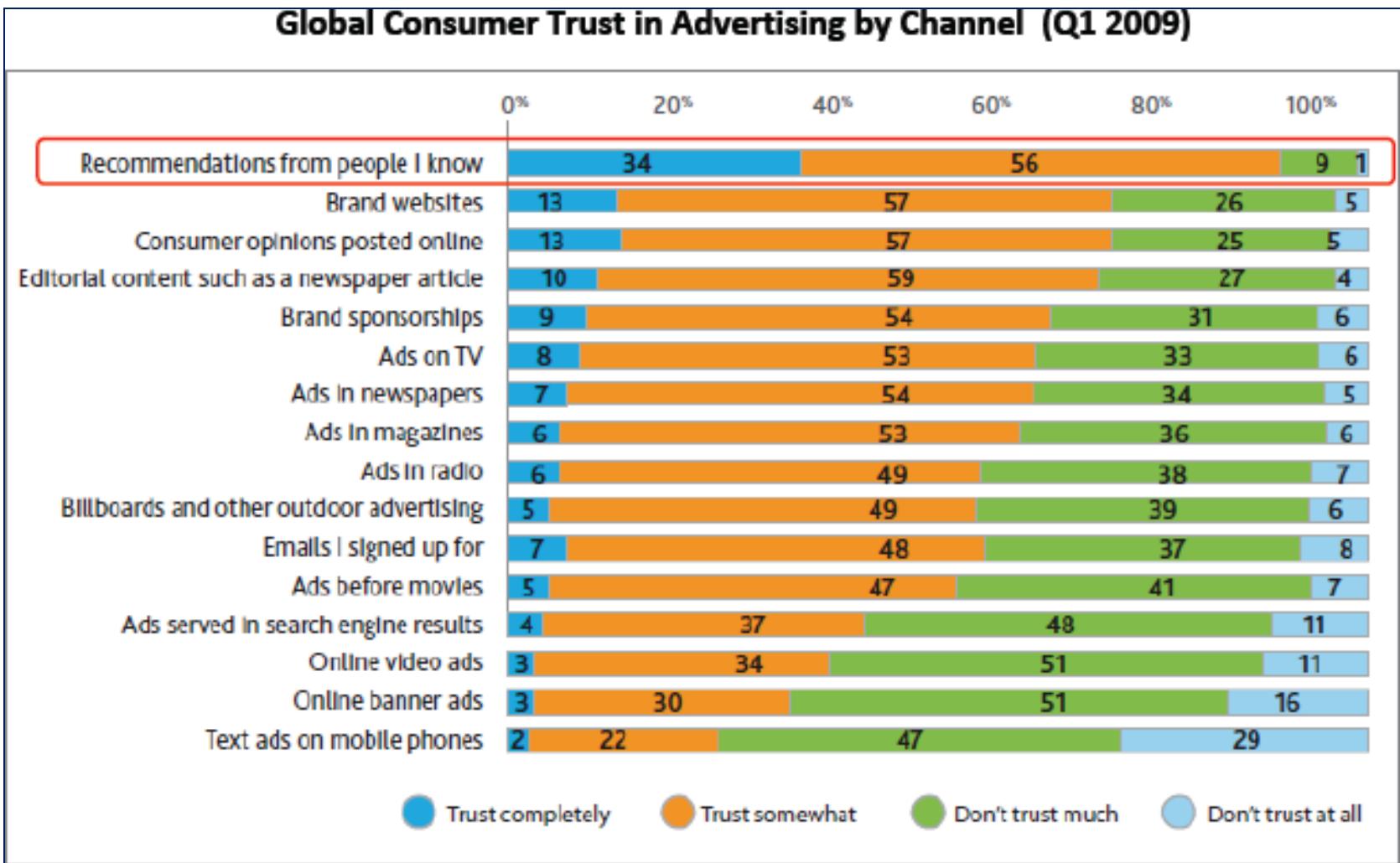
# Linkedin



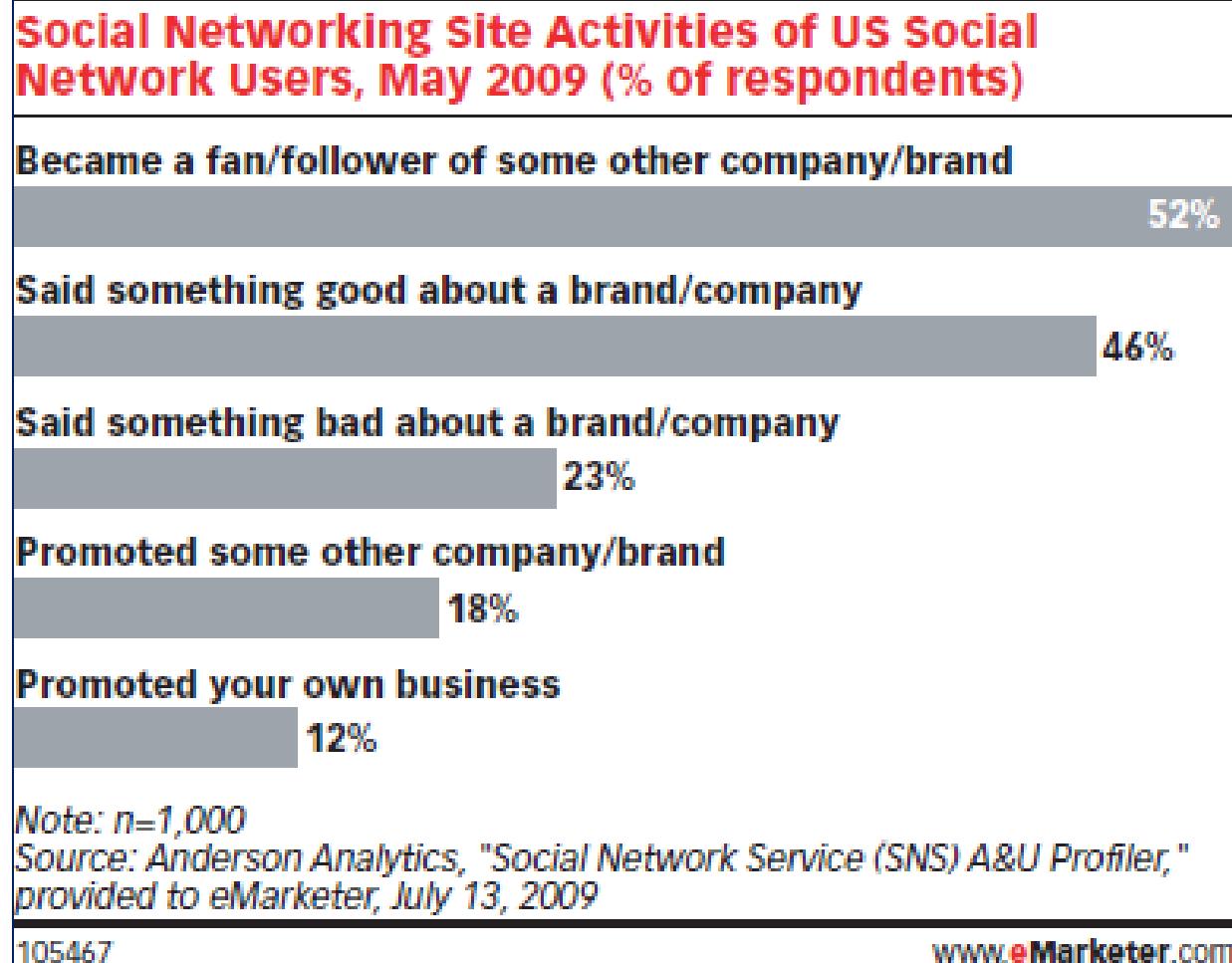
# Social engagement

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# Trust in the channel



# Indirect social brand promotion



# Social network users – interesting demographics?

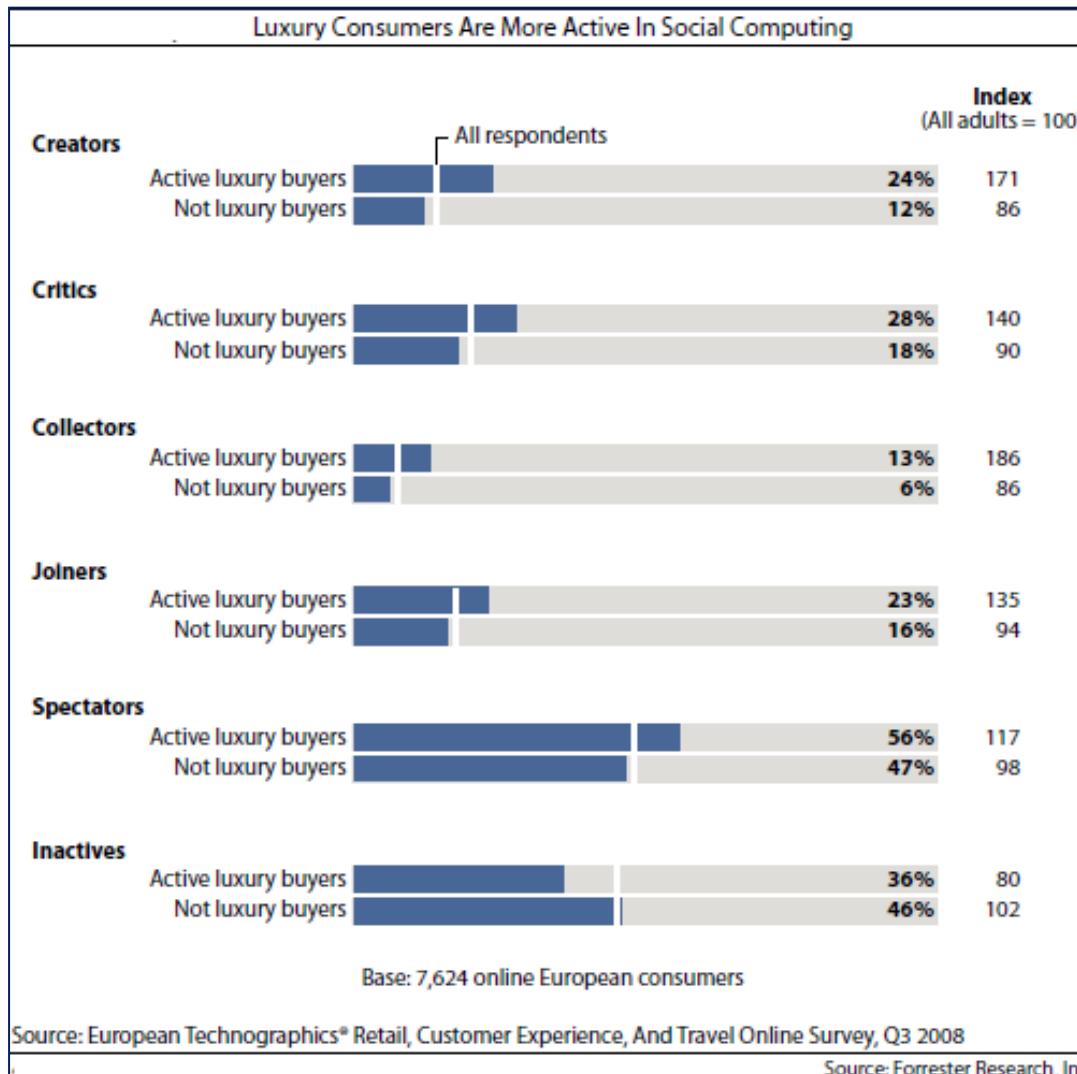
## Products/Services Purchased Online\* by US Social Network Users vs. Nonusers, May 2009 (% of respondents in each group)

	Social network users	Nonusers
Clothing	50%	39%
Books	47%	40%
Music	42%	23%
Movies	41%	23%
Electronics	41%	24%
Shoes	32%	25%
Airline tickets	31%	24%
Food (steaks, cheese, fruit, etc.)	31%	22%
Cosmetics--makeup and skin care	25%	13%
Photo prints	15%	10%

Note: n=1,000 social network users; n=250 nonusers; \*within the past 12 months

Source: Anderson Analytics, "Social Network Service (SNS) A&U Profiler," provided to eMarketer, July 13, 2009

# Social networks, upper class or early adopters?



# Google+ business penetration

## Use of Facebook Pages vs. Google+ Pages Among the Top 100 Brands Worldwide, Nov 2011

93% of top 100 brands have a company page on **Facebook**

53% of top 100 brands with a company page on **Facebook** have a link to it on their homepage

61% of top 100 brands have a company page on **Google+**

12% of top 100 brands with a company page on **Google+** have a link to it on their homepage

