

# INTERNET TRENDS 2016 – CODE CONFERENCE

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June 1, 2016

[kpcb.com/InternetTrends](http://kpcb.com/InternetTrends)

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# Outline

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- 1) Global Internet Trends**
- 2) Global Macro Trends**
- 3) Advertising / Commerce + Brand Trends**
- 4) Re-Imagining Communication – Video / Image / Messaging**
- 5) Re-Imagining Human-Computer Interfaces – Voice / Transportation**
- 6) China = Internet Leader on Many Metrics  
(Provided by Hillhouse Capital)**
- 7) Public / Private Company Data**
- 8) Data as a Platform / Data Privacy**

Thanks...

## KPCB Partners

Especially Alex Tran / Dino Becirovic / Alexander Krey / Cindy Cheng  
who helped develop the ideas / presentation we hope you find useful...

## Hillhouse Capital

Especially Liang Wu...his / their contribution of the China section of Internet Trends provides an especially thoughtful overview of the largest market of Internet users in the world...

## Participants in Evolution of Internet Connectivity

From creators to consumers who keep us on our toes 24x7...and the people who directly help us prepare this presentation...

## Kara & Walt

For continuing to do what you do so well...

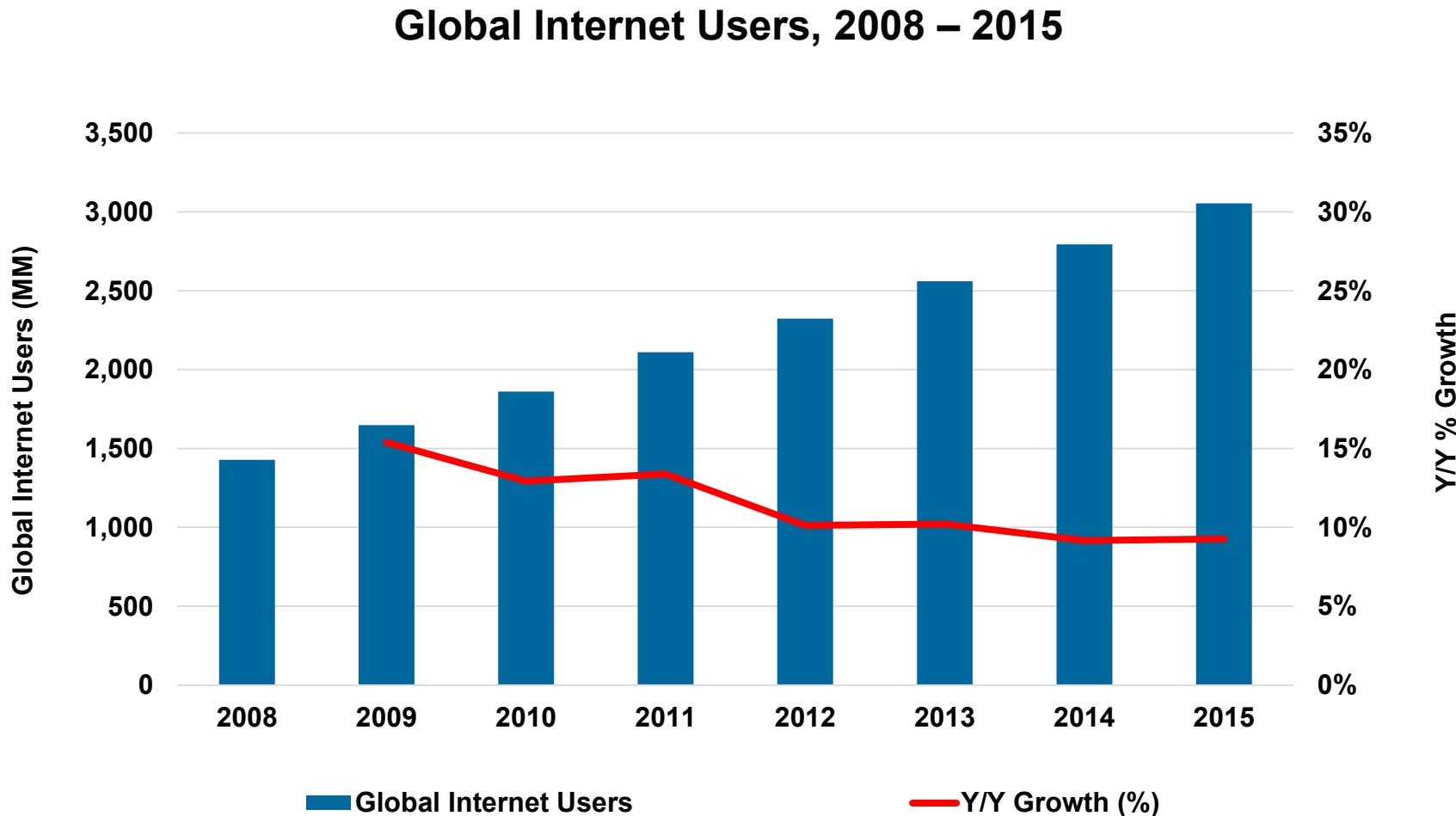
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# GLOBAL INTERNET TRENDS

# *Global Internet Users @ 3B*

*Growth Flat =  
+9% vs. +9% Y/Y...  
+7% Y/Y (Excluding India)*

# Global Internet Users = 3B @ 42% Penetration... +9% vs. +9% Y/Y...+7% (Excluding India)

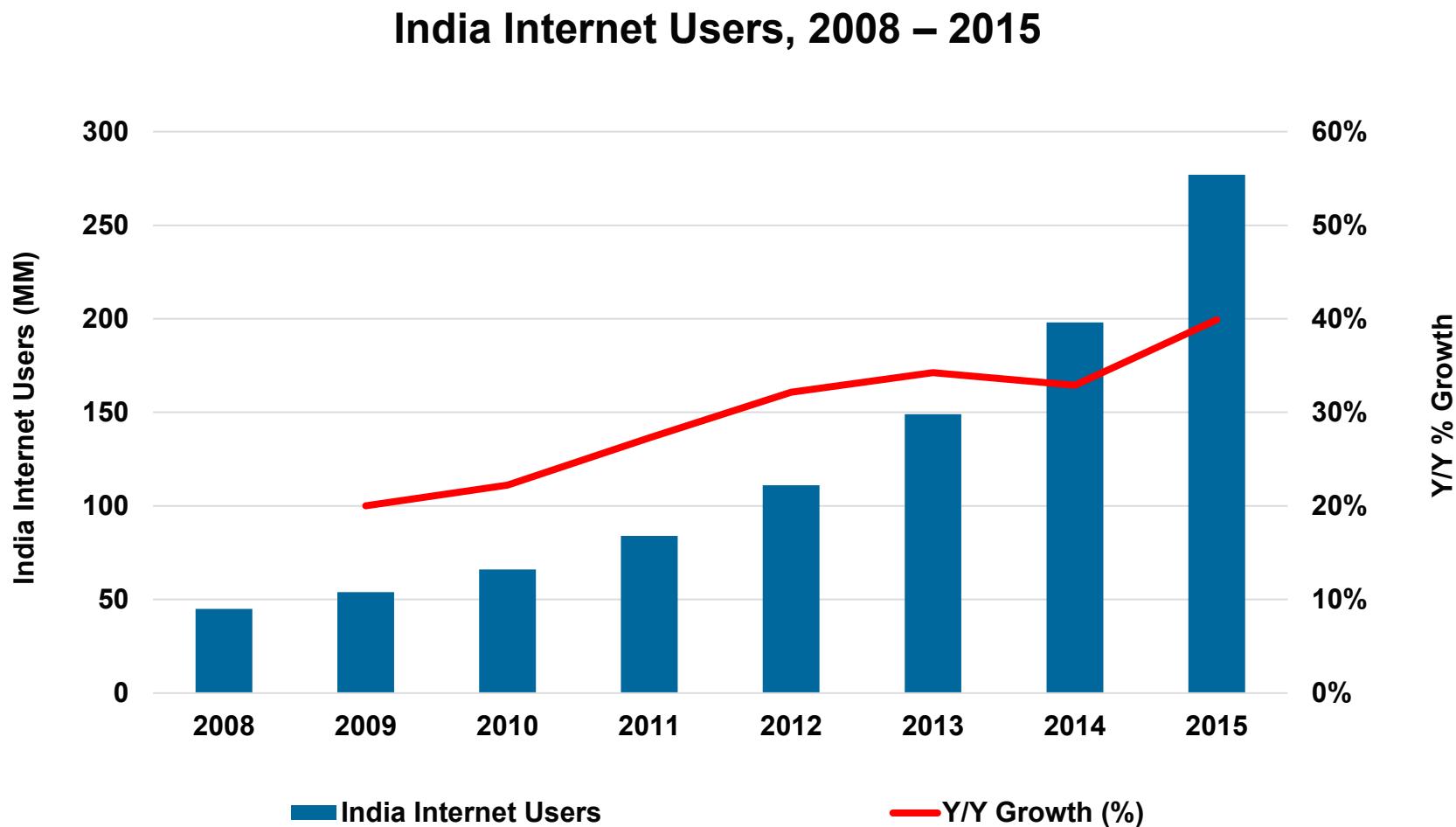


*India Internet User  
Growth Accelerating =  
+40% vs. +33% Y/Y...*

*@ 277MM Users...*

*India Passed USA to Become  
#2 Global User Market  
Behind China*

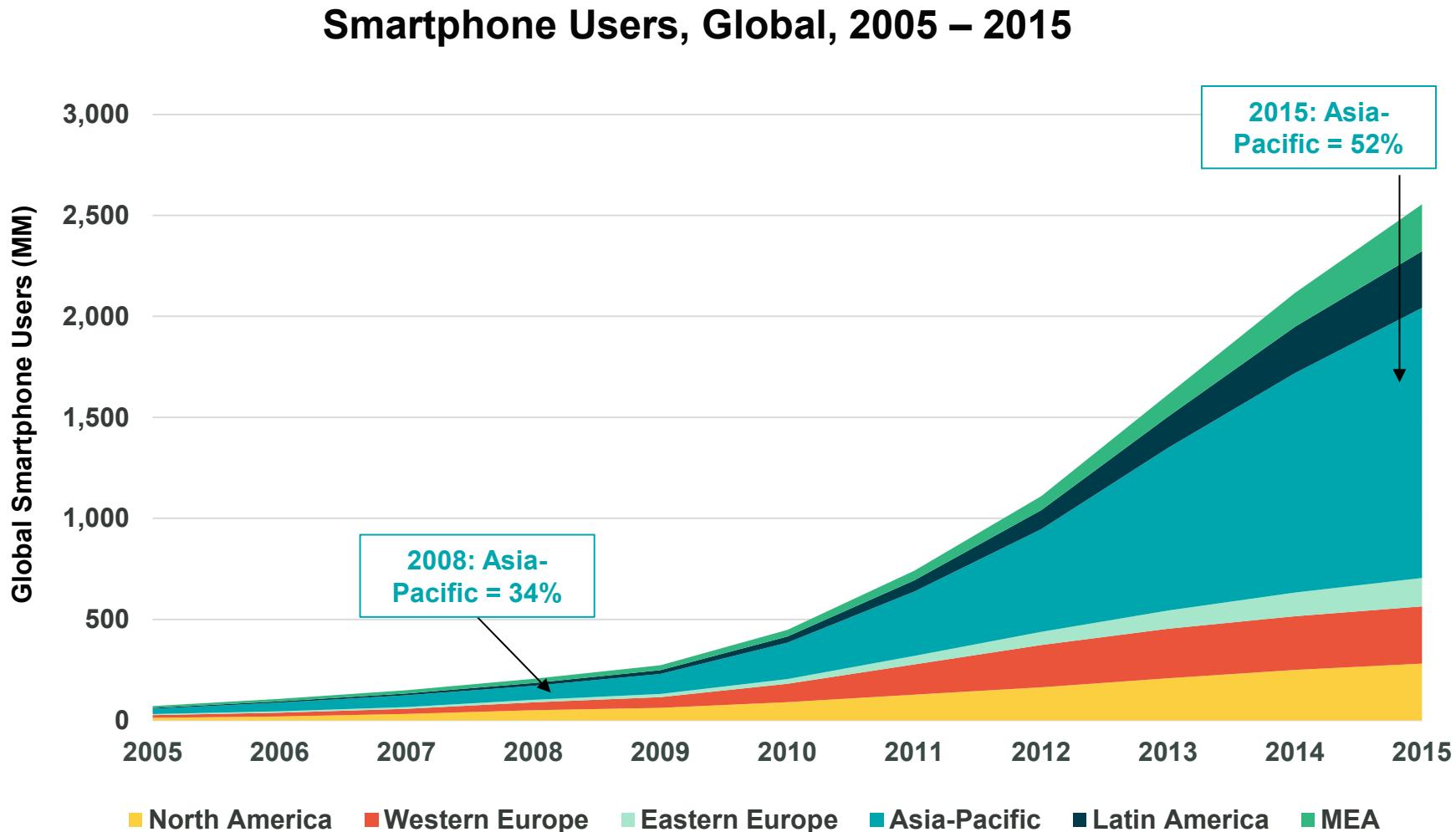
India Internet Users = 277MM @ 22% Penetration...  
+40% vs. +33% Y/Y



*Global Smartphone  
Users Slowing =  
+21% vs. +31% Y/Y*

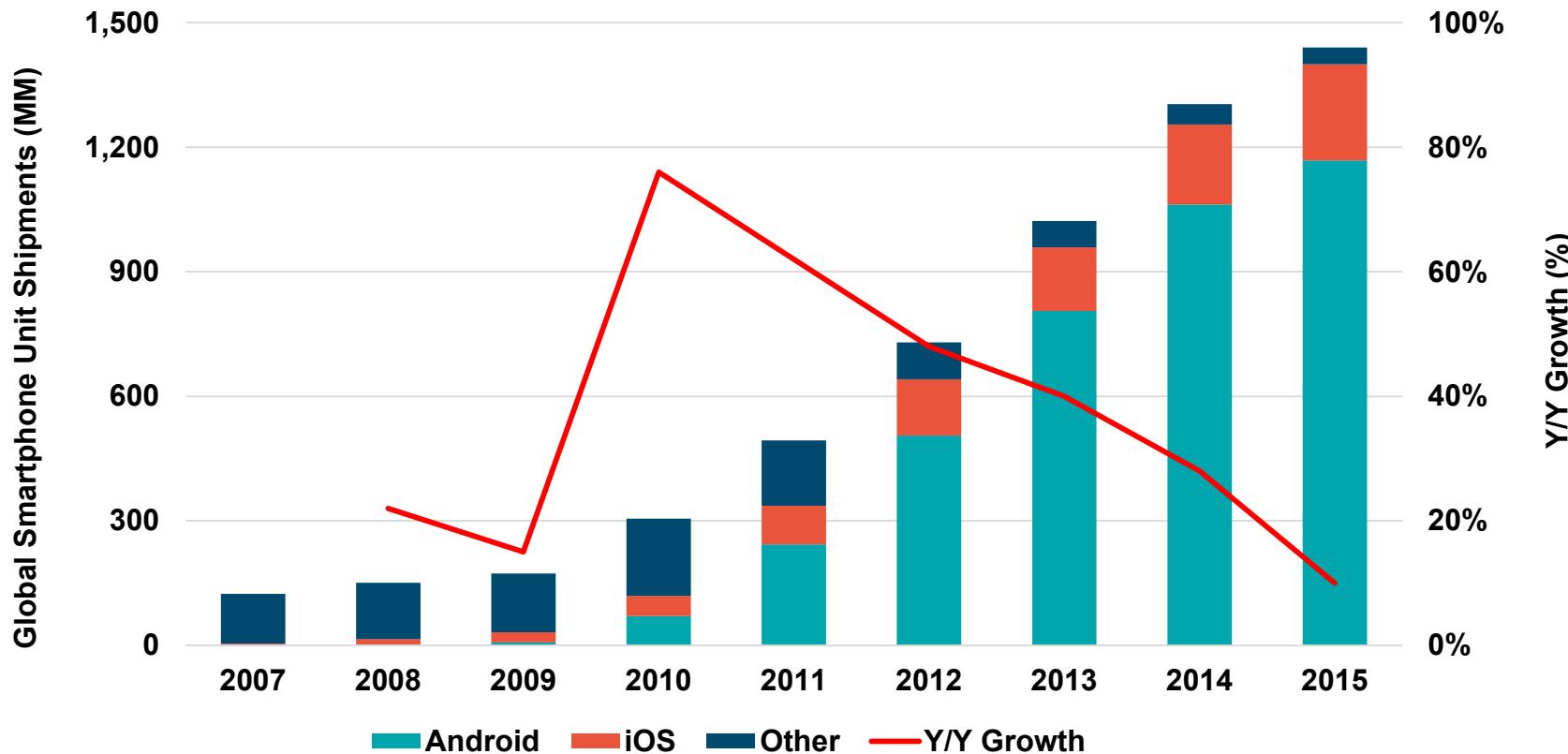
*Global Smartphone  
Unit Shipments Slowing  
Dramatically =  
+10% vs. +28% Y/Y*

# Global Smartphone User Growth Slowing... Largest Market (Asia-Pacific) = +23% vs. +35% Y/Y



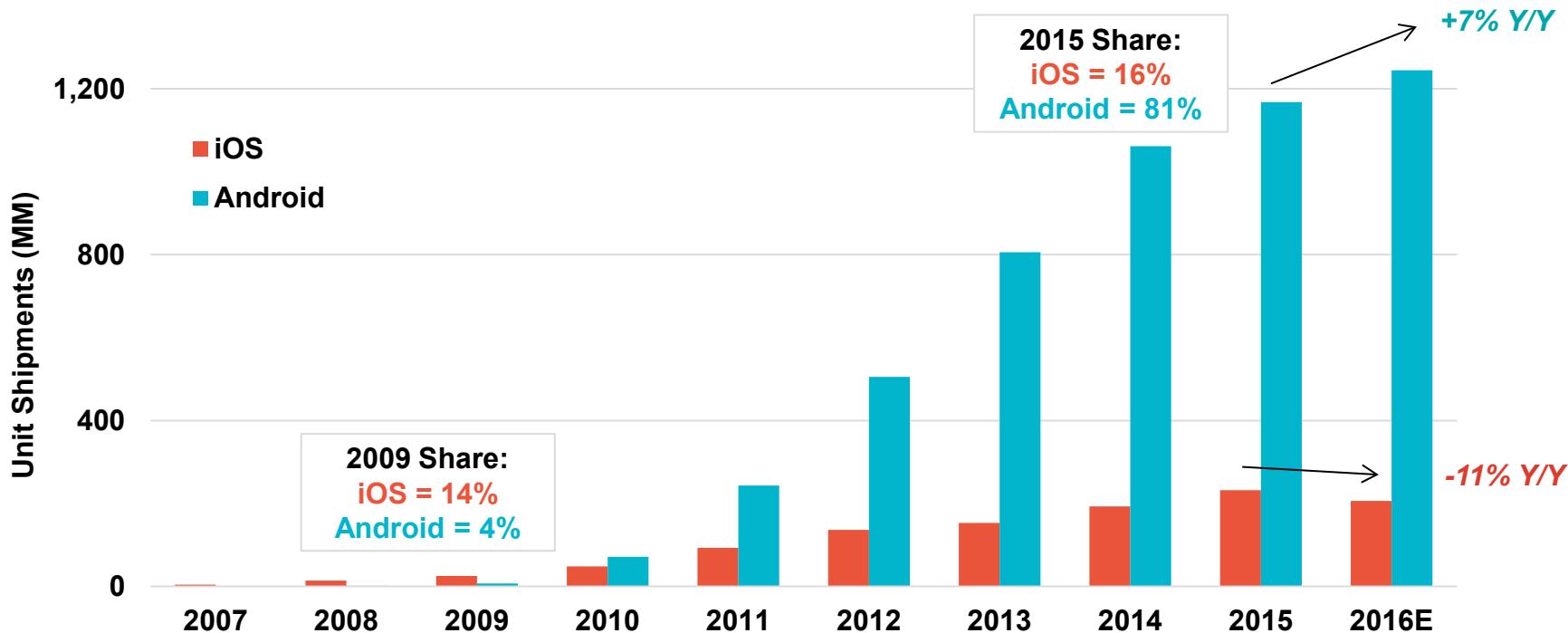
# Global Smartphone Units Slowing Dramatically... After 5 Years of High Growth @ +10% vs. +28% Y/Y

## Smartphone Unit Shipments by Operating System, Global, 2007 – 2015



# Android Smartphone Share Gains Continue vs. iOS... Android ASP Declines Continue...Delta to iOS @ ~3x

## Smartphone Unit Shipments, iOS vs. Android, Global, 2007 – 2016E



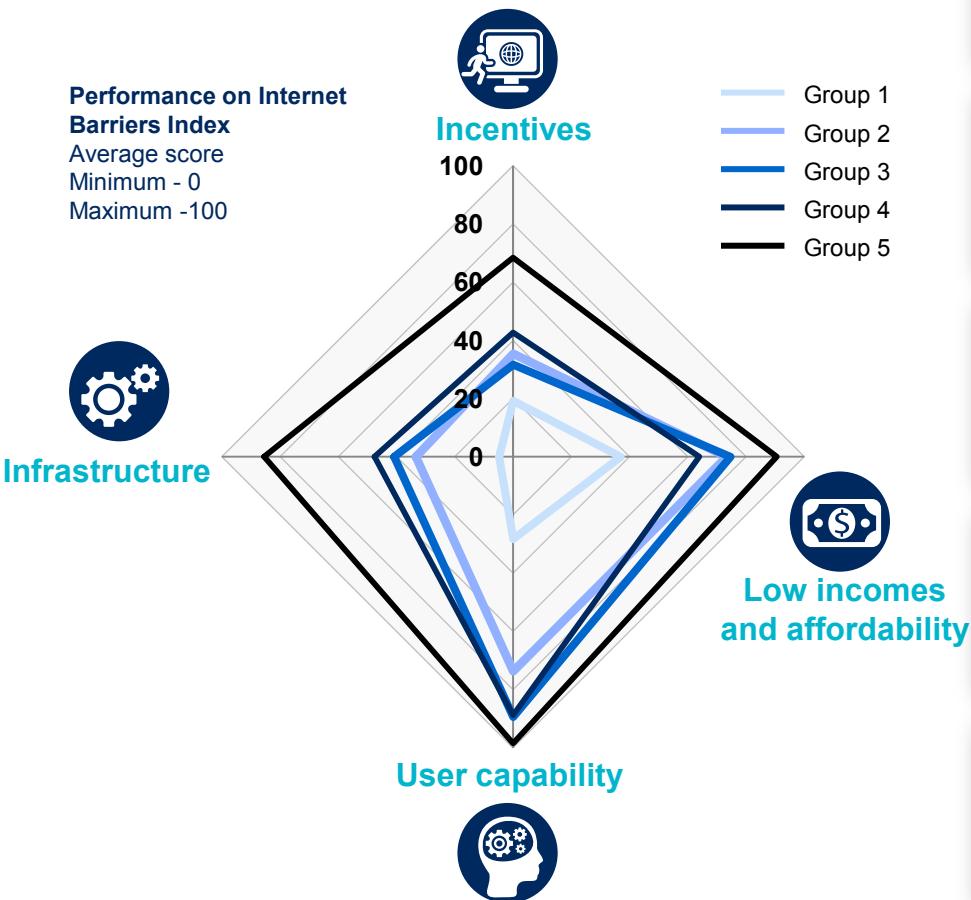
iOS ASP (\$)	\$594	\$621	\$623	\$703	\$712	\$686	\$669	\$680	\$717	\$651
Y/Y Growth	-	4%	0%	13%	1%	-4%	-2%	2%	5%	-9%

Android ASP	-	\$403	\$435	\$441	\$380	\$318	\$272	\$237	\$216	\$208
Y/Y Growth	-	-	8%	1%	-14%	-16%	-15%	-13%	-8%	-4%

*New Internet Users =  
Continue to be Harder to  
Garner Owing to High Penetration  
in Developed Markets*

# With Already High Mobile Penetration in More Developed / Affluent Countries... New Users in Less Developed / Affluent Countries Harder to Garner, per McKinsey

Countries fall into one of 5 groups based on barriers they face to Internet adoption



**Group 1: High barriers across the board; offline populations that are young, rural, and have low literacy**

**Countries:** Bangladesh, Ethiopia, Nigeria, Pakistan, Tanzania

**Offline population, 2014:** 548 million

**Internet penetration, 2014:** 18%

**Group 2: Medium to high barriers with larger challenges in incentives and infrastructure; mixed demographics**

**Countries:** Egypt, India, Indonesia, Philippines, Thailand

**Offline population, 2014:** 1,438 million

**Internet penetration, 2014:** 20%

**Group 3: Medium barriers with greatest challenge in incentives; rural and literate offline populations**

**Countries:** China, Sri Lanka, Vietnam

**Offline population, 2014:** 753 million

**Internet penetration, 2014:** 49%

**Group 4: Medium barriers with greatest challenge in low incomes and affordability; offline populations predominantly urban / literate / low income**

**Countries:** Brazil, Colombia, Mexico, South Africa, Turkey

**Offline population, 2014:** 244 million

**Internet penetration, 2014:** 52%

**Group 5: Low barriers across the board; offline populations that are highly literate and disproportionately low income and female**

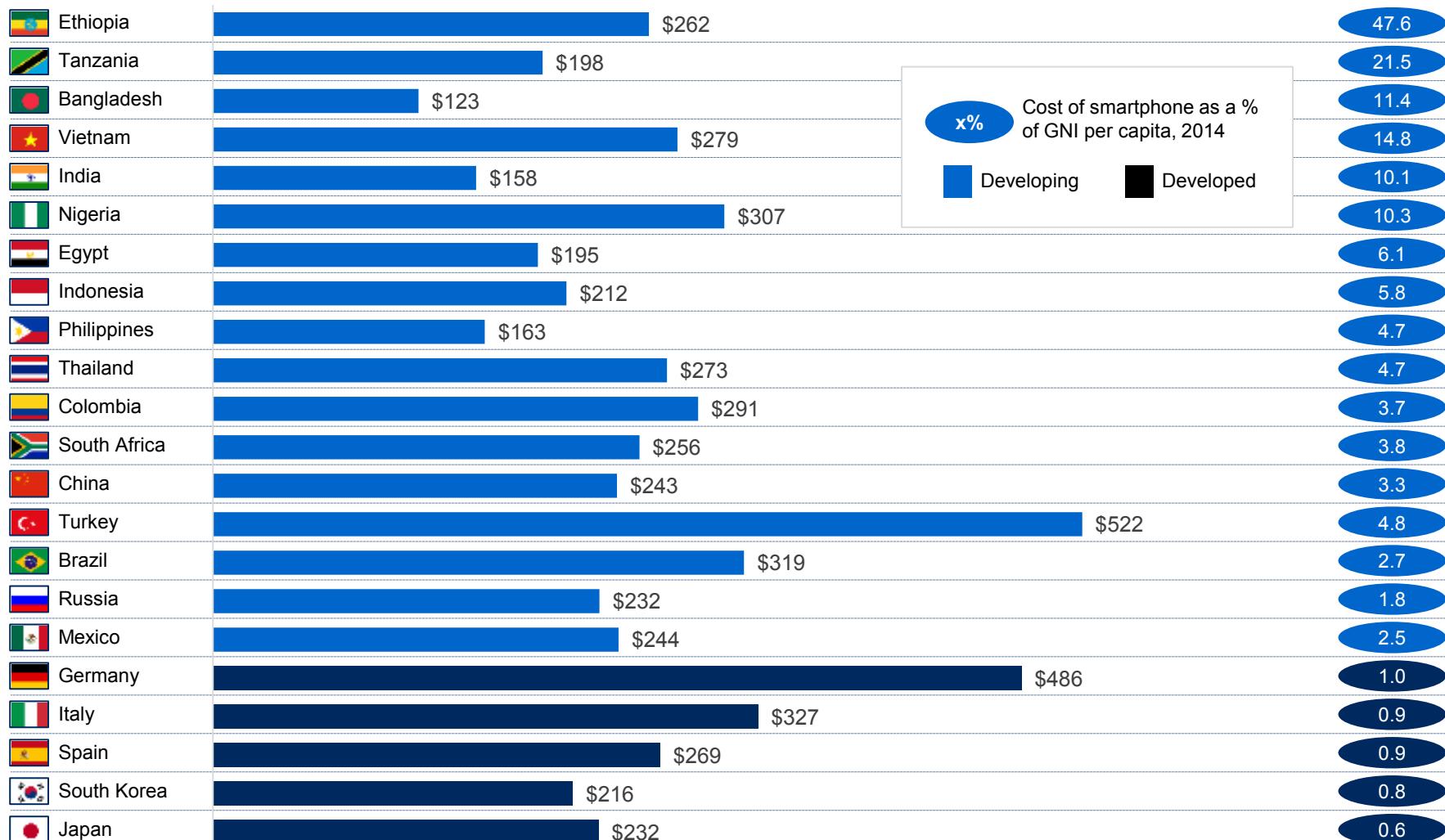
**Countries:** Germany, Italy, Japan, Korea, Russia, USA

**Offline population, 2014:** 147 million

**Internet penetration, 2014:** 82%

# Smartphone Cost in Many Developing Markets = Material % of Per Capita Income... 15% (Vietnam) / 10% (Nigeria) / 10% (India) / 6% (Indonesia), per McKinsey

Average retail price of a smart phone, \$USD, 2014



Source: McKinsey, Euromonitor, (smartphone prices); World Bank, estimates (GNI p.c., Atlas method)  
Note: Reflects true prices as paid by the consumer at point-of-sale; includes taxes and subsidies. Excludes data plan costs.

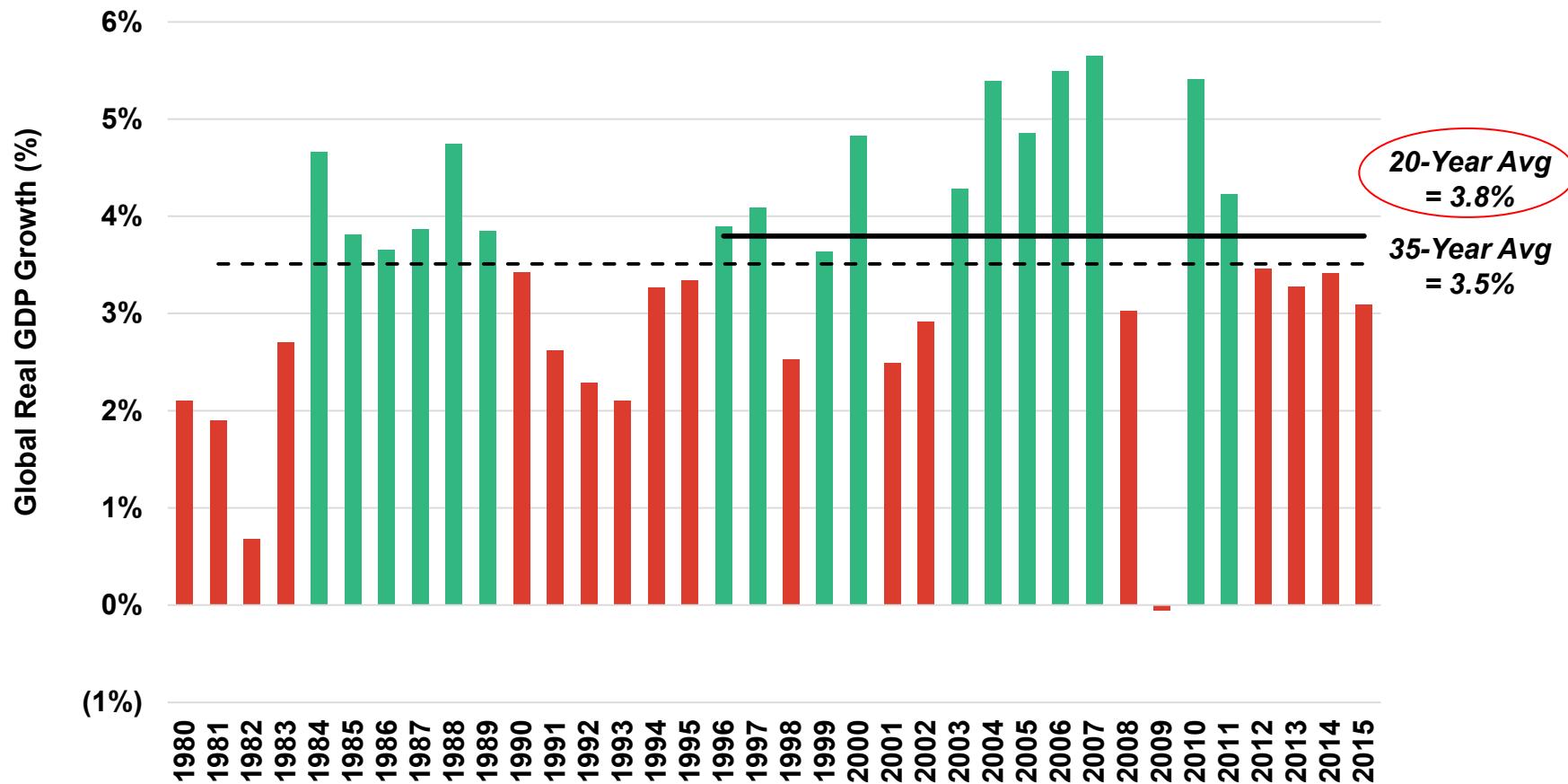
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# GLOBAL MACRO TRENDS

*Global Economic Growth =  
Slowing*

# Global GDP Growth Slowing = Growth in 6 of Last 8 Years @ Below 20-Year Average

Global Real GDP Growth (%), 1980 – 2015



Source: IMF WEO, 4/16. Stephen Roach, "A World Turned Inside Out," Yale Jackson Institute for Global Affairs, 5/16.  
Note: GDP growth based on constant prices (real GDP growth).

*Commodity Price Trends =*

*In Part, Tell Tale of  
Slowing Global Growth*

# Commodity Prices Down = -39% Since 5/14 vs. -8% Annual Average (5/11-4/14) & +6% (1/00-4/11)

**Global Commodity Prices, Bloomberg Commodity Index  
(Indexed to 0 @ 1/00), 2000 – 2016YTD**



Source: Morgan Stanley, Bloomberg as of 5/25/16

Note: Bloomberg Commodity Index represents 22 globally traded commodities, weighted as: 31% Energy, 23% Grains, 17% Industrial Metals, 16% Precious Metals, 7% Softs (Sugar, Coffee, Cotton), and 6% Livestock.

*Global Growth Engines =  
Evolve Over Time*

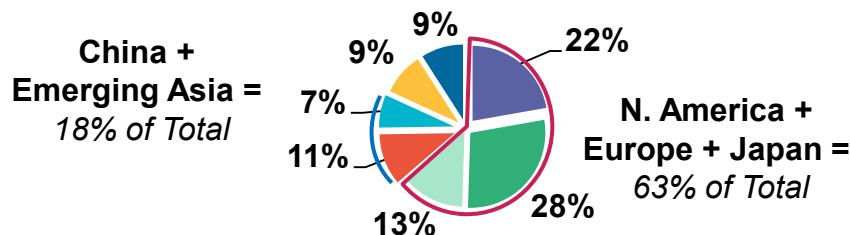
Global Growth Engines @ ~2/3 of Global GDP Growth...

1985 = N. America + Europe + Japan

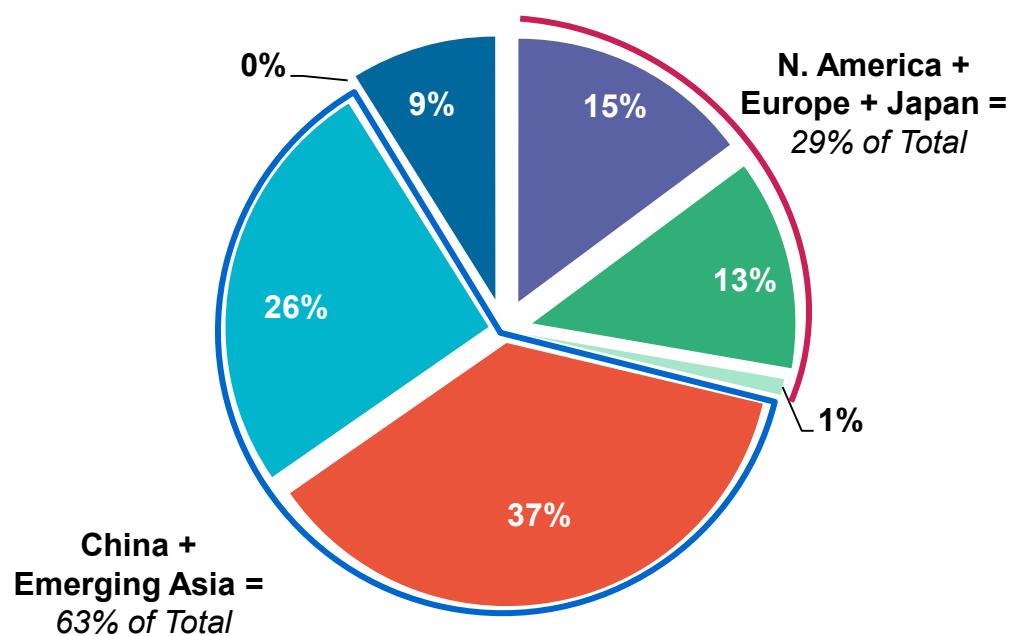
2015 = China + Emerging Asia

## Real GDP Growth Contribution by Region, 1985 / 2015 *(Based on Purchasing Power Parity)*

**1985**  
\$19T = World GDP  
+4% Y/Y



**2015**  
\$114T = World GDP  
+3% Y/Y



■ Europe ■ N. America ■ Japan ■ China ■ Emerging Asia (ex-China) ■ Lat Am ■ Middle East, Africa, Other

Source: IMF WEO, 4/16. GDP growth based on constant prices (real GDP growth). PPP = Purchasing Power Parity exchange rate, national currency per international dollar. GDP PPP = GDP adjusted by PPP rate. Emerging Asia includes Bangladesh, Cambodia, India, Indonesia, Lao, Malaysia, Mongolia, Myanmar, Nepal, Philipines, Sri Lanka, Thailand, Vietnam and others and excludes China. GDP growth contribution based on annual snapshots stated above and not necessarily reflective of secular trends.

# *China's Gross Capital Formation (Capital Equipment / Roads / Buildings...)*

*Past 6 Years >  
Previous 30 Years*

# China Gross Capital Formation = Slowing... Sum of Past 6 Years > Previous 30 Years



Source: China National Bureau of Statistics, 5/16. Assumes constant FX rate RMB/USD @ 6.5.

Gross capital formation = gross fixed capital formation (majority) + changes in inventory. Gross fixed capital formation includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. It also includes the value of draught animals, breeding stock and animals for milk, for wool and for recreational purposes, and newly increased forest with economic value.

# Shanghai Area Over Past 2+ Decades = Illustrates Magnitude of China (& Emerging Asia) Growth

**Shanghai, China,  
Pudong District**

**1987**



**2016**



Source: Reuters/Stringer, Carlos Barria, Yichen Guo.

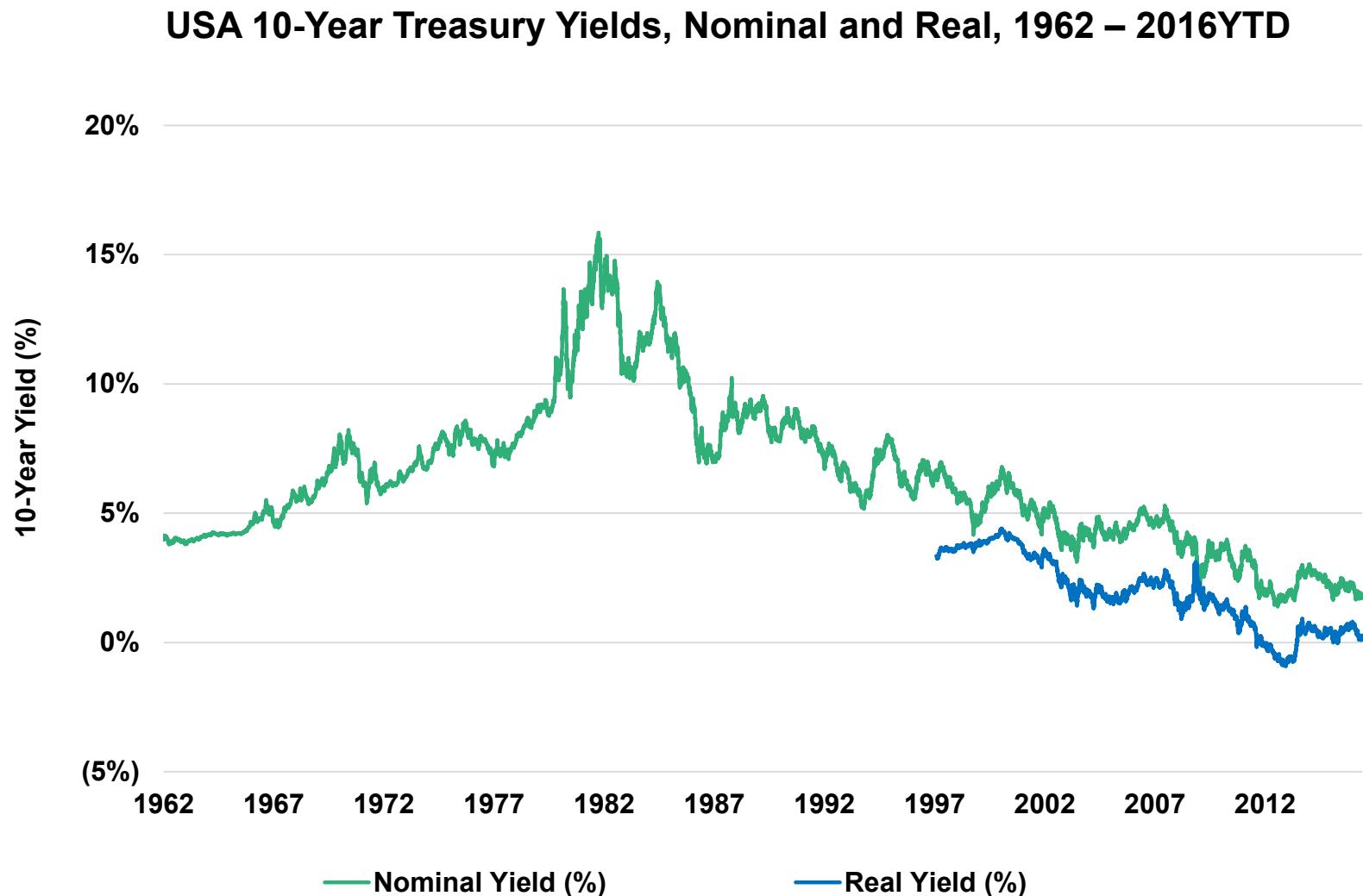
*Re-Imagination of China  
Over Past 3+ Decades –  
World's Population Leader +  
#3 in Land Mass –*

*Helped Drive Incremental  
Global Growth of Likes Which is  
Difficult to Repeat*

*Interest Rates Have Fallen to Historically Low Levels =*

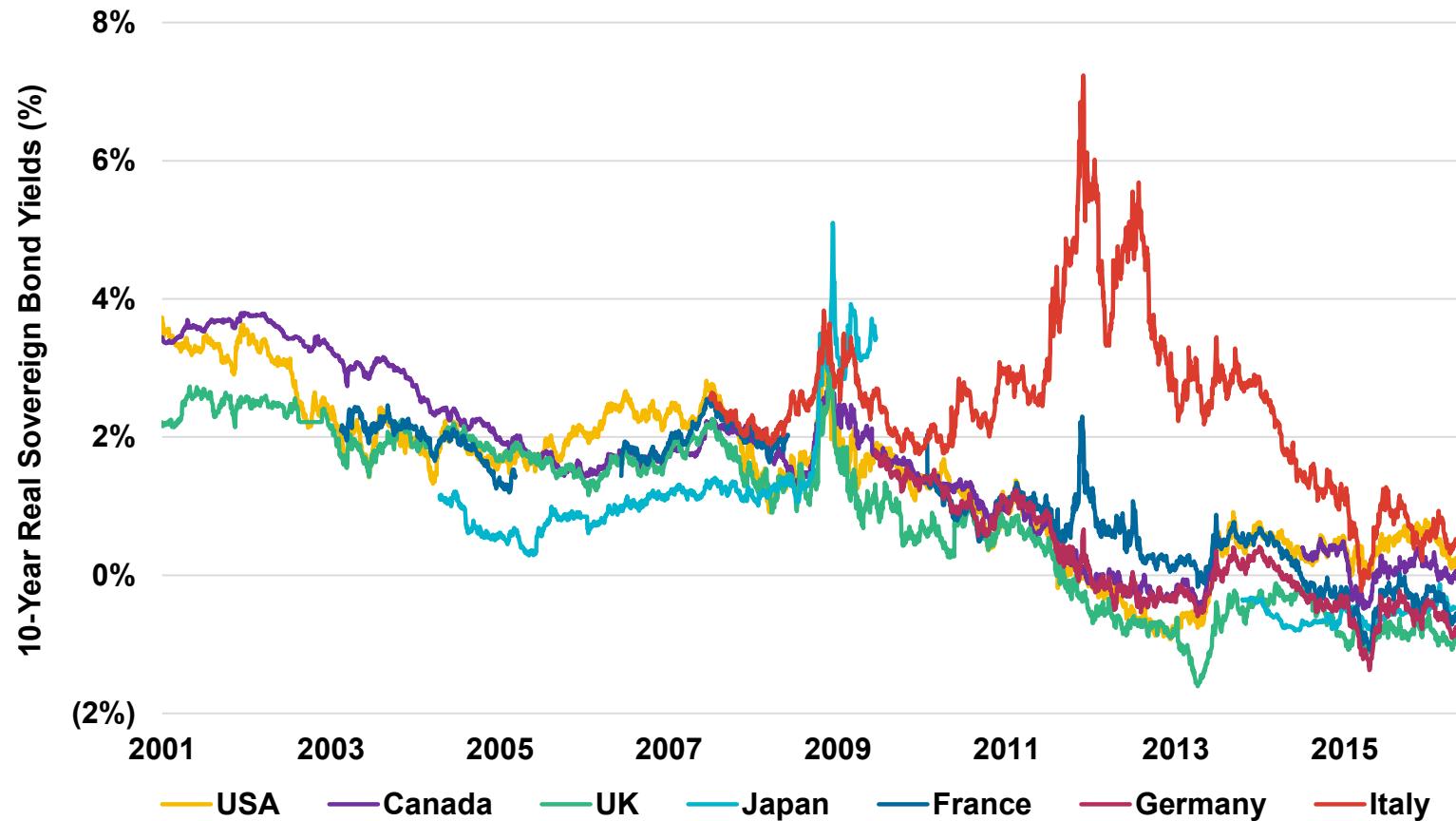
*Interest Rate Trends =  
Can be Indicative of  
Perception for Growth Outlook*

# USA 10-Year Treasury Yield = Low by Historical Standards



# Global 10-Year Bond Yields = Have Trended Down

## 10-Year Real Sovereign Bond Yields (%), Various Countries, 2001 – 2016YTD



Source: Morgan Stanley, Bloomberg, 5/16.

