

# INTERNET TRENDS 2017 – CODE CONFERENCE

**Mary Meeker**  
**May 31, 2017**

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

**KLEINER  
PERKINS**

# Internet Trends 2017

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- 1) **Global Internet Trends** = Solid...Slowing Smartphone Growth 4-9
- 2) **Online Advertising (+ Commerce)** = Increasingly Measurable + Actionable 10-79
- 3) **Interactive Games** = Motherlode of Tech Product Innovation + Modern Learning 80-150
- 4) **Media** = Distribution Disruption @ Torrid Pace 151-177
- 5) **The Cloud** = Accelerating Change Across Enterprises 178-192
- 6) **China Internet** = Golden Age of Entertainment + Transportation  
(Provided by Hillhouse Capital) 193-231
- 7) **India Internet** = Competition Continues to Intensify...Consumers Winning 232-287
- 8) **Healthcare @ Digital Inflection Point** 288-319
- 9) **Global Public / Private Internet Companies...** 320-333
- 10) **Some Macro Thoughts...** 334-351
- 11) **Closing Thoughts...** 352-353

# Thanks...

## **Kleiner Perkins Partners**

Alexander Krey & Ansel Parikh - who were fearless and sometimes sleepless - helped steer the ideas / presentation we hope you find useful / learn from / improve on. Key contributors to specific content include: Noah Knauf & Nina Lu (Healthcare), Bing Gordon (Interactive Games), Alex Tran & Anjney Midha (India), Daegwon Chae (Ads + Commerce) and Alex Kurland & Lucas Swisher (Enterprise). In addition, Mood Rowghani, Eric Feng, Daniel Axelsen, Dino Becirovic and Shabih Rizvi were more than on call with help.

## **Hillhouse Capital**

Especially Liang Wu...his / their contribution of the China sector 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 =**

**SOLID USER GROWTH...**

**SLOWING SMARTPHONE GROWTH**

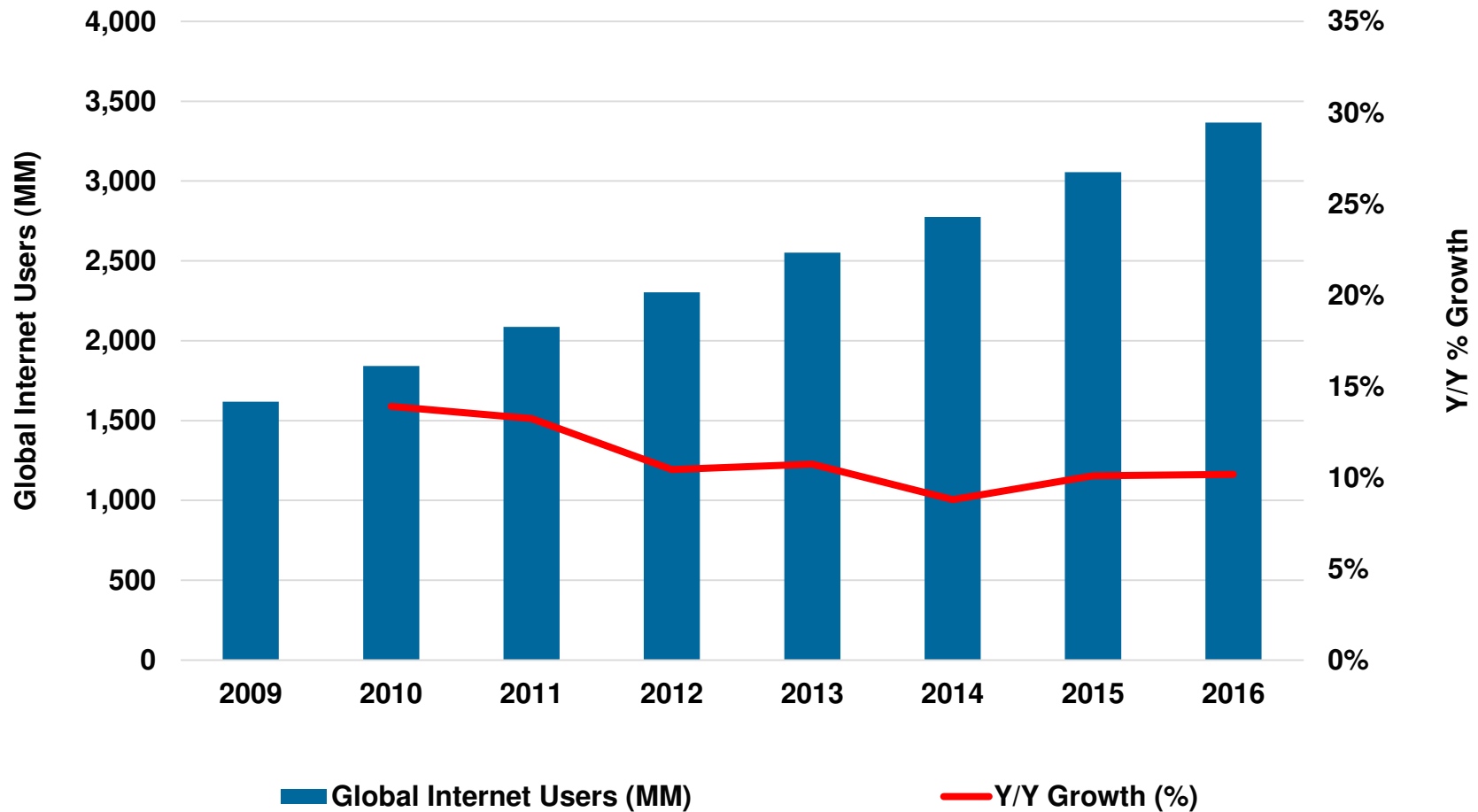


# Global Internet Trends = Solid User Growth...Slowing Smartphone Growth

- 1) **Global Internet Users** = 3.4B...Flat Growth +10% vs. 10% Y/Y...  
+8% vs. 8% Y/Y (ex. India)
- 2) **Global Smartphone Shipments** = Slowing +3% vs. +10% Y/Y
- 3) **Global Smartphone Installed Base** = Slowing +12% vs. +25% Y/Y
- 4) **USA Internet Usage (Engagement)** = Solid +4% Y/Y

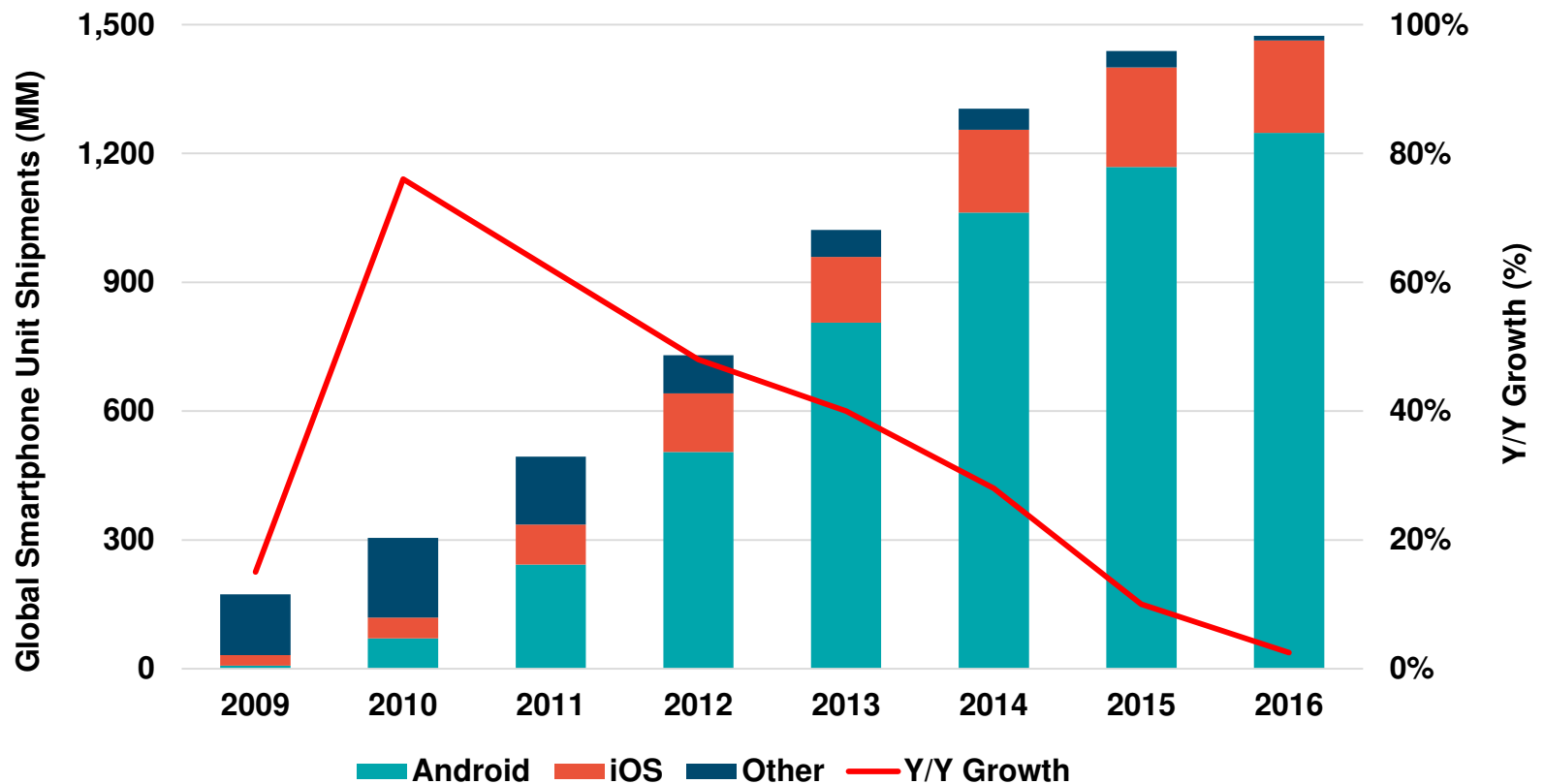
# Global Internet Users = 3.4B @ 46% Penetration... +10% Y/Y vs. +10%...+8% Y/Y vs. +8% (Ex-India)

## Global Internet Users (MM), 2009 – 2016



# Global Smartphone Unit Shipments = Continue to Slow... @ +3% Y/Y vs. +10% (2015) / +28% (2014)

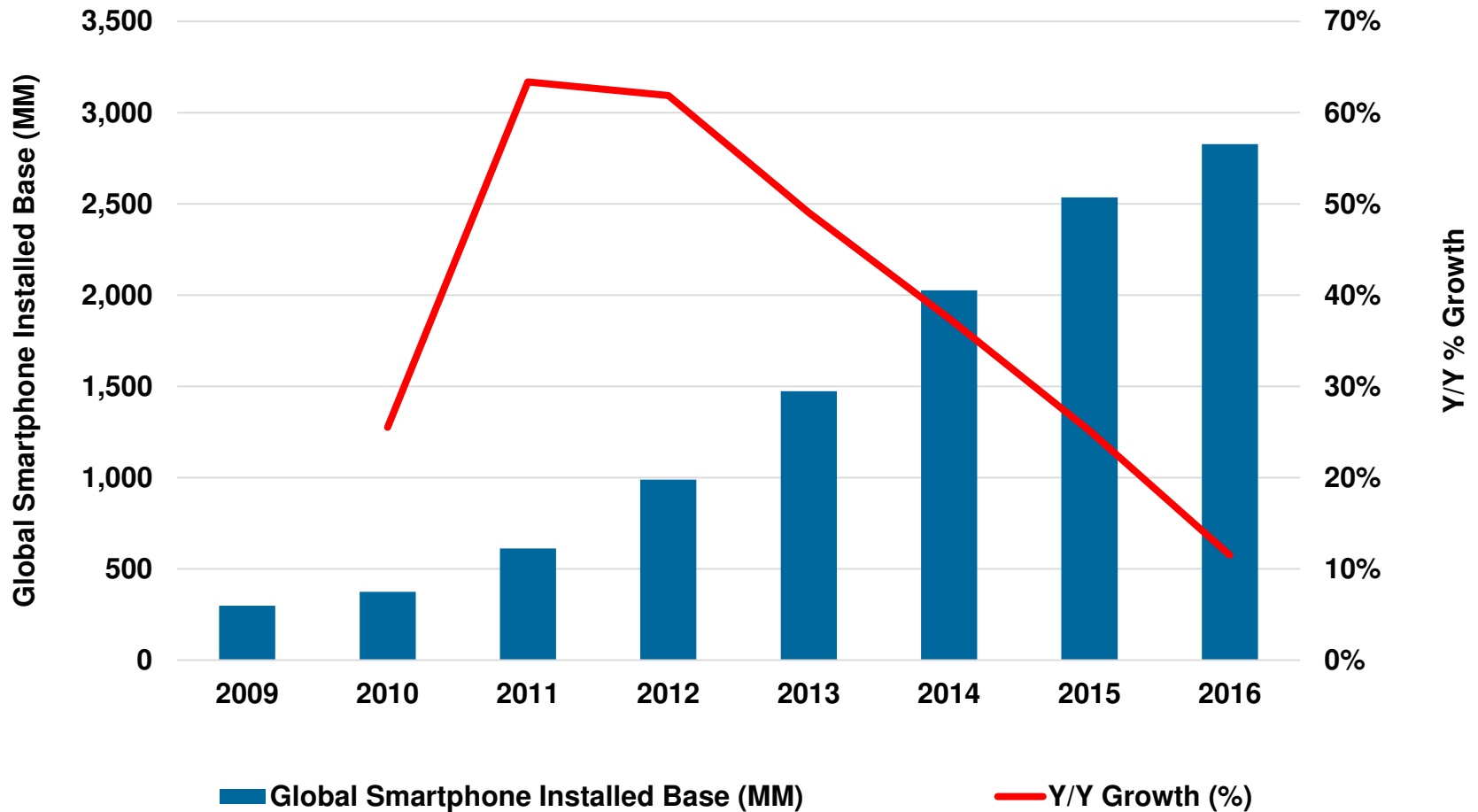
## Smartphone Unit Shipments by Operating System (MM), Global, 2009 – 2016



# Global Smartphone Installed Base = 2.8B...

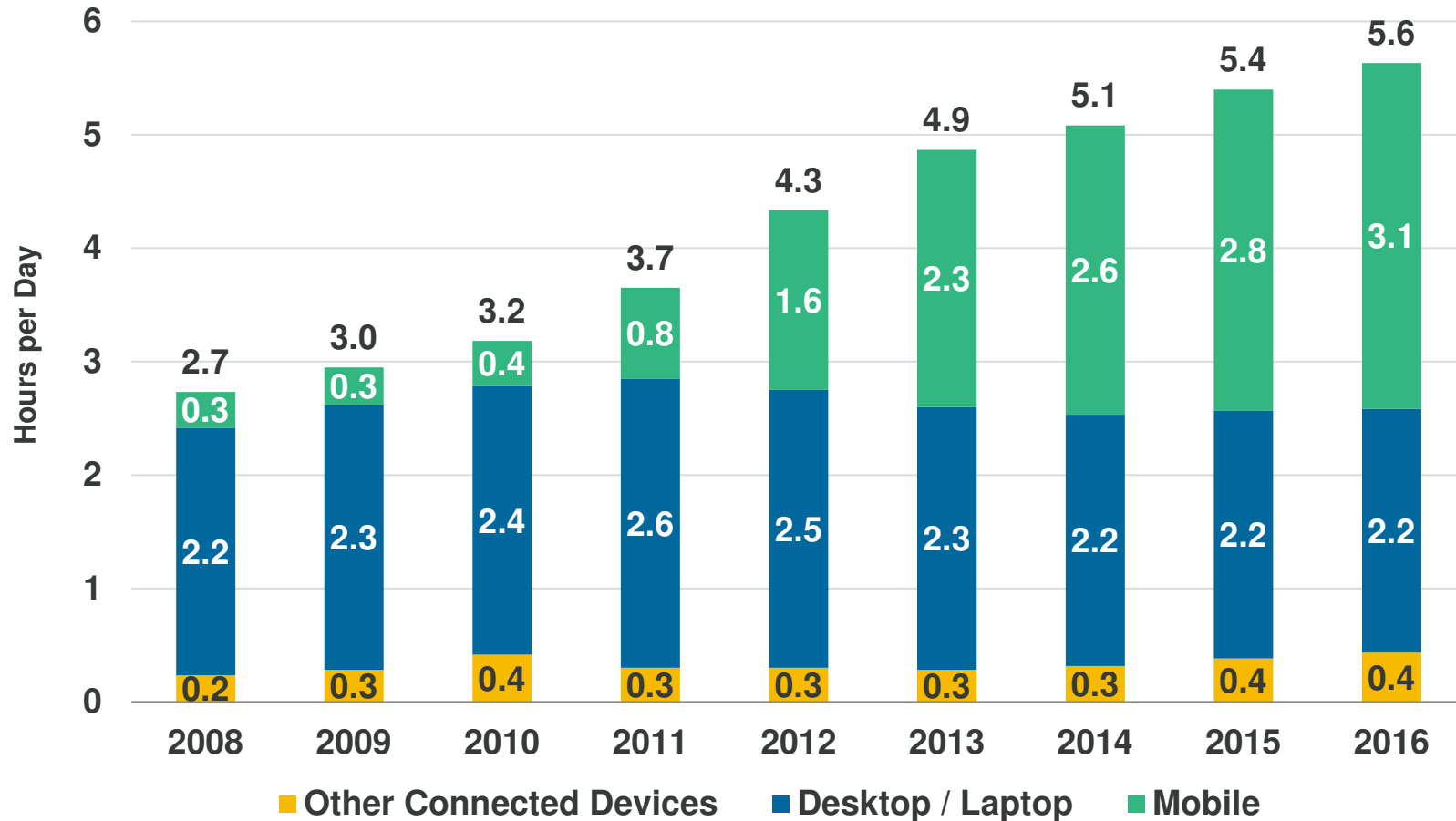
+12% Y/Y vs. +25% (2015) / +37% (2014)

## Global Smartphone Installed Base (MM), 2009 – 2016



# Internet Usage (Engagement) = Solid Growth...+4% Y/Y... Mobile >3 Hours / Day per User vs. <1 Five Years Ago, USA

## Time Spent per Adult User per Day with Digital Media, USA, 2008 – 2016



Source: eMarketer 9/14 (2008-2010), eMarketer 4/15 (2011-2013), eMarketer 4/17 (2014-2016). Note: Other connected devices include OTT and game consoles. Mobile includes smartphone and tablet. Usage includes both home and work. Ages 18+; time spent with each medium includes all time spent with that medium, regardless of multitasking.

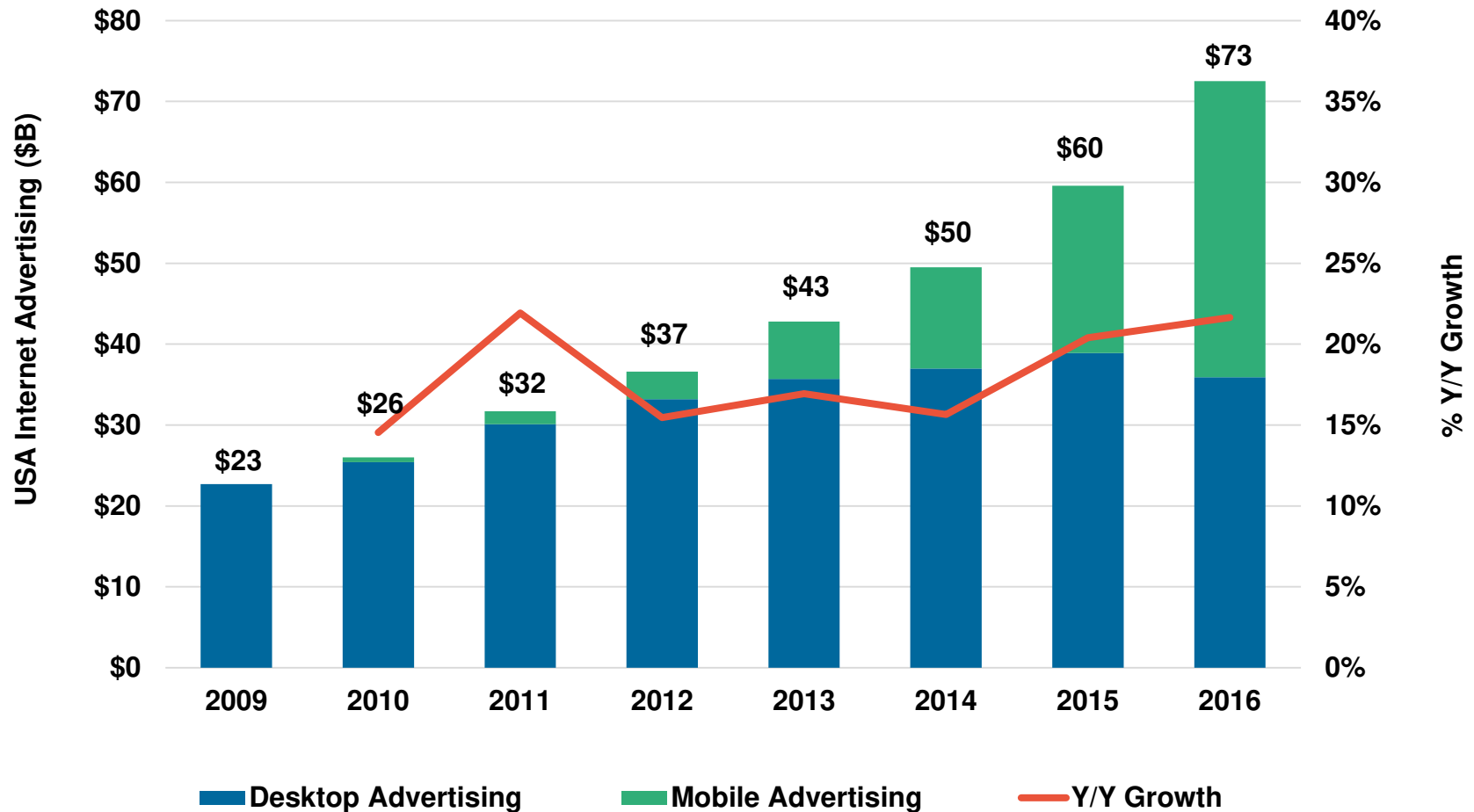
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**ONLINE ADVERTISING (+ COMMERCE) =  
INCREASINGLY  
MEASURABLE + ACTIONABLE**

***Ad Growth =  
Driven by Mobile***

# Online Advertising = Growth Accelerating, +22% vs. +20% Y/Y... Mobile \$ > Desktop (2016) on Higher Growth, USA

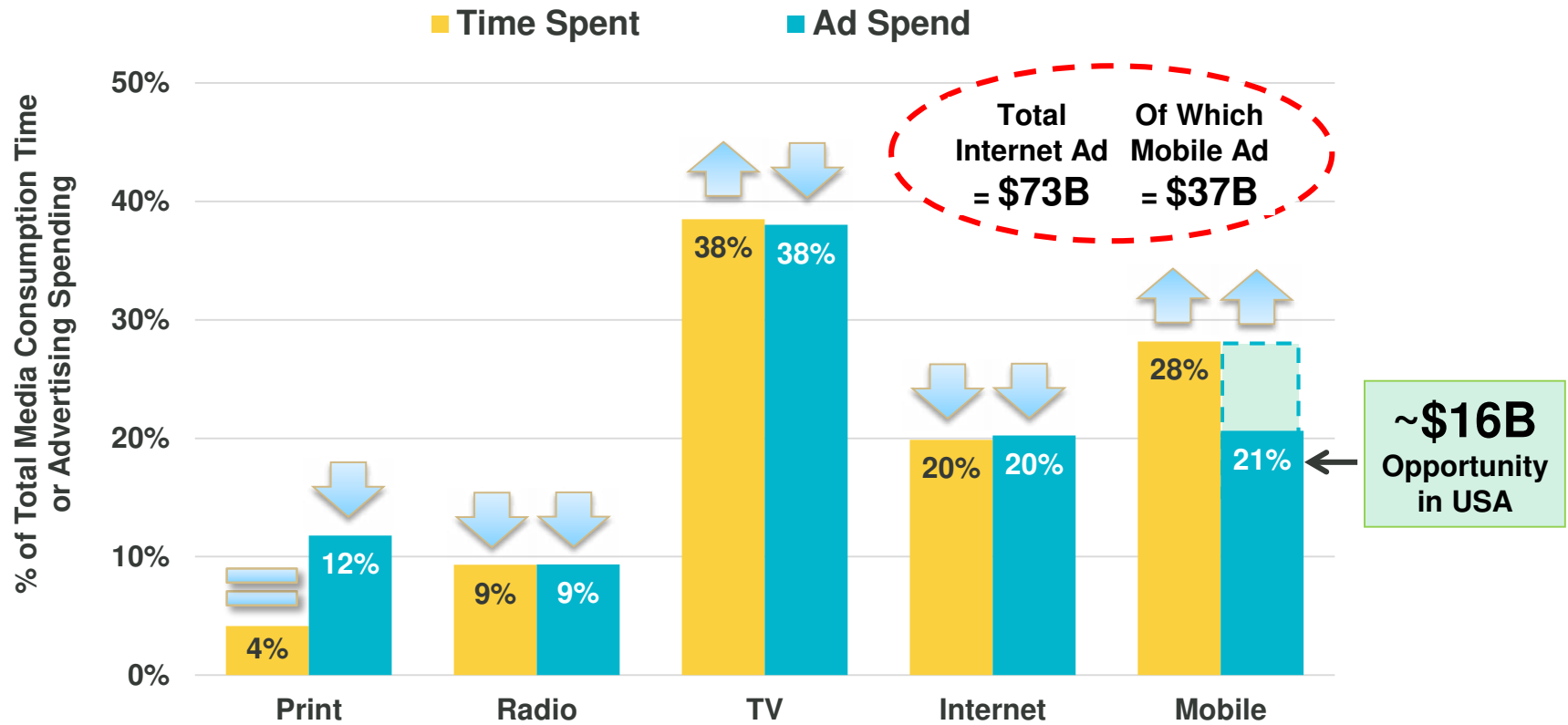
## USA Internet Advertising (\$B), 2009 – 2016





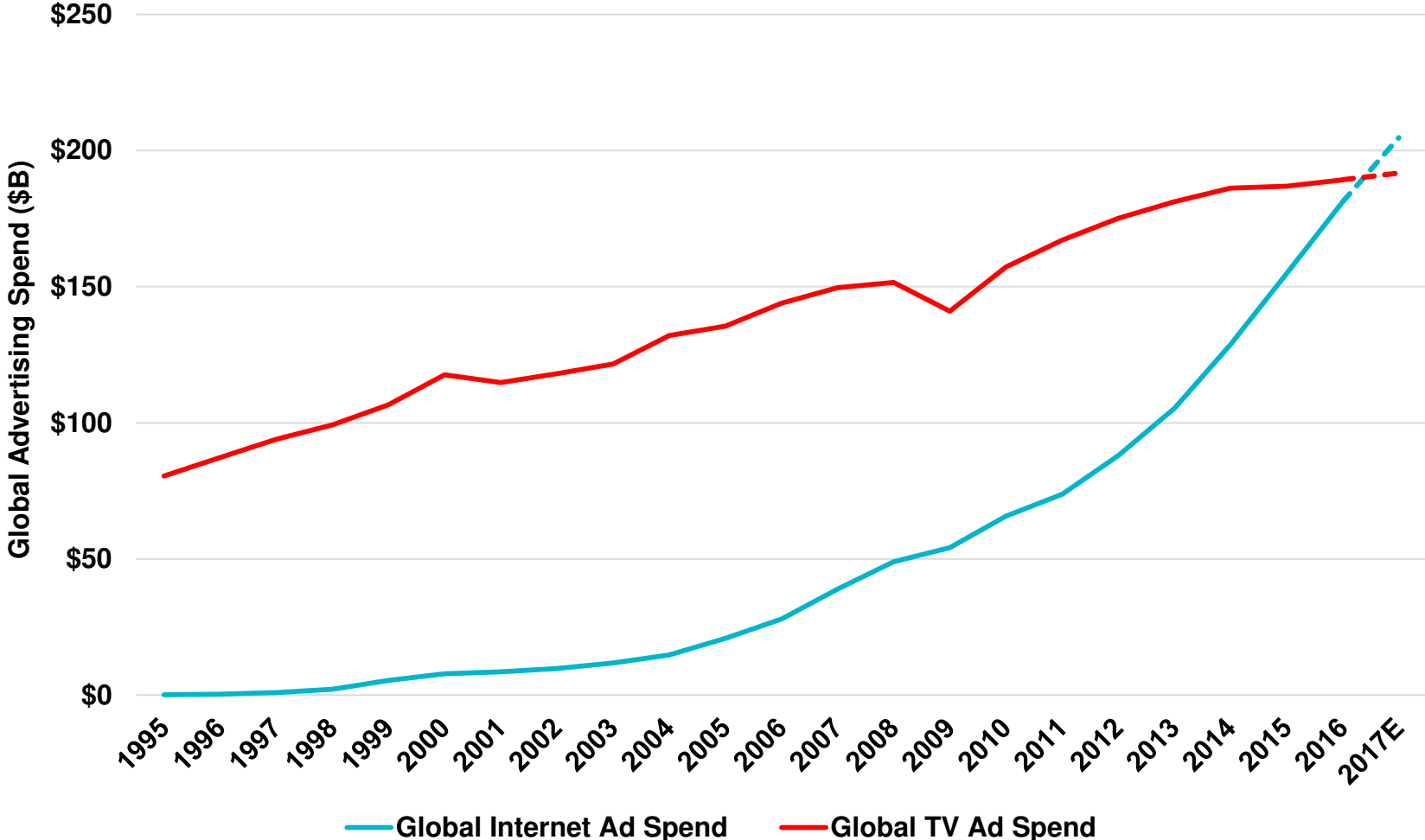
# Advertising \$ = Shift to Usage (Mobile) Continues

## % of Time Spent in Media vs. % of Advertising Spending, USA, 2016



# Advertising \$ = Internet > TV Within 6 Months, Global

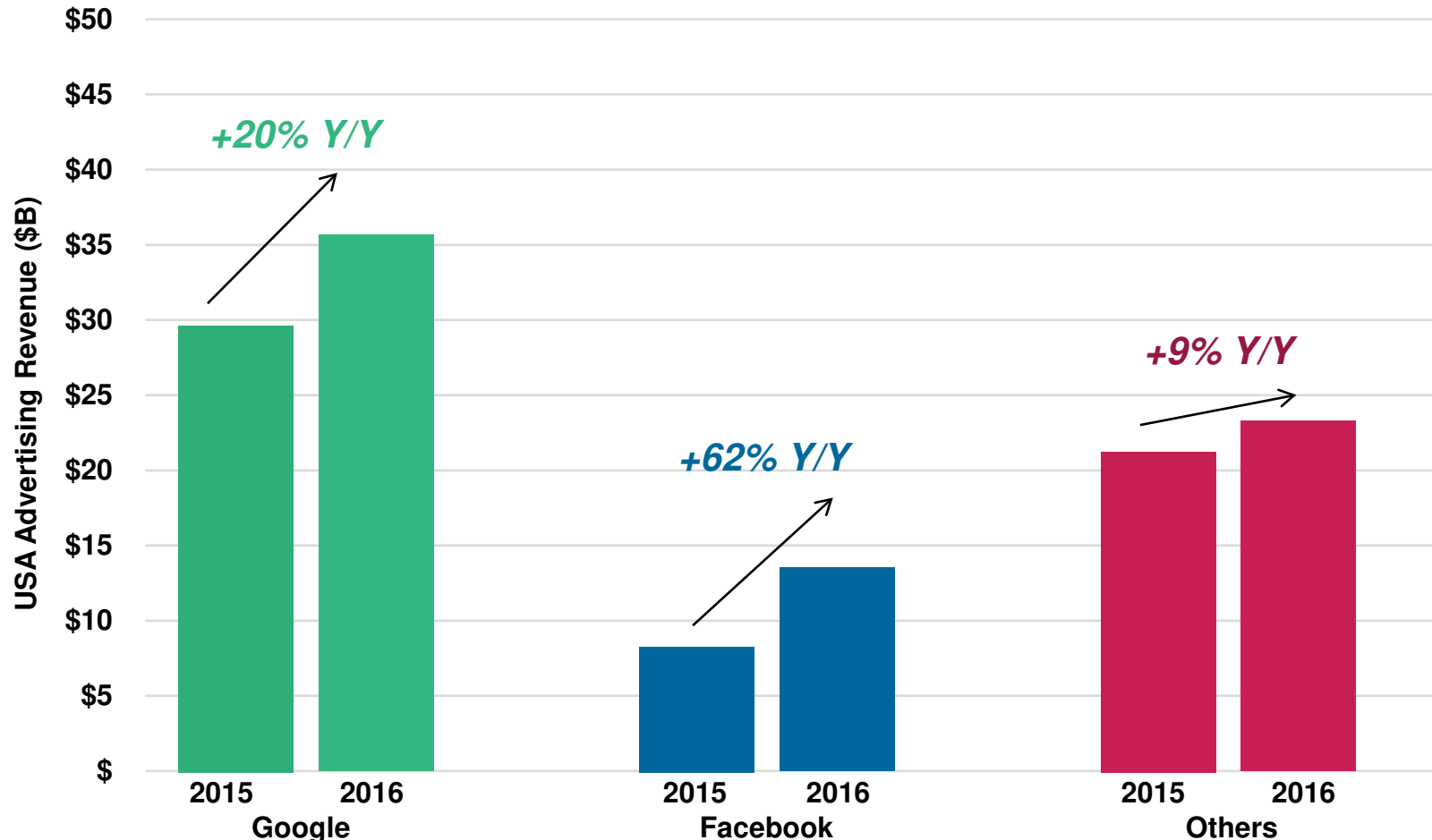
## Internet vs. TV Ad Spend (\$B), Global, 1995-2017E



Source: Zenith Advertising Expenditure Forecasts (3/17)

# Google + Facebook = 85% (& Rising) Share of Internet Advertising Growth, USA

## Advertising Revenue (\$B) and Growth Rates (%) of Google vs. Facebook vs. Other, USA, 2015 – 2016



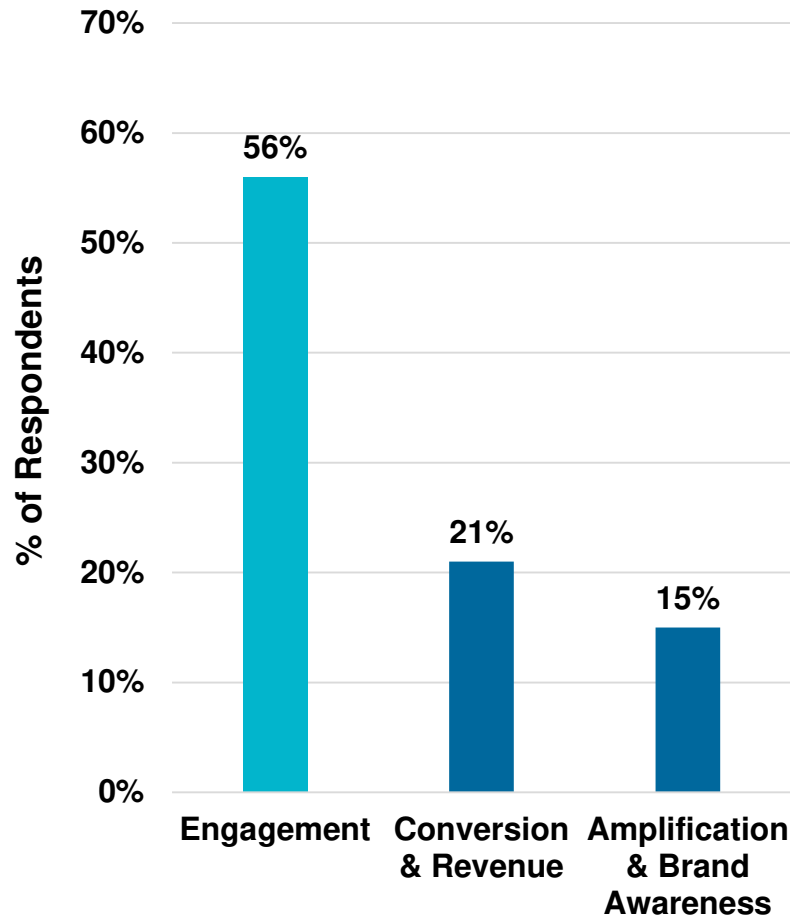
***Ad Measurability =  
Can Be Triple-Edged...***

***When Things Are Measured =  
People Don't Always Like What They See...  
Users Don't Always Like Data Collected***

# Advertisers = Like Measurable *Engagement* Metrics But... Some Find Measuring *ROI* Challenging (as with Offline)

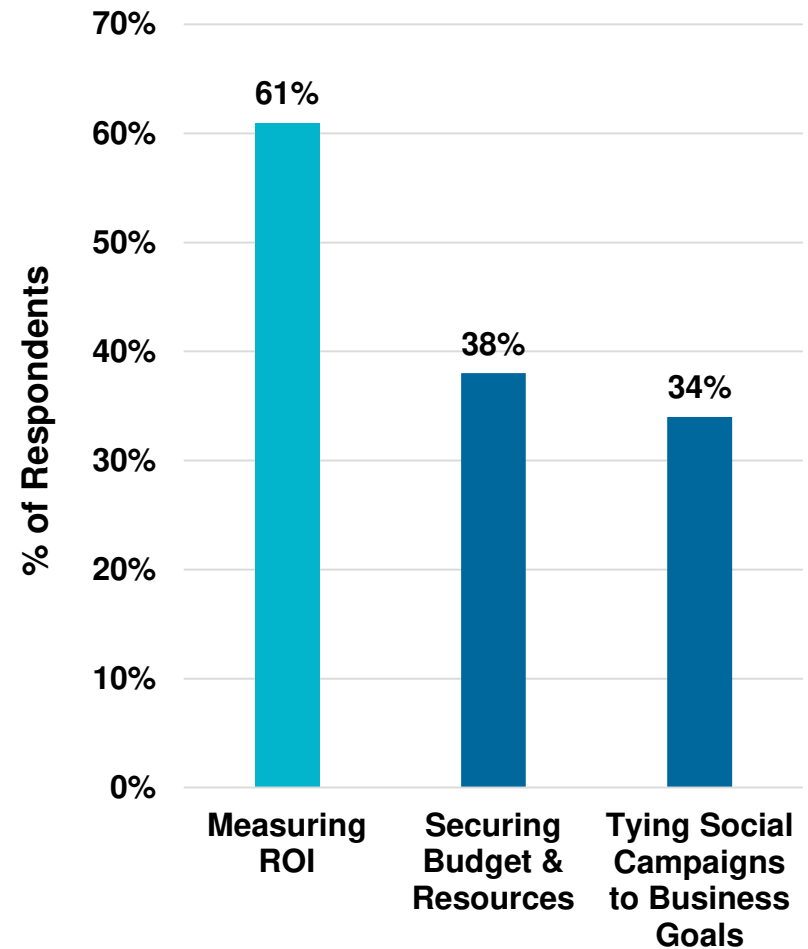
## Social Advertisers

Metrics Used to Measure Success, 6/16



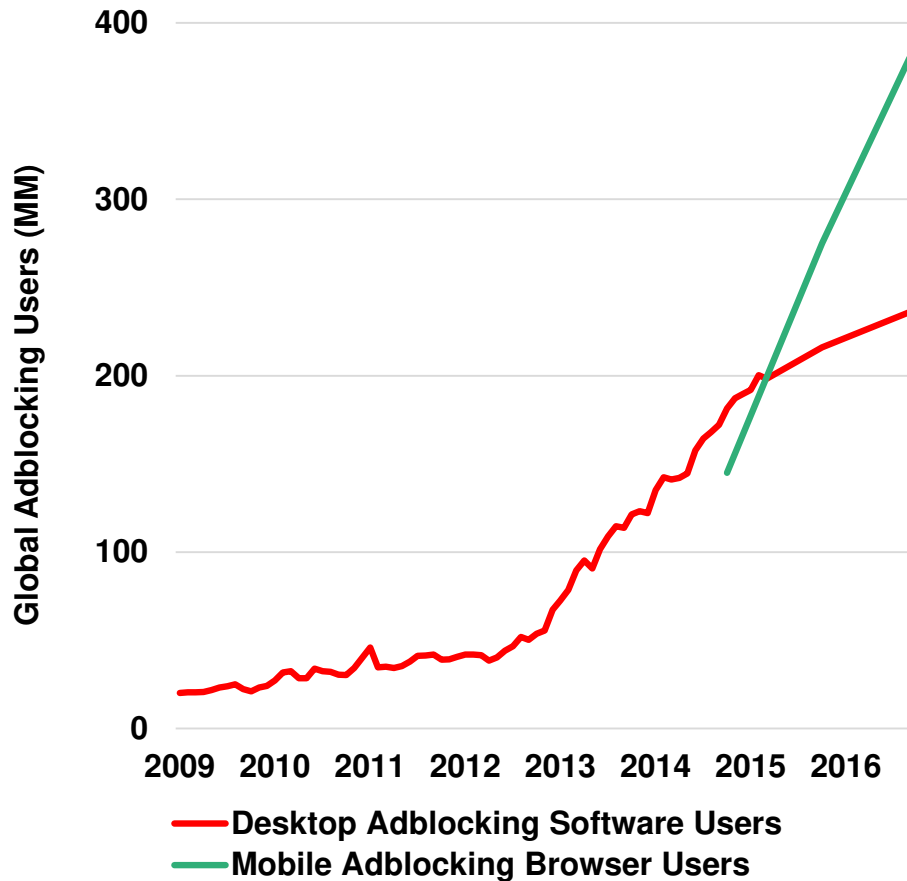
## Social Media Marketing

Top Challenges, 6/16



# Ad Blocking = Growth Continues...Especially in Developing Markets... Users Increasingly Opt Out of Stuff They Don't Want

**Adblocking Users on Web  
(Mobile + Desktop), Global, 4/09 – 12/16**



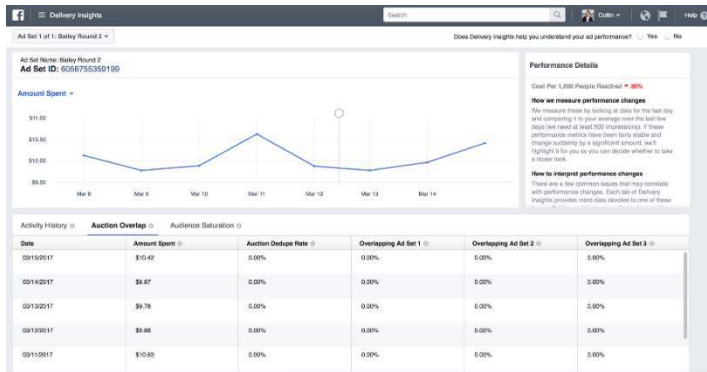
**Adblocking Penetration  
(Mobile + Desktop), Selected  
Countries, 12/16**

Country	Desktop	Mobile
China	1%	13%
India	1%	28%
USA	18%	1%
Brazil	6%	1%
Japan	3%	--
Russia	6%	3%
Germany	28%	1%
Indonesia	8%	58%
UK	16%	1%
France	11%	1%
Canada	24%	--

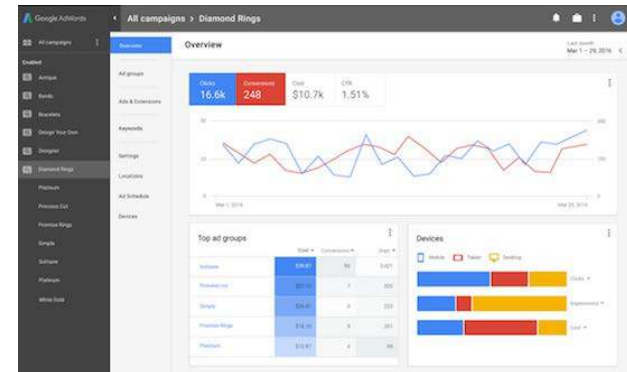
*Leading Platform Ad Offerings =  
Rapidly Improving with  
Back-End Data +  
Front-End Measurement Tools +  
Targeted Delivery of Ads  
Users Increasingly Want*

# Leading Online Ad Platforms = Providing More Ways to Target + Measure Ads

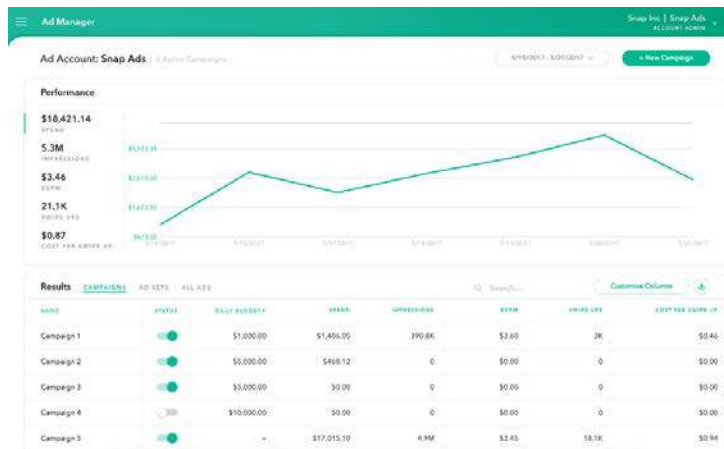
## Facebook (Delivery Insights)



## Google (AdWords)



## Snap (Snap Ads)

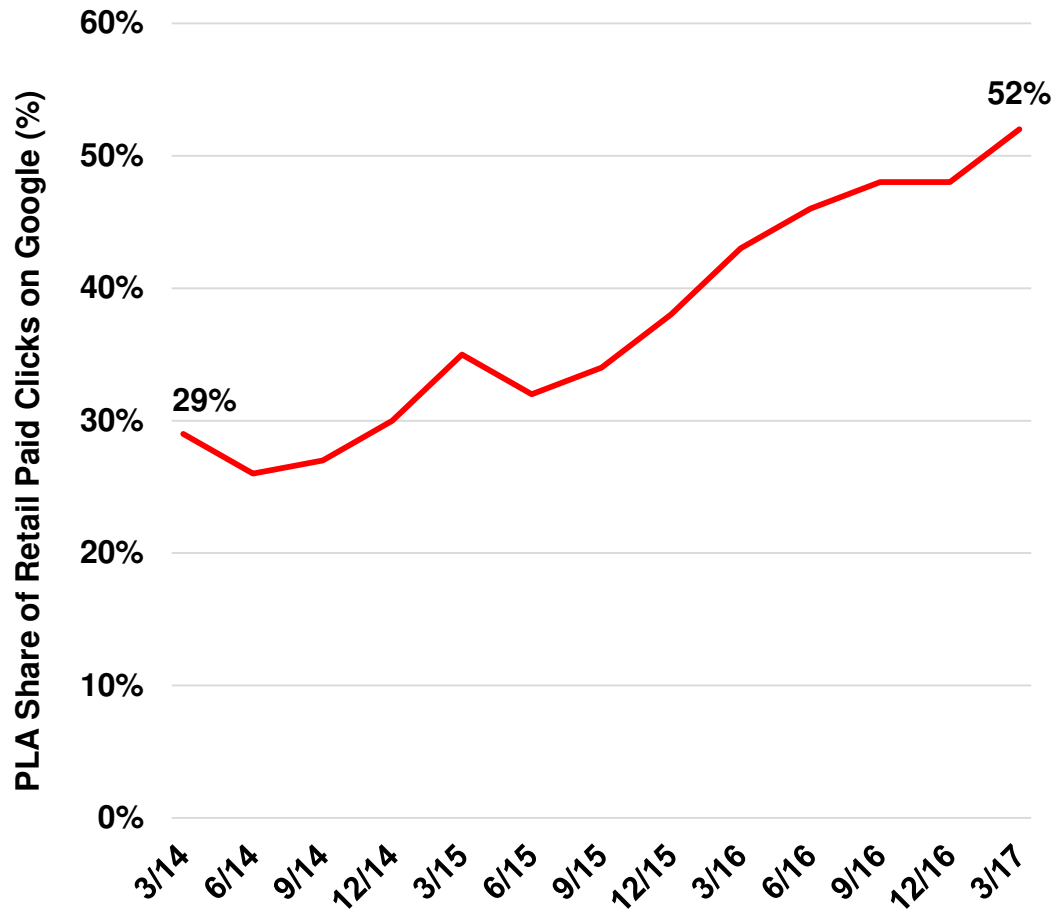




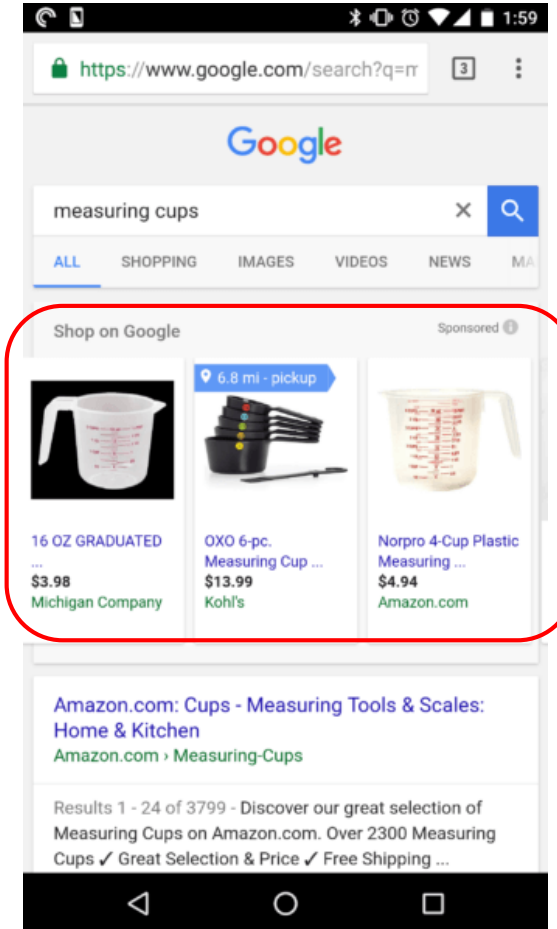
# Product Listing Ads (Google) = Driving Clicks to Product Pages

## Google Product Listing Ads (PLAs)

Share of Retail Paid Clicks on Google, USA, 2014-2016



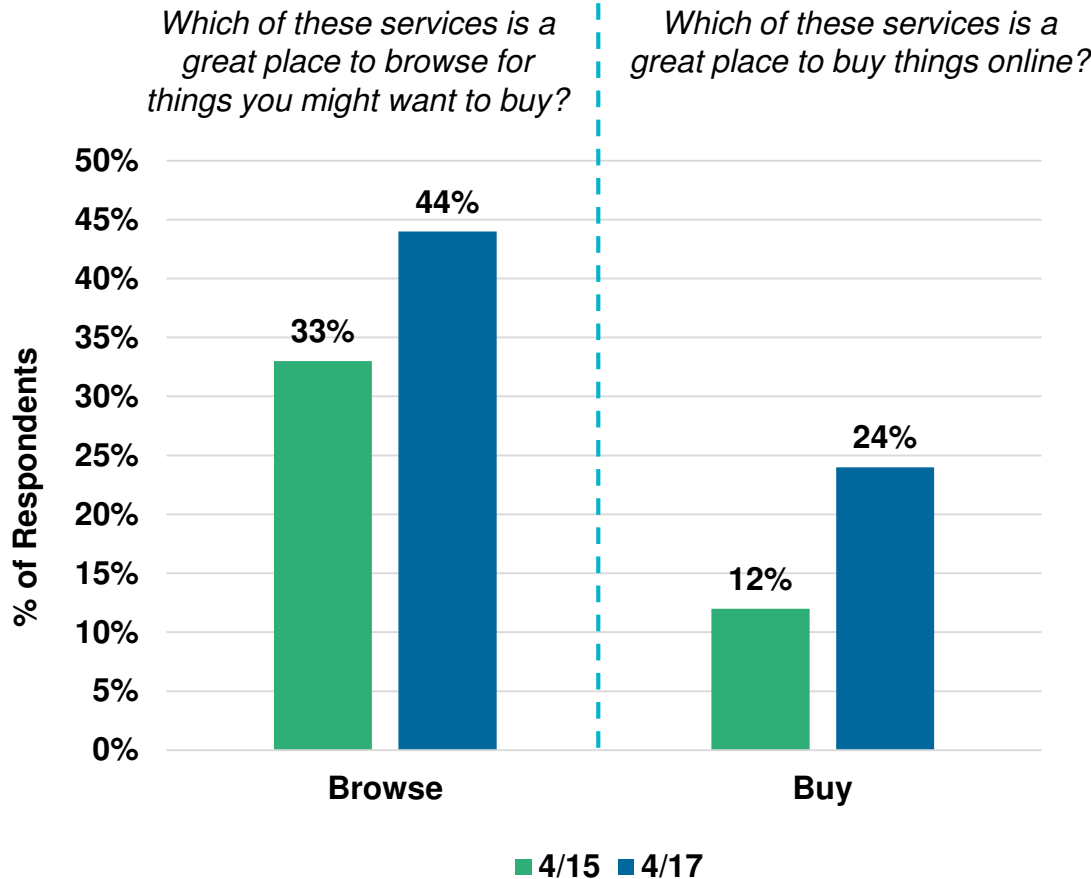
## Google PLA on Mobile Web, 12/16



# Targeted Pins (Pinterest) = Driving Product Discovery + Purchase

## Pinterest

Browsing Turning into Buying, 4/17



## Shop the Look

Inspired Purchases, 2/17



X Shop the look



\$190.00  
Men's 6-Inch  
Premium Waterpr...  
Timberland US

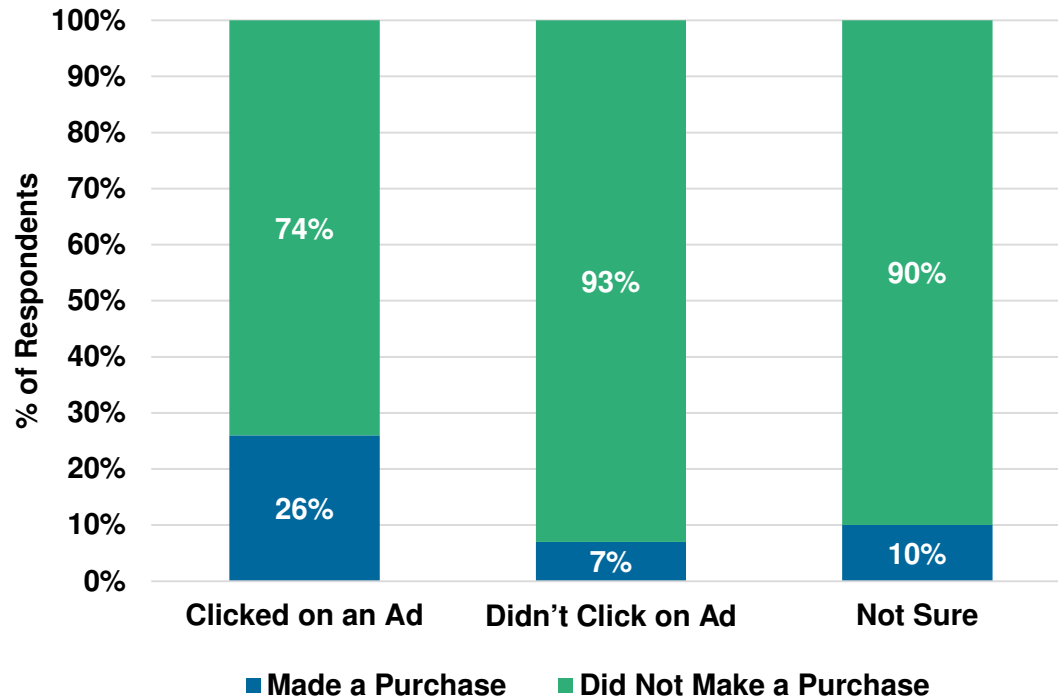
# Contextual Ads (Facebook) = Driving Direct Purchases

## Facebook Users

26% that Click Ads Make Purchase, USA, 3/17

*In past 30 days, have you clicked an ad on Facebook?*

*In past 30 days, have you purchased a product you saw on Facebook?*



## Facebook Messenger Conversational Transactions, 9/16



# Goal Based Bidding Ads (Snap) = Driving User Action

## Snap / Gatorade Ad Campaign

Users Swipe Through Ad to Web Game, 8/16

Users Spend Average of 196 Seconds Playing Game

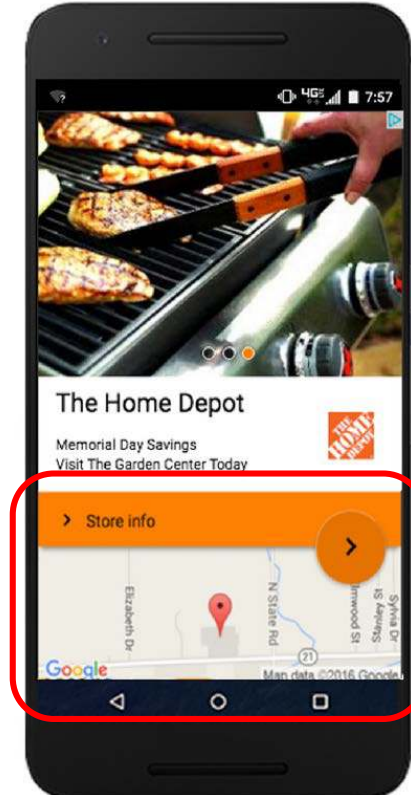
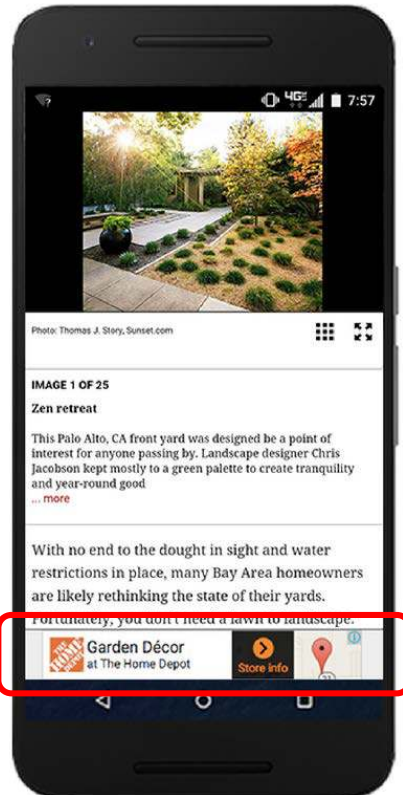


# Geo-Targeted Local Ads (Google) = Driving Foot Traffic to Stores

## Google Location-Tagged Ads

99% Accuracy Tracking Visits to 200MM Stores Globally, 9/16

5B Cumulative Tracked Store Visits, Up 5x Y/Y\*, 5/17

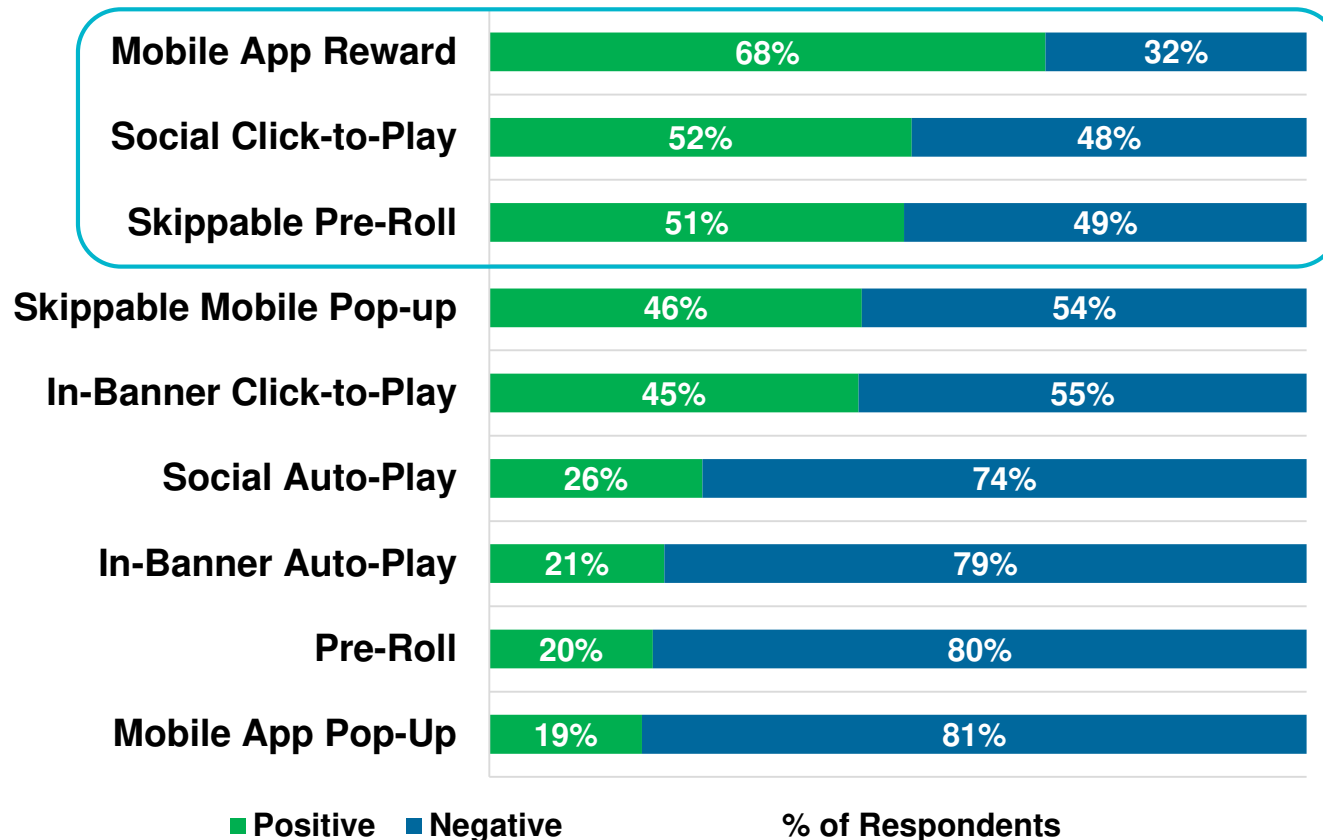


# Incentive-Based + Skippable Video Ads = Driving Positive Interactions

## Incentive-Based + Skippable Video Ads

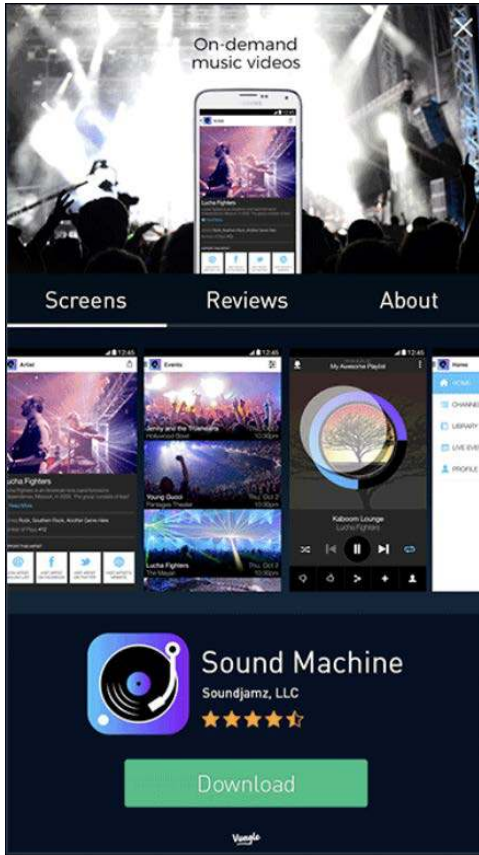
More Likely to be Viewed Positively, 5/16

*How would you characterize your attitude towards the following formats of online video advertising?*

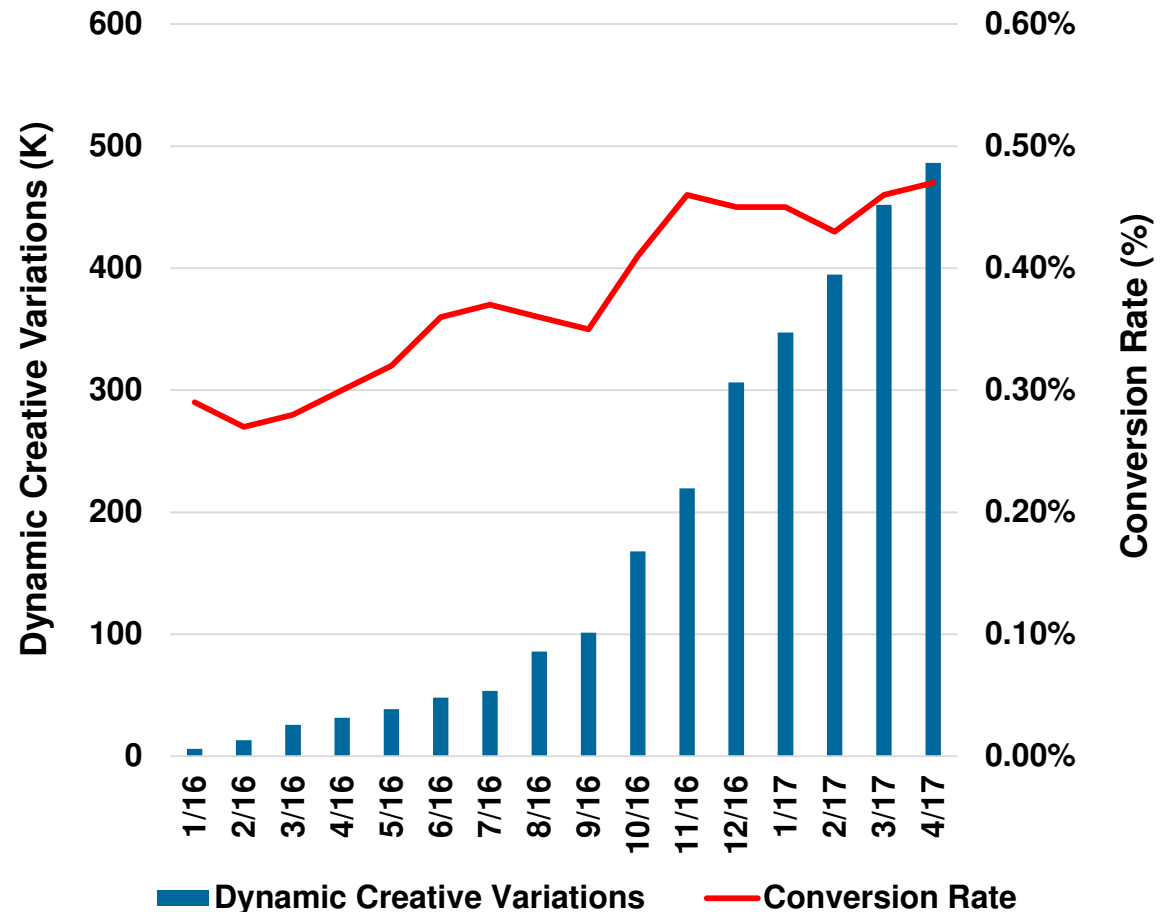


# In-App Ads + Dynamic Creative (Vungle) = Driving Higher In-App Install Performance

## Dynamic Tab Ad Video + Images



## Vungle Dynamic Creative Ads Improving Conversion Rates, 5/17





# In-Ride / In-Hand Recommendations (Uber + Foursquare) = Location + Route + Destination + Time of Day (+ an Offer)

## Uber / Foursquare Partnership

In-App Recommendations for Nearby Businesses, 4/17



Hog Island Oyster Co.