Note: Google+ Pages launched on Nov 7, 2011

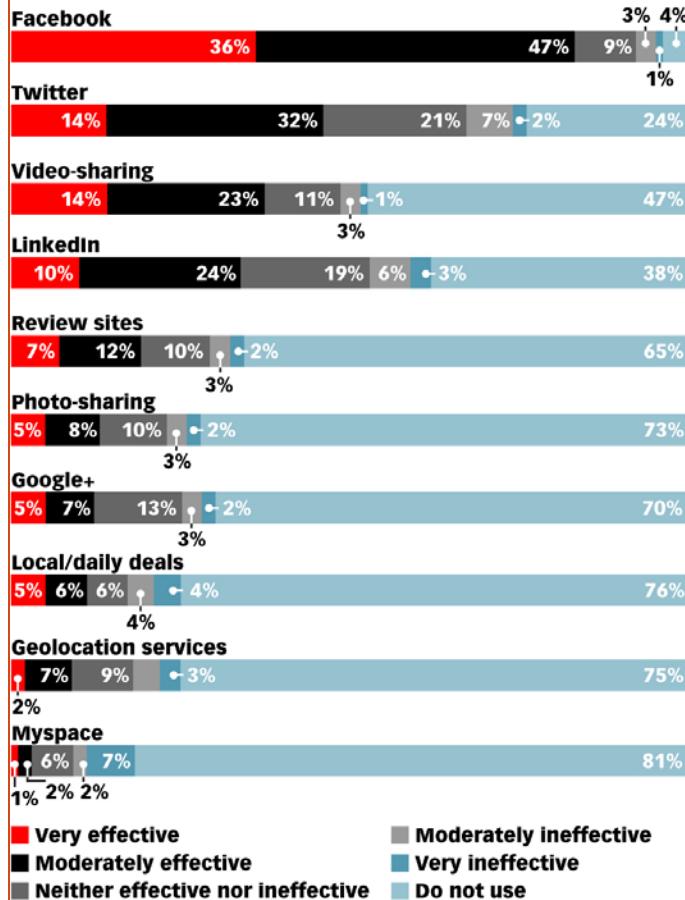
Source: BrightEdge, "Tracking Social Adoption and Trends," Nov 16, 2011

134565

[www.emarketer.com](http://www.emarketer.com)

## Effective Social Media Marketing Tools According to US Small Businesses, Oct 2011

% of respondents



Note: among respondents who said social media marketing is effective; numbers may not add up to 100% due to rounding

Source: Constant Contact, "Fall 2011 Small Business Attitudes & Outlook Survey," Nov 15, 2011

134439

[www.emarketer.com](http://www.emarketer.com)

# Metrics

## Methods of Measuring Social Media Marketing Success According to US B2C and B2B Marketers, Aug 2011

% of respondents

Numbers linking as friends, followers, "likes"

60%

Sharing, forwarding, retweeting or posting brand content

39%

Qualified leads from social media

35%

Visits or time spent with branded social content

30%

Incremental sales attributable to social media

25%

Brand awareness/favorability (measured by surveys)

18%

Source: Chief Marketer, "2011 Social Marketing Survey," Oct 1, 2011

133441

[www.eMarketer.com](http://www.eMarketer.com)

## Attitude of Their Clients Toward Social Media Marketing's Ability to Produce ROI at Budget Time According to US Agencies and Consultancies, Feb 2011

% of respondents

Social marketing is a promising tactic that will eventually produce ROI; let's invest but do it conservatively

64%

Social marketing is producing a measurable ROI; let's continue to invest in this tactic

20%

Social marketing is basically free; let's keep it that way

10%

Social marketing is unlikely to produce ROI; why invest more?

6%

Source: MarketingSherpa, "2011 Social Marketing Benchmark Report," Nov 15, 2011

134445

[www.eMarketer.com](http://www.eMarketer.com)

# Summary

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# Summary

- Huge amounts of time spent in social media, growing
- Social advertising is growing
- Technical aspects:
  - Low attention
  - Matching mostly based on declared demographics
  - Use of social graphs is still unclear/controversial
  - Some social media are becoming platforms, monetization via 3<sup>rd</sup> party applications
- Non technical aspects
  - Demographics biased towards particular segments
  - Privacy
  - Regulatory activities
- Another good area for research

# Questions?

We welcome suggestions about all aspects of the course:

**msande239-aut1112-staff@lists.stanford.edu**

# Thank you!

[broder@yahoo-inc.com](mailto:broder@yahoo-inc.com)  
[vanjaj@yahoo-inc.com](mailto:vanjaj@yahoo-inc.com)

<http://research.yahoo.com>

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