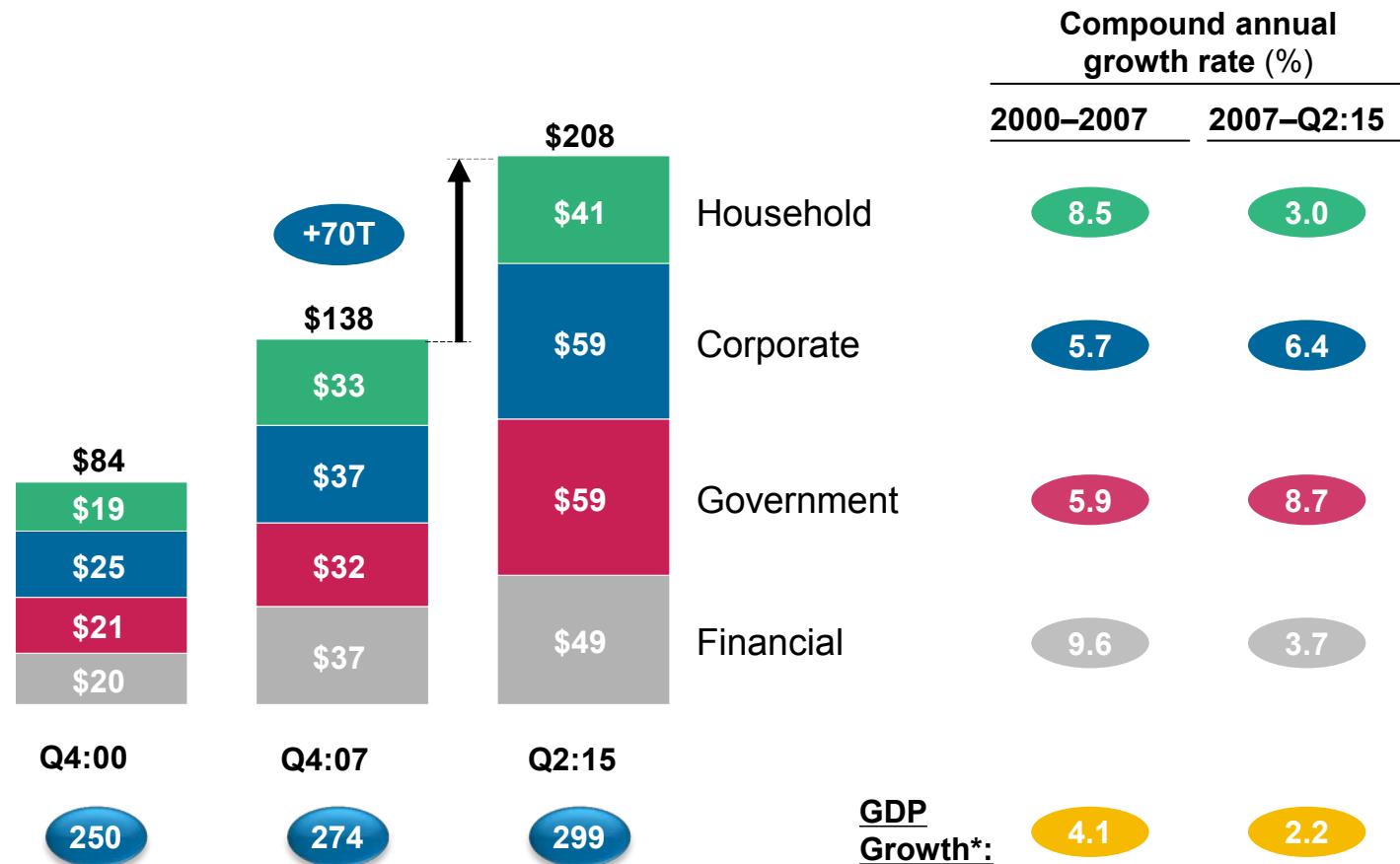
Note: Real rates based on yield to maturity on 10-year inflation-indexed treasury security for each country.

*Total Global Debt Loads  
Over 2 Decades =*

*High & Rising Faster Than GDP*

# Global Government Debt @ 66% Average Debt / GDP (2015) & Up... +9% Annually Over 8 Years vs. +2% GDP Growth\* for 50 Major Countries

## Global Debt By Type (\$T, Constant 2014 FX), Q4:00 – Q2:15

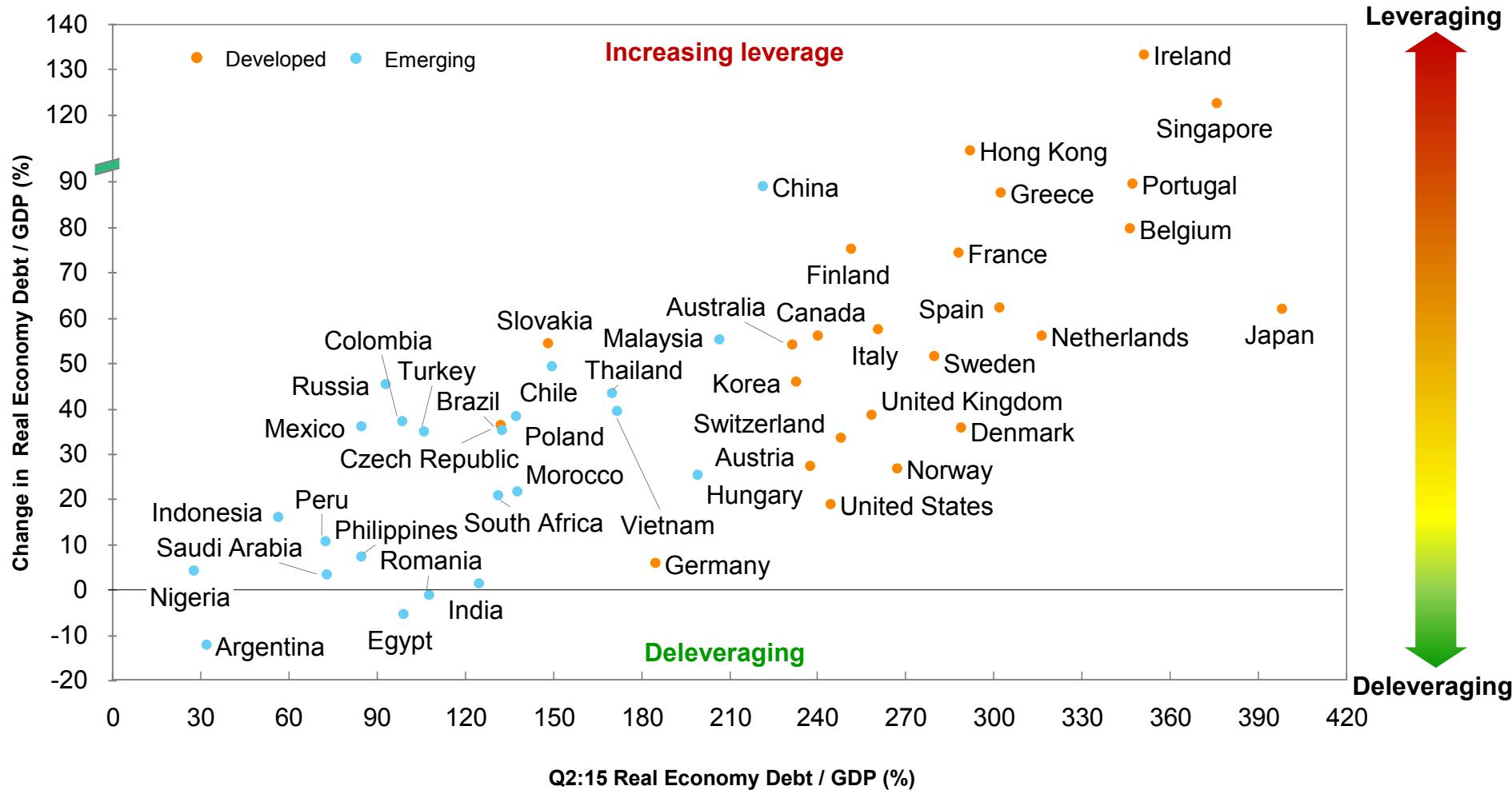


Source: McKinsey Global Institute (3/16), IMF.

\*GDP growth rate based on constant prices and calculated as average of average growth rates across 50 countries from 2000-2007 and 2008-2015.

# Total Debt-to-GDP Ratios = High & Up in Most Major Countries... @ 202% Average vs. 147% (2000)\*

## Change in Real Economy Debt / GDP (%), 2007 – Q2:15

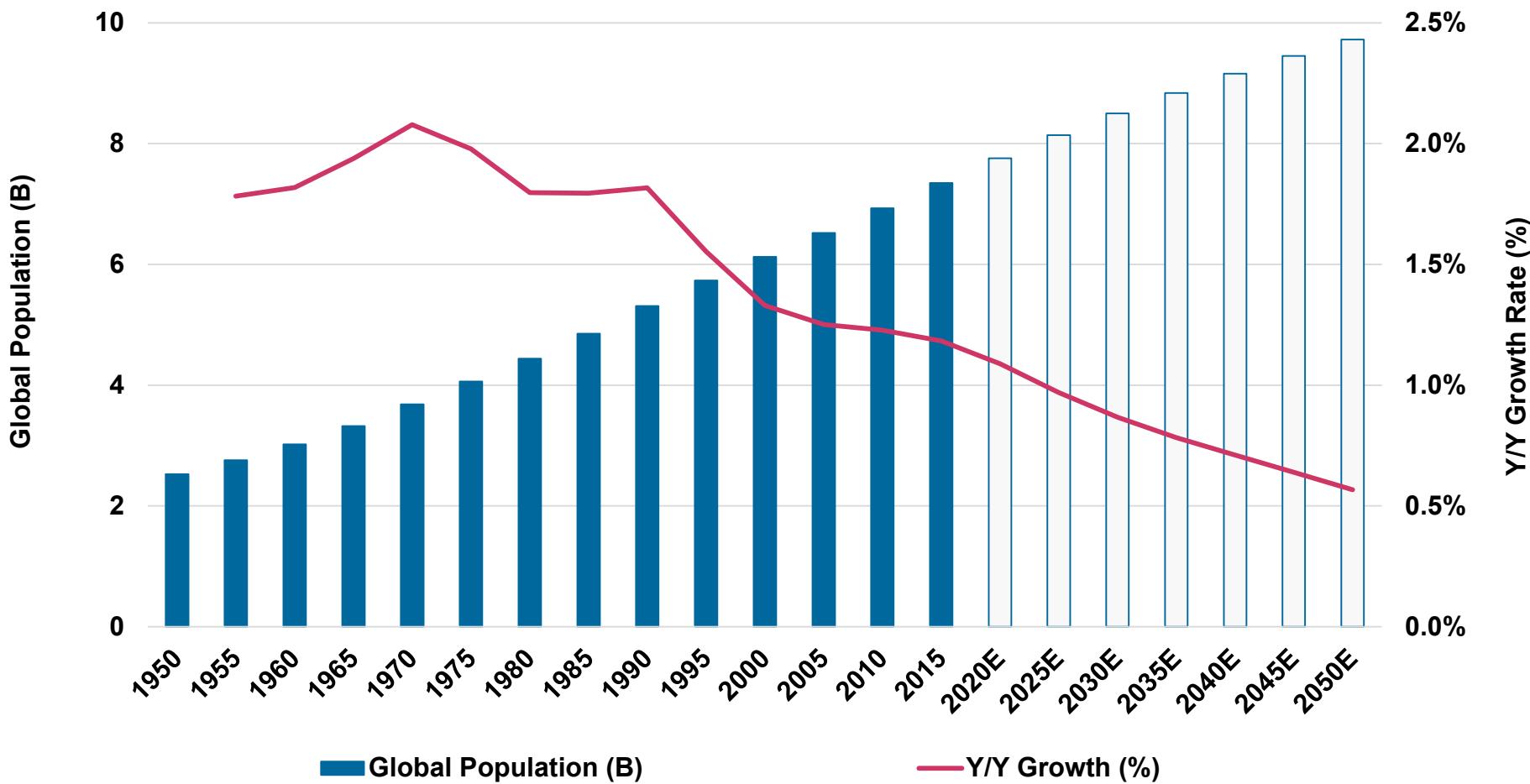


Source: McKinsey Global Institute (3/16). Debt includes that owed by households, non-financial corporates, and governments (i.e. excludes financial sector debt).  
\*Country inclusion per McKinsey; includes top developed countries by GDP and representative geographic selection of emerging countries.

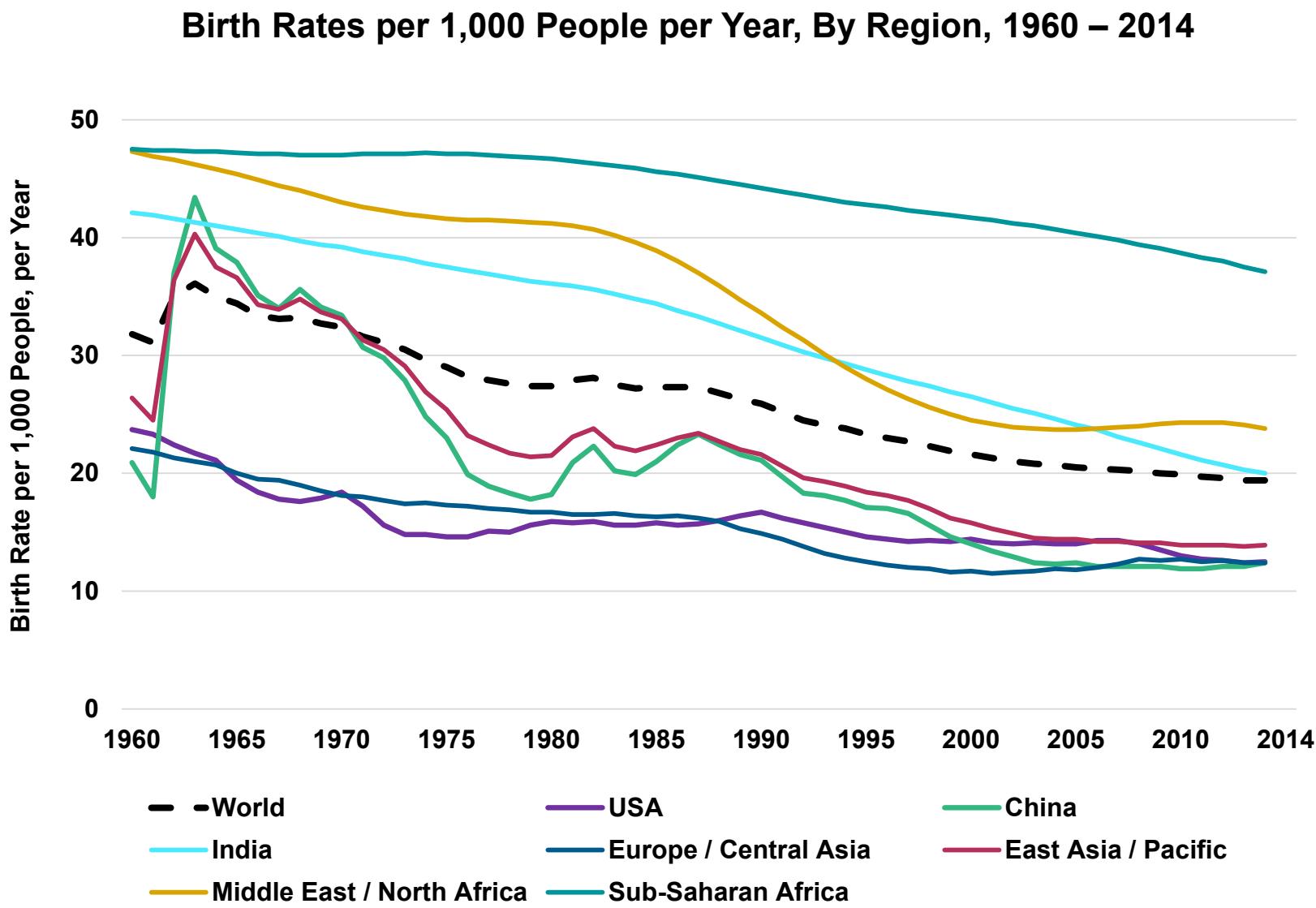
*Demographic Trends =  
Slowing Population Growth...  
Slowing Birthrates +  
Rising Lifespans*

# World Population Growth Rate Slowing = +1.2% vs. +2.0% (1975)

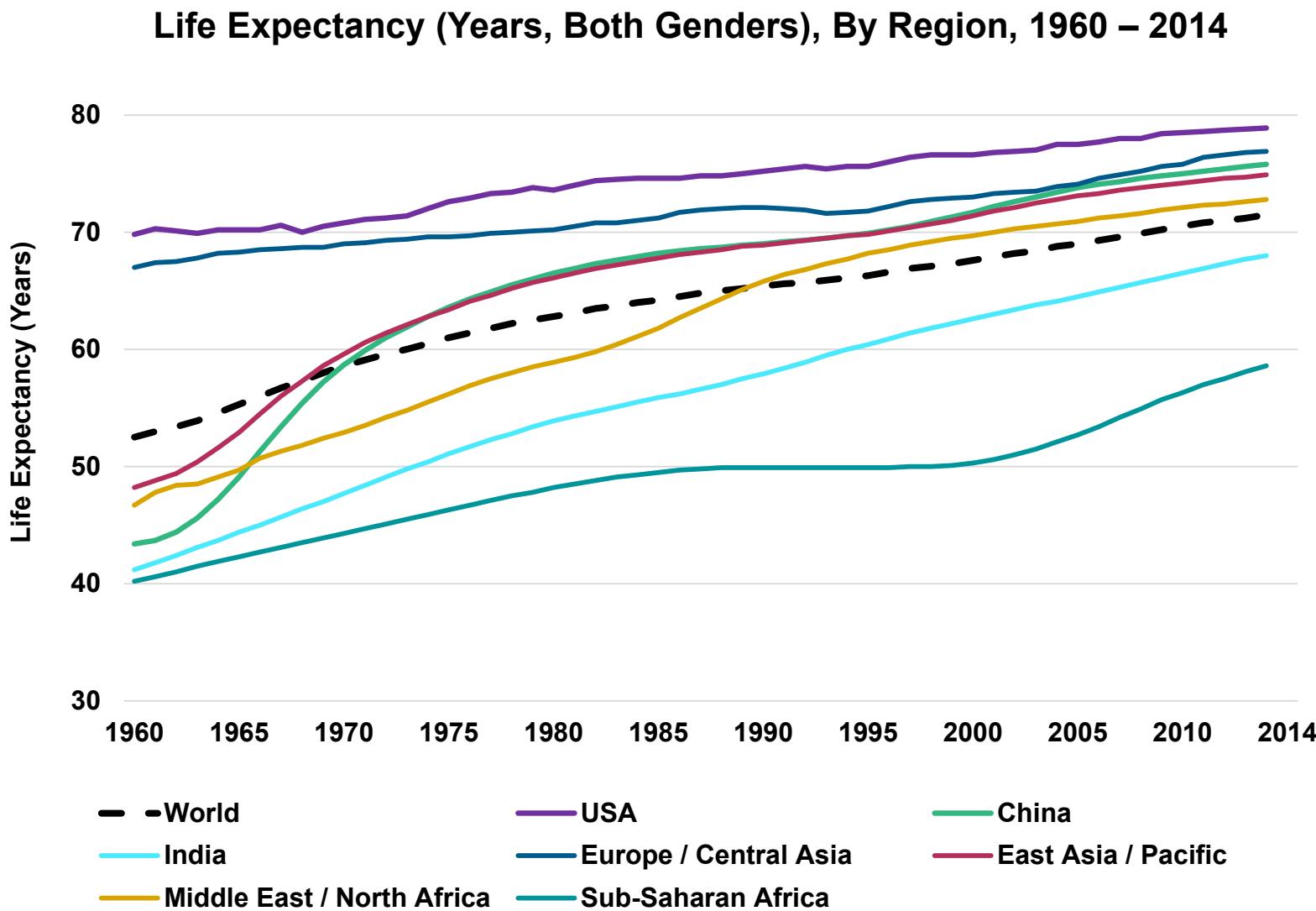
## Global Population and Y/Y % Growth, 1950 – 2050E



# Global Birth Rates = Down 39% Since 1960 (1% Annual Average Decline)



# Global Life Expectancy @ 72 Years = Up 36% Since 1960 (0.6% Annual Average Increase)



*Net, Net,  
Economic Growth Slowing +  
Margins for Error Declining =*

*Easy Growth Behind Us*

# 5 Epic Growth Drivers Over Past 2 Decades = Losing Mojo

## 1) Connectivity Growth Slowing –

Internet Users rose to 3B from 35MM (1995)

## 2) Emerging Country Growth Slowing –

Underdeveloped regions developed – including China / Emerging Asia / Middle East which rose to 69% of global GDP growth from 43%...

## 3) Government Debt Rising (& High) –

Spending rose to help support growth...Government debt-to-GDP rose to 66% from 51% (2000) for 50 major economies

## 4) Interest Rates Have Declined –

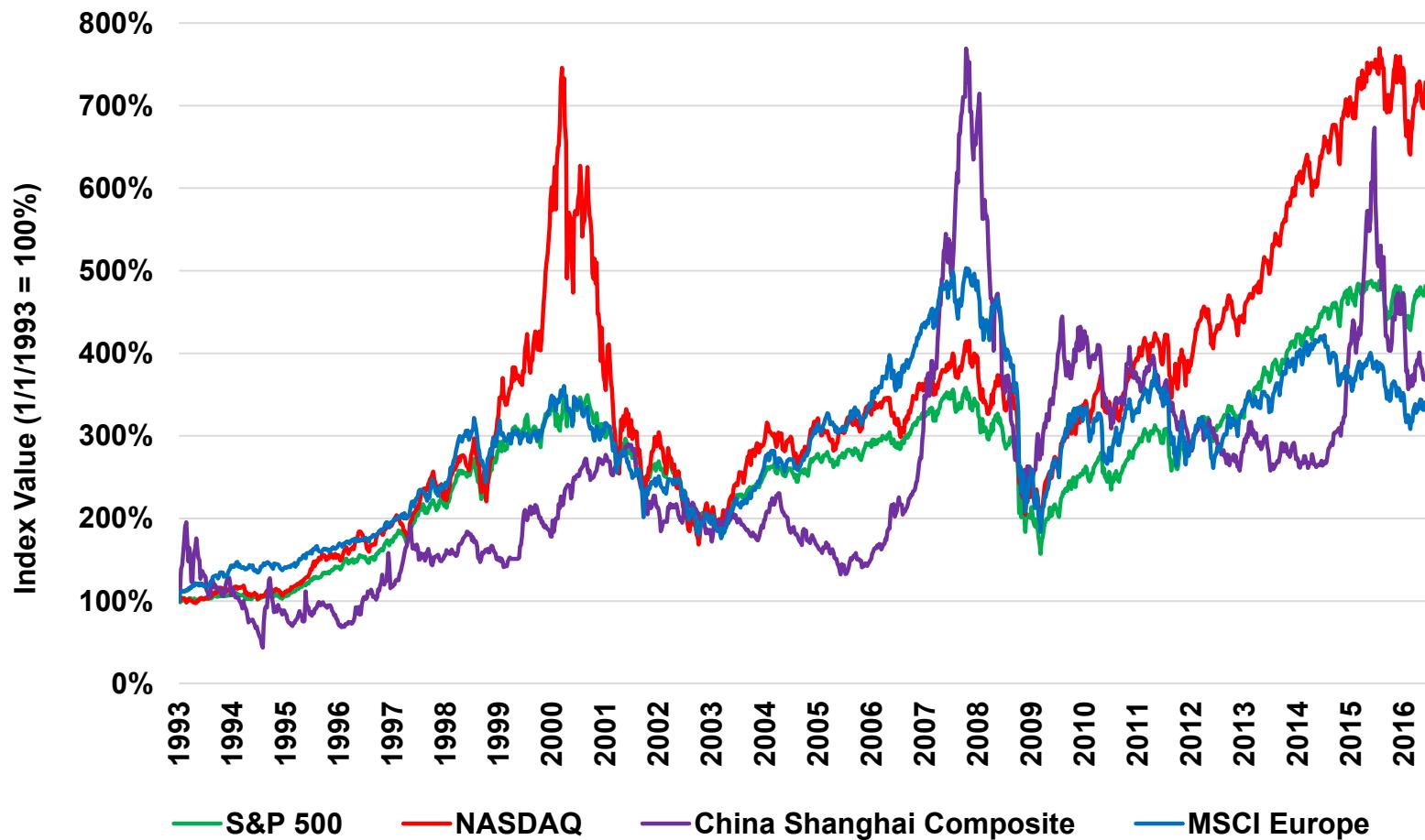
Helped fuel borrowing – USA 10-Year Nominal Treasury Yield fell to 1.9% (2016) from 6.6% (1995)

## 5) Population Growth Rate Slowing & Population Aging –

Higher birth rates helped drive labor force growth – population growth rate continued to fall – to 1.2% from 1.6% (1995)

# Several Up / Down Cycles in Past 2 Decades = Internet 1.0 (2000)...Property / Credit (2008)...

Stock / Commodity Markets Performance (% Change From 1/93), 1/93 – 5/16



*Adjusting to Slower Growth +  
Higher Debt + Aging Population  
Creates Rising Risks...*

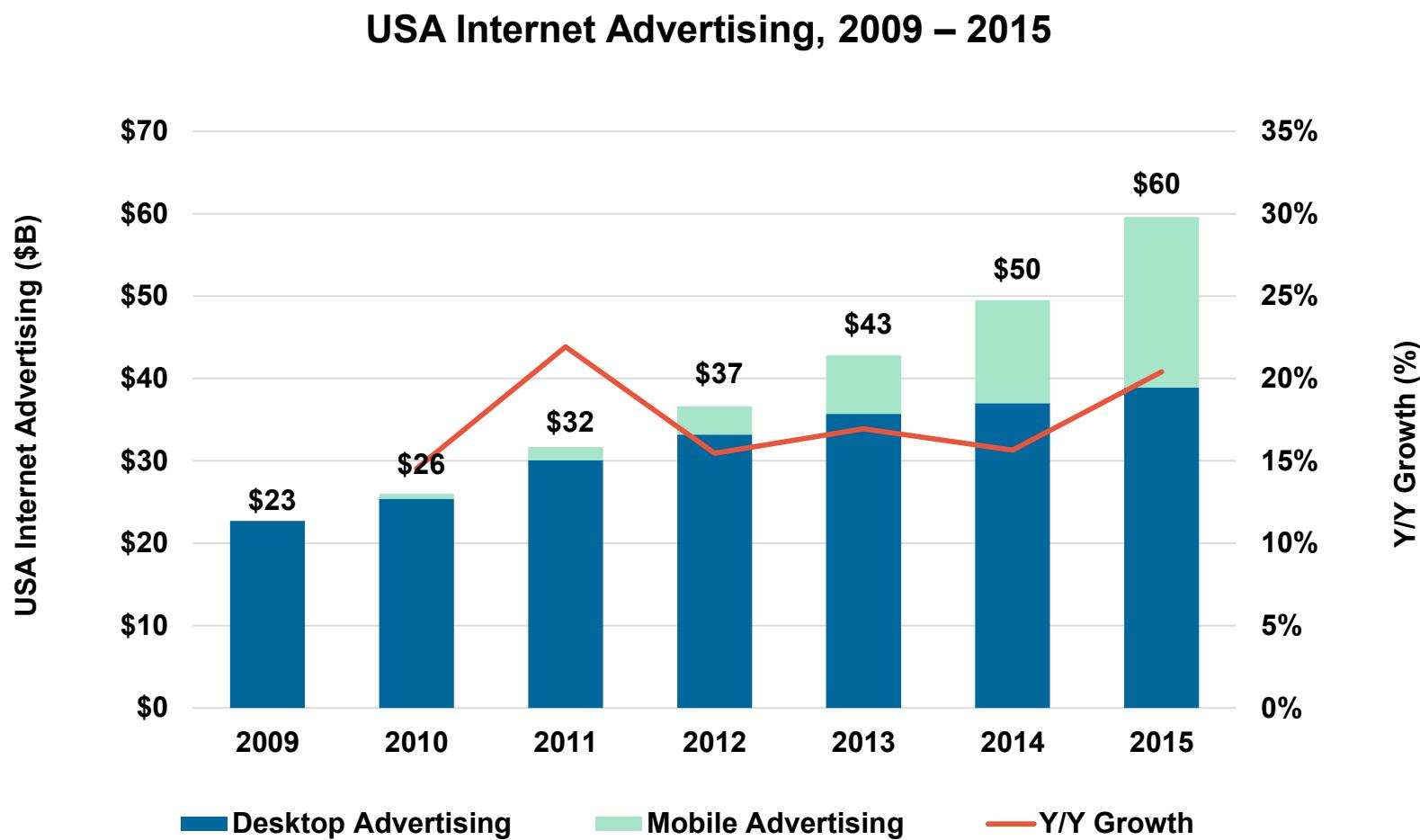
*Creates Opportunities for Businesses that  
Innovate / Increase Efficiency /  
Lower Prices / Create Jobs –  
Internet Can Be @ Core of This...*

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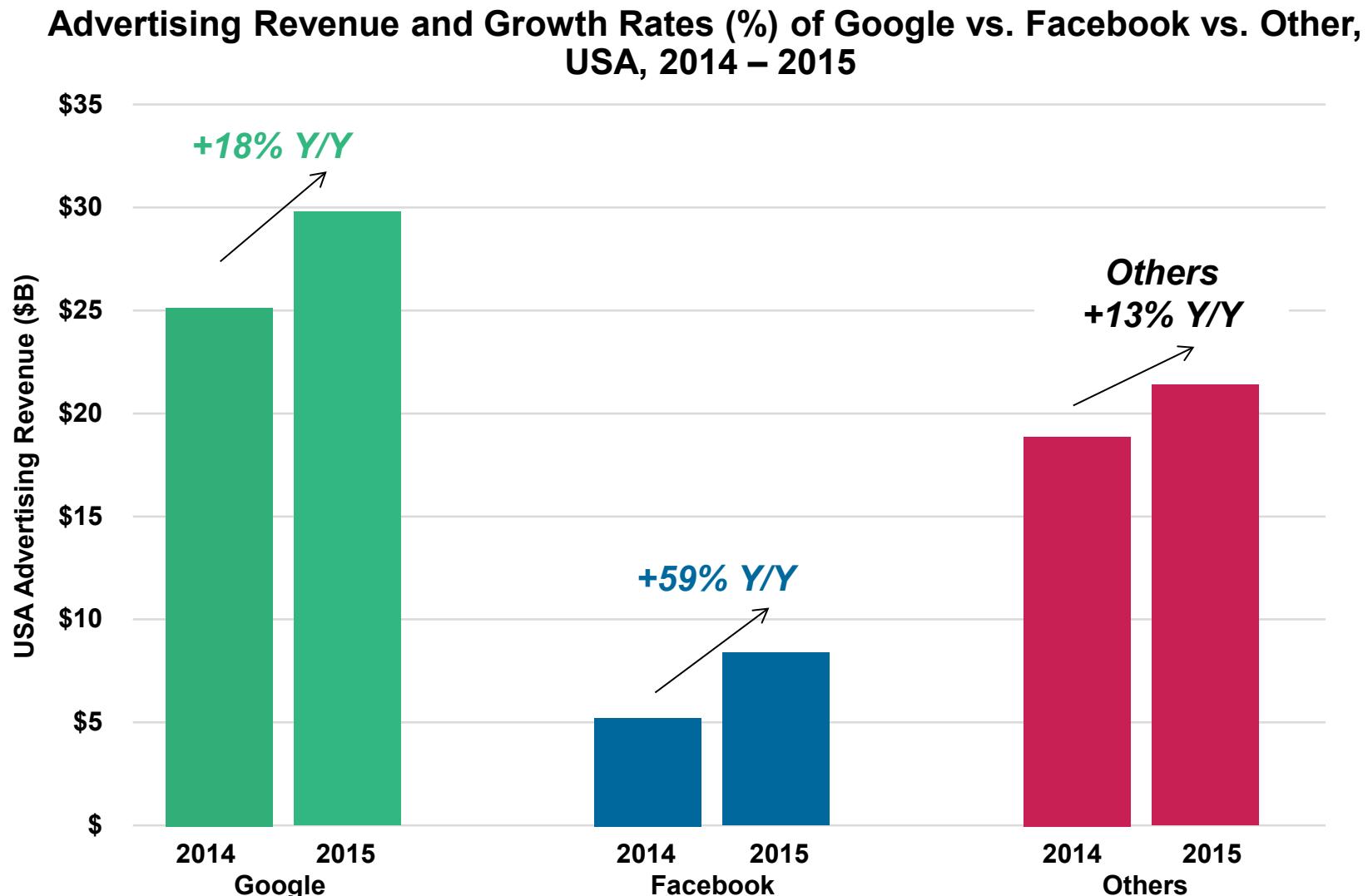
# ADVERTISING / COMMERCE + BRAND TRENDS

*Online Advertising =*  
***Mobile + Majors + Newcomers  
Continue to Crank Away***

# USA Internet Advertising Growth = Accelerating, +20% vs. +16% Y/Y... Owing to Mobile (+66%) vs. Desktop (+5%)

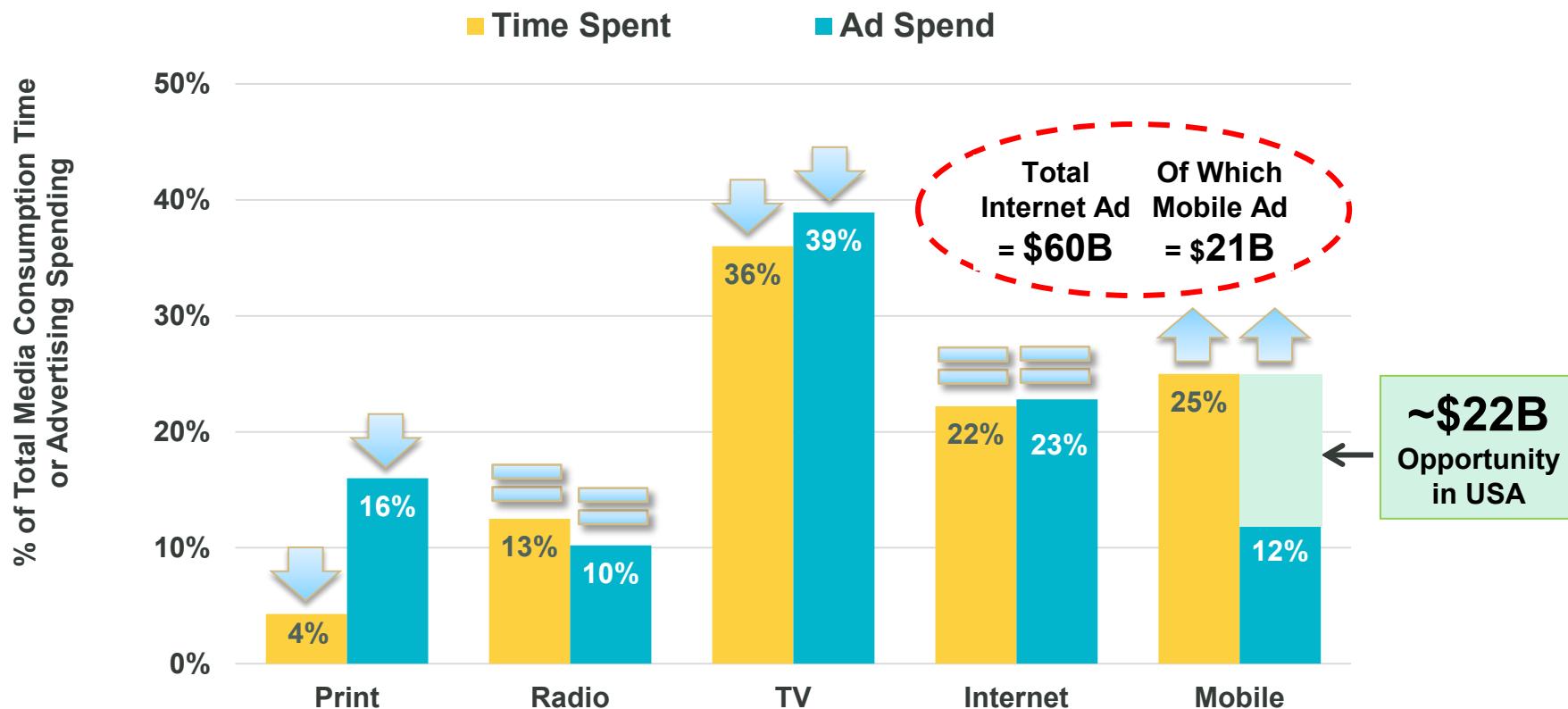


# Google + Facebook = 76% (& Rising) Share of Internet Advertising Growth, USA



Source: IAB / PWC 2015 Advertising Report, Facebook, Morgan Stanley Research  
Note: Facebook revenue include Canada. Google USA ad revenue per Morgan Stanley estimates as company only discloses total ad revenue and total USA revenue. "Others" includes all other USA Internet (mobile + desktop) advertising revenue ex-Google / Facebook.

## % of Time Spent in Media vs. % of Advertising Spending, USA, 2015



Source: Advertising spend based on IAB data for full year 2015. Print includes newspaper and magazine. Internet includes desktop + laptop + other connected devices. ~\$22B opportunity calculated assuming Mobile ad spend share equal its respective time spent share. Time spent share data based on eMarketer 4/16. Arrows denote Y/Y shift in percent share. Excludes out-of-home, video game, and cinema advertising.

# Online Advertising Efficacy = Still Has Long Way to Go

## Google Has Proven Effective Online Advertising Works...

Google = \$75B Revenue (2015), +14% Y/Y / \$510B Market Value (5/31/16)

## ...But Many Online (Video) Ads are Ineffective, per Unruly...

81% = Mute Video Ads

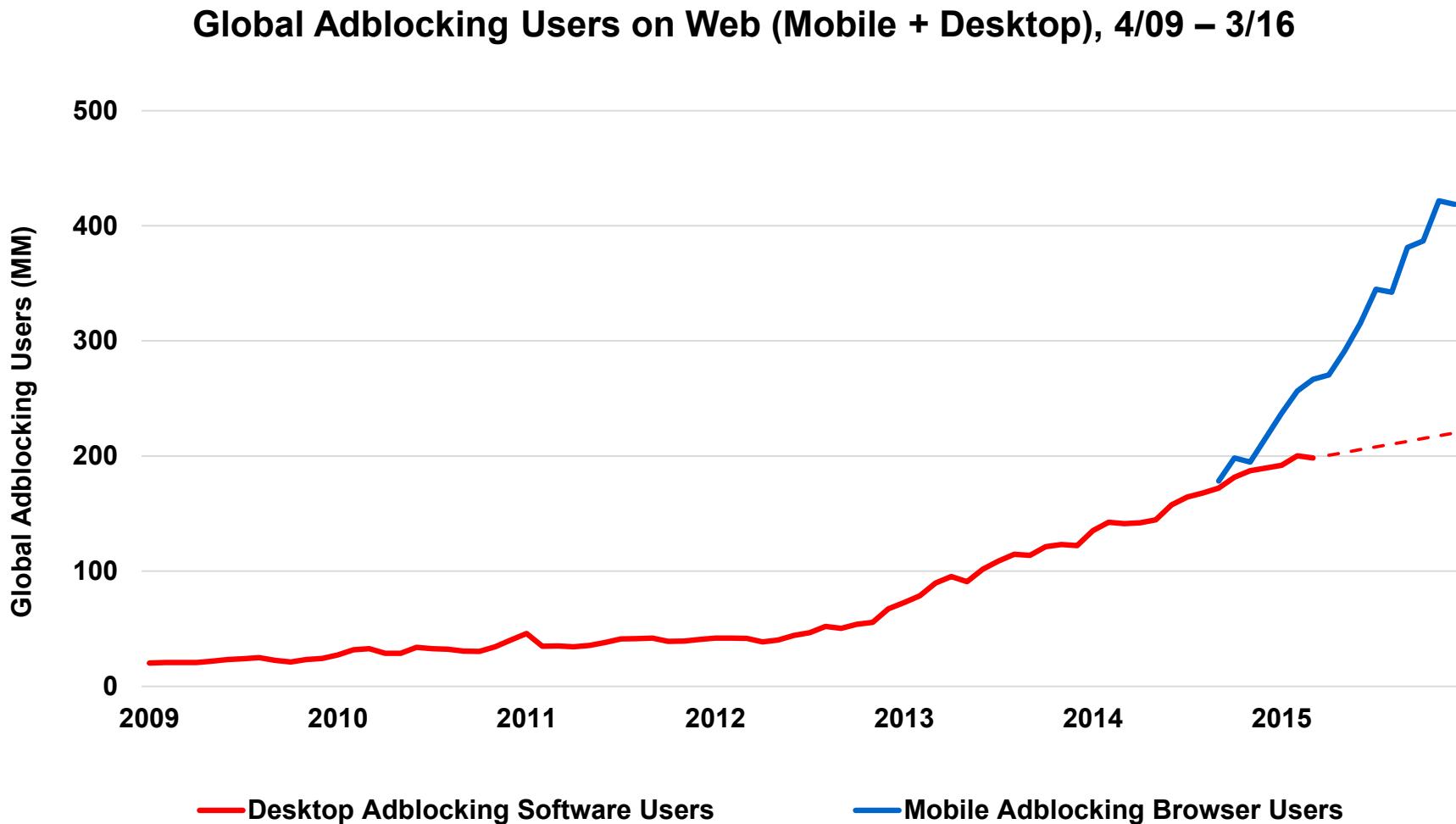
62% = Annoyed with / Put Off by Brand Forcing Pre-Roll Viewing

93% = Consider Using Ad Blocking Software

## ...But There are Ways Video Ads Can Work, per Unruly

- 1) Authentic
- 2) Entertaining
- 3) Evoke Emotion
- 4) Personal / Relatable
- 5) Useful
- 6) Viewer Control
- 7) Work with Sound Off
- 8) Non-Interruptive Ad Format

Adblocking @ ~220MM Desktop Users (+16% Y/Y)...~420MM+ Mobile (+94%)...  
Majority in China / India / Indonesia = Call-to-Arms to Create Better Ads, per PageFair



Source: PageFair, 5/16. Dotted line represents estimated data. These two data sets have not been de-duplicated. The number of desktop adblockers after 6/15 are estimates based on the observed trend in desktop adblocking and provided by PageFair. Note that mobile adblocking refers to web / browser-based adblocking and not in-app adblocking.  
Desktop adblocking estimates are for global monthly active users of desktop adblocking software between 4/09 – 6/15, as calculated in the PageFair & Adobe 2015 Adblocking Report. Mobile adblocking estimates are for global monthly active users of mobile browsers that block ads by default between 9/14 – 3/16, including the number of Digicel subscribers in the Caribbean (added 10/15), as calculated in the PageFair & Priori Data 2016 Adblocking Report.