1155 ratings · \$\$

Seafood · 1.1mi

"Right near the water! Get the oysters, mussels and fried anchovies. They are all super fresh and tasty"



Blue Bottle Coffee

428 ratings · \$\$\$

Coffee Shop · 1.4mi

"Latte and Snickerdoodle - delicious quick snack. Clean facility, good coffee, good service and friendly staff."



# Hyperlocal Targeting (Nextdoor...xAd) = From Home (Neighborhood) to Work (Commute)

## Nextdoor

Neighbors Drive Word of Mouth

+8% Engagement Lift  
for Ring



## xAd

Tracking Where / When Purchases  
Likely to be Made



*Advertising Inefficiency =  
Increasingly Exposed by Data...*

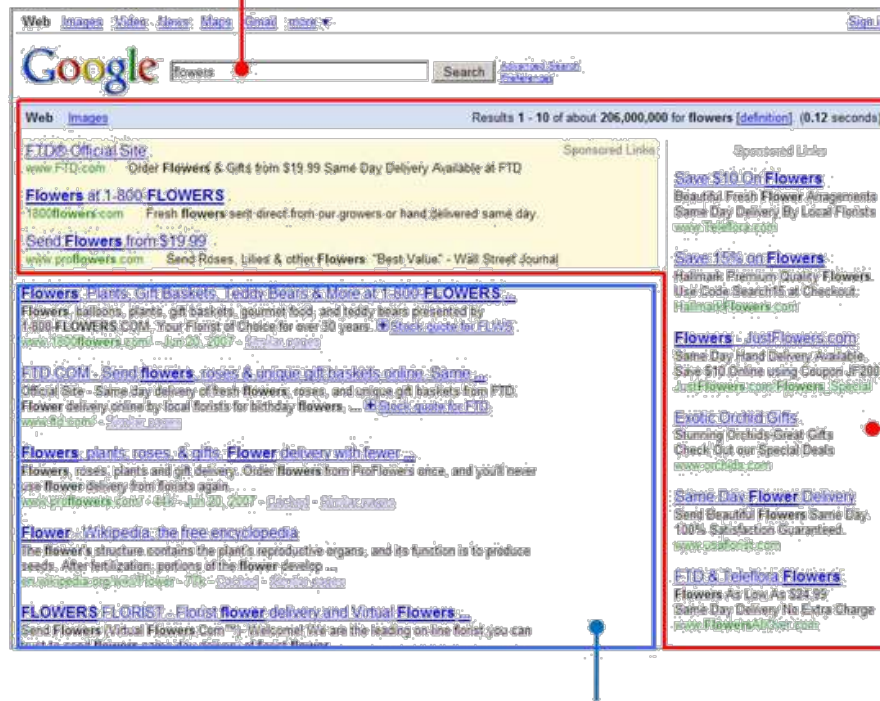
*Right 'Ad' @ Right Place / Time*

# Right Ad @ Right Place / Time (Driven by Algorithms)...

## User-Typed Input (Words)...

Linked to Relevant Ad =  
Google AdWords (Launched 2000)

1. User performs a search by entering search terms (keywords)



2. Contextually relevant Google AdWords ads appear in the Sponsored Links sections alongside or above the search results

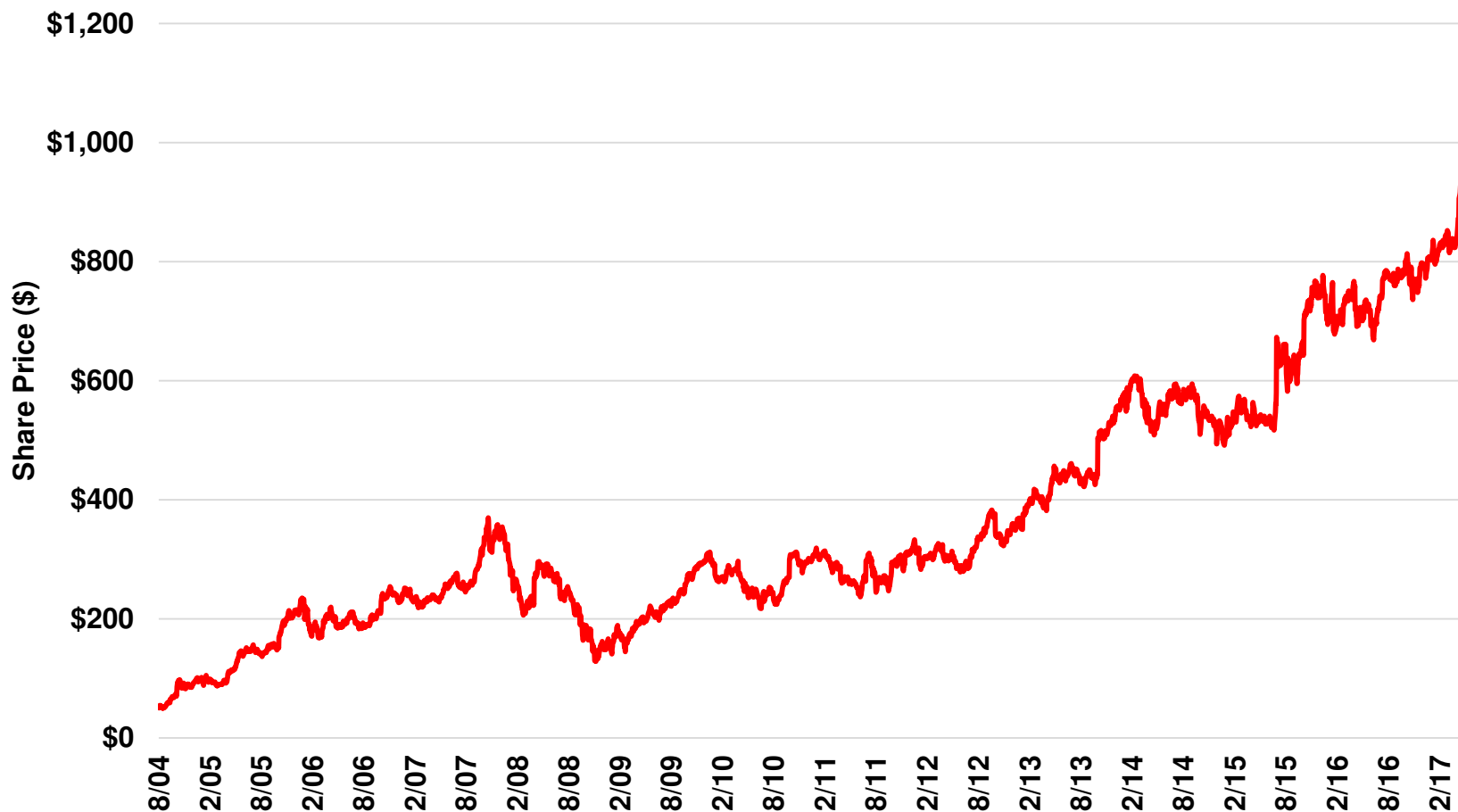
On the left are the organic search results. AdWords does not affect search results. People cannot pay to get on the search results or better placement.

...Right Ad @ Right Place / Time...

Based on *User-Typed Input (Words)* = Big Business for Google

**Google = \$679B Market Capitalization**

+30x vs. IPO



Source: Yahoo Finance  
Note: Priced as of 5/26/17 market close. Google IPO'ed @ \$85 / share on 8/19/04.

# Right Ad @ Right Place / Time (Driven by Algorithms)...

## *User-Uploaded Input (Real-Time Images)...*

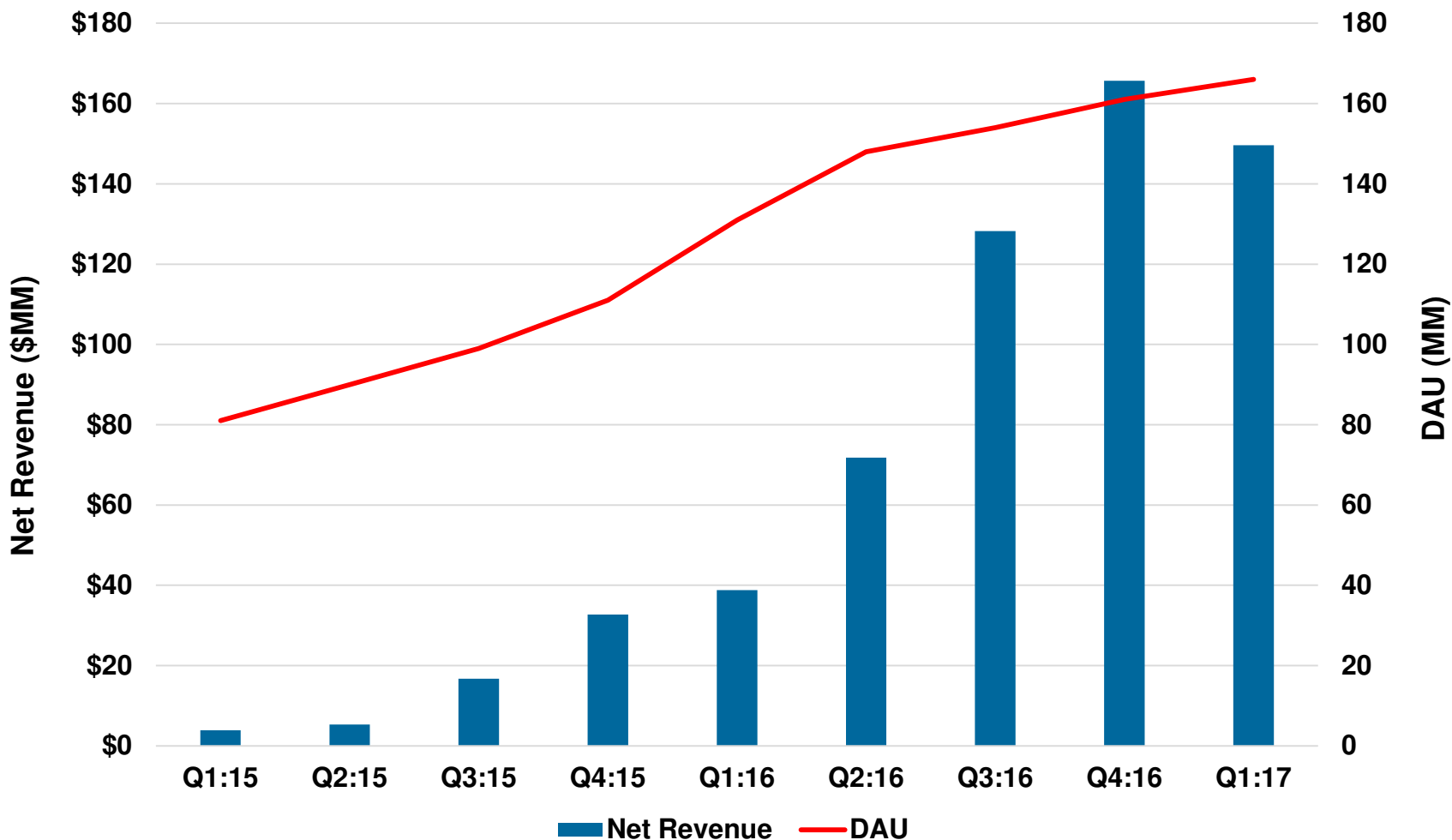
**Linked to Relevant Ad =  
SnapAds (Launched 2014)**



...Right Ad @ Right Place / Time...

Based on *User-Uploaded Input (Images)* = Big Business for Snap

## Snap = \$25B Market Capitalization



*A lot of the future of search is going to be about pictures instead of keywords.*

- Ben Silbermann, Pinterest Founder / CEO, 4/17

***Ads Evolving Rapidly =  
Often Organic + Data @ Core***



*Emerging Retailers + Crafty Big Brands =*

*Finding Ways to Make  
Collaborative Ad Creation  
(Social + UGC) Work for Them...*

# Brands + Consumers = Re-Distribution Driving Engagement...

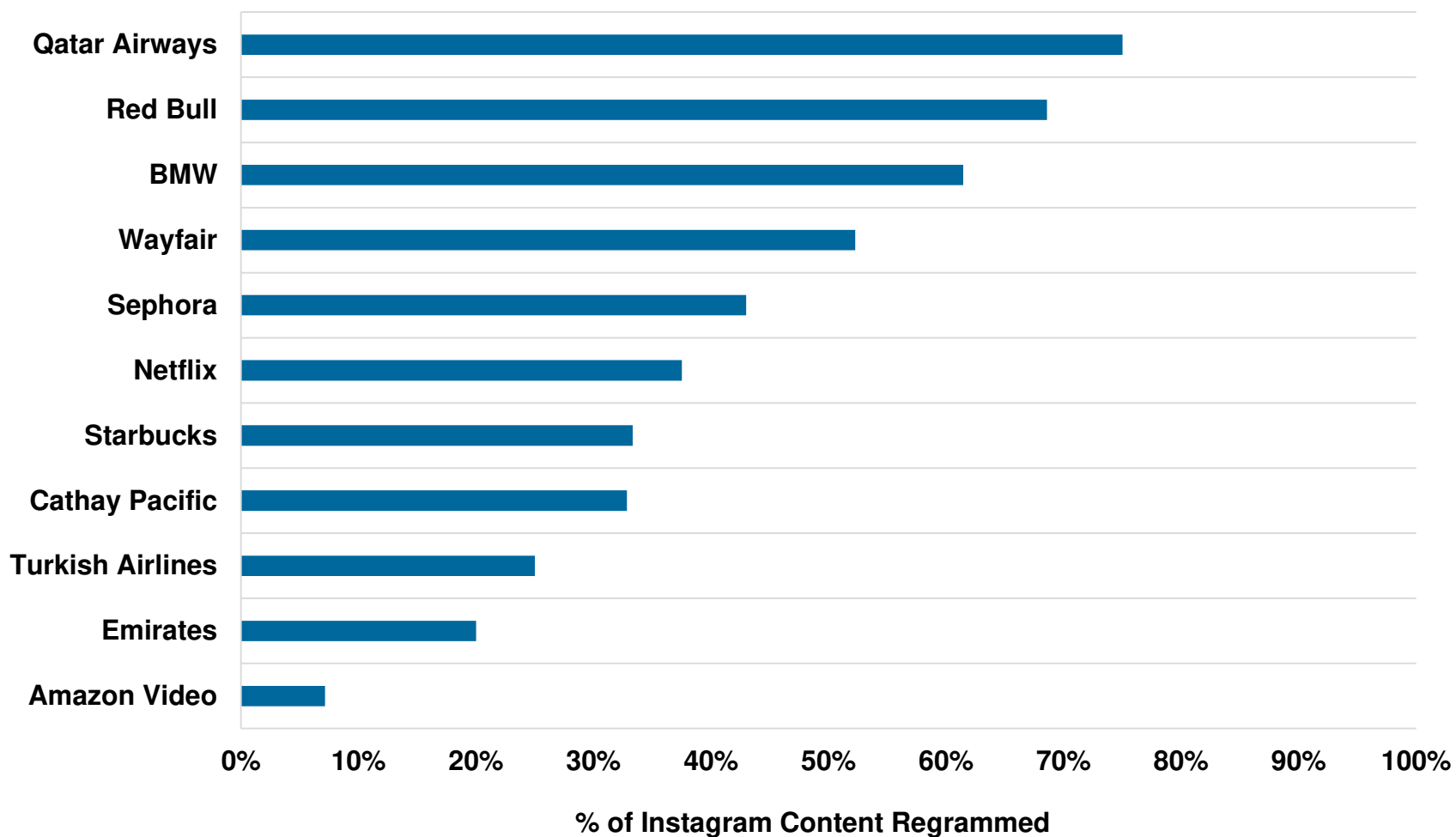
*Effective UGC can generate 6.9x higher engagement than brand generated content on Facebook, per Mavrck, 2/17*

## Ben & Jerry's / UGC on Instagram, 5/17



# ...Brands + Consumers = Brands Sourcing Content from Fans...

## Brands = Leveraging UGC on Instagram




Source: SimplyMeasured (11/16)

Note: Data collected from each company's Instagram page from 7/16-10/16. Posts were manually tagged for regrams based on mentions on 'regram' in the post or the camera emojis.

# ...Brands + Influencers = Re-Distribution Driving Engagement

## Influencers = Can Impact Followers



 stancesocks [Follow](#)

44,406 likes 1w

stancesocks "Now this is a story, all about how, my life got flipped, turned upside down..."  
Coming Soon 🎉 #StanceAnthem #theuncommonthread

load more comments

jamiesonyee Dude I know!!!  
@yabishzayzay

jamiesonyee So stoked!!!  
@yabishzayzay

eyebrowparty @\_cmacc Francis

brettrichardson0 @brooks.cx

\_cmacc @eyebrowparty he already showed me this today haha

tarneajae I need these in my life  
@zchizchi

mitchy.smithy @dan.watts

mitchy.smithy @lachlan.bbrown  
birthday?

*...Emerging Retailers + Crafty Big Brands =*

*Finding Ways to Make  
Images (+ Video) + Data +  
Algorithms + Voice Work for Them*

# Image-Based Platform *Front-Ends* = Tap + Augment Can Replace Typing...

## ‘Front-End’

User-Generated Real-Time Geolocated Images

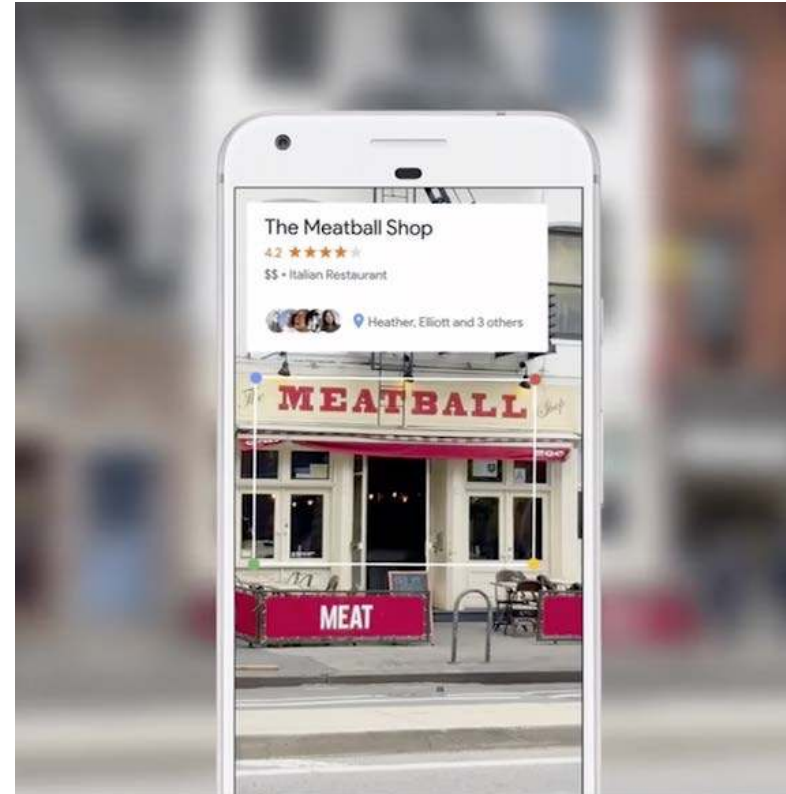
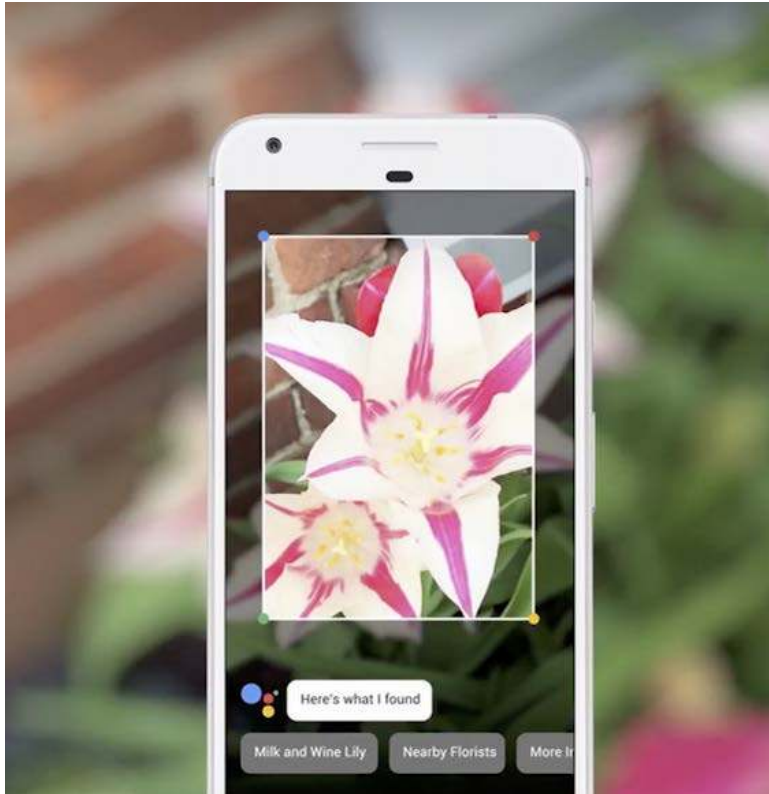




# ...Image-Based Platform *Front-Ends* = Taking Pictures Can Replace Typing...

## ‘Front-End’

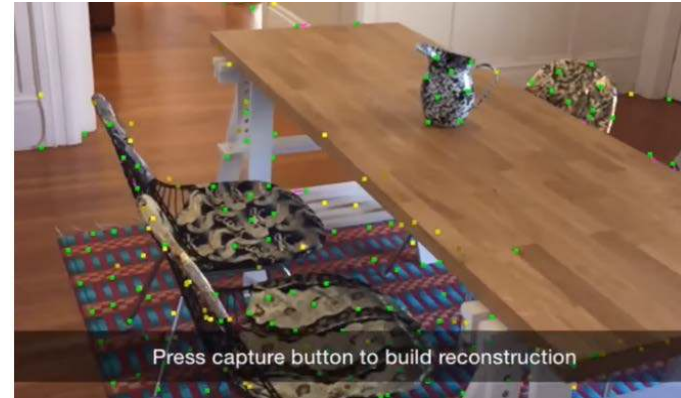
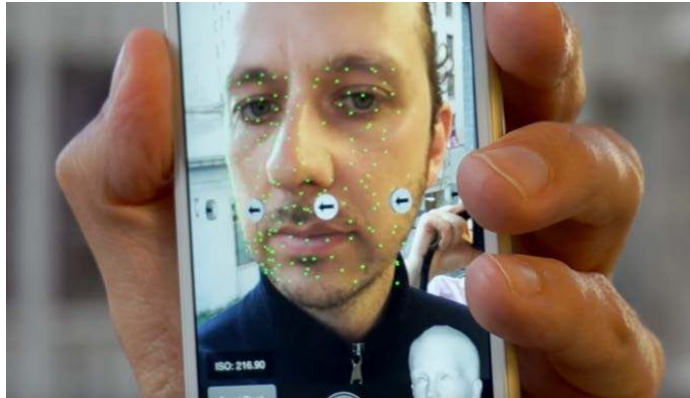
Google Lens Will Provide Greater Context to Images



# ...Image-Based Platform *Back-Ends* = Algorithms Infer User Context from *Images*...

## 'Back-End'

Algorithms Infer Images / Project AR Objects into Scenes

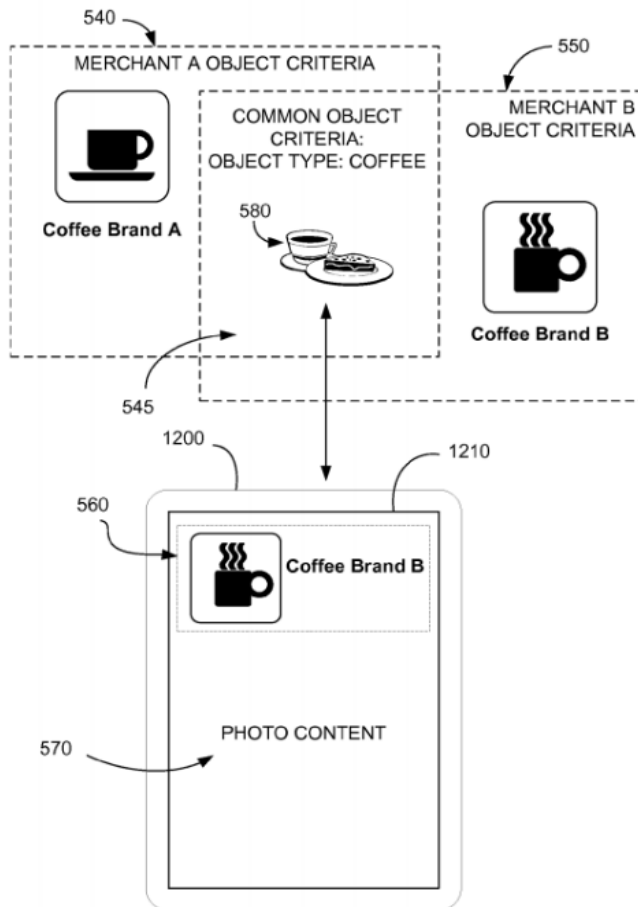




# ...Image Recognition *Back-Ends* = Can Provide Contextual Relevance for Advertisers

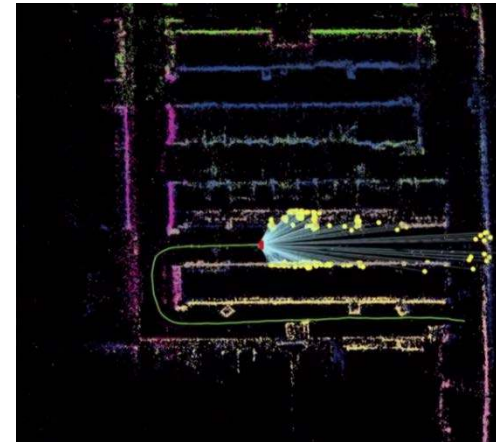
## Snap Image Recognition

Potential Ad Targeting Tool



## Google Visual Positioning Service

Tracking Path to Purchase...In-Store

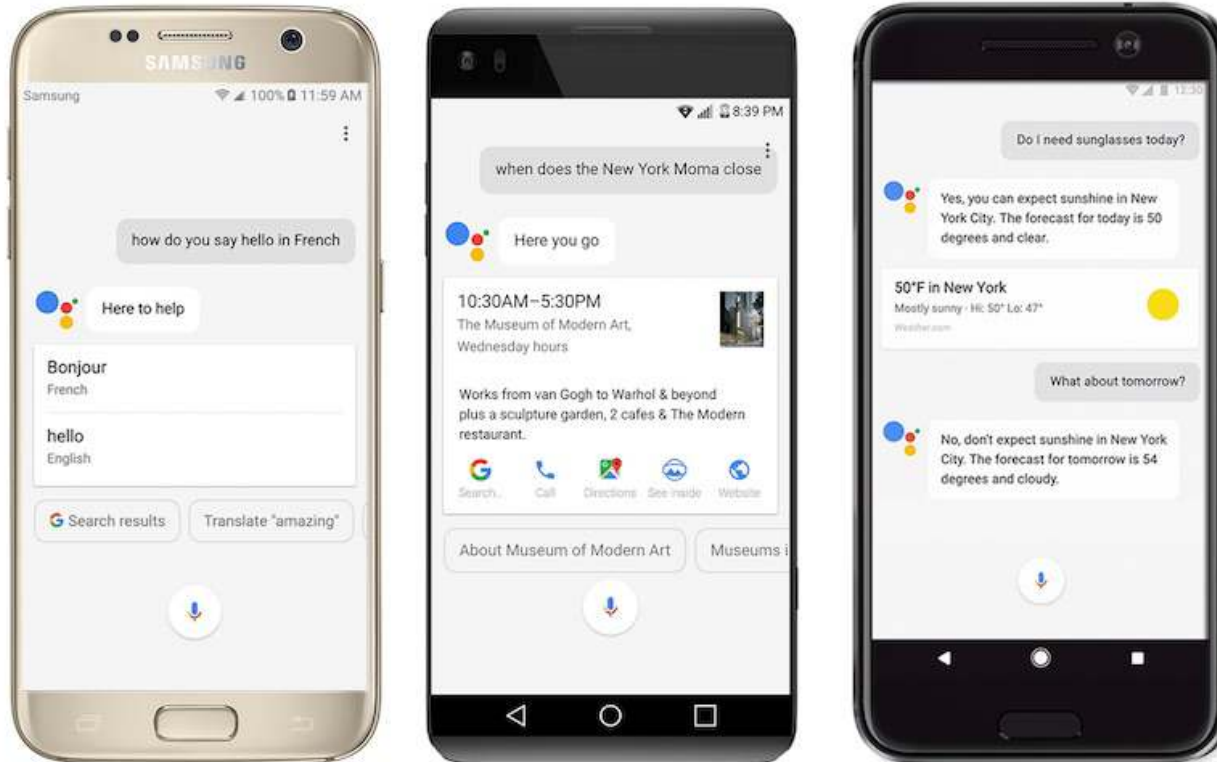


# Voice-Based *Mobile* Platform *Front-Ends* = Voice Can Replace Typing...

## Google Assistant

Nearly 70% of Requests are Natural / Conversational Language, 5/17

**20% of Mobile Queries Made via Voice, 5/16**



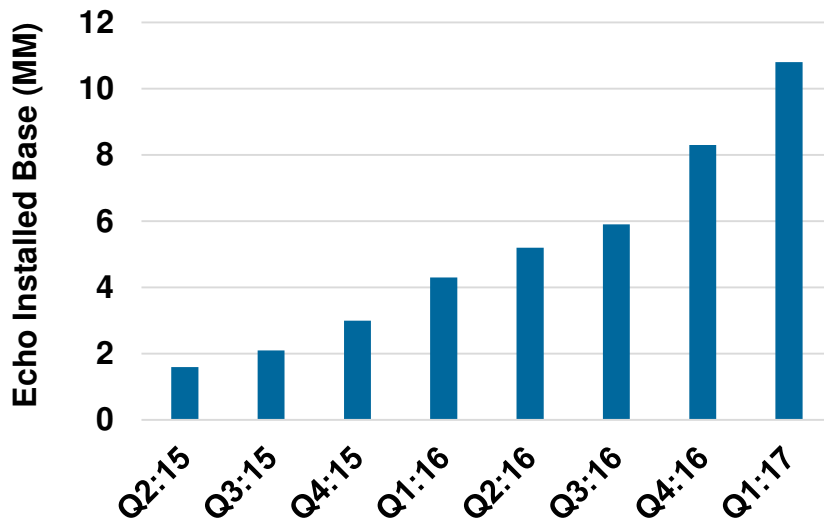
# ...Voice-Based *In-Home* Platform *Front-Ends* = Voice Can Replace Typing...

## Amazon Echo Evolution, 11/14 – 5/17

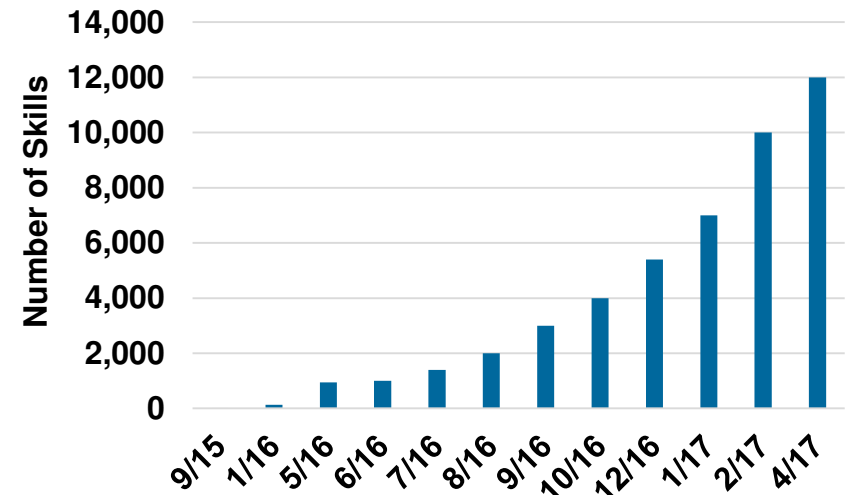


**Echo** = Shopping + Media  
**Echo Look** = Shopping + Recommendations  
**Echo Show** = Video + Voice Calls

### Amazon Echo Device Installed Base, USA



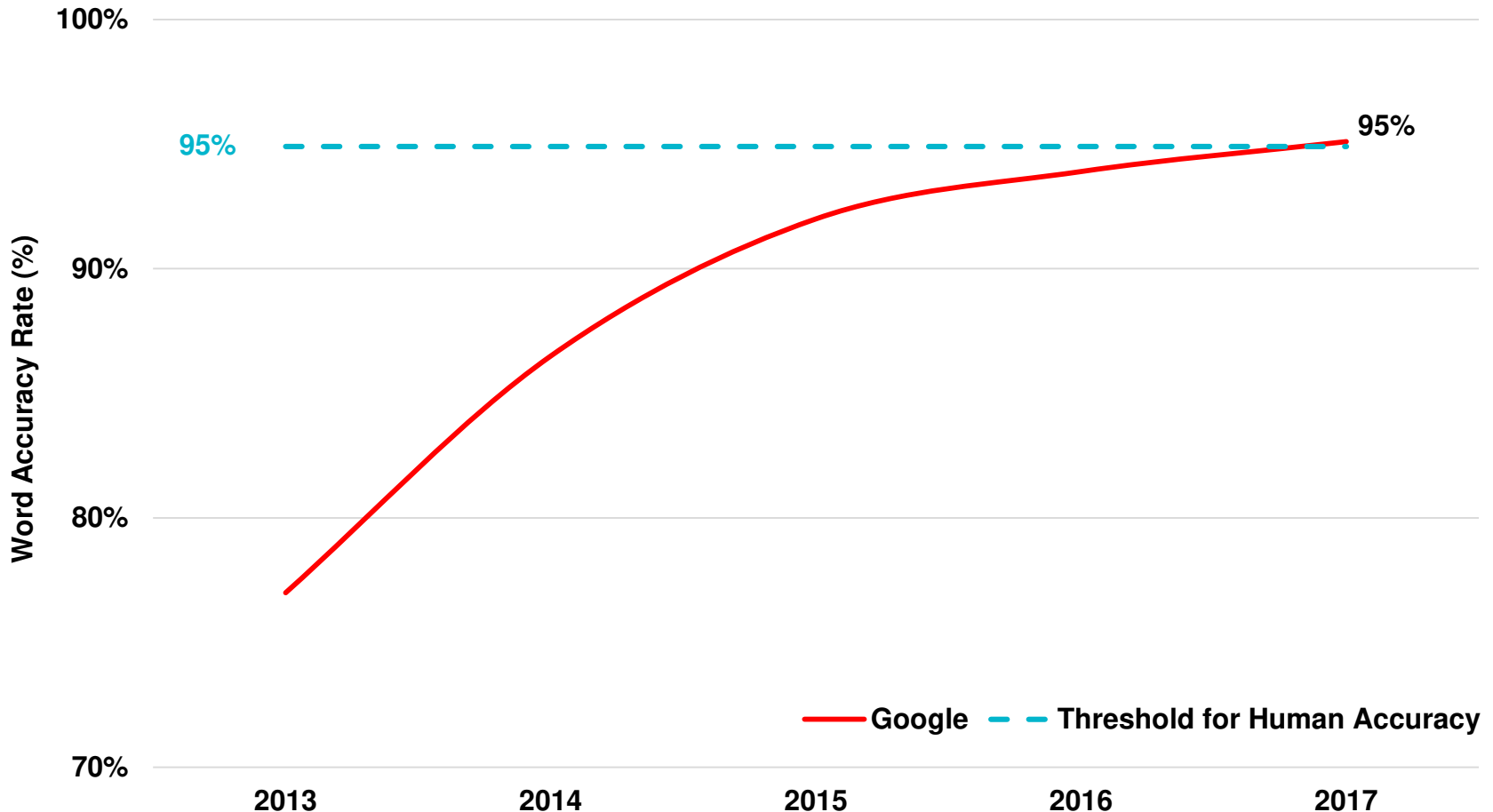
### Amazon Echo Skills Broadening Use Cases



Source: Image: Amazon, Consumer Intelligence Research Partners LLC, Geekwire, Technology Review, Wired, Fast Company

# ...Voice-Based Platform *Back-Ends* = Voice Recognition Accuracy Continues to Improve

## Google Machine Learning Achieving Higher Word Accuracy, 2013-2017



Source: Google (5/17)

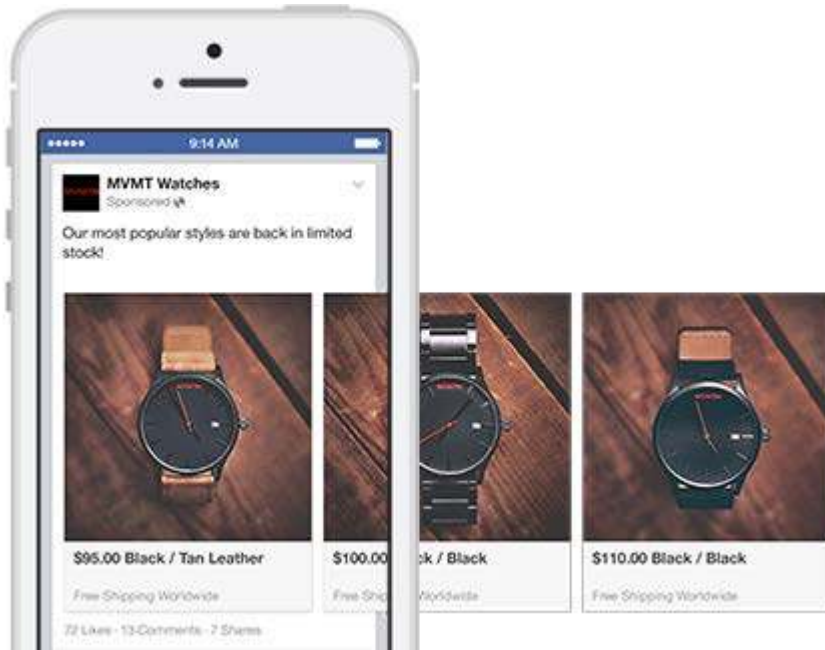
Note: Data as of 5/17/17 and refers to recognition accuracy for English language. Word error rate is evaluated using real world search data which is extremely diverse and more error prone than typical human dialogue.

***Ads =  
Becoming Targeted Storefronts***

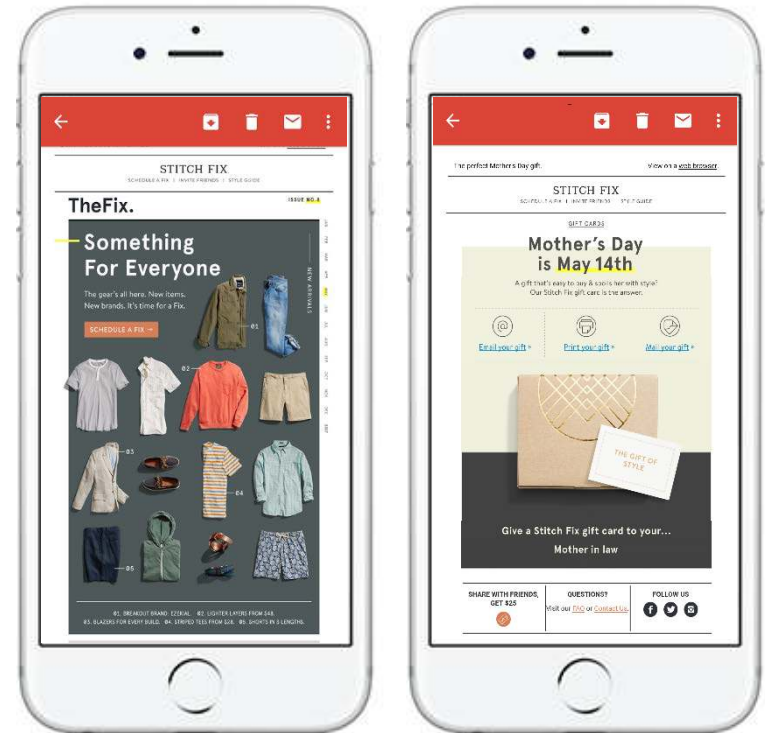
# Ads / Content / Products / Transactions = Lines Blurring. Fast...

## *The Content = The Store*

**Facebook Feed**  
Browsable Storefronts



**Emails**  
Curated Storefronts

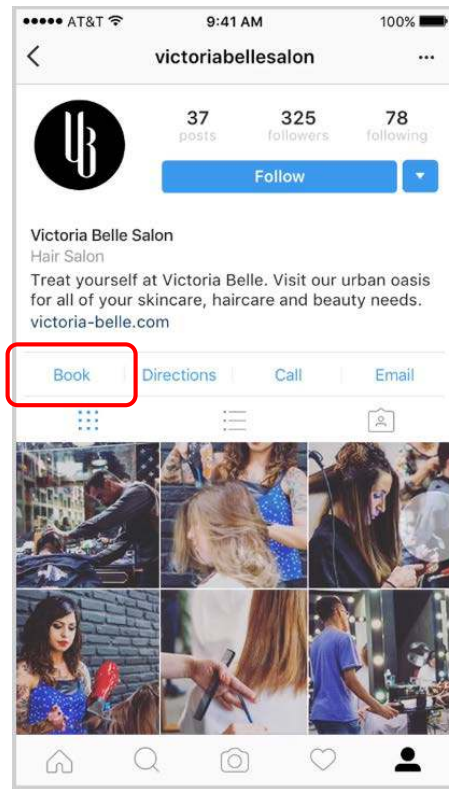


# ...Ads / Content / Products / Transactions = Lines Blurring. Fast.

## The Ad = The Transaction

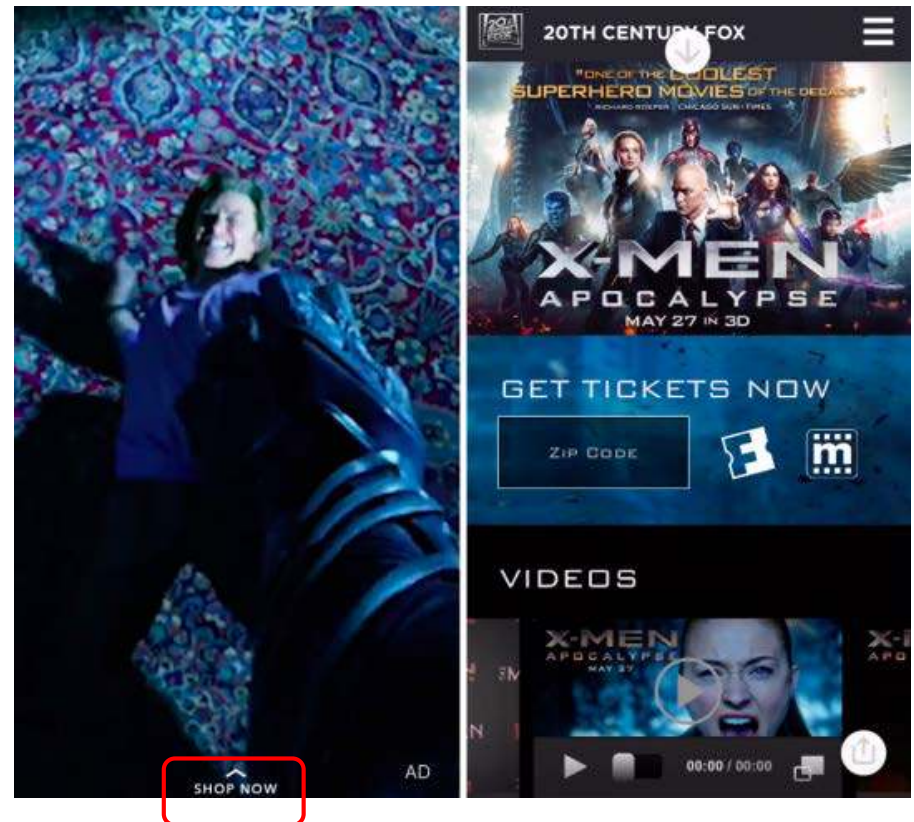
### Instagram Feed

Tap to Book, 4/17



### Snap eCommerce Ad

Swipe Up to Buy, 5/16



Source: Left Image: Instagram, Right Image: Snap



*Product Quality + Customer  
Support + Transparency*

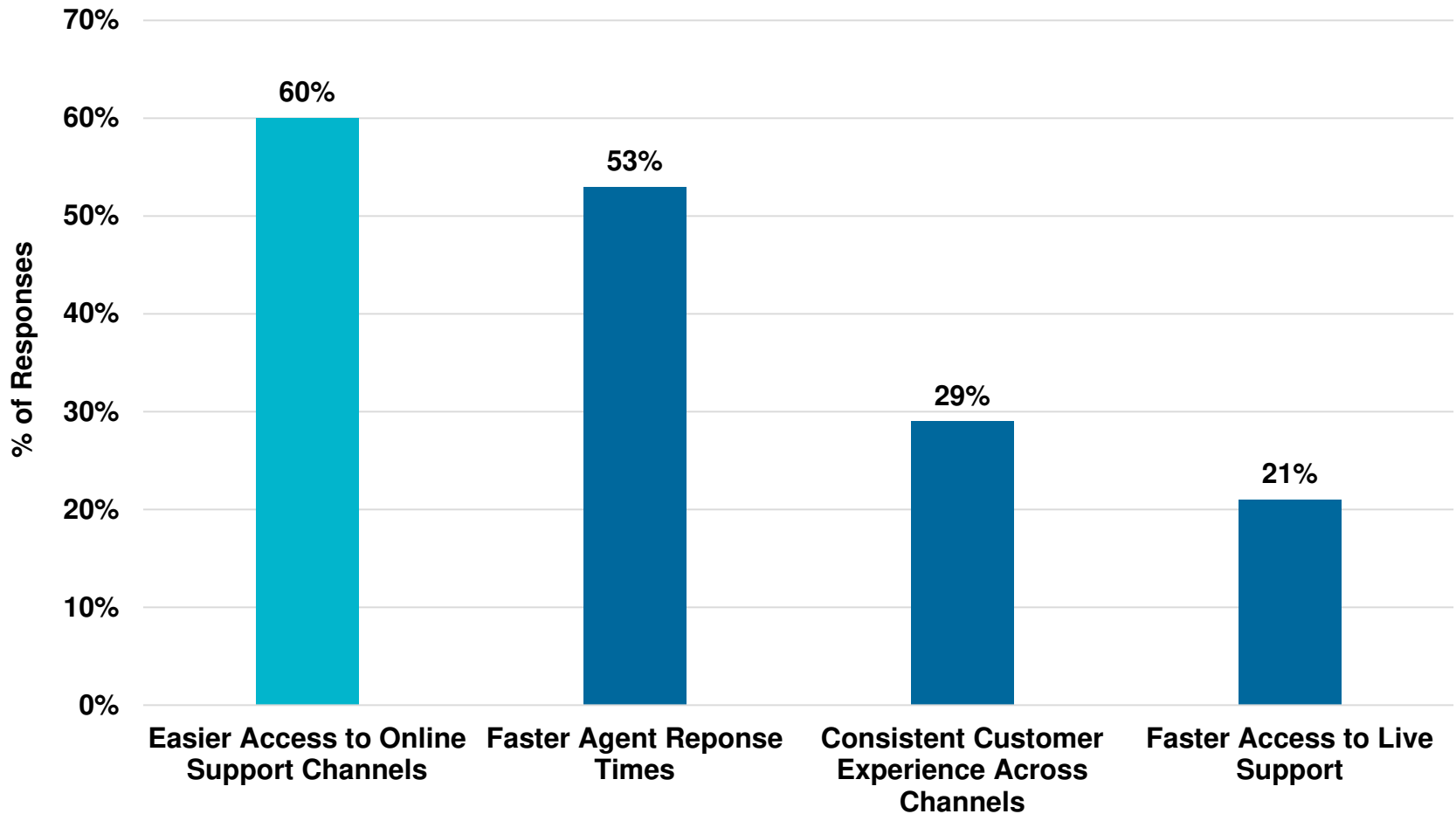
*Bars Rising =*

*Owing to Social Media*



# Social Media = Can Provide Opportunity to Improve Customer Service...

*If you could choose two things for organizations to improve in customer service, what would they be? (Select two), 8/16*



Source: Ovum Get It Right: Deliver the Omni-Channel Support Customers Want (8/16)  
Note: Survey of consumers ages 18-80 in Australia, Europe, New Zealand, and USA, n=400.

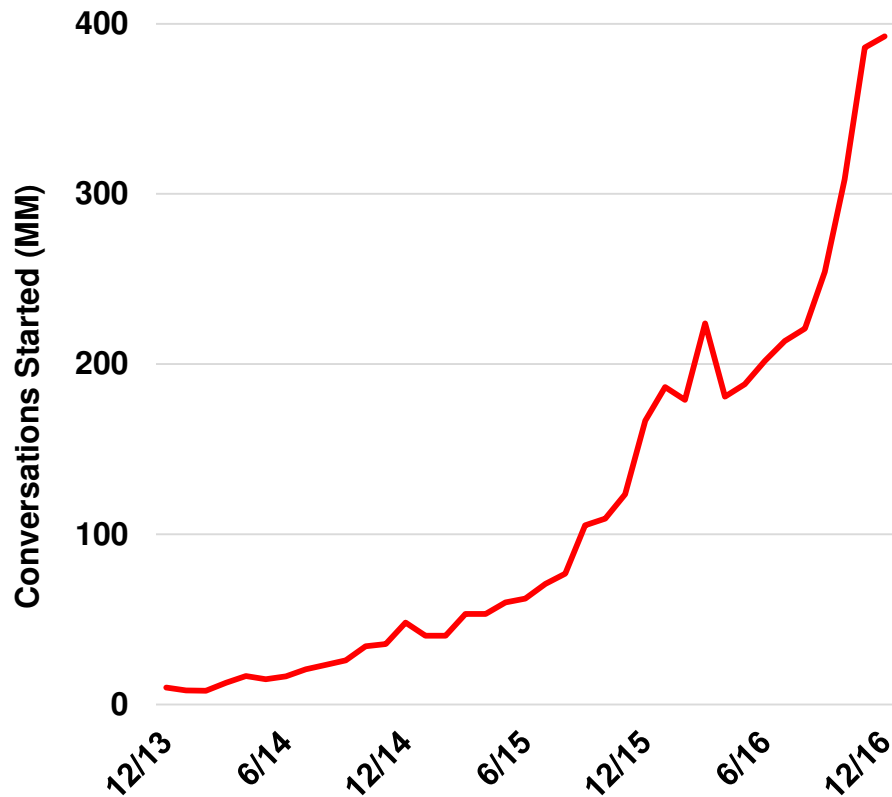
# ...Social Media = Can Drive Accountability...