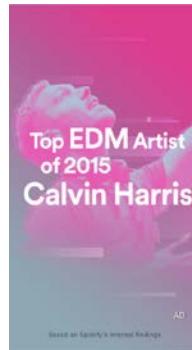
# Video Ads that Work = Authentic / Entertaining / In-Context / Often Brief

## ***Snapchat's 3V Advertising***

**Vertical** (Made for Mobiles) / **Video** (Great Way to Tell Story) / **Viewing** (Always Full Screen)

**Spotify (10-Second Ad) in...  
Snapchat Live Stories + Discover**

**26MM+ Views, 12/15**



**+30% Lift in Subscription Intent,  
2x More Effective Than  
Typical Mobile Channels**

**Furious 7 (10-Second Ad) in...  
Ultra Music Festival Miami Live Story**

**14MM+ Views, 3/15**



**+3x Attendance Among Target Demo for  
Snapchatters vs. Non-Snapchatters  
= Opening Weekend Box Office**

***Commerce + Brands =  
Evolving Rapidly By / For  
This Generation***

*Each Generation Has  
Slightly Different Core Values +  
Expectations...*

*Shaped by Events that  
Occur in Their Lifetimes*

# Consumer Preference / Value Evolution by Generation, USA...

## Millennials = More Global / Optimistic / Tolerant..., per Acosta



	<b>Silent</b>	<b>Baby Boomers</b>	<b>Gen X</b>	<b>Millennials</b>
<b>Birth Years</b>	1928 – 1945	1946 – 1964	1965 – 1980	1981 – 1996
<b>Year Most of Generation 18-33 Years Old</b>	1963	1980	1998	2014
<b>Summary</b>	<ul style="list-style-type: none"> <li>Grew up during Great Depression</li> <li>Fought 2nd “war to end all wars”</li> <li>Went to college on G.I. Bill</li> <li>Raised “nuclear” families in time of great prosperity + Cold War</li> </ul>	<ul style="list-style-type: none"> <li>Grew up during time of idealism with TV + car for every suburban home</li> <li>Apollo, Civil Rights, Women’s Liberation</li> <li>Disillusionment set in with assassination of JFK, Vietnam War, Watergate + increase in divorce rates</li> </ul>	<ul style="list-style-type: none"> <li>Grew up during time of change politically, socially + economically</li> <li>Experienced end of the Cold War, Reaganomics, shift from manufacturing to services economy, + AIDS epidemic</li> <li>Rise of cable TV + PCs</li> </ul>	<ul style="list-style-type: none"> <li>Grew up during digital era with internet, mobile computing, social media + streaming media on iPhones</li> <li>Experiencing time of rising globalization, diversity in race + lifestyle, 9/11, war on terror, mass murder in schools + the Great Recession</li> </ul>
<b>Core Values</b>	<ul style="list-style-type: none"> <li><b>Discipline</b></li> <li><b>Dedication</b></li> <li><b>Family focus</b></li> <li><b>Patriotism</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Anything is possible</b></li> <li><b>Equal opportunity</b></li> <li><b>Question authority</b></li> <li><b>Personal gratification</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Independent</b></li> <li><b>Pragmatic</b></li> <li><b>Entrepreneurial</b></li> <li><b>Self reliance</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Globally minded</b></li> <li><b>Optimistic</b></li> <li><b>Tolerant</b></li> </ul>
<b>Work / Life Balance</b>	<ul style="list-style-type: none"> <li>Work hard for job security</li> </ul>	<ul style="list-style-type: none"> <li>Climb corporate ladder</li> <li>Family time not first on list</li> </ul>	<ul style="list-style-type: none"> <li>Work / life balance important</li> <li>Don’t want to repeat Boomer parents’ workaholic lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>Expanded view on work / life balance including time for community service + self-development</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>Have assimilated in order to keep in touch and stay informed</li> </ul>	<ul style="list-style-type: none"> <li>Use technology as needed for work + increasingly to stay in touch through social media such as Facebook</li> </ul>	<ul style="list-style-type: none"> <li>Technology assimilated seamlessly into day-to-day life</li> </ul>	<ul style="list-style-type: none"> <li>Technology is integral</li> <li>Early adopters who move technology forward</li> </ul>
<b>Financial Approach</b>	<ul style="list-style-type: none"> <li>Save, save, save</li> </ul>	<ul style="list-style-type: none"> <li>Buy now, pay later</li> </ul>	<ul style="list-style-type: none"> <li>Cautious, conservative</li> </ul>	<ul style="list-style-type: none"> <li>Earn to spend</li> </ul>

Source: Acosta Inc., Pew Research

Image: Doomsteaddinner.net, Billboard.com, Metro.co.uk

Note: Data from Acosta as of 7/13. Pew Research Center tabulations of the March Current Population Surveys (1963, 1980, 1998, and 2014). Pew Research defines each generation and may differ from other sources as there are varying opinions on what years each generation begin and end.

# Characteristic Evolution by Generation @ Peak Adult Years (18-33), USA...

## Millennials = More Urban / Diverse / Single...



	<b>Silent</b>	<b>Baby Boomers</b>	<b>Gen X</b>	<b>Millennials</b>
<b>Birth Years</b>	1928 – 1945	1946 – 1964	1965 – 1980	1981 – 1996
<b>Year Most of Generation 18-33 Years Old</b>	1963	1980	1998	2014
<b>Location</b> When Ages 18-33 <i>Metropolitan as % Total</i>	64%	68%	83%	86%
<b>Diversity</b> When Ages 18-33 <i>White as % Total</i>	84%	77%	66%	57%
<b>Marital Status</b> When Ages 18-33 <i>Married as % Total</i>	64%	49%	38%	28%
<b>Education by Gender</b> When Ages 18-33 <i>% with Bachelor's Degree</i>	12% Male / 7% Female	17% Male / 14% Female	18% Male / 20% Female	21% Male / 27% Female
<b>Employment Status by Gender</b> When Ages 18-33 <i>Employed as % Total*</i>	78% Male / 38% Female	78% Male / 60% Female	78% Male / 69% Female	68% Male / 63% Female
<b>Median Household Income **</b> When Ages 18-33	N/A	\$61,115	\$64,469	\$62,066
<b>Population of Generation</b> When Ages 18-33	35MM	61MM	60MM	68MM

Source: Pew Research

Image: Doomsteaddiner.net, Billboard.com, Metro.co.uk

Note: "Only shows those that were civilian employed (i.e. excludes armed forces, unemployed civilians, and those not in labor force). \*\*Median household income shown in 2015 dollars. Pew Research Center tabulations of the March Current Population Surveys (1963, 1980, 1998, and 2014). Pew Research defines each generation and may differ from other sources as there are varying opinions on what years each generation begin and end."

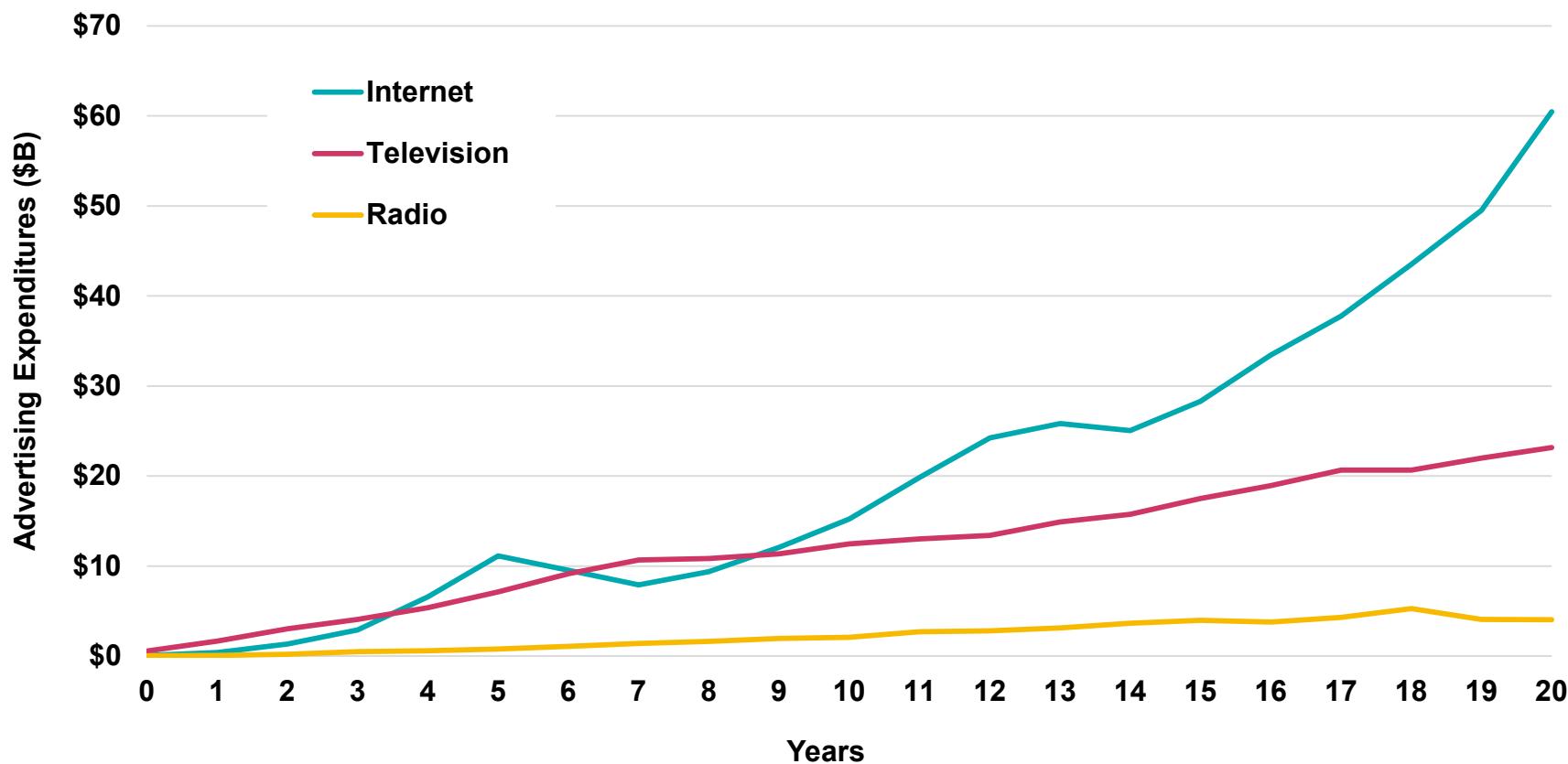
*Marketing Channels  
Evolve With Time...*

*Shaped by Evolution of  
Technology + Media*

# Each New Marketing Channel = Grew Faster...

Internet > TV > Radio

## Advertising Expenditure Ramp by Channel, First 20 Years, USA, 1926 – 2015 *(In 2015 Dollars)*



Source: McCann Erickson (1926-1979); Morgan Stanley Research, Magna, RAB, OAAA, IAB, NAA, PIB (1980-2015)

Note: Data adjusted for inflation and shown in 2015 U.S. dollars. Television consists of cable and broadcast television advertising. Radio consists of network, national spot, local spot, and streaming audio advertising. Internet consists of mobile and desktop advertising.

*Retailing Channels  
Evolve With Time...*

*Shaped by Evolution of  
Technology + Distribution*

# Evolution of Commerce Over Past ~2 Centuries, USA = Stores → More Stores → Malls → E-Commerce

**Corner / General Stores**  
1800s



**Supermarkets**  
1930s



**Discount Chains**  
1950-60s



**Wholesale Clubs**  
1970-80s



Illustrative Generational Overlap

Millennials

Generation X

Baby Boomers

Silent Generation

**Department Stores**  
Mid-1800s



**Shopping Malls**  
1950s



**Superstores**  
1960-80s

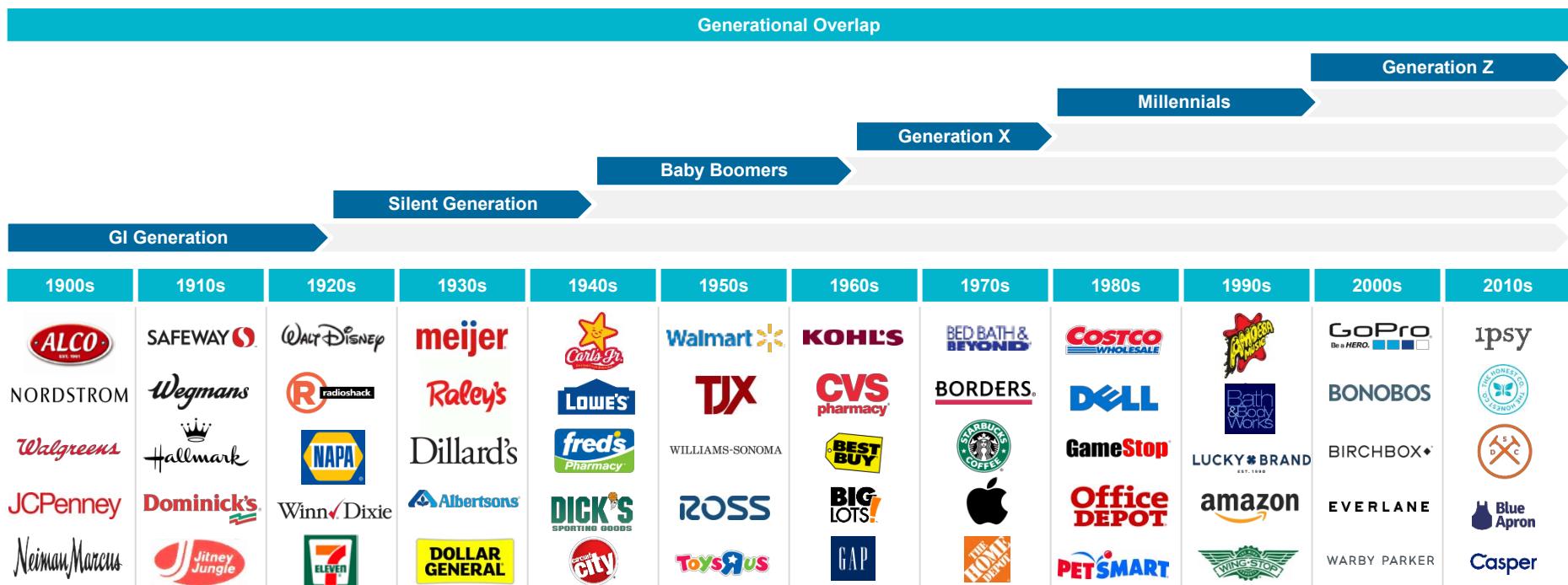


**E-Commerce**  
1990s



# New / Emerging Retailers Optimize for Generational Change = J.C. Penney → Meijer → Walmart → Costco → Amazon → Casper

## Retail Companies Founded by Decade (Illustrative Example), USA, 1900 – 2015



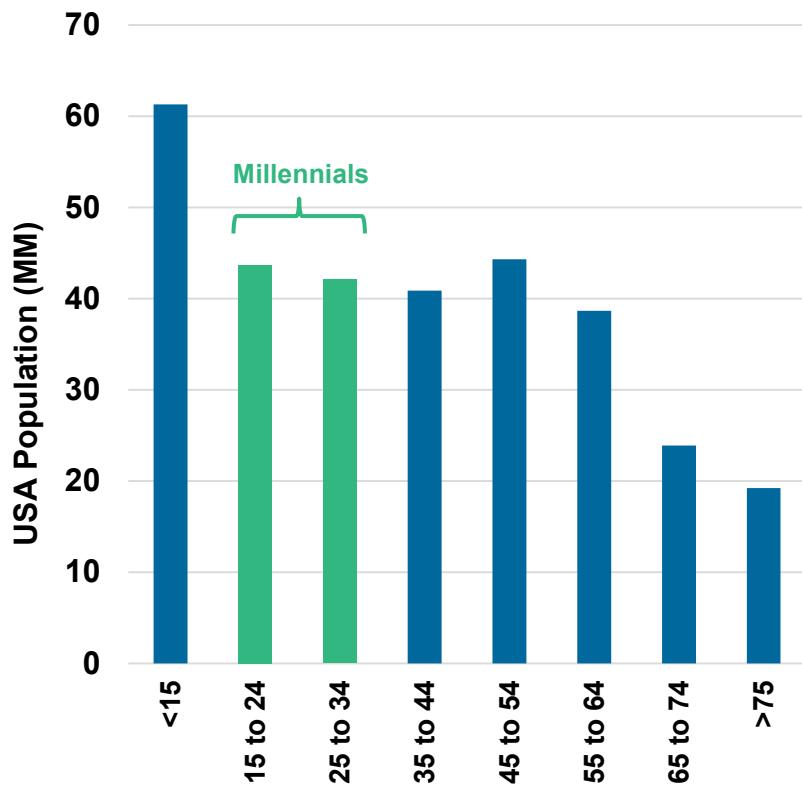
Source: KPCB, Retailindustry.about.com (1900s – 1980s), Ranker (1990s), Internet Retailer "2016 Top 500 Guide" (2000s – 2010s)

Note: Companies shown above in chronological order by founding year by decade. Companies from 2000s onwards selected as diverse set of fast-growing companies based on web sales data from the Internet Retailer "2016 Top 500 Guide." Gen Z defined as those born after 2000. In 2015, they are ages 0-15. Millennials defined as those born between 1980 and 2000. In 2015, they are ages 15-35. Gen X defined as those born between 1965 and 1979. In 2015, they are ages 36-50. Boomers defined as those born between 1946-1964. In 2015, they are ages 51-70. Silents defined as those born between 1925 – 1945. In 2015, they are ages 71 – 90. GI Generation defined as those born between 1900 – 1924. In 2015, they are age 91 – 115. Note there are varying opinions on what years each generation begin and end.

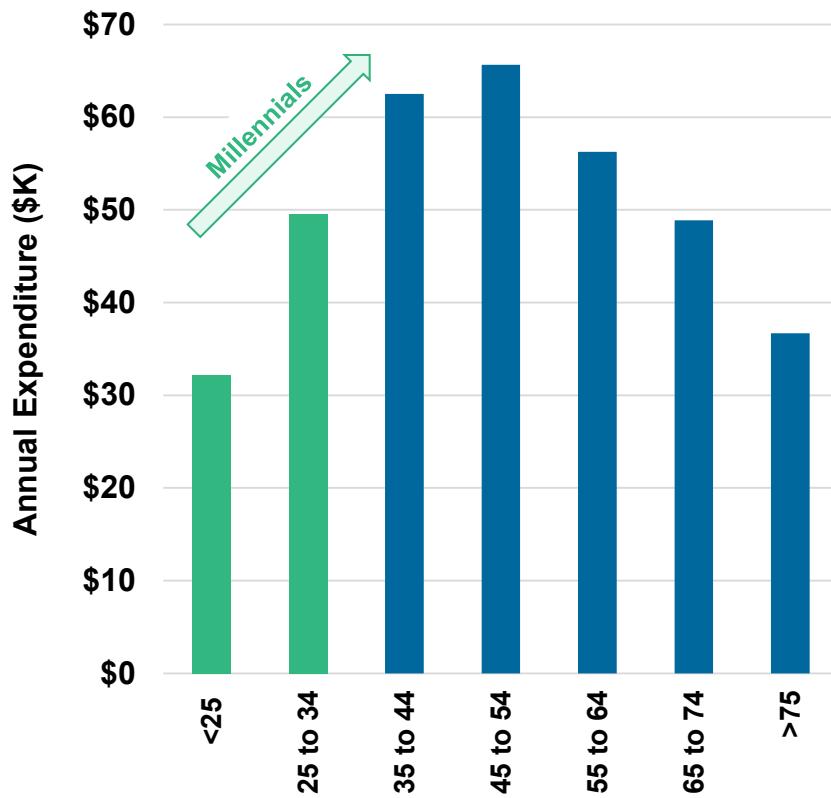
*Millennials =  
Impacting + Evolving Retail...*

# Millennials @ 27% of Population = Largest Generation, USA... Spending Power Should Rise Significantly in Next 10-20 Years

Population by Age Range, USA, 2014



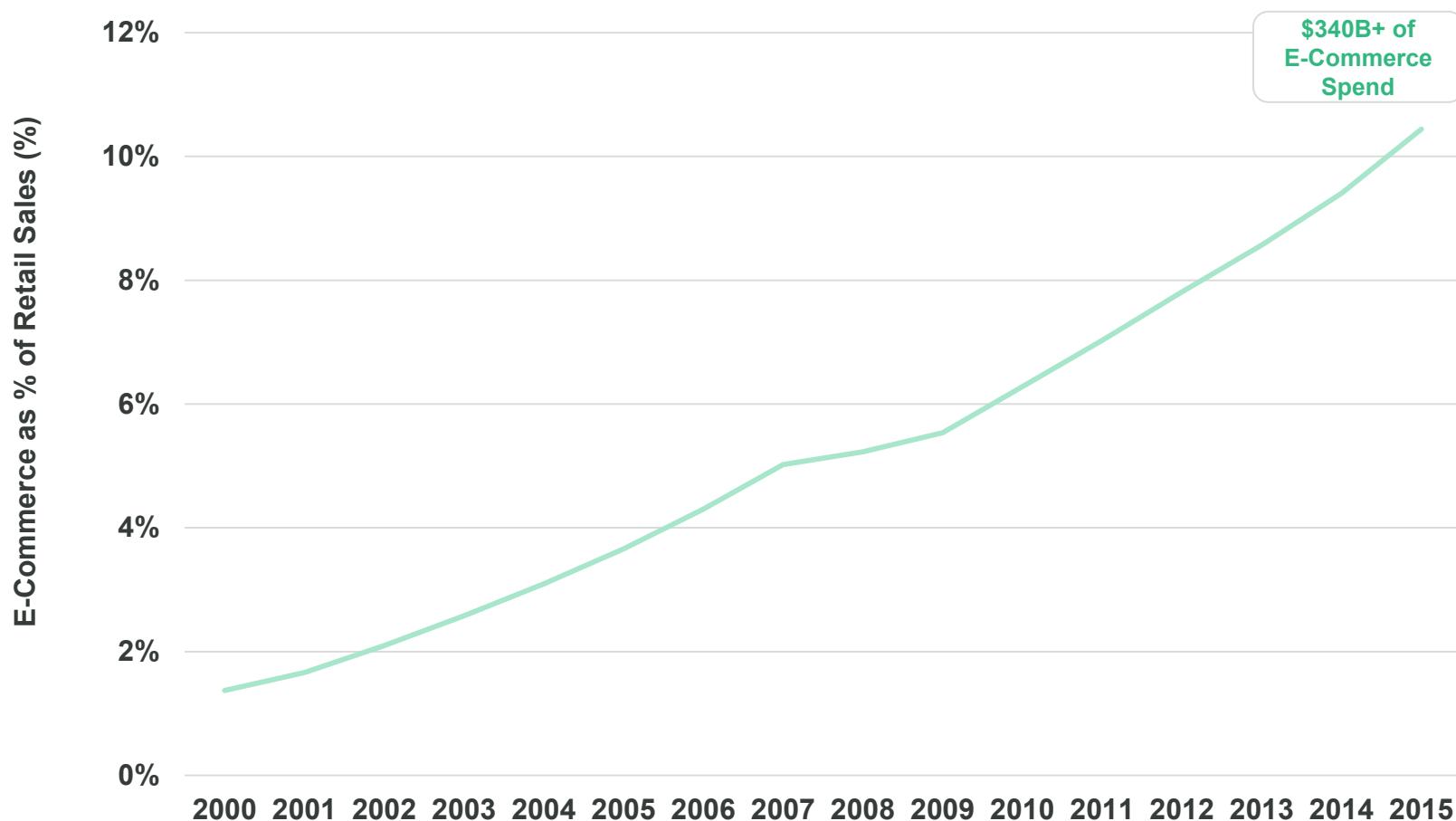
Household Expenditure, Annual Average, by Age of Reference Person, USA, 2014



Source: U.S. Census Bureau "2010-2014 American Community Survey 5-Year Estimates", Bureau of Labor Statistics "Consumer Expenditure Survey 2014"  
Note: Millennials defined as persons born between 1980 – 2000. There are varying opinions on what years each generation begin and end.

# Internet Continues to Ramp as Retail Distribution Channel = 10% of Retail Sales vs. <2% in 2000

## E-Commerce as % of Total Retail Sales, USA, 2000 – 2015



Source: U.S. Census Bureau, Federal Reserve Bank of St. Louis (5/16)  
Note: E-commerce and retail sales data are seasonally adjusted. Retail sales exclude food services, retail trade from gasoline stations, and retail trade from automobiles and other motor vehicles.

*Retail =  
Technology + Media + Distribution  
Increasingly Intertwined*

# Retail – The New Normal = Drive Transaction Volume → Collect / Use Data → Launch New Products / Private Labels...

## Amazon – *Private Label Brand Launches, 2004 – 2015*

### Outdoor Furniture

Strathwood  
2004



% Total Amazon Purchasers  
Which Purchased Home &  
Garden Products:  
**11%**

### Home Goods

Pinzon  
2008



% Total Amazon Purchasers  
Which Purchased Household  
Products:  
**10%**

### Electronic Accessories

AmazonBasics  
2009



% Total Amazon Purchasers  
Which Purchased  
Electronics (<\$50) Products:  
**21%**

### Fashion Brands

Franklin & Freeman, Franklin  
Tailored, James & Erin, Lark & Ro,  
North Eleven, Scout + Ro, Society  
New York  
2015



% Total Amazon Purchasers  
Which Purchased:  
  
Men's Apparel – **12%**  
Women's Clothing – **9%**

# ...Products Become Brands...Brands Become Retailers... Retailers Become Products / Brands...Retailers Come Into Homes...

*Less differentiation between products / brands / retailers as single products evolve into brands + consumers shop directly from brands + retailers leverage insights to develop own vertically-integrated brands...New distribution models emerging enabling direct-to-consumer commerce in the home...*

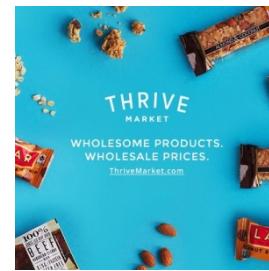
**Products →  
Brands  
(Casper)**



**Brands →  
Retailers  
(Warby Parker)**



**Retailers →  
Products / Brands  
(Thrive Market)**



**New DTC  
Distribution Models  
(Stitch Fix)**



# ...Physical Retailers Become Digital Retailers... Digital Retailers Become Data-Optimized Physical Retailers...

Physical Retailers Evolving & Increasing E-Commerce Presence...New Products / Brands / Retailers Launching Physical Stores / Showrooms / Retail Channels...Omni-Channel is Key...Warby Parker @ \$3K Annual Sales per Square Foot = One of Top Grossing Physical Retailers per Square Foot in USA

## Offline → Online (Neiman Marcus)

**26% of F2015 Sales on Internet, +24% Y/Y**



## Online → Offline (Warby Parker)



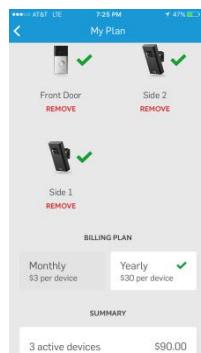
31 locations (5/16),  
up from 10 locations  
(12/14)

## Top 5 Physical Retailers by Sales / Sq. Ft., USA, 2015\*

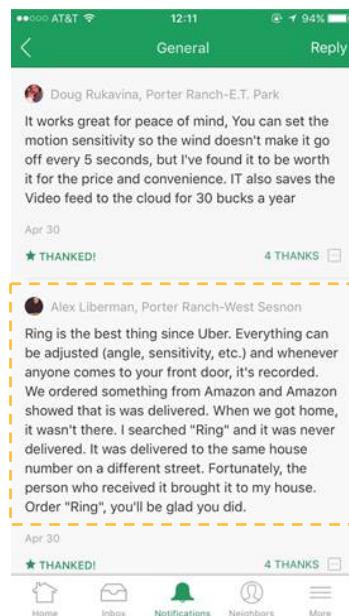


# ...Connected Product Users Easily Notified When to Buy / Upgrade... Can Benefit from Viral Sharing

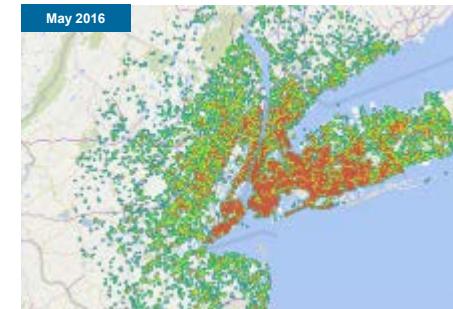
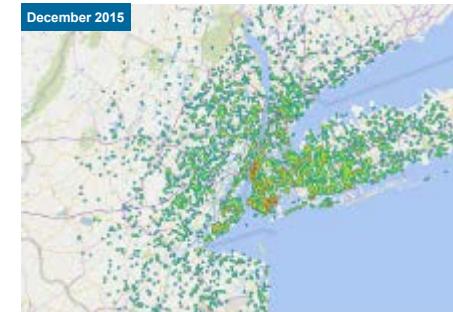
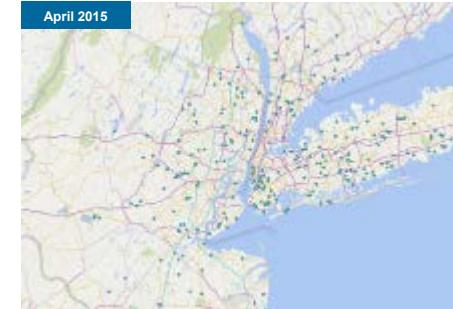
## Ring Connected Devices with Sharable Content



## Sharing of Events Captured on Ring on Neighborhood Level – Nextdoor, TV...



## Proliferation of Ring Connected Devices Serving Broader Communities



*Internet-Enabled  
Retailers / Products / Brands  
On Rise =*

*Bolstered by  
Always-On Connectivity +  
Hyper-Targeted Marketing +  
Images + Personalization*

# Hyper-Targeted Marketing = Driving Growth for Retailers / Products / Brands

***Internet = Driving Force for New Product Introductions with Hypertargeting / Intent-Based Marketing via Facebook / Twitter / Instagram / Google...***

## Combatant Gentlemen



'Our customer acquisition strategy was Facebook. Our [target customer] typically spends a lot of time on Facebook...**Every \$100 we spent on Facebook was worth \$1,000 in sales. For us, it was a simple math equation.'**

'We target based on [Facebook] likes...For example, **we have a lot of guys in real estate who are climbing up the ladder. What we do is we put these guys into cohorts and we say, 'These are our real estate guys.'**

- Vishaal Melwani

CEO and Founder, Combatant Gentlemen

## Stance



1,083 likes  
stancesocks Stance has embraced its inner Jedi to deliver socks that any true Star Wars fan will appreciate.  
view all 206 comments

After noticing that its Instagram placements were outperforming all other placement types in its Star Wars collection launch campaign, Stance decided to create a dedicated ad set to maximize its ad spend against this placement & build upon Instagram's unique visual nature and strong targeting capabilities.

Stance targeted the ads to adults whose interests include the Star Wars movies, but excluded those interested only in specific Star Wars characters. The 'Sock Wars' campaign generated an impressive **36% boost to return on ad spend**.

# Stitch Fix User Experience = Micro Data-Driven Engagement & Satisfaction... Data Collection + Personalization / Curation + Feedback...

***Stitch Fix = Applying Netflix / Spotify-Like Content Discovery to Fashion...  
Each Customer = Differentiated Experience...99.99% of Fixes Shipped = Unique***

## Data-Driven Onboarding Process = Mix of Art + Science

Collect data points on customer preferences / style / activities. 46% of active clients provide Pinterest profiles. Stylists use Pinterest boards + access to algorithms to help improve product selection



A screenshot of a mobile application interface titled "TAKE THE STYLE QUIZ". At the top, it shows signal strength, the time (10:34 PM), and battery level (91%). Below the title are tabs for "STYLE", "FIT/CUT", "SIZE", "PRICE", and "MO". The main content asks, "How often do you dress for the following occasions?". It lists three categories: "WORK / BUSINESS CASUAL", "COCKTAIL / WEDDING / EVENT", and "LAID-BACK CASUAL", each with four options: "Most of the time", "About once or twice a week", "About once or twice a month", and "Rarely".

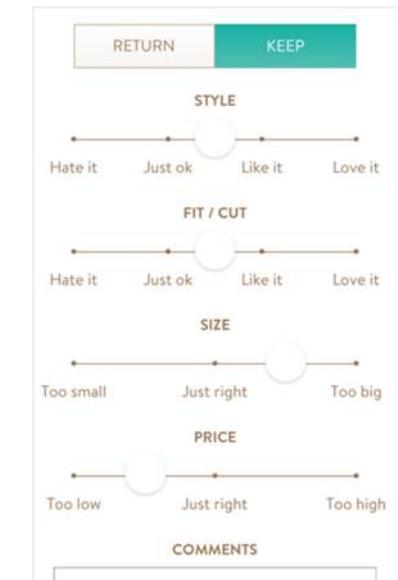
## Ship 'Fixes' with Curated Items Based on Preferences / Style

Allows clients to try products selected by stylists in comfort of home / return items they don't like



## Customer Preferences & Feedback

Collect information on customer experience to drive future product selection



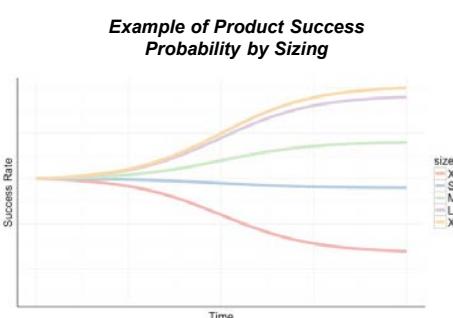
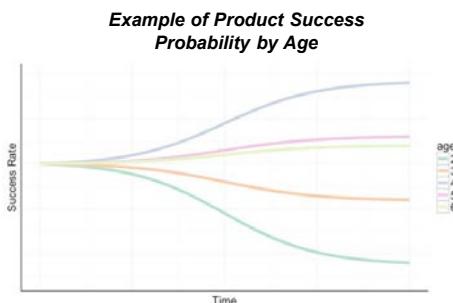
A screenshot of a feedback interface. At the top, there are two buttons: "RETURN" (white) and "KEEP" (teal). Below are five horizontal scales for different factors: "STYLE", "FIT / CUT", "SIZE", "PRICE", and "COMMENTS". Each scale has four points: "Hate it", "Just ok", "Like it", and "Love it" (or "Too big" for size). A circular slider is positioned between "Just ok" and "Like it" for each category. At the bottom, there is a large input field labeled "COMMENTS".

# ...Stitch Fix Back-End Experience = 39% of Clients Purchase Majority of Clothing from Stitch Fix vs. ~30% of Clients Y/Y

***Stitch Fix = Data On Users + Data on Items + Constantly Improving Algorithms = Drive High Customer Satisfaction...100% of Purchases from Recommendations***

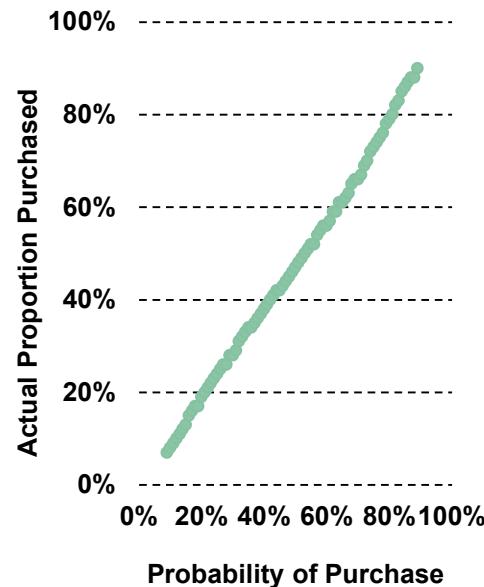
## Data Collection on Item-by-Item Basis Coupled with User Insights

Stitch Fix captures 50-150 attributes on each item, uses algorithms + feedback to determine probability of success (i.e. item will be purchased) for specific demographics, allows stylists to better select items for clients



## Data Networking Effect... Helps Stylist Predict Success of Items with Specific Client

The more information collected, the better the probability of success. Stitch Fix showing 1:1 correlation between probability of purchase per item and observed purchase rate over time



## Strong Consumer Engagement / Anticipation...Increased Wallet Share...

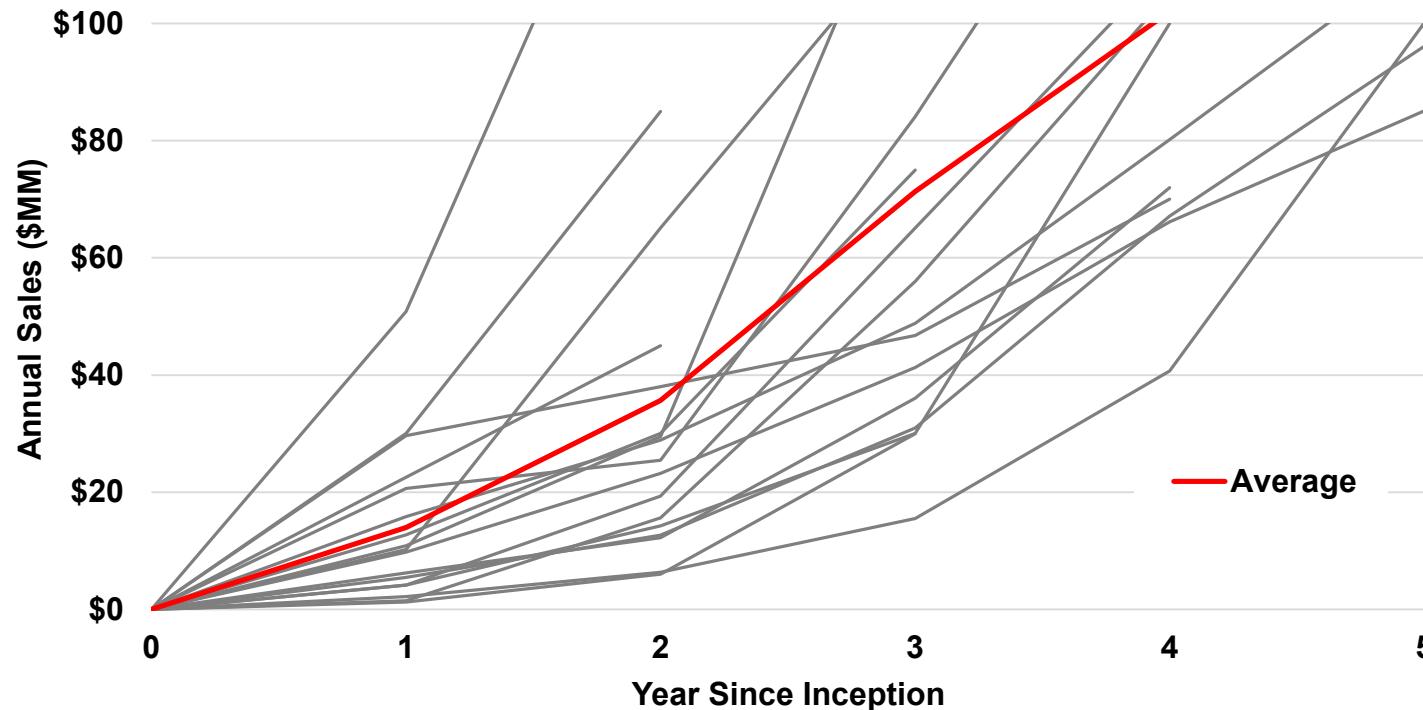
39% of Stitch Fix clients get majority of clothing from Stitch Fix, up from ~30% of clients a year ago



Many Internet Retailers / Brands @ \$100MM in Annual Sales\* in <5 Years...  
Took Nike = 14 Years / Lululemon = 9 / Under Armour = 8\*\*

*Viral Marketing / Sharing Mechanisms (Facebook / Instagram / Snapchat / Twitter...)  
+ On-Demand Purchasing Options via Mobile / Web + Access to Growth Capital  
+ Millennial Appeal = Enabling Rapid Growth for New Products / Brands / Retailers*

### Sales Growth For Select Internet Retailers\*, USA, First 5 Years Since Inception



Source: Internet Retailer "2016 Top 500 Guide", company filings

Note: \*Data only for e-commerce sales and shown in 2015 dollars. \*\*Years to reach \$100MM in annual revenue in 2015 dollars. Chart includes pure-play e-commerce retailers and evolved pure-play retailers. Companies shown include Birchbox, Blue Apron, Bonobos, Boxed, Casper, Dollar Shave Club, Everlane, Fitbit, GoPro, Harry's, Honest Company, Ipsy, Nasty Gal, Rent the Runway, TheRealReal, Touch of Modern, and Warby Parker. The Top 500 Guide uses a combination of internal research staff and well-known e-commerce market measurement firms such as Compete, Compuware, APM, comScore, ForeSee, Experian Marketing Services, StellaService and ROI Revolution to collect and verify information.

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# **RE-IMAGINING COMMUNICATION VIA SOCIAL PLATFORMS –**

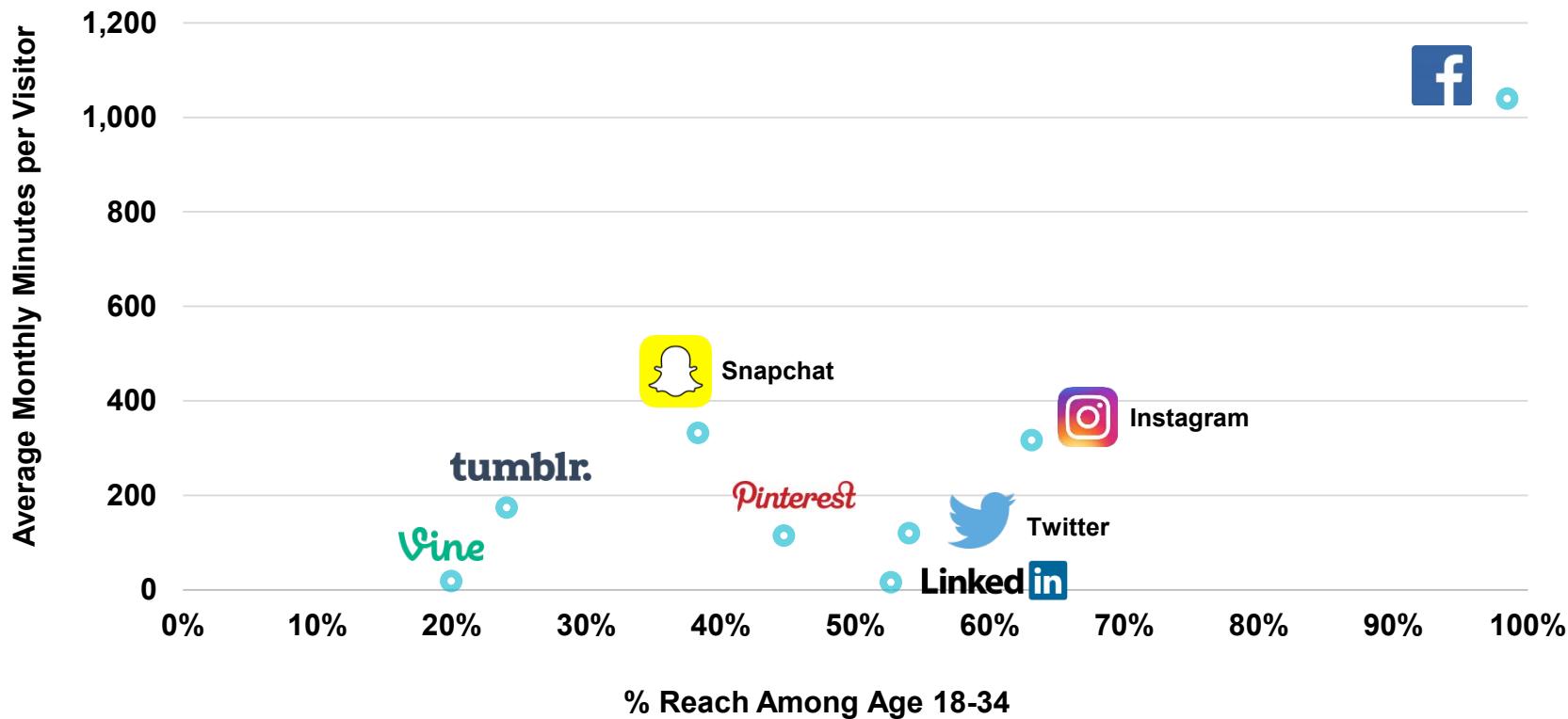
- VIDEO**
- IMAGE**
- MESSAGING**

# *Visual (Video + Image)*

## *Usage Continues to Rise*

# Millennial Social Network Engagement Leaders = Visual... Facebook / Snapchat / Instagram...

Age 18-34 Digital Audience Penetration vs.  
Engagement of Leading Social Networks, USA, 12/15



# Generation Z (Ages 1-20) = Communicates with Images

## Attributes – Millennials vs. Gen Z

### Millennials

Tech Savvy: 2 screens at once

**Communicate with text**

Curators and Sharers

Now-focused

Optimists

Want to be discovered



### Gen Z

Tech Innate: 5 screens at once

**Communicate with images**

Creators and Collaborators

Future-focused

Realists

Want to work for success

# *Video Viewing Evolution Over Past Century =*

*Live → On-Demand → Semi-Live → Real-Live*

# Video Evolution = Accelerating Live (Linear) → On-Demand → Semi-Live → Real-Live

## Live (Linear)

**Traditional TV**  
1926

Tune-In or  
Miss Out

Mass Concurrent  
Audience

Real-Time Buzz



## On-Demand

**DVR / Streaming**  
1999

Watch on  
Own Terms

Mass Disparate  
Audience

Anytime Buzz



## Semi-Live

**Snapchat Stories**  
2013

Tune-In Within 24  
Hours or Miss Out

Mostly Personal  
Audience

Anytime Buzz



## Real-Live

**Periscope + Facebook Live**  
2015 / 2016

Tune-In / Watch  
on Own Terms

Mass Audience,  
yet Personal

Real Time + Anytime Buzz

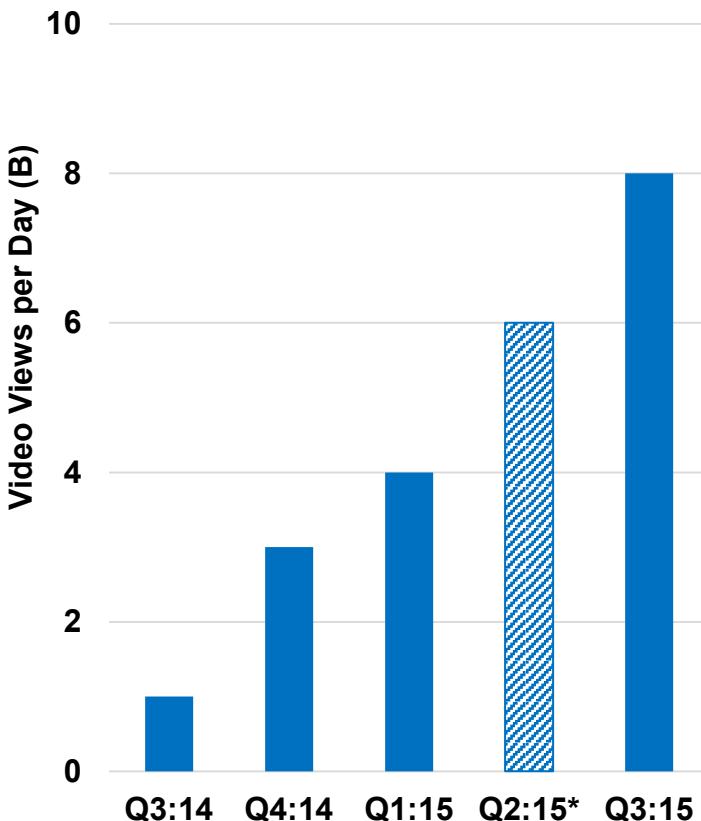


# **Video**

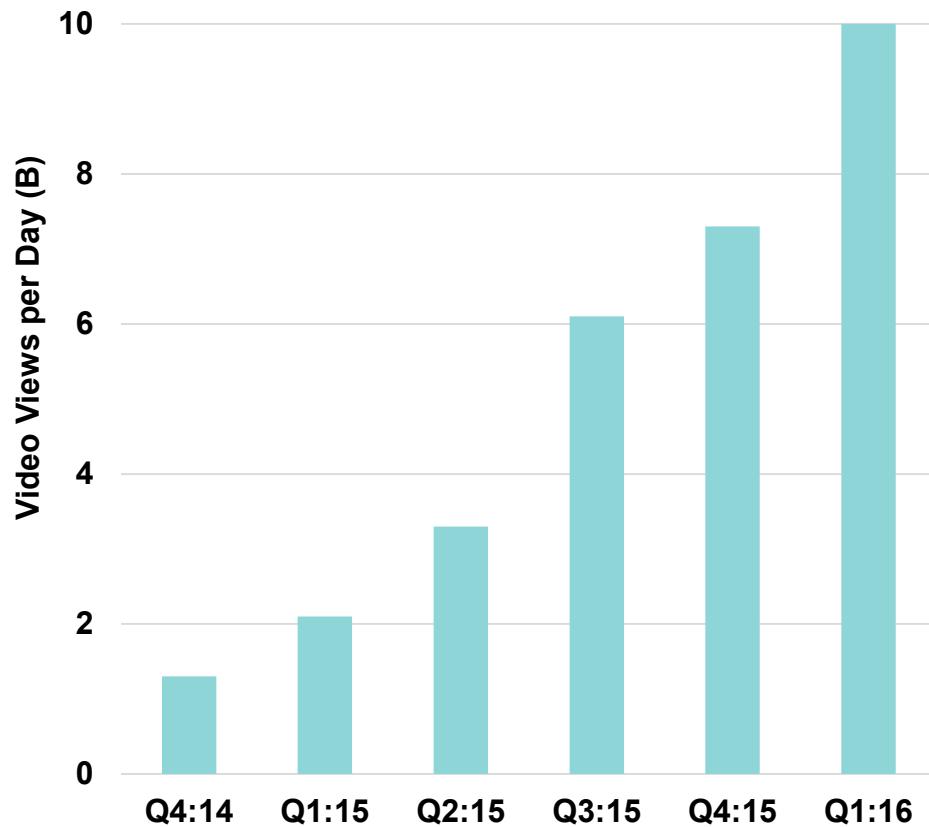
*Usage / Sophistication / Relevance  
Continues to Grow Rapidly*

# User-Shared Video Views on Snapchat & Facebook = Growing Fast

**Facebook Daily Video Views,  
Global, Q3:14 – Q3:15**



**Snapchat Daily Video Views,  
Global, Q4:14 – Q1:16**

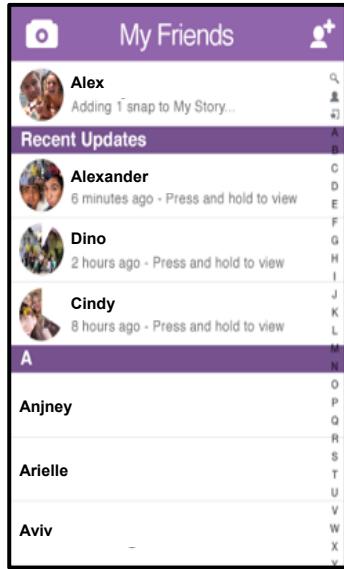


Source: Facebook, Snapchat. Q2:15 Facebook video views data based on KPCB estimate.  
Facebook video views represent any video shown onscreen for >3 seconds (including autoplay). Snapchat video views counted instantaneously on load.

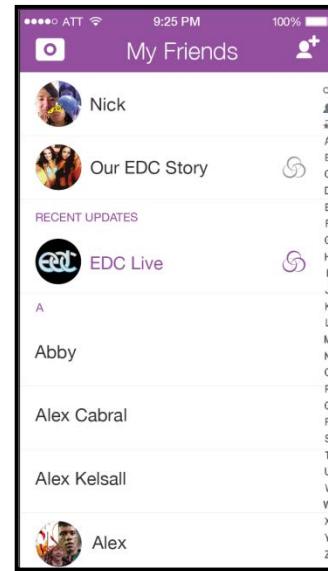
*Smartphone Usage Increasingly =  
Camera + Storytelling + Creativity +  
Messaging / Sharing*

# Snapchat Trifecta = Communications + Video + Platform... Stories (Personal) → Live (Personal + Pro Curation) → Discover (Pro)

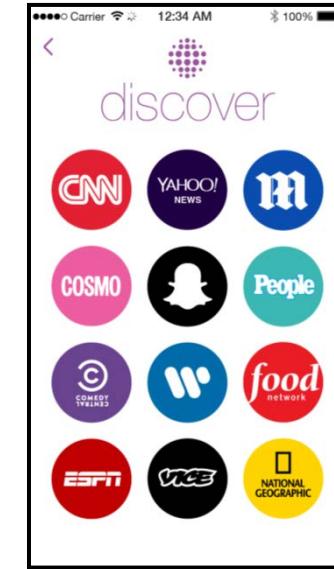
**Stories (Personal)**  
10/13 Launch



**Live (Personal + Pro Curation)**  
6/14



**Discover (Professional)**  
1/15



**10–20MM Snapchatters View  
Live Stories Each Day**

*More Users Watched College Football and MTV Music Awards on Snapchat than Watched the Events on TV*

**70MM+ Snapchatters View  
Discover Each Month**

*Top Performing Channels Average 6 – 7 minutes per Snapchatter per Day*

*Advertisers / Brands =  
Finding Ways Into...*

*Camera-Based  
Storytelling + Creativity +  
Messaging / Sharing*

# Brand Filters Integrated into Snapchat Snaps by Users... Often Geo-Fenced, in Venue

## 'Love at First Bite' by KFC **9MM+ Views**

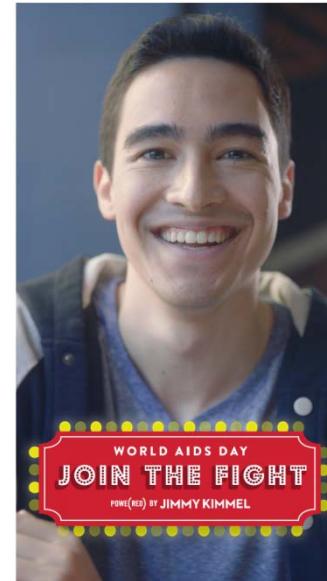
Geofilter offered @ 900+ KFCs in UK and applied 200K+ times,  
12/15 – 2/16



**+23% Visitation Lift Within 7 Days of Seeing Friend's Geofilter**

## 'World AIDS Day – Join the Fight' by (RED) **76MM+ Views**

Each time a geofilter was sent, Bill & Melinda Gates Foundation donated \$3 to (RED)'s fight against AIDS  
12/15



**+90% Higher Likelihood of Donating to (RED) Among Those Who Saw Geofilter**

# Branded Snapchat Lenses & Facebook Filters... Increasingly Applied by Users

**Taco Bell Cinco de Mayo Lens**  
224MM Views on Snapchat  
**5/5/16**



**Gatorade Super Bowl Lens**  
165MM Views on Snapchat  
**2/7/16**



**Iron Man Filter from MSQRD**  
8MM+ Views on Facebook  
**3/9/16**



Average Snapchatter Plays With Sponsored Lens for  
**20 Seconds**

*Real-Live =  
Facebook Live...*

*New Paradigm for  
Live Broadcasting*

# UGC (User Generated Content) @ New Orders of Viewing Magnitude... Facebook Live = Raw / Authentic / Accessible for Creators & Consumers

## Candace Payne in Chewbacca Mask on Facebook Live

*Most Viewed Live Video @ 153MM+ Views, 5/16*

*Kohl's = Mentioned 2 Times in Video*

*Kohl's = Became Leading App in USA iOS App Store*

*Chewbacca Mask Demand Rose Dramatically*



Candace Payne was live.  
It's the simple joys in life...  
Like · Share · May 19



Candace Payne was live.  
It's the simple joys in life...  
Like · Share · May 19

*Live Sports Viewing =*

*Has Always Been Social But....  
It's Just Getting Started*

*How Often are You Able to Watch a Game  
(on Sidelines or TV) with All Your Friends  
Who Share Your Team Love?*

***Live Streaming –  
Wrapped with Social Media Tools –  
Helps Make that More of a Reality...***

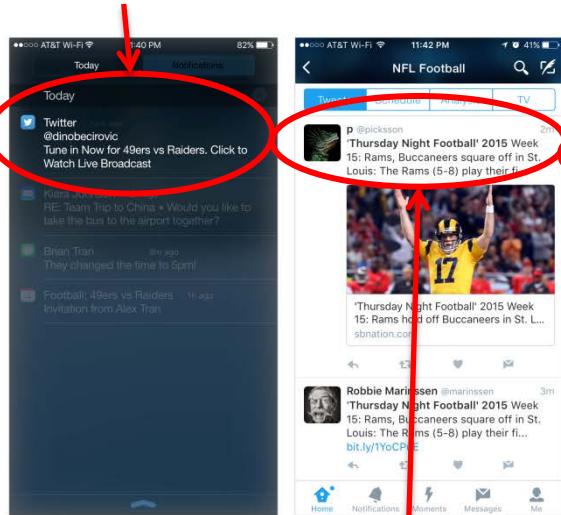
# 2016E = Milestone Year for ‘Traditional’ Live Streaming on Social Networks... NFL Live Broadcast TV of Thursday Night Football on Twitter (Fall 2016)

## Hypothetical Mock-Up

Complete Sports Viewing Platform =

Live Broadcast + Analysis + Scores + Replays + Notifications + Social Media Tools

Tune-In Notifications,  
Game Reminders,  
Breaking Actions



Scoreboard Allows Fans to  
Follow Play-by-Play



Vertical View =  
Live Broadcast + Tweets  
Dashboard for Social  
Media Engagement



Horizontal View =  
Unencumbered, Full-  
Screen, TV-like Viewing  
Experience



Tweets Engage Fans in  
Real-Time Conversation

Professional  
Commentary and  
Analysis

Toggle Between Tweets  
from Stadium / Nearby / All

All Tweets Stadium Tweets Nearby Tweets

Home Notifications Moments Messages Me

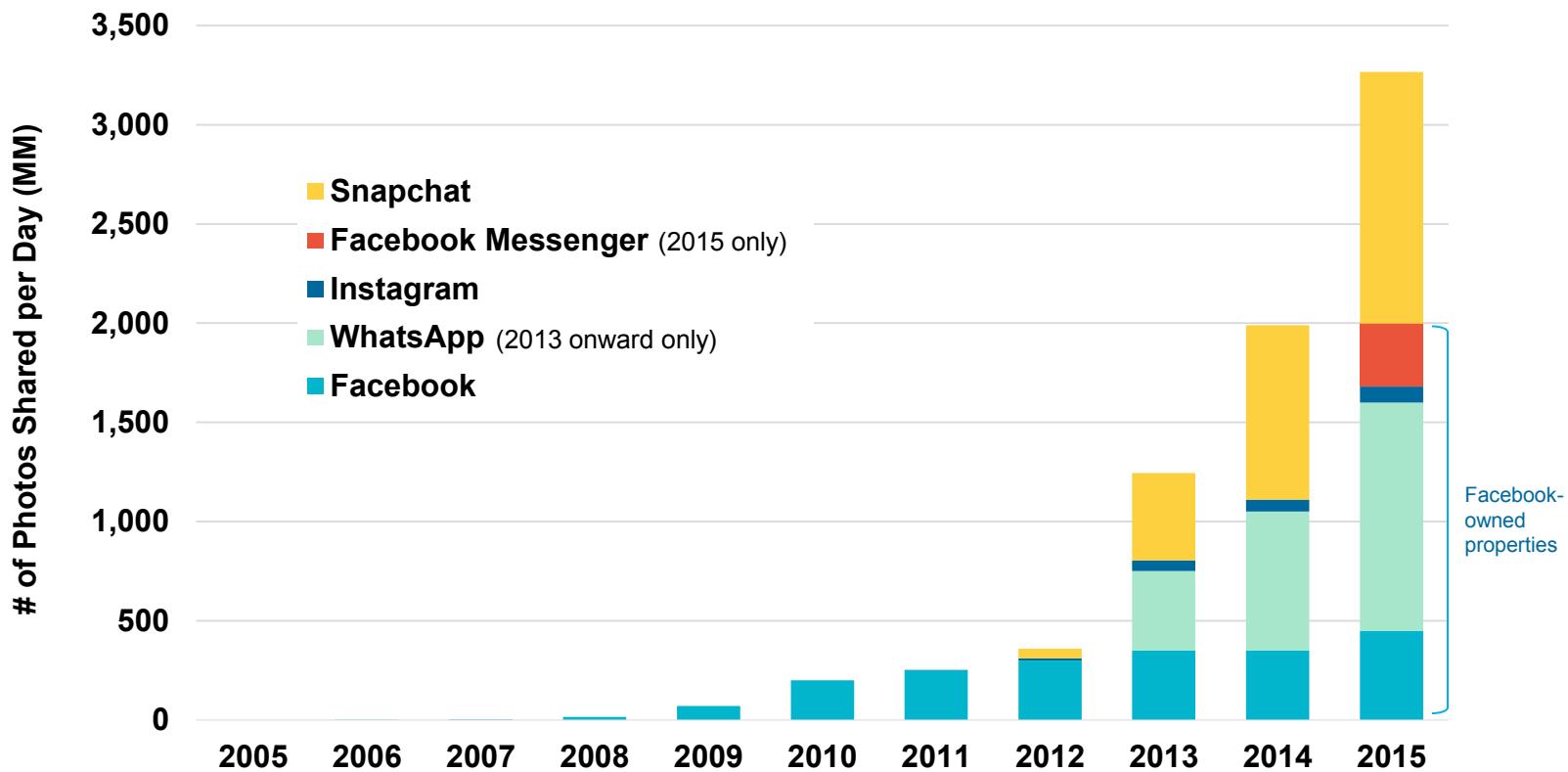
Home Notifications Moments Messages Me

# *Image*

*Usage / Sophistication / Relevance  
Continues to Grow Rapidly*

# Image Growth Remains Strong

## Daily Number of Photos Shared on Select Platforms, Global, 2005 – 2015



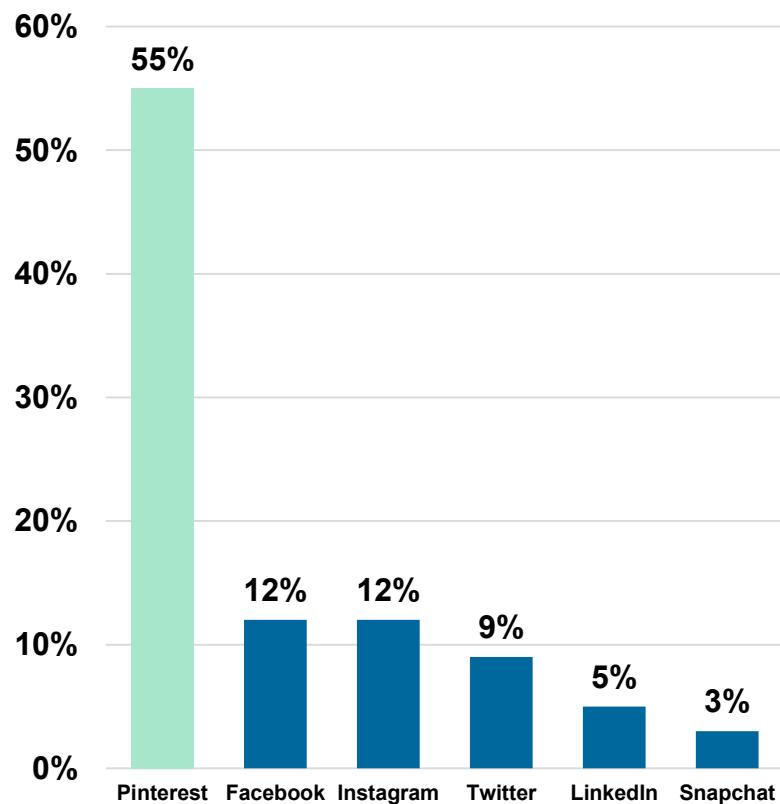
Source: Snapchat, Company disclosed information, KPCB estimates

Note: Snapchat data includes images and video. Snapchat stories are a compilation of images and video. WhatsApp data estimated based on average of photos shared disclosed in Q1:15 and Q1:16. Instagram data per Instagram press release. Messenger data per Facebook (~9.5B photos per month). Facebook shares ~2B photos per day across Facebook, Instagram, Messenger, and WhatsApp (2015).

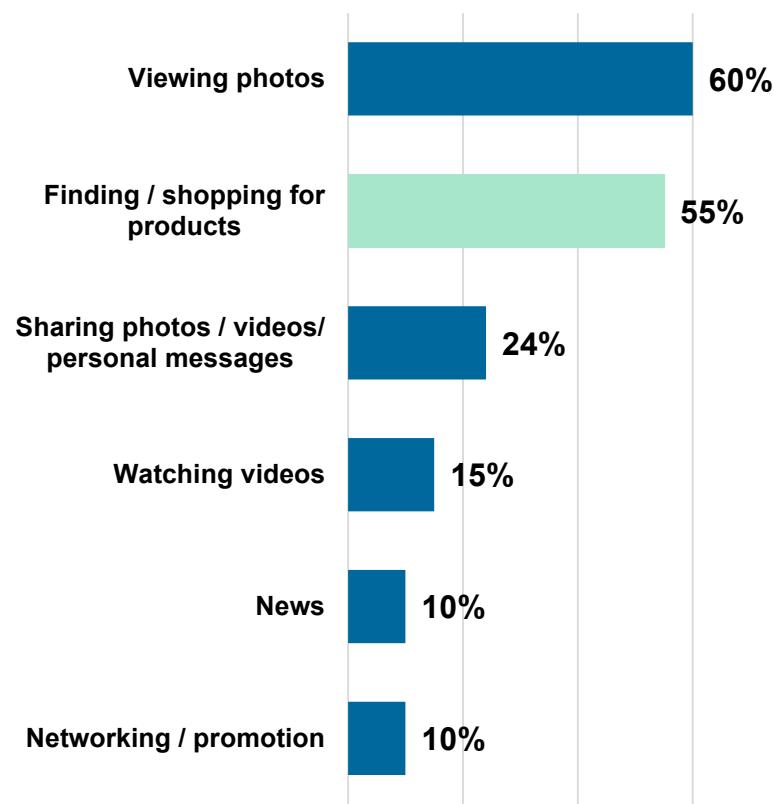
*Images =  
Monetization Options Rising*

# Image-Based Platforms Like Pinterest = Often Used for Finding Products / Shopping...

**% of Users on Each Platform Who Utilize to Find / Shop for Products, USA, 4/16**

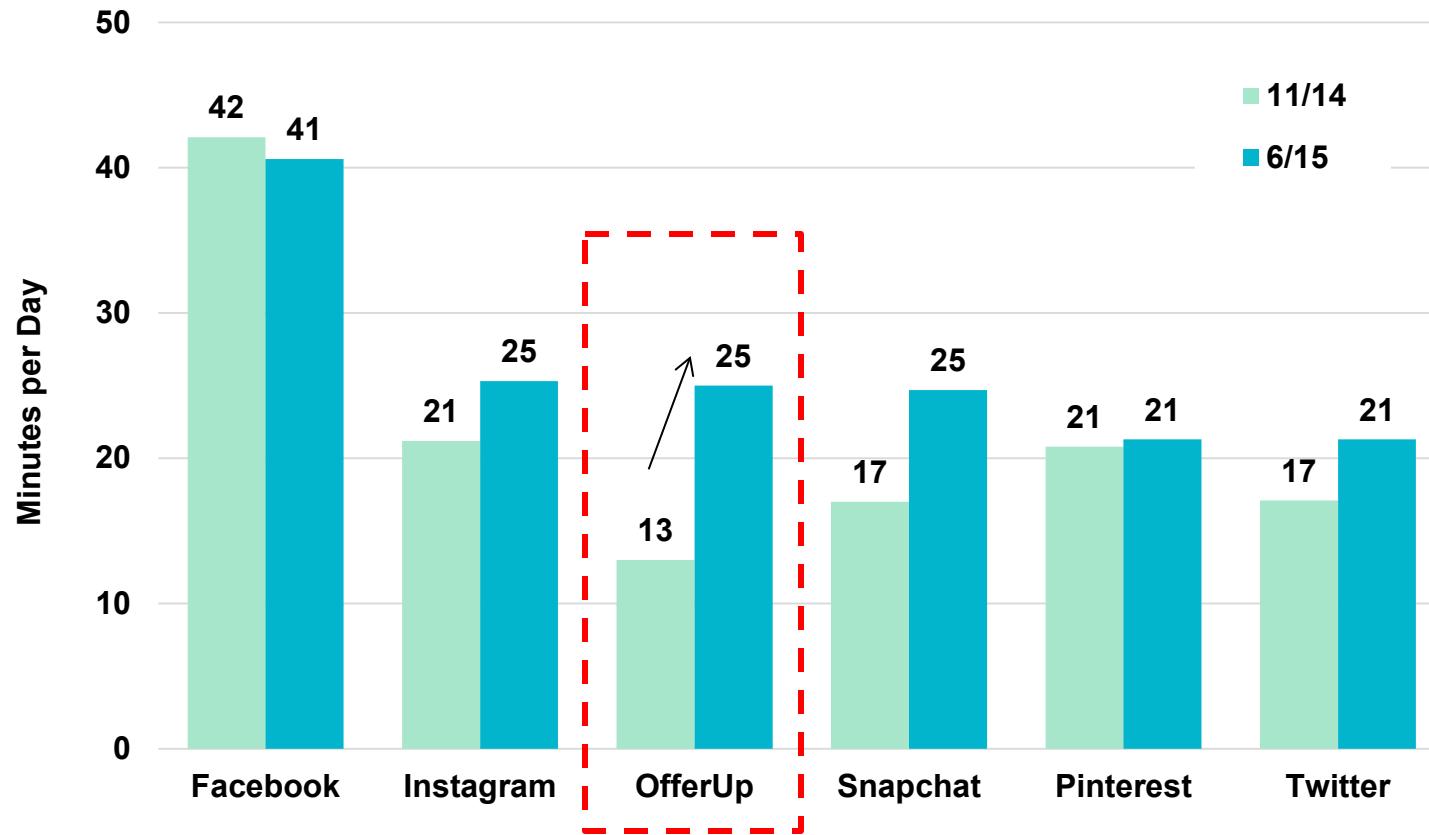


**'What Do You Use Pinterest For?' (% of Respondents), USA, 4/16**



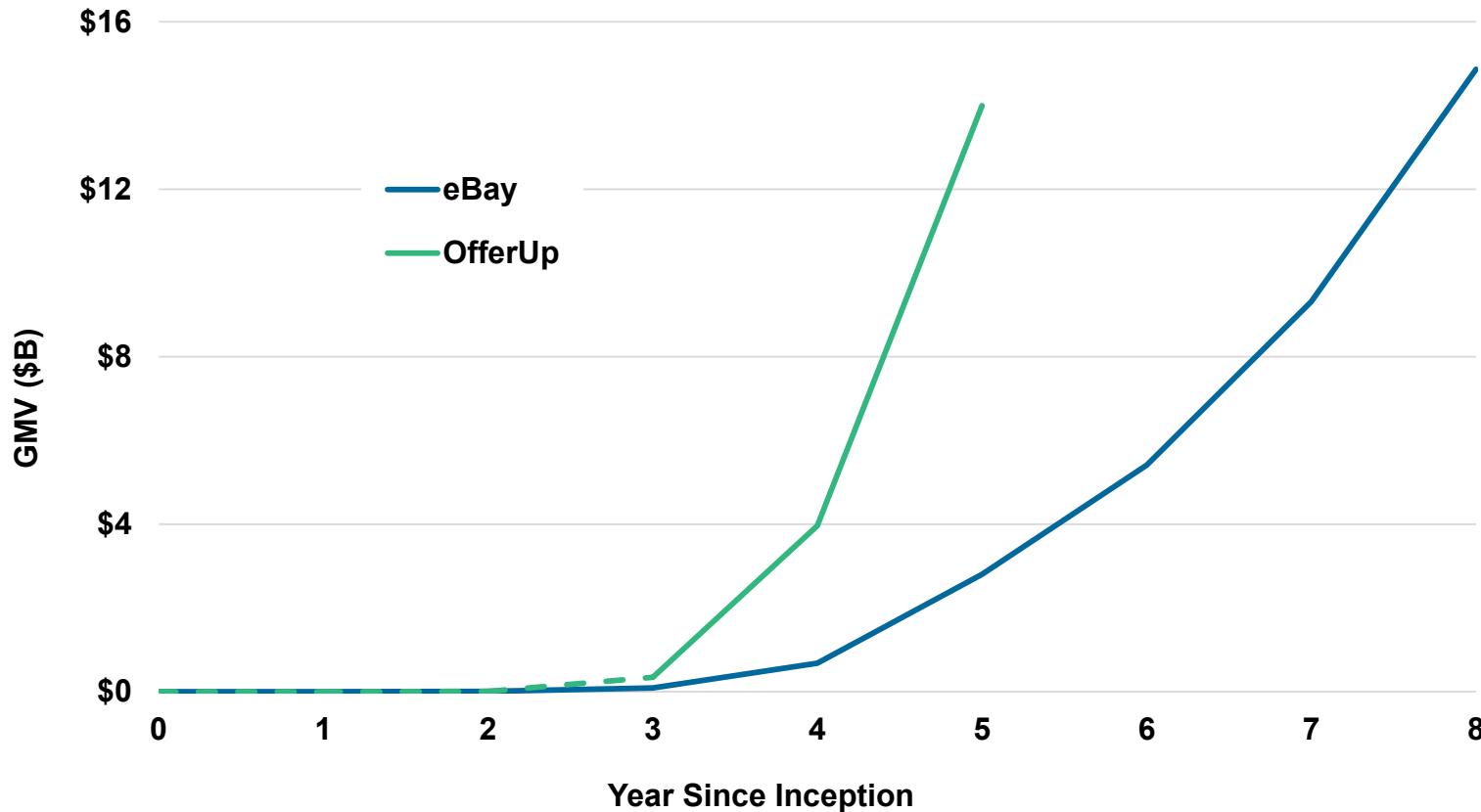
# ...Image-Based Platforms Like OfferUp = High (& Rising) Engagement Levels & Used for Commerce...

Average Daily Time Spent per User, USA, 11/14 & 6/15



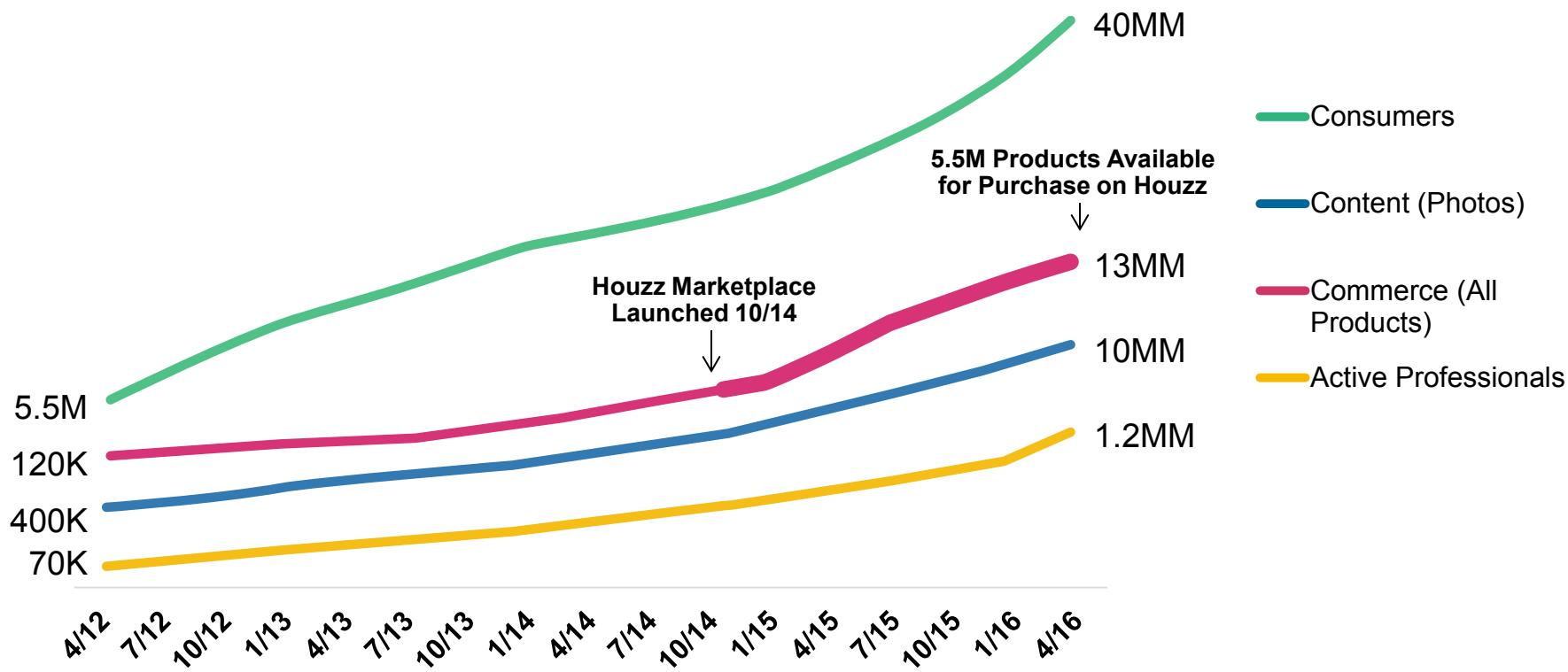
...Image-Based Peer-to-Peer (P2P) Marketplace OfferUp =  
Ramping Faster than eBay @ Same Stage...

### OfferUp vs. eBay GMV Growth, First 8 Years Since Inception



# ...Image-Based Platform Houzz = Content + Community + Commerce Continue to Ramp...

Houzz – Content (Photos) / Community (Professionals + Consumers) /  
Commerce (Products), 4/12 – 4/16



Source: Houzz  
5.5MM products are available on Houzz for purchase directly within the app and on Houzz.com (Houzz Marketplace).  
There are 13MM total products available on Houzz Marketplace + linked to merchant sites.

# ...Houzz Personalized Planning with Images = 3-4x Higher Engagement...5x Higher Purchase Conversion

## View In My Room (2/16 Launch)

Pick a Product & Preview What It Looks Like  
In Any Room Through Camera

50% of Users Who Made a Purchase in Latest  
Version of Houzz App (Since 2/17/16)  
Used View In My Room

Users = 97% More Likely to Use Houzz Next Time  
They Shop...5.5x More Likely to Purchase...  
Spend 3x More Time in App



## Sketch (12/15)

Add Products from Houzz Marketplace to  
Any Photo on Houzz or Your Own Sketch

Over 500K Sketches Saved Since Launch

Sketch Users = 5x More Likely to Purchase...  
Spend 4x More Time in App

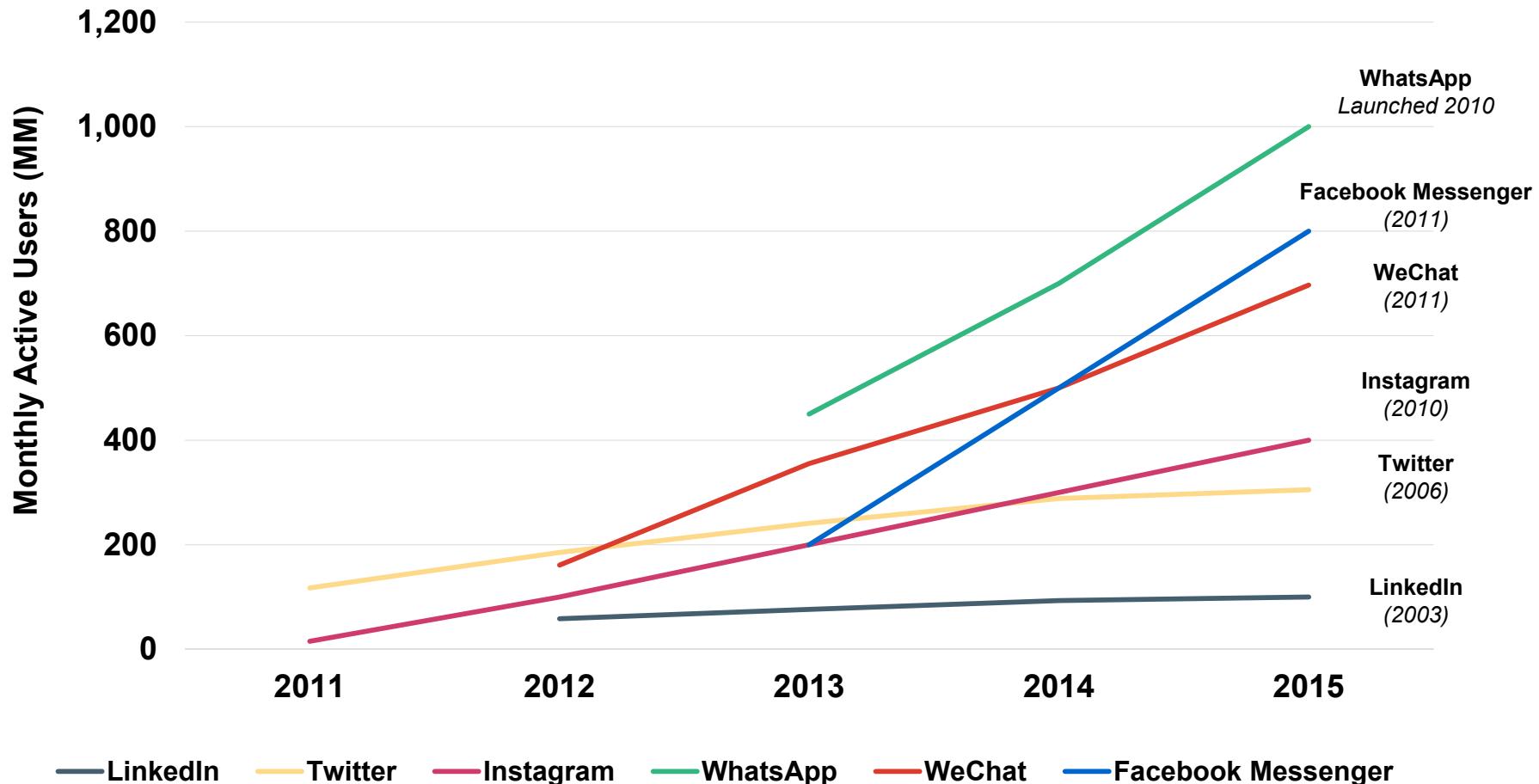


*Messaging =  
Evolving Rapidly*

*Messaging Leaders =  
Strong User (+ Use) Growth*

# Messaging Continues to Grow Rapidly... Leaders = WhatsApp / Facebook Messenger / WeChat

## Monthly Active Users on Select Social Networks and Messengers, Global, 2011 – 2015



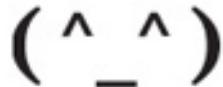
Source: Facebook, WhatsApp, Tencent, Instagram, Twitter, LinkedIn, Morgan Stanley Research  
Note: 2013 data for Instagram and Facebook Messenger are approximated from statements made in early 2014. Twitter users excludes SMS fast followers.

*Messaging =*  
*Evolving from*  
*Simple Social Conversations to*  
***More Expressive***  
***Communication...***

# Messaging Platform Evolution = More Tools for Simple Self-Expression

## ***Global Electronic Messaging Platforms – Evolution of Simple Self-Expression***

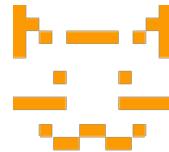
*Japanese Cell Phones – Type-Based Emoji  
1990s*



*AOL Instant Messenger –  
Convert Text Emoticon to  
Graphical Smiley  
1997*



*NTT DoCoMo-  
Emoji  
1999*



*Apple iOS 5 –  
Native Emoji  
2011*



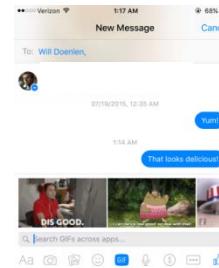
*Line –  
Stickers  
2011*



*Bitstrips – Bitmoji  
Personalized Emoji  
2014*



*Facebook Messenger –  
GIF Keyboard  
2015*



*Snapchat –  
Lenses  
2015*



*...Messaging =*

*Evolving from*  
*Simple Social Conversations to*  
***Business-Related Conversations***

# Asia-Based Messaging Leaders = Continue to Expand Uses / Services Beyond Social Messaging



Name	KakaoTalk	WeChat	LINE
Launch	March 2010	January 2011	June 2011
Primary Country	Korea	China	Japan
<b>Banking / Financial Services</b>	<b>Kakao Bank (11/15)</b>	<b>WeBank (1/15)</b>	<b>Debit Card (2016)</b>
<b>Enterprise</b>	✗	<b>Enterprise WeChat (3/16)</b>	✗
<b>Online-To-Offline (O2O)</b>	<b>Kakao Hairshop (1H:16E) Kakao Driver (1H:16E)</b>	✓	<b>Grocery Delivery (2015)</b>
<b>TV</b>	<b>Kakao TV (6/15)</b>	✓	<b>Line Live &amp; Line TV (2015)</b>
<b>Video Calls / Chat</b>	(6/15)	✓	✓
<b>Taxi Services</b>	<b>Kakao Taxi (3/15)</b>	✓	✓
<b>Messaging</b>	✓	✓	✓
<b>Group Messaging</b>	✓	✓	✓
<b>Voice Calls</b>	<b>Free VoIP calls (2012)</b>	<b>WeChat Phonebook (2014)</b>	✓
<b>Payments</b>	<b>KakaoPay (2014)</b>	(2013)	<b>Line Pay (2014)</b>
<b>Stickers</b>	(2012)	<b>Sticker shop (2013)</b>	(2011)
<b>Games</b>	<b>Game Center (2012)</b>	(2014)	(2011)
<b>Commerce</b>	<b>Kakao Page (2013)</b>	<b>Delivery support w/ Yixin (2013)</b>	<b>Line Mall (2013)</b>
<b>Media</b>	<b>Kakao Topic (2014)</b>	✓	✓
<b>QR Codes</b>	✓	<b>QR code identity (2012)</b>	✓
<b>User Stories / Moments</b>	<b>Kakao Story (2012)</b>	<b>WeChat Moments</b>	<b>Line Home (2012)</b>
<b>Developer Platform</b>	<b>KakaoDevelopers</b>	<b>WeChat API</b>	<b>Line Partner (2012)</b>

New Services Added 2015 -16\*

Previous Existing Services

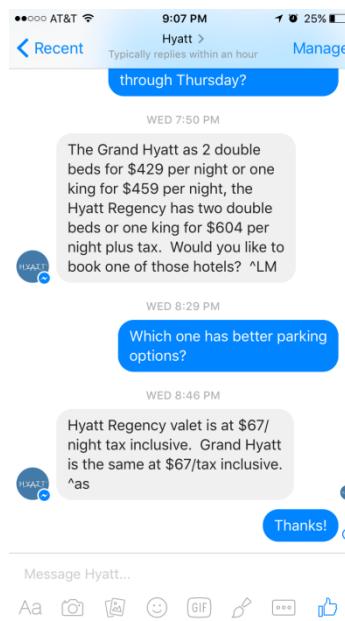
Source: Company websites, press releases, Morgan Stanley Research.

\*Blue shading denotes that at least one of the platforms listed has added new features since 2015. Some features for other platforms may have been added in prior years.  
Note: Enterprise denotes product made specifically for messaging or social networking within the enterprise, which is distinct from B2C messaging where businesses engage with current or potential customers.

# Messaging Secret Sauce = Magic of the Thread = Conversational... Remembers Identity / Time / Specifics / Preferences / Context

## Hyatt

Check Availability / Reservations / Order Room Service



Message Hyatt...

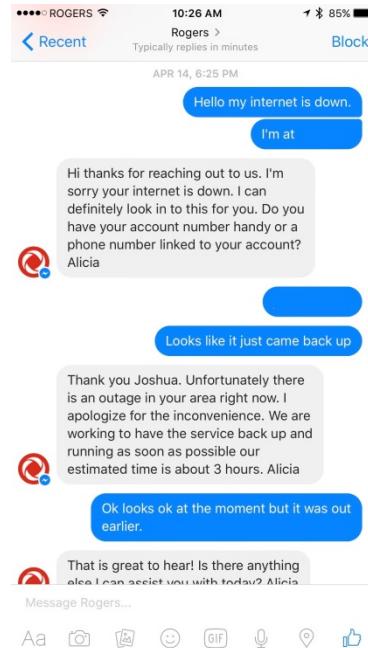
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*Started Offering Customer Service on Facebook Messenger in 11/15*

*+20x Increase in Messages Received by Hyatt Within ~1 Month*

## Rogers Communications

Ask Questions / Update Account / Set Up New Plan



Message Rogers...