**82% of Customers Stopped Doing Business with a Company  
After Bad Experience vs. 76% in 2014, 8/16**

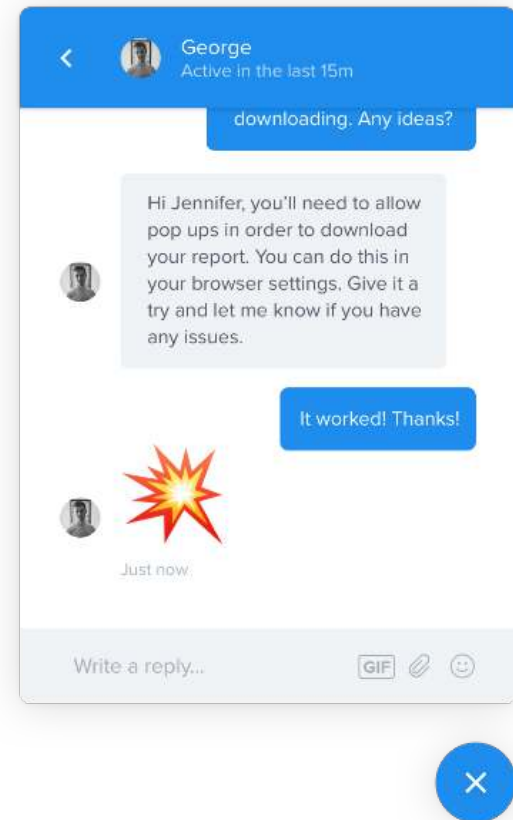


# ...Real-Time Online Customer Conversations = Rising Rapidly...

## Intercom Conversations Started, Global, 12/13-12/16



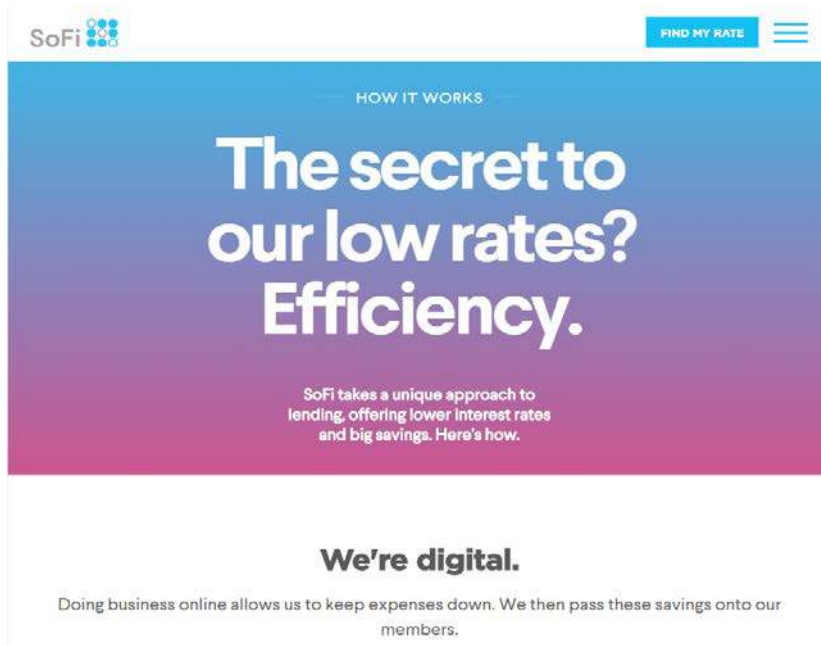
## Intercom Simple + Engaging UI



# Customers = Increasingly Expect to Understand How Things Work

## SoFi 'How It Works'

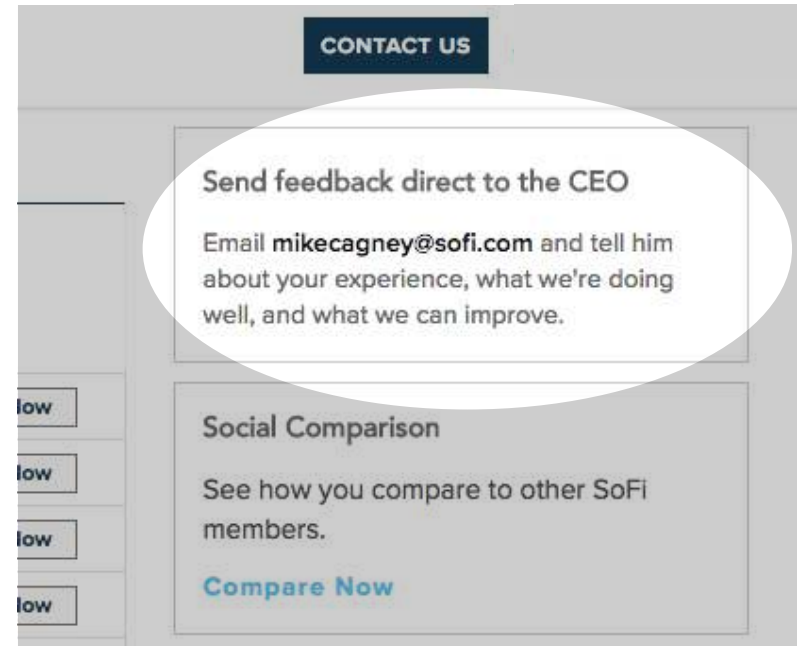
Most Viewed Content, After Home Page



The screenshot shows the SoFi 'How It Works' page. At the top left is the SoFi logo, and at the top right is a 'FIND MY RATE' button with a menu icon. The main content area has a blue-to-purple gradient background with the text 'HOW IT WORKS' in small letters, followed by 'The secret to our low rates? Efficiency.' in large white font. Below this, a smaller paragraph reads: 'SoFi takes a unique approach to lending, offering lower interest rates and big savings. Here's how.' At the bottom, there is a section titled 'We're digital.' with the text: 'Doing business online allows us to keep expenses down. We then pass these savings onto our members.'

## SoFi Member Dashboard

Send Questions Directly to CEO



The screenshot shows a SoFi Member Dashboard. At the top right is a dark blue 'CONTACT US' button. Below it, a white oval highlights a section titled 'Send feedback direct to the CEO' with the text: 'Email [mikecagney@sofi.com](mailto:mikecagney@sofi.com) and tell him about your experience, what we're doing well, and what we can improve.' Below this is a 'Social Comparison' section with the text: 'See how you compare to other SoFi members.' and a blue 'Compare Now' link. On the left side of the dashboard, there are several 'low' labels next to input fields.

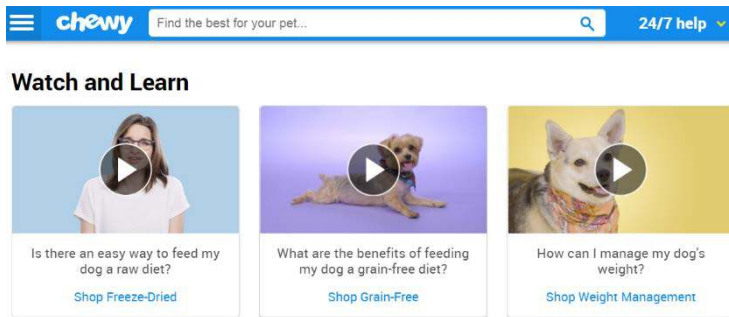
# *Retailers Emerging With Especially Effective Strategies...*

# Chewy.com = Pet Treats / Food / Supplies... Strong User Community + Great Target Market

## Engaged Community + High Customer Satisfaction

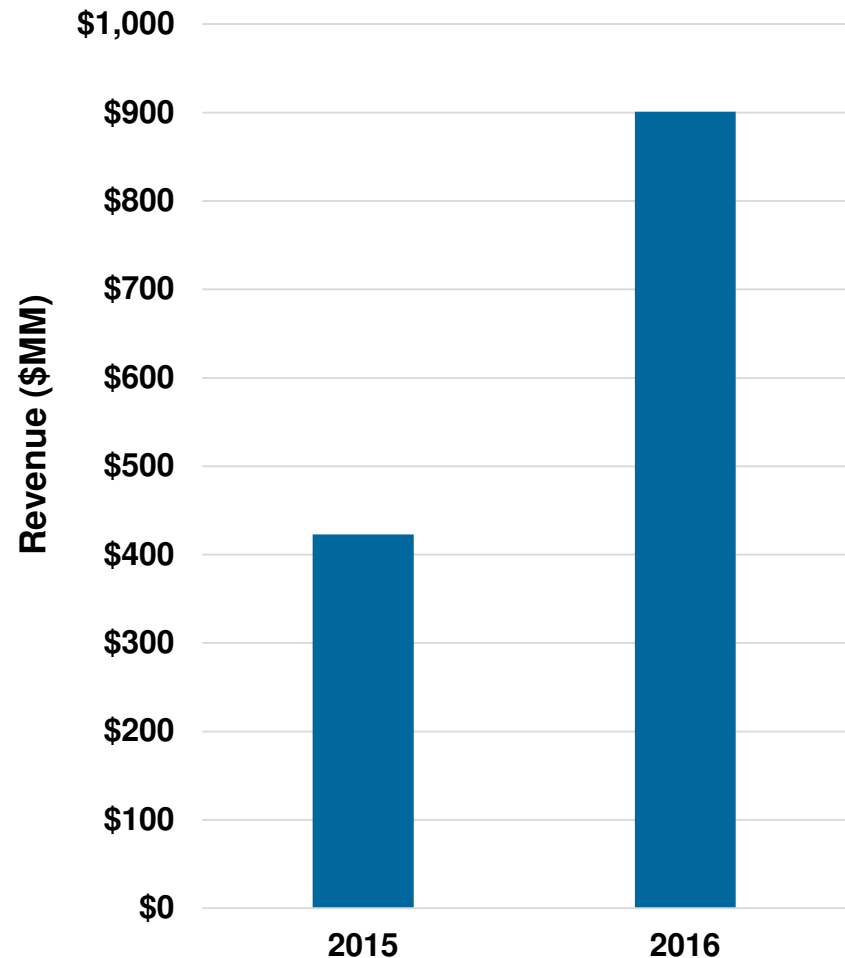


## Dynamic Customer Service



Source: Chewy.com

## Strong Revenue Growth

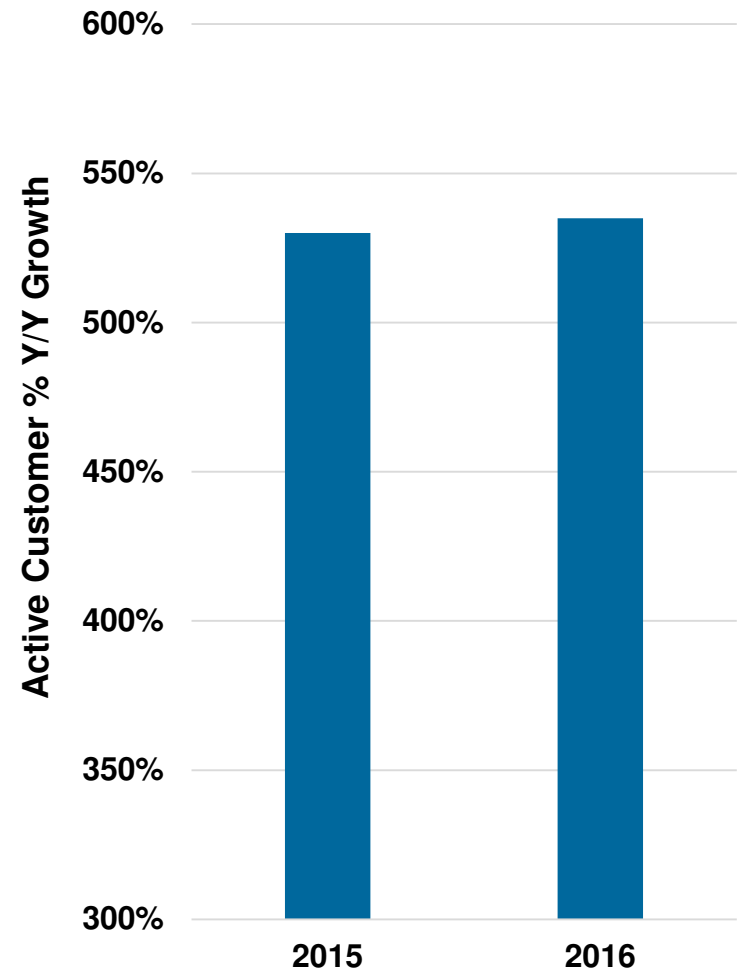


# Glossier = Skincare & Beauty Products... Content Marketing

## User Generated Content = Influencers



## Accelerating Active Customer Growth



## 'Into the Gloss' = Content Marketing



Source: Glossier, Top Left Image: Instagram user genius\_hotel, Bottom Left Image: Glossier

# UNTUCKit = Shirts...

## Online-Offline Synergies in Marketing + Merchandising

### Digital-Physical Feedback Loop

Deliberate Branding + Clear Messaging @ Core

### Offline Engagement

Direct Touchpoints in Physical World

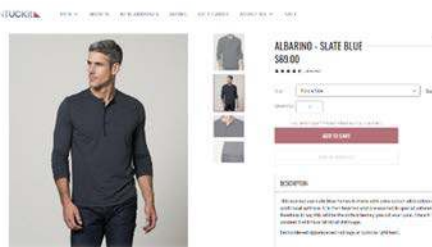


# UNTUCKit



### In-Store Interactions

Intimacy + Active Dialogue

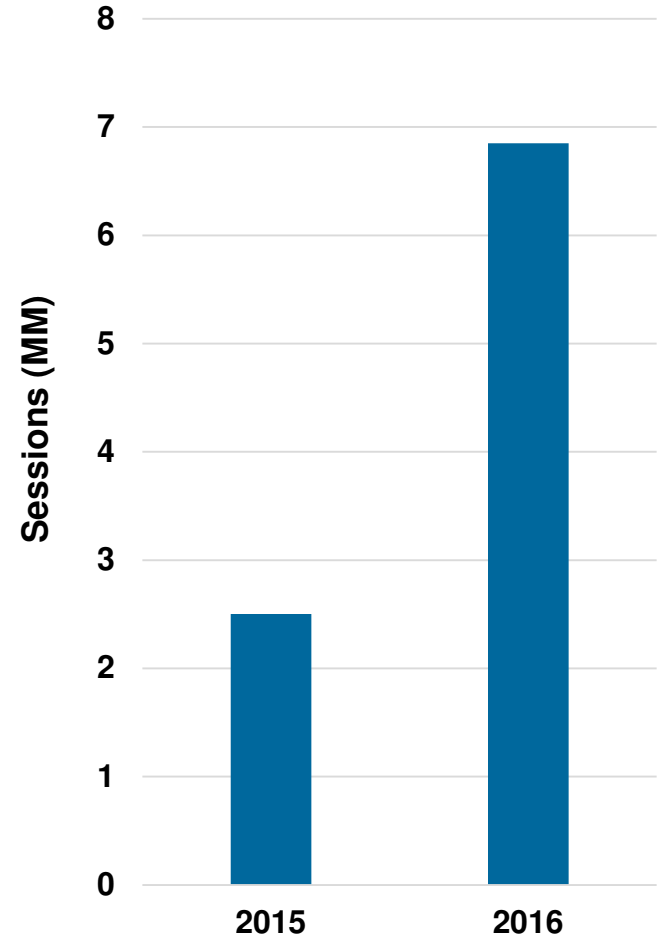


### Online Storefront

Digital Merchandising Insights

### Online Sessions

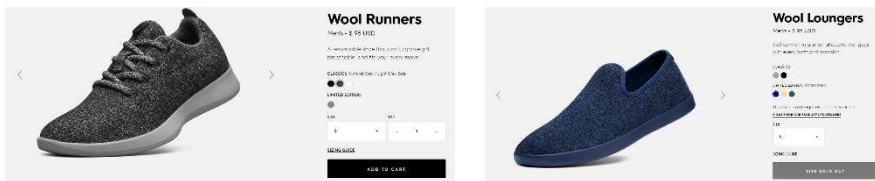
Up >2.5x Y/Y





# Allbirds = Shoes... Innovative Product + Simple Choice (Less Selection = More)

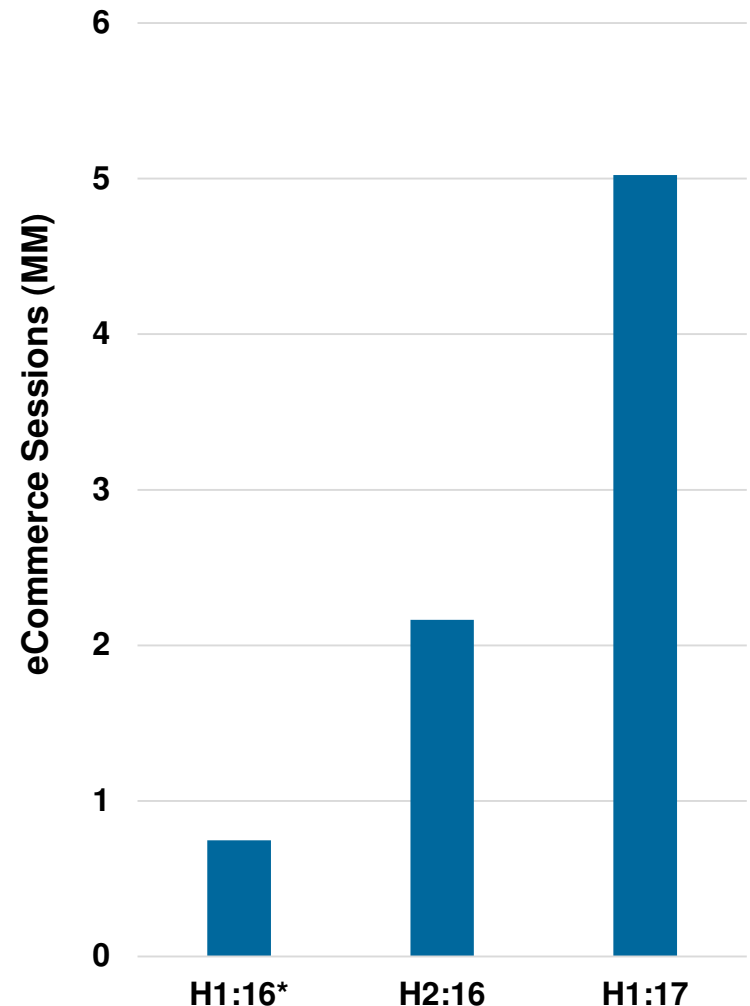
## Two Comfortable, High Quality Styles



## Product Changes Based on Customer Input



## Growing eCommerce Sessions



# Trendyol = Apparel...

## Private Label + Local Sourcing for Local Consumers (Middle East)

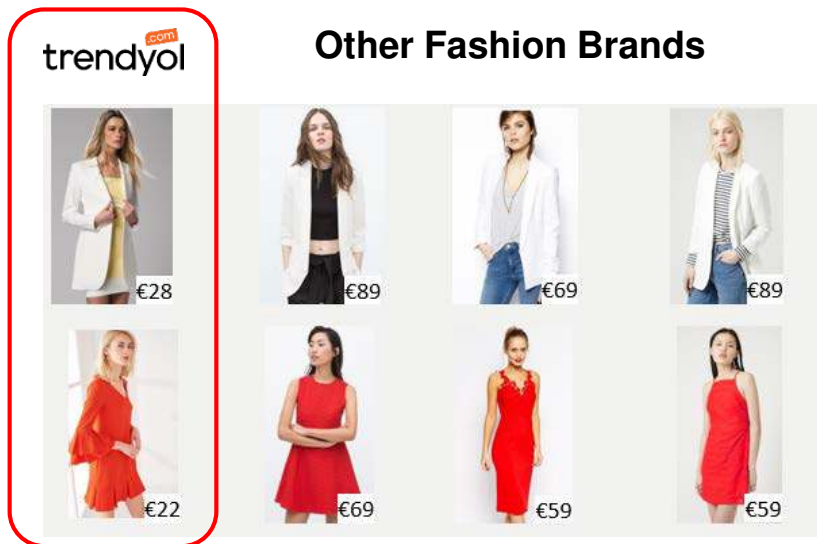
### Private Label + Local Sourcing

Low Prices + Short Lead Times

~1K Suppliers 50km from Trendyol HQ

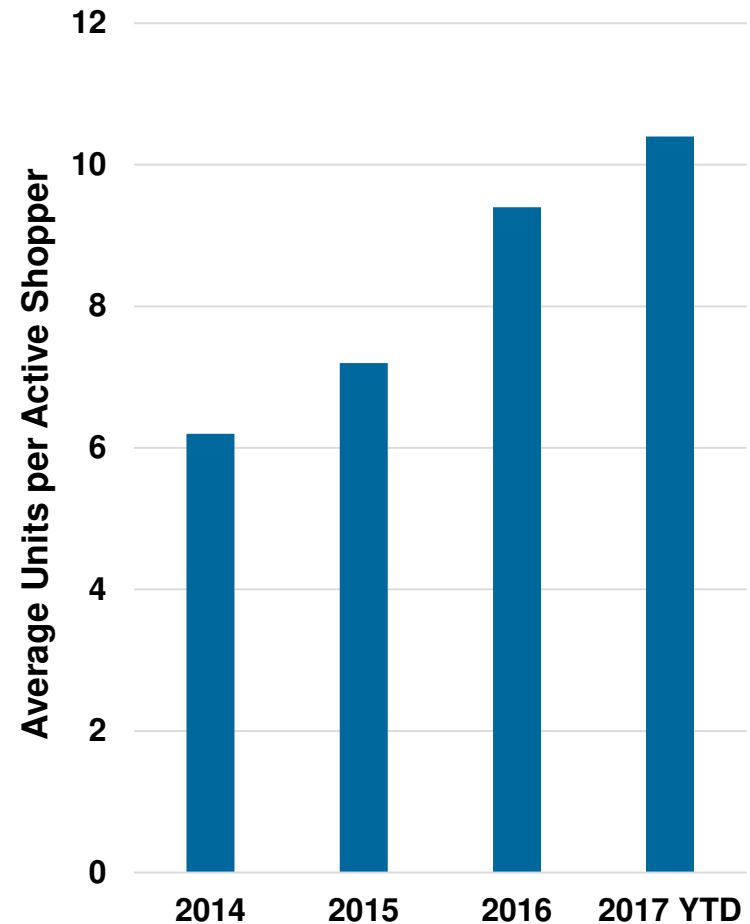
Fast Replenishment (7-10 days)

Private Label @ 38% of Revenue



### High Purchase Re-Engagement

Items Purchased per Shopper Continue to Rise



# MM.LaFleur = Women's Professional Wardrobe... Relationship-Driven Experience (Online & Offline)

## Wardrobe Survey Algorithmic Optimization

What's your typical weekday dress code?

Business Formal	Business Casual
Casual	Fashion-forward



**Bento Box**  
Curated Impressions

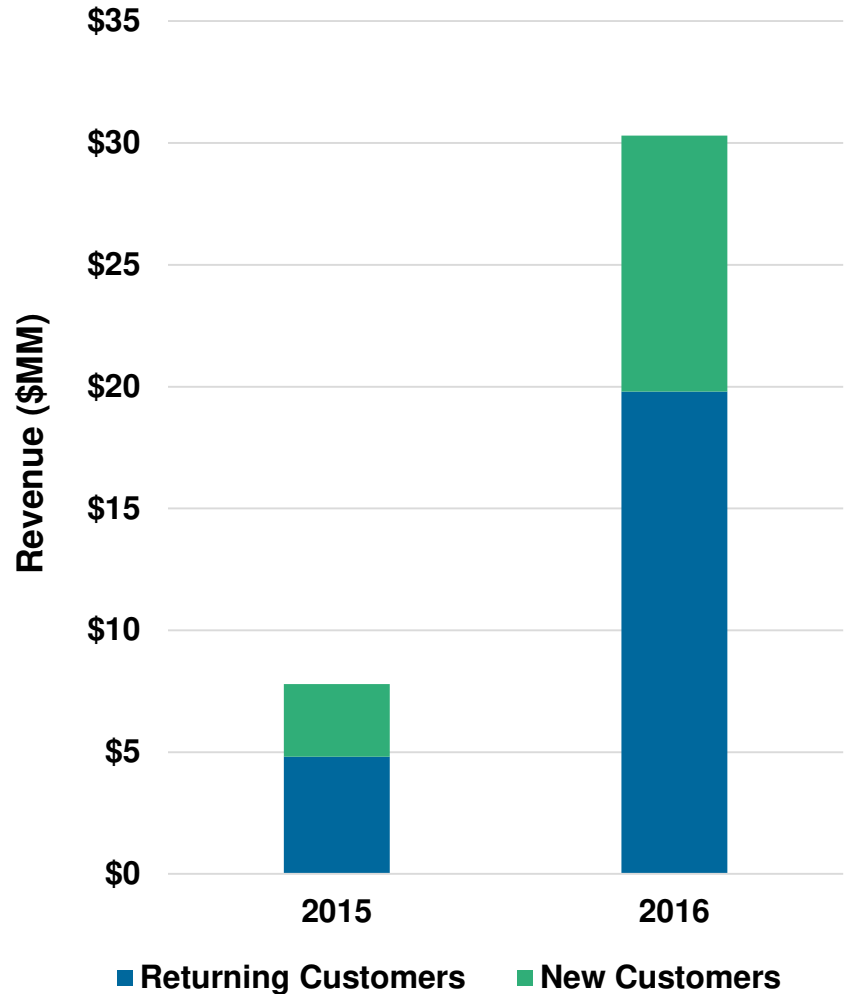
**Online Shopping**  
Ongoing Customer Engagement



**In-Store Stylist Appointments**  
Human Touch + Active Dialogue



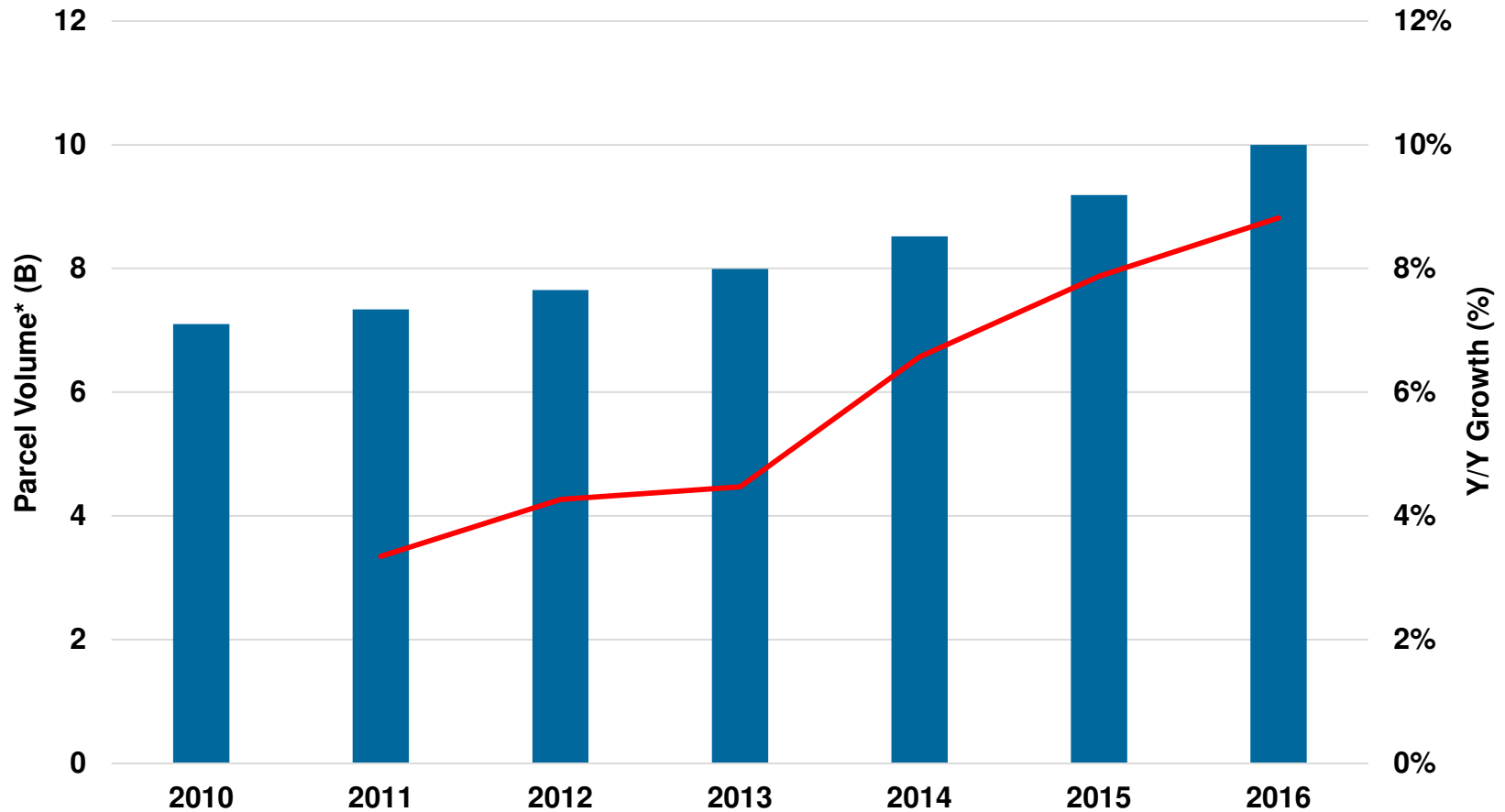
## High Growth + Retention



# *eCommerce A-Ha's*

# If It Seems Like Package / Parcel Growth is Accelerating... It's Because It Is, +9% Y/Y...

## Parcel Volume\*, USA, 2010-2016



# ...Apartment Building Lobbies Becoming Warehouses... Doormen Becoming Foremen...

## Landlords

Expanding Package Rooms to Accommodate Rising Online Order Delivery





# ...Unwrapping Boxes... Becoming Entertainment...

## Unboxing YouTube Top 5 Channels = 33MM+ Subscribers, 5/17



# ...Eating Out is... Increasingly Eating In...

## Top 10 DoorDash San Francisco Bay Area Restaurants

Delivery as % of Revenue = 7% vs. 2% (2015)  
Revenue Growth = +45% Y/Y vs. 10% (2015)

### Eating Out



### Eating In

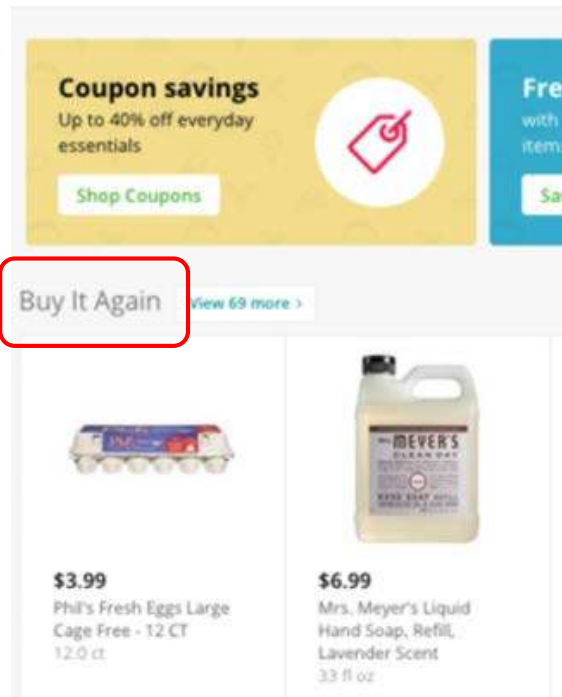




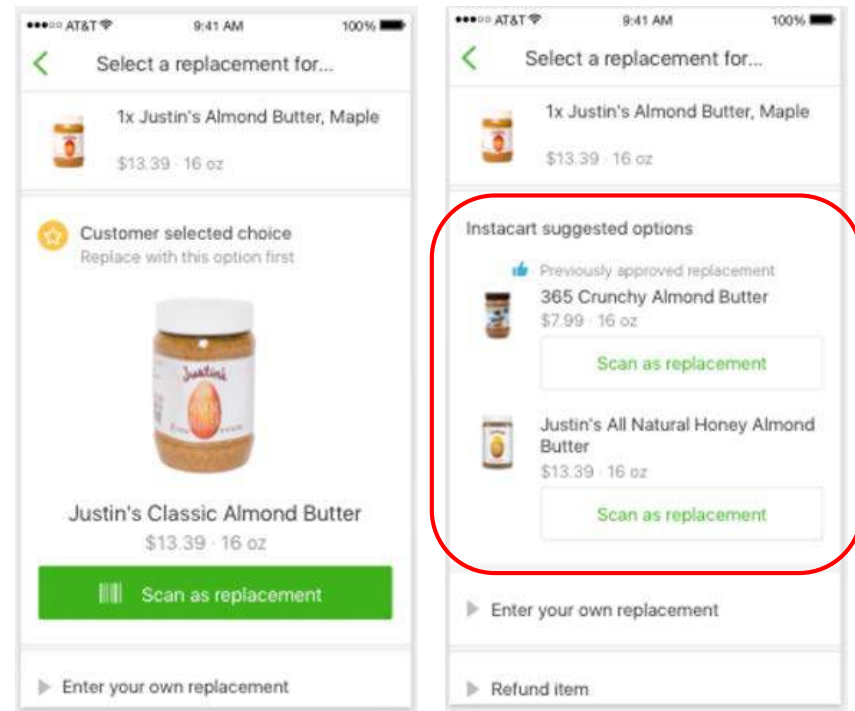
# ...Grocery Shopping... Getting Personal / Fast / Easy...

## Instacart = Personalized Grocery Recommendations

**8x More Likely to Buy**  
When Prompted with  
'Buy It Again' Option



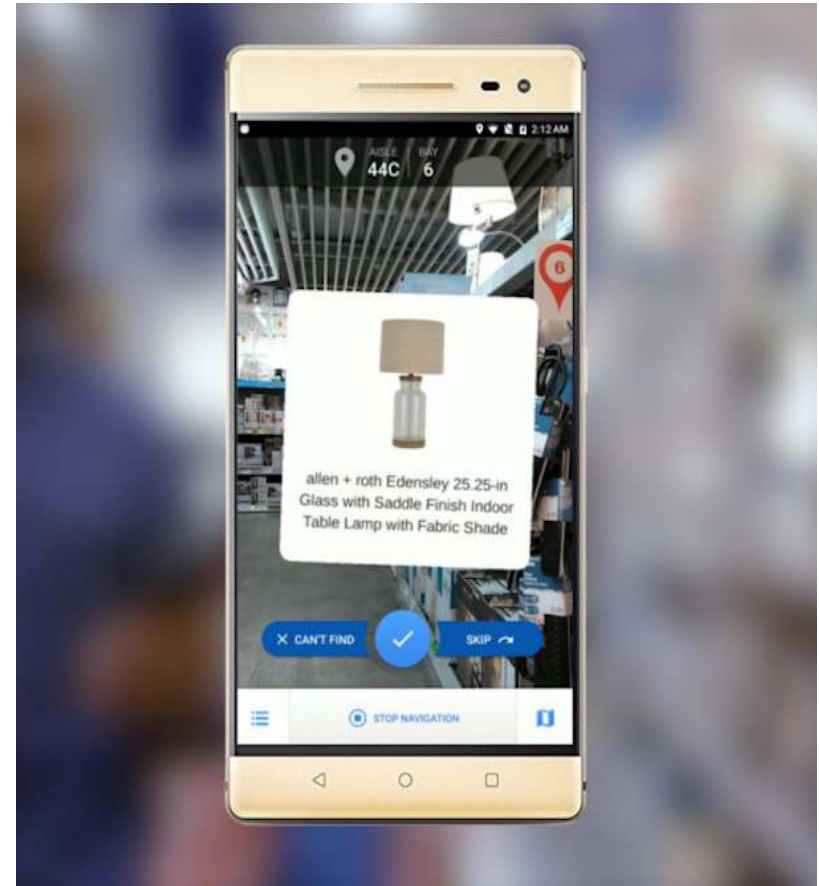
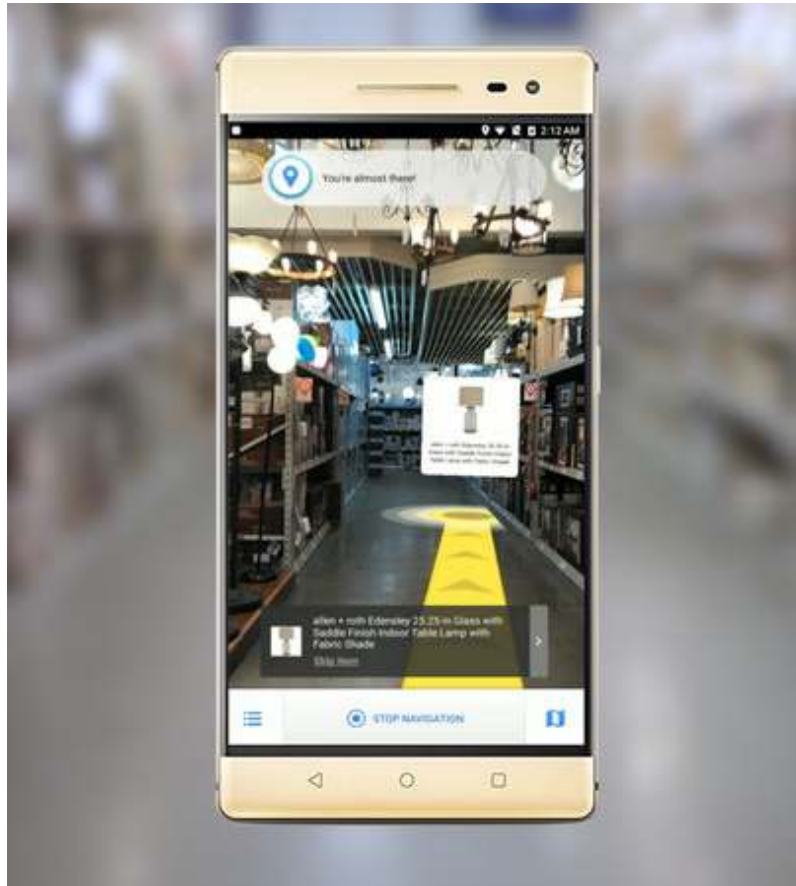
**85% of In-Store Replacements...**  
Chosen Based on Algorithmic Recommendations



# ...Lowe's Doing Augmented Reality... Helping Consumers Find Products In-Store...

## Lowe's / Google Partnership

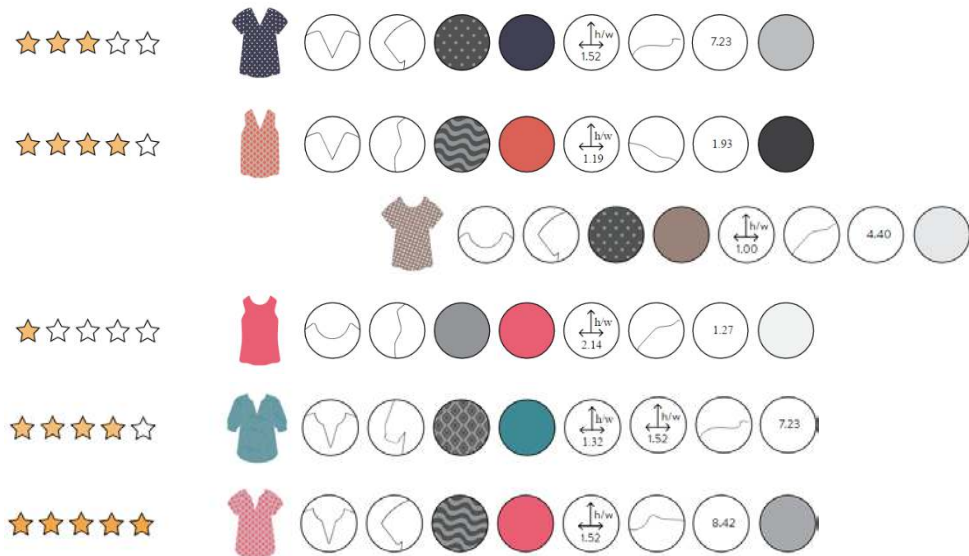
Guides Customers to In-Store Items via Augmented Reality on Mobiles, 3/17



# ...Stitch Fix Launching Another Private-Label Clothing Brand &... It's Computer-Generated (1% of Products for Now)...

## Product Attributes + Customer Feedback + Data Science / Testing

New Style, 5/17

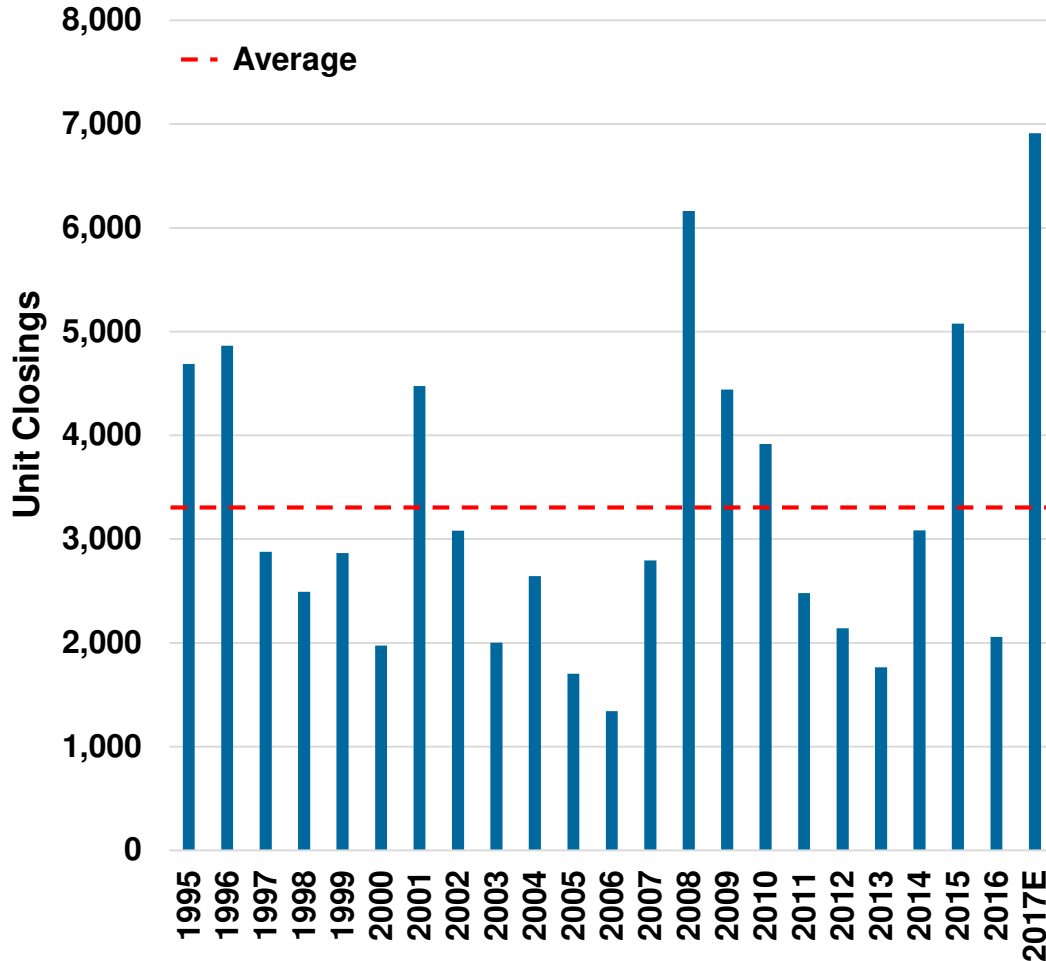


## Cassie Crochet Detail Top



# ...Retail Store Closings May Break 20 Year Record While... Amazon Opens Retail Stores...

## Retail Unit Closings, USA, 1995-2017 YTD



Source: Credit Suisse, Amazon  
 Note: 2017 is YTD as of 4/6/17. 2017 estimate per Credit Suisse.

## Amazon Looks to Expand its Physical Footprint





# ...Digitally Native Brands = Go Offline...

*I don't think retail is dead. Mediocre retail experiences are dead.*

- Neil Blumenthal, Co-CEO @ Warby Parker, 1/17

**Warby Parker**  
Schedule Eye Exams...Buy Glasses



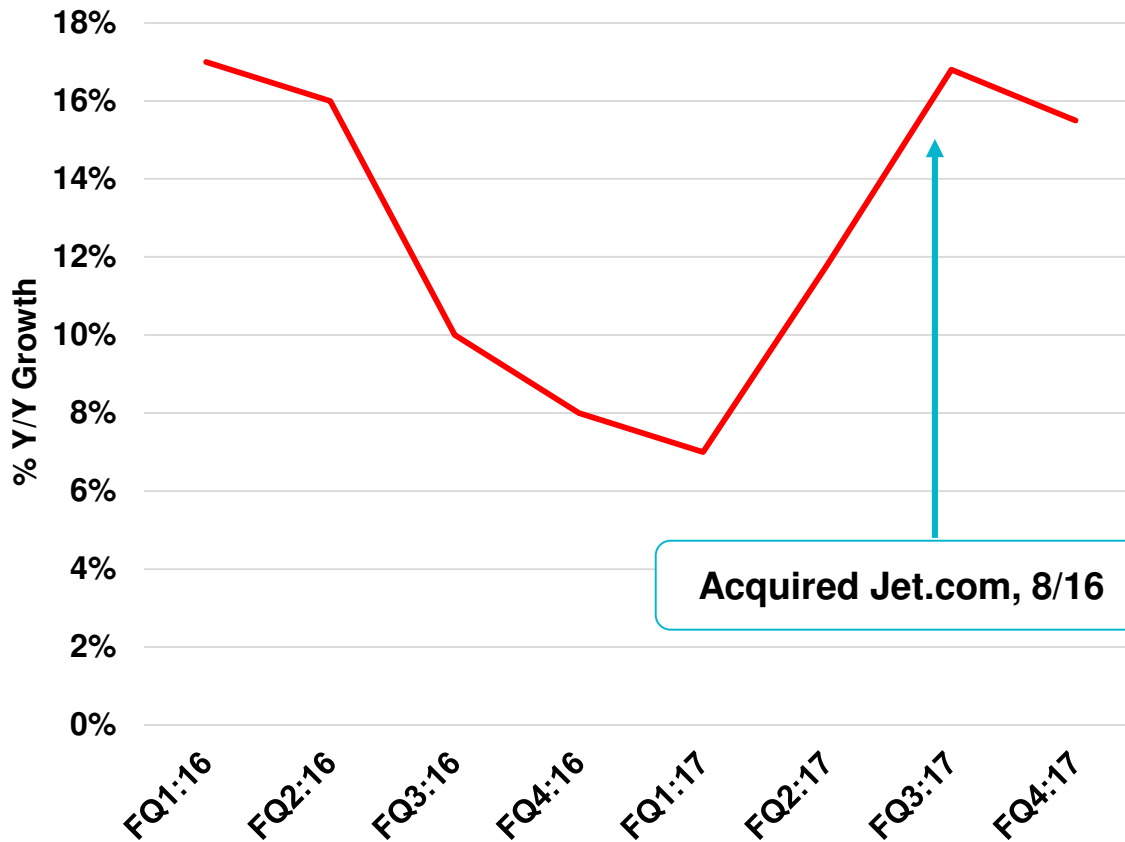
**Bonobos Guide Shops**  
Try On In-Store...Ship to Home



# ...World's Largest Offline Retailer (Wal-Mart)... Getting Aggressive Online...

**90% of Americans Live Within 10 Miles of a Wal-Mart**

**Wal-Mart eCommerce Revenue Y/Y Growth, Global**



## Organic + Inorganic Growth

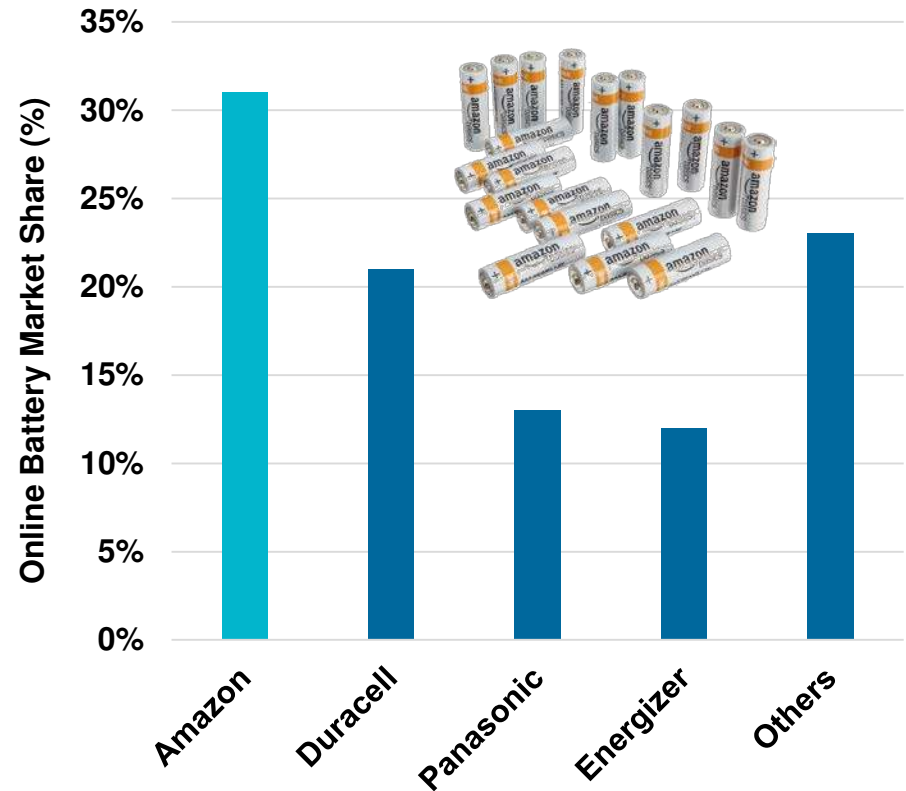
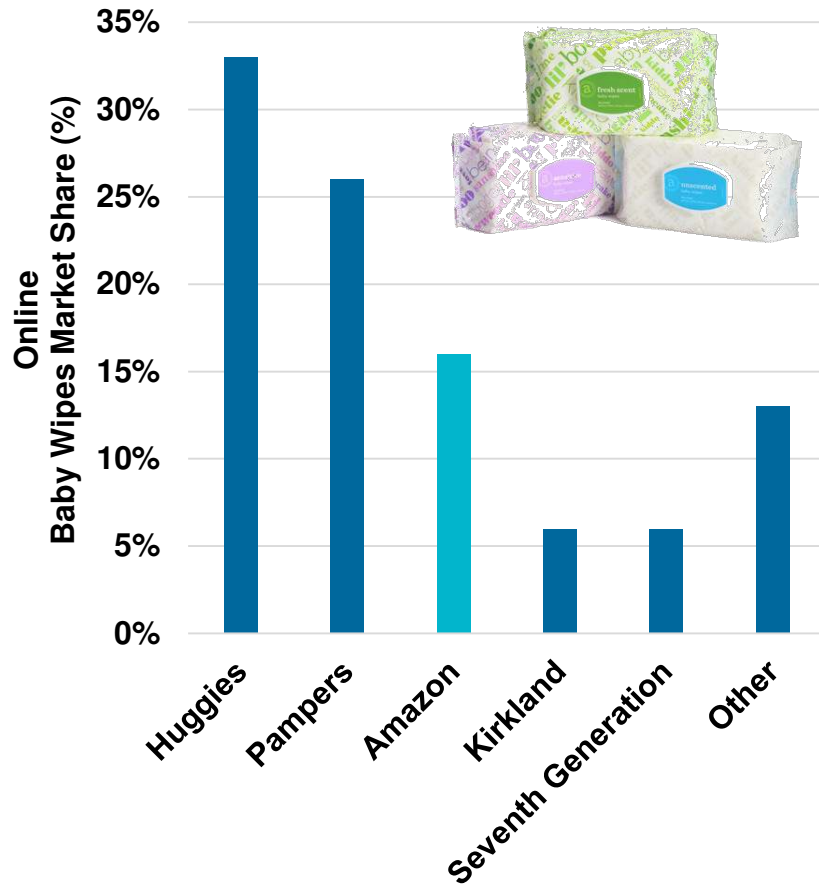
FQ1:18 eCommerce Revenue Growth @ 63% Y/Y vs. 29% FQ4:17, USA

## Recent Acquisitions & Investments

Modcloth.com, 3/17  
Moosejaw, 2/17  
JD.com (Increased to 12%), 2/17  
Shoebuy, 1/17

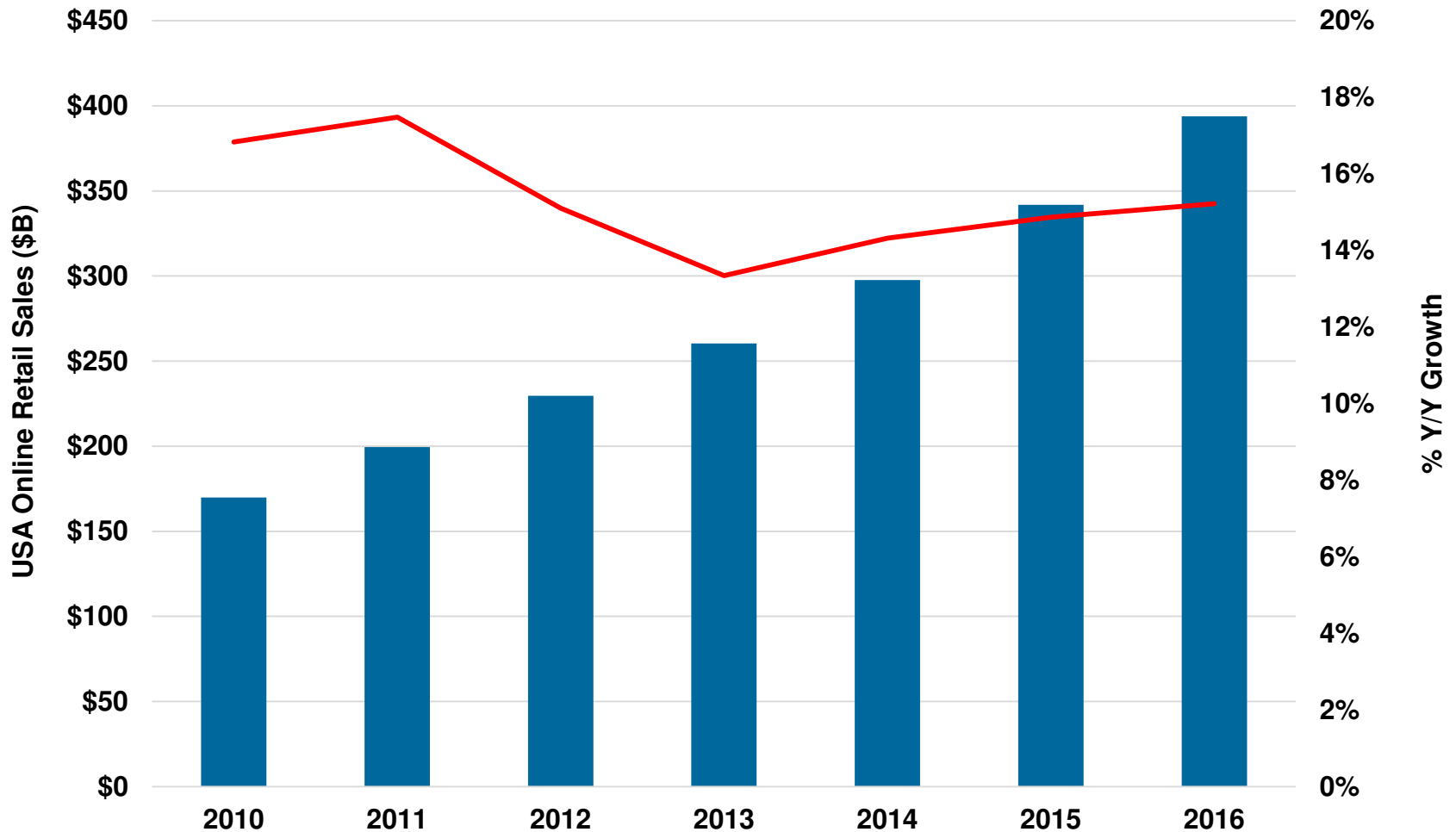
# ...Amazon Becoming a Leading Private-Label Supplier of... Baby Wipes + Batteries, USA...