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*Started Offering Customer Service on Facebook Messenger in 12/15*

*65% Increase in Customer Satisfaction  
65% Decrease in Customer Complaints*

# Messaging Platforms = Millions of Business Accounts Helping Facilitate Customer Service & Commerce...

	<b>Business / Official Accounts</b>	<b>Engagement</b>	<b>Payments</b>	<b>B2C Chat for SMEs</b>	<b>Advertising (Within Messengers)</b>	<b>Partnerships / Other Services</b>
	<b>10MM+</b> Official Accounts	~80% Users Follow Official Accounts	WeChat Pay (2013)	Official Accounts (2012)	Official Accounts (2012)	Weidian (2014)
	<b>50MM+</b> Small Business Pages	1B+ Messages / Month Between Businesses and Users, +2x Y/Y 80% Businesses Active on Mobile	Payments (2015)	Messaging via Pages (2011)  Chatbots Platform (2016)	Sponsored Messages (2016)	Shopify & Zendesk Partnership (2015 / 2016)
	<b>2MM+</b> Line@ + Official Accounts	--	Line Pay (2014)	Official Accounts & Line @ (2012 / 2015)  Chatbots Platform (2016)	Official Accounts (2012)	Commerce / Stores on Line@ (2016)

# ...Messaging Platforms = Conversational Commerce Ramping

## Shopper in Thailand on Instagram

Browsing Begins on Instagram...Conversation / Payment / Confirmation Ends on Line



Visit Instagram Shop

Browse Products

Inquire About Product via Line

Get Payment Details

Confirm Payment

Ship & Track Order

# Best Ways for Businesses to Contact Millennials = Social Media & Chat... Worst Way = Telephone

## Popularity of Business Contact Channels, by Age

*Which channels are most popular with your age-profiled customers?  
(% of contact centers)*

	% of Centers Reporting Most Popular Contact Channels by Generation				
	Internet / Web Chat	Social Media	Electronic Messaging (e.g. email, SMS)	Smartphone Application	Telephone
<b>Generation Y</b> (born 1981-1999)	24% (1 <sup>st</sup> choice)	24% (1 <sup>st</sup> choice)	21% (3 <sup>rd</sup> choice)	19% (4 <sup>th</sup> choice)	12% (5 <sup>th</sup> choice)
<b>Generation X</b> (born 1961-1980)	21% (3 <sup>rd</sup> choice)	12% (4 <sup>th</sup> choice)	28% (2 <sup>nd</sup> choice)	11% (5 <sup>th</sup> choice)	29% (1 <sup>st</sup> choice)
<b>Baby Boomers</b> (born 1945-1960)	7% (3 <sup>rd</sup> choice)	2% (5 <sup>th</sup> choice)	24% (2 <sup>nd</sup> choice)	3% (4 <sup>th</sup> choice)	64% (1 <sup>st</sup> choice)
<b>Silent Generation</b> (born before 1944)	2% (3 <sup>rd</sup> choice)	1% (4 <sup>th</sup> choice)	6% (2 <sup>nd</sup> choice)	1% (5 <sup>th</sup> choice)	90% (1 <sup>st</sup> choice)

*Android / iOS Home Screens  
(Like Portals in Internet 1.0) =  
Mobile Power Alleys (~2008-2016)...*

*Messaging Leaders =  
Want to Change That*

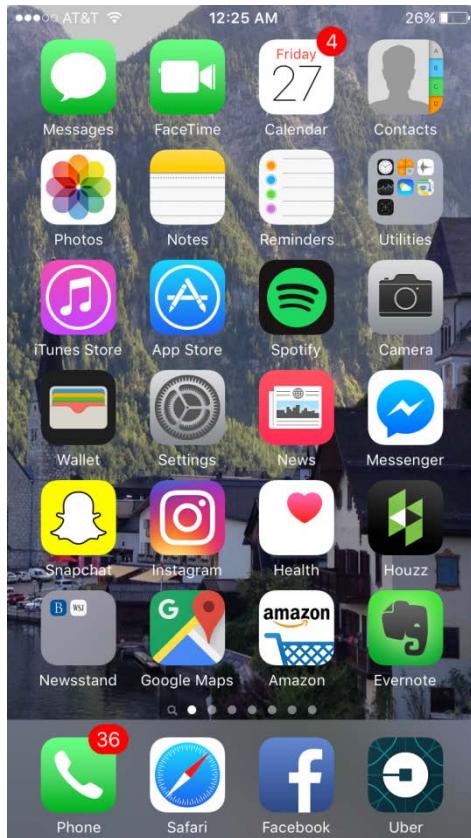
# Average Global Mobile User = ~33 Apps...12 Apps Used Daily... 80% of Time Spent in 3 Apps

## Day in Life of a Mobile User, 2016

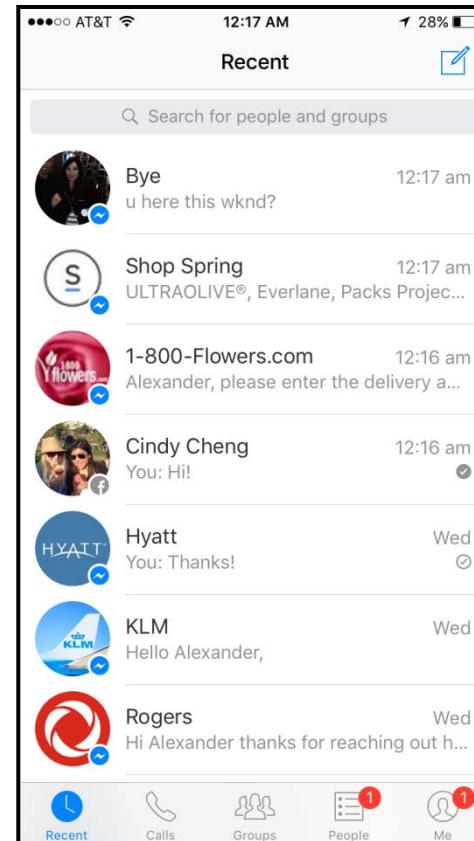
	Average # Apps Installed on Device*	Average Number of Apps Used Daily	Average Number of Apps Accounting for 80%+ of App Usage	Time Spent on Phone (per Day)	Most Commonly Used Apps
<b>USA</b>	37	12	3	5 Hours	Facebook Chrome YouTube
<b>Worldwide</b>	33	12	3	4 Hours	Facebook WhatsApp Chrome

# Messaging Apps = Increasingly Becoming Second Home Screen...

iOS  
Home Screen



Facebook Messenger  
Inbox



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# **RE-IMAGINING HUMAN / COMPUTER INTERFACES –**

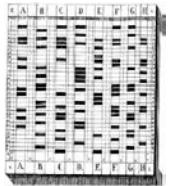
- VOICE**
- TRANSPORTATION**

# *Re-Imagining Voice = A New Paradigm in Human-Computer Interaction*

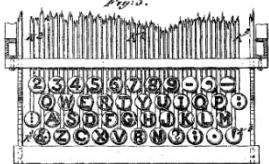
*Evolution of Basic  
Human-Computer Interaction  
Over ~2 Centuries =*

*Innovations Every Decade  
Over Past 75 Years*

# Human-Computer Interaction (1830s – 2015), USA = Touch 1.0 → Touch 2.0 → Touch 3.0 → Voice



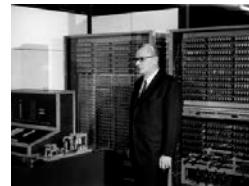
Punch Cards for  
Informatics  
**1832**



QWERTY  
Keyboard  
**1872**



Electromechanical  
Computer (Z3)  
**1941**



Electronic Computer  
(ENIAC)  
**1943**



Paper Tape Reader  
(Harvard Mark I)  
**1944**



Mainframe Computers  
(IBM SSEC)  
**1948**



Trackball  
**1952**



Joystick  
**1967**



Microcomputers  
(IBM Mark-8)  
**1974**



Portable Computer  
(IBM 5100)  
**1975**



Commercial Use of  
Window-Based GUI  
(Xerox Star)  
**1981**



Commercial Use  
of Mouse  
(Apple Lisa)  
**1983**



Commercial Use  
of Mobile  
Computing  
(PalmPilot)  
**1996**



Touch + Camera -  
based Mobile  
Computing  
(iPhone 2G)  
**2007**



Voice on Mobile  
(Siri)  
**2011**



Voice on Connected /  
Ambient Devices  
(Amazon Echo)  
**2014**

*Voice as  
Computing Interface =*

*Why Now?*

# Voice = Should Be Most Efficient Form of Computing Input

## Voice Interfaces – Consumer Benefits

### 1) Fast

Humans can speak 150 vs. type 40 words per minute, on average...

### 2) Easy

Convenient, hands-free, instant...

### 3) Personalized + Context-Driven / Keyboard Free

Ability to understand wide context of questions based on prior questions / interactions / location / other semantics

## Voice Interfaces – Unique Qualities

### 1) Random Access vs. Hierarchical GUI

Think Google Search vs. Yahoo! Directory...

### 2) Low Cost + Small Footprint

Requires microphone / speaker / processor / connectivity – great for Internet of Things...

### 3) Requires Natural Language Recognition & Processing

# Person to Machine (P2M) Voice Interaction Adoption Keys = 99% Accuracy in Understanding & Meaning + Low Latency

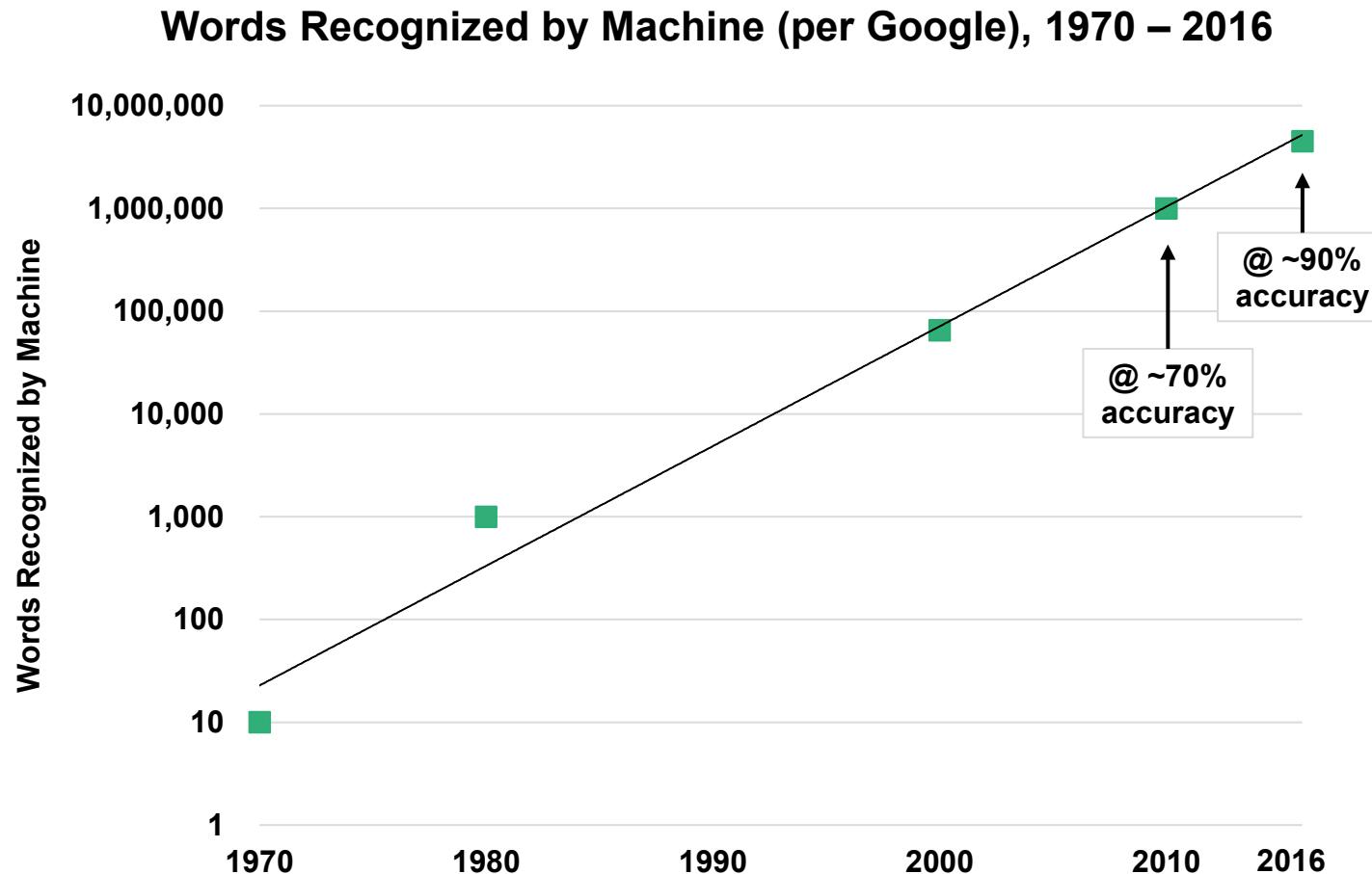
*As speech recognition accuracy goes from say 95% to 99%, all of us in the room will go from barely using it today to using it all the time. Most people underestimate the difference between 95% and 99% accuracy – **99% is a game changer...***

**No one wants to wait 10 seconds for a response.**  
*Accuracy, followed by latency, are the two key metrics for a production speech system...*

- ANDREW NG, CHIEF SCIENTIST AT BAIDU

# Machine Speech Recognition @ Human Level Recognition for... Voice Search in Low Noise Environment, per Google

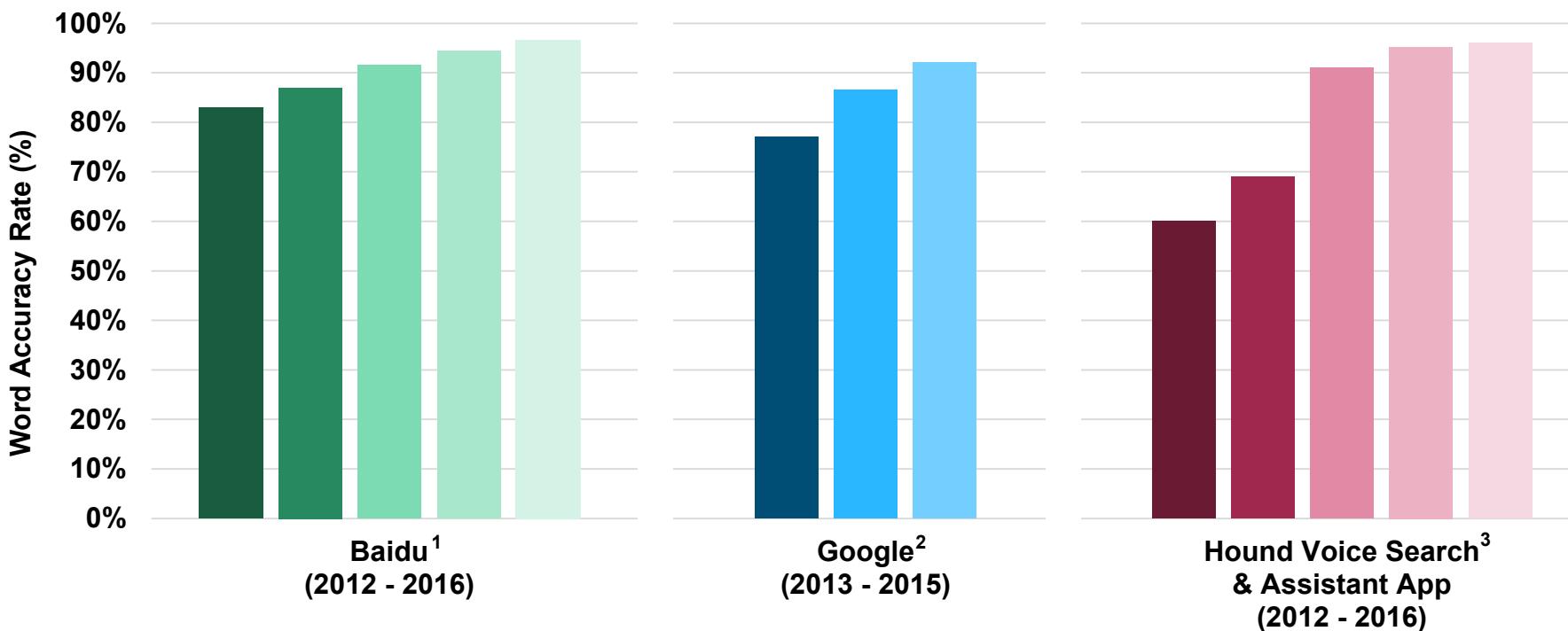
**Next Frontier = Recognition in heavy background noise in far-field & across diverse speaker characteristics (accents, pitch...)**



# Voice Word Accuracy Rates Improving Rapidly... +90% Accuracy for Major Platforms

## Word Accuracy Rates by Platform\*, 2012 – 2016

\*Word accuracy rate definitions are unique to each company...see footnotes for more details



Source: Baidu, Google, VentureBeat, SoundHound

Note: "Word Error Rate (WER) definitions are specific to each company. Word accuracy rate = 1 - WER. (1) Data shown is word accuracy rate on Mandarin speech recognition on one of Baidu's speech datasets. Real world mobile phone speech data is very noisy and hard for humans to transcribe. A 3.5% WER is better than what most native speakers can accomplish on this task. WER across different datasets and languages are generally not comparable. (2) Data as of 5/15 and refers to recognition accuracy for English language. Word error rate is evaluated using real world search data which is extremely diverse and more error prone than typical human dialogue. (3) Data as of 1/16 and refers to recognition accuracy for English language. Word accuracy rate based on data collected from thousands of speakers and real world queries with noise and accents.

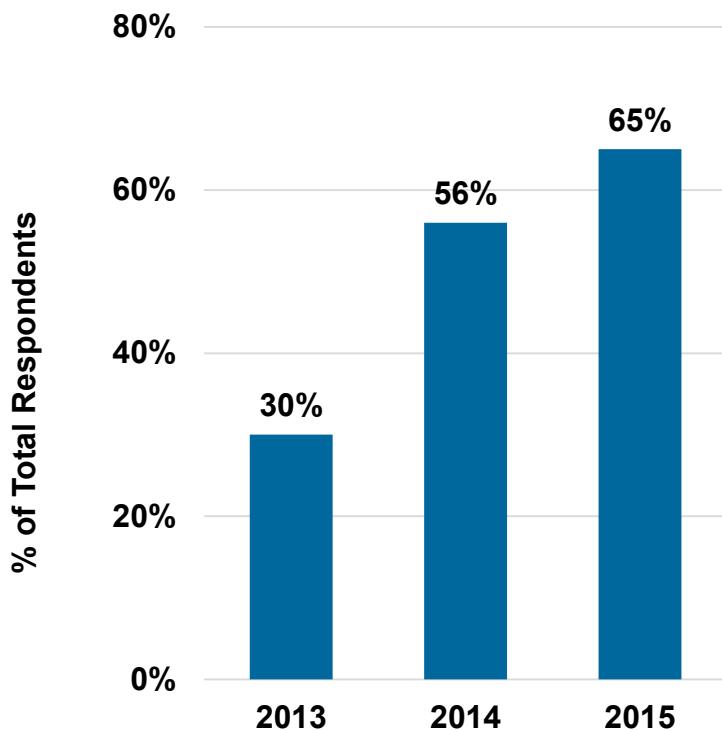
*Computing Interface...*

*Evolving from Keyboards to  
Microphones & Keyboards =*

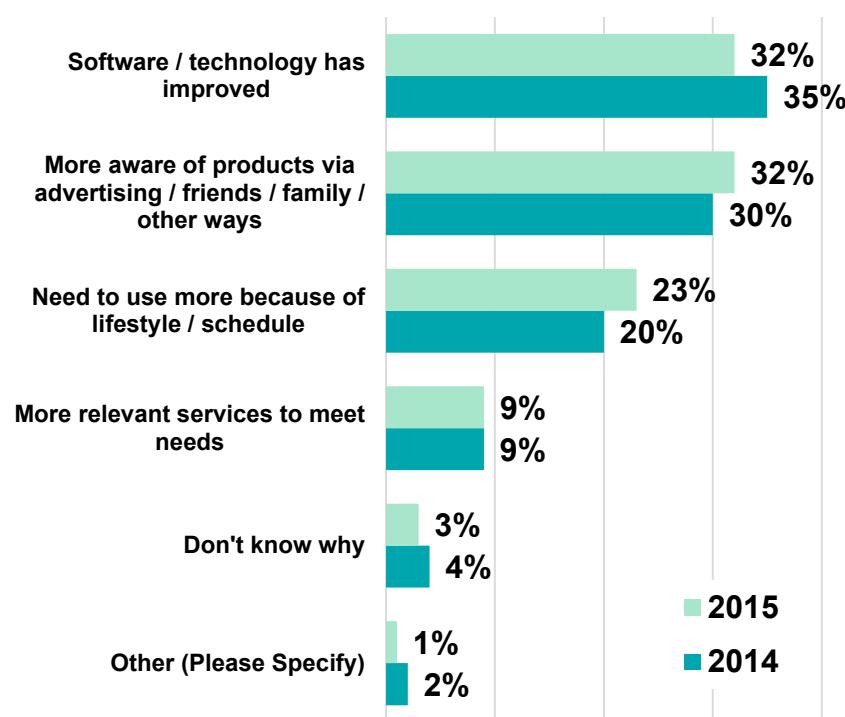
*Still Early Innings*

# Mobile Voice Assistant Usage = Rising Quickly... Primarily Driven By Technology Improvements

% of Smartphone Owners Using Voice Assistants  
Annually, USA, 2013 – 2015



Voice Assistant Usage – Primary Reason for Change, % of Respondents, USA, 2014 – 2015



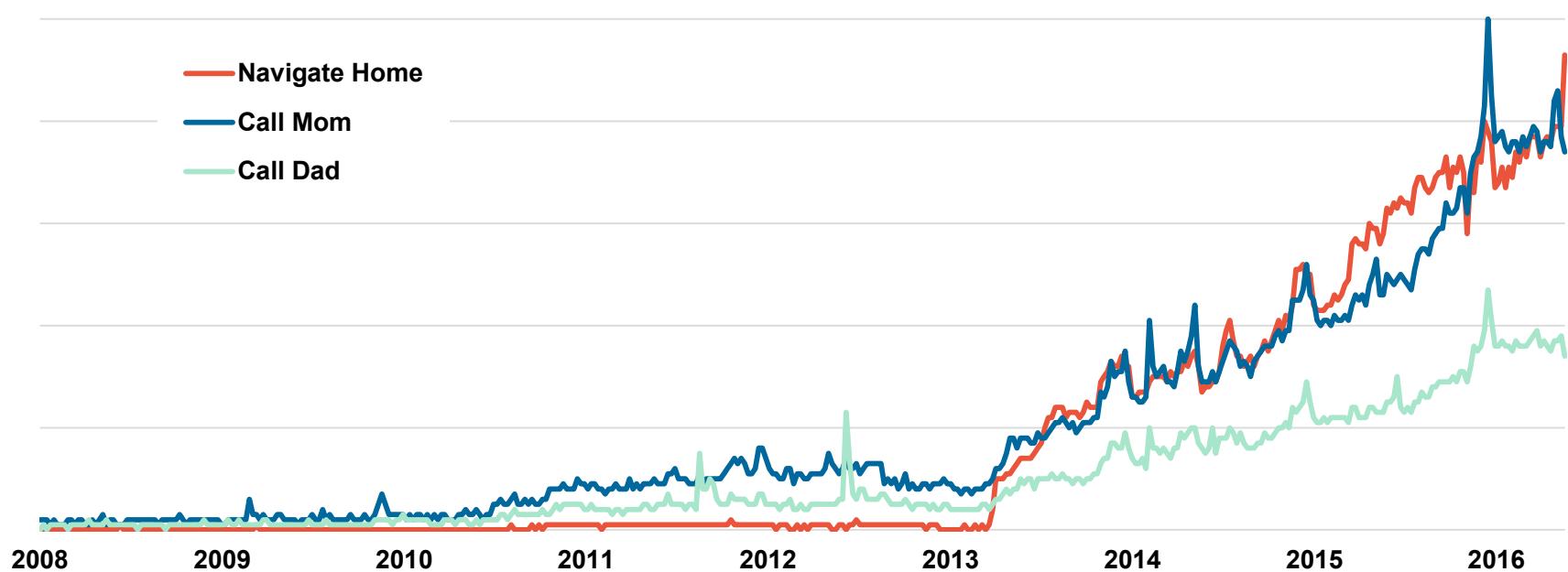
Source: Thrive Analytics, "Local Search Reports" 2013-2015

Note: Results highlighted in these charts are from the 2013, 2014, and/or 2015 Local Search surveys. These surveys were conducted via an online panel with representative sample sizes for the national population in the US. There were 1,102, 2,058, and 2,125 US smartphone owners that completed the surveys in 2013, 2014 and 2015 respectively.

# Google Voice Search Queries = Up >35x Since 2008 & >7x Since 2010, per Google Trends

*Google Trends imply queries associated with voice-related commands have risen >35x since 2008 after launch of iPhone & Google Voice Search*

**Google Trends, Worldwide, 2008 – 2016**



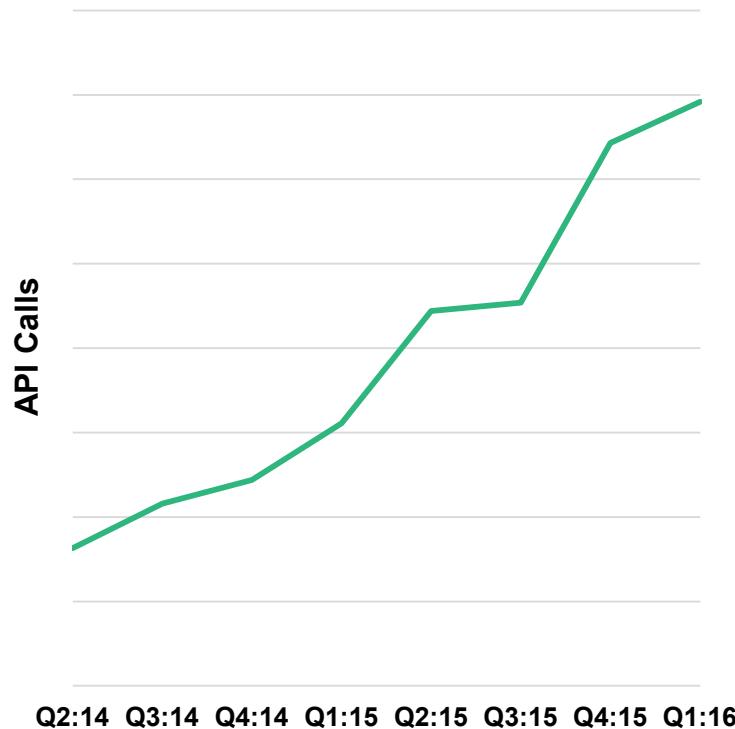
Source: Google Trends

Note: Assume command-based queries are voice searches given lack of relevance for keyword-based search. Aggregate growth values determined using growth in Google Trends for three queries listed above.

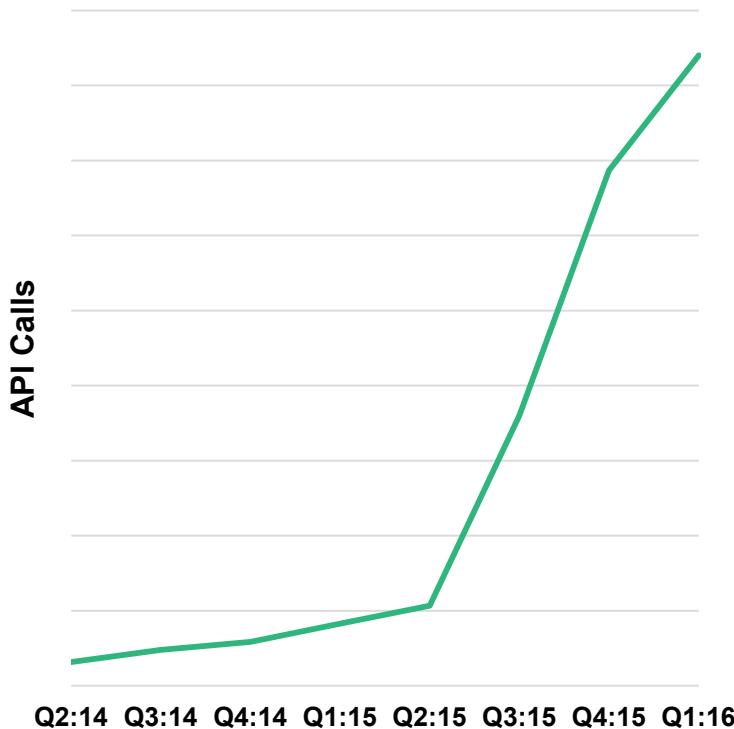
# Baidu Voice = Input Growth >4x...Output >26x, Since Q2:14

*Usage across all Baidu products growing rapidly...typing Chinese on small cellphone keyboard even more difficult than typing English...Text-to-Speech supplements speech recognition & key component of man-machine communications using voice*

**Baidu Speech Recognition Daily Usage by API Calls,  
Global, 2014 – 2016<sup>1</sup>**



**Baidu Text to Speech (TTS) Daily Usage by API Calls,  
Global, 2014 – 2016<sup>2</sup>**



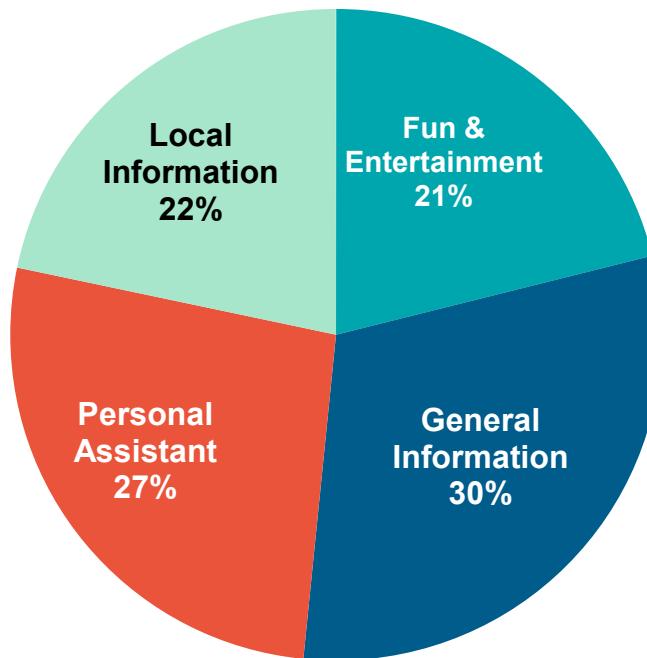
Source: Baidu

Note: (1) Data shown is growth of speech recognition at Baidu, as measured by the number of API calls to Baidu's speech recognition system across time, from multiple products. Most of these API calls were for Mandarin speech recognition. (2) Data shown is growth of TTS (text to speech) at Baidu, in terms of the total number of API calls to Baidu's TTS system across time, from multiple products. Most of these API calls were for Mandarin TTS.

# Hound Voice Search & Assistant App = 6-8 Queries Across 4 Categories per User per Day

*Seeing 6-8 queries per active user per day among 100+ domains across 4 categories...  
Users most care about speed / accuracy / ability to follow up / ability to understand complex  
queries...*

## Voice Query Breakdown – Observed Data on Hound App, USA, 2016

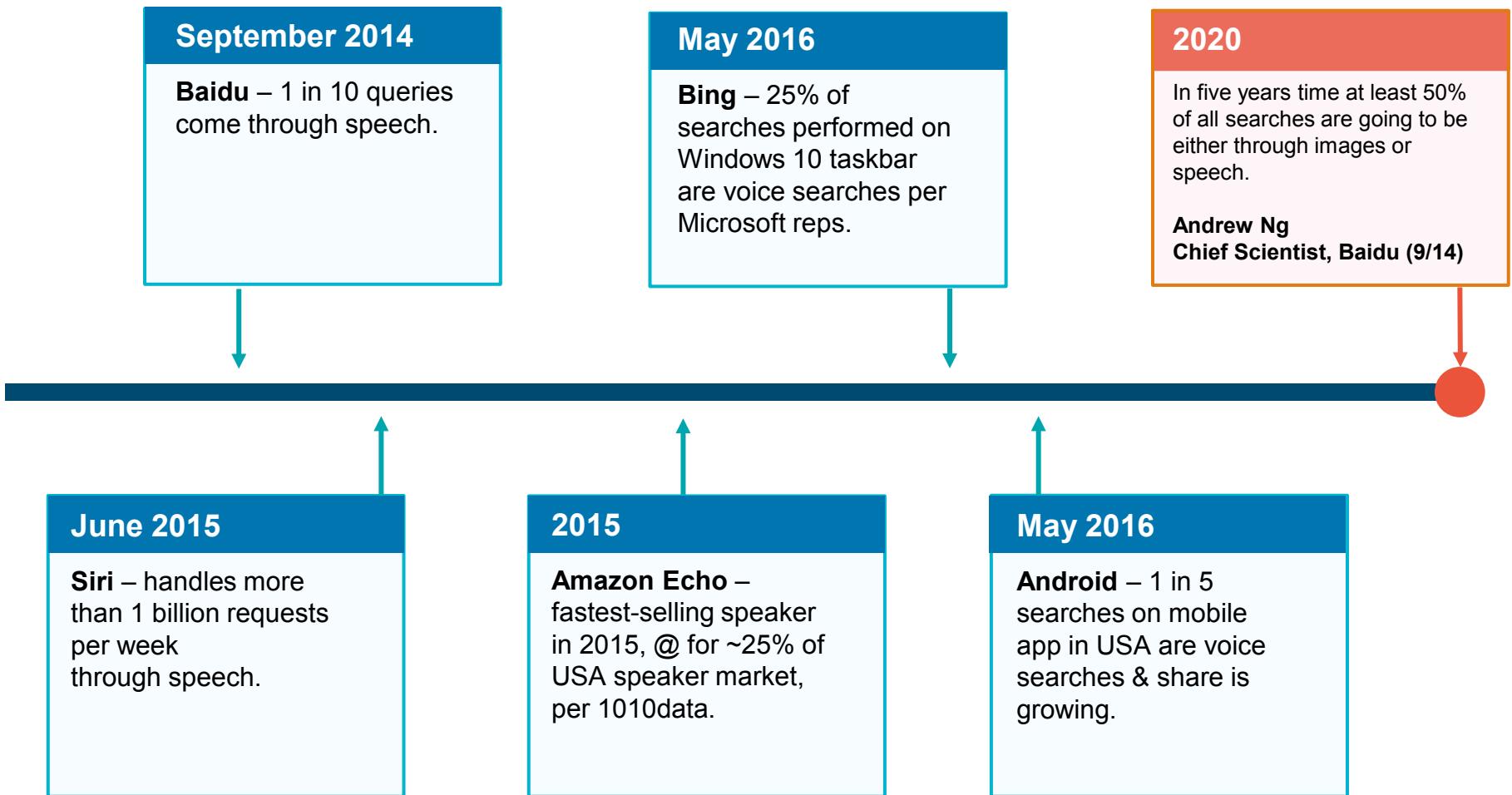


Source: SoundHound

Note: Based on most recent 30-days of user activity. Local information refers to queries about weather, restaurants, hotels, maps and navigation. Fun & entertainment refers to queries about music, movies, games, etc. General information refers to queries about facts, dictionary, sports, stocks, mortgages, nutrition, etc. Personal assistant refers to queries and commands about phone / communications, Uber and transportation, flight status, calendars, timers, alarms, etc.

# Voice = Gaining Search Share...

USA Android @ 20%...Baidu @ 10%...Bing Taskbar @ 25%

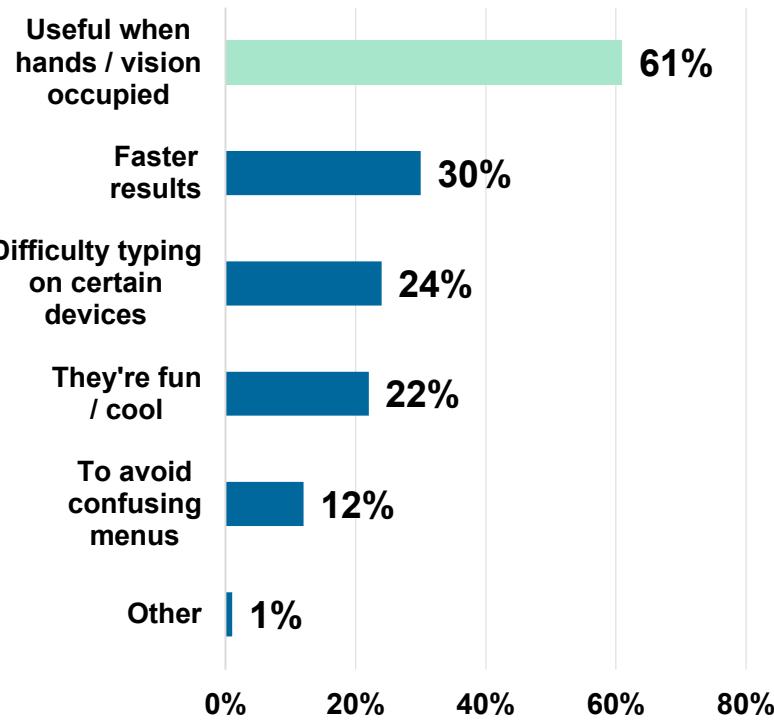


*Voice as  
Computing Interface...*

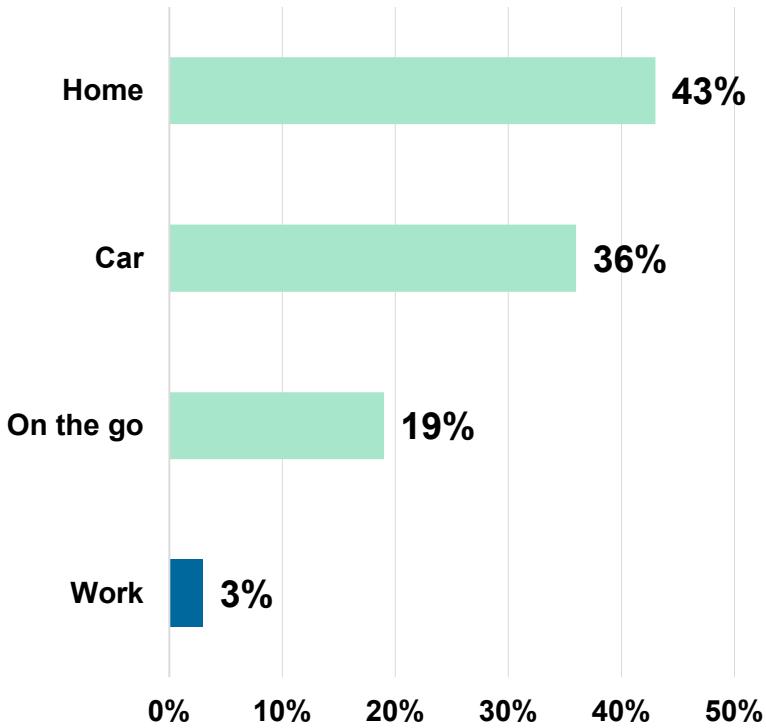
*Hands & Vision-Free =  
Expands Concept of ‘Always On’*

# Hands & Vision-Free Interaction = Top Reason to Use Voice...@ Home / In Car / On Go

**Primary Reasons for Using Voice,  
USA, 2016<sup>1</sup>**



**Primary Setting for Voice Usage,  
USA, 2016<sup>2</sup>**



Source: MindMeld "Intelligent Voice Assistants Research Report - Q1 2016"

Note: Based on survey of n = 1,800 respondents who were smartphone users over the age of 18, half female half male, geographically distributed across the United States. (1) In response to the survey question stating "Why do you use voice/search commands? Check all that apply." (2) In response to the survey question stating "Where do you use voice features the most?"

*Voice as  
Computing Interface...*

*Platforms Being Built...  
Third Party Developers  
Moving Quickly*

# Amazon Alexa Voice Platform Goal = Voice-Enable Devices = Mics for Home / Car / Mobiles...

## Alexa Voice Service – OEM / Developer Integrations (10+ integrations...)



Alexa 'Skills' Kit Developers = ~950 Skills (5/16) vs. 14 Skills (9/15)



# ...Amazon Alexa Voice Platform Goal = Faster / Easier Shopping on Amazon

*Leveraging proliferation of microphones throughout house to reduce friction for making purchases...  
3x faster to shop using microphone than to navigate menus in mobile apps\**...

**Amazon Echo**



**Amazon  
Echo Dot**



**Amazon  
Echo Tap**



**Amazon Prime**  
(~44MM USA Subscribers)



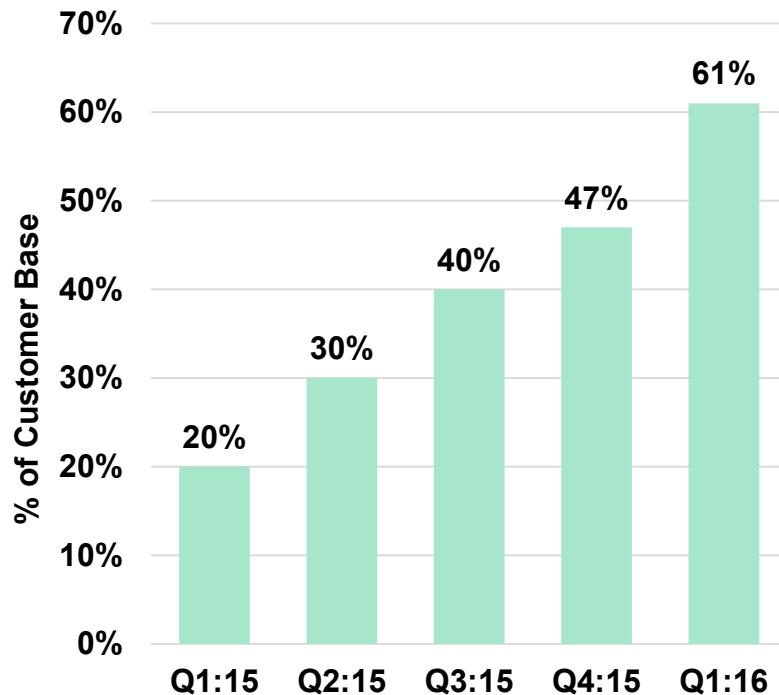
## Evolution of Shopping with Echo

1. Shopping Lists (**2014**)
2. Reorder past purchases by voice (**2015**)
3. Order new items – assuming you are fine with Amazon selecting exact item (**2015**)

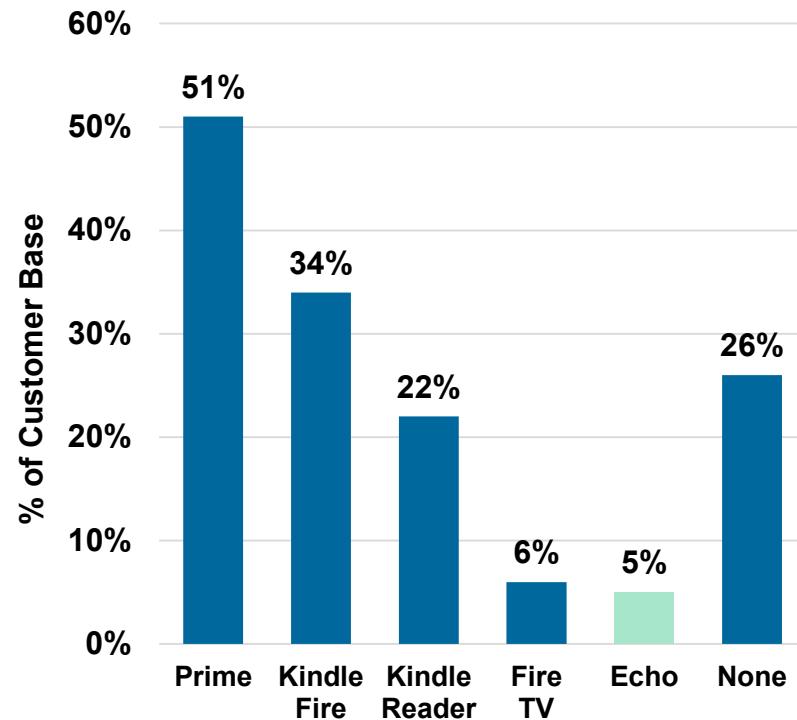
~5% of Amazon USA Customers Own an Echo vs. 2% Y/Y...  
~4MM Units Sold Since Launch (11/14), per CIRP

~4MM Amazon Echo devices have been sold in USA as of 3/16, with ~1MM sold in Q1:16, per CIRP estimates

### Amazon Customer Awareness of Amazon Echo, USA, Q1:15 – Q1:16



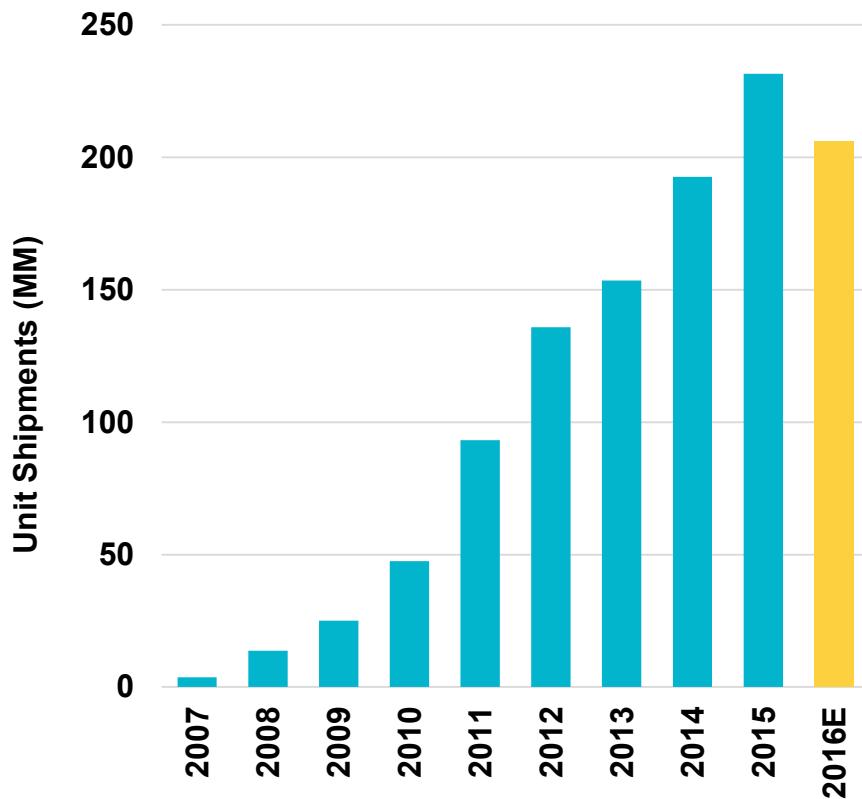
### Amazon Customer Ownership of Amazon Devices, USA, Q1:16



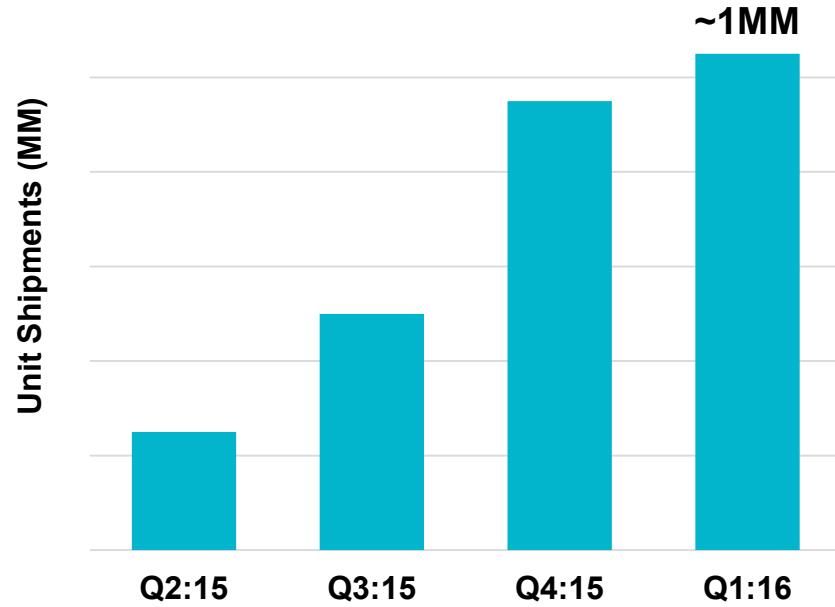
*Computing Industry  
Inflection Points =  
Typically Only Obvious  
With Hindsight*

# iPhone Sales May Have Peaked in 2015... While Amazon Echo Device Sales Beginning to Take Off?

iOS Smartphone Unit Shipments,  
Global, 2007 – 2016E



Estimated Amazon Echo Unit Shipments,  
USA, Q2:15 – Q1:16



Source: Morgan Stanley Research (5/16), Consumer Intelligence Research Partners (CIRP), KPCB estimates  
Note: Apple unit shipments shown on a calendar-year basis. Amazon Echo limited launch occurred in 11/14 and wide-release launch occurred in 6/15.

*Re-Imagining  
Transportation =  
Another New Paradigm in  
Human-Computer Interaction...  
Cars*

# Is it a Car...Is it a Computer?...

## *Is it a Phone...Is it a Camera?*



## *Is it a Car...Is it a Computer?*



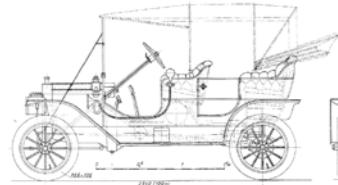
# ...One Can... Lock / Monitor / Summon One's Tesla from One's Wrist



*Car Industry Evolution =  
Computerization Accelerating*

# Car Computing Evolution Since Pre-1980s = Mechanical / Electrical → Simple Processors → Computers

**Pre-1980s**  
**Analog / Mechanical**  
Used switches / wiring to route feature controls to driver



**1980s (to Present)**  
**CAN Bus**  
**(Integrated Network)**  
New regulatory standards drove need to monitor emissions in real time, hence central computer



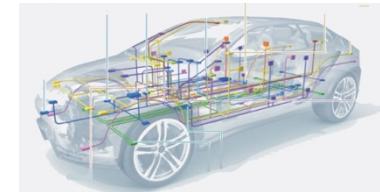
**1990s (to Present)**  
**OBD (On-Board Diagnostics) II**  
Monitor / report engine performance; Required in all USA cars post-1996



**1990s-2010s**  
**Feature-Built Computing + Early Connectivity**  
Automatic cruise control... Infotainment... Telematics... GPS / Mapping...



**Today = Complex Computing**  
Up to 100 Electronic Control Units / car...  
Multiple bus networks per car (CAN / LIN / FlexRay / MOST)...  
Drive by Wire...



**Today = Smart / Connected Cars**  
Embedded / tethered connectivity...  
Big Tech = New Tier 1 auto supplier (CarPlay / Android Auto)...



**Tomorrow = Computers Go Mobile?...**  
Central hub / decentralized systems?  
LIDAR...  
Vehicle-to-Vehicle (V2V) / Vehicle-to-Infrastructure (V2I) / 5G...  
Security software...



# Car Automation Accuracy / Safety Improvements = Accelerating... Early Innings of Level 2 / Level 3

## NHTSA – Automated Driving System Classifications

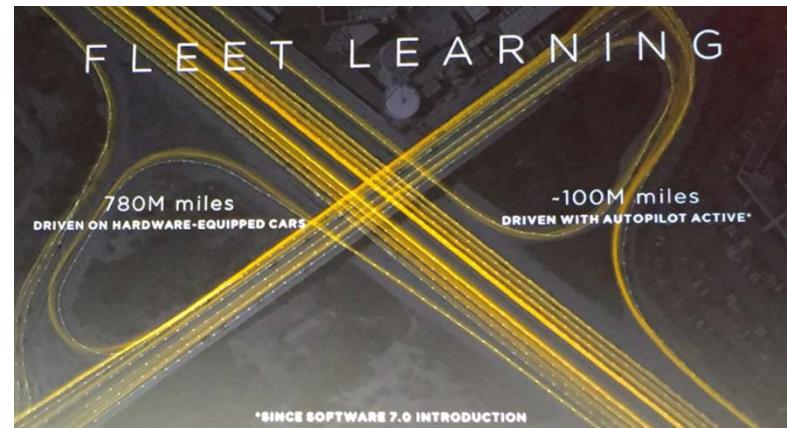
	L0	L1	L2	L3	L4
Description	<ul style="list-style-type: none"><li>Driver in complete and sole control of primary vehicle controls (brake, steering, throttle, motive power) at all times.</li><li>Systems with warning technology (e.g. forward collision warning) do not imply automation</li></ul>	<ul style="list-style-type: none"><li>Automation of one or more primary vehicle control functions, but no combination of systems working in unison</li></ul>	<ul style="list-style-type: none"><li>Automation of at least two primary vehicle control systems working in unison</li></ul>	<ul style="list-style-type: none"><li>Driver able to cede full control of all safety-critical functions under certain conditions.</li><li>Driver is expected to be available for occasional control, but with sufficiently comfortable transition time</li></ul>	<ul style="list-style-type: none"><li>Vehicle can perform all safety-critical driving and monitoring functions during an entire trip</li></ul>
Example	<ul style="list-style-type: none"><li>N/A</li></ul>	<ul style="list-style-type: none"><li>ABS</li><li>Cruise Control</li><li>Electronic Stability Control</li><li>Park Assist</li></ul>	<ul style="list-style-type: none"><li>Tesla Autopilot</li><li>GM Super Cruise (2017)</li></ul>	<ul style="list-style-type: none"><li>Google Car (manned prototype)</li></ul>	<ul style="list-style-type: none"><li>Google Car</li></ul>
Time Frame	<ul style="list-style-type: none"><li>Since cars invented (1760s)</li></ul>	<ul style="list-style-type: none"><li>1990s – Today</li></ul>	<ul style="list-style-type: none"><li>2010s</li></ul>	<ul style="list-style-type: none"><li>2010s</li></ul>	<ul style="list-style-type: none"><li>?</li></ul>

# Early Autonomous / ADAS Features Continue to Improve = Miles Driven Continue to Rise

## Google (Level 3 / 4 Autonomy)



## Tesla (Level 2 Autonomy)



## Google Self-Driving Car Project

Where we are

We've self-driven more than 1.5 million miles  
and are currently out on the streets of  
Mountain View, CA, Austin, TX, Kirkland, WA and  
Metro Phoenix, AZ.

Tesla customers have driven **100 million**  
**miles with Autopilot active**

# Primary Approaches to Autonomous Vehicle Rollouts = All New or Assimilation...Traditional OEMs Taking Combined Approach

## All New = Top-Down, Fully Autonomous Vehicles

- Design & build vehicles from day one with goal of full autonomy
- Craft architectures / systems for end product needs and with full fleet in mind
- Adapt testing environments to needs (individual city testing)
- Solves potentially dangerous middle layer of semi-autonomy
- Need very specific environments and regulation to guide integration with current system
- Potentially difficult to scale
- Key Example: 

## Assimilation = Gradual Rollout / Mixed-Fleet Environments

- Roll out / upgrade autonomous features in current automotive context
- Solves issue of integrating autonomy into existing asset base
- Real-time, in-field updates & improvements (Tesla over-the-air software updates)...real-world learnings
- Semi-autonomous stages require potentially dangerous resumption of driver control
- OEM production cycles sometimes long, which could cause innovation to remain slow
- Key Example: 

*Car Industry Evolution =  
Driven by Innovation...  
USA Led...USA Fell*

# Car Industry Evolution, 1760s – Today = Driven by Innovation + Globalization

## Early Innovation (1760s-1900s) = European Inventions

**1768** = First Self-Propelled Road Vehicle (Cugnot, France)



**1876** = First 4-stroke cycle engine (Otto, Germany)



**1886** = First gas-powered, 'production' vehicle (Benz, Germany)



**1888** = First four-wheeled electric car (Flocken, Germany)



## Streamlining (1910s-1970s) = American Leadership

**1910s** = Model T / Assembly Line (Ford)



**1920s-1930s** = Car as Status Symbol... Roaring '20s / First Motels

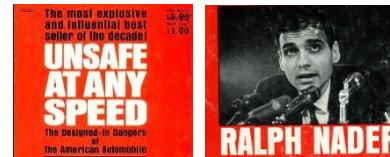


**1950s** = Golden Age... Interstate Highway Act (1956)... 8 of Top 10 in Fortune 500 in Cars or Oil (1960)



## Modernization (1970s-2010s) = Going Global / Mass Market

**1960s** = Ralph Nader / Auto Safety



**1970s** = Oil Crisis / Emissions Focus



**1980s** = Japanese Auto Takeover Begins...



**1990s – 2000s** = Industry Consolidation; Asia Rising; USA Hybrid Fail (Prius Rise)

DAIMLERCHRYSLER



**Late 2000s** = Recession / Bankruptcies / Auto Bailouts

## Re-Imagining Cars (Today) = USA Rising Again?

**DARPA Challenge (2004, 2005, 2007, 2012, 2013)** = Autonomy Inflection Point?



**Today =**



**+**

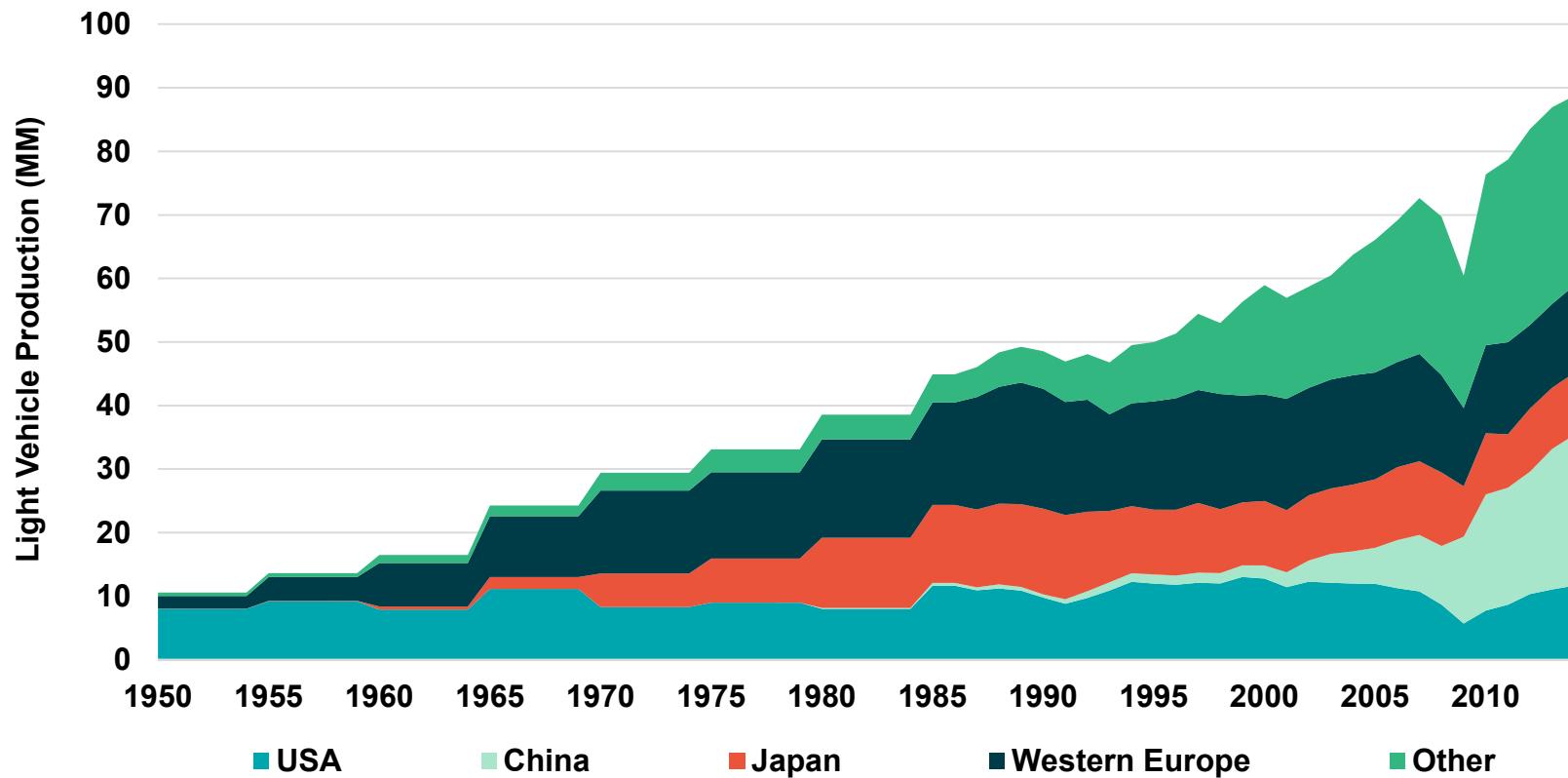


**+**



# Global Car Production Share = Rise & Decline of USA... Cars Produced in USA = 13% vs. 76% (1950)...

Annual Light Vehicle Production, By Region, 1950 – 2014

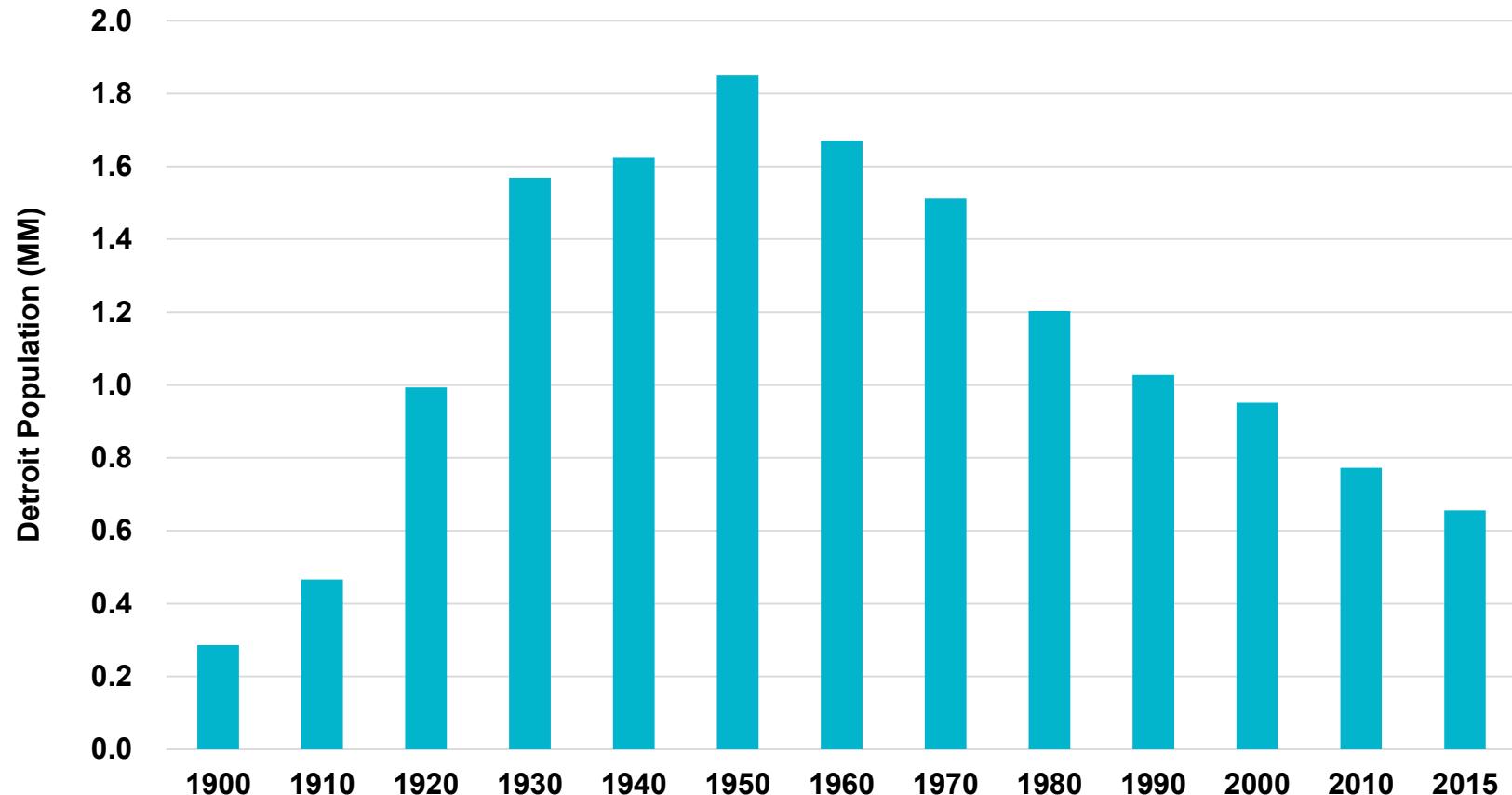


Source: Wards Automotive, Morgan Stanley Research

Note: Production measure represents all light vehicles manufactured within the given region (regardless of OEM home country). Light vehicles include passenger cars, sport utility vehicles and light trucks (e.g. pickups). Data from 1950-1985 only available every 5 years. Largest "Other" constituents are South Korea, India and Mexico.

# Detroit Population Tells Tale of USA Car Production = Down 65% from 1950 Peak @ 1.8MM

**Detroit Population, 1900 – 2015**



*Car Industry =  
Innovation Accelerating in  
USA*

USA =

Potential to be Global Hub of Auto Industry Again?...

### ***USA Has Many Key Components of Ecosystem***

- 1) **Incumbents** – GM / Ford...Leading (2 of Top 10 Global) Auto Manufacturers
- 2) **Attackers** – Tesla... #1 Electric Vehicle Manufacturer
- 3) **Systems / Components** – *Processors / GPUs (Nvidia...)...Sensors / LIDAR / Radar (Velodyne / Quanergy / Google...)...Connectivity (AT&T / Telogis / INRIX...)...Mapping (Google / Waze / Uber...)...Operating Systems (Google / Apple)...Other (Drivetrain / Power Electronics / Aerodynamics / Lightweighting / Etc...)*
- 4) **Autonomous Vehicles** – Google / Tesla / Uber...Leadership in Development of Autonomous Vehicle Solutions
- 5) **Mobility & Fleet Innovation** – Uber / Lyft / Zendrive...Leadership in Ride Sharing Solutions / Infrastructure / Fleet Knowledge (Distribution via Mobile Devices / Recommended Traffic Flows)
- 6) **Education / University Innovation** – Stanford / Carnegie Mellon / Michigan / MIT / UC Berkeley...Leadership in STEM & Computer Science Education / Computer Vision / Robotics / Deep Learning / Automotive Engineering

...USA =

# Potential to be Global Hub of Auto Industry Again?

## ***USA Could Benefit from Creating Space in the Automotive Regulatory Framework to Foster Innovation***

- 1) **Federally Provided Guidance to States to Embrace Autonomy** – Multiple legislative frameworks from individual states could impede autonomous innovation...
- 2) **Flexibility of Regulation** – Numerous approaches to solving autonomy challenge are likely to evolve simultaneously... regulation should not impede any single innovation approach...
- 3) **Individual Cities / States Championing Autonomy** – More testing locations / forward-leaning cities like Mountain View, CA / Austin, TX / Kirkland, WA / Metro Phoenix, AZ...
- 4) **Comprehensive Safety Frameworks** – Gov't should have power to allow autonomous systems that demonstrate quantifiable safety improvements over current driver-vehicle combination...
- 5) **Leaning Forward on Sharing (Car & Ride)** – Regulators should work with rather than against sharing companies to craft policy as consumer demand illustrates need / interest in sharing...
- 6) **Auto Cybersecurity** – Connected cars face increased risk of cyber attacks...manufacturers & suppliers should keep consumer security / privacy as a key priority...
- 7) **Next-Generation Franchise Laws** – Semi-autonomous & autonomous cars are likely to change process of buying / servicing given 'over the air' nature of software downloads...USA could consider the EU 'Block Exemption' as model & allow consumers to service vehicles at either manufacturer-affiliated or independent locations

# Regulators = Typically Slow to Adapt to New Technologies

***Back in the Day When Horseless Carriage (Car) Came Along...***



**Locomotive Act of 1865 –  
Red Flag Act  
Law Enacted in UK...  
Horseless Carriages (Cars) Had to be  
Preceded By Someone with Red Flag For  
Safety Purposes**



**Jitneys (1914)**  
*Ride-Sharing, ~100 Years Ago...  
150K Jitney Rides / Day (1915) in LA, yet  
Regulated Out of Existence by 1919...  
157K Uber Rides / Day (2016) in LA...*

# Global Perspective on Auto Industry Future – By Region, per Morgan Stanley Auto & Shared Mobility Research

**N. America** – Some home field advantage on tech innovation & early application of shared mobility, but culture of private ownership and litigious USA judicial system may slow progress.

**China** – Government focus on technology / environment, as well as quality of ride-sharing companies (esp. Didi), have driven strong early sharing adoption. Competing investment in public transit and impact of car ownership on social standing may impede full-scale adoption.

**India** – Offers all key ingredients (rapid urbanization, limited public infrastructure, large millennial population, internet inflection point) for shared mobility leadership. Current market structure is likely to change as shared mobility gains dominance, so future remains unclear.

**Europe** – Lack of homegrown tech champions coupled with power of OEMs (particularly Germans) and quality of European public transit may make adoption more difficult. High fuel costs and strong emissions standards may drive movement forward.

**Japan** – Social implications of an aging population and policy support (given importance of a strong automotive industry) represent key advantages, but OEM buy-in to new paradigm is crucial, and R&D investment in tech arena lags somewhat behind other geographies.

**Korea** – Strong technological culture, early political support and sharing-focused younger demographic leaves Korea relatively well positioned for move to shared mobility, though adoption remains in its infancy.

# *Re-Imagining Transportation – Mobility also Being Re-Imagined*

# Re-Imagining Automotive Industry = From Cars Produced to Miles Driven?

*We do believe the traditional ownership model is being disrupted...We're going to see more change in the next five to ten years than we've seen in the last 50.*

- MARY BARRA, GM CEO, 10/25/15

*You could say there would be less vehicles sold, but we're changing our business model to look at this as vehicle miles traveled...I could argue that with autonomous vehicles, the actual mileage on those vehicles will accumulate a lot more than a personally owned vehicle.*

- MARK FIELDS, FORD CEO, 4/12/16

# Car Ownership Costs (Money + Time) = High

## Car Ownership Costs = High

\$8,558 / Year, USA = Depreciation @ 44% / Fuel @ 15% / Finance + Fees @ 14% / Insurance @ 14% / Maintenance + Repair @ 9%

## Commuting Time = Significant

4.3 Hours per Week per Worker, Average (13% of Work Week, USA)

## Urban Auto Commuting Delays = Rising

42 Hours / Year / Urban Worker, USA (+2x in 30 Years), Equivalent to ~1.2 Extra Work Weeks / Year

## Millennials = Driving Differently

Drivers License Usage Declining (Age 16-44) = @ 77% vs. 92% (1982, USA)

Millennial Willingness to Car Share = @ ~50% (Asia-Pacific) / @ ~20% (North America)

46% of Millennials Expect Vehicle Technology to do Everything a Smartphone Can...

Source: Ownership costs per AAA (4/16). Vehicle fees include license, taxes and registration. Commuting times per U.S. Census Bureau (2013) and include all transport options apart from walking and biking. Average USA work week per OECD Employment Outlook (7/15). Urban auto commuting delays per Texas A&M Transportation Institute / INRIX 2015 Mobility Scorecard (8/15); delays defined as extra time spent during the year traveling at congested rather than free-flow speeds by private vehicle drivers / passengers for 471 US urban areas. Driver's license rates per University of Michigan Transportation Research Institute / Federal Highway Administration (1/16). Car sharing statistics per Goldman Sachs Research (5/15). Millennial expectations per AutoTrader 2016 Cartech Impact Study (9/15, n=1,012).

# Efficiency Gain Potential from Ride & Car Sharing = High

## Cars = Underutilized Assets

USA = 2.2 Cars / Household, ~20% of Households Have 3+ Cars,  
Cars Used ~4% of Time

## Vehicle Miles Traveled (VMT) = High Per Capita

USA VMT Per Capita = 9K / +11x China (~850) / +48x India (~200)

## Parking Infrastructure = Lots of It

~19MM Parking Spaces in Los Angeles County (2010), +12MM since 1950  
14% of Incorporated Land in Los Angeles County Allocated to Parking  
~4 Estimated Parking Spots / Person in USA

## Energy Consumption by Light Vehicles = Significant

~500B Gallons of Fuel, Global (2014)...

# Uber Platform / Network =

## Why Millions of Riders Have Taken >1B Rides Since 2009

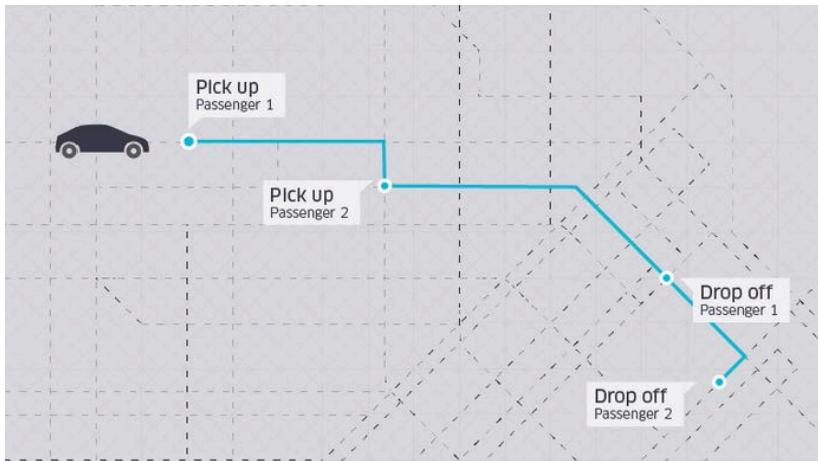
### Top Reasons Riders Choose Uber

- 93% = Get to Destination Quickly
- 87% = Safety
- 84% = Too Much Alcohol to Drive
- 83% = Save Money
- 77% = Avoid Dealing with a Car
- 65% = Option During Public Transit 'Off' Hours

# Shared Private Rides Becoming Urban Mainstream = uberPOOL @ 20% of Global Uber Rides in <2 Years



## uberPOOL



- **36** = Global UberPool Cities, +7x Y/Y
- **100MM** = UberPool Trips Since Launch (8/14)
- **40%** = UberPool as % of Total SF Rides
- **30MM** = China Rides / Month (in <1 Year)
- **>100K** = Riders / Week in 11 Global Cities
- **90MM** = Vehicle Miles Traveled saved vs. UberX\*
- **1.8MM** = Gallons of Gas Saved vs. UberX\*

# Re-Imagining Most Important Seat in Car = Back Seat, Again?

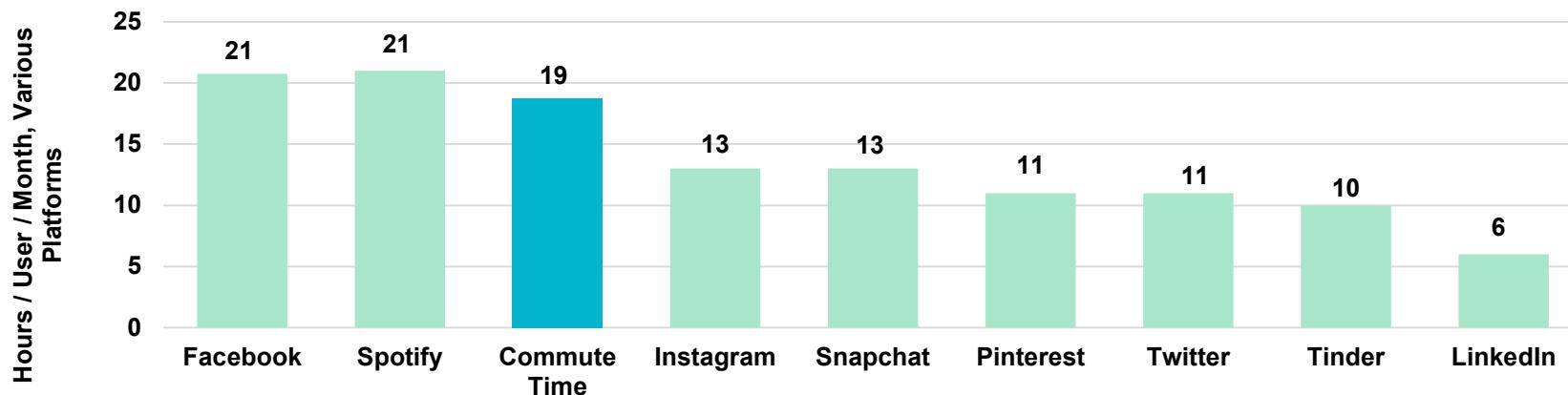
**Rolls Royce 10hp (1904) =**  
Designed for Rider



**Mercedes-Benz F 015**  
**'Luxury in Motion' Concept (2015) =**  
Déjà Vu?



Commute Time = Significant Engagement / Entertainment Opportunity?



Source: Time Spent data per Cowen & Co, Research + SurveyMonkey (n = 2,059, 6/15, minutes / day spent across all cohorts and extrapolated to hours / month), except for Spotify (per Company). Commute data per US Census Bureau as of 2013, includes all modes of transportation apart from walking / biking. Assumes 25.9 minute one-way commute, assumed to be 5 days per week in both commute directions and 4.35 average weeks / month. Images per RREC / SWNS.com, Mercedes-Benz, carbodydesign.com

*Transportation Industry =  
Strap In for Next Few Decades*

# Automotive Industry Golden Age, Take Two?

## What if a Car:

- Is part of a network that provides a commuting service that comes to you?
- Is the most advanced computing device you use?
- In effect, is an on-demand cash generator, boosted by car / ride sharing?
- Gives you safe driving pay-backs from your insurer?
- Is safer, due to automation / reduced human error?
- Drives itself? Parks itself?
- Makes you want to commute?
- Makes you more productive?

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# CHINA = INTERNET LEADER ON MANY METRICS

*Hillhouse Capital\**  
*Provided China Section of Internet Trends, 2016*

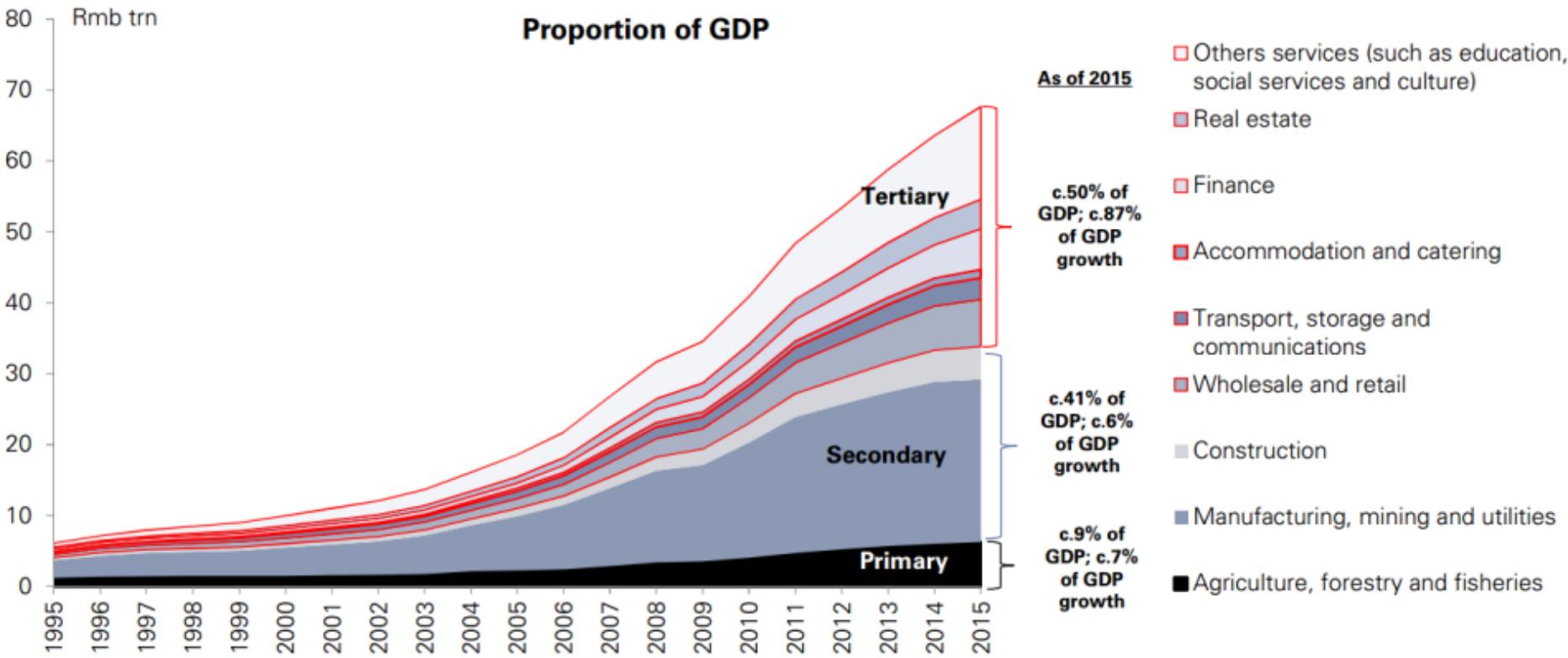


\*Disclaimer – The information provided in the following slides is for informational and illustrative purposes only. No representation or warranty, express or implied, is given and no responsibility or liability is accepted by any person with respect to the accuracy, reliability, correctness or completeness of this Information or its contents or any oral or written communication in connection with it. A business relationship, arrangement, or contract by or among any of the businesses described herein may not exist at all and should not be implied or assumed from the information provided. The information provided herein by Hillhouse Capital does not constitute an offer to sell or a solicitation of an offer to buy, and may not be relied upon in connection with the purchase or sale of, any security or interest offered, sponsored, or managed by Hillhouse Capital or its affiliates.

*China Macro =*  
*Robust Service-Driven Job &*  
*Income Growth...*  
*Despite Investment Slowdown*

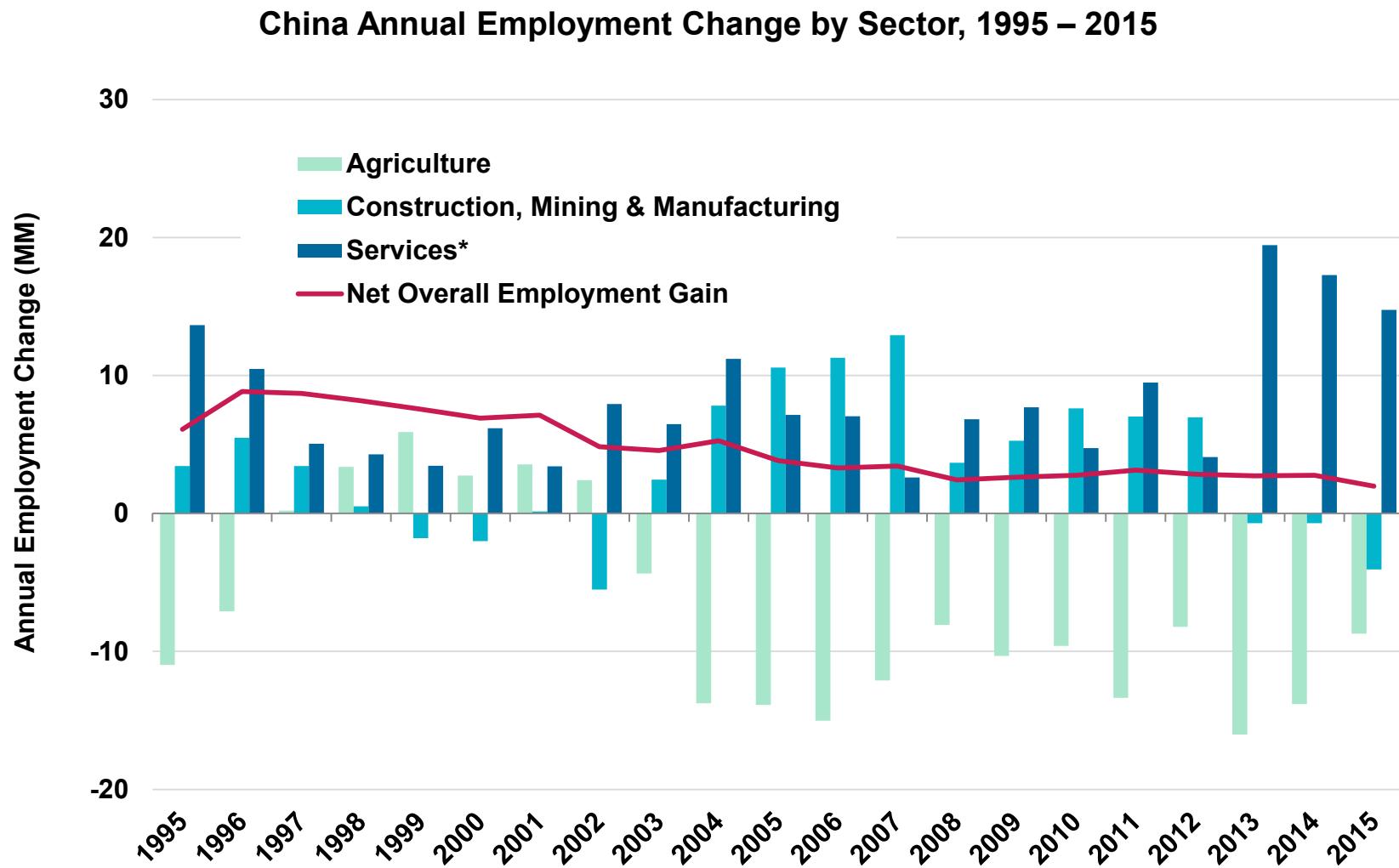
# China Services Industries = 50%+ (& Rising) of China's GDP & ~87% of GDP Growth

## China's GDP by Sector, 1995 – 2015



Source: National Bureau of Statistics of China, CEIC, Goldman Sachs Global Investment Research.

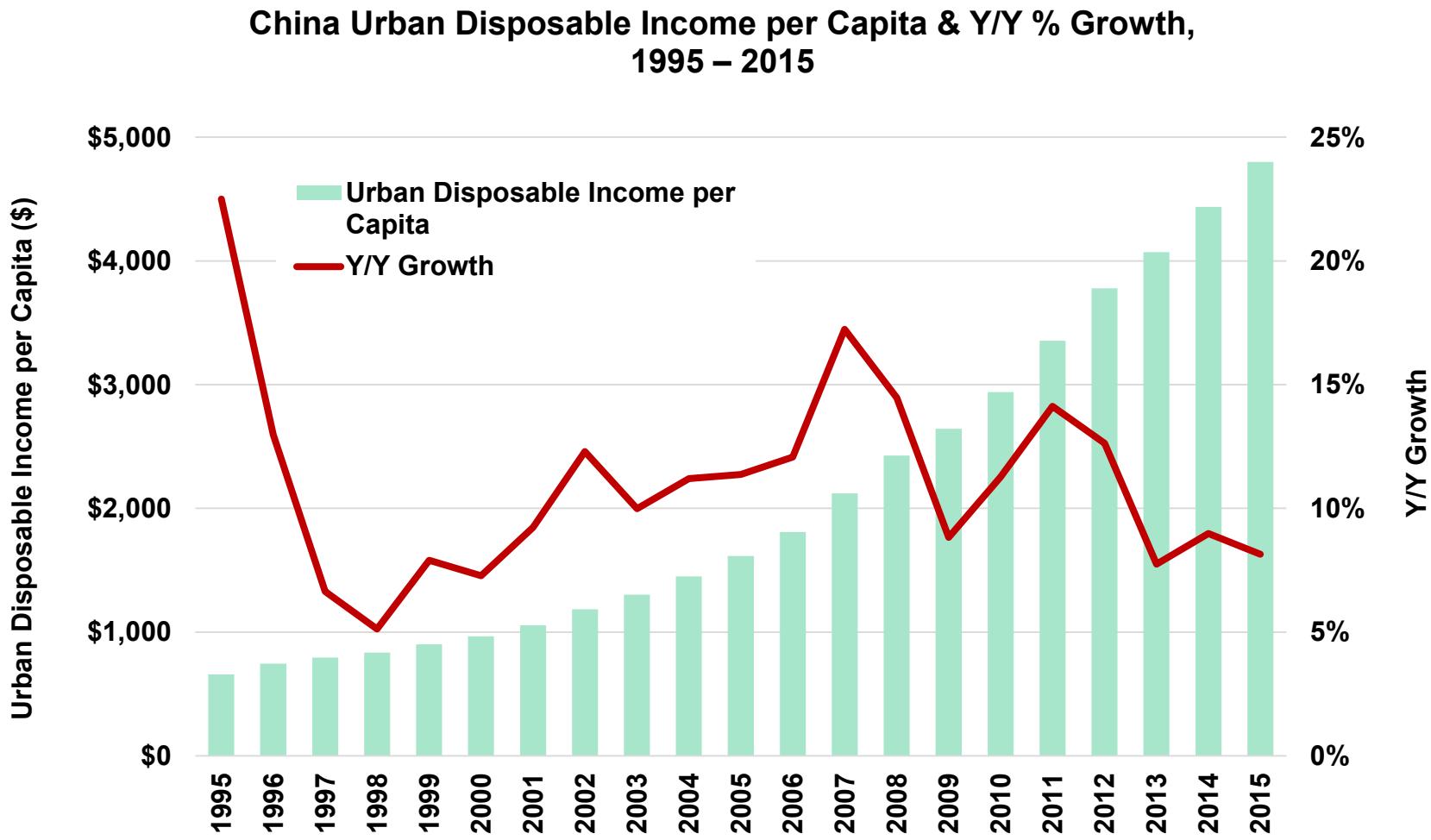
# China Services\* Industries Job Growth = Accelerating... Offsetting Job Losses from Construction / Manufacturing / Agriculture



Source: National Bureau of Statistics of China, Wind Information.

\*Note: Services include wholesale, retail, transportation, storage, communication, accommodation, catering, finance, education, real estate and other services.

# China Urban Disposable Income Per Capita = Continues to Grow @ Solid Rates

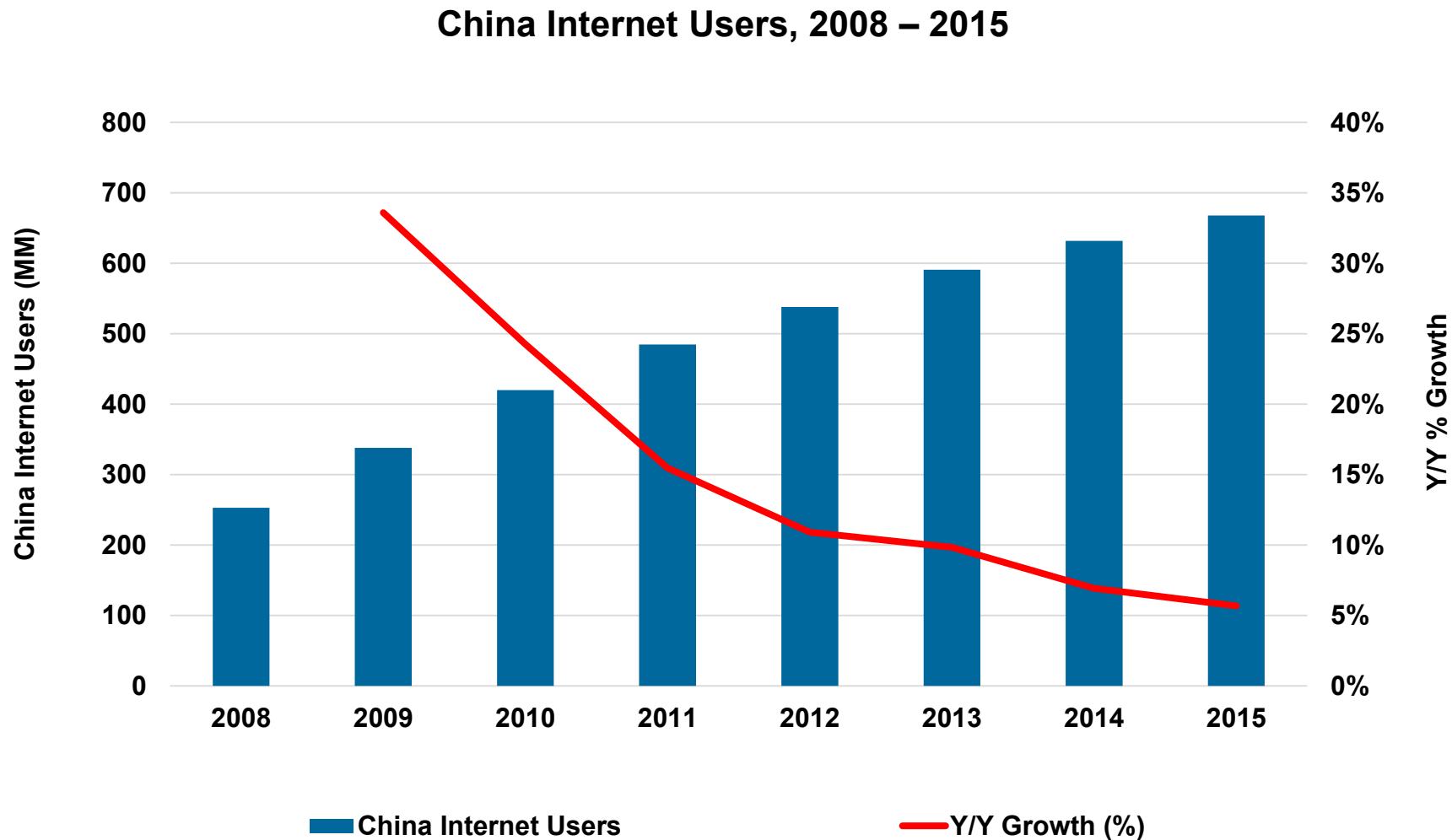


Source: CEIC, assume constant FX 1USD=6.5RMB.