## Amazon Basics Market Share, 8/16 USA



# ...eCommerce Growth = +15% Y/Y... Accelerating, Again, USA...

## Online Retail Sales vs. Y/Y Growth, USA 2010-2016



Source: St. Louis Federal Reserve FRED Database



# ...And Now We Have a New Kind of Store = A Subscription Store

## Amazon Subscription Store = Central Hub for Monthly Services, 4/17



Source: Amazon

***More / Faster Than Ever =***

***Great Products Find Customers...  
Customers Find Great Products...***

***Process + Data Collection + Intermediaries =  
Changing @ Torrid Pace...***

# Online Advertising (+ Commerce) = Increasingly Measurable + Actionable

- 1) **Ad Growth** = Driven by Mobile
- 2) **Ad Measurability** = Can Be Triple-Edged
- 3) **Ads Evolving Rapidly** = Often Organic + Data @ Core
- 4) **Ads** = Becoming Targeted Storefronts
- 5) **eCommerce Growth** = Accelerating, Again
- 6) **eCommerce A-Ha's...**

---

**INTERACTIVE GAMES =**

**MOTHERLODE OF...**

**TECH PRODUCT INNOVATION / EVOLUTION +  
MODERN LEARNING**

*WITH THANKS TO BING GORDON FOR INSIGHT + INSPIRATION*

***Global Interactive Gaming =  
Mainstream / Evolving Rapidly /  
Still Early Days...***

***2.6B Gamers\* vs. 100MM in 1995***

# Gaming Evolution = Individual Play → Global Collaborative Play (1967-2017)...

**Moore's Law  
(Processing)**

**Zuckerberg's Law\*  
(Sharing)**

**1 Player =  
Arcade**

**2 Players =  
Consoles**

**2+ Players =  
Consoles +  
LAN**

**Millions of  
Players =  
Online  
Network**

**Millions of  
Players +  
Spectators =  
eSports**



**Solo – Living Room...**

**...Many – Arena (Thousands)...  
Online (Millions)**



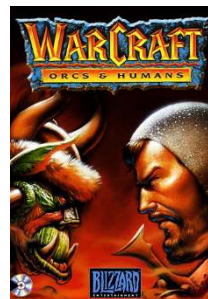
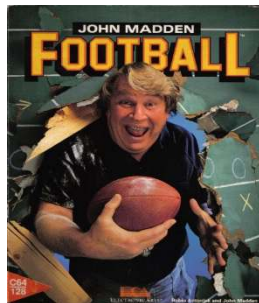
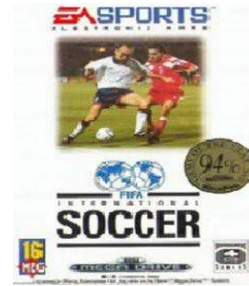
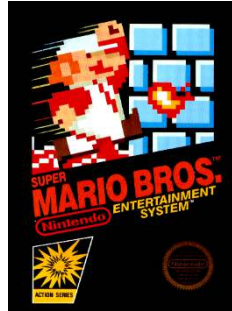
**45 Years**



# ...Gen X + Millennials = Gamified Since Birth

## Gen X

## Millennials



1970

1980

1990

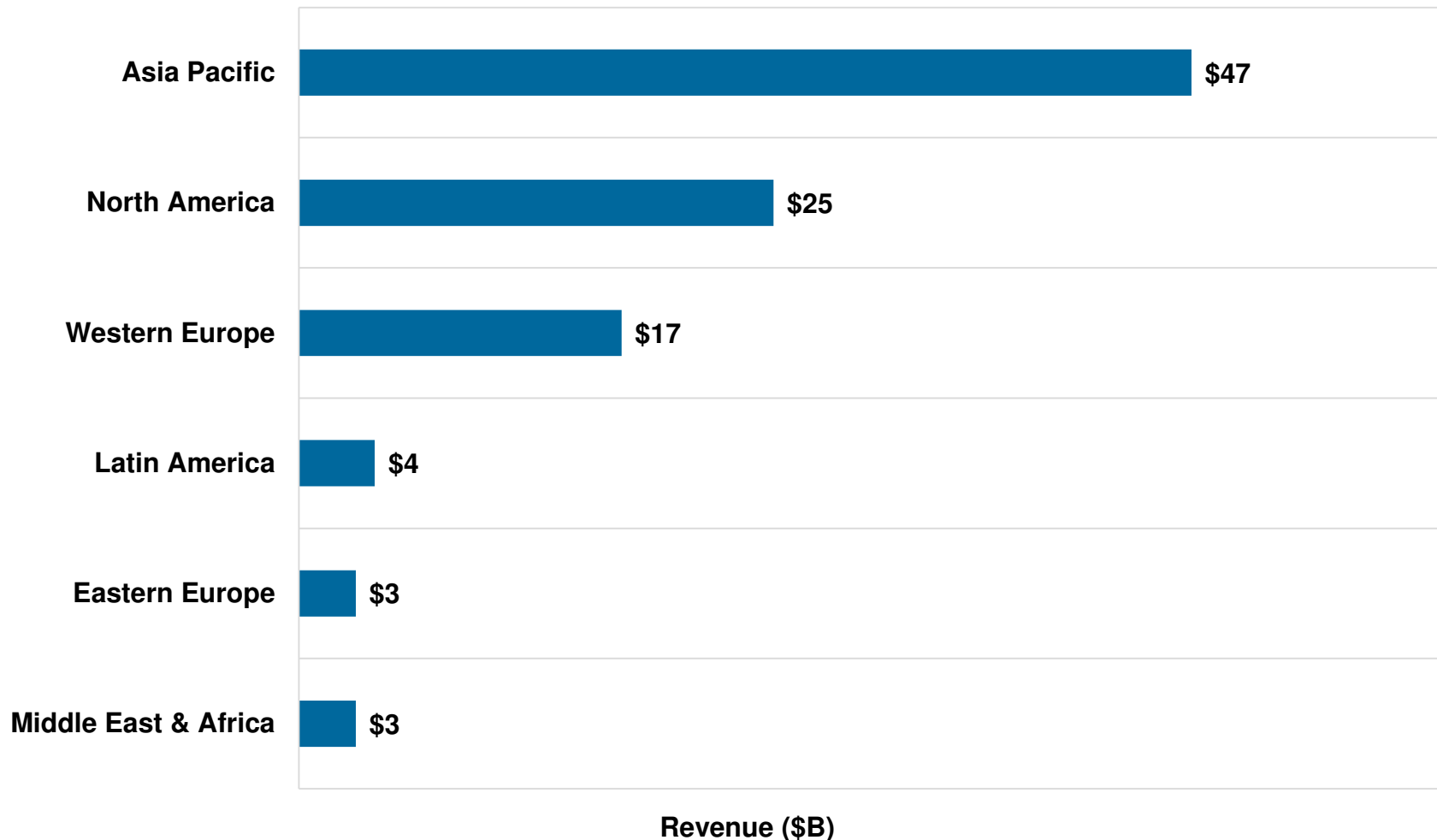
2000

2010

# Gaming = Large + Broad + Growing Business...

## Revenue @ \$100B, +9% Y/Y

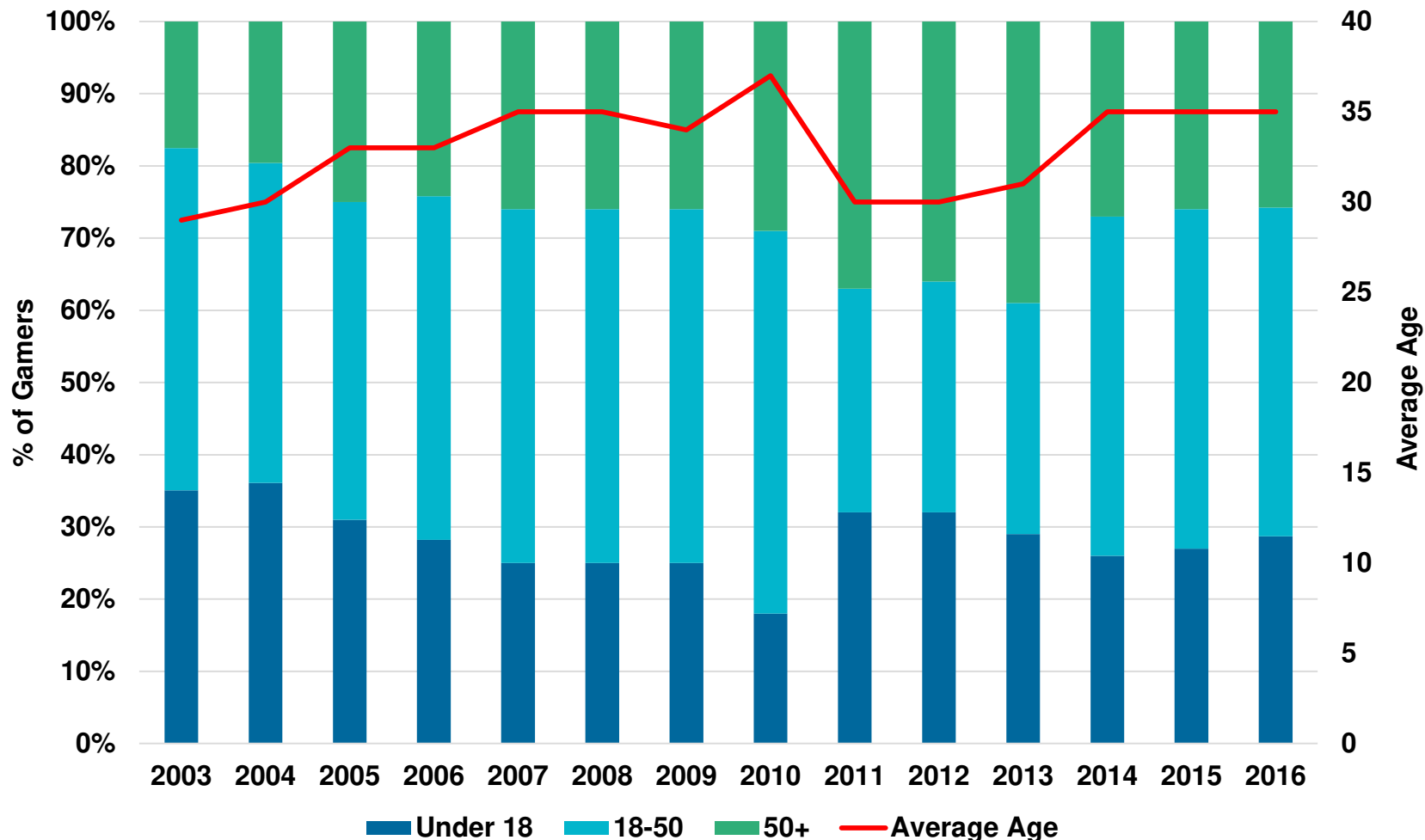
### Interactive Gaming Revenue Estimates per Newzoo, Global, 2016





# Gamers = All Ages... 35 Year-Old Average, USA

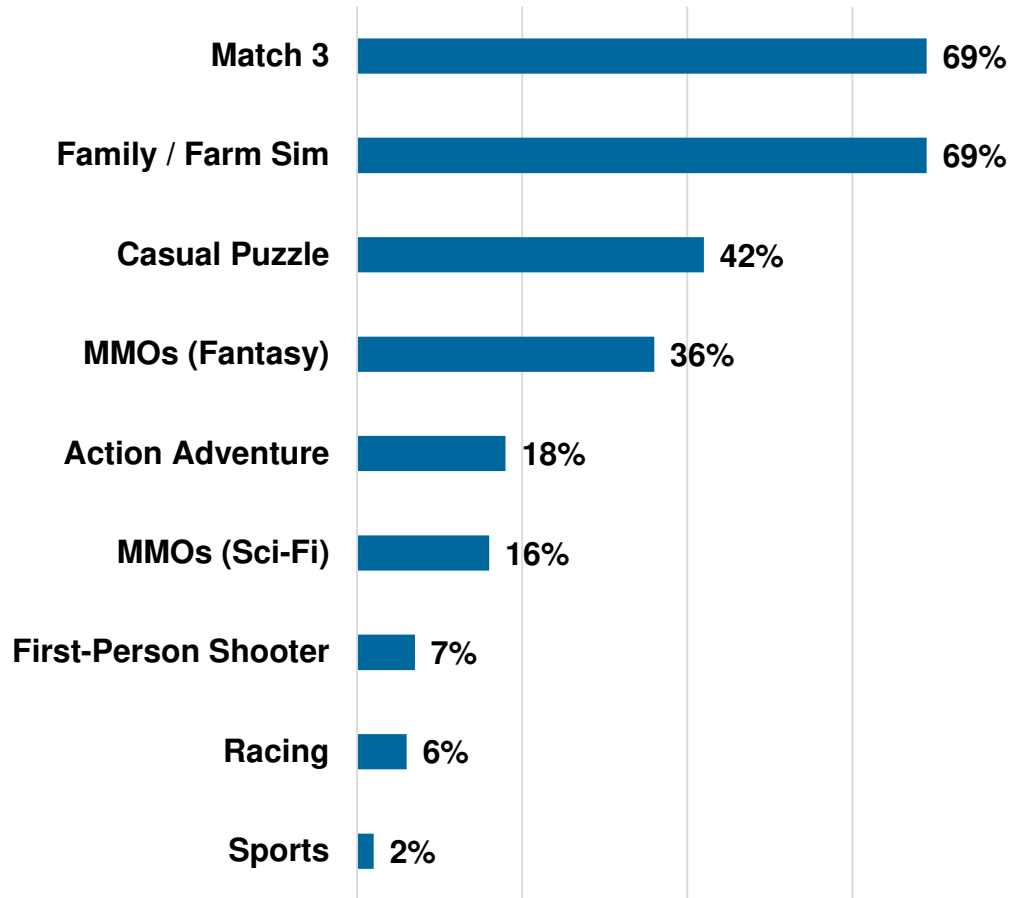
## Gamer Demographics vs. Average Age, USA, 2003-2016



Source: Entertainment Software Association (ESA) Essential Facts About the Computer and Video Game Industry 2003-2016  
 Note: Based on a survey of 4,000 U.S. households.

# Female Gamers = Players Since Early Days But Genres Vary... 2000 (Year) Marked Rise of Casual Female Gamer

**% of Female Players by Game Genre,  
Global, 1/17**



## Match 3

Pioneered by Diamond Mine /  
Bejeweled, 2000



## Family / Farm Sim

Pioneered by Sims, 2000



***Gaming Tools = Pervasive Online...***

***Can Optimize Learning +  
Engagement...***

***Foundational for Internet Services***

# **Gaming Tools =**

## **Can Optimize Learning + Engagement...**

### *Foundational for Internet Services*

*Repetition*

*Dynamic Difficulty Adjustment*

*Solving Puzzles*

*Planning Workflows*

*Completing Projects*

*Leveling Up*

*Competing*

*Exploring / Discovering*

*Following Rules*

*Collaborating – Social Connection / Leadership*

*Observing*

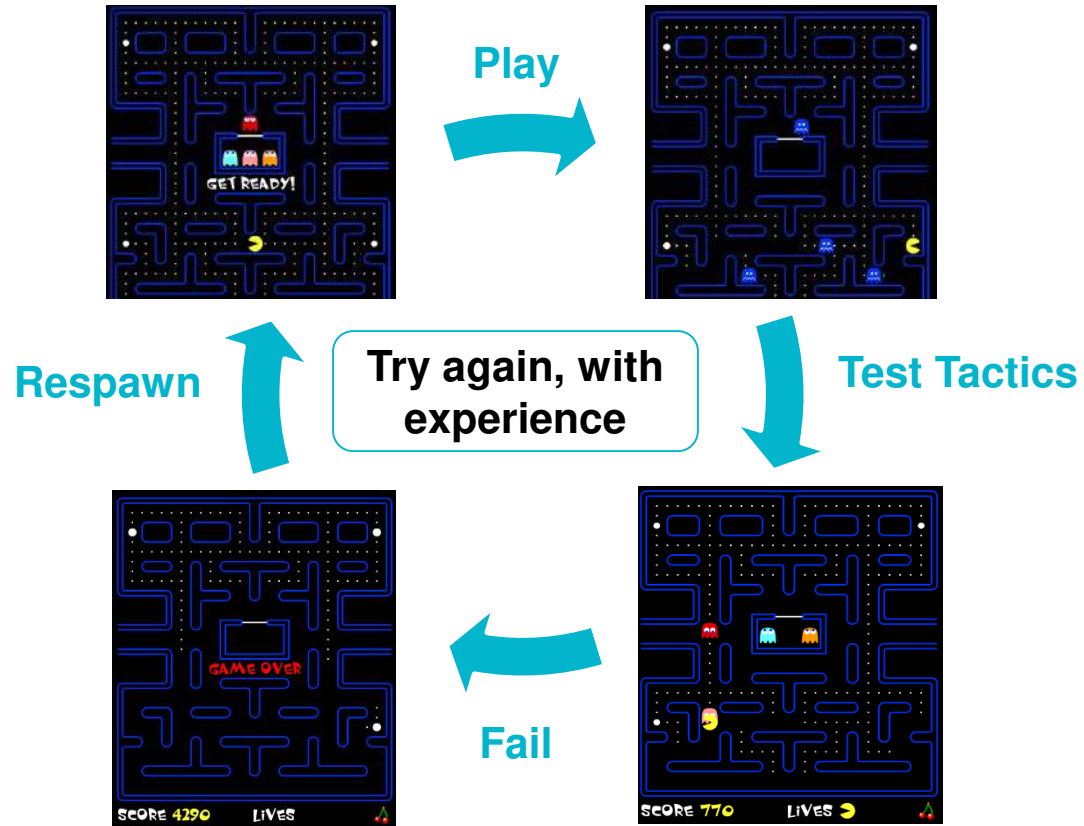
*Interacting With / Analyzing Data*

*Self Optimizing*

*Creative Story Telling*

# Repetition = Learn from Losing...

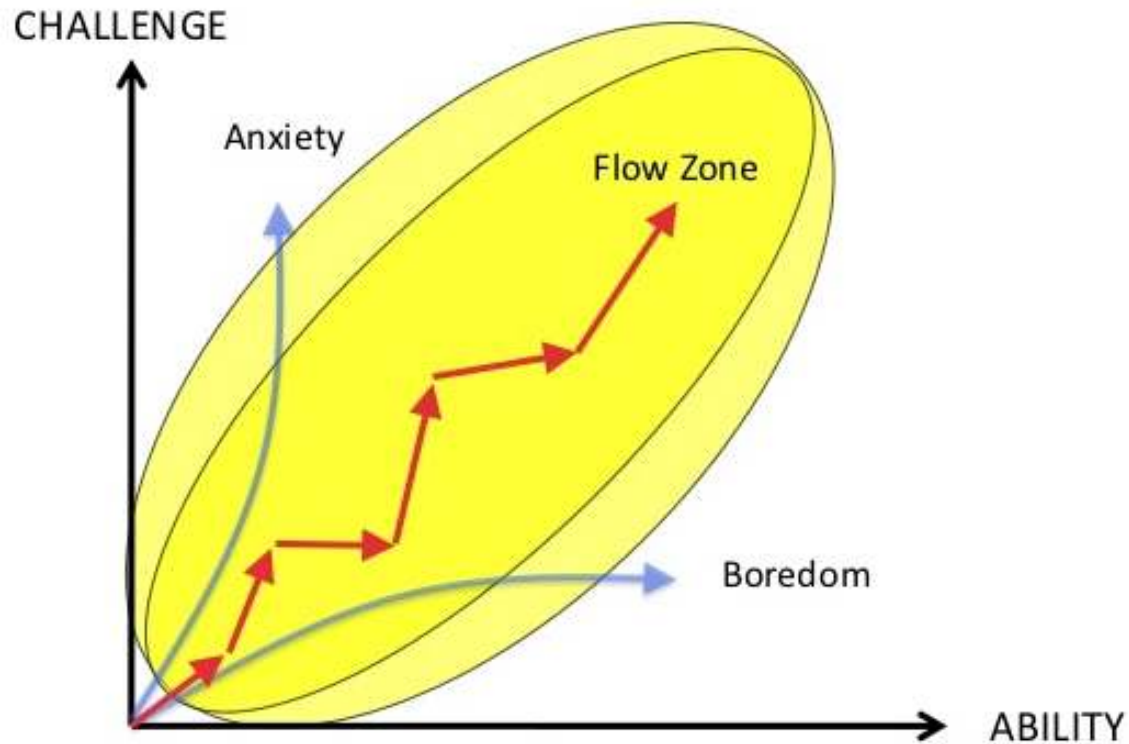
## Trial & Error Gaming Lifecycle



# ...Dynamic Difficulty Adjustment = Ultimate Trial & Error Experience...

## Engaging Learning Process

Machine-Learning Fine-Tunes Gaming Mechanics

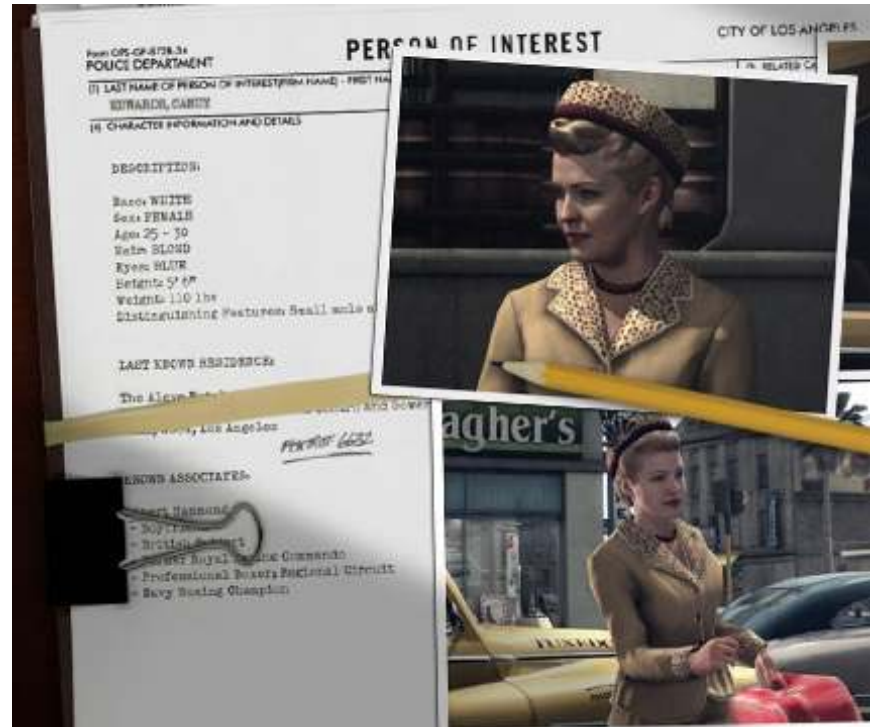


# ...Solving Puzzles = Pattern Recognition + Critical Thinking...

## Defined Rules + Strategy (Short-Form) Minesweeper



## Unstructured Puzzles (Long-Form) L.A. Noire Detective Cases

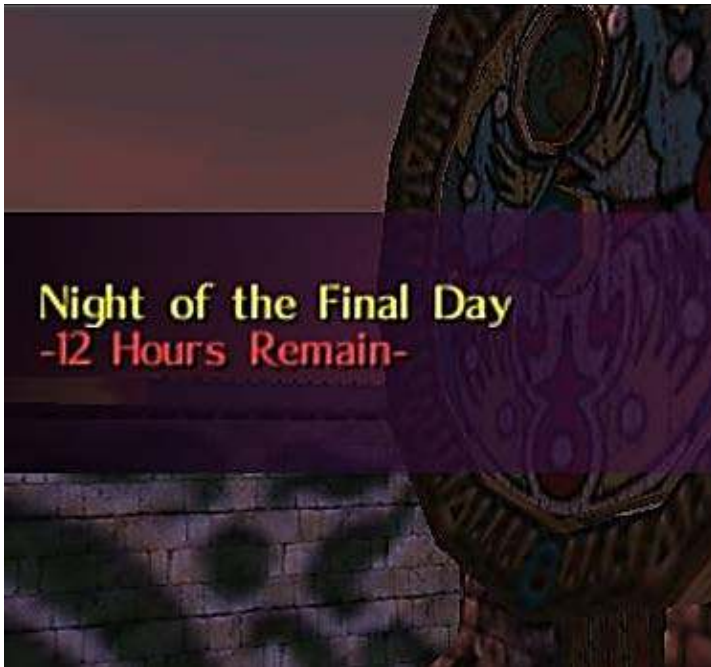




# ...Planning Workflows = Manage Time + Resource Efficiency...

## Time Management

Legend of Zelda: Majora's Mask Quest  
Progress Resets Periodically



## Resource Management

Starcraft II 'Require More Minerals'





# ...Completing Projects = Track Finish Line from Start...

## Focus on End Goal

Pokémon 'Gotta catch 'em all!'



## Track Experience

Skyrim



# ...Leveling Up = On-Going Progress Measurement...

## Leveling Up Candy Crush Saga



Gain Experience Completing Puzzles



## Quantified Mastery Max Level in World of Warcraft



# ...Competing = Play Against Self + Others Sharpens Skills...

## Competing Against Yourself Time Trials in Mario Kart 64



## Competing Against Others Scoring Goals Online in Rocket League

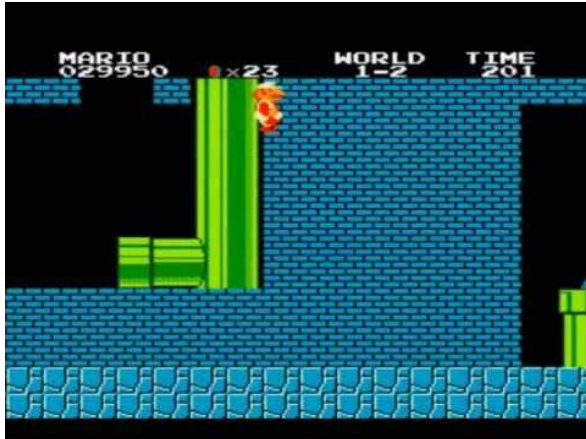




# ...Exploring / Discovering = Open Closed Doors...Hack to Improvement...

## Discovering Glitches

Secret Level in Super Mario Bros



## Discovering Easter Eggs

Silent Hill 2 + Tony Hawk's Pro Skater 2



# ...Following Rules = Structured Play...

*A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.*

- Salen & Zimmerman, Rules of Play: Game Design Fundamentals, 9/03

**Players = Free to Break Rules...**



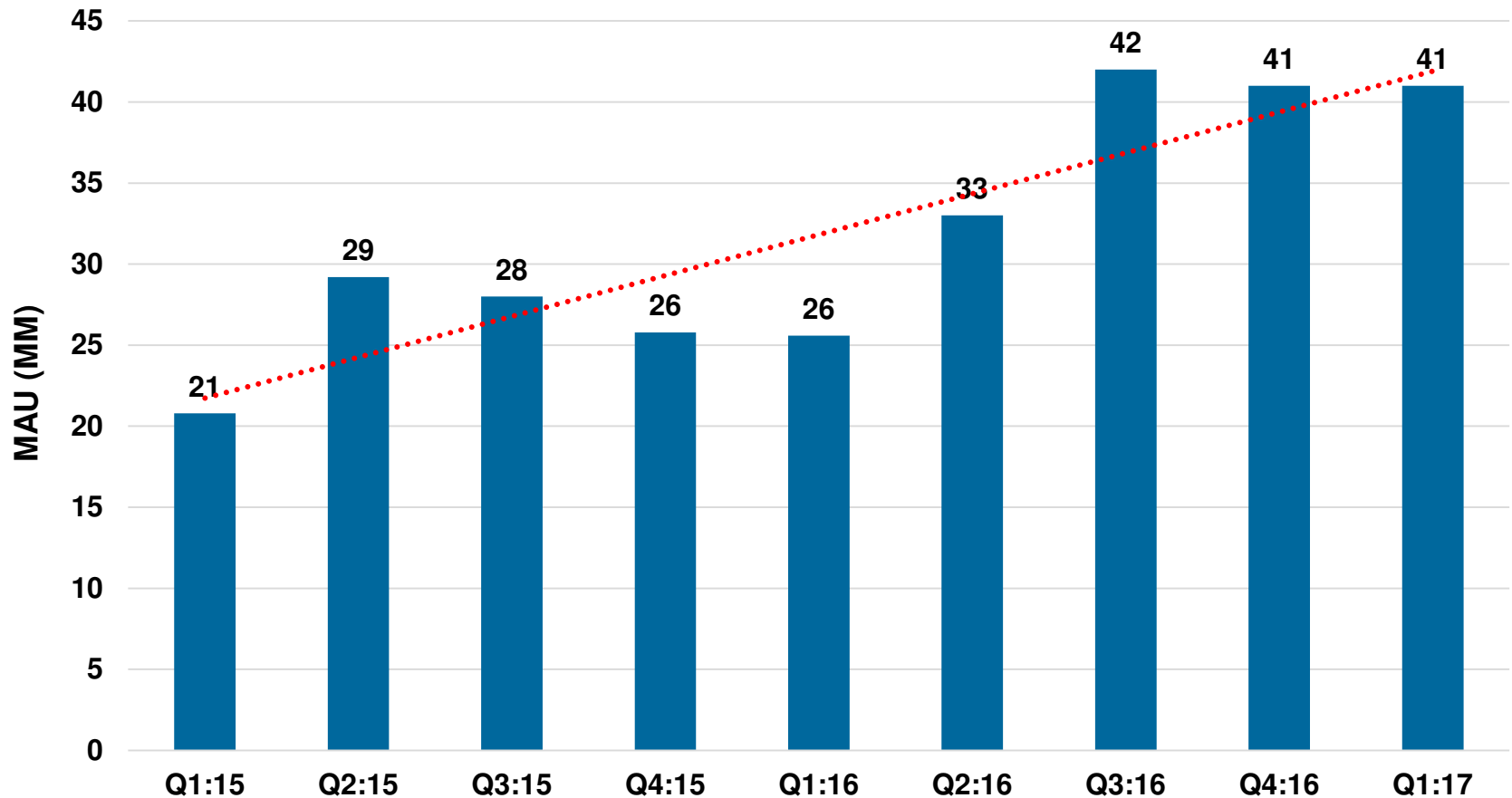
**...But = Consequences**



# ...Collaborating – Social Connection / Leadership = Learn From / Work With Others...

## Blizzard = Millions Playing Together Online, Global

Key Multiplayer Franchises = World of Warcraft + Diablo + Starcraft + Overwatch

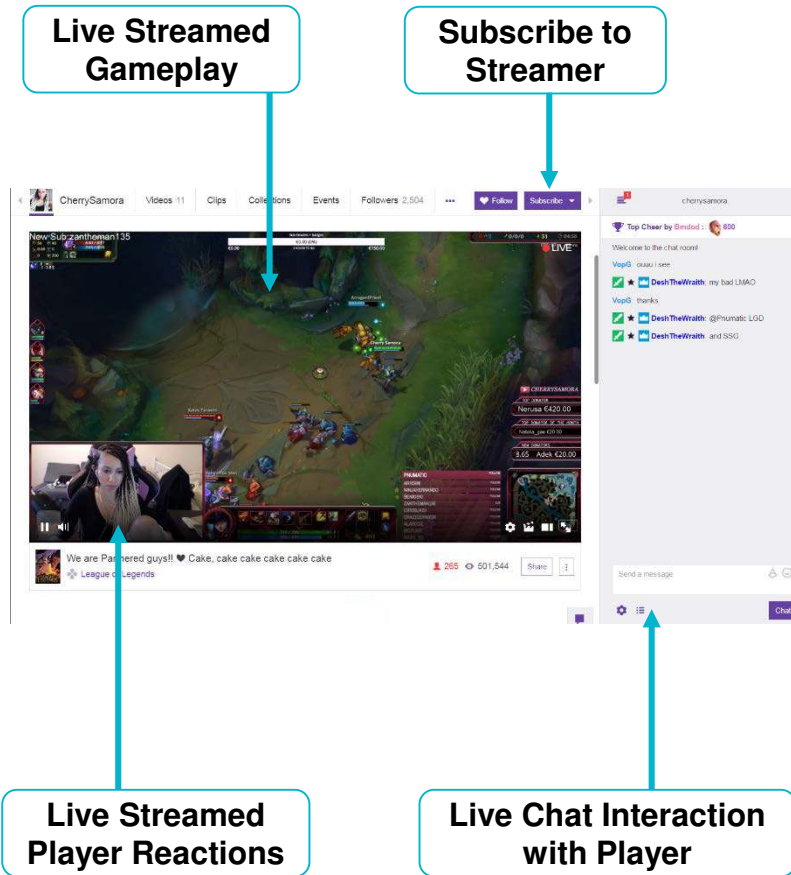


Source: Activision, Morgan Stanley

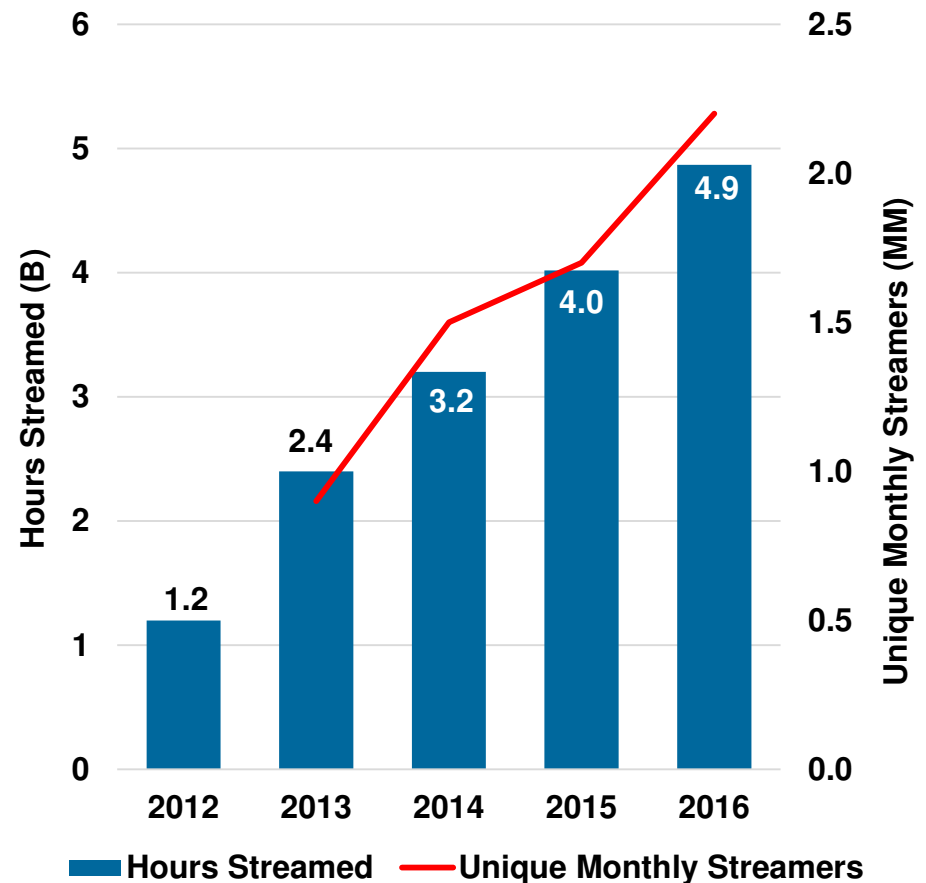
Note: Graph emphasizes Blizzard over Activision and King users due to the multiplayer nature of most Blizzard franchises.

# ...Observing = Learn From Watching Others Perform...

## Twitch Streaming 10MM DAU, 2/17



## Twitch Hours Streamed vs. Unique Monthly Streamers



# ...Interacting With / Analyzing Data = Many Games Have Strong Math Underpinnings...

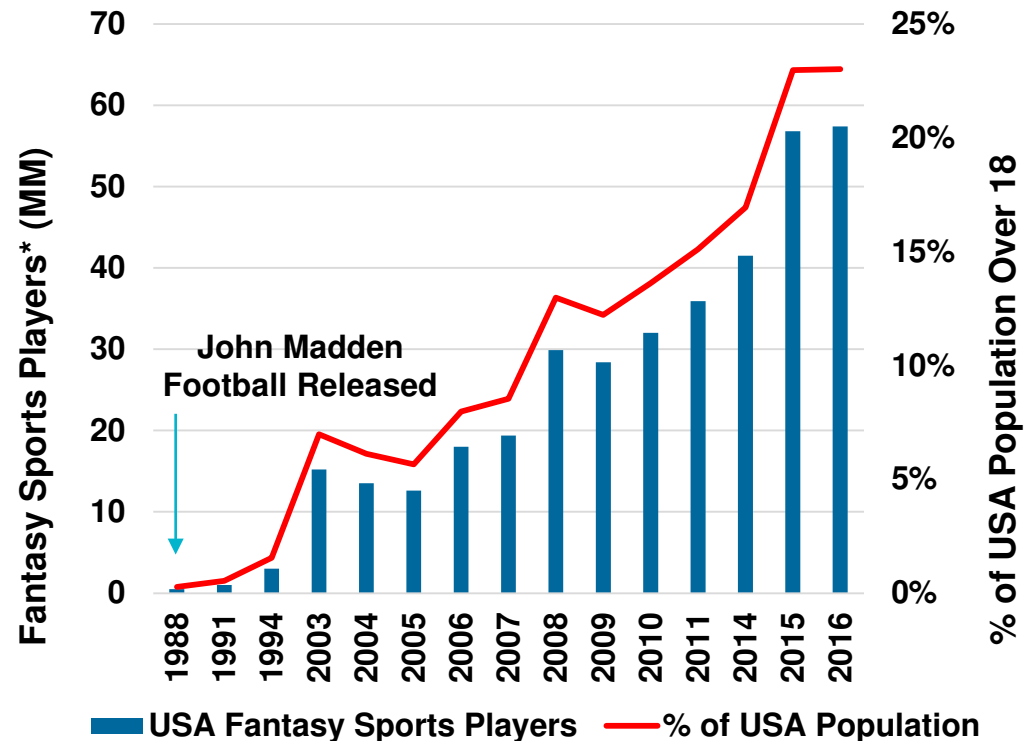
## Live Stats

Feed Into Video Games + Fantasy Sports



## Fantasy Sports

Fans Engaged in Analytics, USA, 1988-2016





# ...Self-Optimizing = Driven by Math (Statistics / Metrics / Rankings)...

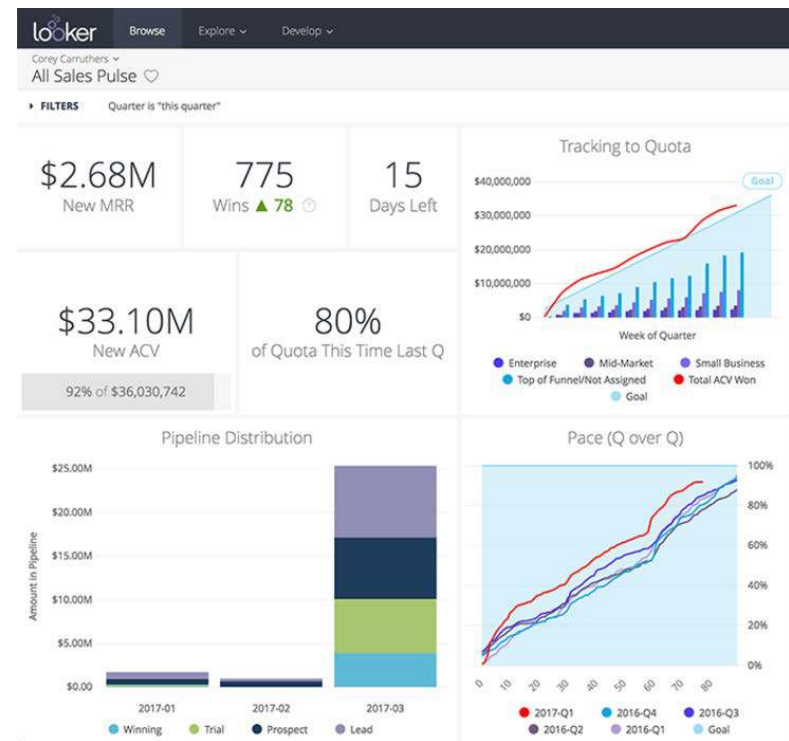
## In-Game Player Analytics / Dashboards

Increasingly Found in Enterprise / Consumer Products / Services

### Madden 2017 Player Stats

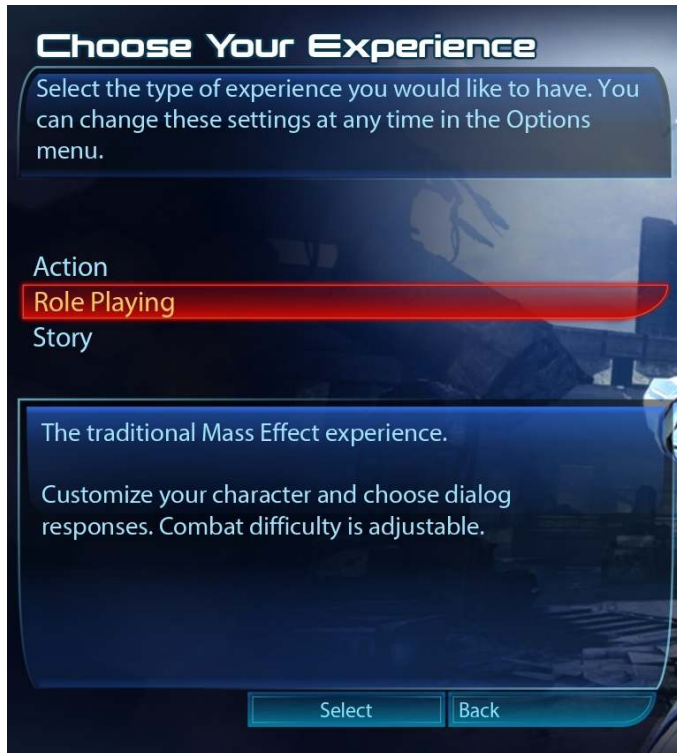


### Looker Business Intelligence Dashboard

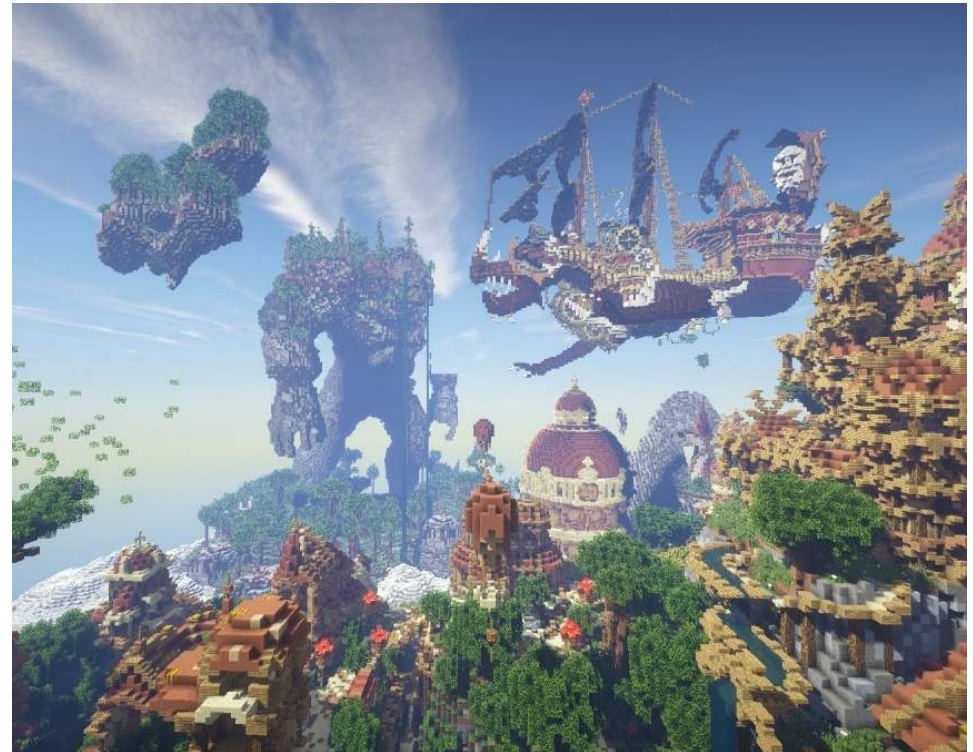


# ...Creative Story Telling = Can Be Master of a Universe

## Choosing Gameplay Experience Mass Effect 3



## Laying Building Blocks of a Virtual World Minecraft



# **Gaming Tools =**

*Can Optimize Learning + Engagement...*

## **Foundational for Internet Services**

*Reputation / Rankings*

*Digital Recognition*

*Interactive Storytelling*

*Interactive Learning*

*Upgrades + Downloadable Content*

*Secondary Markets*

*Messaging*

*Live Camera Angles*

*Graphics Computation*

# Reputation / Rankings = Deep Roots in Gaming...

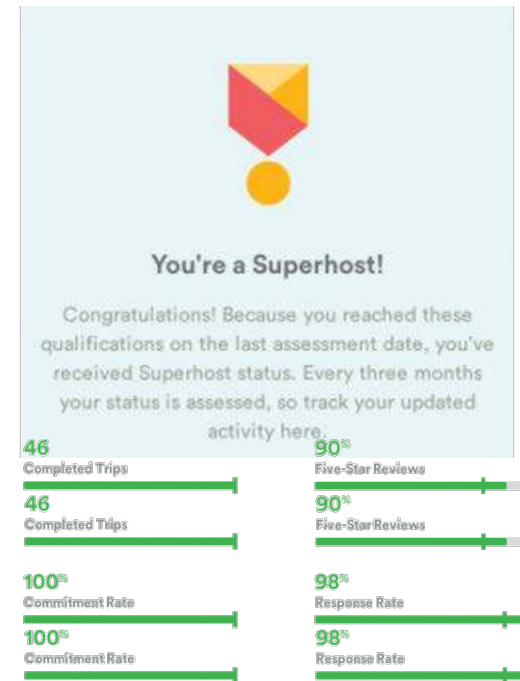
## Early Gaming (1978)

**Space Invaders**  
First Arcade Game to Record High Scores



## Mainstream Internet (Now)

**Airbnb**  
Superhost Program Recognizes Top Performing Hosts



Source: Left image: Codexdex, Right image: Airbnb, Probnb



# ...Digital Recognition = Deep Roots in Gaming...

## Early Gaming (1980)



## Mainstream Internet (Now)

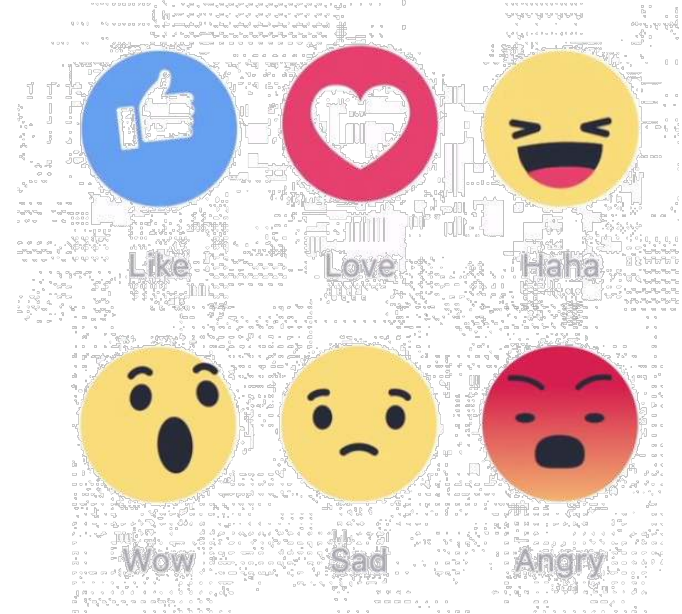
### Activision 2600 Games

Physical Badges for In-Game Achievements



### Facebook

Give Digital Badges to Others

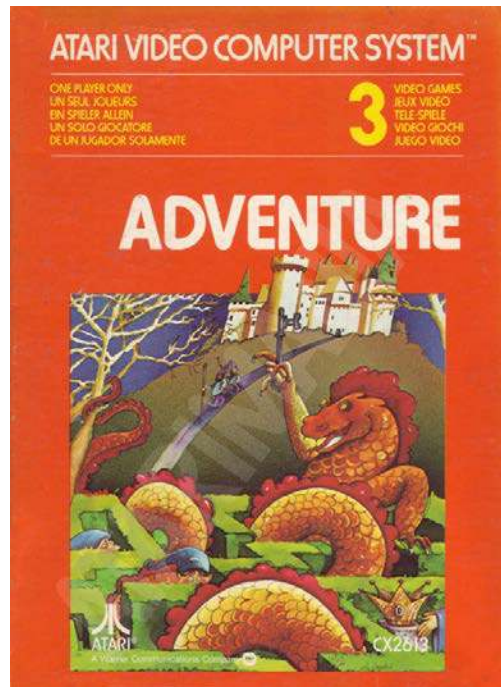


# ...Interactive Storytelling = Deep Roots in Gaming...

## Early Gaming (1980)

**Atari**

First Role Playing Game



## Mainstream Internet (Now)

**Netflix + Amazon / Twitch**

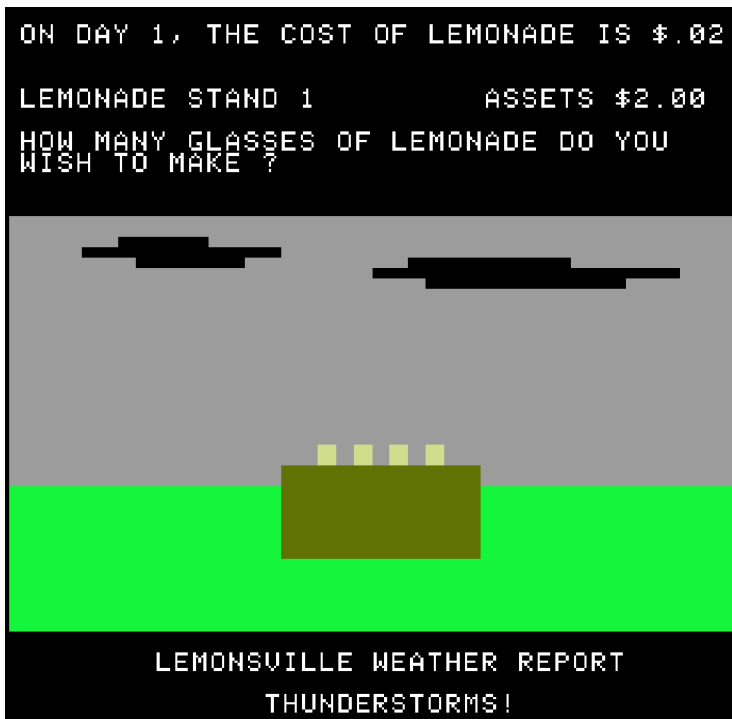
Experimenting with Interactive Shows



# ...Interactive Learning = Deep Roots in Gaming...

## Early Gaming (1979)

### Lemonade Stand Teaching Economics 101



## Mainstream Internet (Now)

### Duolingo Leveling Up in Languages



# ...Upgrades + Downloadable Content = Deep Roots in Gaming...

**Early Gaming (1993)**



**Mainstream Internet (Now)**

**Sega**

Downloadable Content via Cable



**Tesla**

Over-the-Air Software Updates





# ...Secondary Markets = Deep Roots in Gaming...

## Early Gaming (2001)

### Runescape

Secondary Markets for Items / Currency

The screenshot displays a secondary market interface for Runescape. It features a search bar at the top with the text "8 x 10M Runescape 3 Gold" and a "BUY" button. Below the search bar, there are four item listings, each with a "More info" link, a "BUY" button, and a price:

- 8 x 10M Runescape 3 Gold**: Price \$21.36. You save: \$0.24. Delivery time: 5-10 minutes.
- Air Rune (RS3) x 50 000**: Price \$1.75. Delivery time: 5-30 minutes.
- Fire Rune (RS3) x 50 000**: Price \$3.45. Delivery time: 5-30 minutes.
- Water Rune (RS3) x 50 000**: Price \$1.75. Delivery time: 5-30 minutes.

## Mainstream Internet (Now)

### Apple iMessage

3<sup>rd</sup> Parties Offer Sticker Packs

The screenshot shows the Apple iMessage sticker pack selection screen. It displays a grid of 20 different sticker packs, each with a unique icon and name:

- TTL
- GamePigeon
- GIFwrapped
- ETA
- Nyan Cat: Lost...
- CARROT We...
- Castro
- TV Time
- Record Bird
- Llama
- Mo Mojis by Mo...
- Kaomotion
- Rando Emoji
- Emoji Stickers
- Mixologist
- Happy Toast
- Bananas
- Sweets
- Coffee
- Anitate
- Bright Eyes Ani...
- Face Bomb
- Sticker Pals
- Dramatic Ellipsi...
- Relay FM
- Places
- Passport
- N'Yer Today
- Stuck On

# ...Messaging = Deep Roots in Gaming...

## Early Gaming



## Mainstream Internet (Now)



2009



2013



# ...Live Camera Angles = Deep Roots in Gaming...

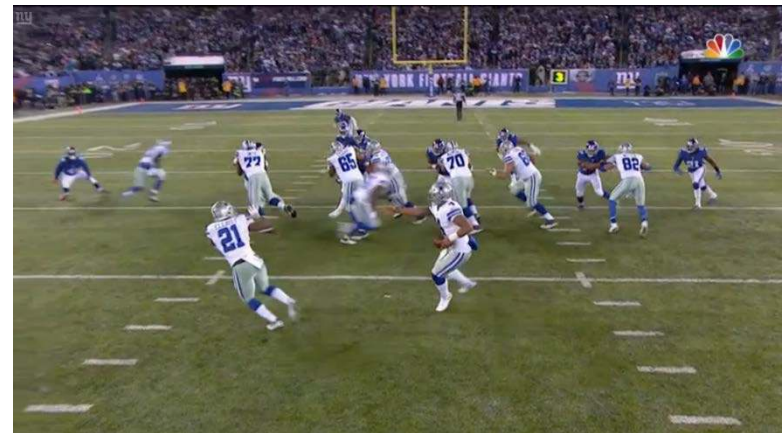
## Early Gaming (1996)

**Madden Football**  
Unique Game Perspectives



## Mainstream Media (Now)

**Cable TV Cameras**  
Unique Angles of Live Games



# ...Graphics Computation = Deep Roots in Gaming

## Early Gaming (1999)

**NVIDIA**

Launches GeForce 256 GPU



## Mainstream Internet (Now)

**Many Companies**

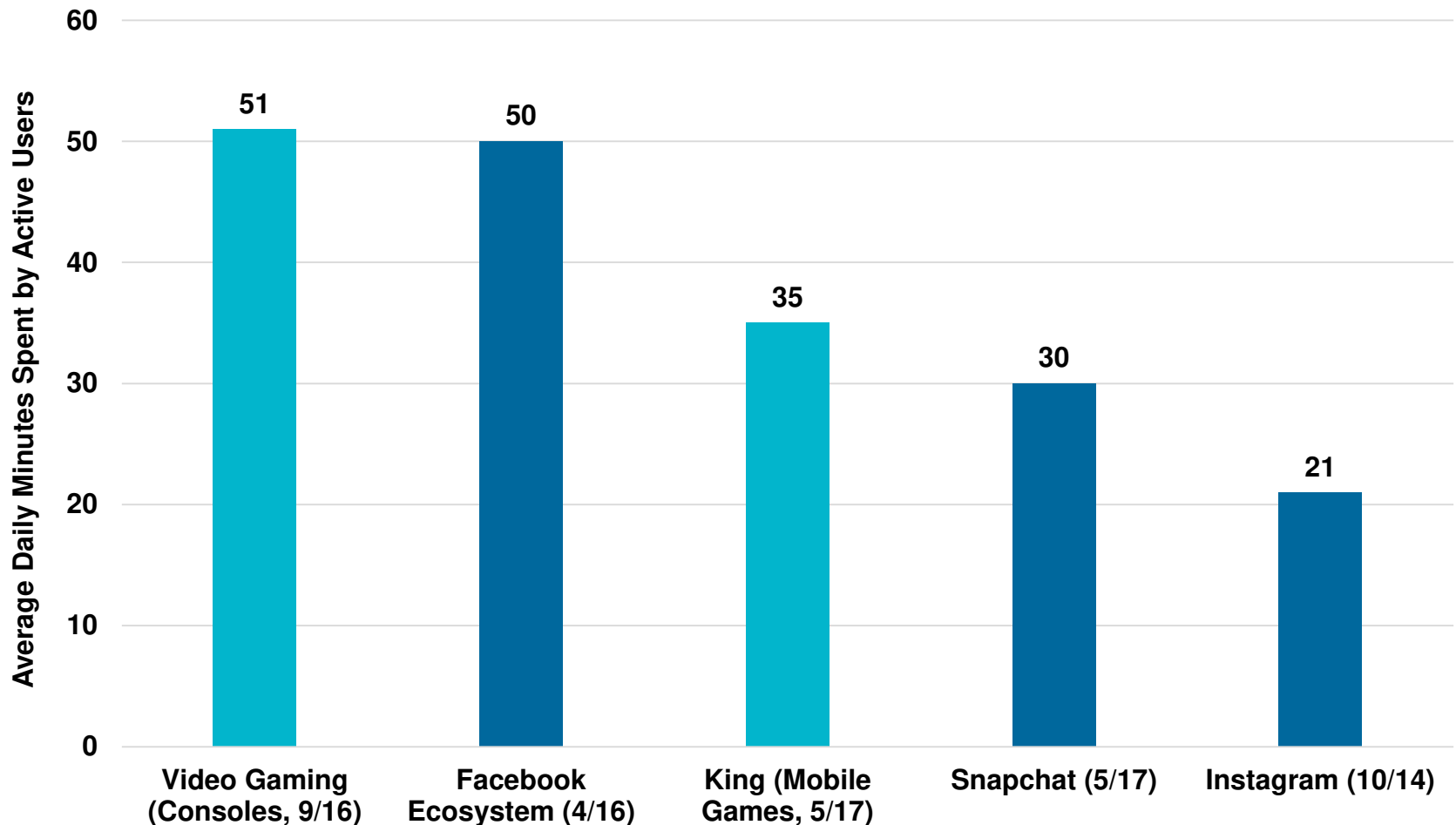
GPUs Used for Artificial Intelligence



*In Era of  
Perceived Disengagement =  
'Engagement' Rising...*

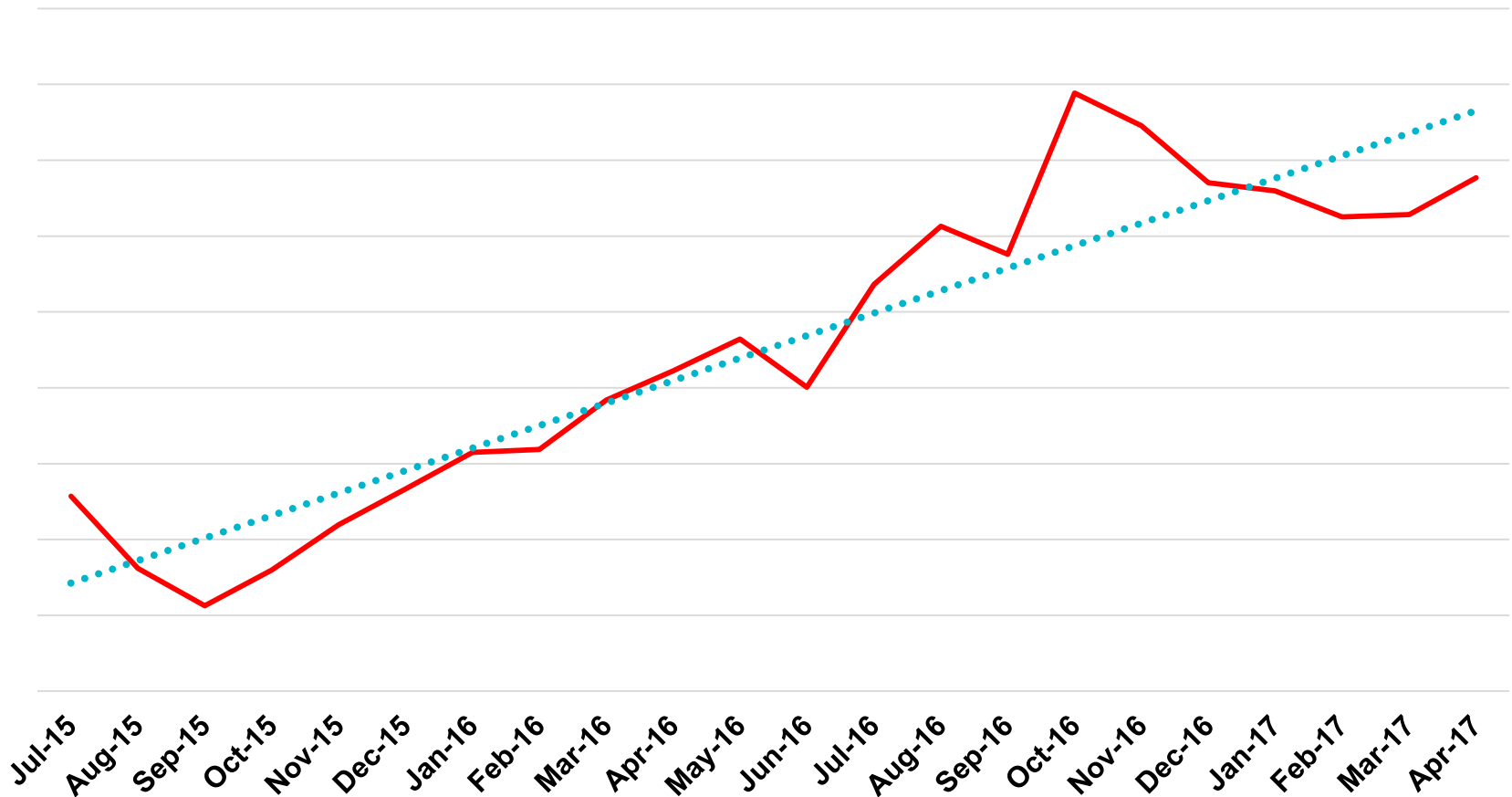
# Video Gaming = Most Engaging Form of Social Media

## Daily Minutes Spent per User Across Select Digital Media Platforms



# Mobile Daily Gaming Session Duration = +33% (3/17 vs. 7/15), Global, per Unity Games

## Mobile Average Daily Gaming Session Duration on Unity Games, Global, 7/15 – 3/17





*When I play a video game, it's the only time I put away the phone and forget it exists.*

*Video games command your attention in a way that nothing else can or will.*

- Gary Whitta, Screenwriter, Rogue One: A Star Wars Story, 5/17



*Perhaps Interactive Gaming  
Evolution / Growth / Usage...*

*Has Been Helping Prepare Society for  
Ongoing Rise of  
Human-Computer Interaction?*

***Gaming Tools =***

***Improving Human Performance...***

***Virtual + Augmented Reality /  
Simulations / Real-Time Analytics***

*Immersive Gaming Tools =  
Improving Athlete Performance...*

# Video + Virtual Reality = Mental Reps Can Improve Performance

## STRIVR Labs + Stanford Football

Utilize Video + Virtual Reality to Repeatedly Run Plays / Scenarios



# Video + Machine Learning = Visuals + Deep Analytics Can Improve Performance

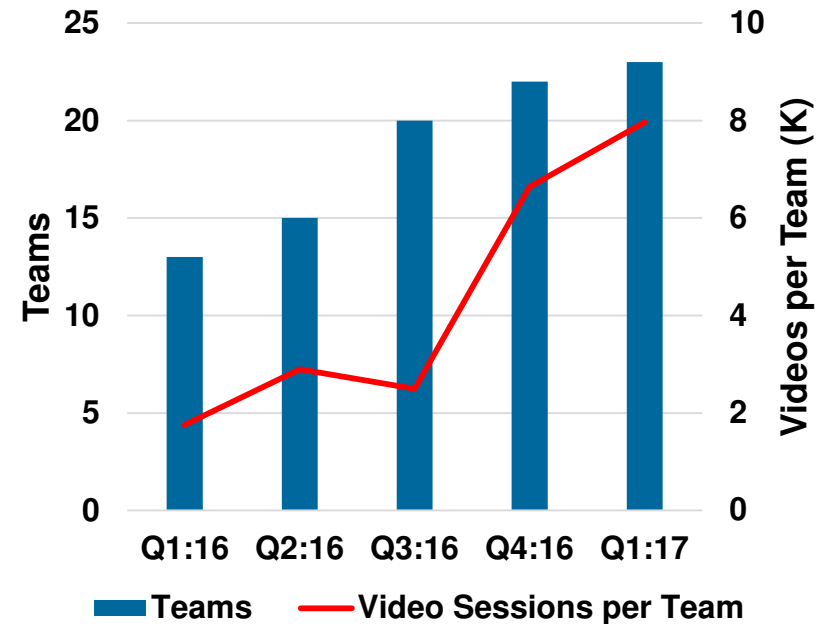
## Second Spectrum

150K+ Tracked Events per Game,\* 5/17

### Video Analytics of Key Plays



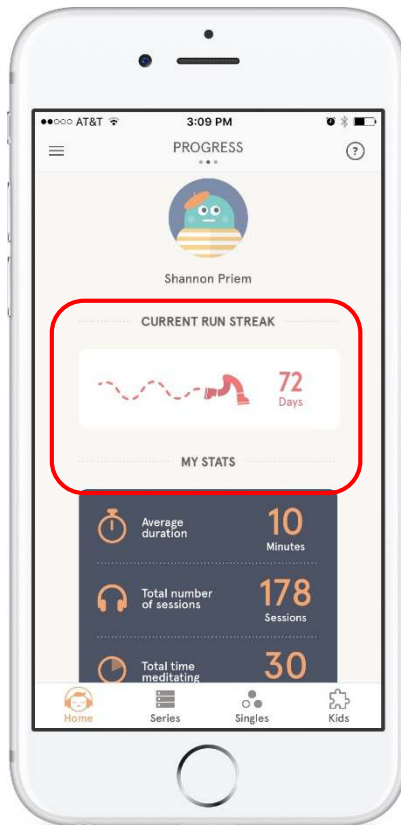
### Teams vs. Video Sessions per Team



# Audio + Guided Meditation = Mental Focus Can Improve Performance

## Headspace

Run Streak Reinforce Habits



## CJ McCollum, NBA Shooting Guard

Uses Headspace to Maintain Focus, 6/16

*There's a lot of stress in my job...and a 10 minute Headspace meditation helps you take care of all of those things and more.*

- CJ McCollum, 4/17



# Physically Interactive Media (PIM) = Real-Time Activity / Analytics Can Boost Intensity / Focus for Athletes

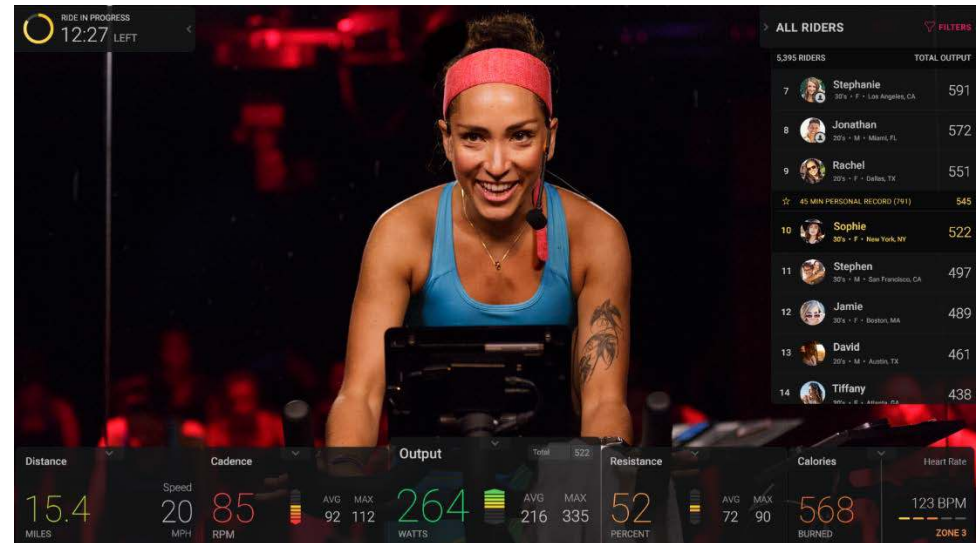
2 Workouts per Week per  
Subscriber



## Peloton

100K+ Bike Subscribers  
(95% Retention After 1 Year)...400K+ Home Riders

1MM+ Home Workouts Streamed in 3/17





# Video Games = Simulations Can Improve Athlete Strategy + Performance...

*I could go ten hours at a stretch [playing soccer video games] and I'd often spot solutions in the games that I parlayed into real life.*

– Zlatan Ibrahimovic, *I Am Zlatan: My Story On and Off the Field*, 6/14

**From FIFA Online...**



**...To the Real Game**





# ...Video Games = Stats Can Assist Athletes + Coaches...

## Players + Coaches View Digital Stats as Important Performance Measure

**Video Game Player Stats**  
Real-Time Feedback Offline, 9/16



Michy Batshuayi  
@mbatshuayi



@EASPORTSFIFA 59 passing 🙄🙄🙄 so weak  
12:57 PM - 12 Sep 2016

19,484 18,251

**Hoffenheim Scout Discovers Roberto Firmino...**  
Using Football Manager Video Game, 11/16

A screenshot of the Football Manager 2016 interface showing the profile of Roberto Firmino, an attacking midfielder for Hoffenheim. The profile includes a player picture, personal details (age 25, height 5'11", weight 11 st 1...), and a comprehensive list of attributes. A 'Physical' section shows a 97% condition bar and 100% match fitness. A 'Match Fitness' section shows a 100% bar. The interface also displays various tabs like Overview, Transfer, Contract, and Reports.

Attribute	Value	Attribute	Value	Attribute	Value
0 apps	25	weight	11 st 1...	Wages	£70K p/w
0 goals	2/10/1991	height	5'11"	value	£13M
0 U21 a...	0 U21 g...	footed	Right	after tax	£39K p/w
				expires	30/6/18
				Reputation	Continental

Attribute	Value	Attribute	Value	Attribute	Value
11	Aggression	15	Acceleration	11	
12	Anticipation	16	Agility	14	
16	Bravery	8	Balance	10	
14	Composure	14	Jumping Reach	10	
17	Concentration	10	Natural Fitness	17	
9	Creativity	14	Pace	16	
13	Decisions	12	Stamina	17	
11	Determination	9	Strength	10	
7	Flair	17			
7	Leadership	6			
14	Off The Ball	16			
12	Positioning	8			
8	Teamwork	10			
17	Work Rate	16			

...Video Games = Stats Can Be Predictive...

Madden Super Bowl Winner Prediction Accuracy @ 71% (14 Years)

## Madden Football Super Bowl Predictions vs. Actual Results, 2004-2017

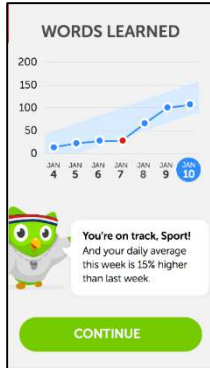
Game	Year	Teams	Madden		Actual	
			Winner	Score	Winner	Score
Super Bowl LI	2017	Patriots vs. Falcons	<b>Patriots</b>	<b>27-24</b>	Patriots	34-28
Super Bowl L	2016	Broncos vs. Panthers	<b>Panthers</b>	<b>24-20</b>	Broncos	24-10
Super Bowl XLIX	2015	Patriots vs. Seahawks	<b>Patriots</b>	<b>25-24</b>	Patriots	28-24
Super Bowl XLVIII	2014	Broncos vs. Seahawks	<b>Broncos</b>	<b>31-28</b>	Seahawks	43-8
Super Bowl XLVII	2013	49ers vs. Ravens	<b>Ravens</b>	<b>27-24</b>	Ravens	34-31
Super Bowl XLVI	2012	Patriots vs. Giants	<b>Giants</b>	<b>27-24</b>	Giants	21-17
Super Bowl XLV	2011	Steelers vs. Packers	<b>Steelers</b>	<b>24-20</b>	Packers	31-25
Super Bowl XLIV	2010	Saints vs. Colts	<b>Saints</b>	<b>35-31</b>	Saints	31-17
Super Bowl XLIII	2009	Steelers vs. Cardinals	<b>Steelers</b>	<b>28-24</b>	Steelers	27-23
Super Bowl XLII	2008	Patriots vs. Giants	<b>Patriots</b>	<b>38-30</b>	Giants	17-14
Super Bowl XLI	2007	Colts vs. Bears	<b>Colts</b>	<b>38-27</b>	Colts	29-17
Super Bowl XL	2006	Steelers vs. Seahawks	<b>Steelers</b>	<b>24-19</b>	Steelers	21-10
Super Bowl XXIX	2005	Patriots vs. Eagles	<b>Patriots</b>	<b>47-31</b>	Patriots	24-21
Super Bowl XXXVIII	2004	Patriots vs. Panthers	<b>Patriots</b>	<b>23-20</b>	Patriots	32-29

Source: Electronic Arts, ESPN, USA Today, Forbes

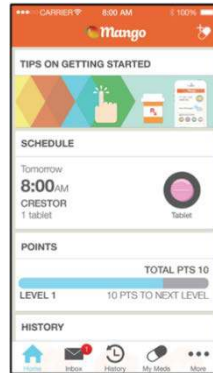
*...Immersive Gaming Tools =  
Improving Performance  
Across Disciplines*

# Gamification = Influencing Multiple Consumer Services...

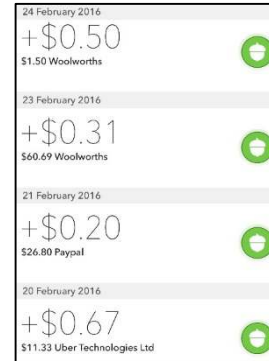
## Education Duolingo



## Personal Health Mango Health



## Personal Finance Acorns



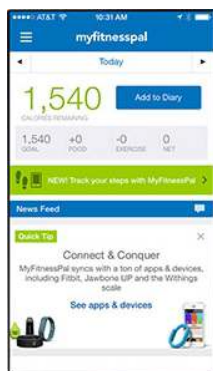
## Energy Conservation Nest



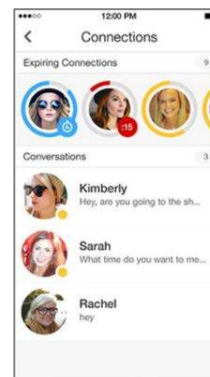
## Food Starbucks



## Exercise myfitnesspal



## Dating Bumble



## Advertising Snapchat



# ...Gamification = Influencing Multiple Businesses...

## Healthcare Research

Foldit

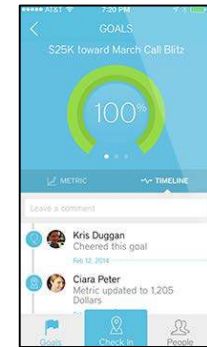


## Military Training



## Work Productivity

Betterworks



## Pilot Training

Boeing



## Healthcare Training

Simulated Surgery



## Neuroscience

PTSD Therapy



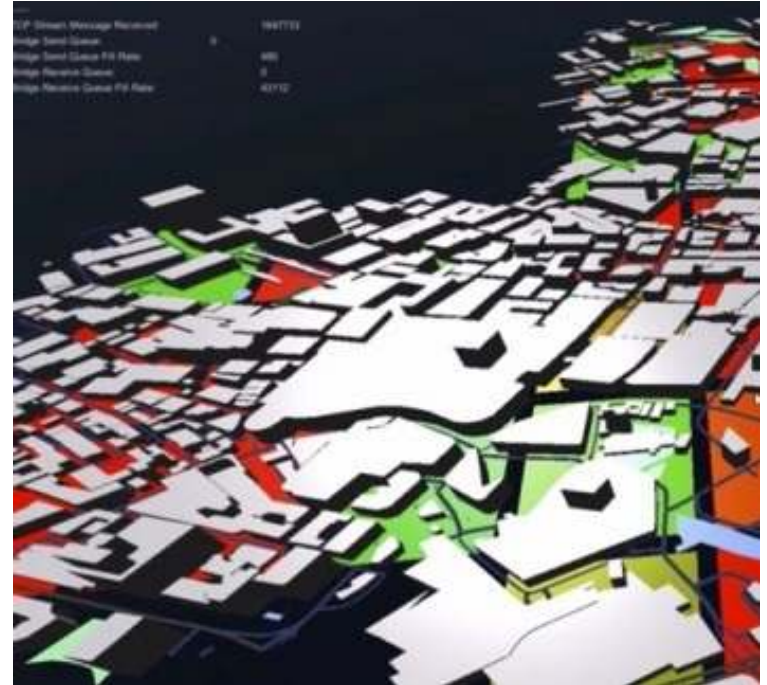


# ...Gamification = Influencing Complex Virtual Worlds + Real-World Simulations

## Improbable in Gaming Simulate Vast Virtual Worlds



## Improbable in Real World Simulate Cities + Power / Web Networks

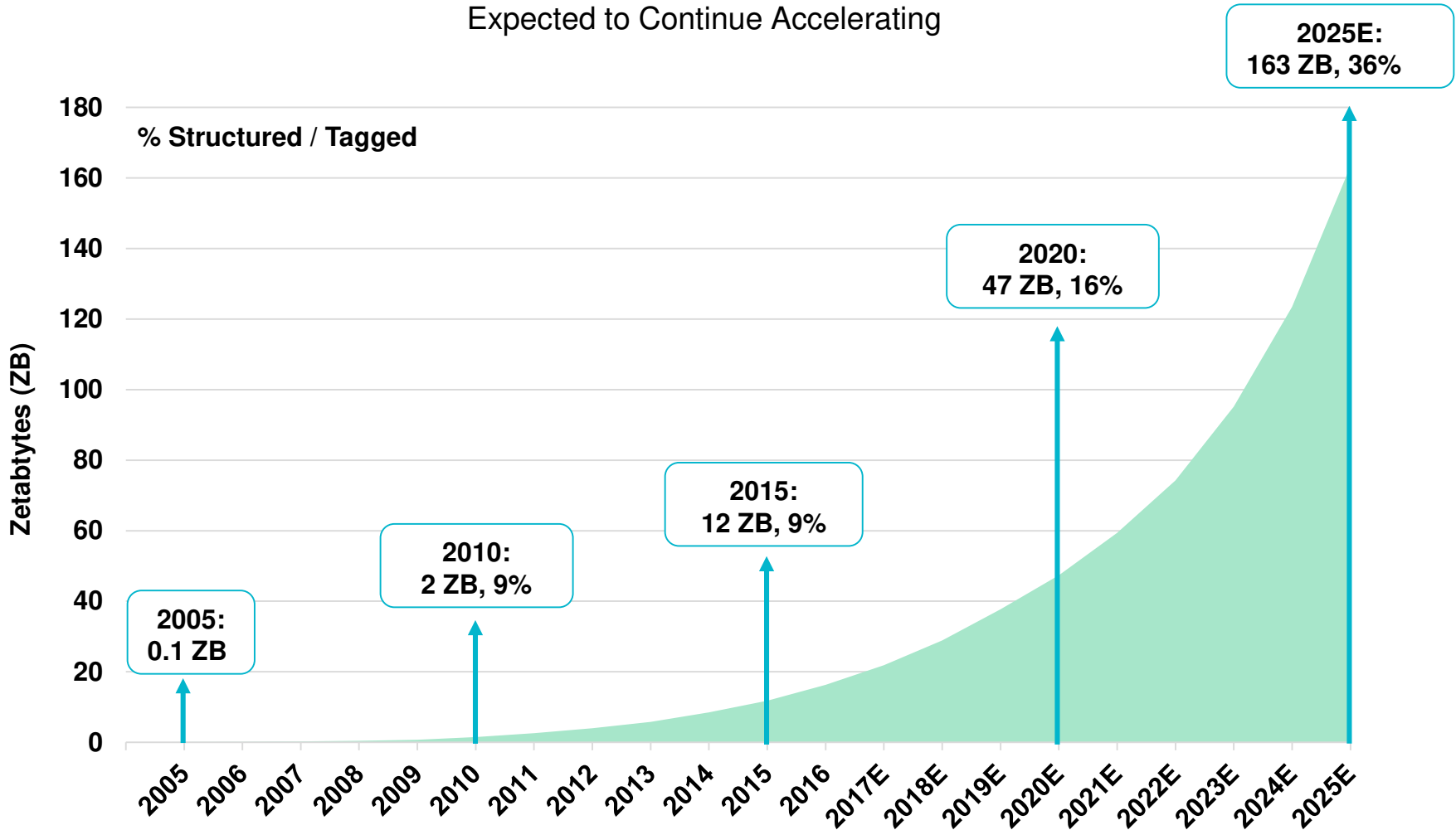


*As Rapid Data Growth Continues =  
Gaming Tools / Interfaces / Processors  
Will Continue to  
Organize + Drive Usefulness*



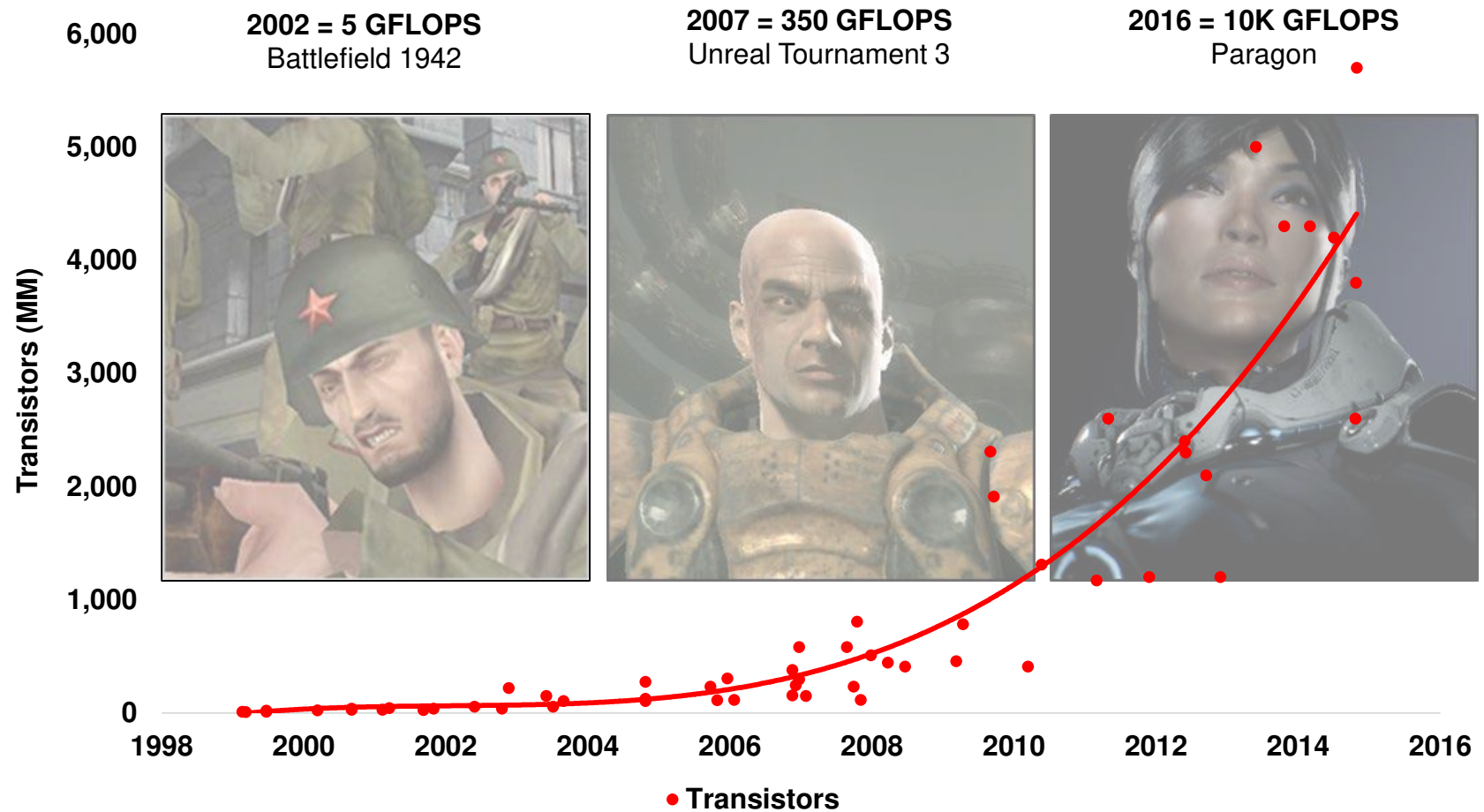
# Data Volume Growth Continues @ Rapid Clip... % Structured / Tagged (~10%) Rising Fast...

**Information Created Worldwide =**  
Expected to Continue Accelerating



# ...GPU Processing Power Ramp Continues

## NVIDIA Transistors, 1998-2016



***Gaming Platforms =  
Evolving @ High Speed***

# New Gaming Development Tools / Platforms = Evolving to Continue to Build Virtual Worlds...

**Developers**

**Development Platforms**

**Players**

**Build Virtual Worlds / Share Ideas**



**Explore Virtual Worlds**

**Construct Virtual Worlds with New Dimensions**

**VR / AR Platforms**



**Have Virtual Experiences**

**Build / Share Creations**

**In-Game Sandboxes**



**Build / Share / Explore Creations**

**Distribute Content**

**Gaming Marketplaces**

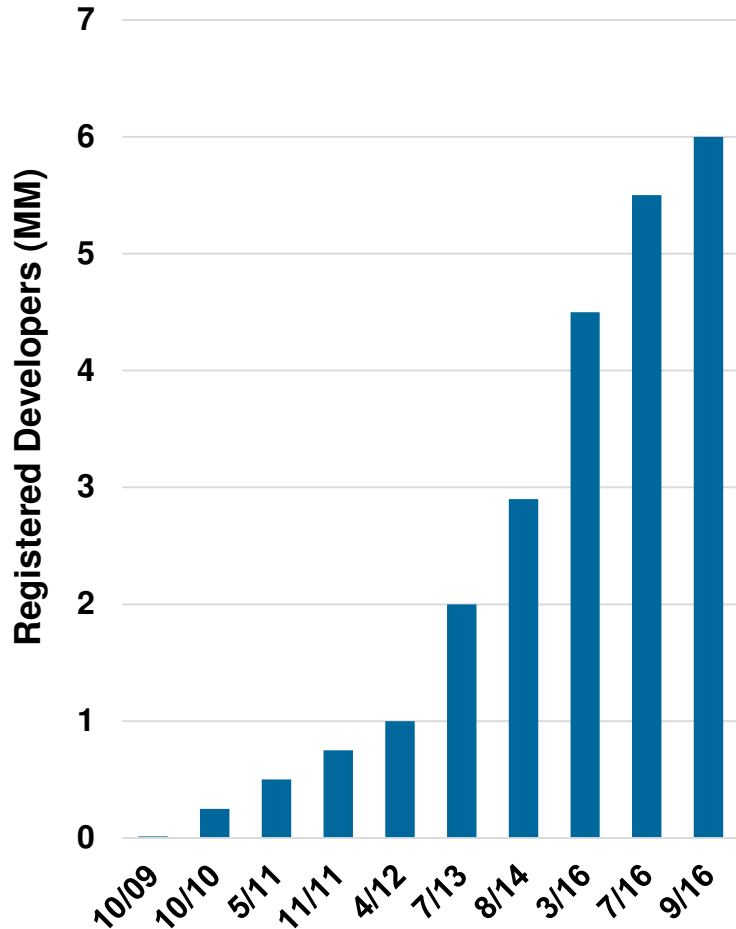


**Discover / Buy / Share Content**

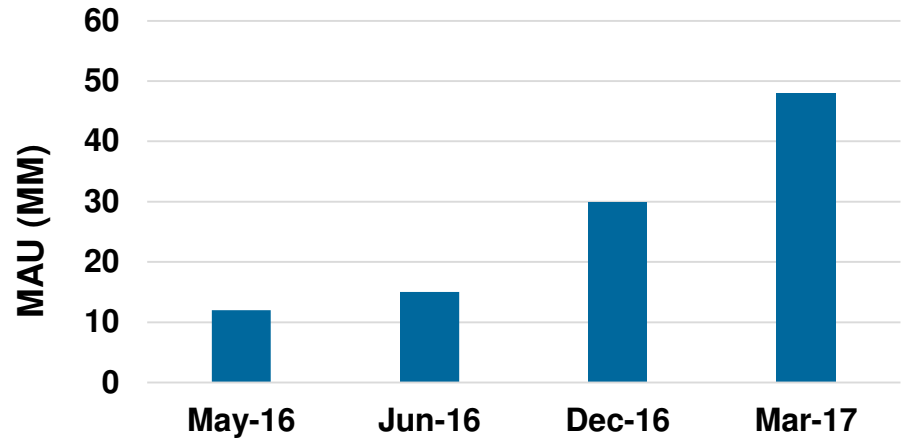
Source: Unreal, Unity, HTC Vive, Oculus (Facebook) Microsoft, Minecraft, Roblox, Tencent, Steam (Valve), Sony

# ...New Gaming Development Tools / Platforms = Supporting Rapid Growth

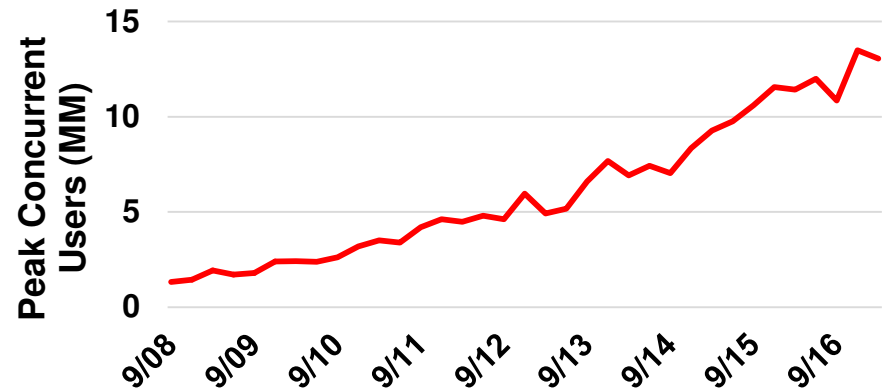
Unity = Registered Developers



Roblox = Monthly Active Users



Steam = Peak Concurrent Users\*



***eSports =***

***Expanding Gaming Ecosystem via  
Fans / Spectators***

# eSports = 45 Year Evolution to Global Stage

1972



**Stanford University  
AI Lab = First Ever  
Gaming Tournament  
(Spacewars)**

1980



**Atari Space Invader  
Competition = Early  
National Gaming  
Tournament**

1997



**Red Annihilation  
Quake Tournament =  
Early eSports  
Competition**

2000



**Electronic Sports  
League + Korea  
eSports Assn. =  
Emerge as First  
eSports Leagues**

## Evolution of Global eSports

2006



**Justin.tv Founded =  
Precursor to  
Twitch.tv**

2009



**League of Legends  
Released =  
Becomes One of  
Most Played Strategy  
Games (100MM MAU,  
9/16)**

2012



**OnGameNet Begins  
Broadcasting League  
of Legends =  
First Major Korean  
Tournament on TV**

2016



**League of Legends  
2016 World  
Championship =  
43MM viewers**



# eSports = People Watch What They Play...

## League of Legends Expands from Home to Staples Center, LA (Worlds 2016 Finals = ~20K in Stadium + 43MM Online)

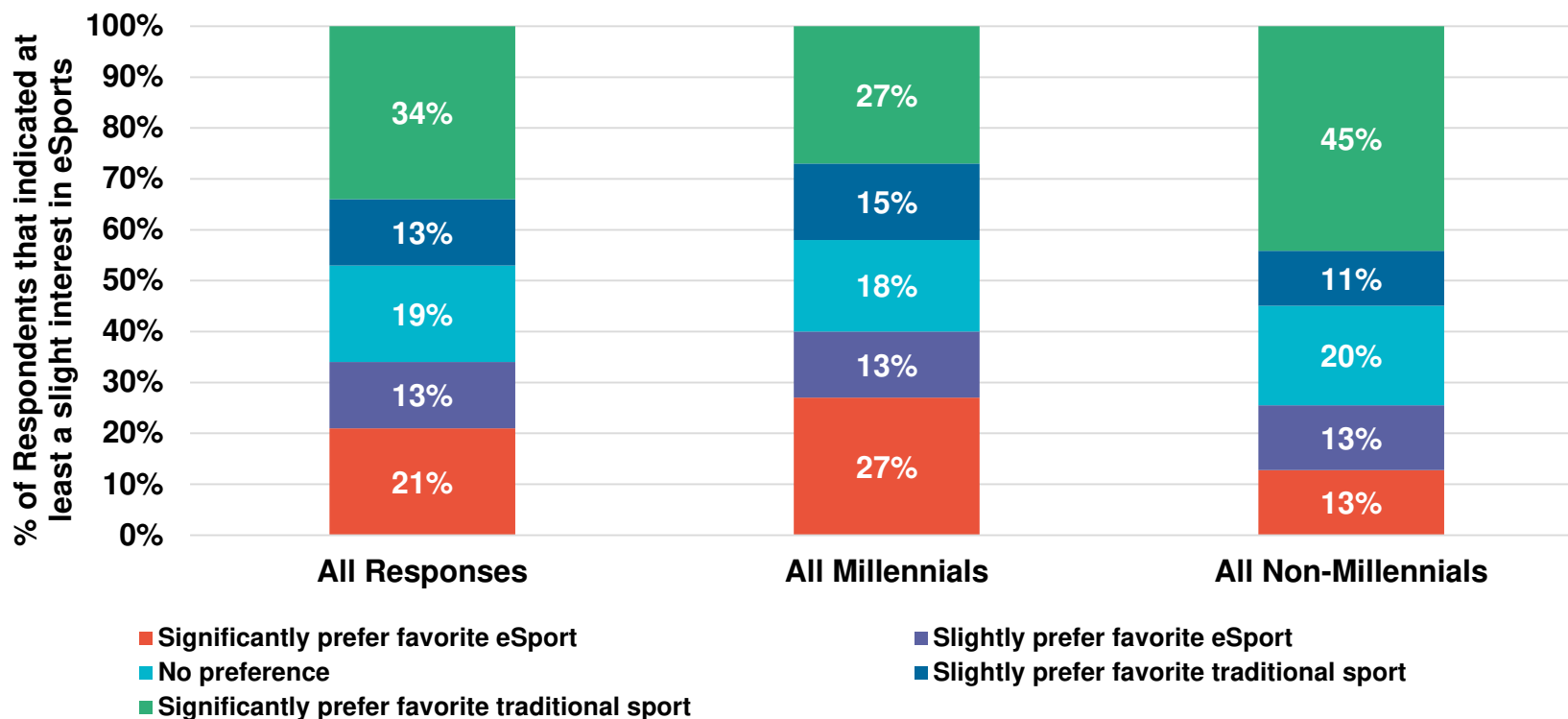


# ...eSports Trending vs. Traditional Sports = Very Strong with Younger Generations

**Millennials** = 27% 'Significant Preference' for eSports vs. 27% for Traditional Sports

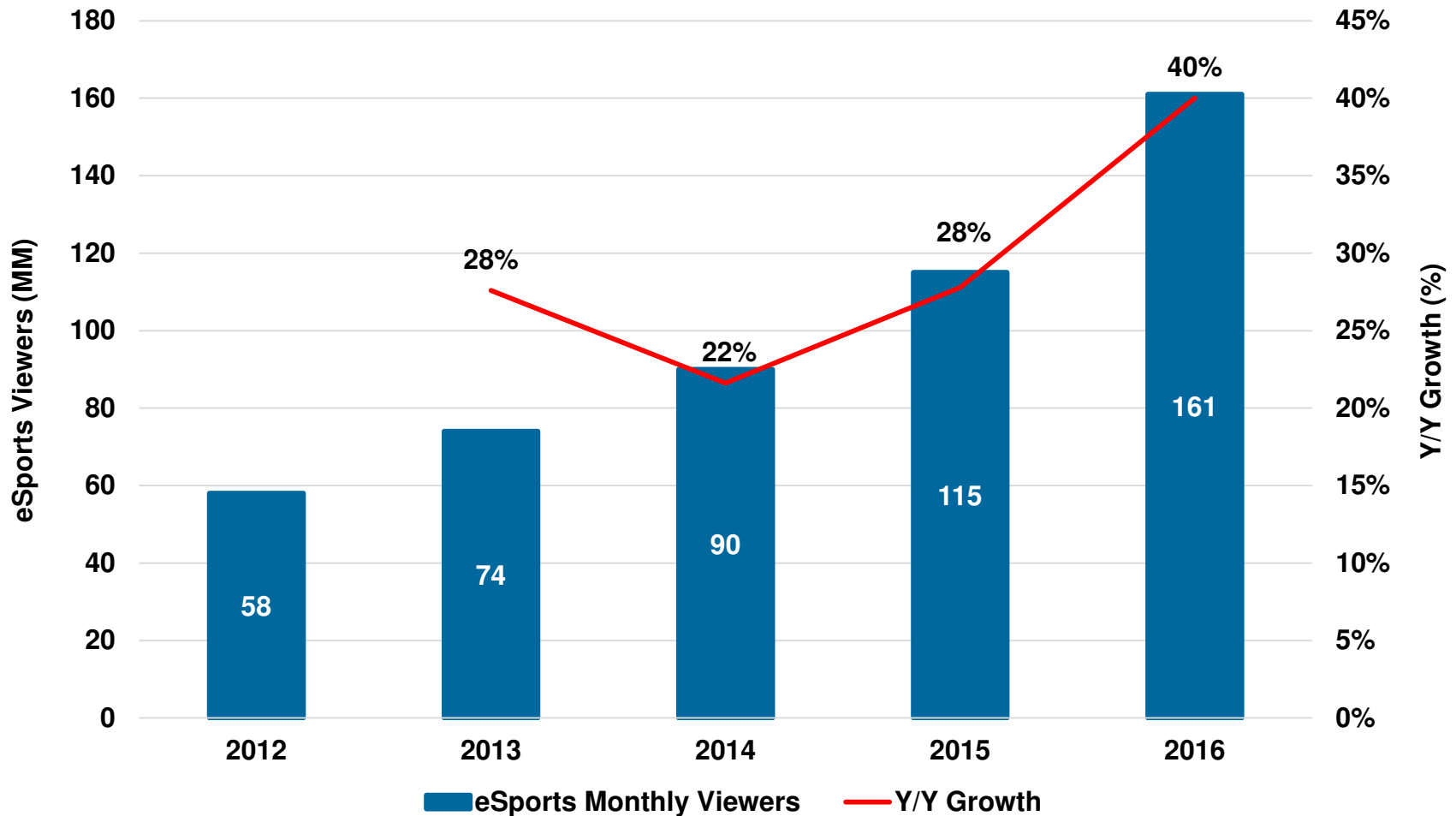
**Non-Millennials** = 45% for Traditional Sports vs. 13% for eSports

*Which do you prefer, your favorite traditional sport or favorite eSports?*



# eSports Monthly Viewers @ 161MM... +40% Y/Y & Accelerating

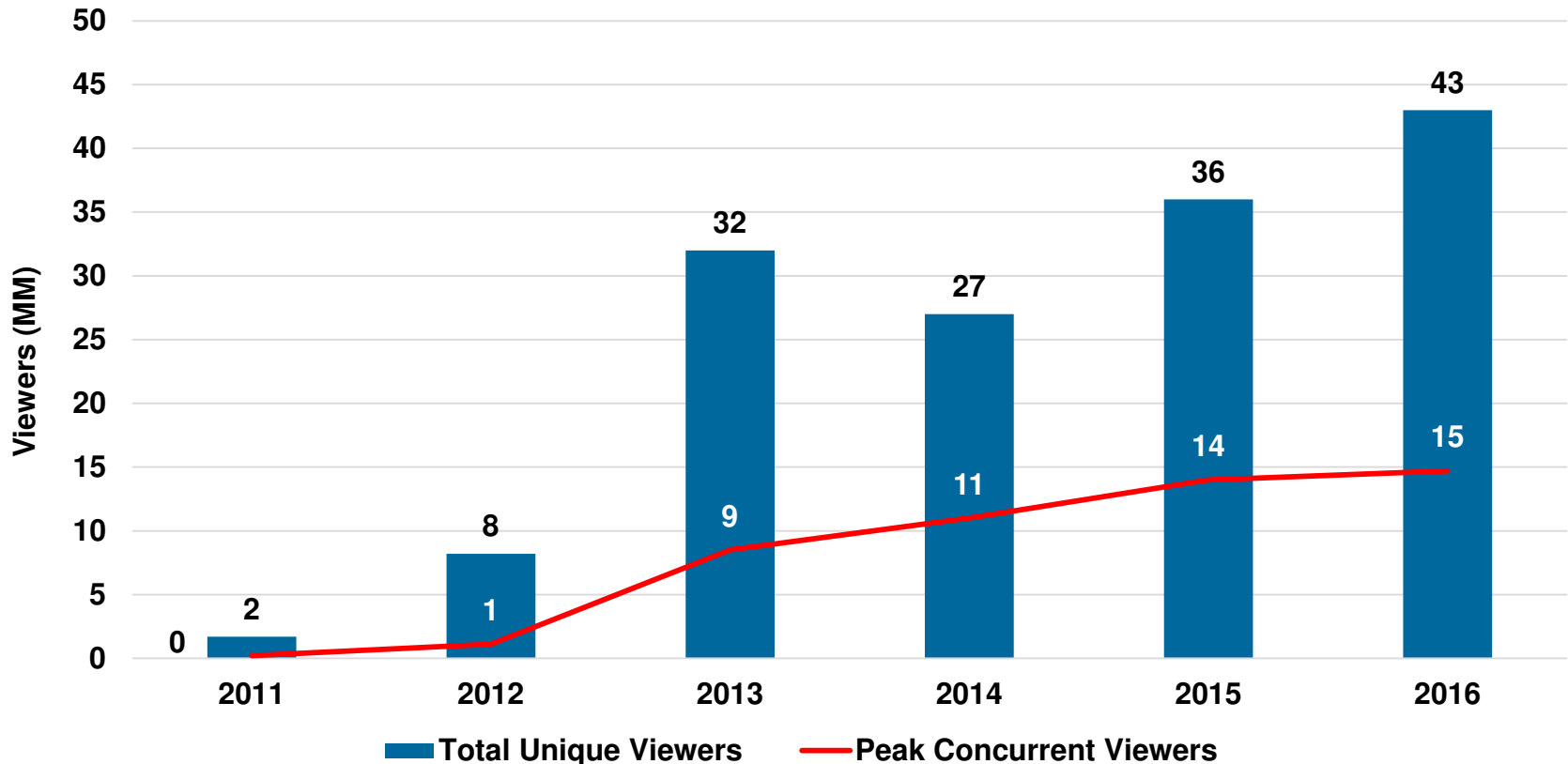
## eSports Monthly Viewers, Global, 2012-2016



# eSports League of Legends Championship Viewers @ 43MM... +19% Y/Y

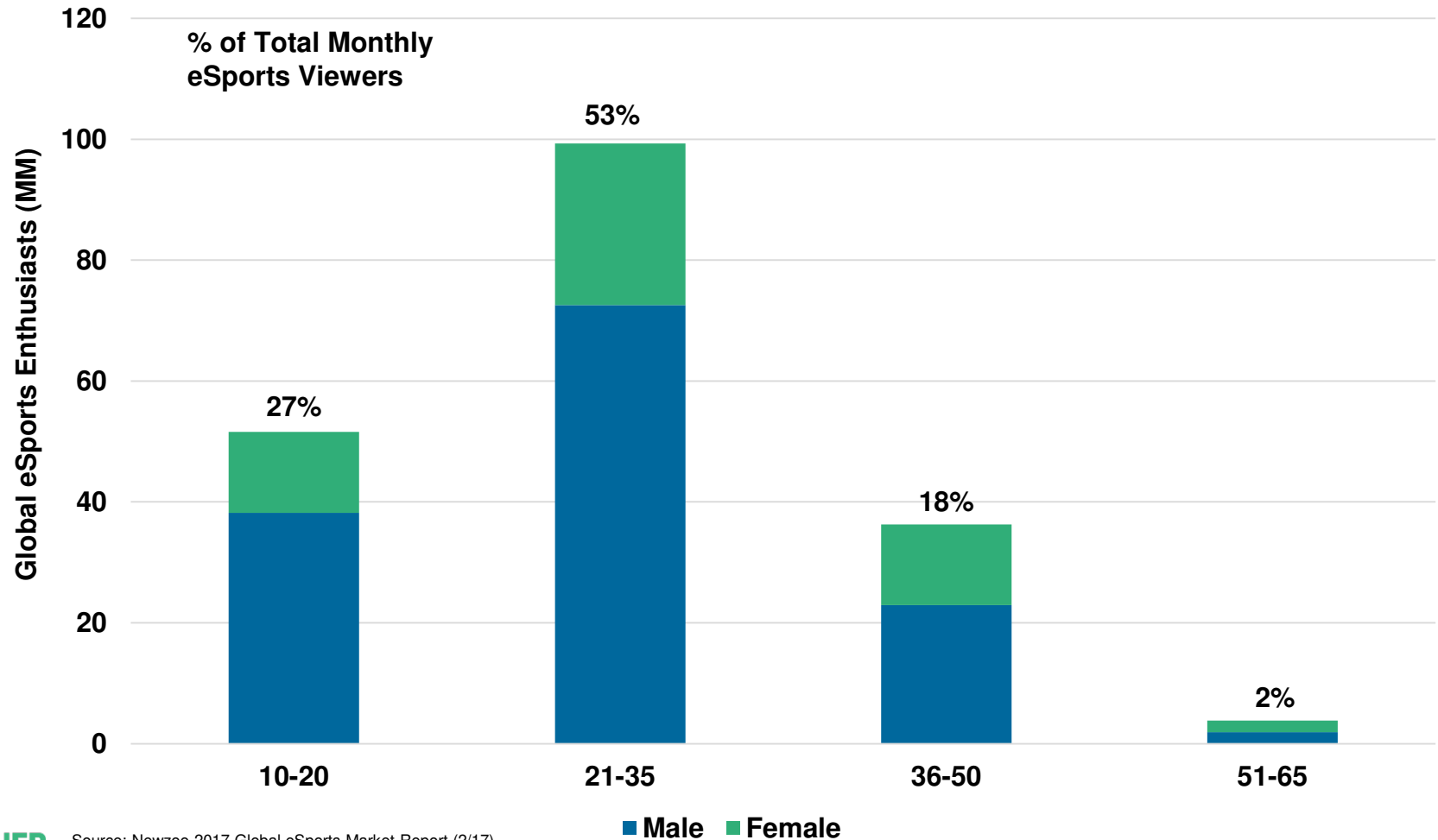
## League of Legends World Championship Global Viewership Largest eSports Viewer Base

### Total Unique Viewers vs. Peak Concurrent Viewers



# eSports Monthly Viewers = 79% <35 Years Old...29% Female

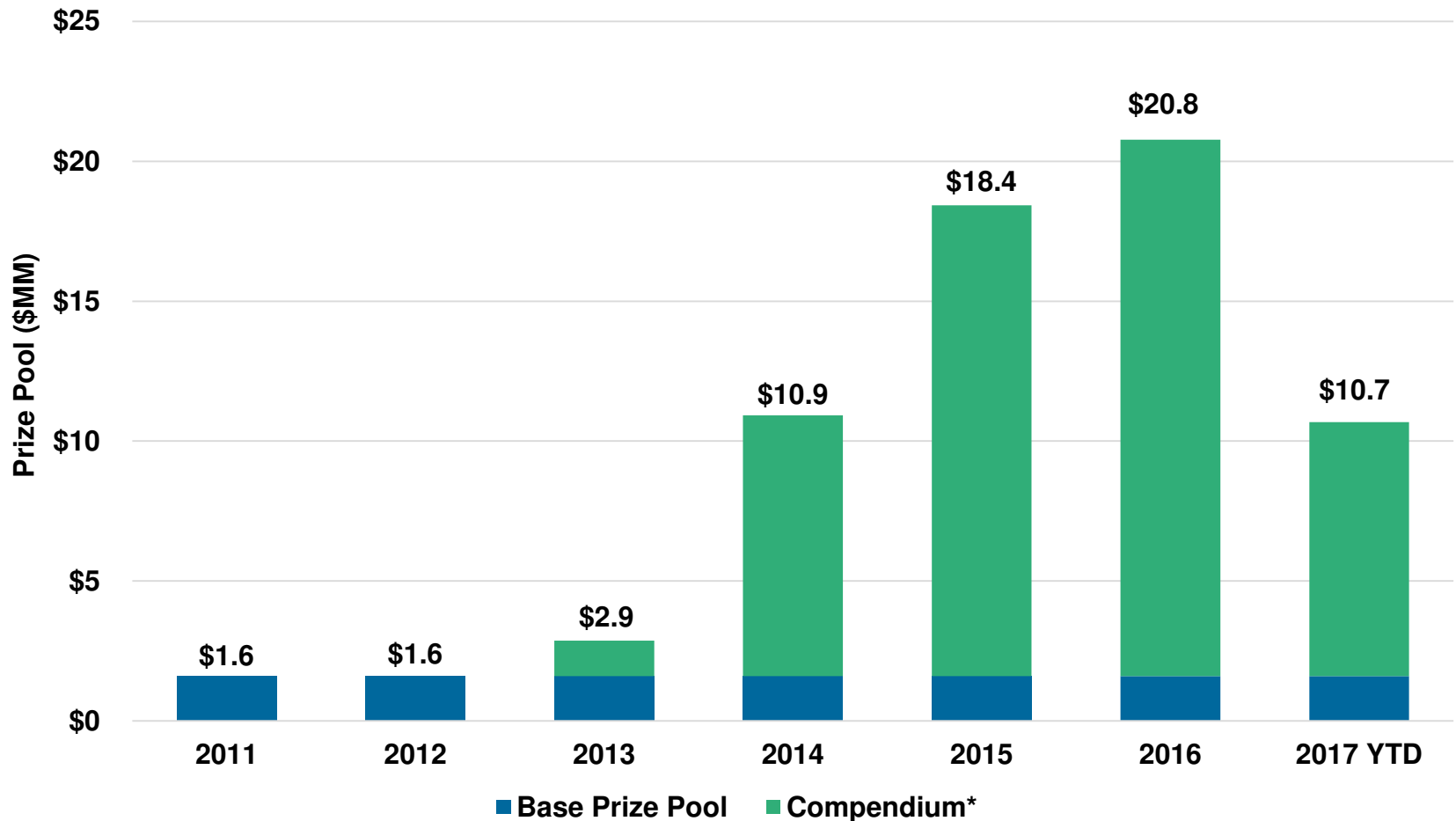
## Monthly eSports Viewers by Age / Gender, Global, 2016



Source: Newzoo 2017 Global eSports Market Report (2/17)

# eSports (Like Sports) = Money Follows Viewers + Winners... Fan In-Game Purchases Boost Prize Pools

## Prize Pool for The International (DOTA 2), 2011-2017



# Partnerships + Investments = Helping Bring eSports into Mainstream

**German Soccer Club,  
FC Schalke 04 =  
Acquires eSports  
Team, Elements, 5/16**



**Philadelphia 76ers =  
Acquire eSports  
Teams, Dignitas &  
Apex, 9/16**



**Riot Games +  
BAMTech = \$300MM  
6yr LoL Streaming  
Rights, 12/16**



**Miami Heat = Invests  
in eSports Team,  
Misfits, 1/17**



## Expanding Connections with Sports / Media Platforms

**Italian Soccer Club AS  
Roma = Partners with  
eSports Team, Fnatic, 2/17**



**NBA + Up with Take Two =  
2K eSports League, 2/17**



**Facebook = Expands  
eSports Relationships with  
ESL Streaming Deal, 5/17**





***Gaming Experience =>***

***Technology  
Leadership + Innovation?***

*If you want to see what  
business leadership may look like in  
three to five years, look at what's  
happening in online games.*

- Byron Reeves, Professor of Communication, Stanford University, 6/07

# ...~Ten Years Later = Entrepreneurs Often Fans of Gaming Experience

*I like video games. In fact, that's what got me into software engineering when I was a kid. I wanted to make money so I could buy a better computer so I could play better video games.*

- **Elon Musk**, CEO Tesla & SpaceX, 10/16

*As a child I played a lot of Avalon Hill board games. And each board game is actually a complex set of rules and circumstances... So it was actually in fact my childhood gaming — for being able to build a model of what a game was — that was essentially the fundamental thing that informs my strategic sense.*

- **Reid Hoffman**, Co-Founder of LinkedIn, 8/15

*I do think this dynamic around kids growing up, building games, and playing games, is an important one because I think this is how a lot of kids get into programming. I definitely wouldn't have gotten into programming if I hadn't played games.*

- **Mark Zuckerberg**, CEO Facebook, 5/15

*Perhaps Interactive Gaming  
Evolution / Growth / Usage With  
Related Data Collection / Analytics /  
Real-Time Simulations + Engagement...*

*Has Been Helping Prepare Society for  
On-Going Rise of  
Human-Computer Interaction?*

# Interactive Games = Motherlode of... Tech Product Innovation + Modern Learning

- 1) **Global Gaming** = Mainstream / Evolving Rapidly / Still Early Days
- 2) **Gaming Tools** = Pervasive Online
- 3) **Gaming Tools** = Improving Human Performance
- 4) **Gaming Platforms** = Evolving @ High Speed
- 5) **eSports** = Expanding Gaming Ecosystem via Fans / Spectators
- 6) **Gaming Experience** => Technology Leadership + Innovation?

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**MEDIA =**

**DISTRIBUTION DISRUPTION @  
TORRID PACE**

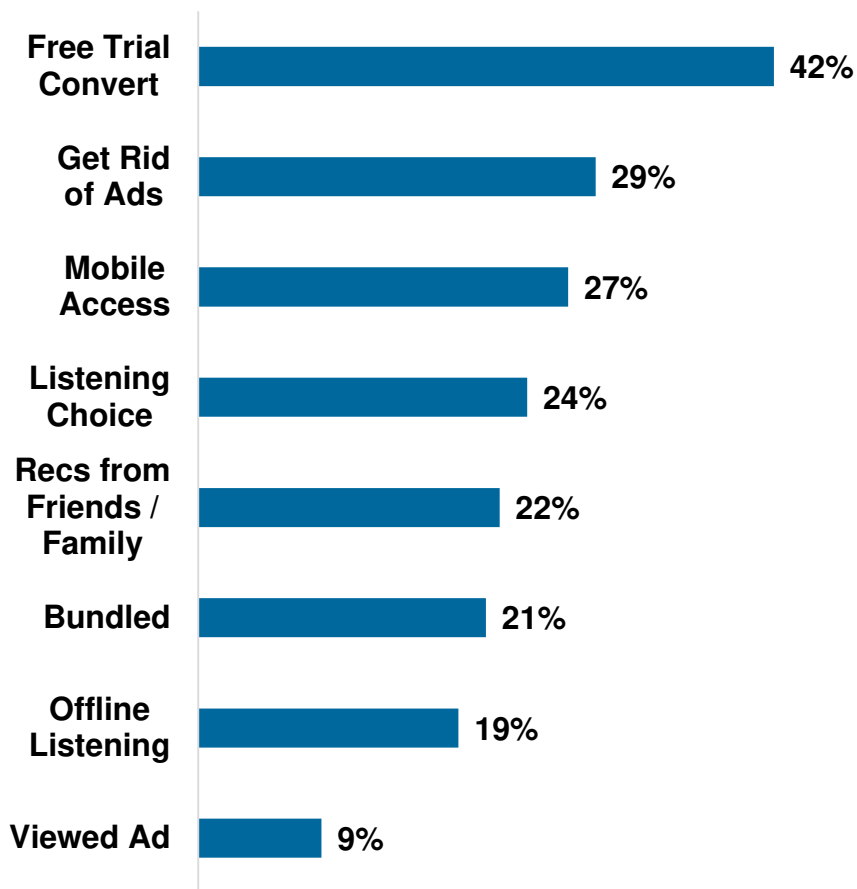
***Digital Leaders =  
Transforming Media With  
Better User Experiences +  
Lower Prices...Data + Scale***



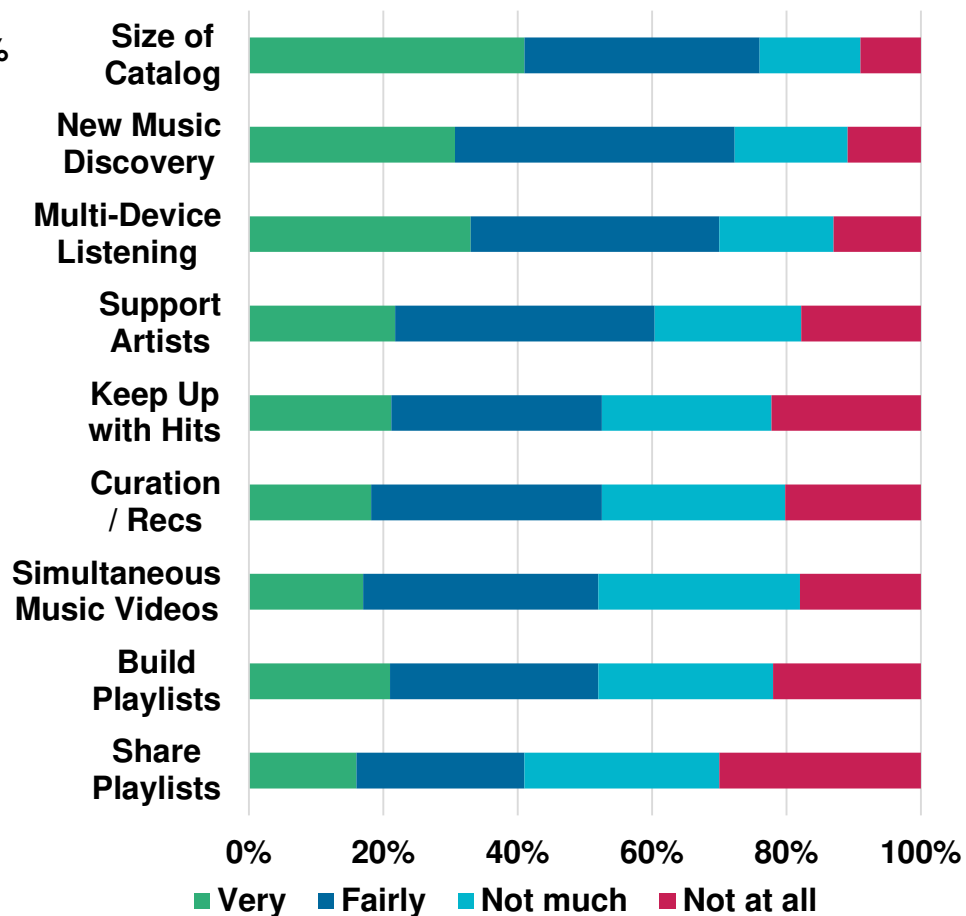
# Music = Why Streaming?

Access / Choice / Discovery / Personalization / Mobile / Fewer Ads

### Reasons for Paying for Music Streaming, 12/15

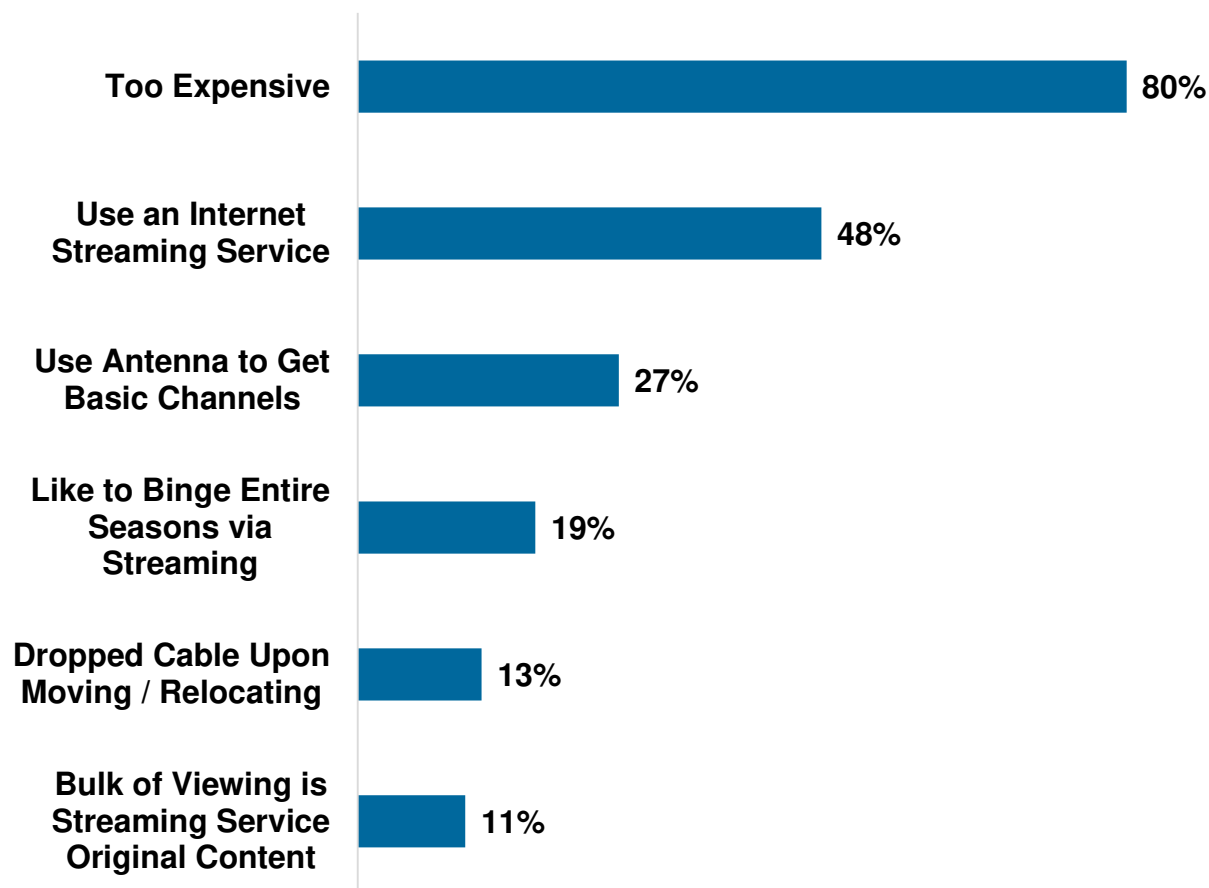


### Importance of Streaming Product Features, 12/15



# Video = Why Cord-Cutting? Lower Price + Convenience

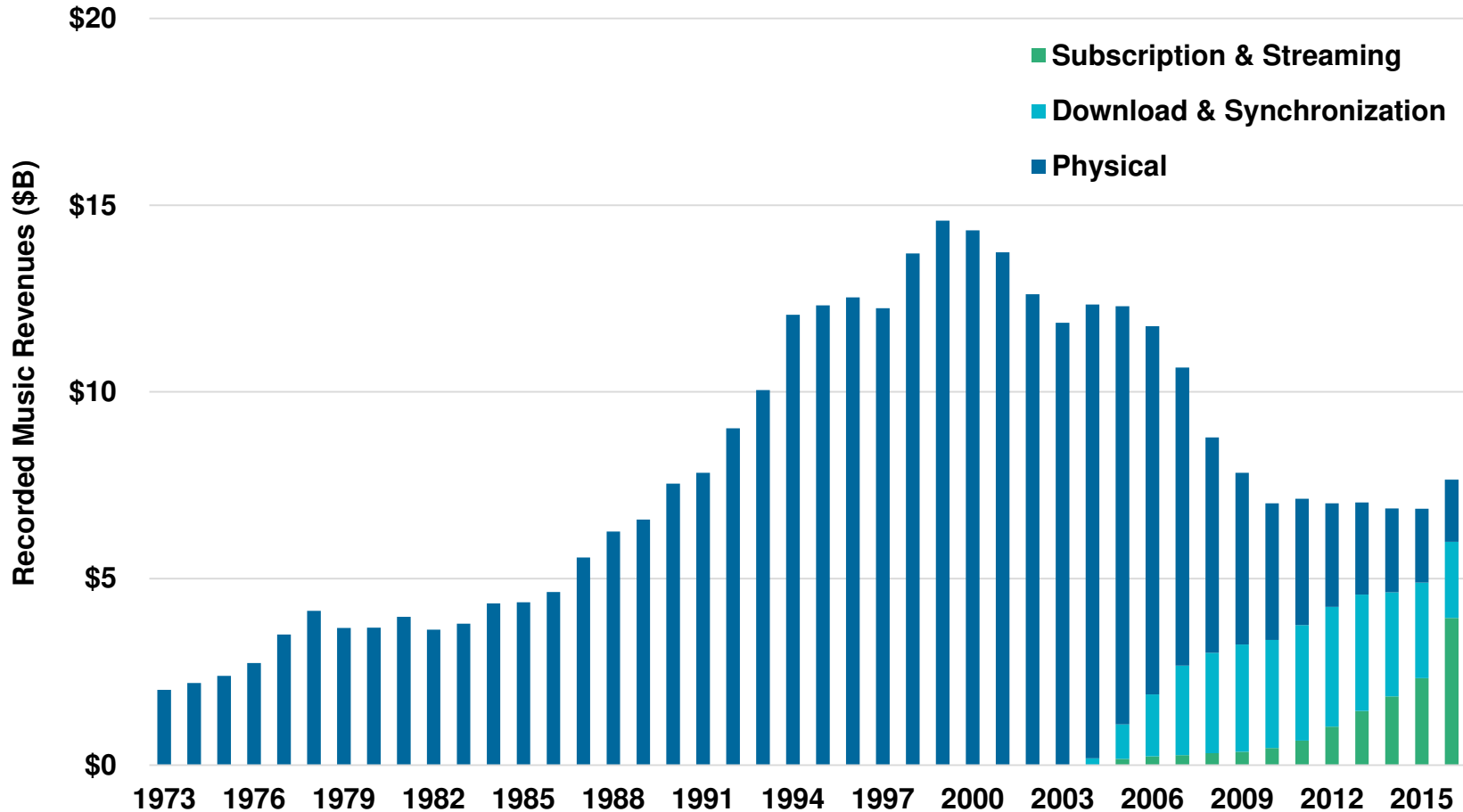
## Reasons for Cutting Pay-TV Service, Q4:16



*Digital Evolution of  
Music + Video =  
Ramping Rapidly...*

# Recorded Music = Revenue +11% After 16 Years of -4% Annual Average Growth... Subscription & Streaming @ 52% of Revenue vs. 0% Thirteen Years Ago, USA

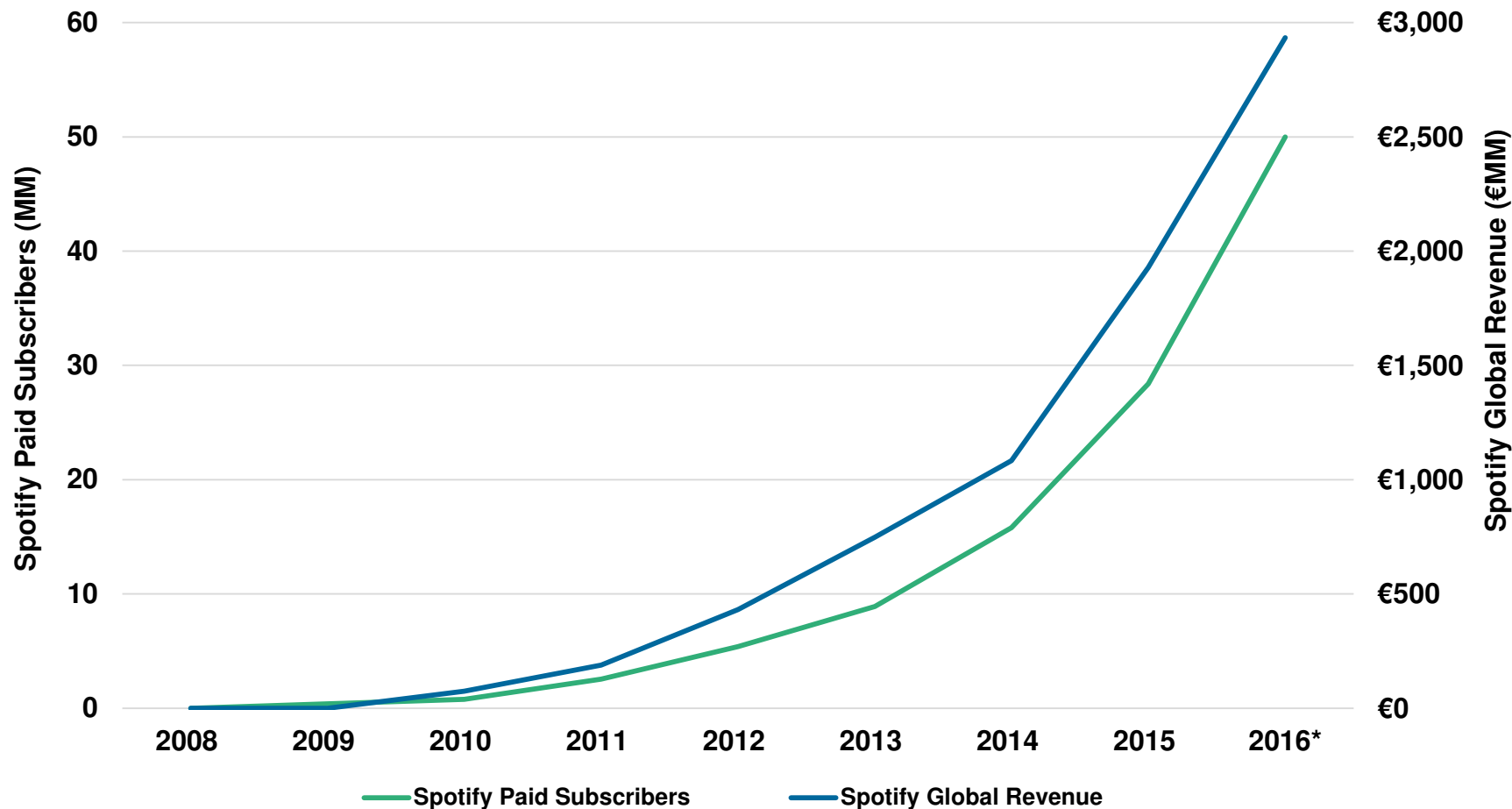
## Recorded Music Revenues by Format (\$B), USA, 1973-2016



# Spotify = Catalyst for Internet-Driven Evolution of Music Industry... 0 → 50MM Paid Subscribers / 126MM MAUs in <9 Years...