*China Internet @*  
668MM Users =

+6% vs. +7% Y/Y

# China Internet Users = 668MM, +6% vs. 7% Y/Y...@ 49% Penetration



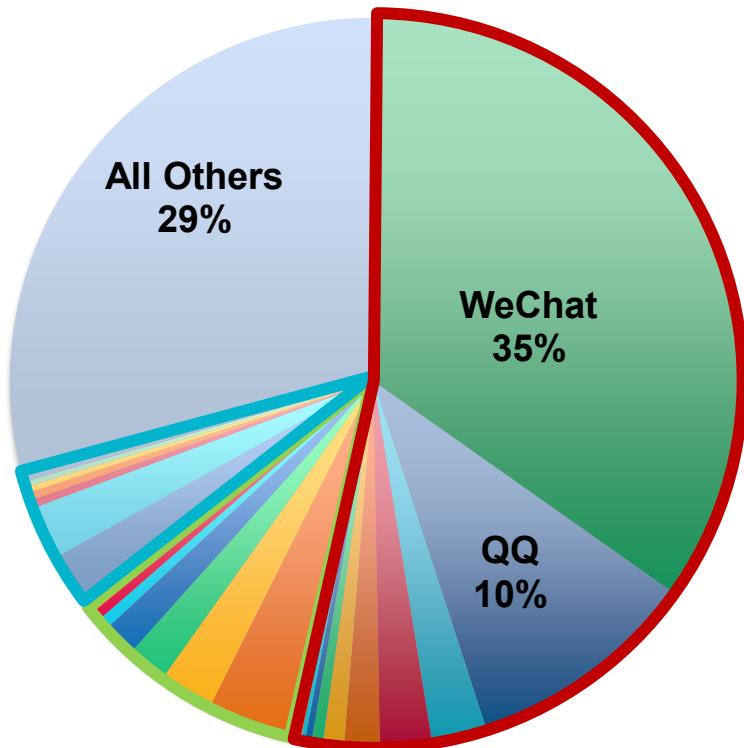
Source: CNNIC. Internet user data is as of mid-year.

# China Mobile Internet Usage Leaders...

Tencent + Alibaba + Baidu = 71% of Mobile Time Spent

Share of Mobile Time Spent, April 2016

Daily Mobile Time Spent = ~200 Minutes per User, Average



Tencent

- WeChat
- QQ
- QQ Browser
- Tencent Video
- Tencent News
- Tencent Games
- QQ Music
- JD.com
- QQ Reading

Alibaba

- UCWeb Browser
- Taobao
- Weibo
- YouKu Video
- Momo
- Shuqi Novel
- AliPay
- AutoNavi

Baidu

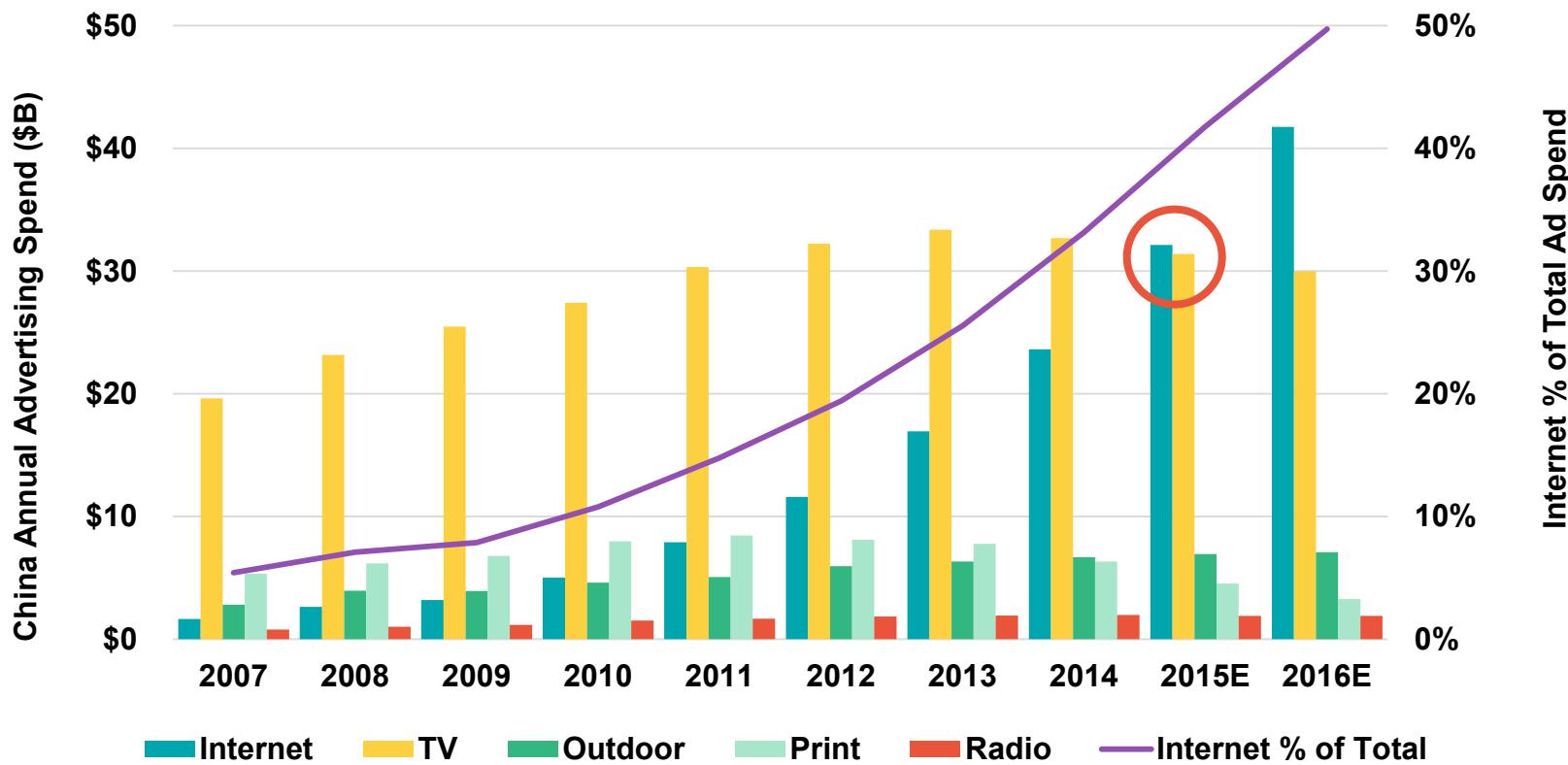
- Mobile Baidu
- iQiyi / PPS Video
- Baidu Browser
- Baidu Tieba
- 91 Desktop
- Baidu Maps
- All Other

*China Internet Traction =  
Advertising / Commerce /  
Travel / Financial Services  
Trends Often Compare  
Favorably to USA*

# China Online Advertising > TV (2015)...

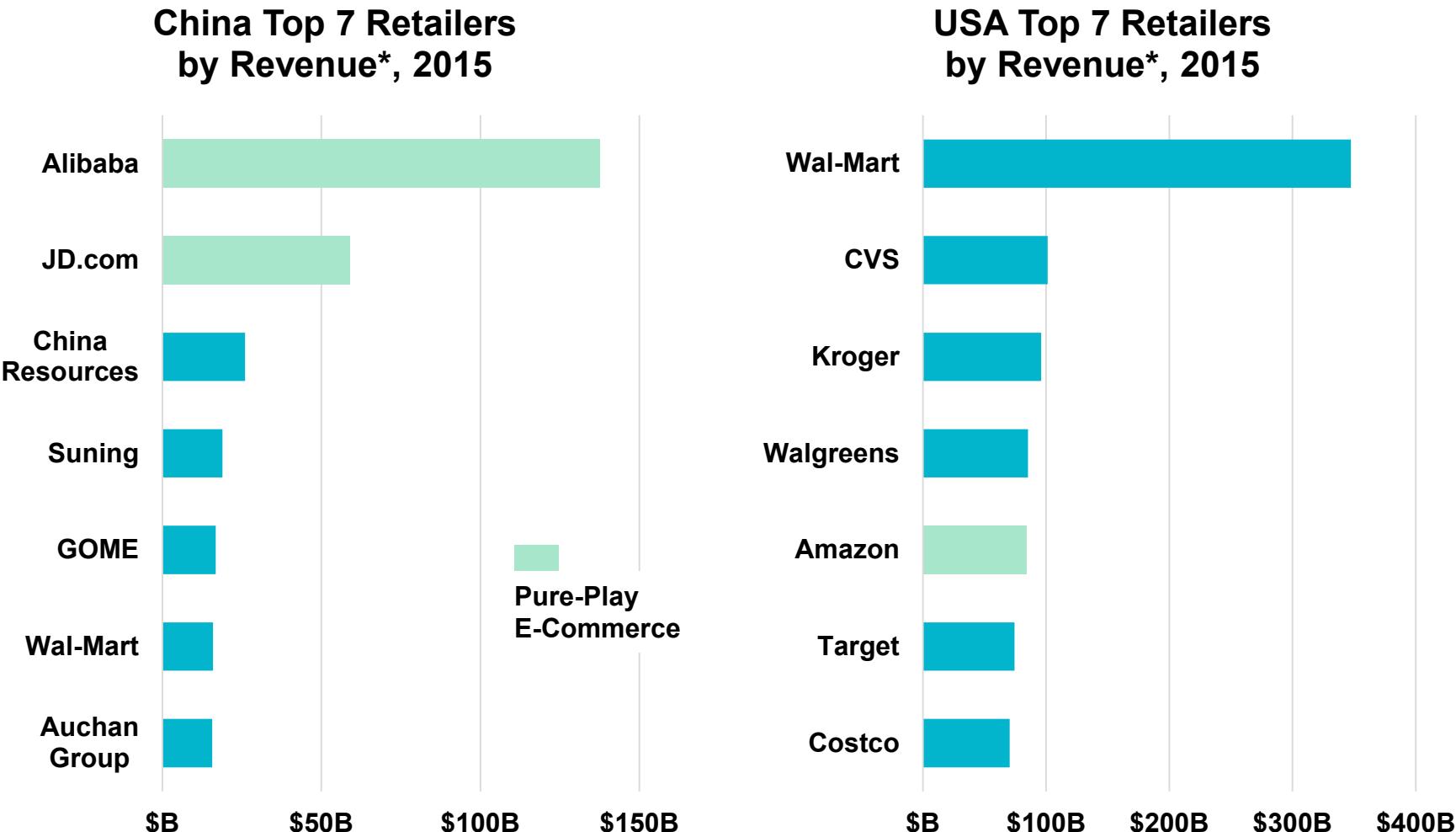
Online > 42% Total Ad Spend vs. 39% in USA

China Annual Advertising Spend by Medium, 2007 – 2016E



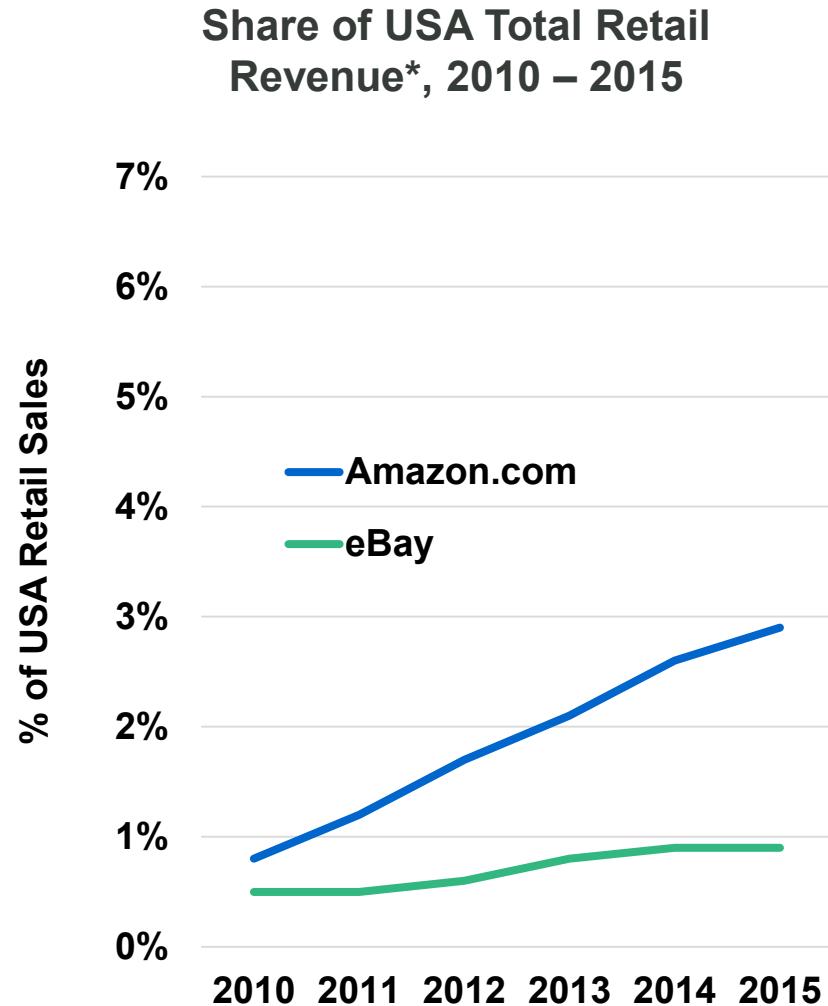
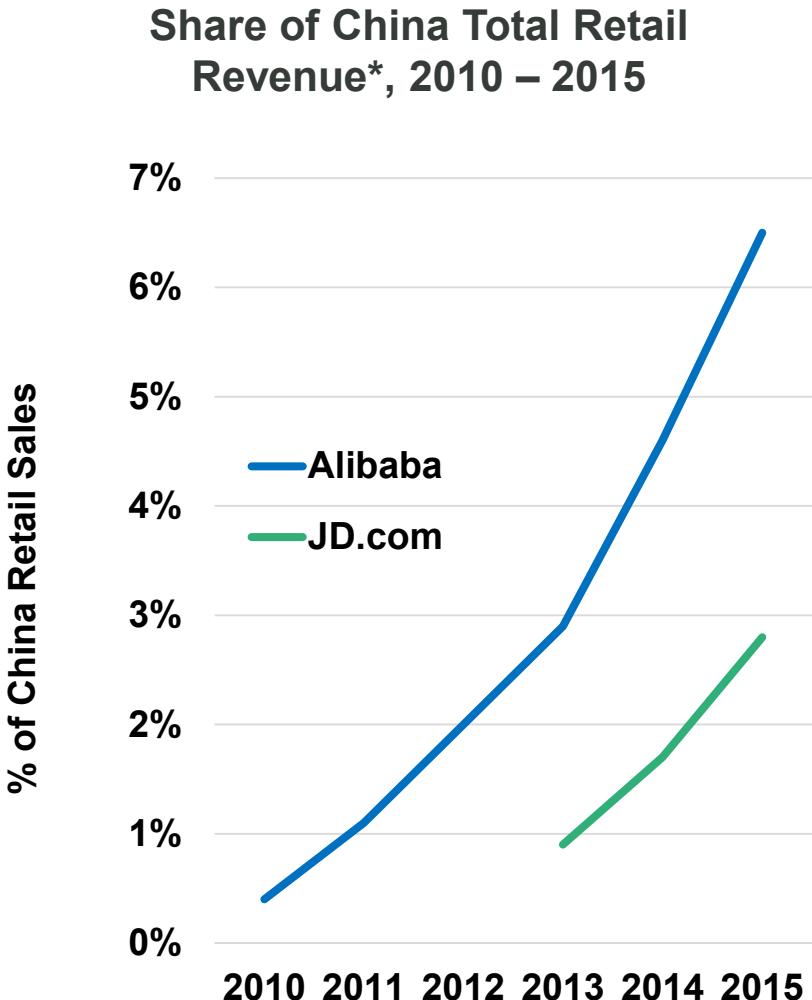
Source: GroupM China, April 2016 Forecast. Assume constant FX 1USD = 6.5RMB.  
USA advertising share data excludes out-of-home, video game, and cinema.

# China E-Commerce Companies = Dominate Top Retailer Rankings vs. USA Peers...



Source: Euromonitor. Note: \*Revenue defined as retail value of goods excluding tax, and excluding certain transaction categories such as consumer-to-consumer, motor vehicles & auto parts, tickets, travel bookings, delivery foodservice, returns, and others, hence may differ from company disclosed total revenue or gross merchandise value figures.

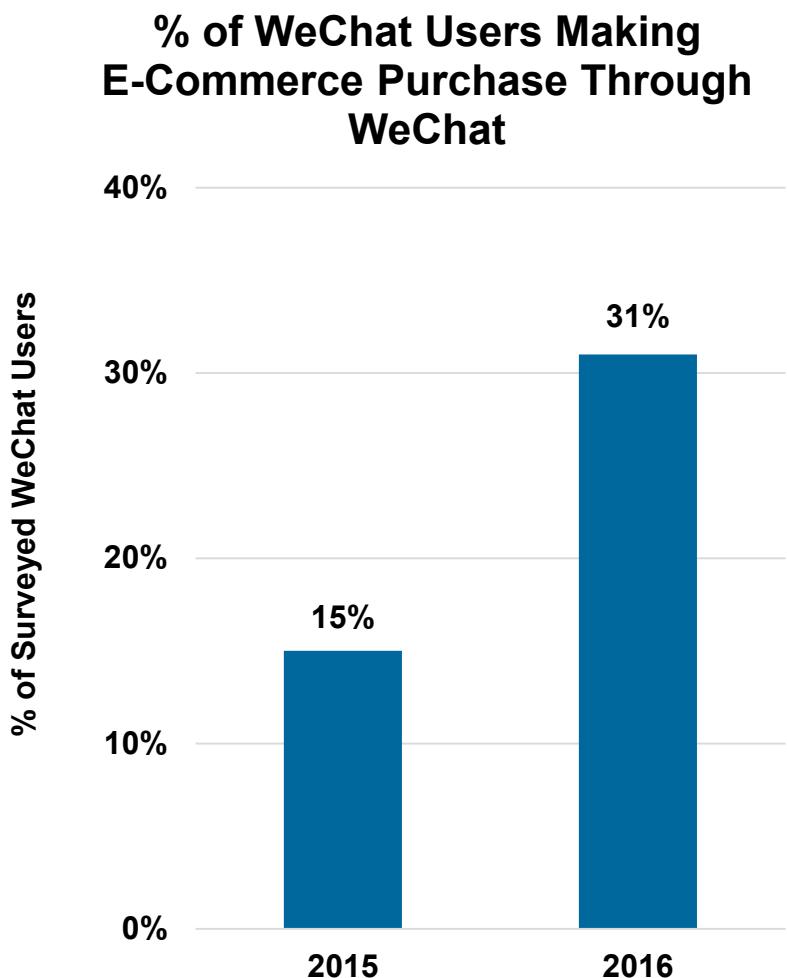
# ...China E-Commerce Companies = Gaining Retail Share Faster than USA Peers...



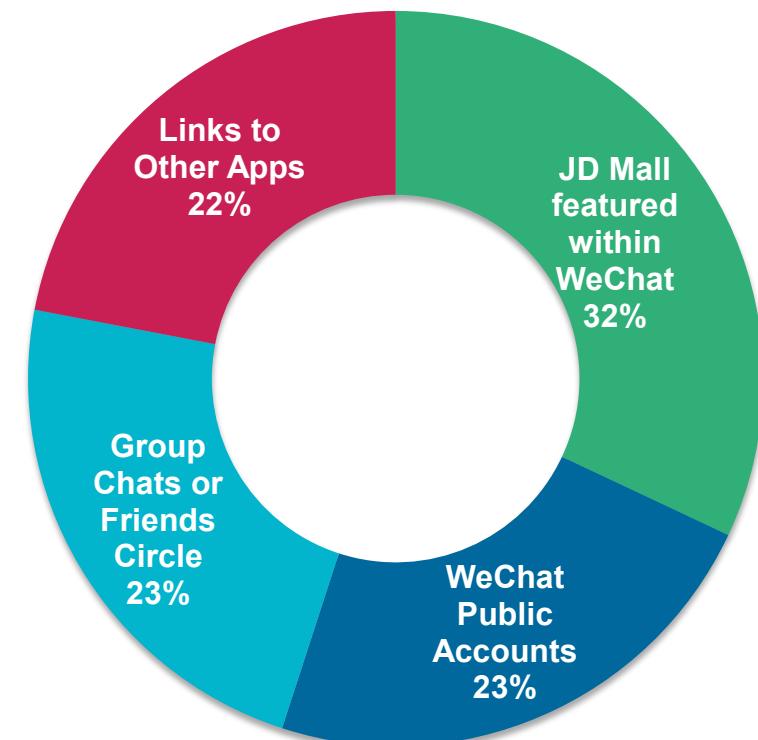
Source: Euromonitor. Note: \*Revenue defined as retail value of goods excluding tax, and excluding certain transaction categories such as consumer-to-consumer, motor vehicles & auto parts, tickets, travel bookings, delivery foodservice, returns, and others, hence may differ from company disclosed total revenue or gross merchandise value figures.

# ...China E-Commerce = Becoming More Social...

## 31% of WeChat Users Purchase via WeChat, +2x Y/Y



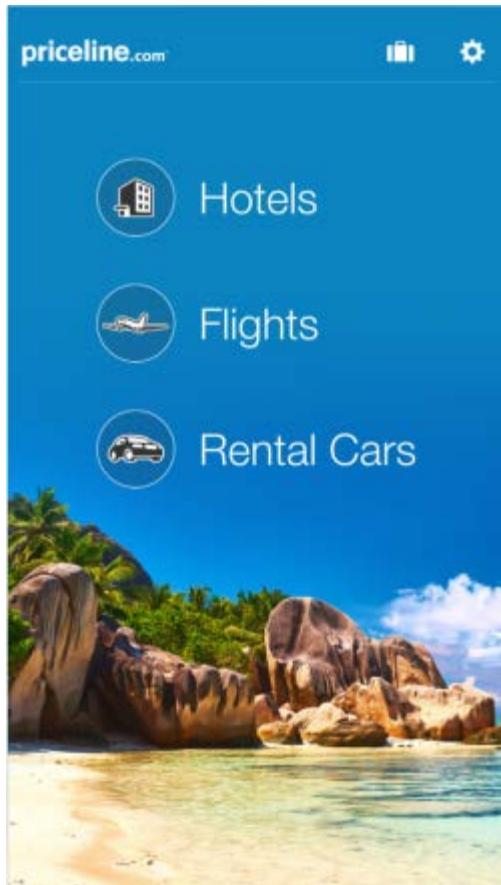
**Channels Through Which Users Made E-Commerce Purchase**



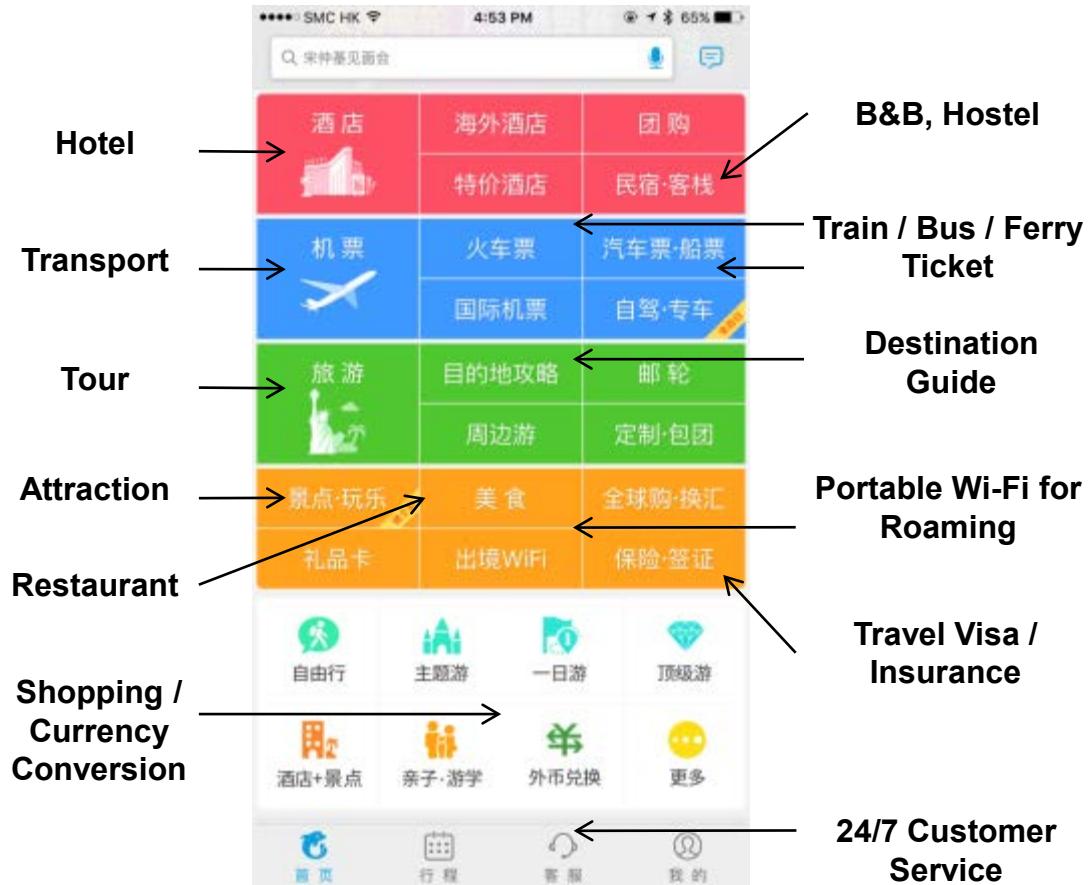
Source: McKinsey's 2016 China Digital Consumer Survey Report.

# China Travel...Ctrip = Expansive One-Stop-Shop for Travelers...

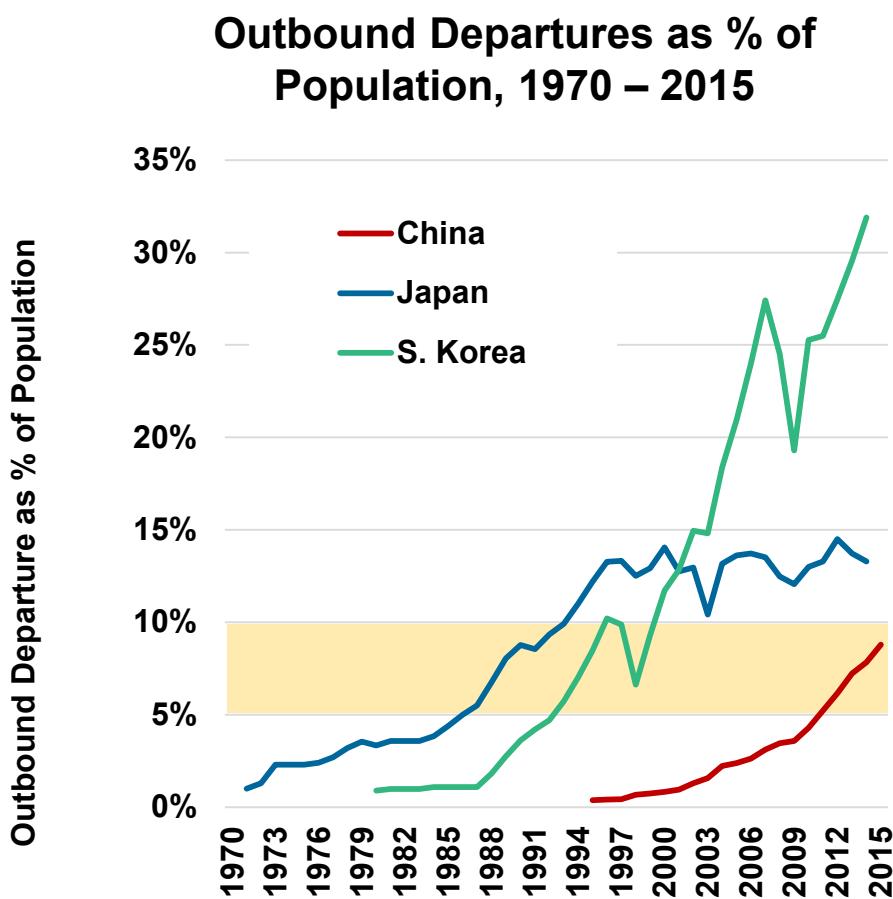
Priceline App (USA)



Ctrip App (China)

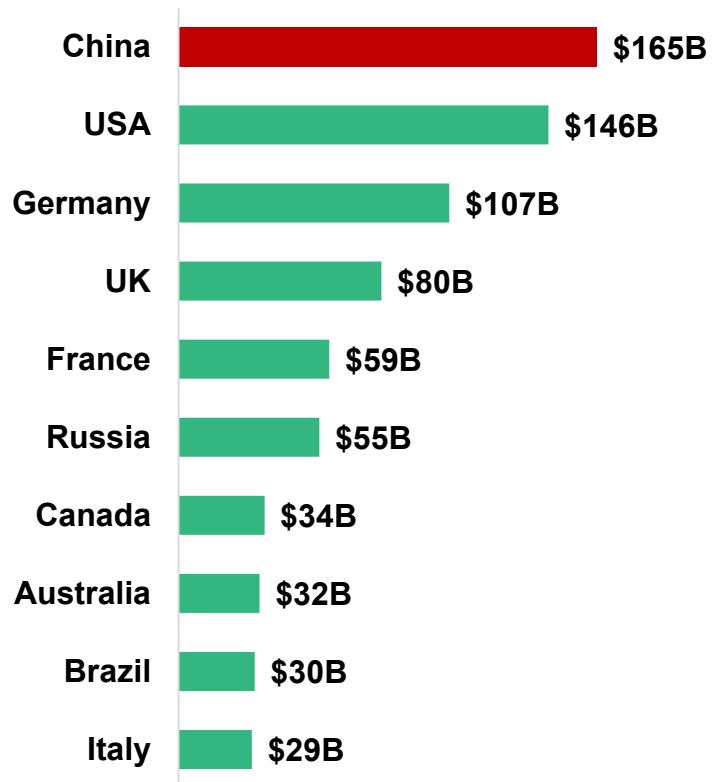


# ...China Outbound Travel Penetration @ Inflection Point = Already World's Biggest Outbound Tourism Spender



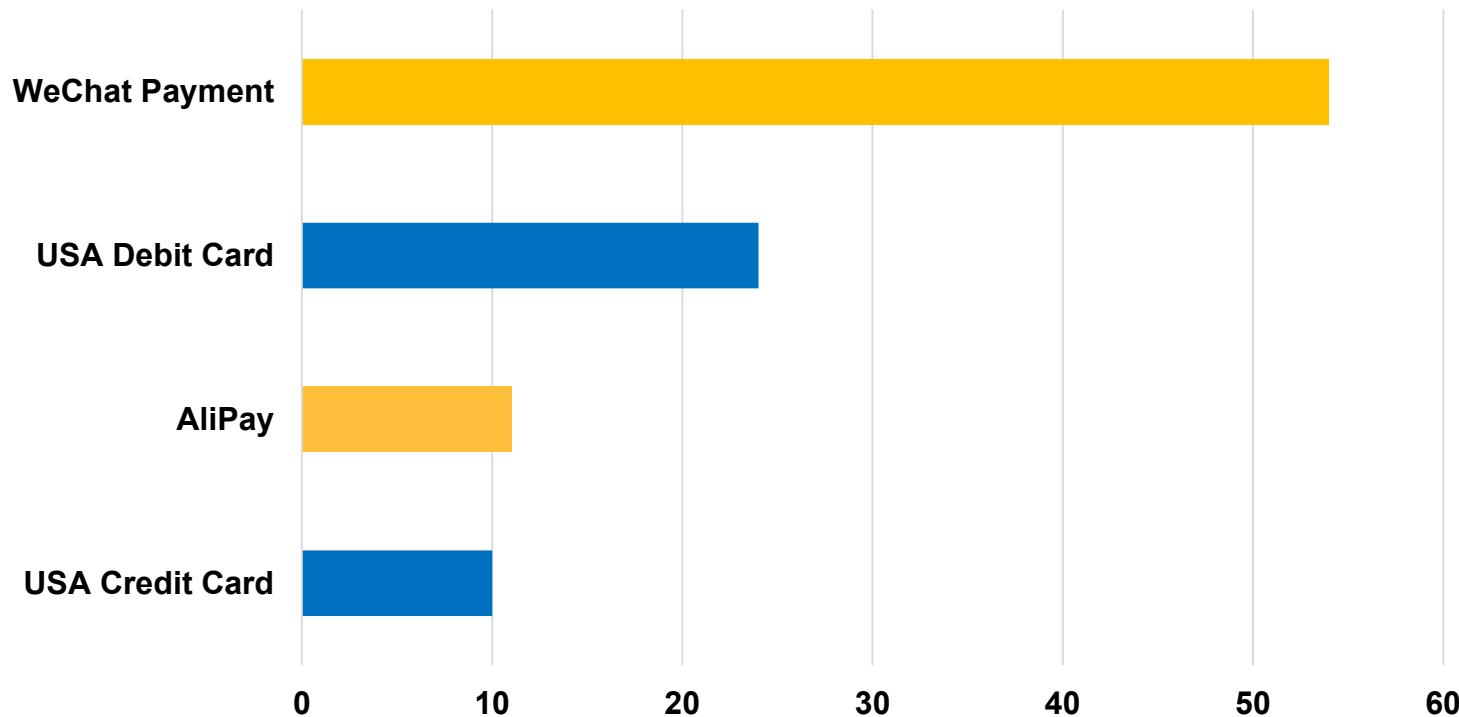
Source: CLSA, World Bank.

### Top 10 Outbound Tourism Spending Country, 2014



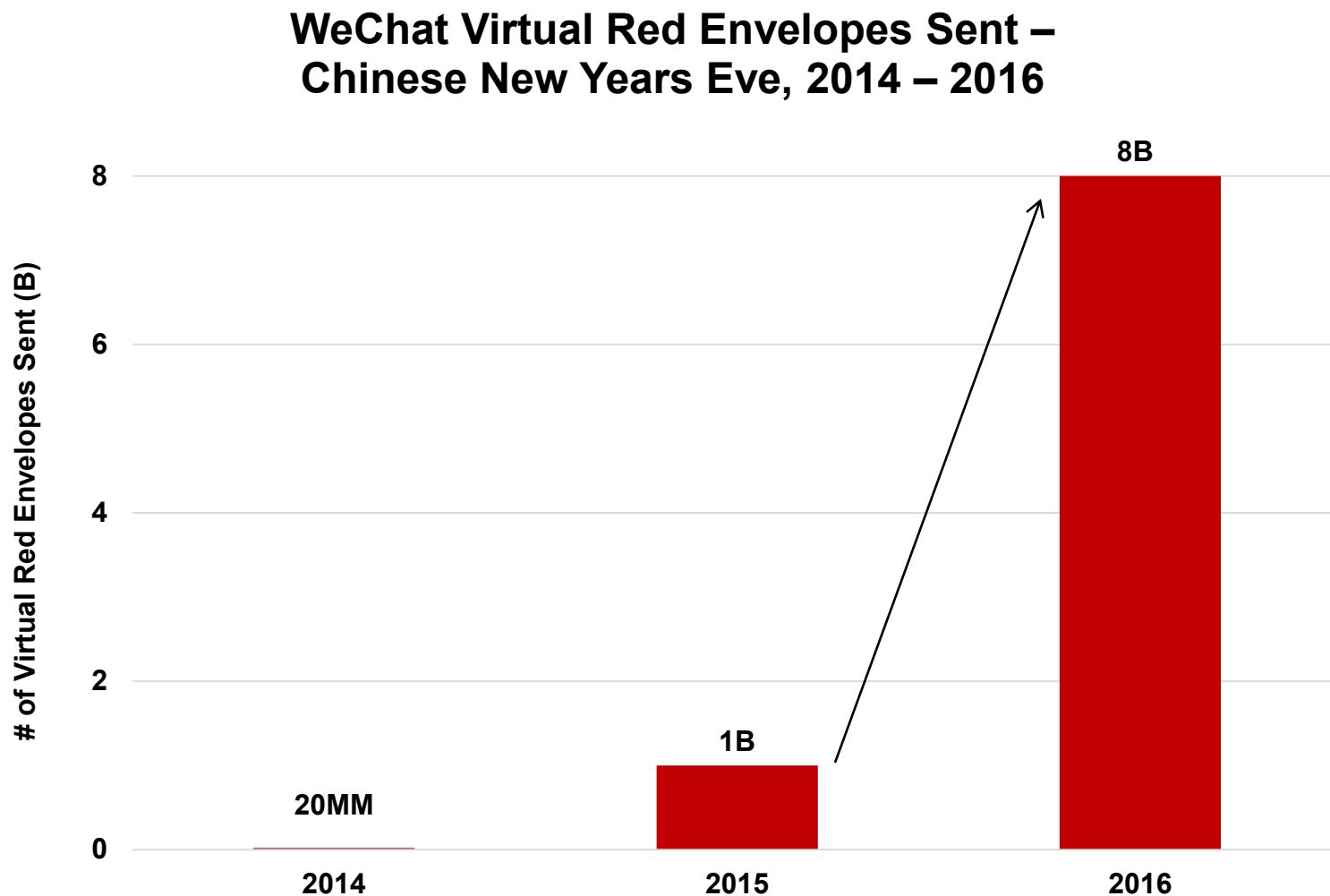
# China Smartphone-Based Payment Solutions = High Engagement

## Estimated Monthly Payment Transactions per User



Source: US debit and credit card data defined as number of payments (including online and offline) a month per active general-purpose card. Active cards are those used to make at least one purchase or bill payment in a month. Data per 2013 Federal Reserve Payments Study. AliPay / WeChat Pay stats per Hillhouse estimates. WeChat data includes peer-to-peer payments such as virtual Red Envelopes.

# WeChat Chinese New Year Payments = 8B Virtual Red Envelopes Sent, + 8x Y/Y...



# ...WeChat Payments = Can Drive Merchant Loyalty & CRM

An Example of Paying the Bill at McDonald's via Weixin Pay  
**"Weixin Pay + Public Accounts" is powerful**



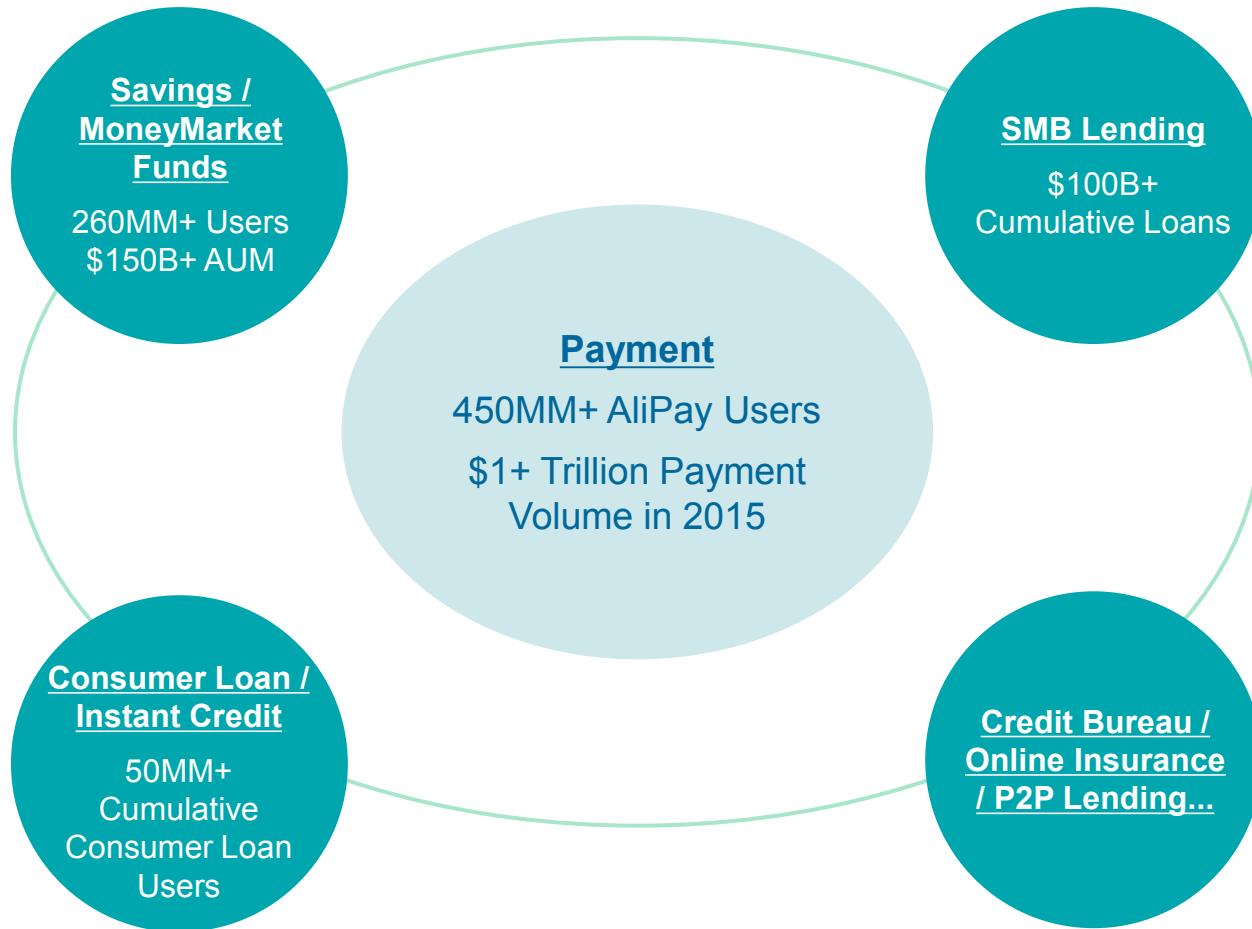
➤ After successful payment, consumers will follow McDonald's public account on Weixin by default.

➤ **Public Account enables merchants to reach existing customers for future marketing and CRM.**

➤ After successful payment, an e-receipt will also pop up automatically via the public account of Weixin Pay.