## Spotify Subscribers (MM) & Revenue (€MM), 2008 – 2016\*, Global

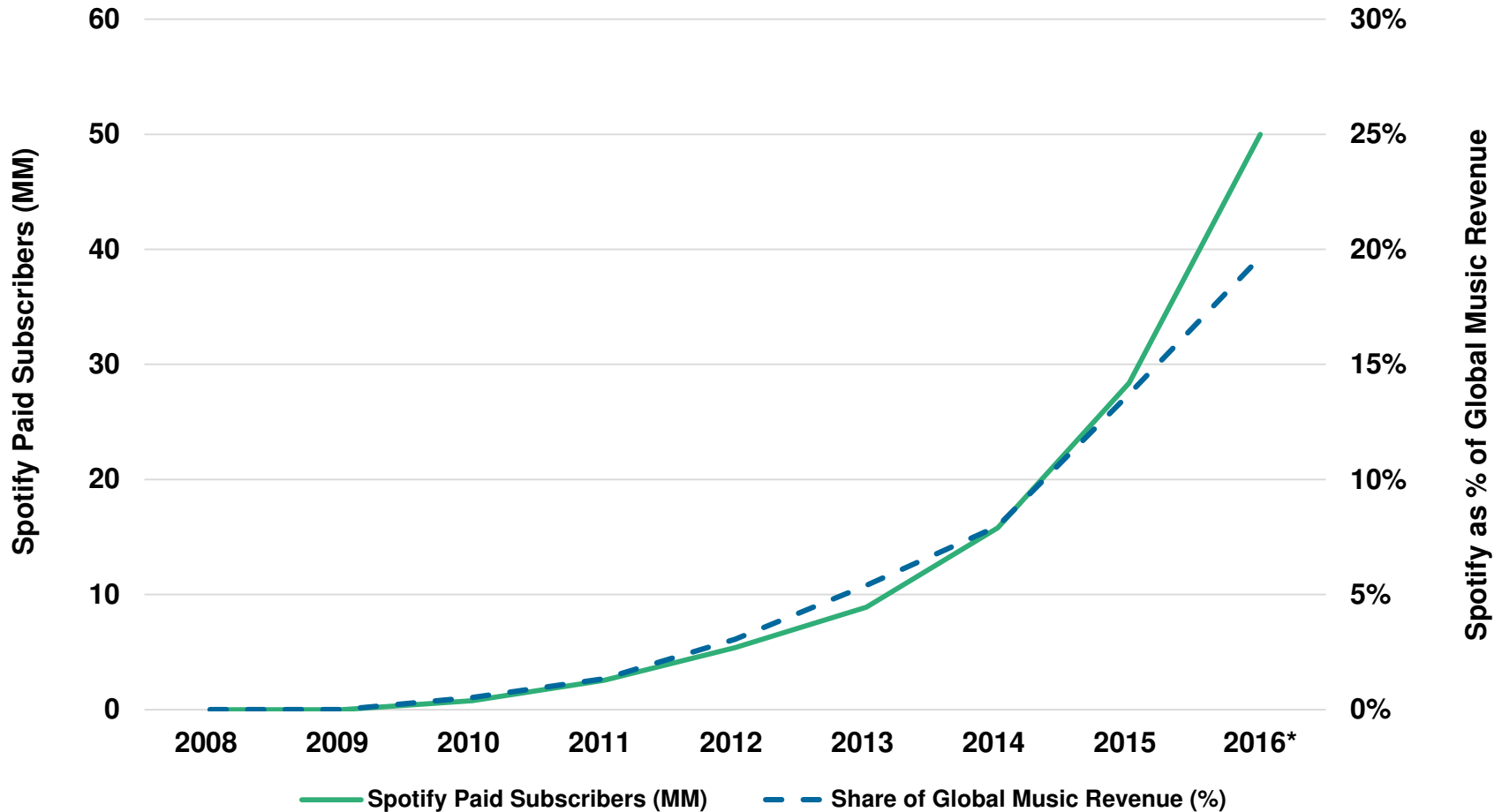
Q4:16 Monthly ARPU = €5.80 (\$6.10)



...Spotify = 20% of Global Music Industry Revenue vs. 0% in 2008

## Spotify Subscribers (MM), 2008 – 2016\*, Global

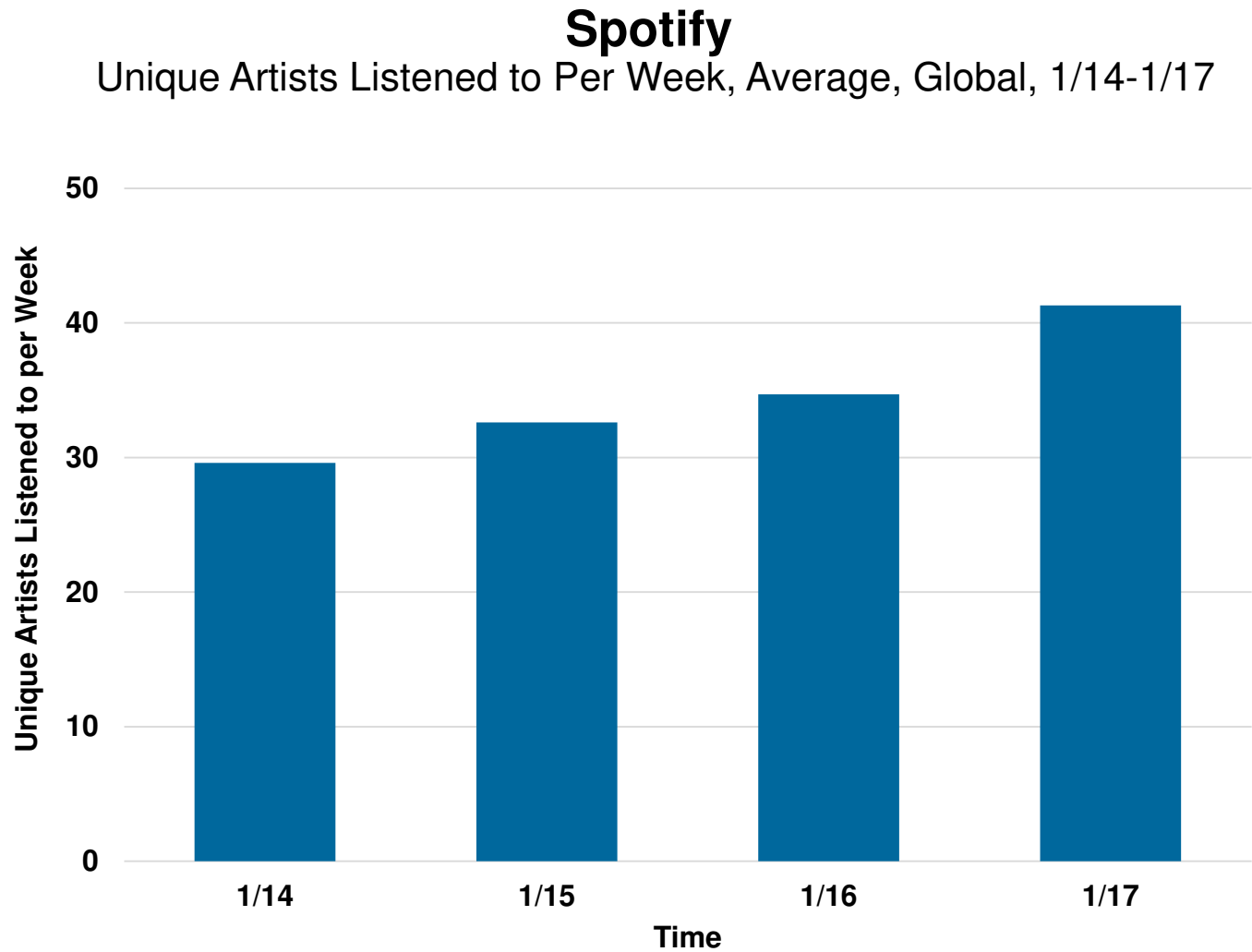
Q4:16 Monthly ARPU = €5.80 (\$6.10)



Source: Spotify, IFPI 2017 Global Music Report

\* Subscribers as of 3/2017, when Spotify announced they had reached the 50 million subscriber mark.

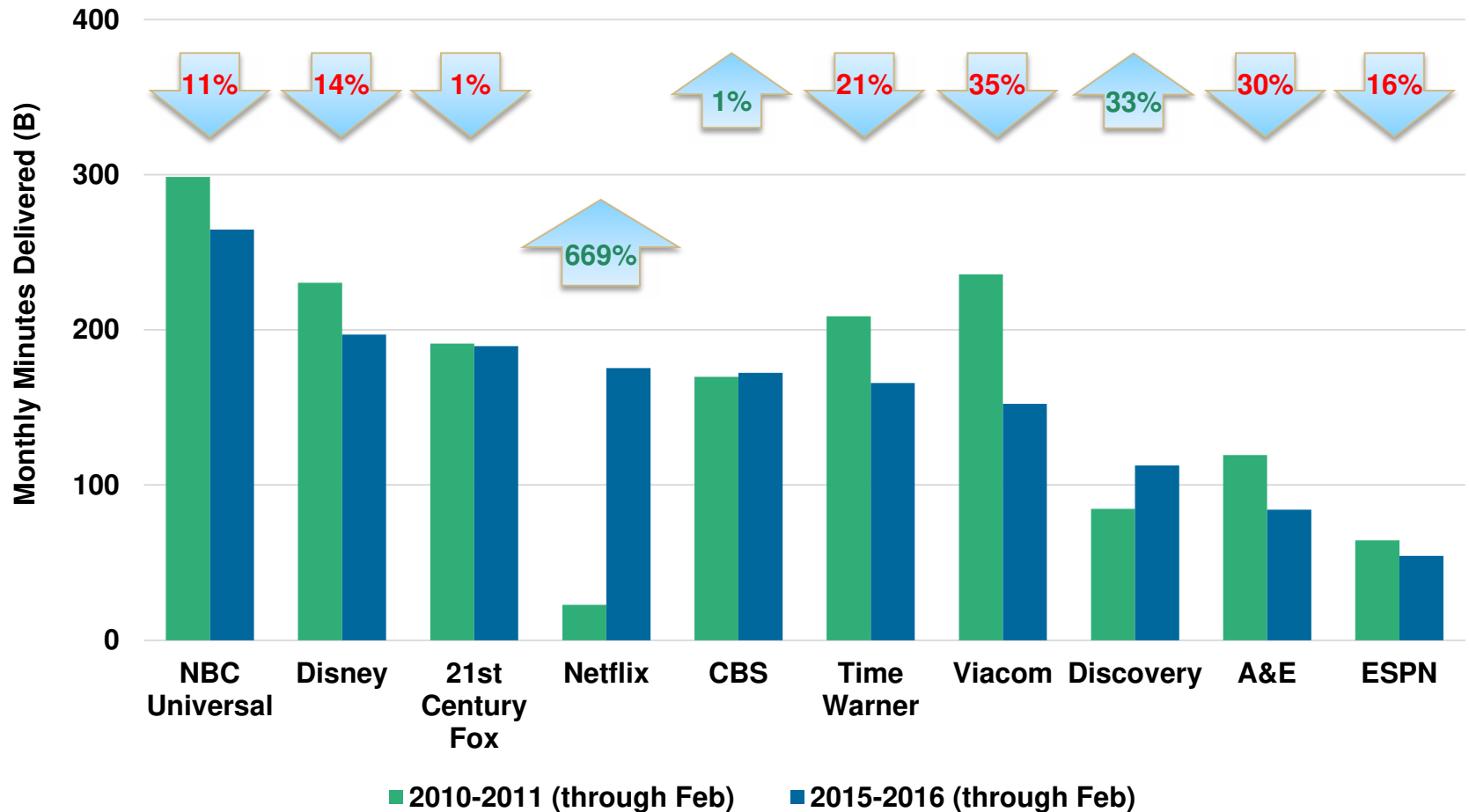
# Spotify = Users Listen to 41 Artists per Week, +40% (vs. 1/14) Owing to... Recommendation Engine (Data + Algorithms)





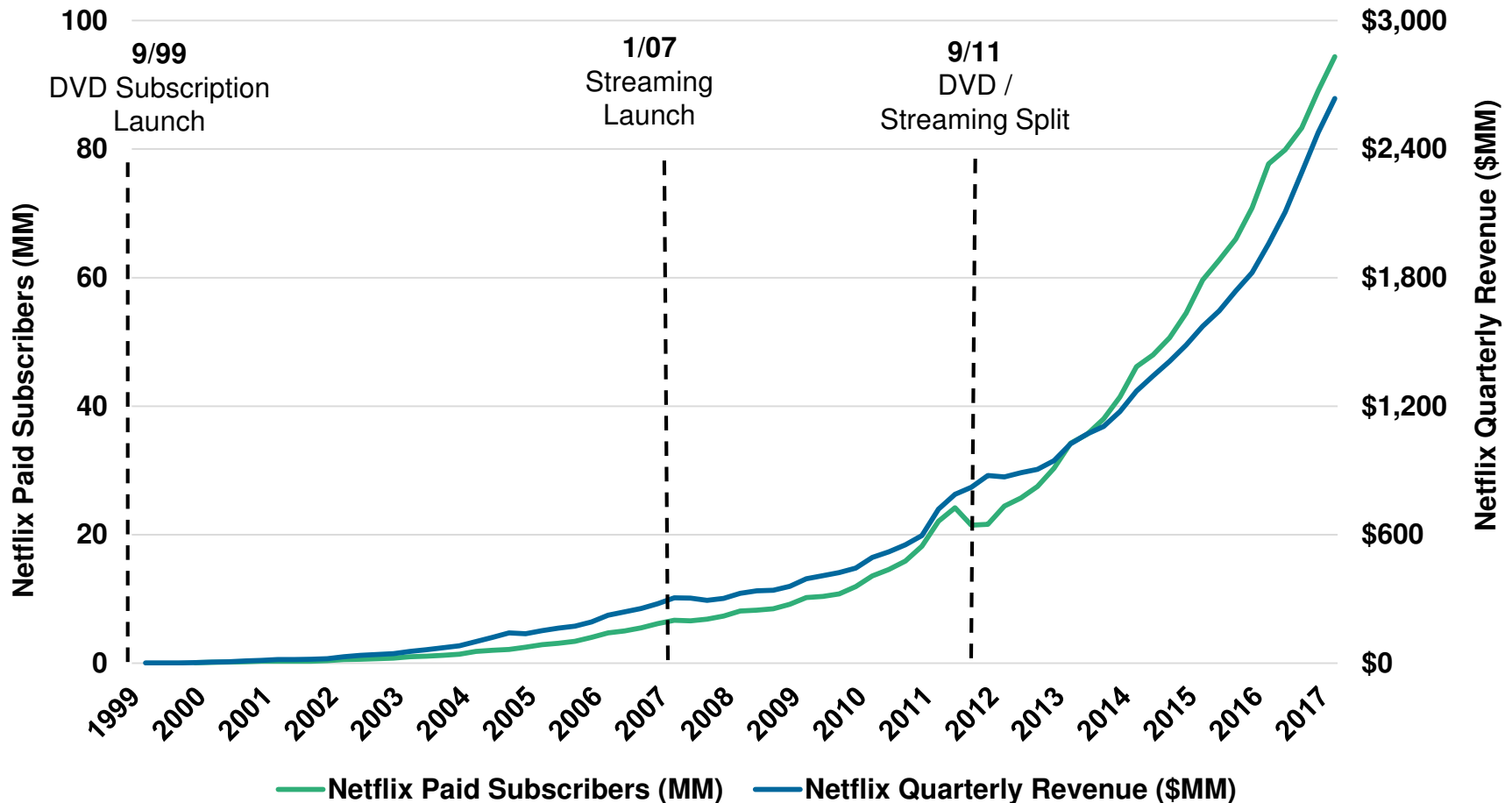
# Network TV\* Minutes Delivered = 2011 Top 5 Networks -10% Average... Netflix +669% Over 5 Years, USA...

## Monthly Minutes Delivered By Network Group, USA, 2010/11-2015/16



# Netflix = Catalyst for Internet-Driven Evolution of Video Industry... 95MM Streaming Subscribers in 10 Years...

## Netflix Subscribers (MM) & Quarterly Revenue (\$MM), 2/99 – 3/17, Global Q1:17 Streaming ARPU per Month = \$9.14

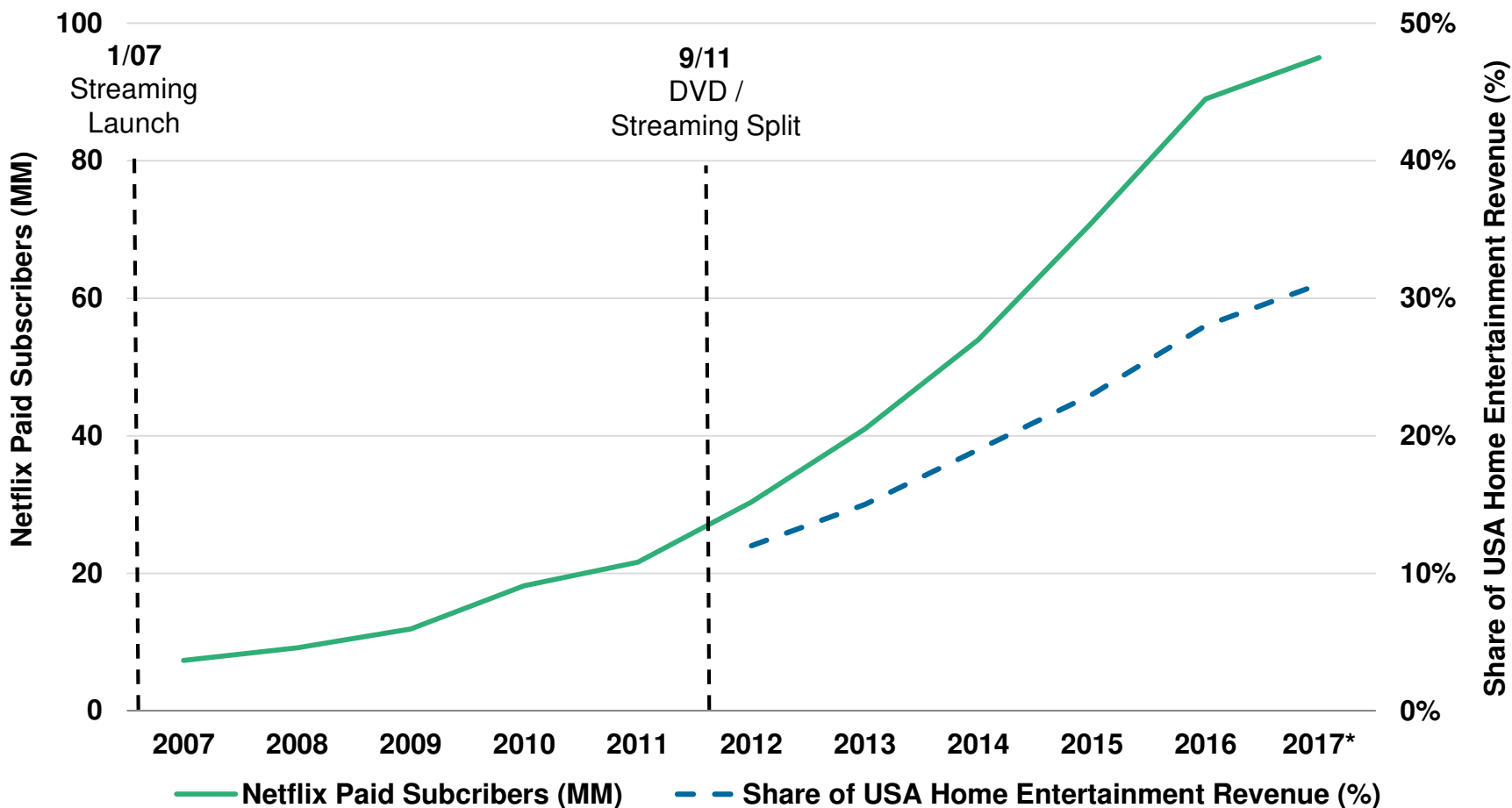


Source: Netflix  
 Note: Netflix subscription DVD service launched 9/1998. Data before Q3 2001 represents all subscribers because paid subscribers not broken out. Netflix split streaming subs from DVD subs in Q3 2011; graph shows only streaming subs thereafter. ARPU shown ex-DVD.

# ...Netflix Streaming = From 0% to >30% of Home Entertainment Revenue in 10 Years, USA

## Netflix Subscribers, 2009 – 2017\*, Global

Q1:17 Streaming ARPU per Month = \$9.14

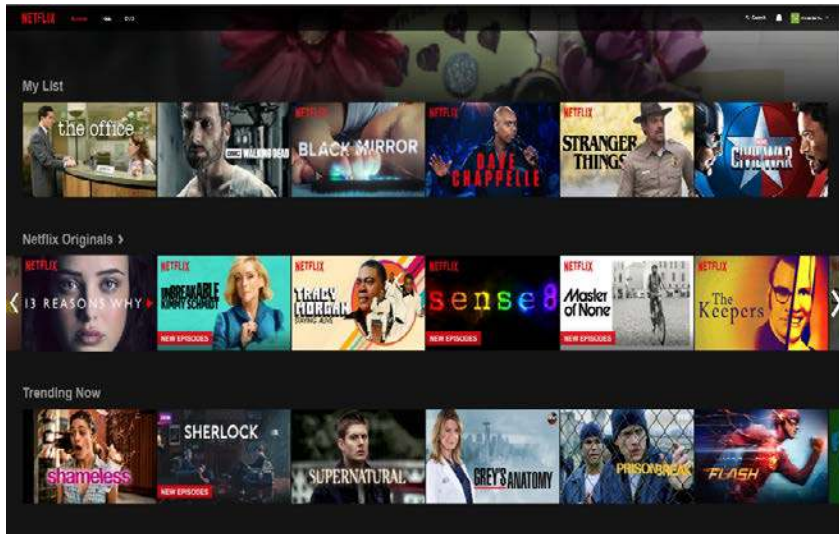


# Google Pioneered Search / Find / Obtain (SFO) for Content + Products... Netflix + Spotify Pioneered Search / Find / Serve Up (SFS) for Media

## *From Give to Get...With Data + Algorithms*

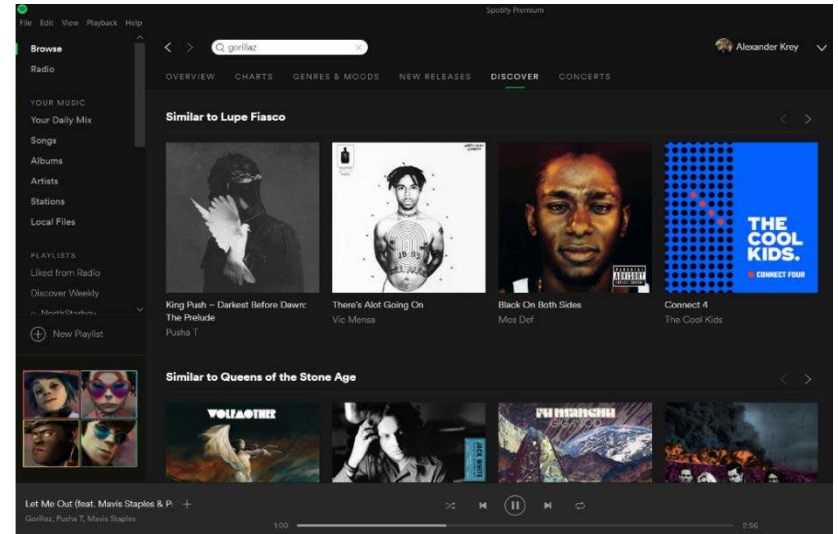
**98MM Different Netflixes...**

*\$1B cost savings / year  
from recommendations (12/15)*



**126MM Different Spotifys...**

*~5B Discover Weekly streams in  
<1 year post-launch (5/16)*

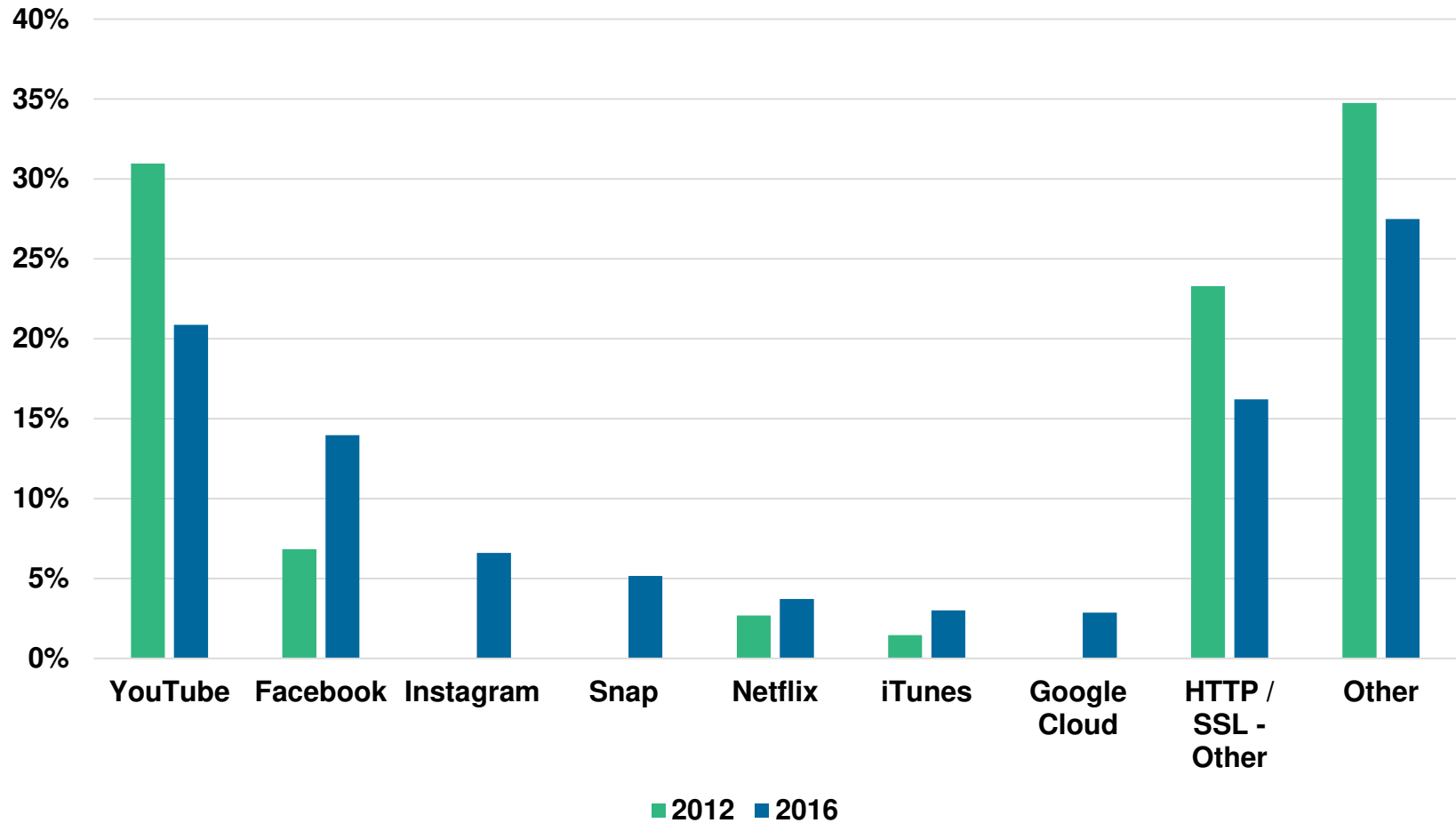


*Digital Evolution of  
Music + Video =*

*Multiple Approaches...*

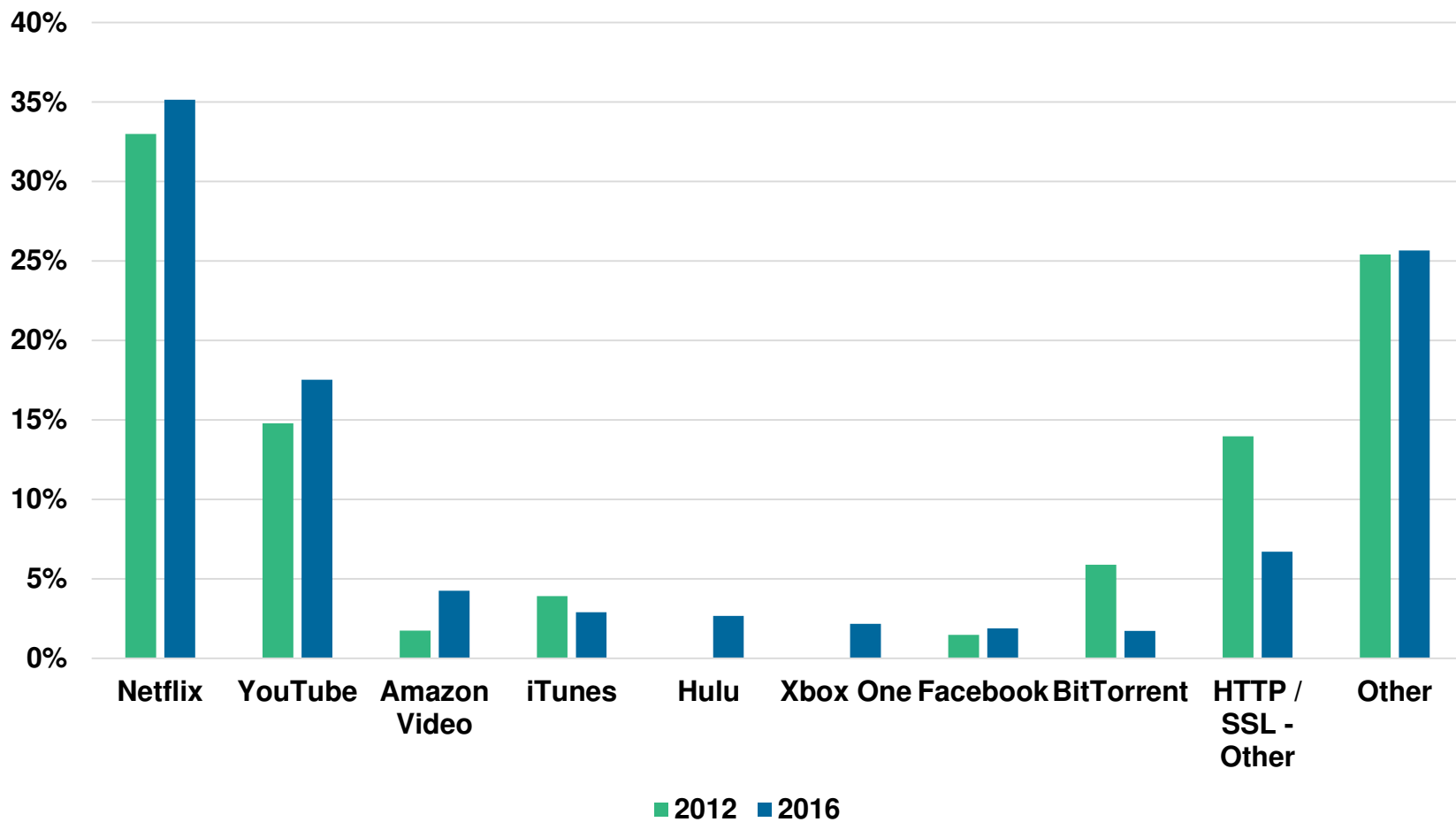
# Facebook / Instagram / Snap = Mobile Video Traffic Share Gainers Over 4 Years...

## Share of Downstream Video Traffic (%), North America, 2H 2016



# ...Netflix / YouTube = Fixed-Access Video Traffic Share Leaders

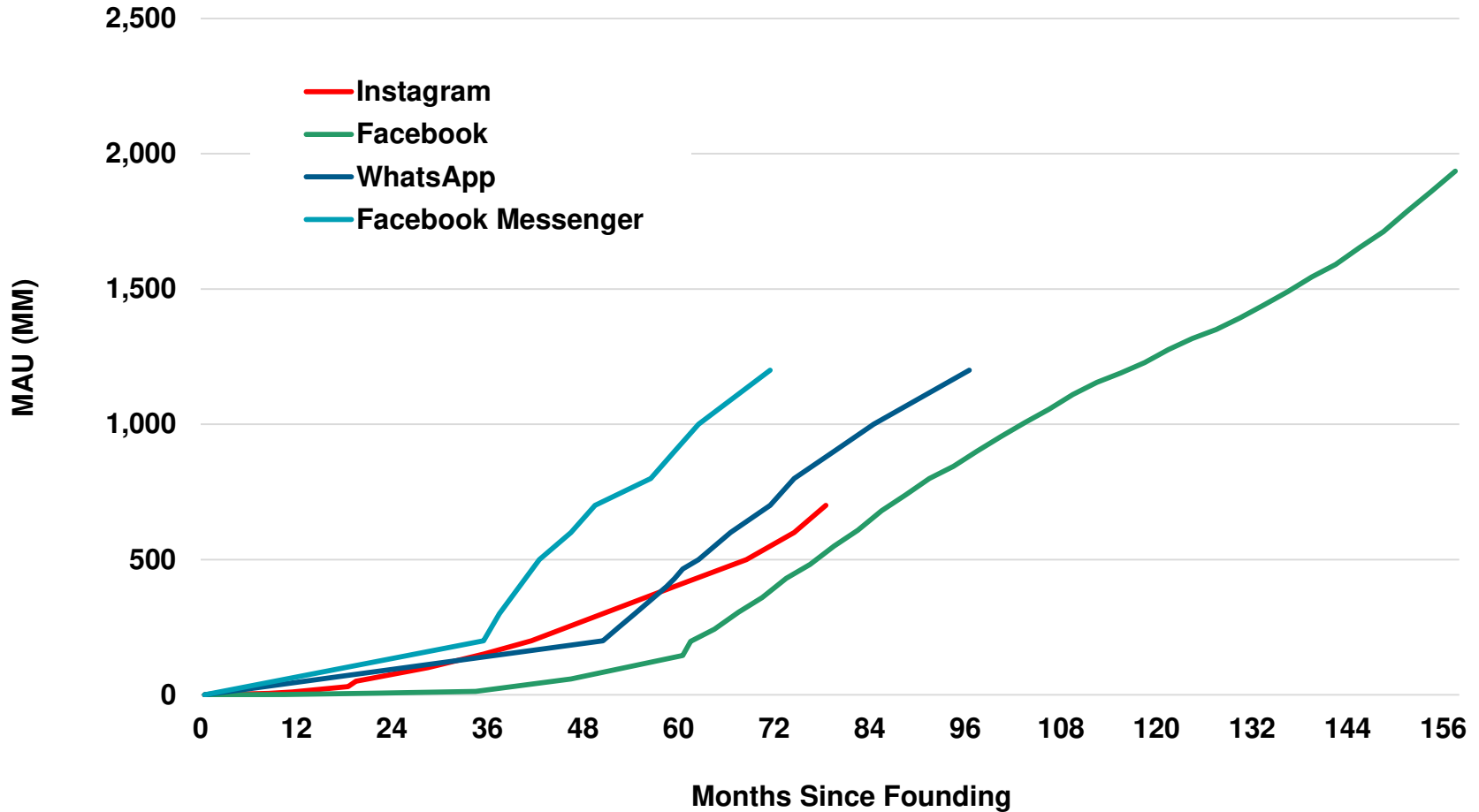
## Share of Downstream Video Traffic (%), North America, 2H 2016





# Facebook (Facebook / WhatsApp / Messenger / Instagram) = Video Ramping Across Platform

## Facebook Platform MAUs, Global, Months Since Launch



Source: Facebook, Instagram, Whatsapp, Financial Times, TechCrunch

# Snap = Ramping Original Short-Form Content

## Snap 'Original Shows'

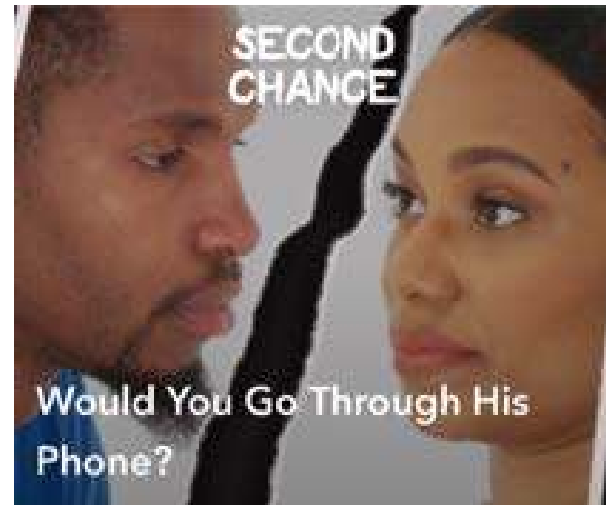
### Phone Swap

10MM+ Views for 1<sup>st</sup> Episode, 5/17



### Second Chance

8MM+ Views for 1<sup>st</sup> Episode, 5/17



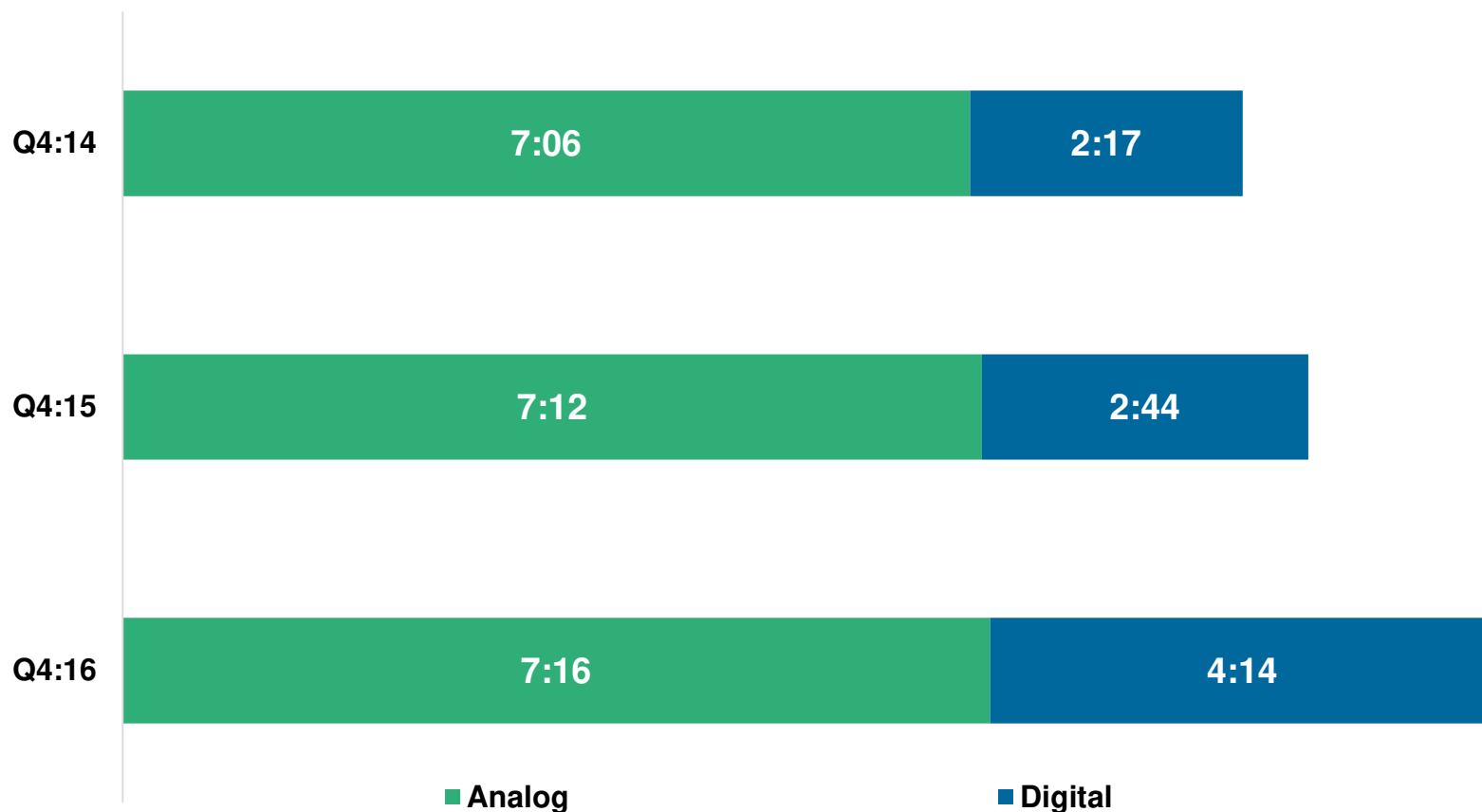
***Generational Media Usage =***

***Chasm Increasing...***

***Shifts to Internet-Enabled  
Media Continue***

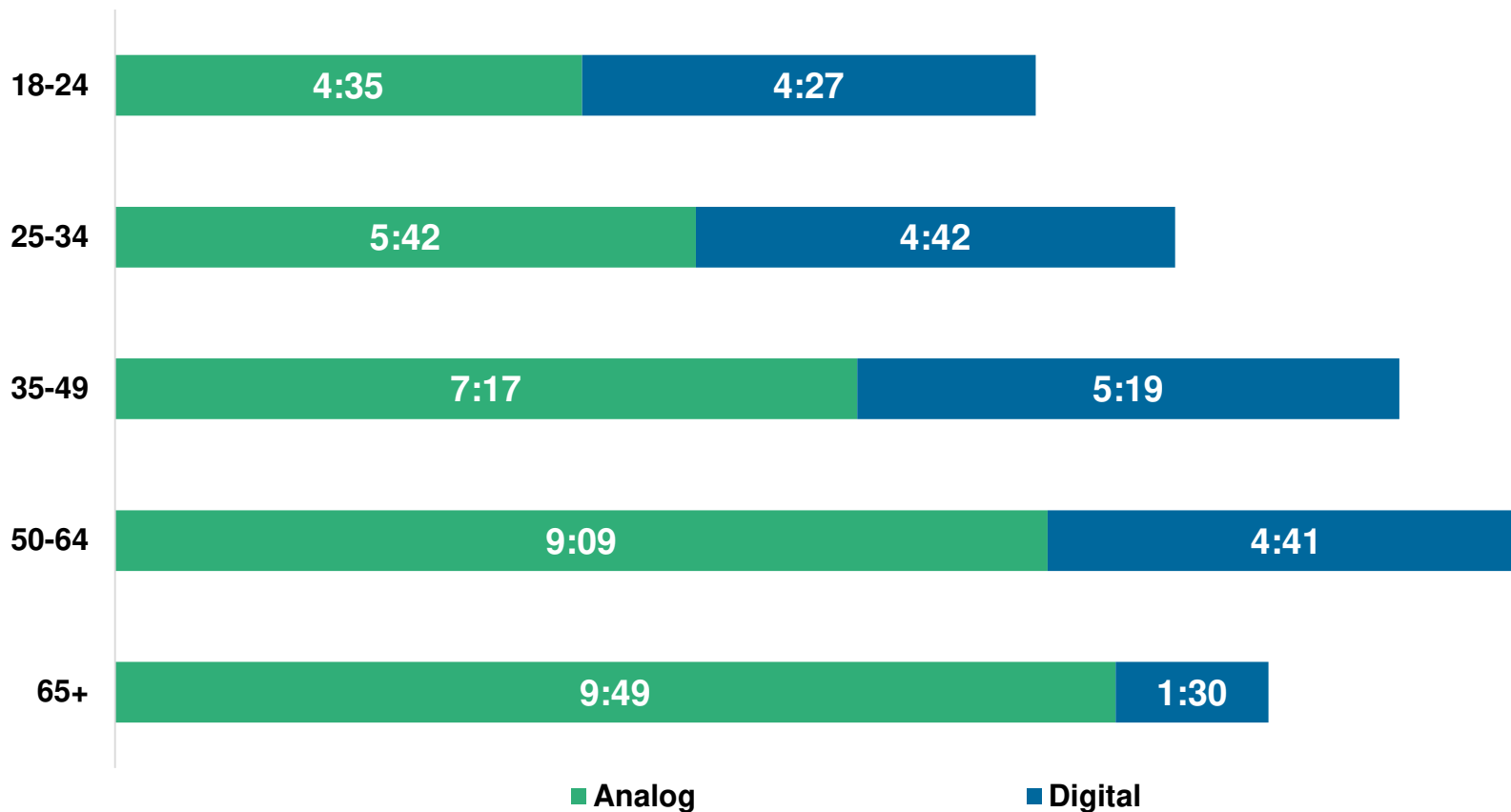
# Mobile Device Time per Day = +2x Over 2 Years...

## Daily Time Spent by Media (Not De-Duped), USA, Q4:14-Q4:16



# ...Mobile Device Time per Day = 18-24 Year-Olds @ 49% Digital...65+ Year-Olds @ 13%, USA

## Daily Time Spent by Media & Age Bracket (Not De-Duped), USA, Q4:16



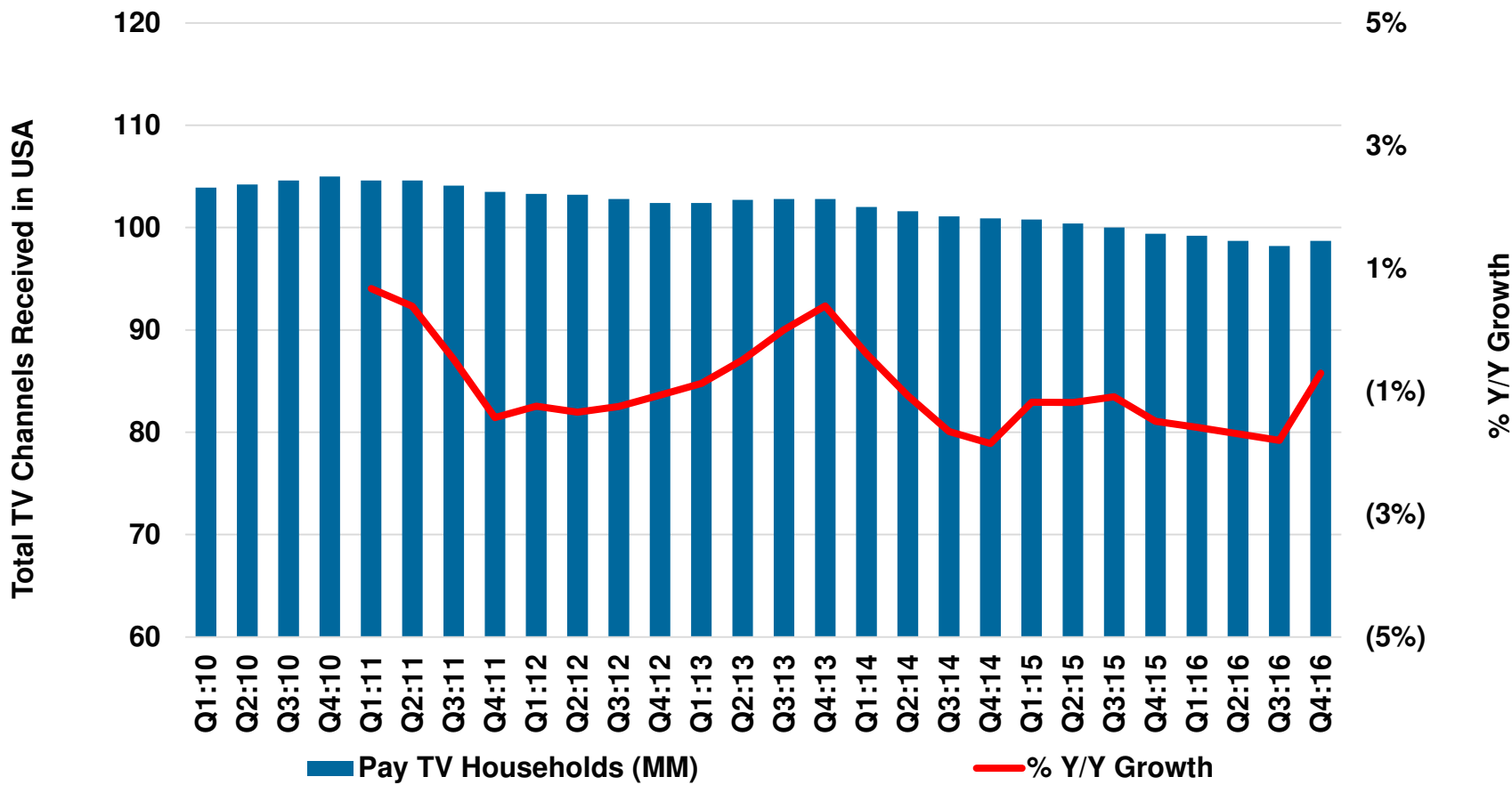
***Traditional Cable Conundrum =***

***Channels + Consumer Prices +  
Programming Costs Rising...***

***Subscribers Falling***

# Pay TV Household Growth = -1.3% Average for Last 12 Quarters... While Programming Costs >2x+ since 2006...

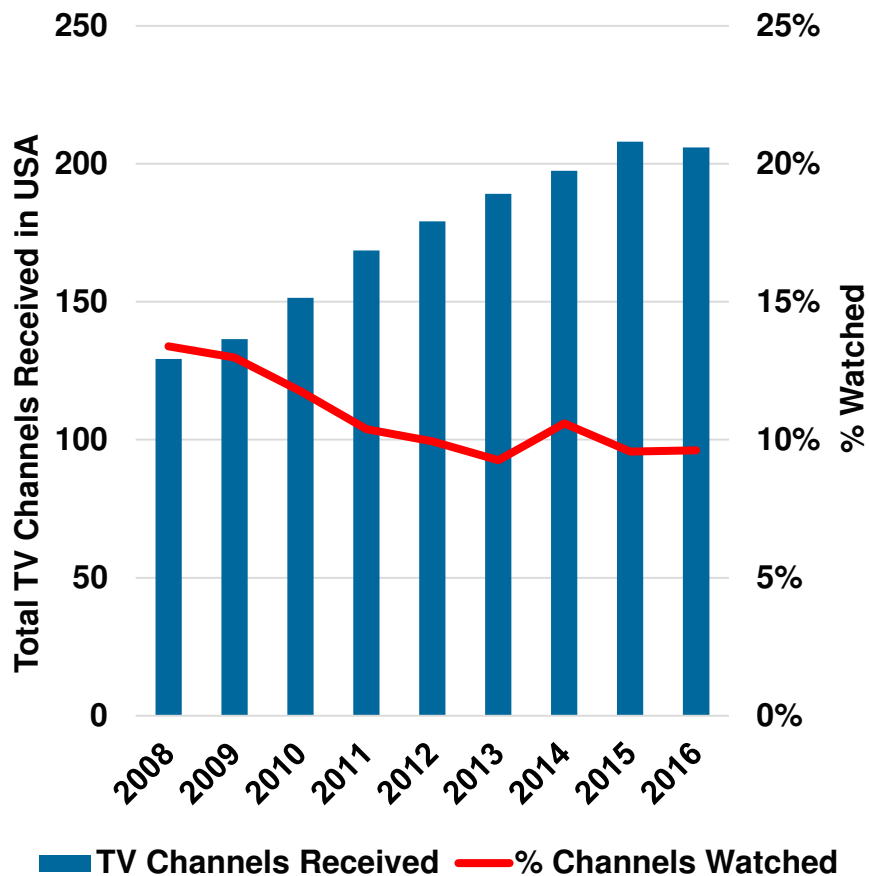
## Pay TV Households (MM), USA, 2010-2016



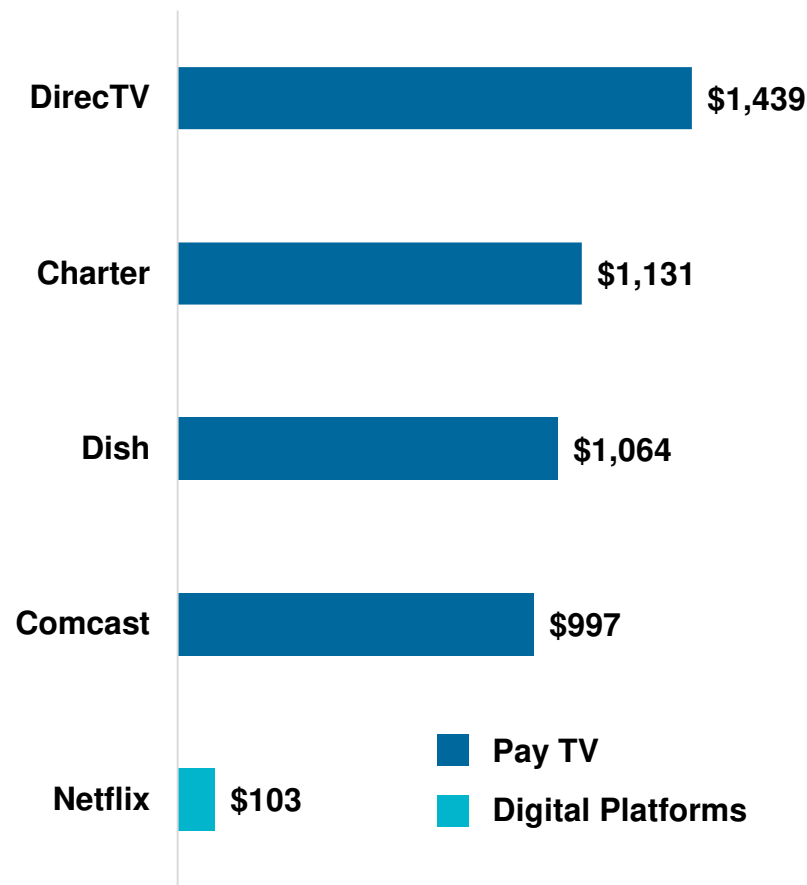


# ...# TV Channels Watched <10% of Channels Received... Pay TV ARPU 10-15x > Netflix...

## Average TV Channels Received vs. Watched per Household, USA, 2008-2016



## Annual ARPU, Selected Platforms, 2016



***Digital Subscriptions =***

***Rising Owing to Massive  
User Experience Improvements...***

***On-Demand / A La Carte Selection +  
Choice / Personalization / Payment  
Systems / 2-Way UGC / Mobile...***

# Media Evolution (1950-2017) = Market of Millions → Market of One x Millions

## Network Era 1950s-1980s

*Cater to All /  
High Viewership /  
No Personalization*



## Cable Era 1980s-2010s

*Broad Genres /  
Focus on Programming /  
Limited Bundle Choices*



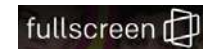
## Digital Era Current

*Cater to Sub-Genres /  
Power Users /  
A La Carte + Subscription*

### Digital Distributors



### Digital Studios



# Media = Distribution Disruption @ Torrid Pace

- 1) **Digital Leaders** = Transforming Media With Better User Experiences + Lower Prices...Data + Scale
- 2) **Generational Media Usage** = Chasm Increasing as Shifts to Internet-Enabled Media Continue
- 3) **Traditional Cable Conundrum** = Channels + Consumer Prices + Programming Cost Rising...Subscribers Falling
- 4) **Digital Subscriptions** = Rising Owing to Massive User Experience Improvements (On-Demand / Selection + Choice / Personalization / Payment Systems / 2-Way UGC / Mobile...)

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**THE CLOUD =**

**ACCELERATING CHANGE ACROSS  
ENTERPRISES**

*ALEX KURLAND @ KLEINER PERKINS*

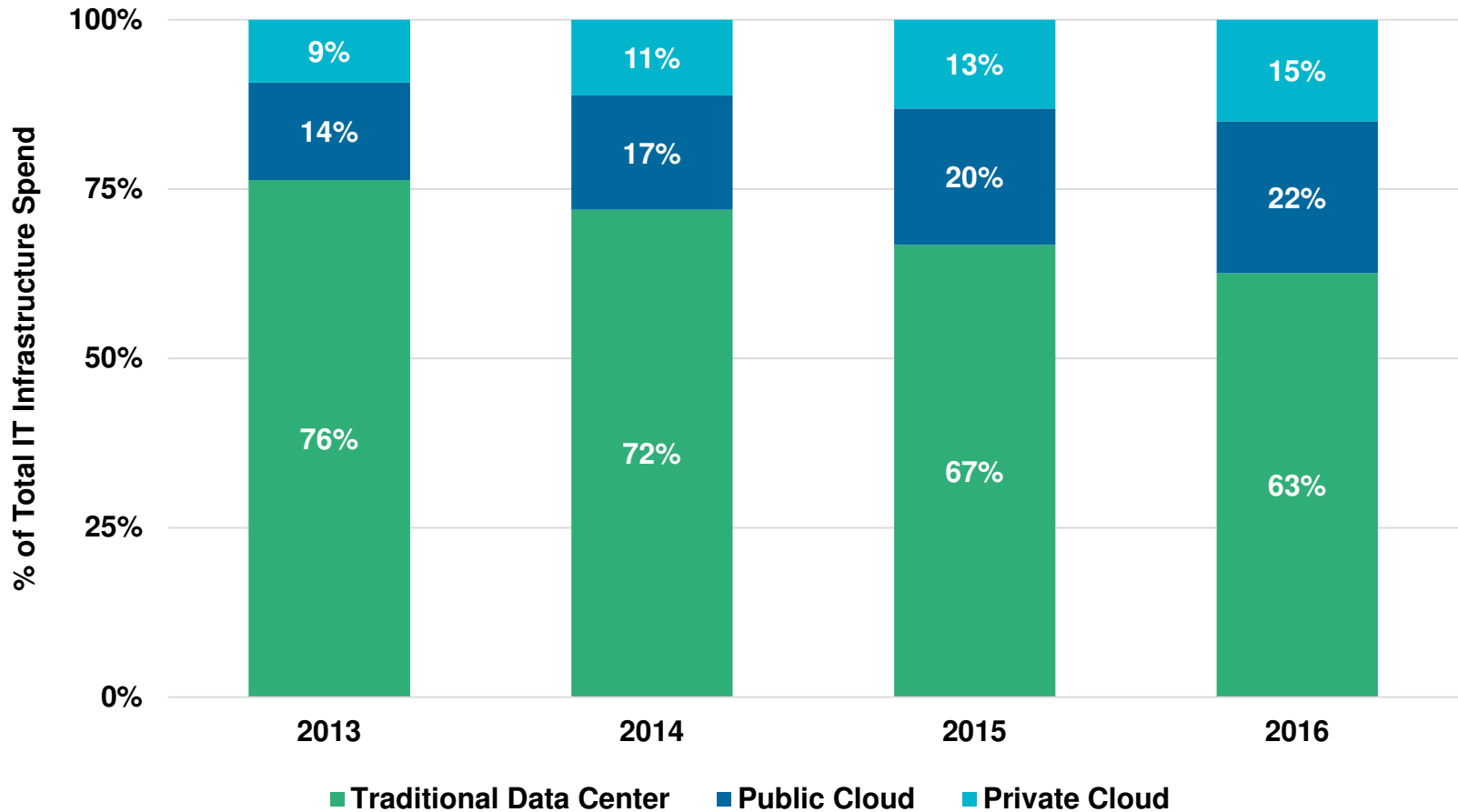
# The Cloud = Accelerating Change Across Enterprises

- 1) **Cloud Adoption** = Reaching New Heights + Creating New Opportunities
- 2) **Enterprise Software** = Customer Expectations → Mirroring Those of Consumer Apps
- 3) **Security** = More Applications → More Vulnerabilities

***Cloud Adoption =  
Reaching New Heights +  
Creating New Opportunities***

# Public + Private Clouds = Approaching Traditional Data Center Spend... +37% to \$36B vs. 2014

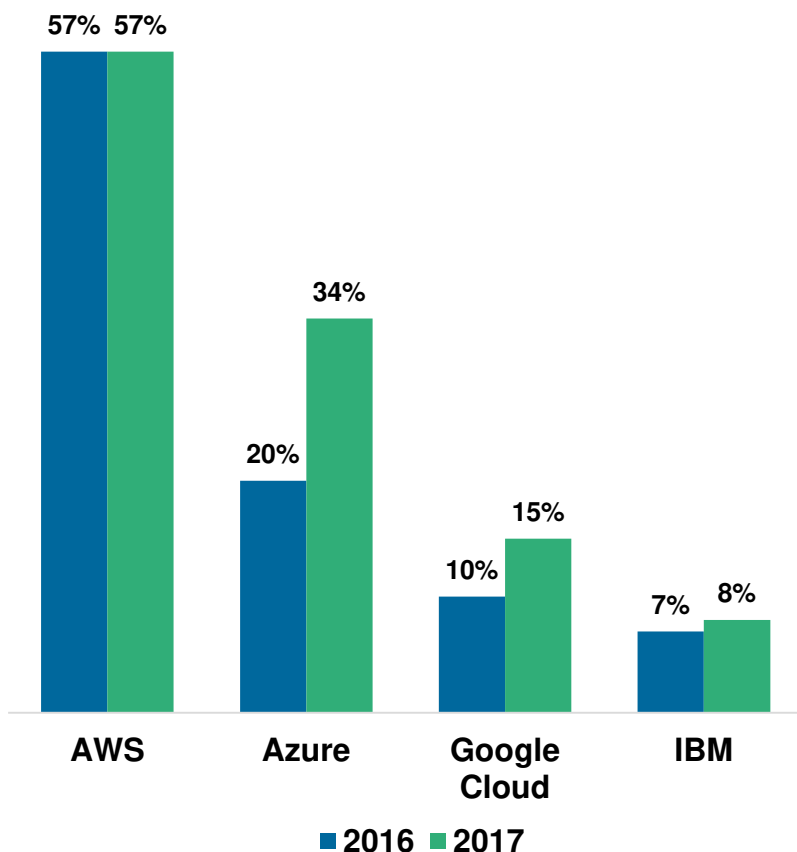
## IT Infrastructure Spend, Global, 2014-2016



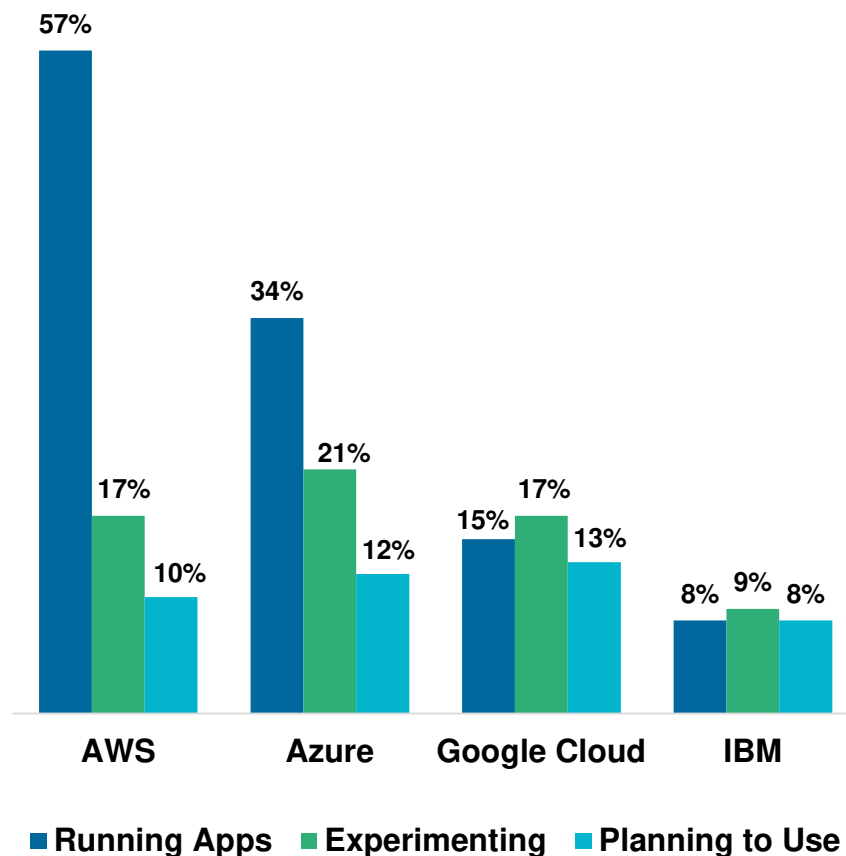


# Public Cloud Adoption Trends = AWS Maintains Lead...Azure + Google Rising

**Public Cloud Adoption, 2016 vs. 2017**  
*% of Respondents Running Applications*

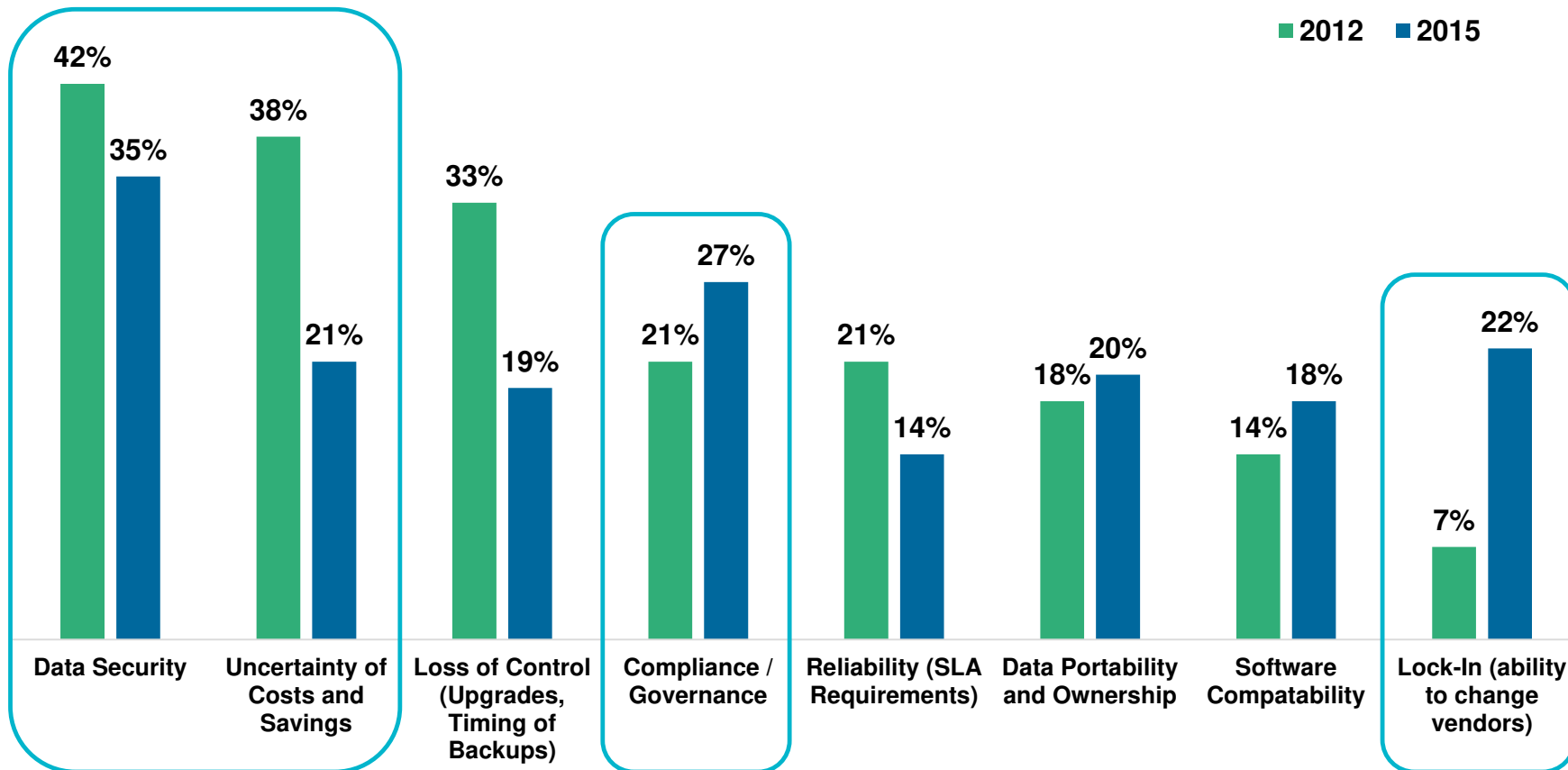


**Public Cloud Adoption, 2017**  
*% of Respondents Running, Experimenting, or Planning to Use Applications*

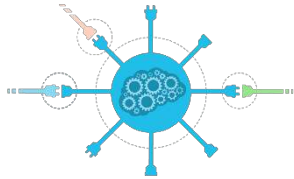


# Cloud Concerns = Shifting from Data Security + Cost Uncertainty → Vendor Lock-In + Compliance / Governance

## Share of Respondents Citing Criteria as Top-Three Concern, USA, 2012-2015



# Cloud Evolution / Tools = Paving Way for... Innovation Across Infrastructure Landscape...



## **New Methods of Software Delivery =**

APIs / Browser Extensions...creating new wave of capabilities (+ companies) for both companies and end users



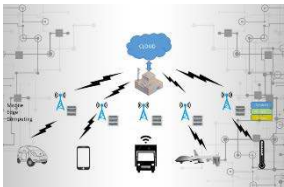
## **Containers / Microservices =**

Simplify software development process / improve consistency between testing & production environments / reduce complexity of managing & updating apps due to modular approach



## **Elastic Analytical Databases =**

Likes of Google BigQuery / Snowflake / AWS Redshift Spectrum nearly infinitely scalable / usage based + have minimal maintenance requirements



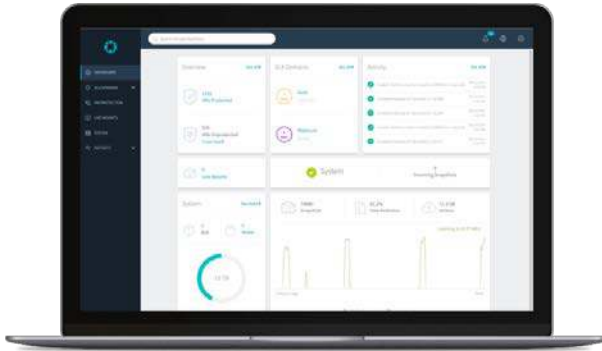
## **Edge Computing =**

Pushing compute away from centralized nodes & closer to sources of data... addresses many IT challenges when running data-centric workloads in cloud – reduces latency / can have security + compliance benefits...

# ...New Cloud Companies Emerging... Providing Elegant + Intuitive Experiences for End Users

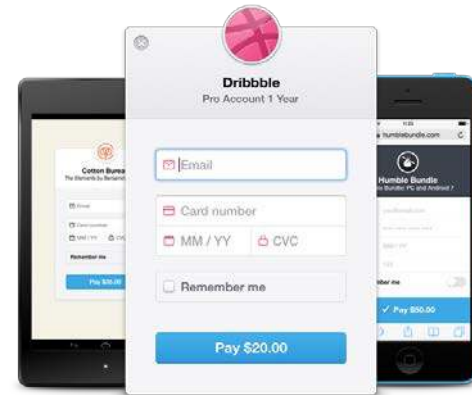
## Rubrik

Managing data across cloud & on-prem infrastructure, approaching \$100MM in annualized bookings



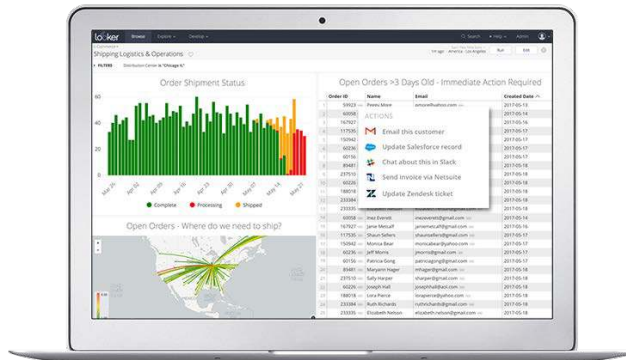
## Stripe

Processing billions of transactions a year across 100K+ businesses in 100+ countries



## Looker

Empowering data analysis for 40K users across every department, each averaging 2 new queries every day



## CloudHealth

Actively managing more than 1.3MM policies globally for hybrid & multi-cloud environments



***Enterprise Software =  
Customer Expectations →  
Mirroring Those of Consumer Apps***

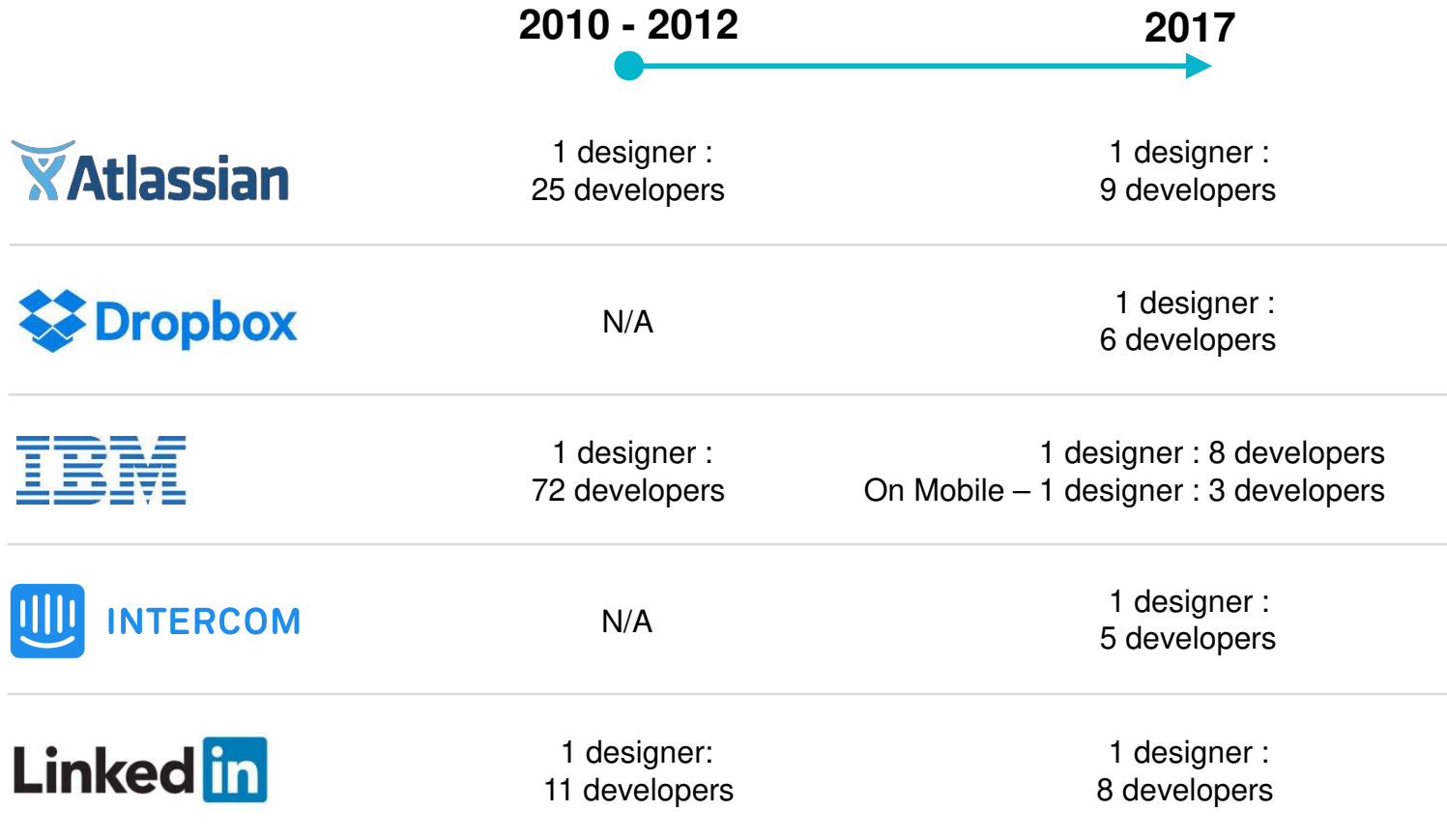
# Enterprise Software (2000 → 2017) = Users Expect Products to be as... Well Designed / Easy-to-Use / Reliable as Consumer Apps

*Perpetual, On-Premise Software → Cloud-Based SaaS Apps → Mobile-First Smart Apps*

	2000	2017
<b>Delivery Method</b>	On-Prem	Cloud-based
<b>Pricing</b>	Perpetual License	Subscription
<b>UX</b>	Generic	Personalized
<b>Intelligence</b>	Constrained	Unlimited (AI / ML)
<b>Growth Engine</b>	Sales	Product
<b>Purchase Decision</b>	Top-Down	Bottoms-Up
<b>Measure of Engagement &amp; Customer Satisfaction</b>	N/A	DAUs / MAUs / NPS

# Design = Increasingly Core to Enterprise R&D... End-Users Demanding Consumer-Quality Product Experiences

## Change in Designer : Developer Ratio, Selected Enterprises, 2010-2017



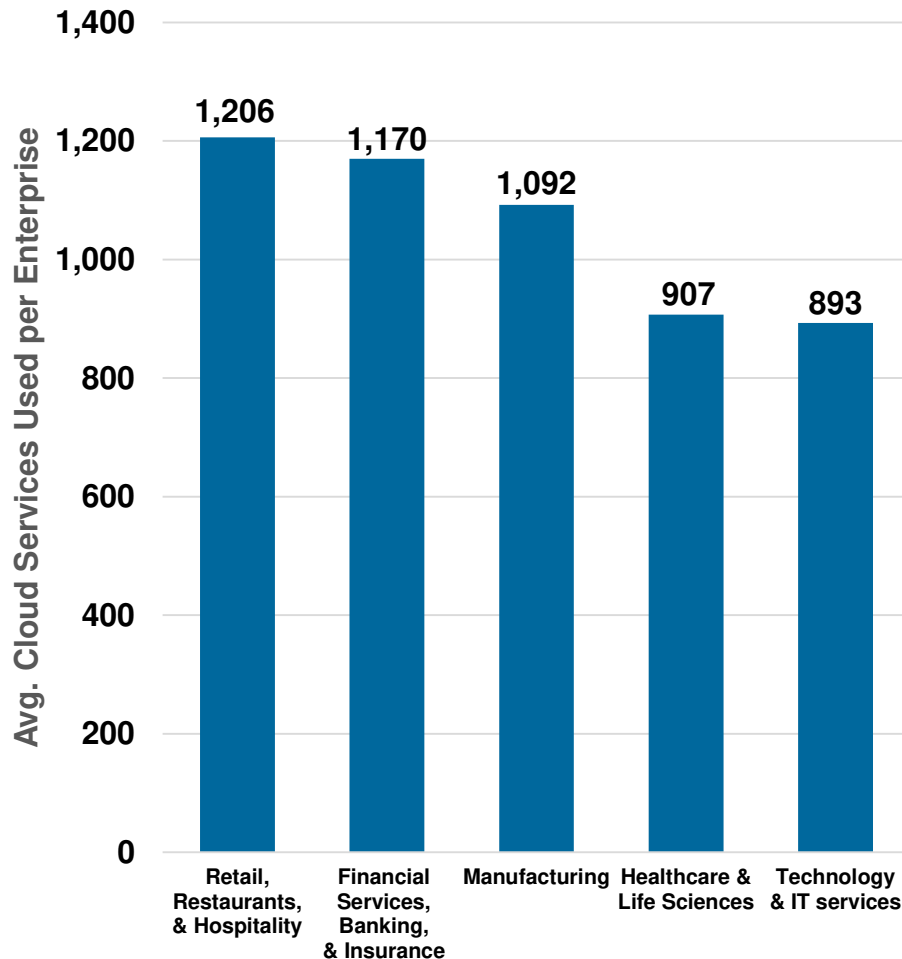
Source: Company data, Figma  
 Note: Ratios for entire orgs, unless noted otherwise. Atlassian historical ratio from 2012; Dropbox data for product org only; IBM historical ratio from 2012, data for product org only; Intercom data for product org only; LinkedIn historical ratio from 2010.

***Security =  
More Applications → More Vulnerabilities***



# Cloud-Enabled App Use in Enterprises = Rising Rapidly... Cheaper to Build / Easier to Adopt / Harder to Secure...

**Avg. # of Cloud Apps Used by Vertical, Global, April 2017**



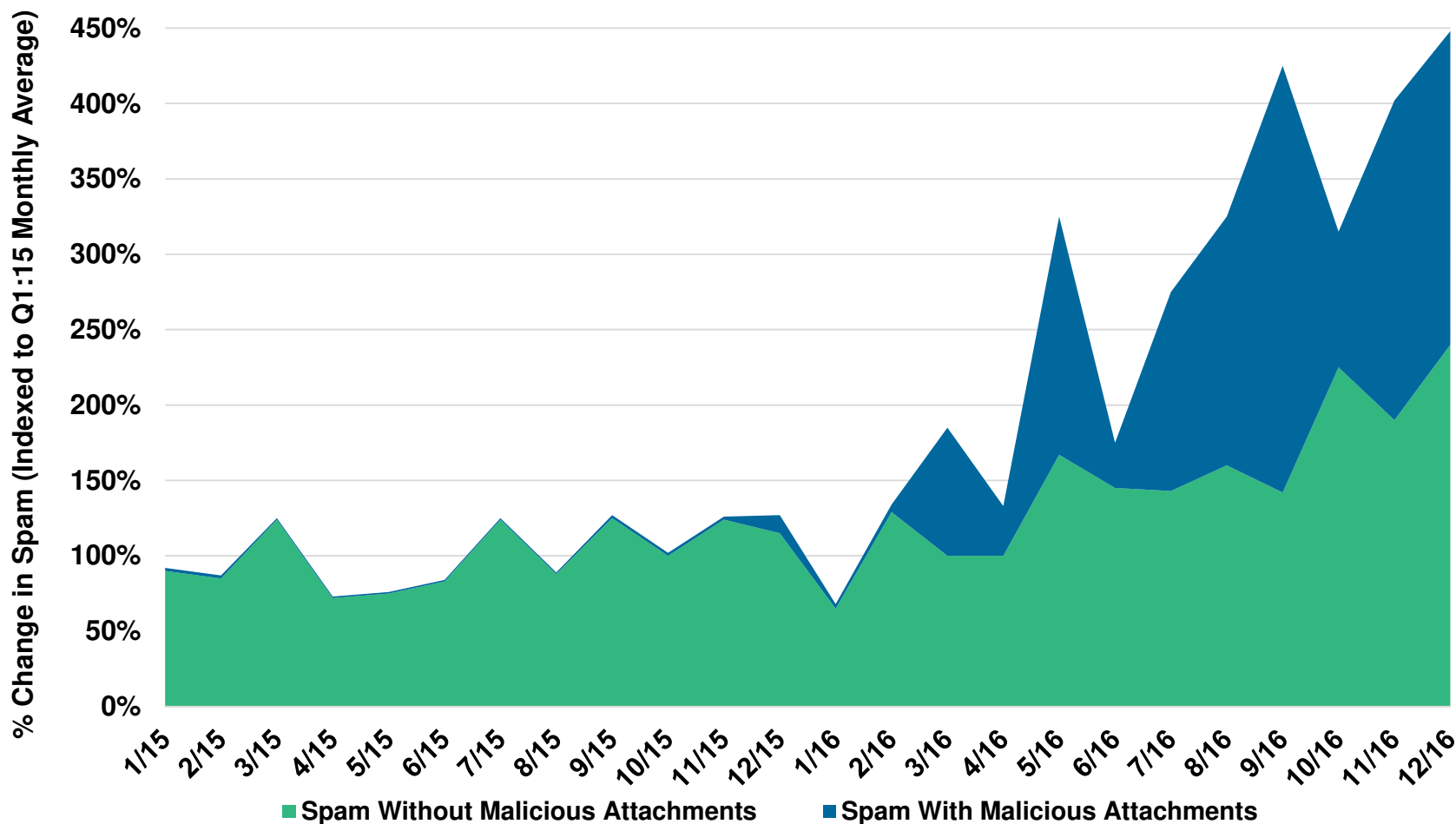
**Avg. # of Cloud Services used by Category, Global, April 2017**

Category	# Per Enterprise	% Not Enterprise Ready
Marketing	91	97%
HR	90	96%
Collaboration	70	87%
Finance / Accounting	60	95%
CRM / Sales	43	94%
Software Development	41	96%
Productivity	37	95%
Social	30	91%
Cloud Storage	27	72%
IT Service / Application Management	25	98%

This has serious security & compliance implications...  
**94% of all cloud apps used are not "enterprise-ready,"**  
per Netskope

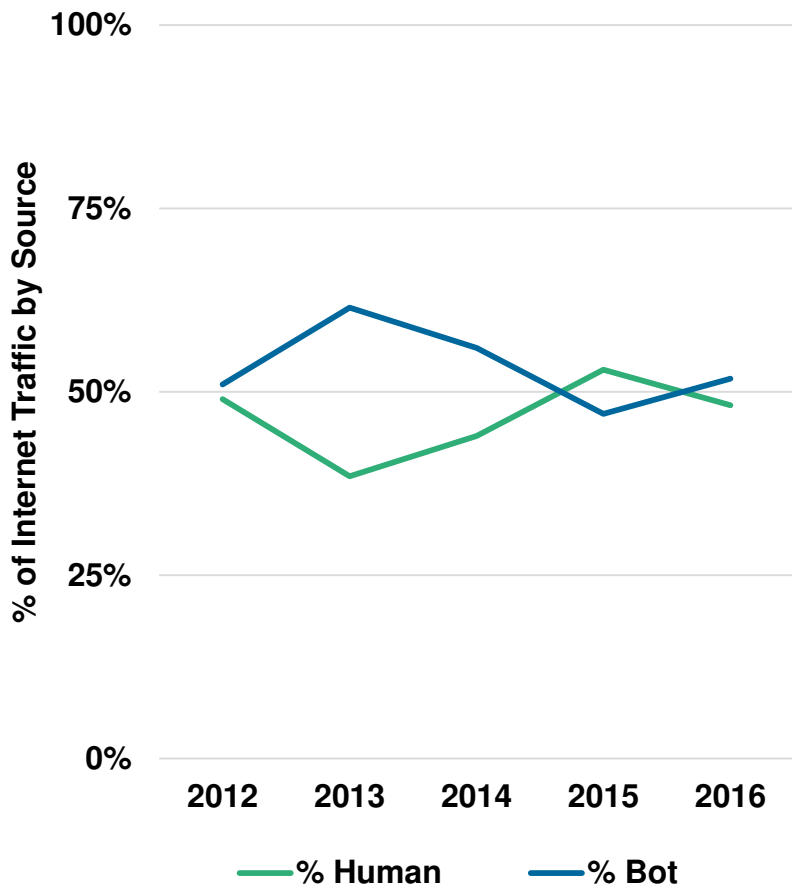
# ...Network Breaches = Increasingly Caused by Email Spam / Phishing... Spam +350% vs. Q1:15 Monthly Average...

## Change in Amount & Type of Spam, Global, 2015-2016 Indexed to Q1:15 Monthly Average

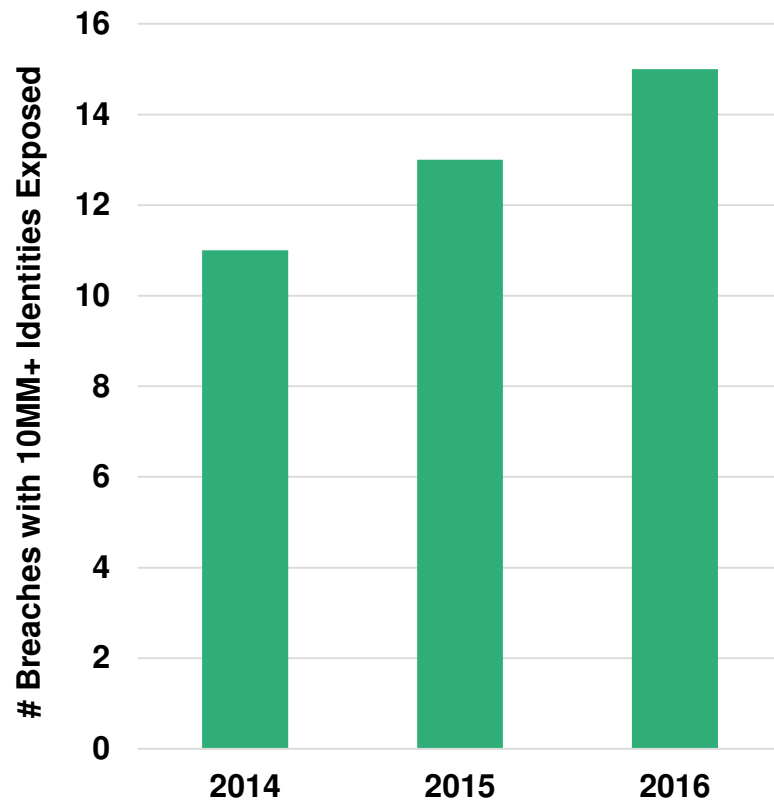


# ...Cyber Threats Severity Rising = 10MM+ Identities Exposed in... 15 Breaches in 2016...vs. 11 in 2014

**% of Internet Traffic by Source, Global, 2012-2016**



**Breaches with 10MM+ Identities Exposed, Global, 2014-2016**



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# CHINA INTERNET =

# GOLDEN AGE OF ENTERTAINMENT + TRANSPORTATION



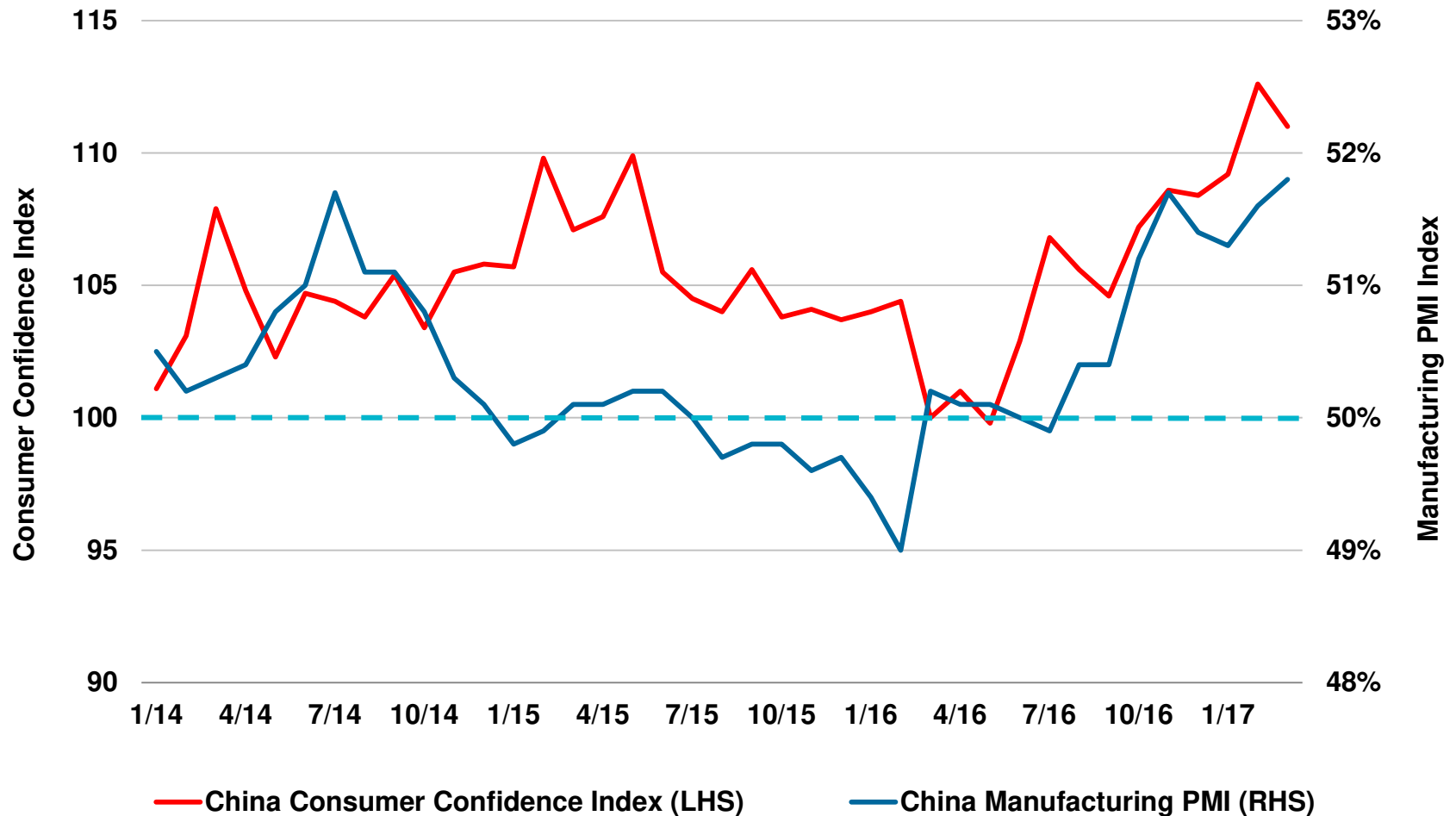
Hillhouse  
Capital

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***China Macro =  
Positive Trends***

# China Macro = Confidence Improving Since CH2:16

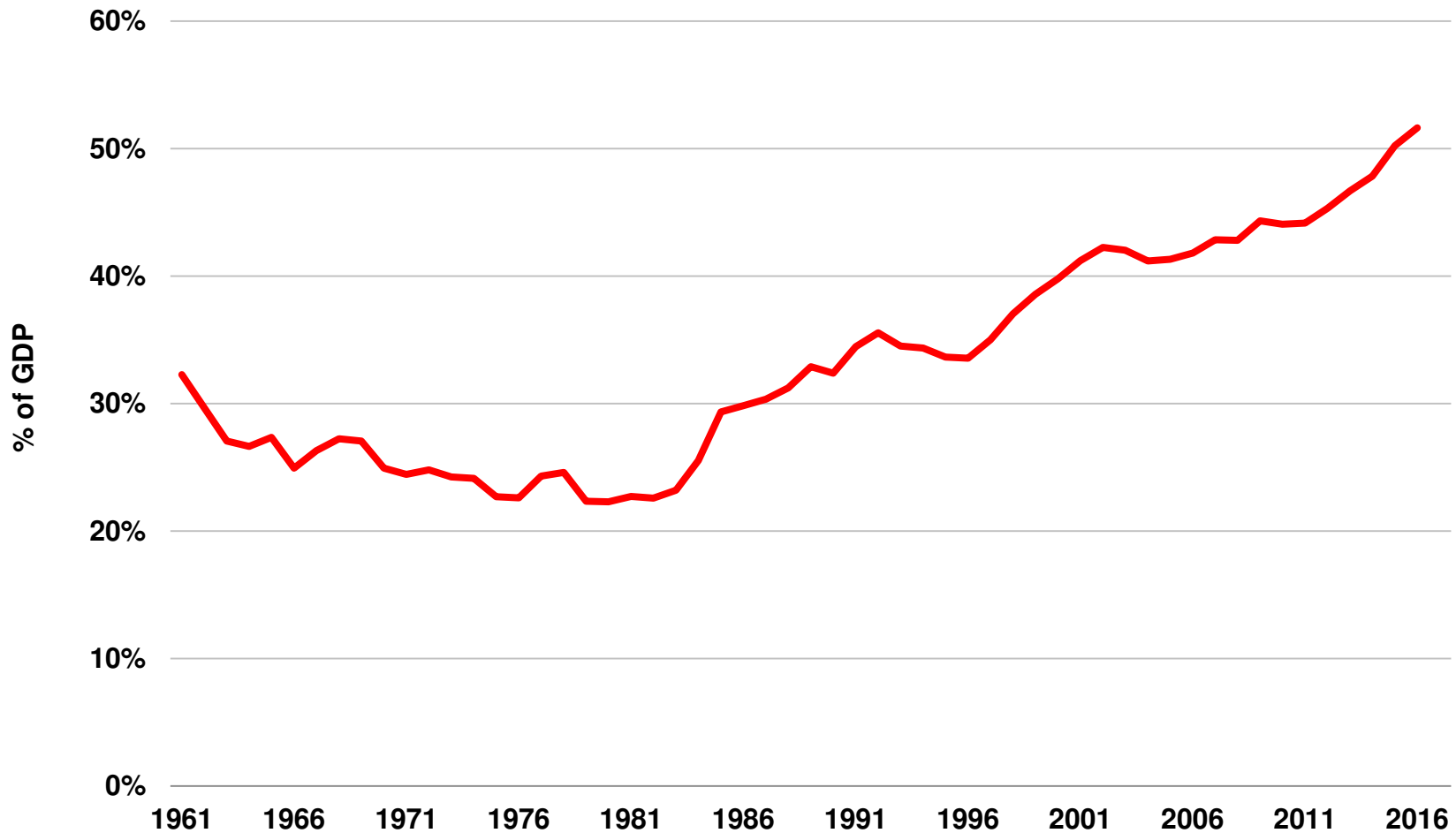
## Consumer Confidence Index & Manufacturing PMI Index, China, 1/14 – 3/17



Source: China National Bureau of Statistics, Bernstein Research

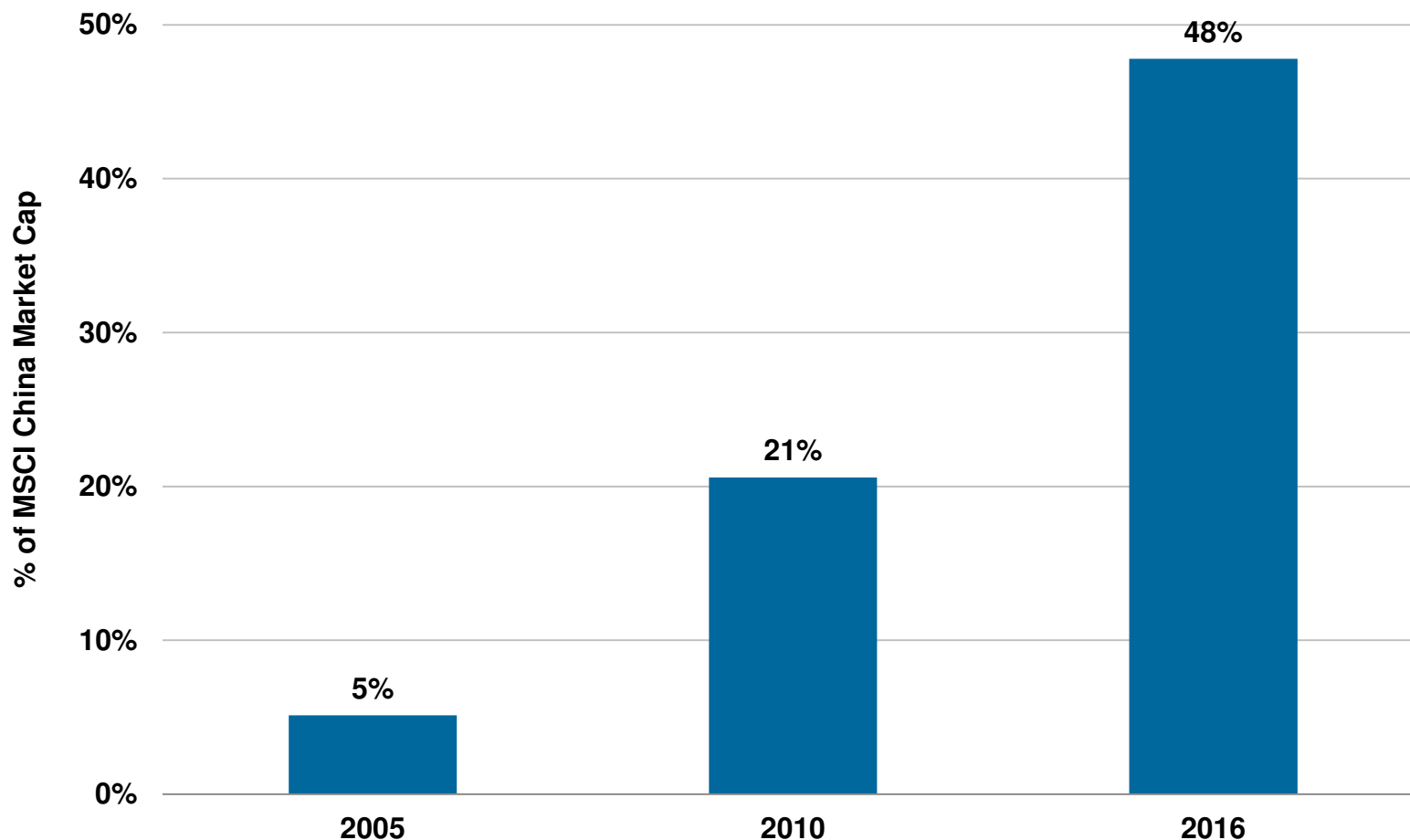
# China Macro = Service Sector @ 52% GDP Share vs. 23% Thirty-Five Years Ago

## Service Sector Output as % of Nominal GDP, China, 1961 – 2016



# China Macro = Private (Non-SOEs) Enterprises... Increasingly Driving Wealth Creation + Economic Growth + Jobs

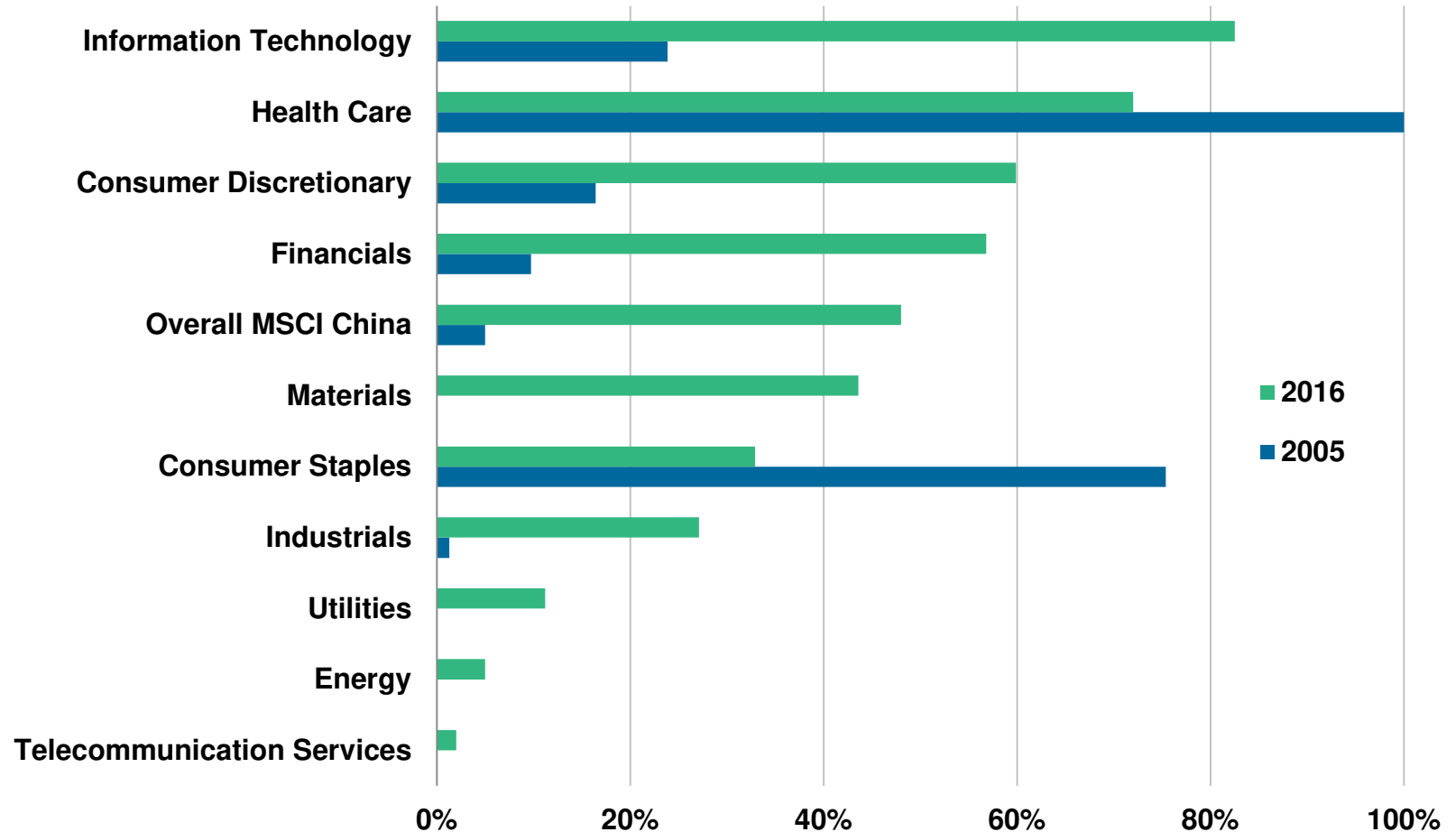
## Private Enterprise (Non-SOE\*) % Share of MSCI China Weighted Market Cap





# China Macro = Technology Companies Lead Public Market Wealth Creation

## Private Enterprise (Non-SOE) % of MSCI China Market Cap by Sector, 2005 vs. 2016

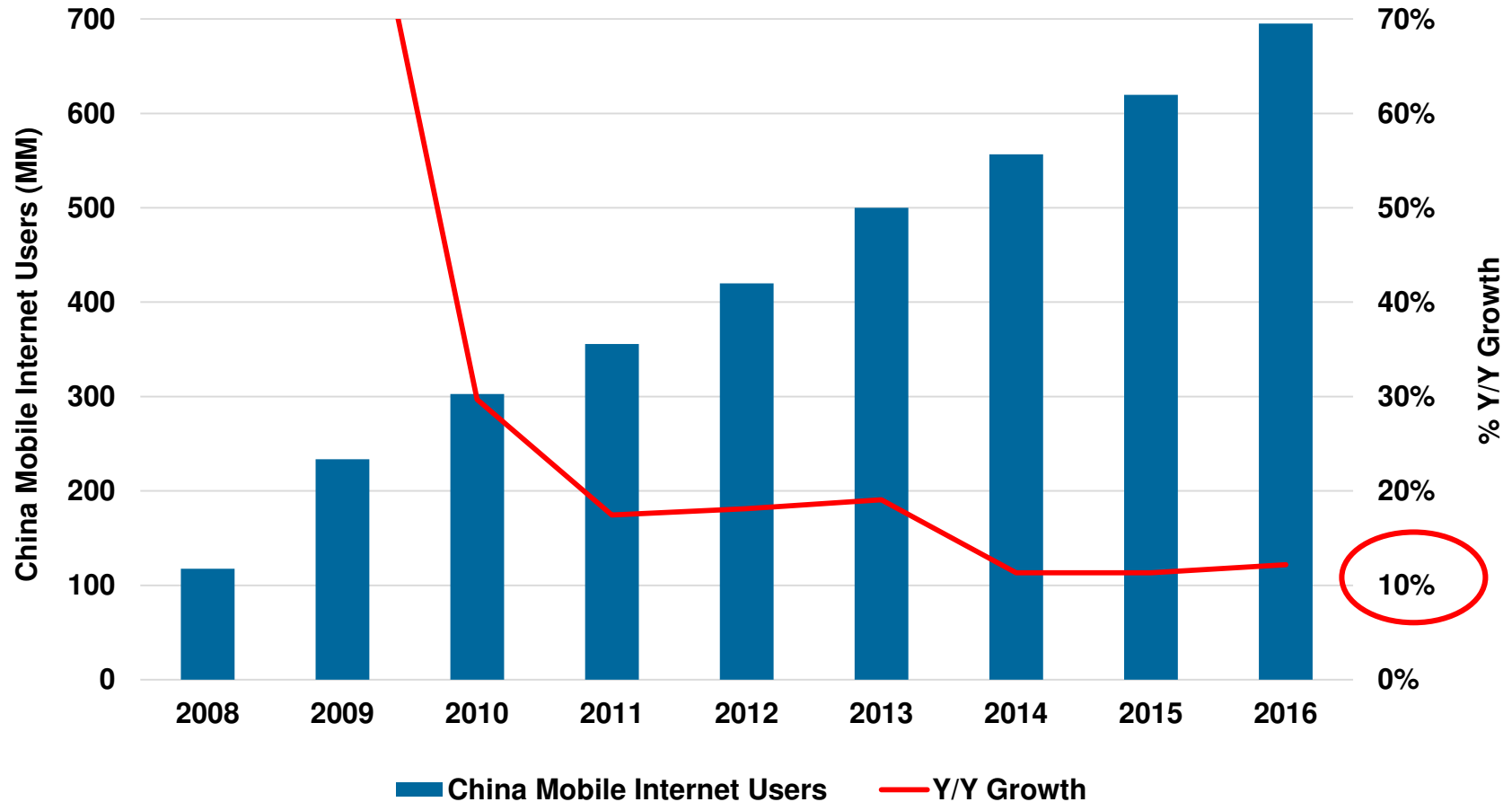


***China Internet Users + Usage =***

***Healthy User Growth...  
Usage Outpacing Users***

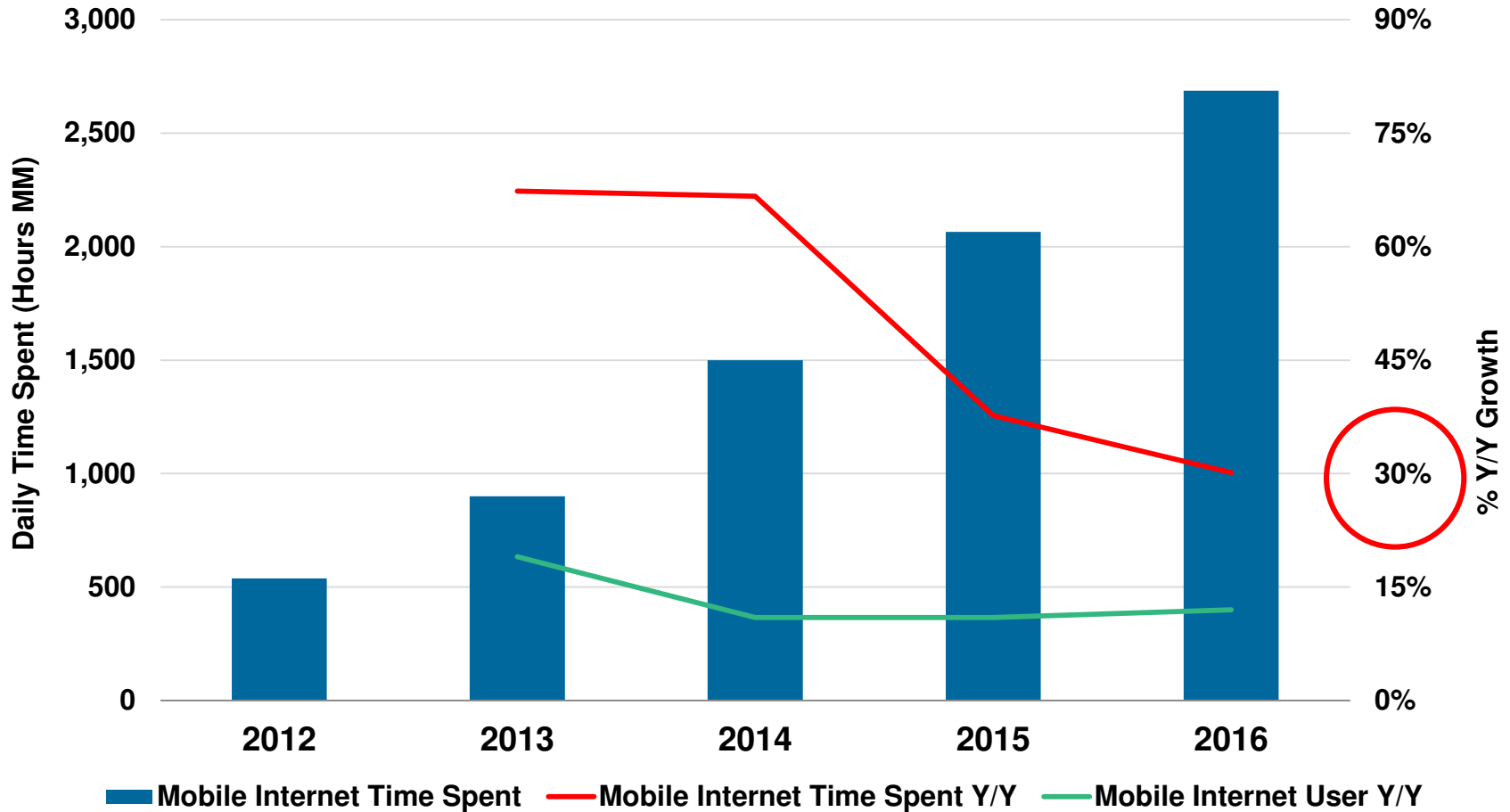
# China Mobile Internet Users = @ ~700MM, +12% Y/Y vs. 11% in 2015

## Mobile Internet Users & Y/Y Growth, China, 2008 – 2016



# China Mobile Internet Usage Outpacing User Growth = +30% Y/Y for Usage...+12% for Users

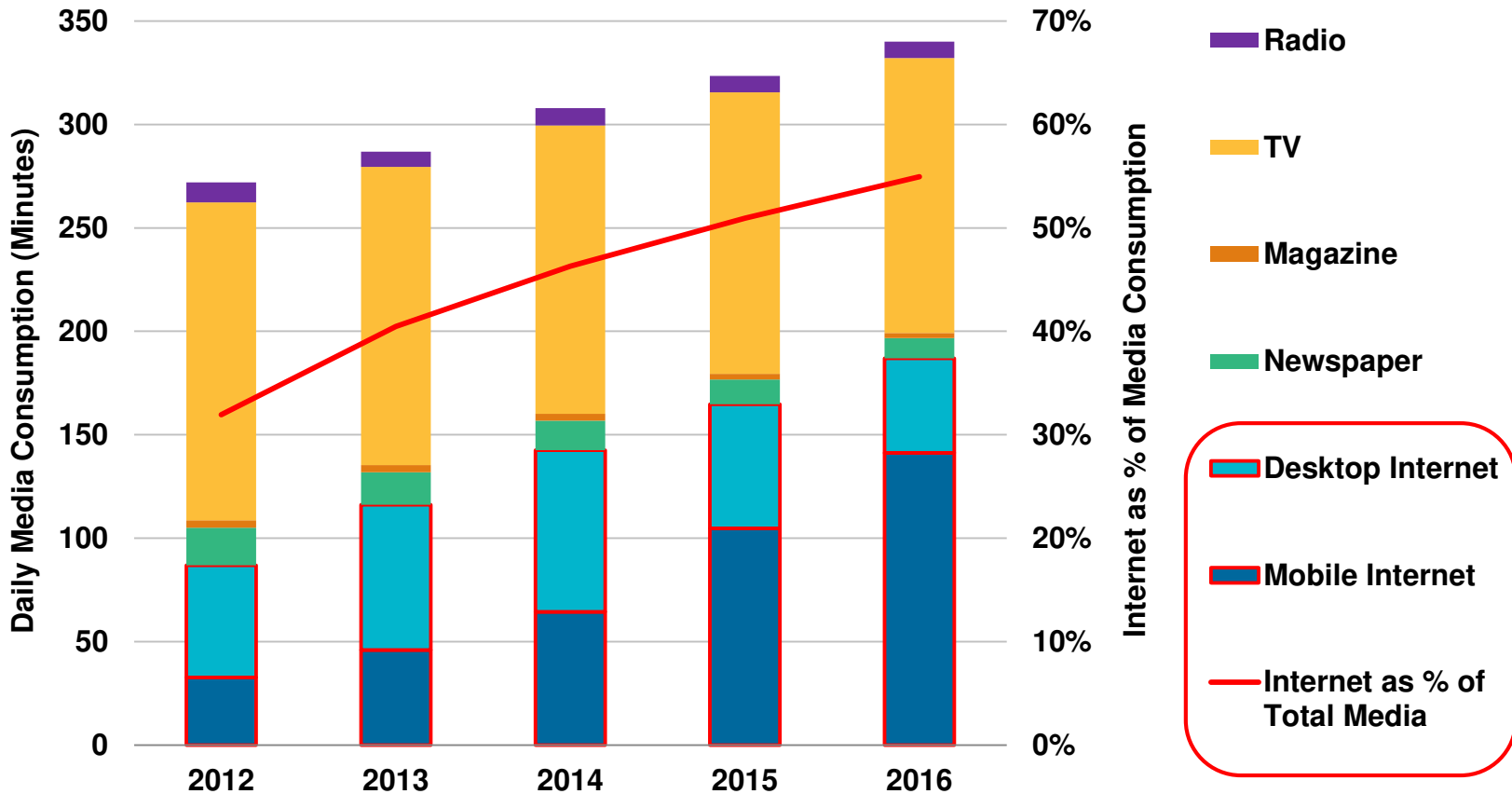
## Estimated Mobile Internet Daily Time Spent, China, 2012 - 2016



***China Entertainment =  
Online Innovation Driving  
Robust User + Usage +  
Monetization Growth***

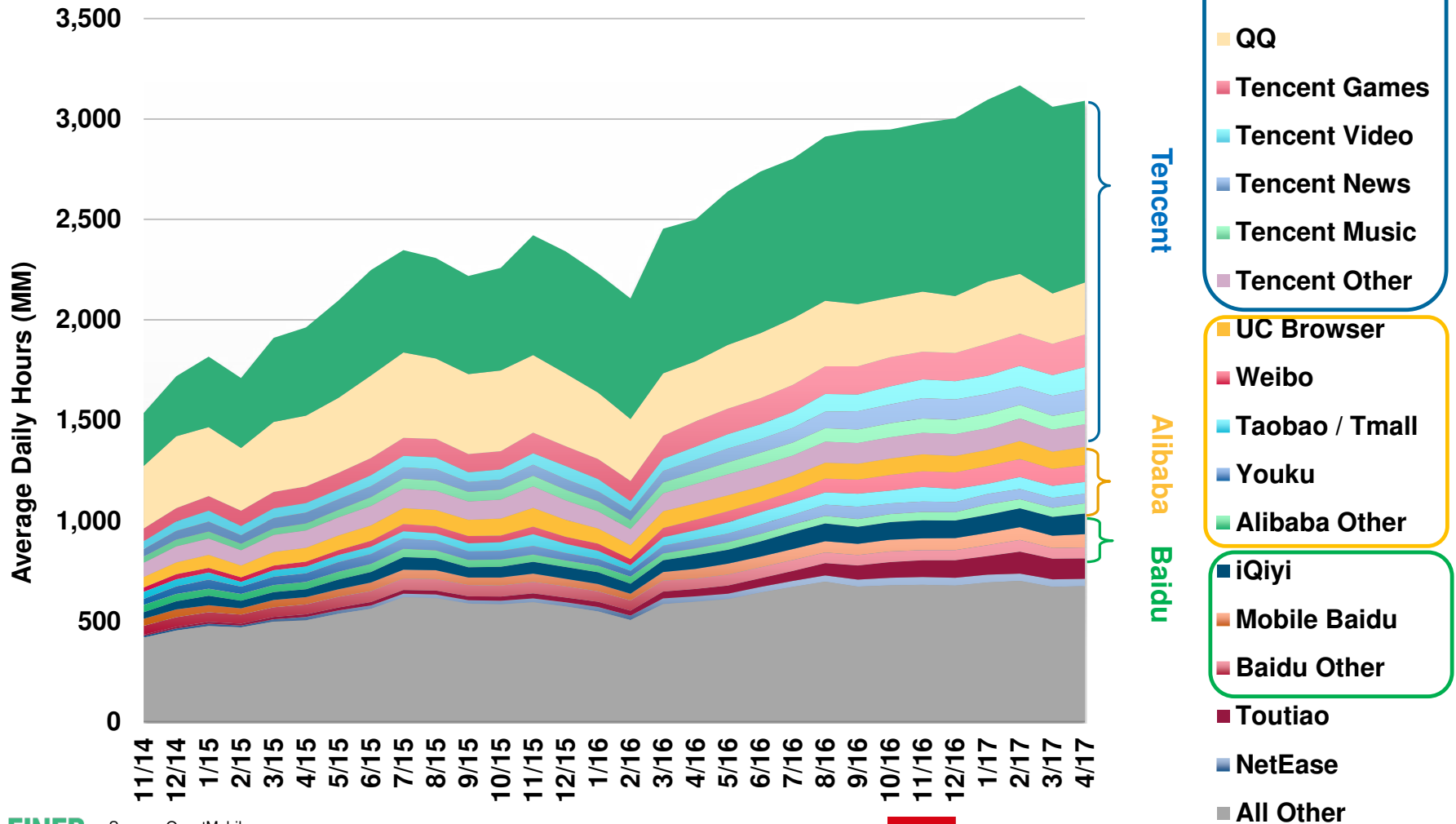
# China Media = Internet @ 55% of Time Spent...Mobile > TV (2016)

## Average Daily Media Consumption Minutes by Medium, China, 2012 - 2016



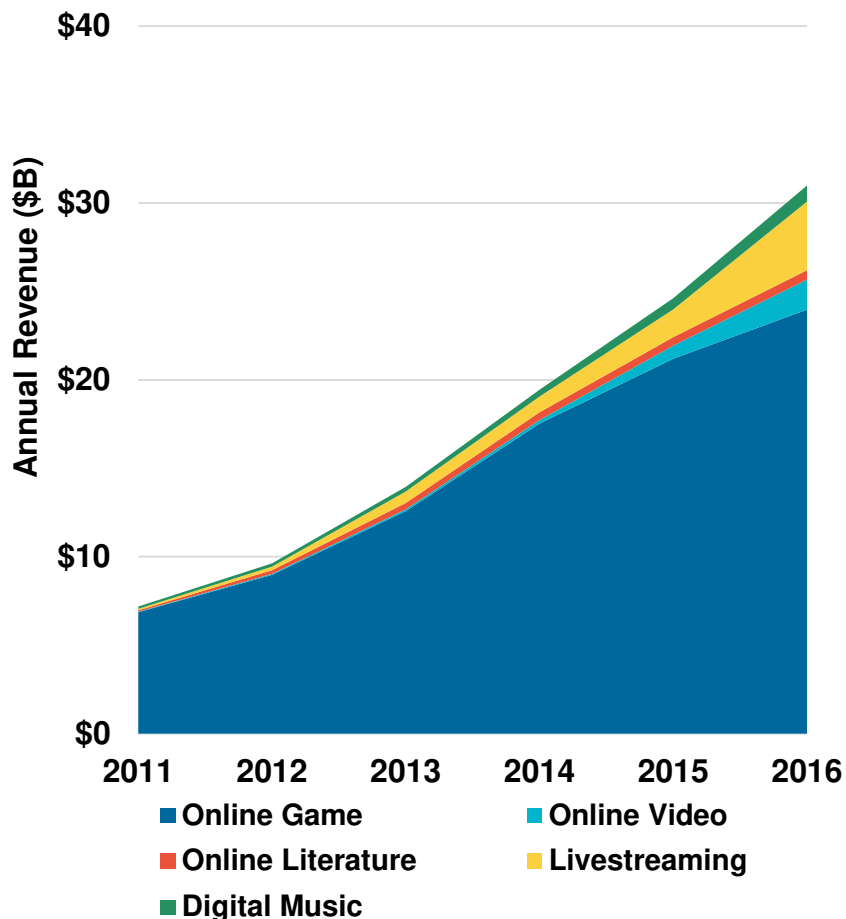
# China Entertainment = Key Driver of Mobile Time Spent... eCommerce + Games = Monetize Best Per Time Spent...