➤ **The public account allows consumers to review all historical transactions.**

# Ant Financial (~\$60B Valuation\*) = Leveraging Alibaba AliPay Scale... Building China Financial Services One-Stop-Shop



Source: Media reports, Ant Financial.  
\*Financing in 4/16

*China Internet Emerging  
Momentum =  
On-Demand*

# China On-Demand Transportation = Global Leader... 4B+ Annualized Trips (+4x Y/Y...~70% Global Share)

## Annualized Global On-Demand Transportation Trip Volume by Region, Q1:13 – Q1:16

~25MM  
Annualized  
Trip Volume

~750MM  
30x Y/Y

~1.7B  
2.3x Y/Y

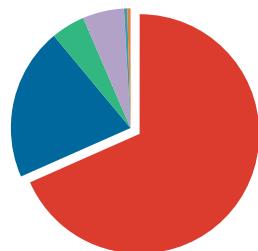
~6.3B  
3.7x Y/Y



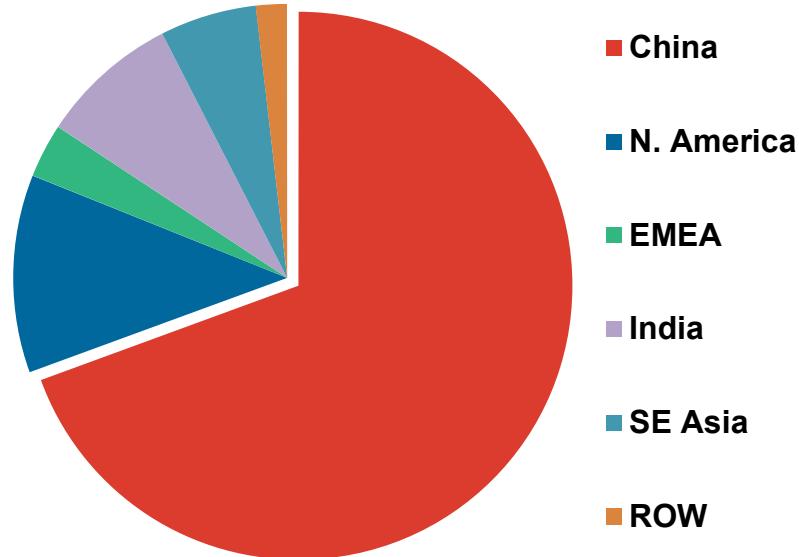
Q1:13



Q1:14



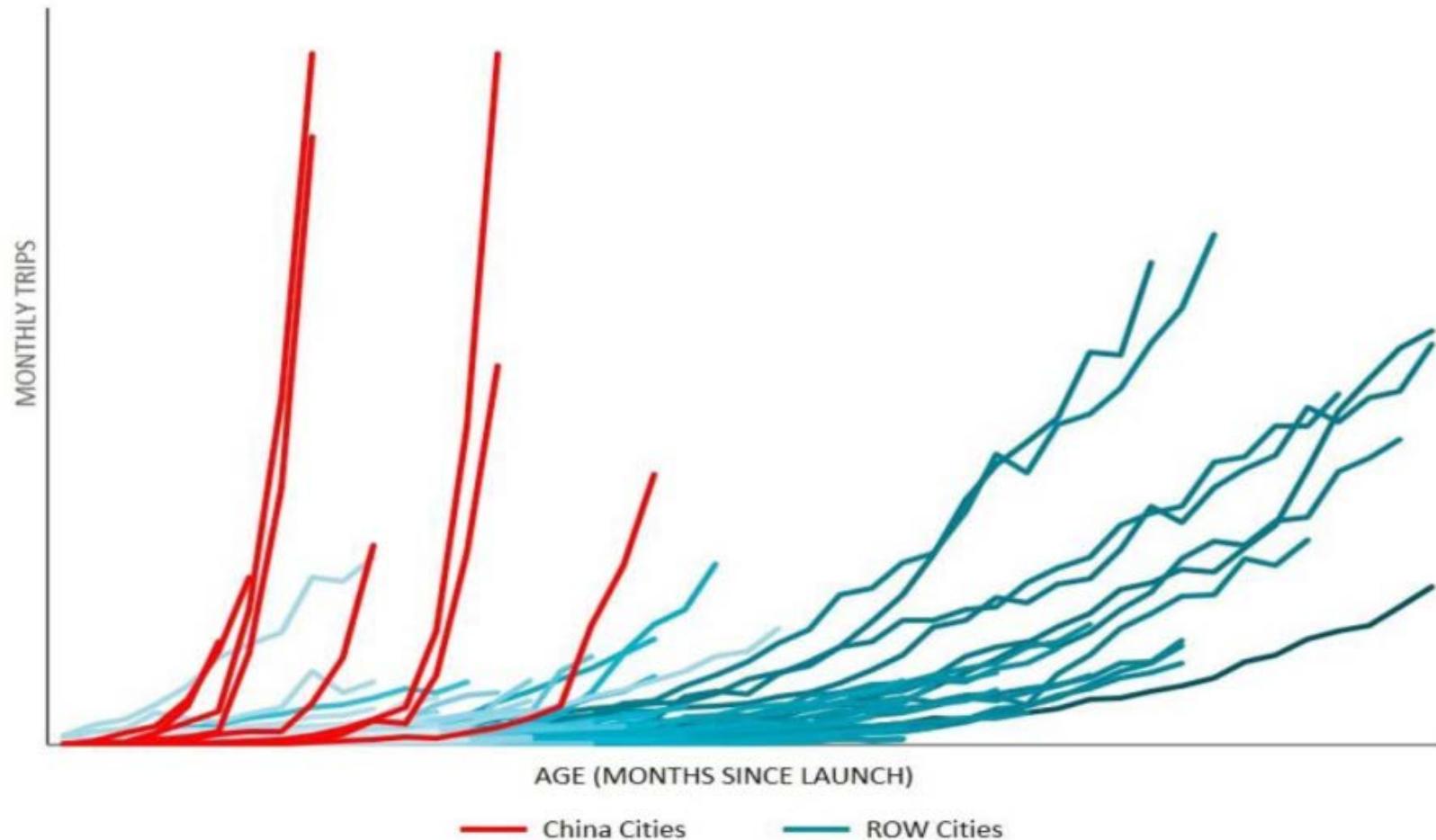
Q1:15



Q1:16

# China On-Demand Transportation... China Cities = Fastest Global Growers

Monthly Trips Since Inception, Uber China vs. Rest of World



Source: Uber China chart per leaked CEO letter to investors in China in June 2015, third-party press releases.

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# PUBLIC / PRIVATE COMPANY DATA

*Impact of Internet =  
Extraordinary & Broad  
But, in Many Ways...  
It's Just Beginning*

# Internet-Related Dislocations = Long-Time in Making...Still Early Stage

*Cord-Cutting Impacts Earnings for Traditional Media Companies...  
E-Commerce Impacts Revenue Growth for Traditional Retailers*

## Media

Market Cap	2006	2016*
Viacom	\$33B	\$18B
Netflix	\$1.4B	\$44B

## Retail

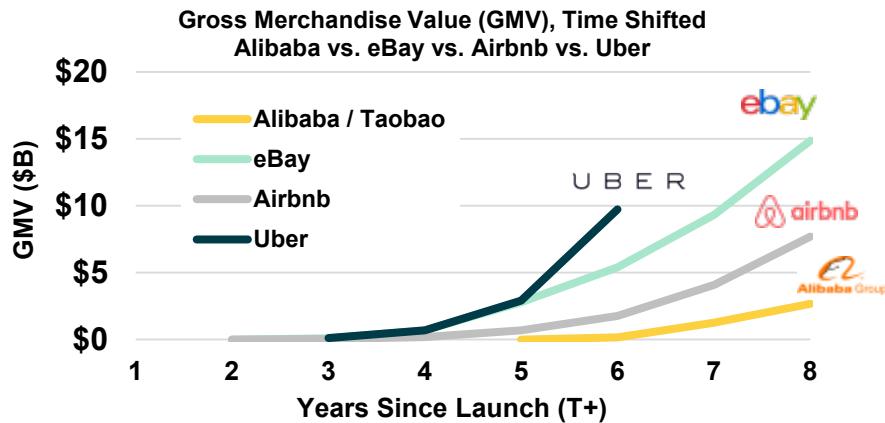
Market Cap	1997	2016*
Wal-Mart	\$69B	\$222B
Amazon.com	\$400MM	\$341B

Revenue	2006	2015*
Viacom	\$11B (+19% Y/Y)	\$13B (-6% Y/Y)
Netflix	\$1B (+46% Y/Y)	\$7B (+23% Y/Y)

Revenue	1997	2015*
Wal-Mart	\$118B (+12% Y/Y)	\$482B (-1% Y/Y)
Amazon.com	\$148MM (+9.4x Y/Y)	\$107B (+20% Y/Y)

# Current Generation of Internet Leaders = Growing Faster than Previous Generation

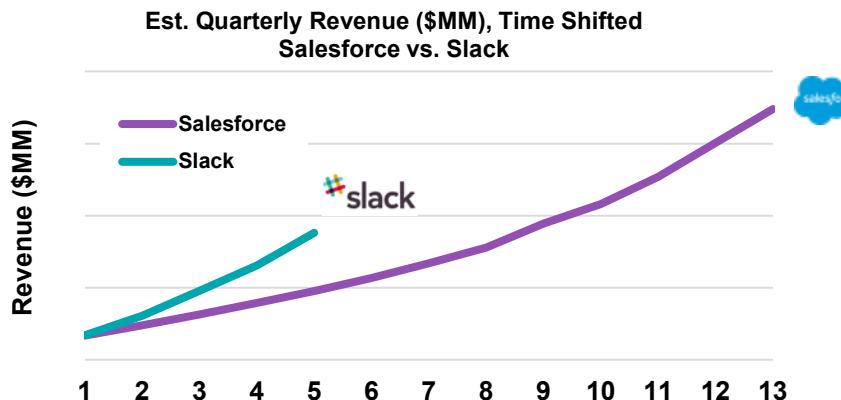
## Marketplaces



## Commerce



## Enterprise



@KPCB Marketplaces Source: Company data, Morgan Stanley Research. eBay founded in 1995. Amazon founded in 1995. Alibaba.com founded in 1999 as B2B portal connecting Chinese manufacturers and overseas buyers. Uber launched 2009, gave first ride in 2010. Airbnb founded in 2008.  
Commerce Source: Publicly available company data, Morgan Stanley Research. JD.com launched B2C shipments in 2004, founded 1998 as an online magneto-optical store. Amazon founded in 1995.  
Enterprise Source: Slack. Graph starting point based on similar est. revenue figures. Salesforce quarterly revenue approximated from publicly disclosed annual GAAP revenues.

*Internet Leaders =  
Getting Bigger... Staying Aggressive*

# Global Internet Market Leaders = Apple / Google / Amazon / Facebook / Tencent / Alibaba...Flush with Cash...Private Companies Well Represented

Rank	Company	Region	Current Market Value (\$B)	Q1:16 Cash (\$B)	2015 Revenue (\$B)
1	Apple	USA	\$547	\$233	\$235
2	Google / Alphabet	USA	510	79	75
3	Amazon	USA	341	16	107
4	Facebook	USA	340	21	18
5	Tencent	China	206	14	16
6	Alibaba	China	205	18	15
7	Priceline	USA	63	11	9
8	Uber	USA	63	--	--
9	Baidu	China	62	11	10
10	Ant Financial	China	60	--	--
11	Salesforce.com	USA	57	4	7
12	Xiaomi	China	46	--	--
13	Paypal	USA	46	6	9
14	Netflix	USA	44	2	7
15	Yahoo!	USA	36	10	5
16	JD.com	China	34	5	28
17	eBay	USA	28	11	9
18	Airbnb	USA	26	--	--
19	Yahoo! Japan	Japan	26	5	5
20	Didi Kuaidi	China	25	--	--
<b>Total</b>			<b>\$2,752</b>	<b>\$447*</b>	<b>\$554*</b>

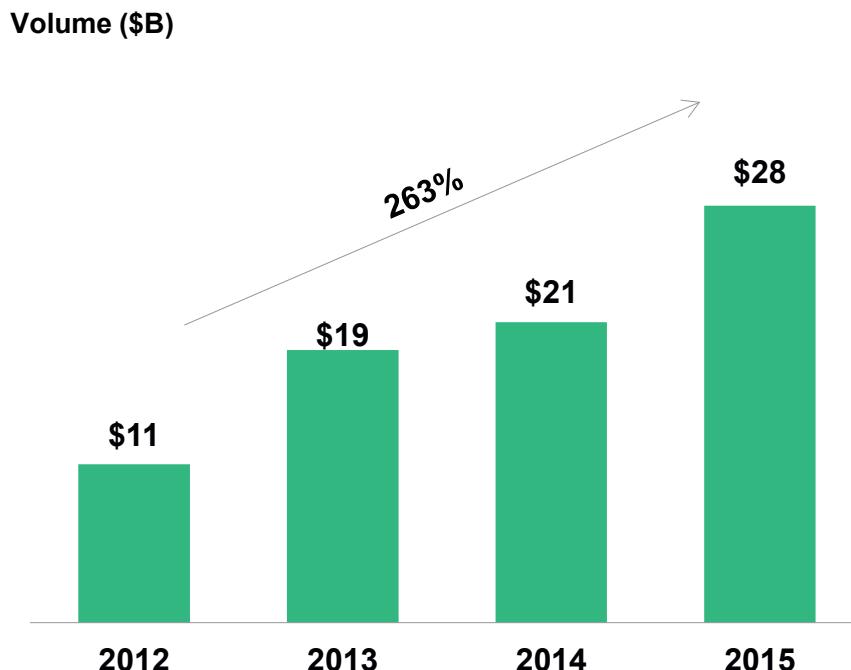
Source: CapIQ, CB Insights, Wall Street Journal, media reports. Market value data as of 5/31/16. \* Includes only public companies.

Note: For public companies, colors denote current market value relative to Y/Y market value. Green = higher. Red = lower. Purple = newly public within last 12 months (applied here to both eBay and Paypal given Paypal spinoff on 7/20/15). Yellow = private companies, where market value represents latest publicly announced valuation. Ant Financial and Didi Kuaidi valuation per latest media reports as of 5/2016. Ant Financial treated separately from Alibaba as Alibaba retains no control of Ant and will receive a capped lump sum payment in the event of an Ant liquidity event. Cash includes cash and equivalents and short-term marketable securities plus long-term marketable securities where deemed liquid.

*Traditional Industry Incumbents =  
Active in Acquisitions / Investments*

# Incumbents = Increasingly Betting on Technology Companies to Fuel Growth... Non-Tech Acquisitions of Tech Companies +2.6x Since 2012

## Tech Acquisitions by Non-Tech Corporate Buyers



## Select Acquisitions by Non-Tech Incumbents

- **Auto Consortia** / Nokia Here
- **Avis** / Zipcar
- **Axel Springer** / Business Insider
- **Disney** / Maker Studios, Playdom
- **Disney + Fox + NBCUniversal** / Hulu
- **First Data** / Perka, Clover
- **Ford** / Livio
- **General Motors** / Cruise Automation
- **Hudson Bay** / Gilt Groupe
- **Liberty Interactive** / Zulily
- **Monsanto** / Climate Corporation
- **Neiman Marcus** / Mytheresa.com
- **Nordstrom** / HauteLook
- **Northwestern Mutual** / Learnvest
- **Staples** / Runa
- **Target** / DermStore.com
- **Under Armour** / MapMyFitness, MyFitnessPal
- **Walmart** / Kosmix

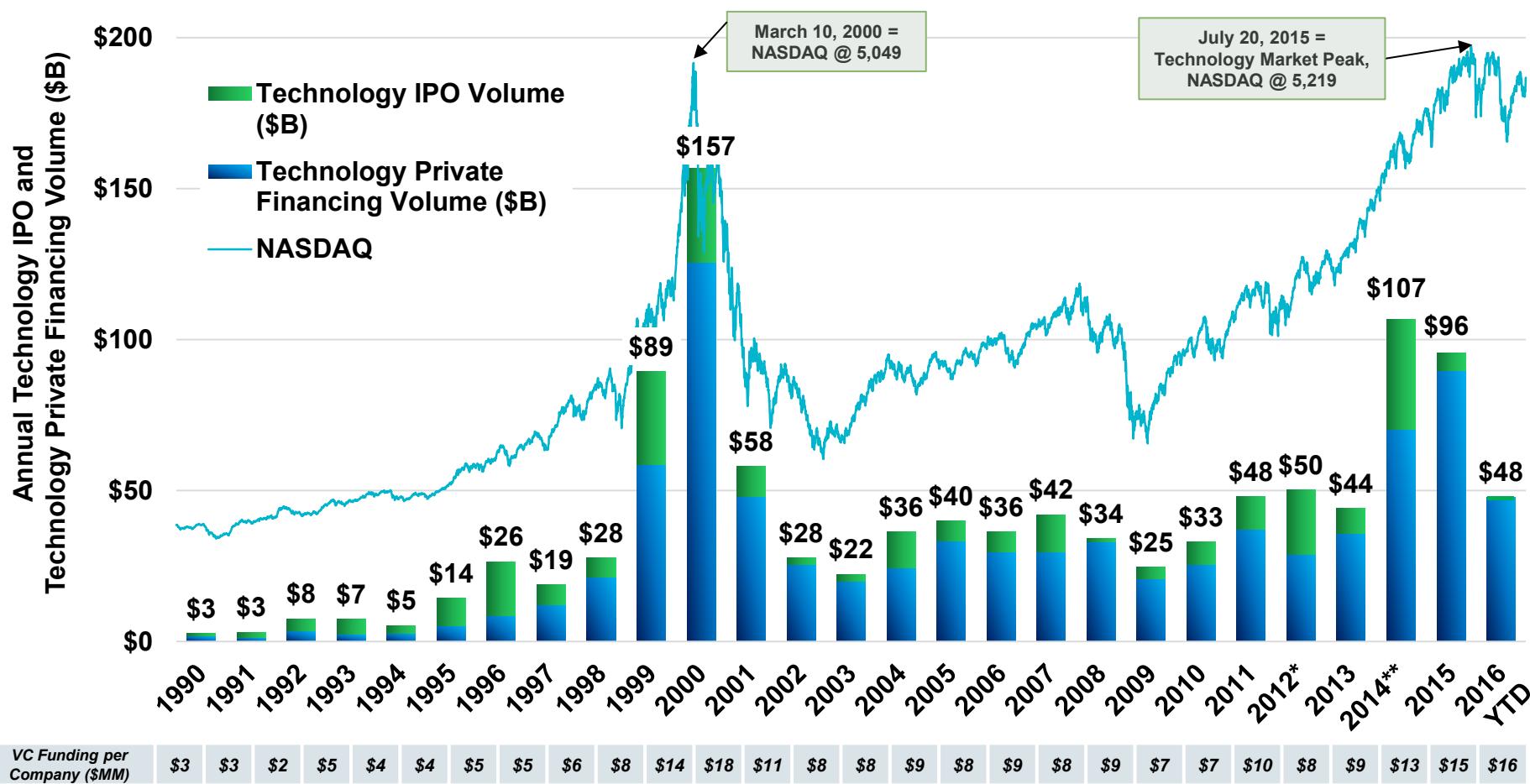
## Select Investments by Non-Tech Incumbents

- **American Express** / Concur
- **Citi** / Ayasdi, Betterment
- **Coca-Cola** / OneWeb
- **Ford** / Pivotal
- **Fox Sports** / DraftKings
- **General Motors** / Lyft
- **Goldman Sachs** / Dataminr, Kensho, Symphony
- **J.P. Morgan** / Prosper Marketplace
- **Lowes** / Porch
- **NBCUniversal** / BuzzFeed, Vox Media
- **Nikkei** / Evernote
- **Turner Sports** / FanDuel
- **USAA** / TRUECar
- **Visa** / Square
- **Whole Foods** / Instacart

*Global Technology Financings =  
Solid Trends in  
Private Financings...  
Only 2 Tech IPOs 2016YTD*

# Global Technology Public + Private Financing Volume = Solid Relative to History

## Global US-Listed Technology IPO Issuance and Global Technology Venture Capital Financing, 1990 – 2016YTD



\*Facebook (\$16B IPO) = 75% of 2012 IPO \$ value. \*\*Alibaba (\$25B IPO) = 69% of 2014 IPO \$ value.

Source: Thomson ONE, 2016YTD as of 5/26/16. VC Funding per Company (\$MM) calculated as total venture financing per year divided by number of companies receiving venture financing. Morgan Stanley Equity Capital Markets, 2016YTD as of 5/26/16. All global U.S.-listed technology IPOs over \$30MM, data per Dealogic, Bloomberg, & Capital IQ.

*There are pockets of Internet company overvaluation but there are also pockets of undervaluation...*

*Very few companies will win – those that do – can win big...*

*Over time, best rule of thumb for valuing companies = value is present value of future cash flows.*

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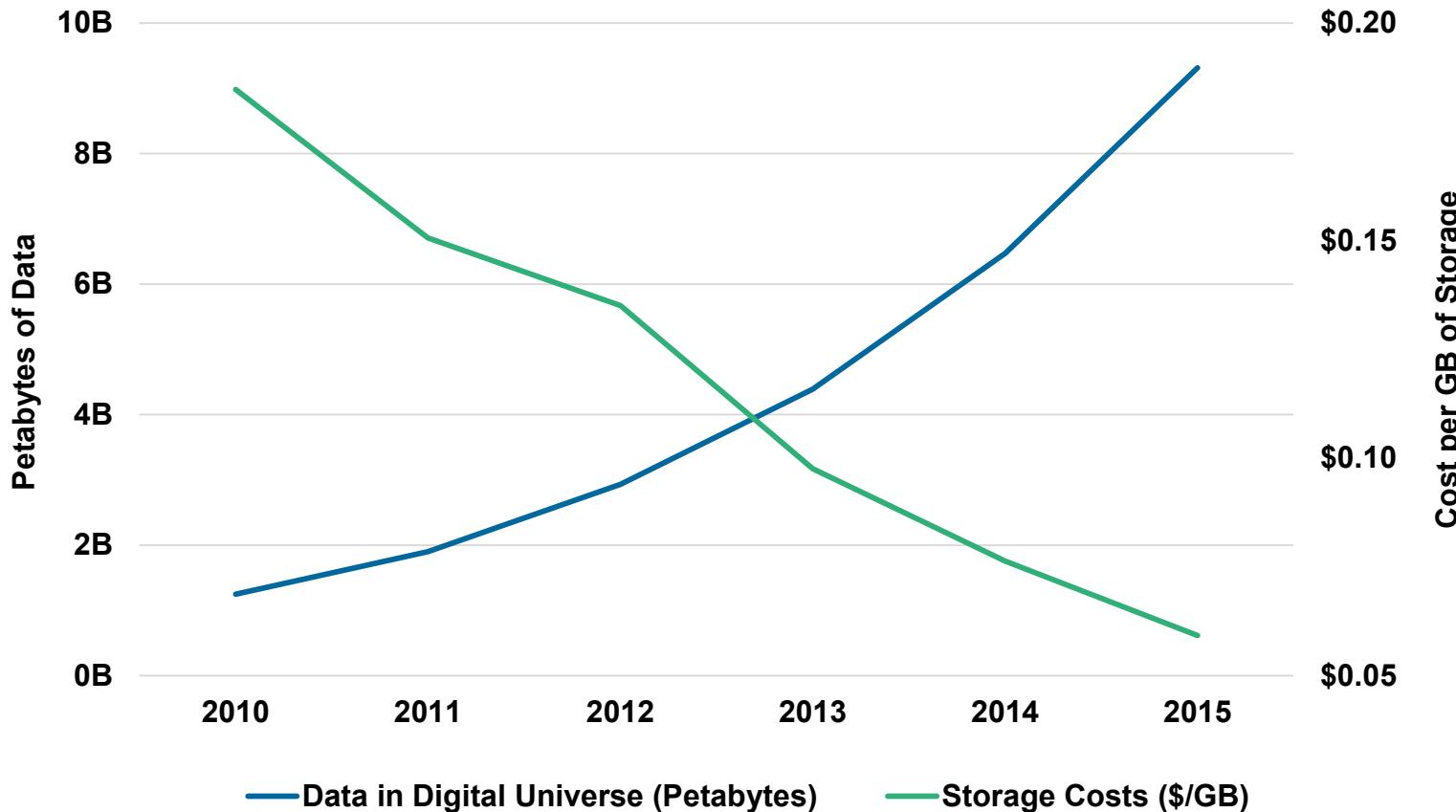
# DATA AS A PLATFORM / DATA PRIVACY

*CREATED BY KPCB PARTNERS TED SCHLEIN / ALEX KURLAND*

# *Data as a Platform*

# Global Data Growth Rising Fast = +50% CAGR since 2010... Data Infrastructure Costs Falling Fast = -20% CAGR

## Data in Digital Universe vs. Data Storage Costs, 2010 – 2015



# Data Generators = Increasing Rapidly



# Data = A New Growth Platform... Powering New Services / Systems / Apps

↓ Sources of Leverage for Global Internet Growth

## The Network

Large investments in fiber optic & last-mile cables created connectivity that facilitated the early Internet growth

## The Software

Optimizing the network with software became far more capital efficient than additional capex buildouts...ultimately resulting in the creation of *pervasive networks* (siloed data centers → AWS)...& then *pervasive software* (Siebel → Salesforce)

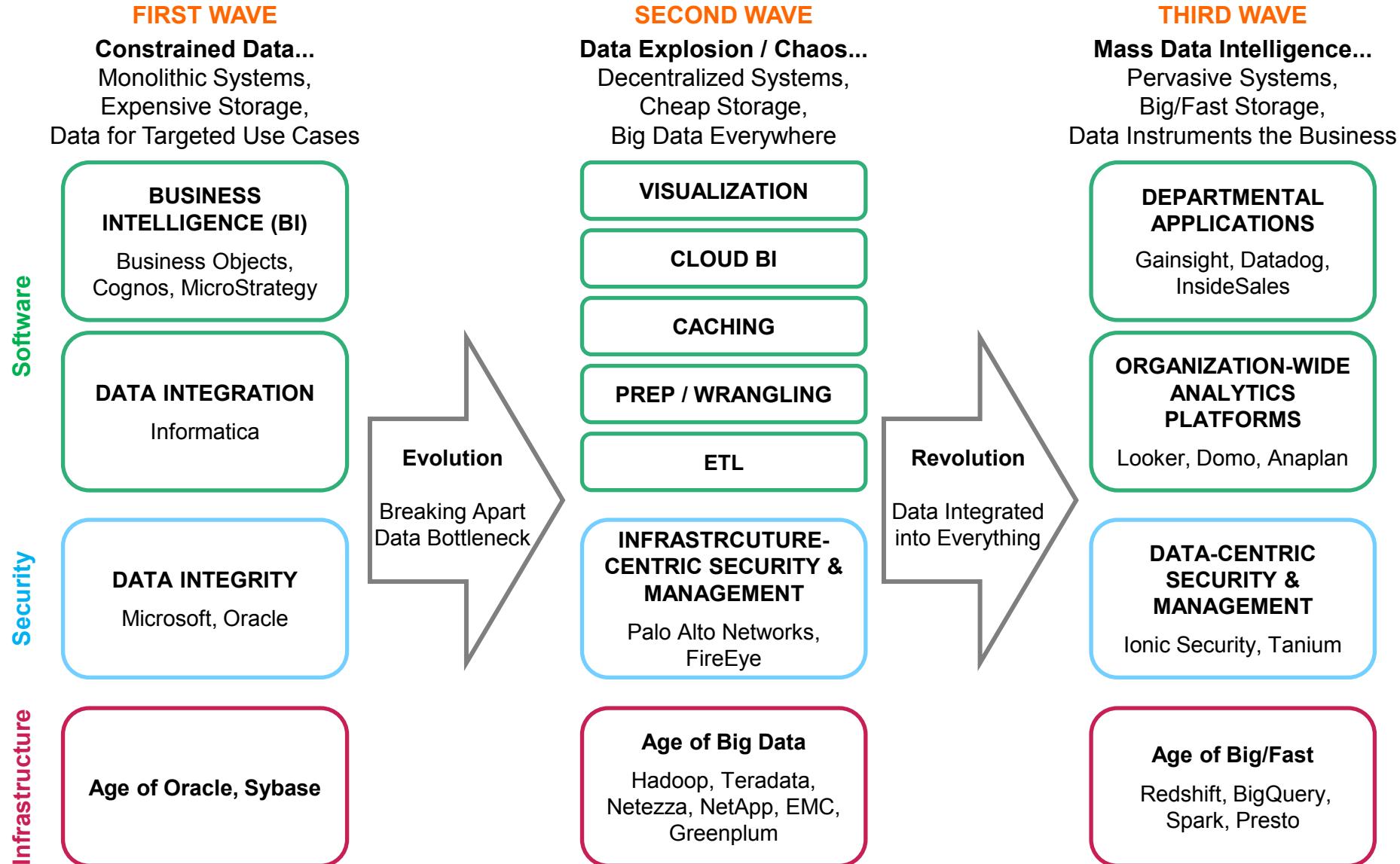
## The Infrastructure

Emergence of pervasive software created the need to optimize the performance of the network & store extraordinary amounts of data at extremely low prices

## The Data

Next Big Wave = Leveraging this unlimited connectivity & storage to collect / aggregate / correlate / interpret all of this data to improve people's lives & enable enterprises to operate more efficiently

# Evolution of the Data Platform, 1990 – 2016



*Data is moving from something you use outside the workstream to becoming a part of the business app itself.*

*It's how the new knowledge worker is actually performing their job.*

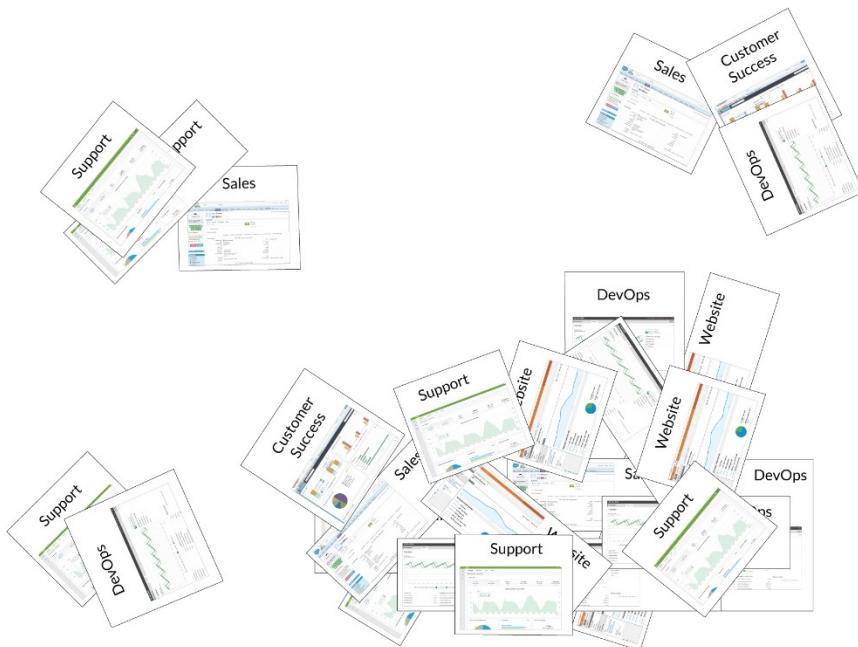
- FRANK BIEN, CEO OF LOOKER, 2016

# *Data as a Platform – A Few Companies Utilizing Analytics to Improve Business Efficiency...*

# Data Analytics as a Platform = Looker

**THEN**

Complex Tools Operated by Data Analysts,  
Chaos of Data Silos Across the Company



**NOW**

Looker



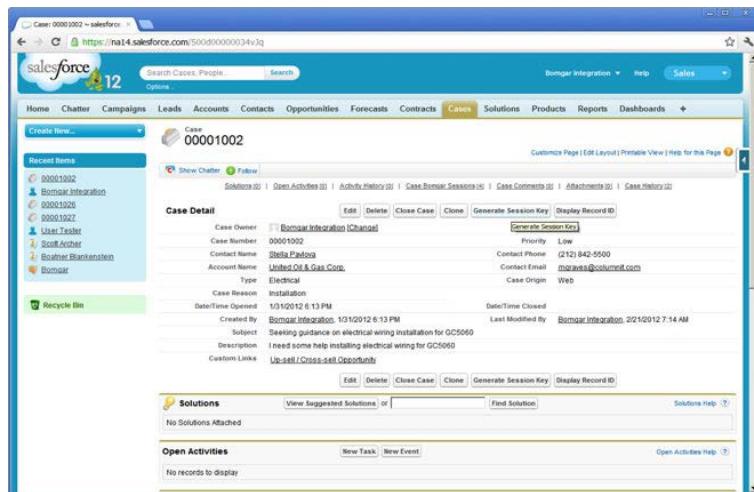
Looker Data Platform

Data analytics platform built for both data analysts &  
non-technical business users that can scale throughout organizations

# Customer Data & Relationship Intelligence as a Platform = SalesforceIQ

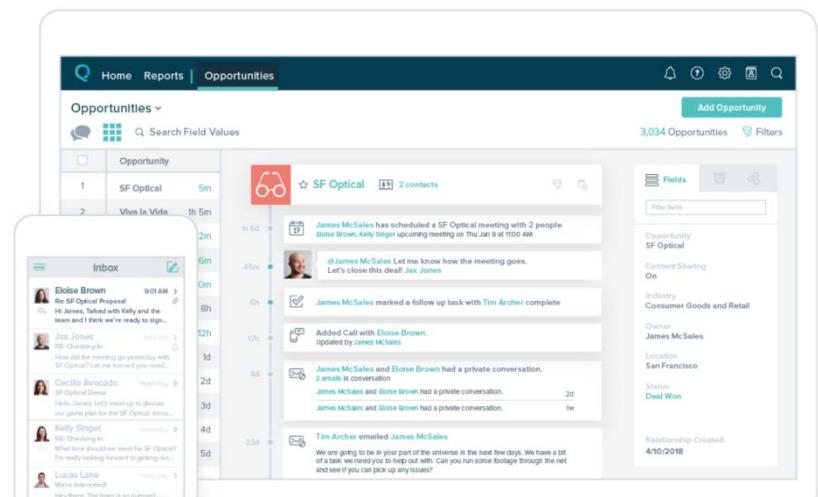
## THEN

Difficult to Customize, Lack of  
Automated Customer Insights



## NOW

SalesforceIQ



CRM solution that helps businesses build stronger customer relationships by analyzing data & patterns to identify opportunities.

# Data Mapping as a Platform = Mapbox

**THEN**

Difficult & Expensive to Collect Data...  
Limited In-App Digital Map Usage



**NOW**  
Mapbox

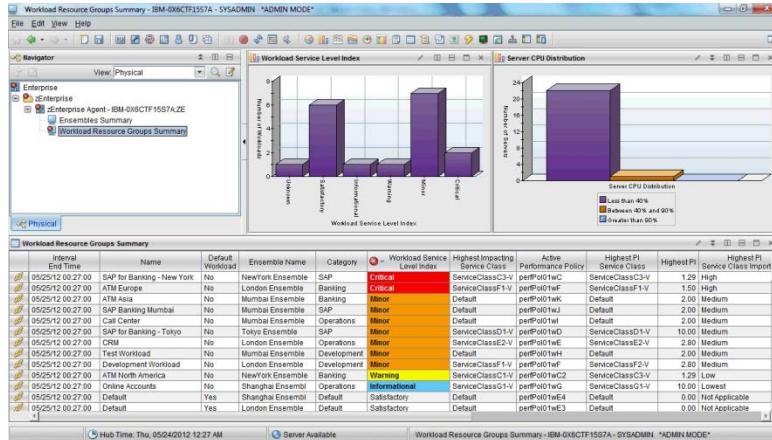


Worldwide maps crowdsourced by a community of smartphone users whose mobile navigation data facilitates real-time updates to the platform

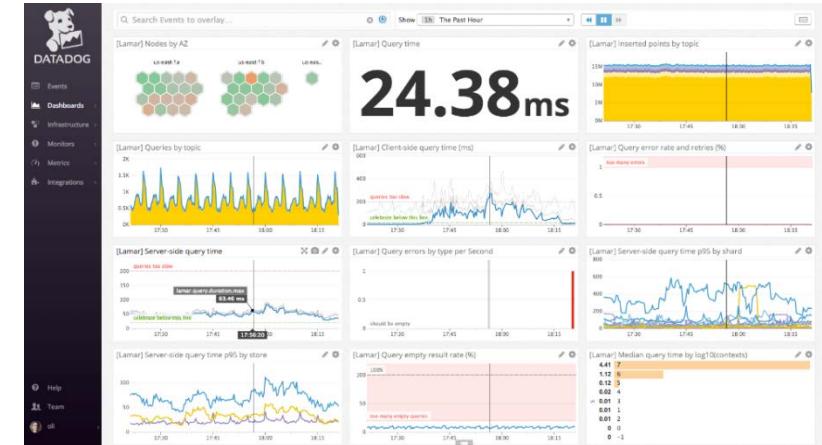
# Cloud Data Monitoring as a Platform = Datadog

**THEN**

Expensive & Clunky Point Solutions,  
Lengthy Implementation Cycles, Only  
Used by System Administrators



**NOW**  
Datadog



Cloud monitoring platform for both System Administrators & Developers that automatically integrates 100+ sources in real-time to represent hundreds of thousands of cloud instances

# Data Security & Management as a Platform = Ionic Security

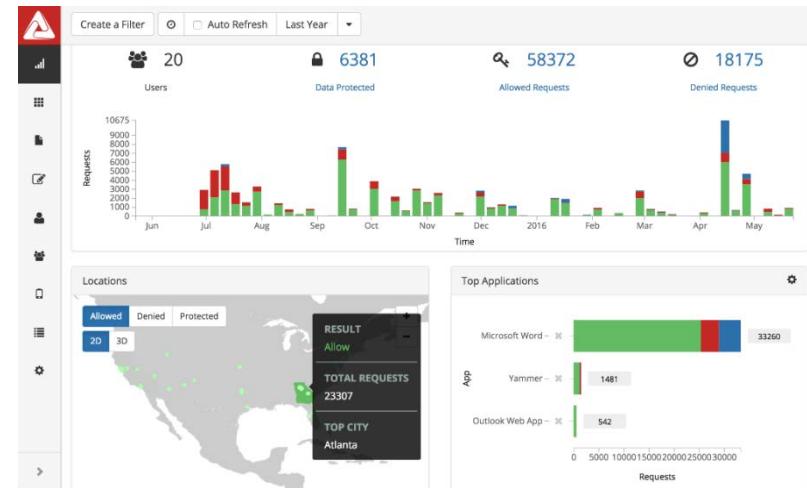
**THEN**

Securing Infrastructure to  
Keep Data Safe



**NOW**

Ionic Security



Distributed data protection & management platform that has processed tens of billions of API requests to enable customers to secure & control their data

*As Data Explodes...  
Data Security Concerns Explode*

# Data Privacy Debate – Major Events, 2013 – 2016

## Edward Snowden

(Jun-13)

Former CIA contractor leaked classified information to media about internet & phone surveillance by USA intelligence.

## Burr-Feinstein Anti-Encryption Bill

(Apr-16)

Proposed law that would require technology companies & phone manufacturers to decrypt customer data at a court's request.

## Apple vs. FBI

(Feb-16)

FBI claimed it needed Apple to provide access to an iPhone owned by a man who committed a mass shooting in San Bernardino, CA, so that the agency could recover information for its investigation. Request was denied by a federal judge in New York.

## Microsoft Lawsuit

(Apr 16)

Files lawsuit for right to be able to tell customers when law enforcement officials request their emails & other data.

## WhatsApp's Default End-to-End Encryption

(Apr-16)

WhatsApp implements end-to-end encryption as default setting to protect communications of their 1B monthly active users worldwide.

## Apple Hires Data Security Expert

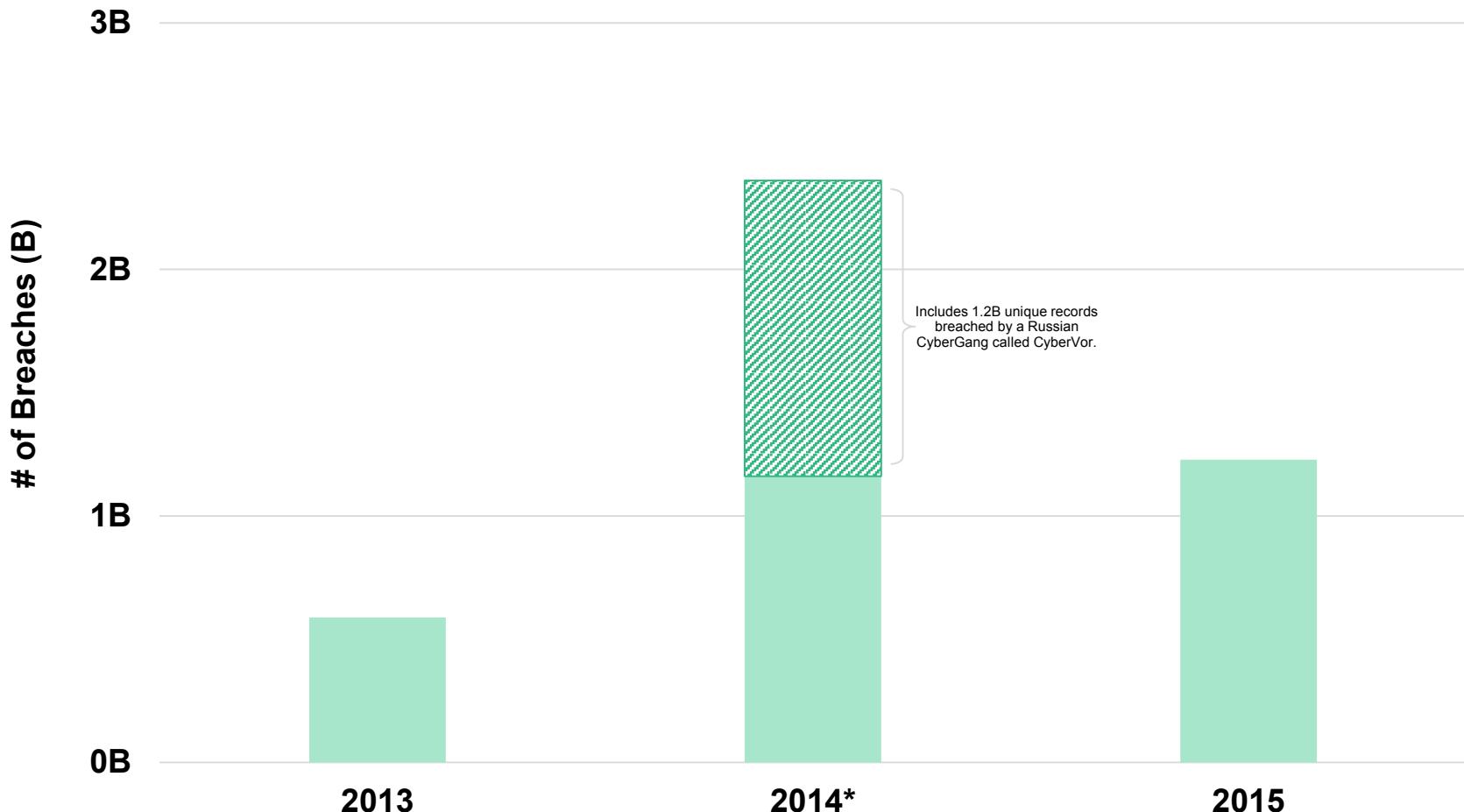
(May-16)

Jon Callas, who co-founded several well-respected secure communications companies including PGP Corp, Silent Circle and Blackphone, rejoins Apple (he was also an employee in the 1990s and again between 2009 and 2011, when he designed an encryption system to protect data stored on a Macintosh computer).

# Cybercrime = Widespread Borderless Threat

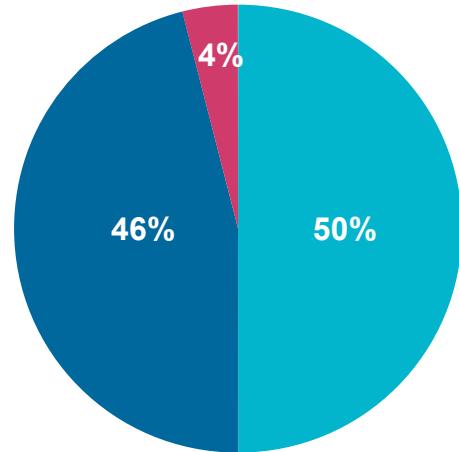
## ~4 Billion Data Records Breached Globally Since 2013

### Records Breached, Billions of Individual Records, Global, 2013 – 2015



# Consumer Data Privacy Concerns Rising Rapidly

***How Concerned are You About Data Privacy & How Companies Use Customer Data?***



- Very Concerned
- Somewhat Concerned
- Not Concerned

**45%**  
Are more worried about their  
Online privacy than one year ago

**74%**  
Have limited their online activity  
in the last year due to privacy  
concerns

# Consumers' Top Privacy Concerns = Data Selling / Storage / Access / Being Identified Individually...

## Rate Level of Privacy Concerns Across Each of the Following Ways Companies Interact with Personal Data, n = 2,062

(These percentages reflect all respondents who rated their privacy concerns on a 1-5 scale,  
with 5 = Extremely Concerned, 4 = Very Concerned, etc.)



# ...Do People Care About Privacy... Or Do They Care About *Who* Has Their Data?

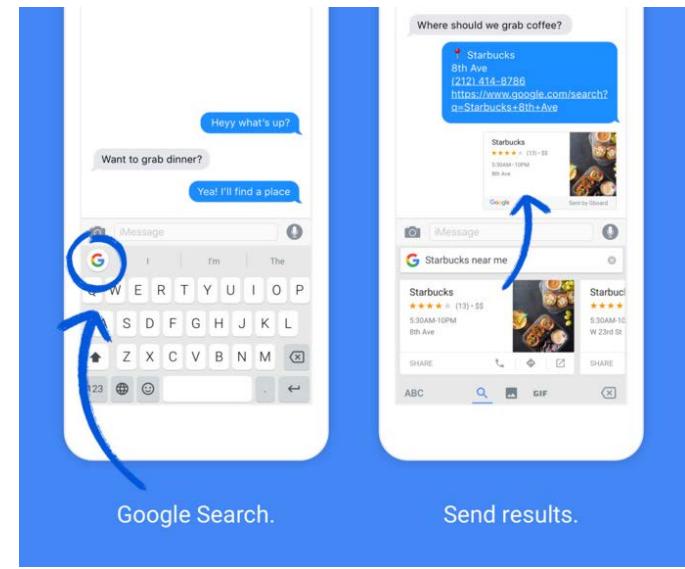
## Amazon Echo

The Echo's Alexa Voice Service listens to all speech in default mode



## Google Gboard

Integrated keyboard for iOS devices that had an estimated 500K+ downloads within the first week of launch



*In the tangible world, physical limitations prevent the broad abuse of the law...*

*Should the same laws automatically apply to the digital world where a few lines of code can unlock someone's entire life?*

- ADAM GHETTI, FOUNDER & CEO OF IONIC SECURITY, 2016

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