## China Mobile Internet Daily Hours By App, 11/14 – 4/17

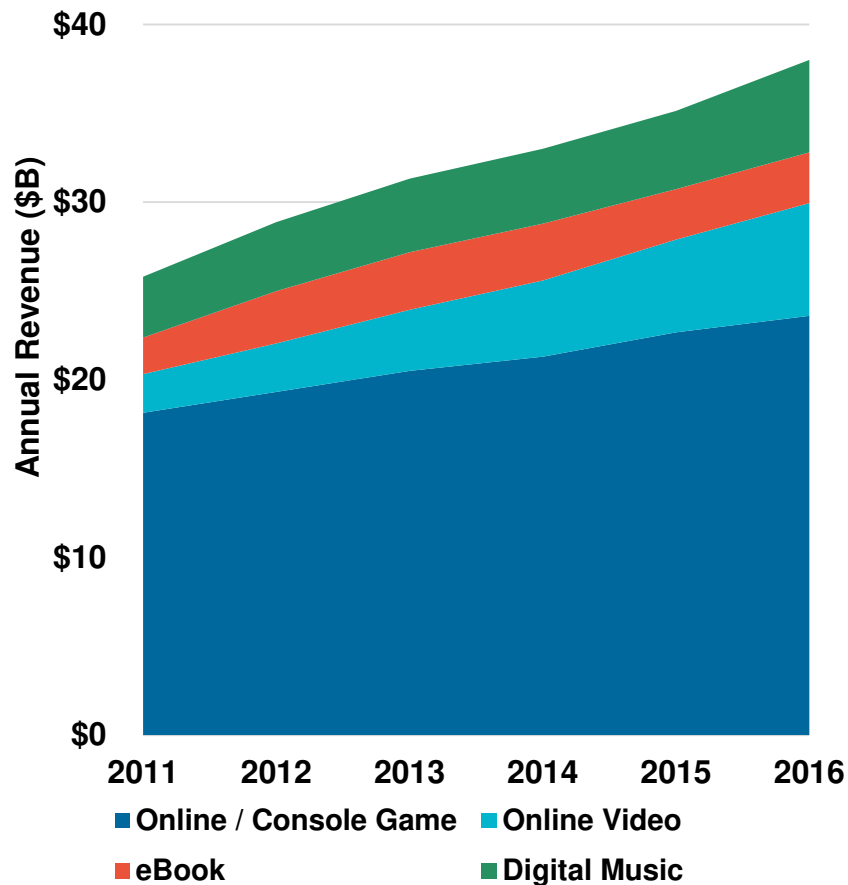


# China Online Entertainment = Consumers Increasingly Willing to Pay... Led by Games + Livestreaming + Video

## Online Entertainment User-Pay Revenue By Vertical, China, 2011-2016



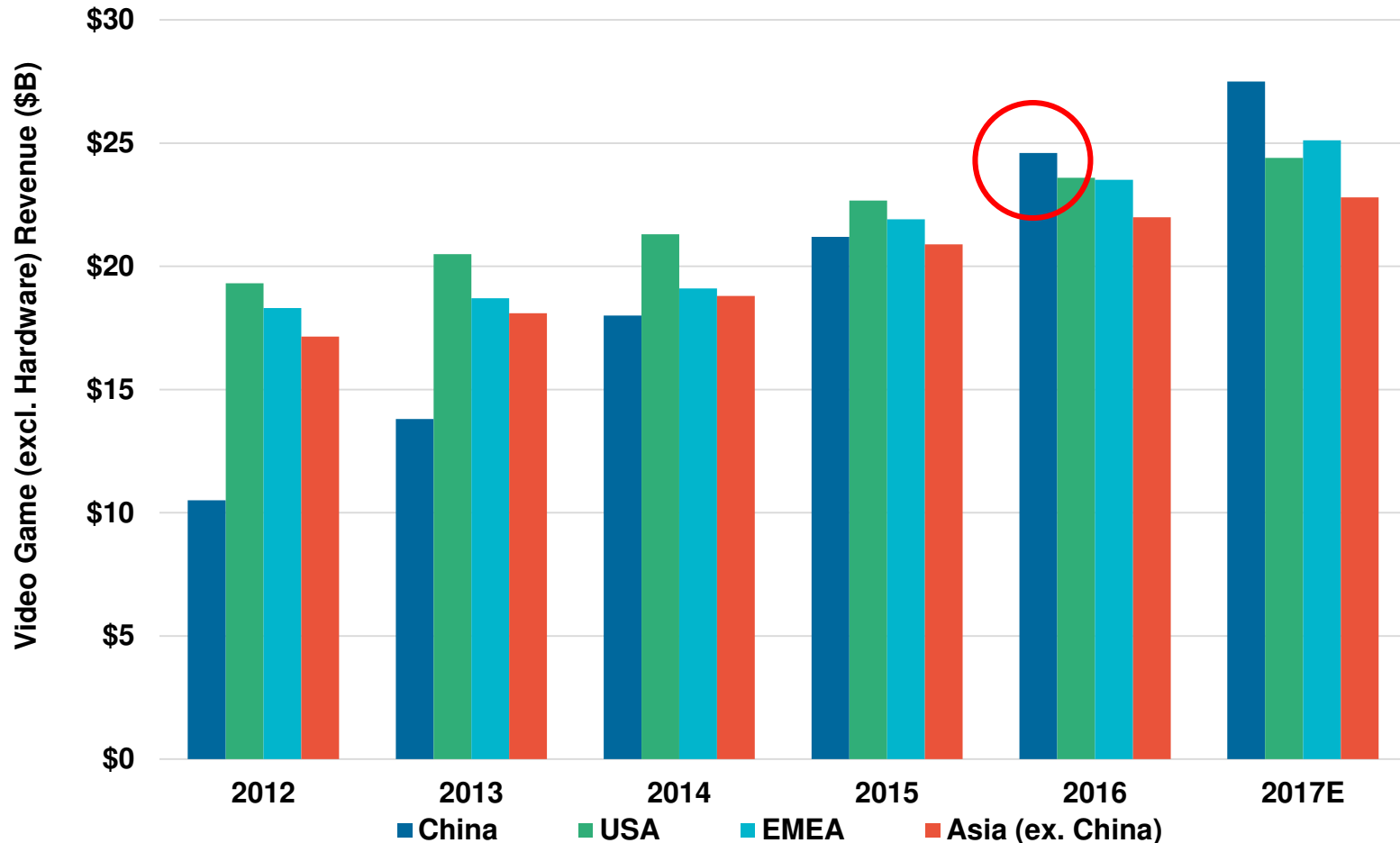
## Online Entertainment User-Pay Revenue By Vertical, USA, 2011-2016





# Global Interactive Game Revenue = China #1 Market in World\* > USA (2016)

## Interactive Game Software Revenue by Region, Global, 2012 – 2017E



# China Online Gaming = Tencent + NetEase... Mobile MOBA + MMORPG Game Leaders...

## Tencent – Honor of Kings

Mobile Multiplayer Online Battle Arena (MOBA) Leader...

50MM+ DAU, \$3B+ Annualized Bookings  
Driven by Social + Simple UI + Constant Product Improvement



## NetEase

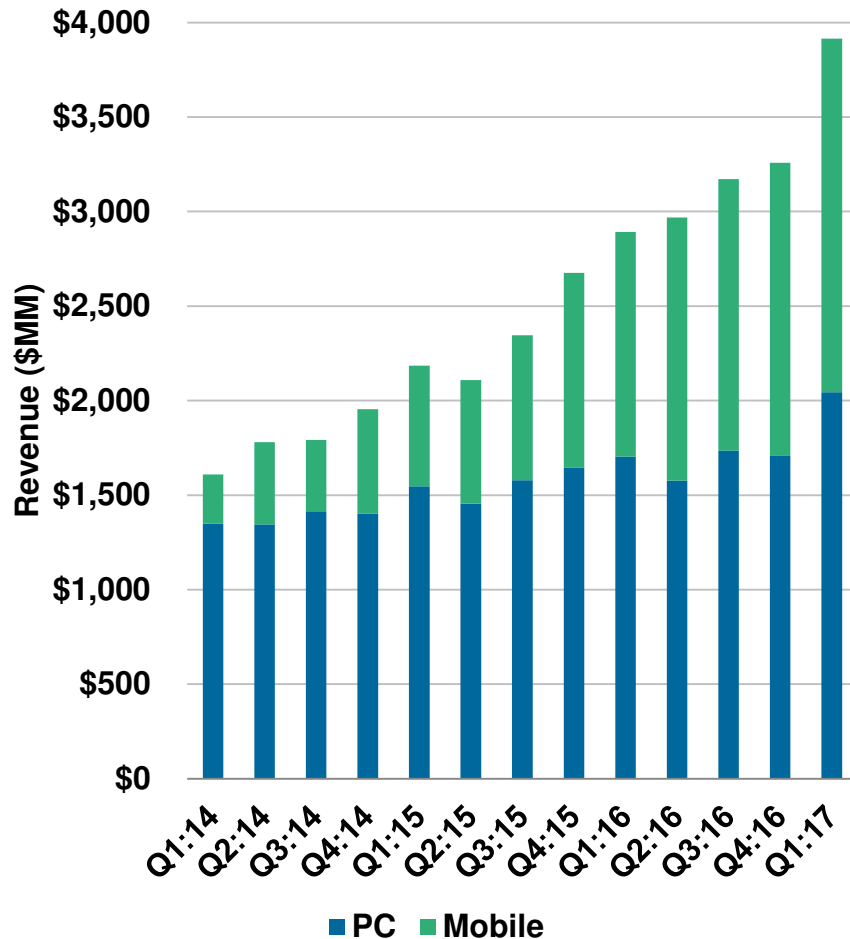
Portfolio of Leading Mobile Massively Multiplayer Online Role Playing Games (MMORPGs) ...  
Driven by Mobile First Mover Advantage + IP + Social Design + Quality Production



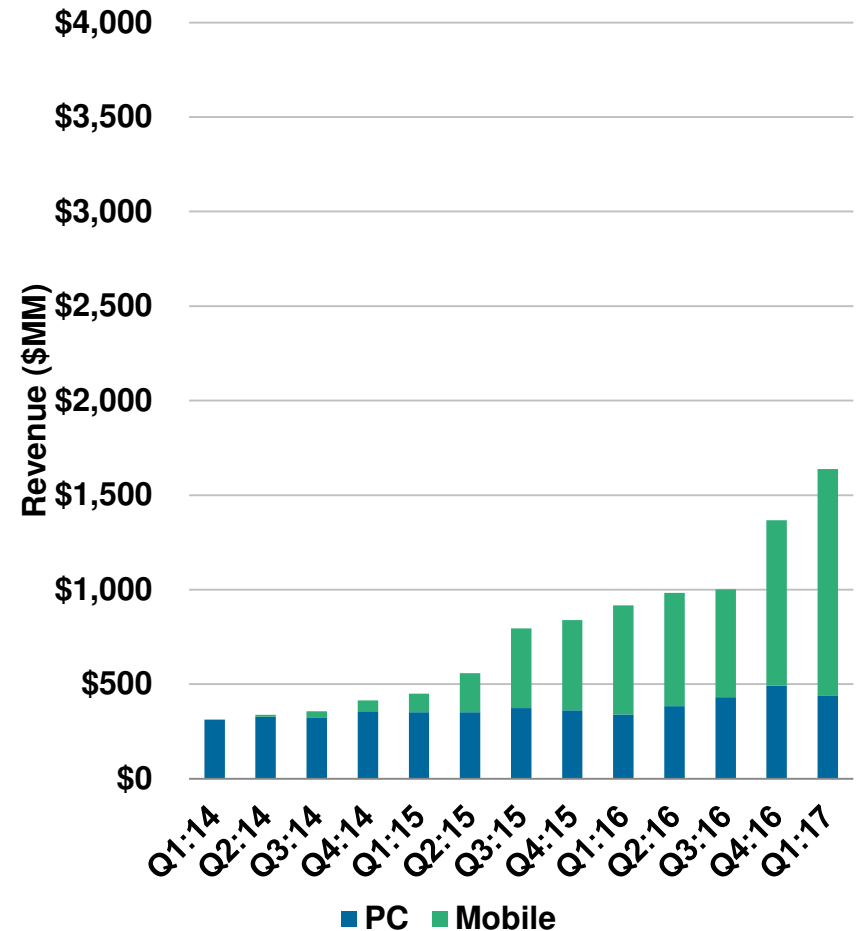
Ranked amongst Top10 grossing games in China iOS store

# ...China Online Gaming = Tencent + NetEase Driving Mobile Innovation + Revenue

## Tencent Online Game Revenue, PC vs. Mobile, Q1:14-Q1:17



## NetEase Online Game Revenue, PC vs. Mobile, Q1:14-Q1:17

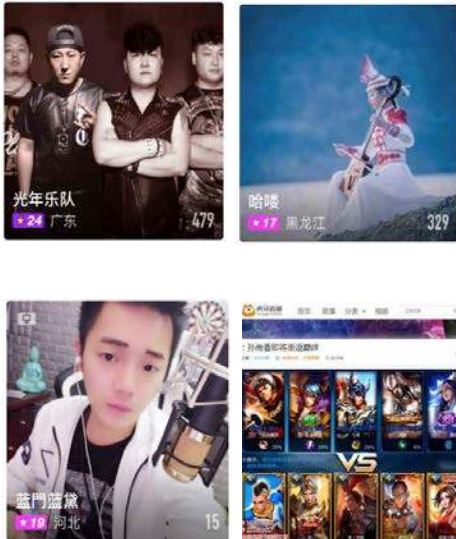


Source: Tencent, NetEase, Goldman Sachs Investment Research  
 Note: Assuming 1USD = 6.9RMB.

# China Livestreaming = High Consumer Engagement + Willingness to Pay...

## Diverse Live Content Type

Singing / Dancing /  
Talk Show / Game Play...



## Interactive / Social / Gamified

Like / Chat with Hosts & Audience /  
Buy Virtual Gifts to Support Performers



20+ Virtual Gift  
Categories  
priced from Rmb0.01



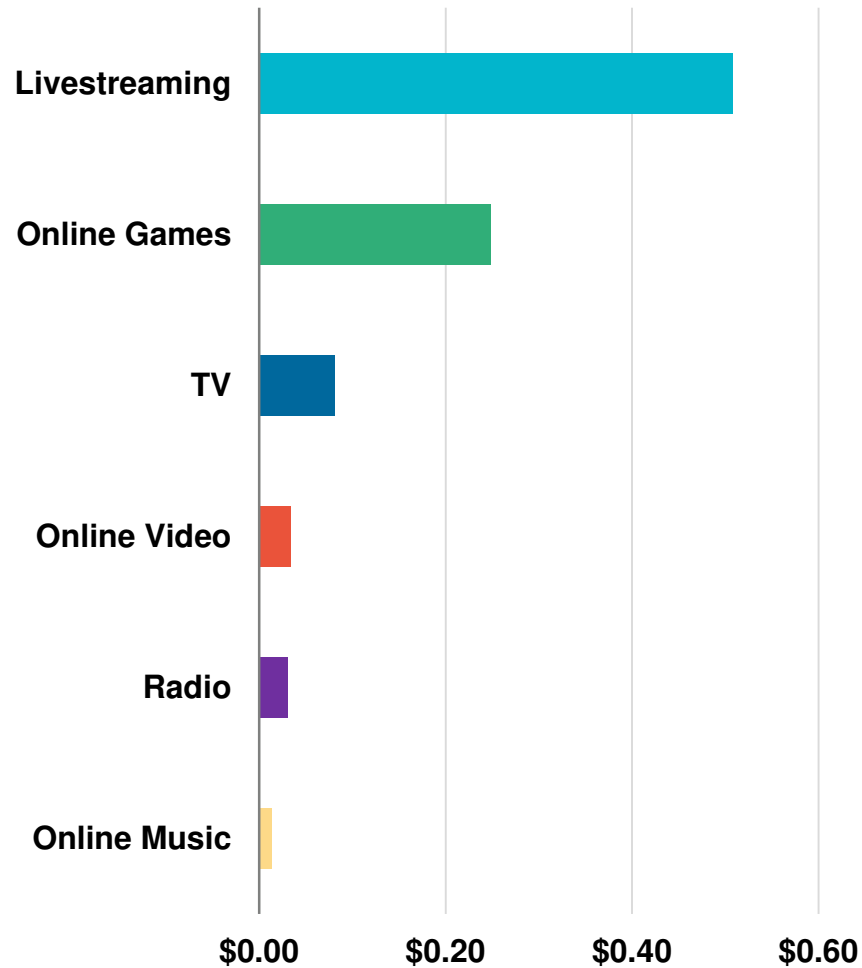
## Local / Social

Nearby Livestreams /  
Chat & Add Friends



# ...China Livestreaming = Compelling Monetization

## Estimated Revenue per Hour, China, 2016

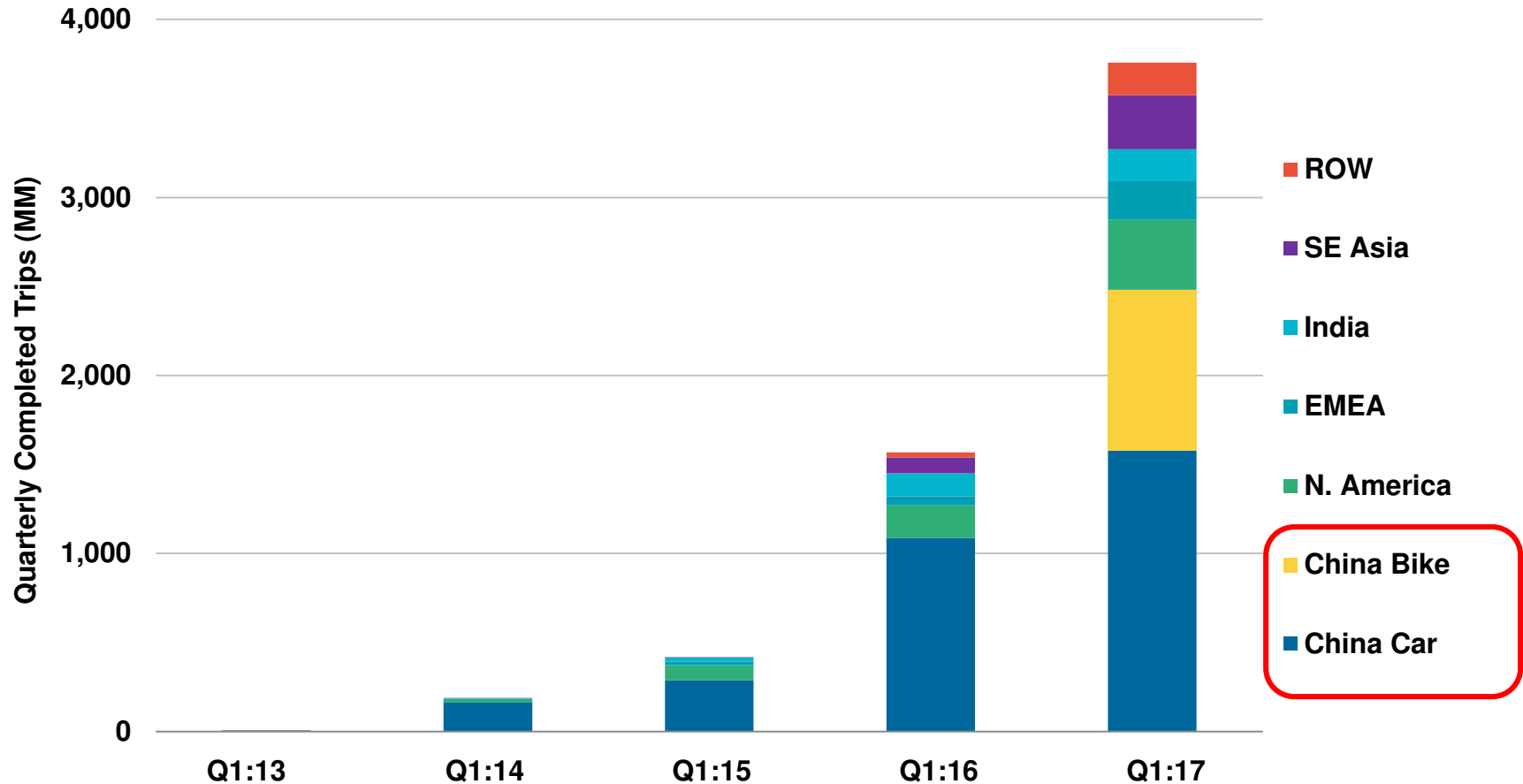


Source: Hillhouse estimates based on Newzoo, iResearch, Questmobile, and select company disclosures  
Note: Revenue data includes subscription, advertising and paid download revenue streams.

***China On-Demand Transportation =  
#1 Global Market...  
Cars + Bikes***

# China On-Demand Transportation (Cars + Bikes) = Global Leader @... ~67% Global Share (10B+ Annualized Trips, + >2x Y/Y)

## On-Demand Transportation Trip Volume by Region, Global, Q1:13 – Q1:17





# China On-Demand Bike Sharing = Mobile Innovation Driving Significant Usage Ramp

## Mobike Product Innovation

### In-Bike GPS + Smartphone

Bike Sharing Without  
Stations...Location-Based Virtual  
Red Envelope Drives Utilization



### QR Code + Mobile Payment

Easy Unlock & Low Friction  
Payment



### Ubiquity + Low Cost (¥1/~\$0.15 per 30 min) +

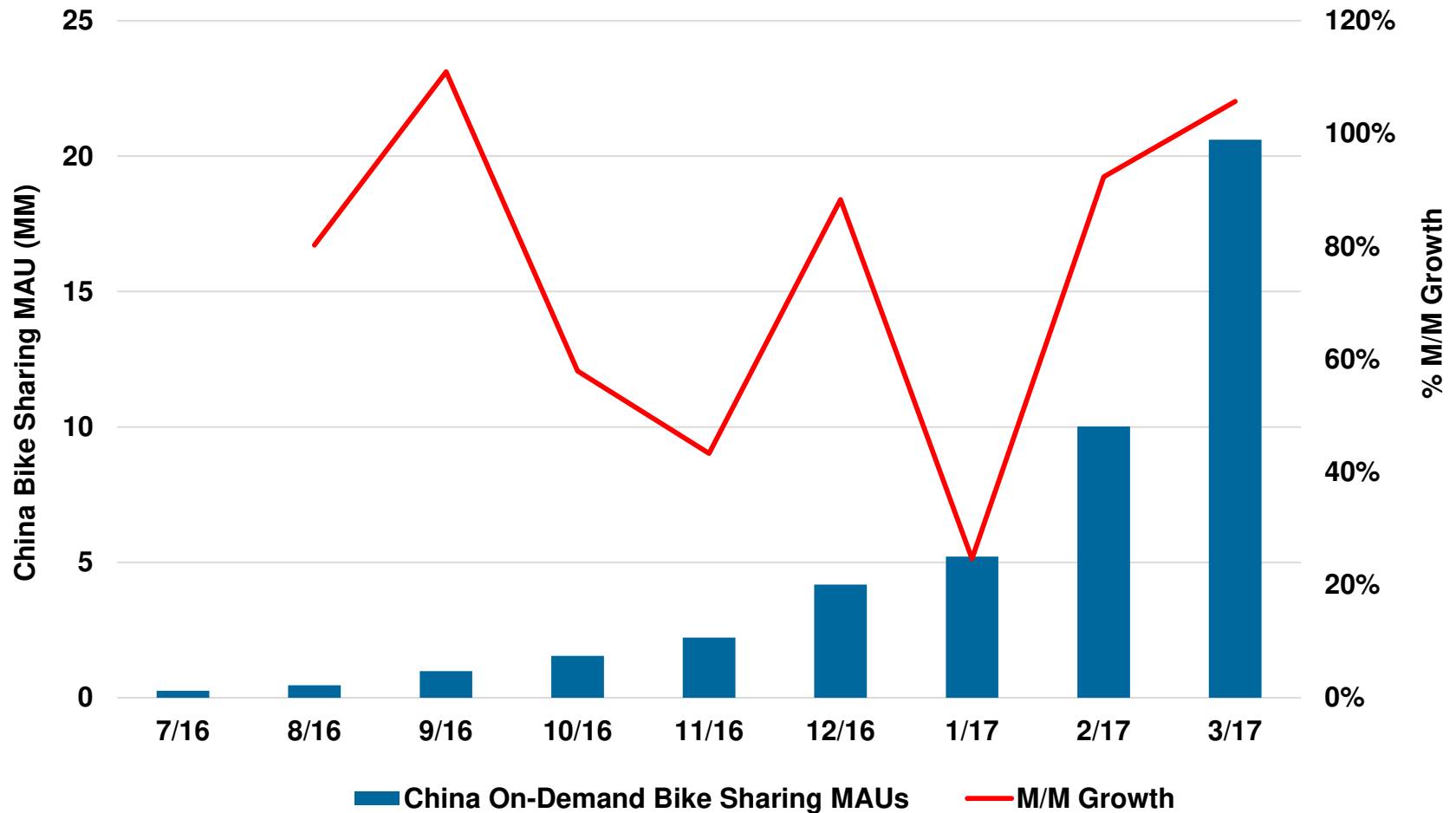
**Convenience**  
Mass Adoption &  
Bike Utilization





# China On-Demand Bike Sharing =... @ 20MM+ MAU...100%+ M/M Accelerating Growth

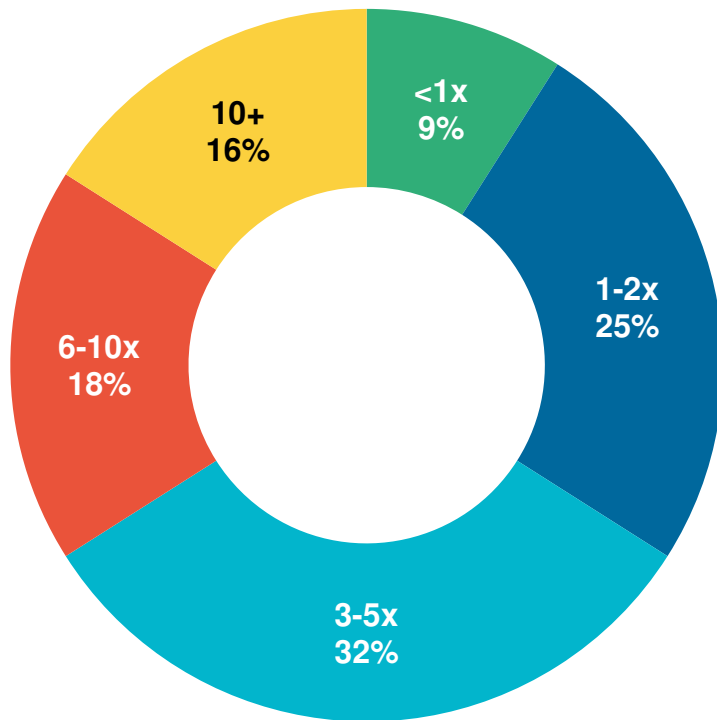
## China On-Demand Bike Sharing MAU, 7/16 – 3/17



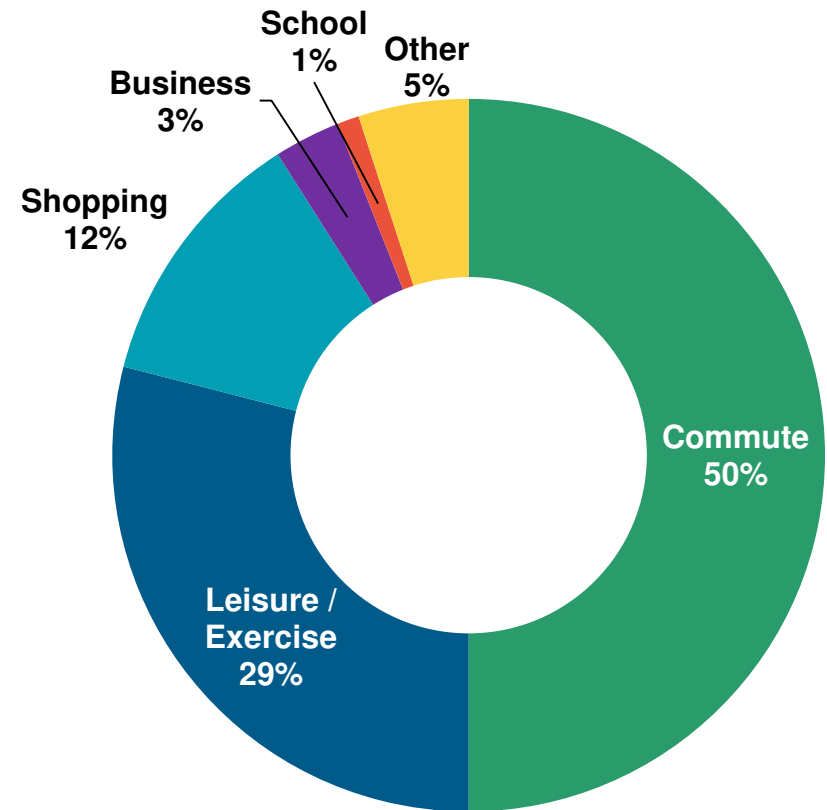
# China On-Demand Bike Sharing = High Frequency... 2/3 Users Ride 3+ Times Per Week

## Highlights from Shenzhen Municipality On-Demand Bike Sharing Study, 5/17

### On-Demand Bike Trips per Week



### Purpose of On-Demand Bike Trips



# On-Demand Bike Sharing = Positive Environmental Impact + High Customer Satisfaction

## Highlights from Shenzhen Municipality On-Demand Bike Sharing Study, 5/17

**11MM**

Registered Users in  
Shenzhen, China

**530K**

Available Bikes

**2.6MM**

Daily Trips

**5**

Trips per Available Bike per  
Day

**50%**

On-Demand Bike Trips Serving as Last-Mile  
Connection to Public Transit Trips

**10%**

Bike Trips Replacing Private Car Driving Trips

**100K+ Tons**

Reduction in Annual CO2 Emission\*

**95%**

Respondents Support Continued Development  
of Bike Sharing

# China On-Demand Bike Sharing = Complements On-Demand Cars... @ 75% Shorter Trip Distance & 80% Lower Cost per Mile

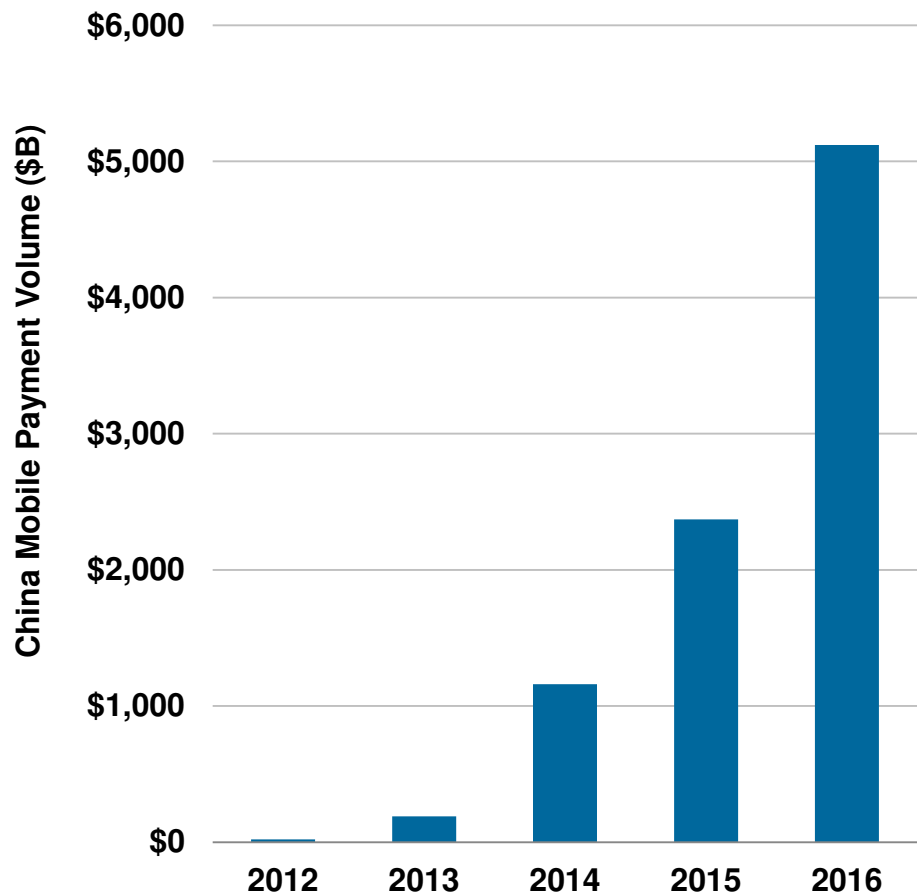
	On-Demand Car Share (Didi)	On-Demand Bike Share (Mobike / Ofo)
Average Trip Distance	8 KM ~5 Miles	2 KM 1.2 Miles
Average Trip Cost	20 RMB ~3 USD	~1 RMB ~0.15 USD
Cost per Km	~2.50 RMB	~0.50 RMB
Cost per Mile	~0.60 USD	~0.12 USD

***China Mobile Payment  
Infrastructure =***

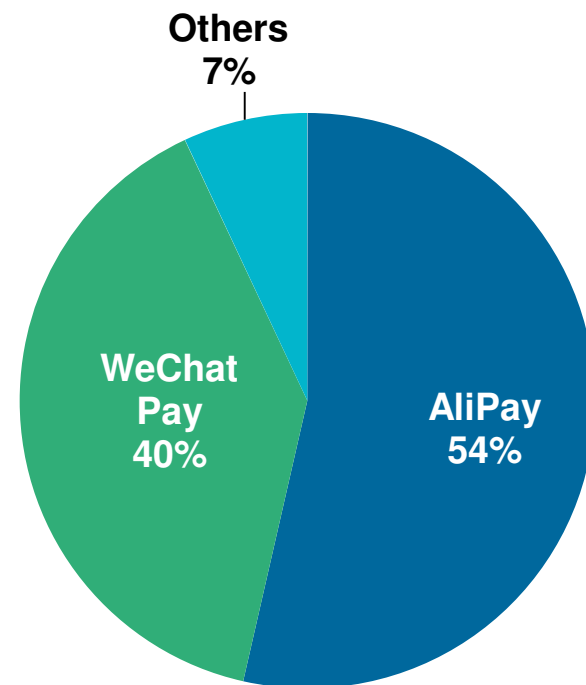
***Enabling Rapid Growth +  
Monetization of Internet Usage***

# China Mobile Payment Volume = +2x Y/Y to \$5T+ Led by AliPay + WeChat Pay

## China Mobile Payment Volume, 2012 - 2016

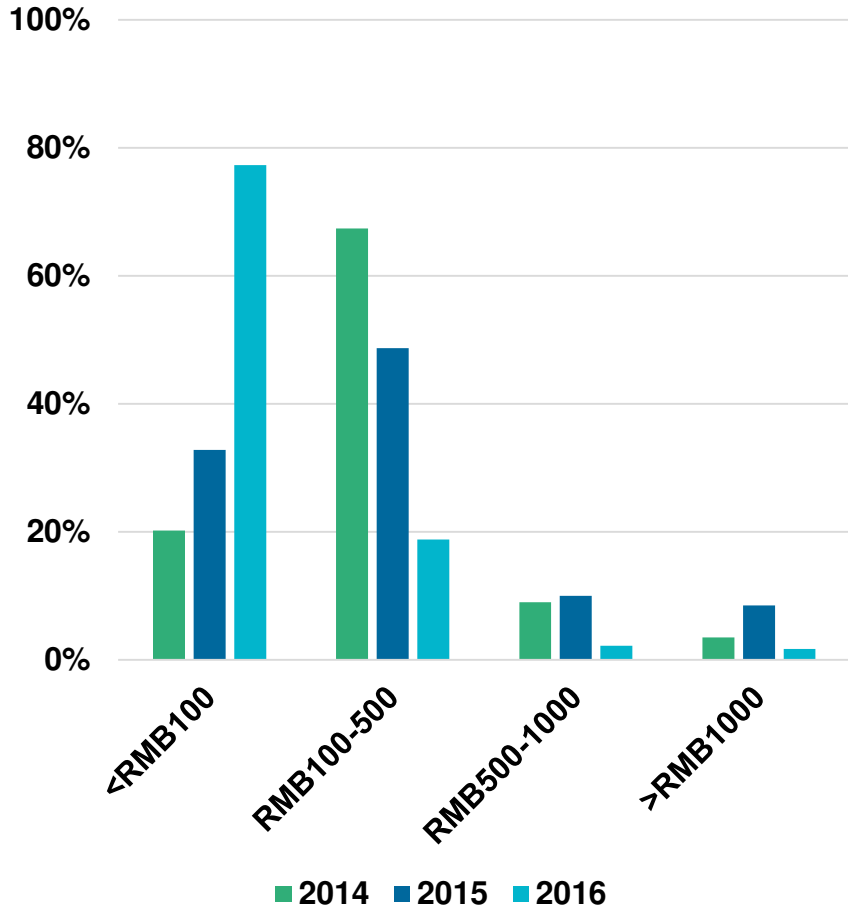


## China Mobile Payment Market Share\*, Q1:17

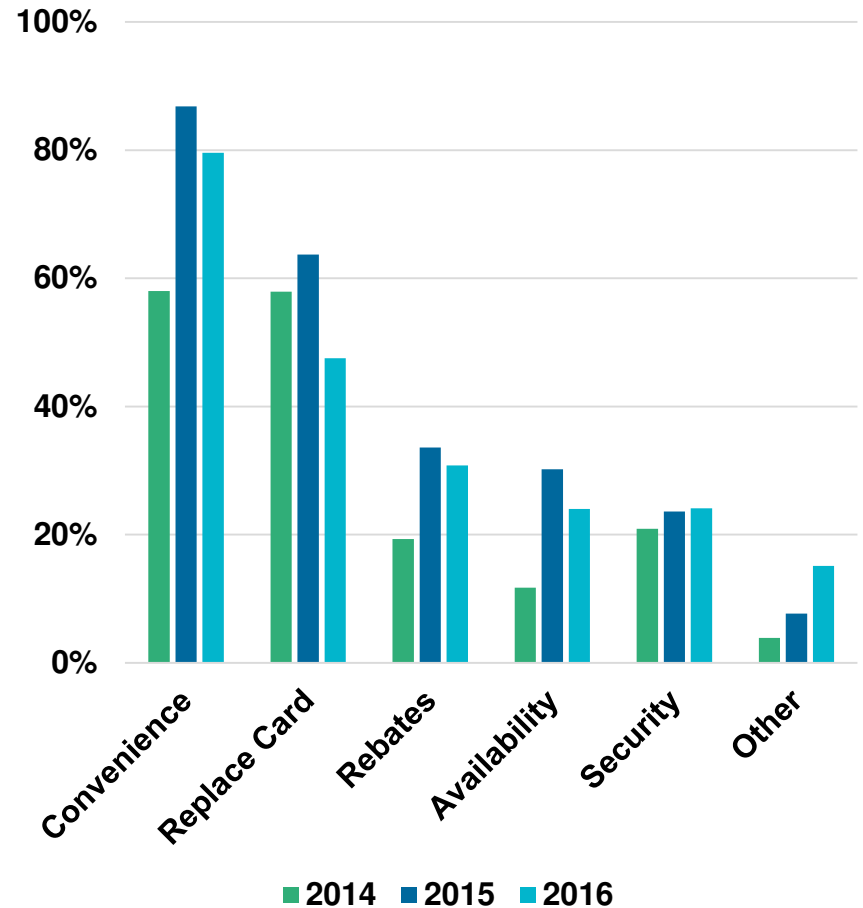


# China Mobile Payments = Convenience vs. Cash & Bank Cards... Small Transactions Growing Especially Fast (<100RMB / \$15)

## Size of Mobile Payment Transactions, 2012 - 2016



## Reasons for Using Mobile Payments, 2012 - 2016



# AliPay + WeChat Pay on Mobiles = Digitizing Micro Payments On + Offline

~\$0.15 for On-Demand Bike



~\$0.15 for On-Demand Mobile Recharge



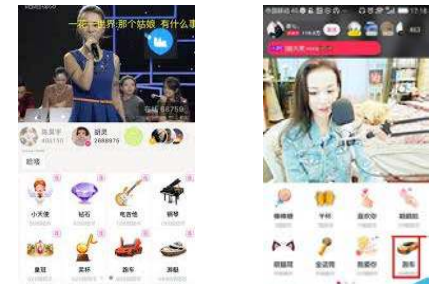
\$0.50+ for Street Food



\$0.01+ for Article / Author Tipping



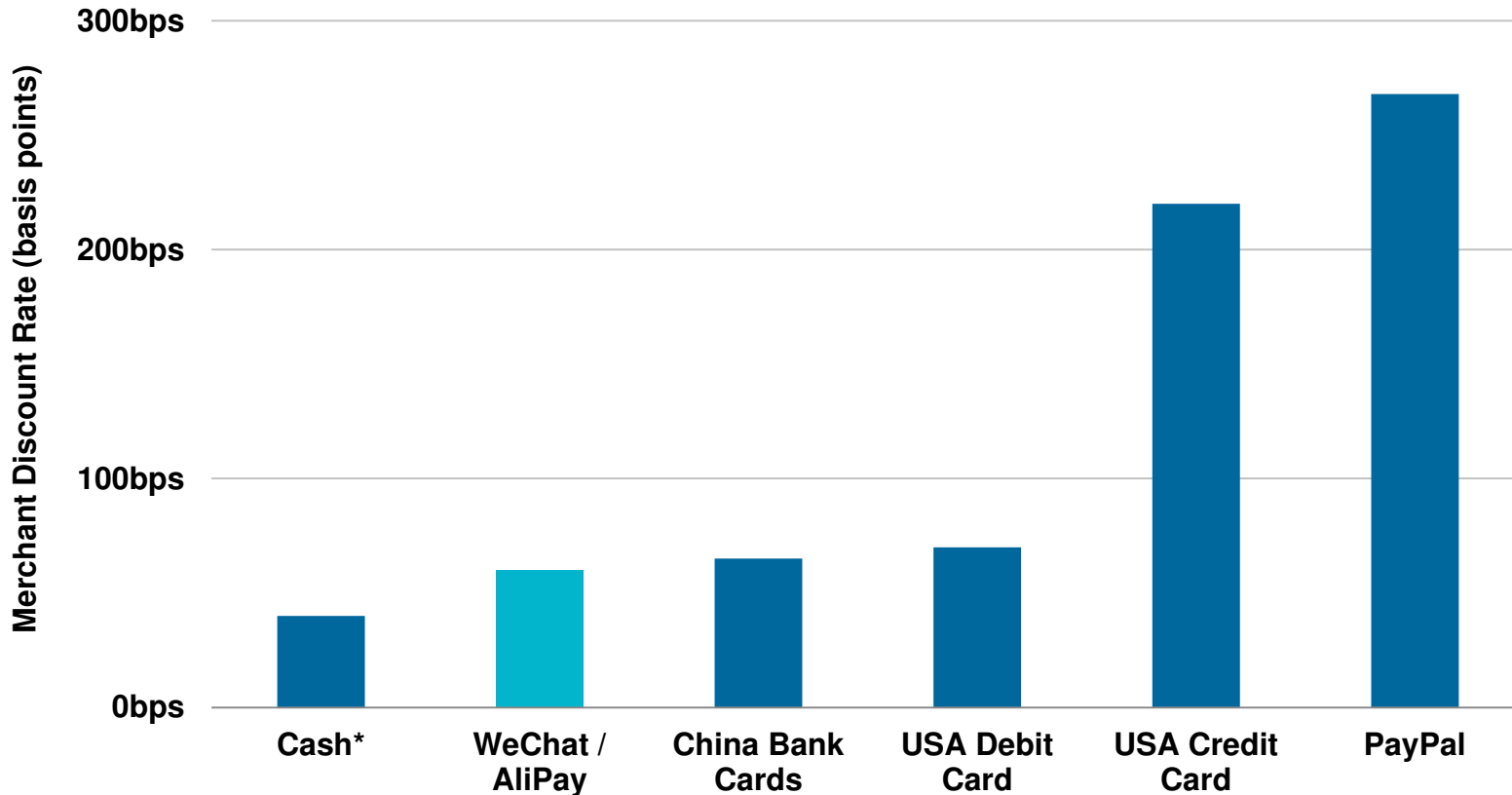
\$0.01+ for Livestreaming Tipping





# China Mobile Payments = Low Relative Cost... Helped by Regulated Interchange Rates...

## Average Merchant Discount Rate, Basis Points (100bps = 1%)



# Mobile Payments = Gateway for China Internet Leaders to... Become Diversified Financial Services Platforms

## Payment

## Wealth Management

## Financing

## Insurance

## Credit Rating / History



### Ant Financial

**451MM**  
Annual Active Users<sup>1</sup>

**>300MM**  
Cumulative Users<sup>2</sup>

**>100MM** Cumulative Consumer Finance Users<sup>3</sup>, **>5MM** Cumulative SME Borrowers<sup>4</sup>

**380MM**  
Cumulative Users<sup>5</sup>

**130MM**  
Cumulative Users<sup>6</sup>



### Tencent

WeChat Pay  
**>600MM**  
MAU<sup>7</sup>

**>80MM**  
Cumulative Users<sup>8</sup>

**>30MM** Cumulative Users<sup>9</sup>



### JD Finance

**119MM**  
Annual Active Users<sup>10</sup>

**>20MM**  
Cumulative Users<sup>11</sup>

**>30MM**  
Cumulative Users<sup>11</sup>

**168MM**  
Cumulative Users<sup>11</sup>

**>35MM**  
Cumulative Users<sup>11</sup>

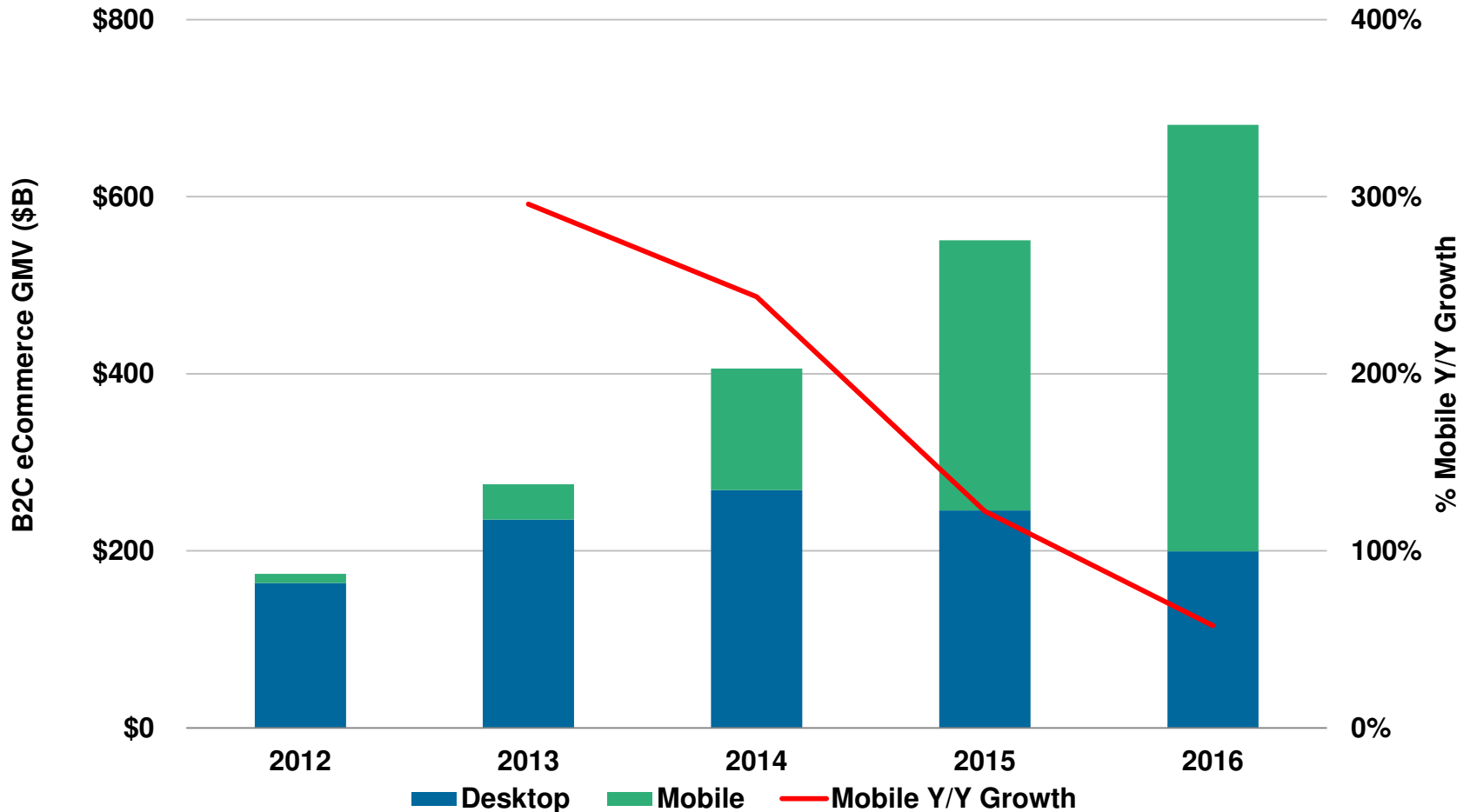
Source: Alibaba / Ant Financial, Tencent, JD Finance

<sup>1</sup>Number of users of Alipay with one or more successful transactions in 2015; <sup>2</sup>As of 3/16; <sup>3</sup>As of 4/17; <sup>4</sup>As of 1/17; <sup>5</sup>As of 2015; <sup>6</sup>As of 3/16; <sup>7</sup>For 12/16; <sup>8</sup>As of 11/16; <sup>9</sup>As of 5/17; <sup>10</sup>As of 12/16; <sup>11</sup>Number of users of JD Pay with one or more successful transactions in 2016; <sup>11</sup>As of 5/17

***China eCommerce +  
Advertising =  
Innovation + Growth***

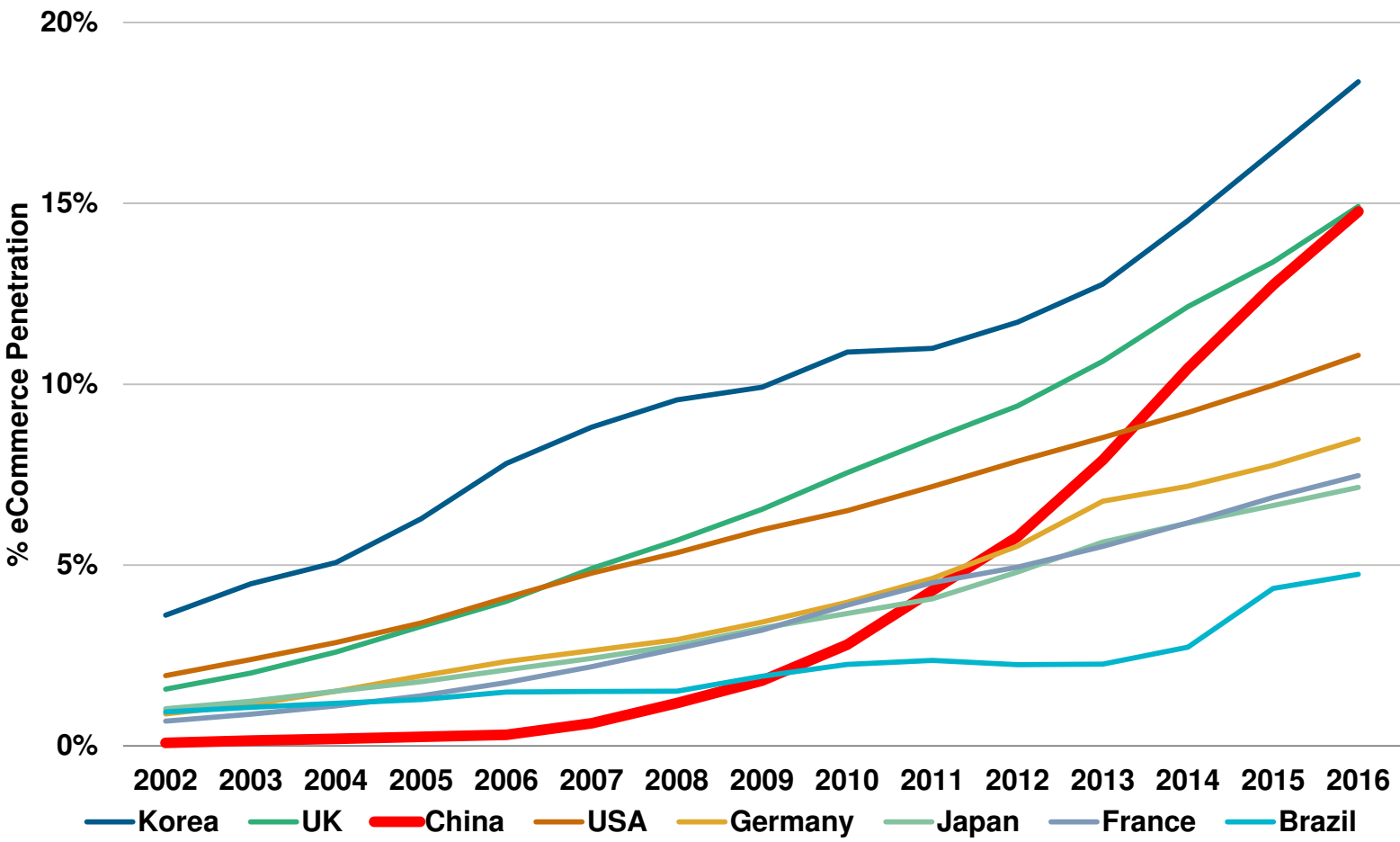
# China eCommerce = Strong Growth +24% Y/Y @ \$681B GMV...71% Mobile

## China B2C eCommerce Gross Merchandise Value (\$B), Desktop vs. Mobile, 2012 - 2016



# China B2C eCommerce @ 15% of Retail Sales... Penetration Ramping Faster Than Peers

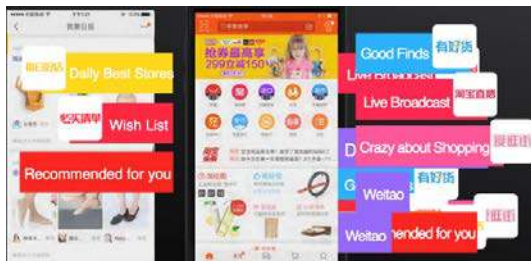
## B2C eCommerce as % of Retail Sales by Country, 2002 - 2016



# Alibaba = Massive Scale + Engagement + Innovation...

**507MM Mobile MAUs, +24% Y/Y...41% DAU/MAU Ratio...  
24+ Minutes Daily Time Spent per User**

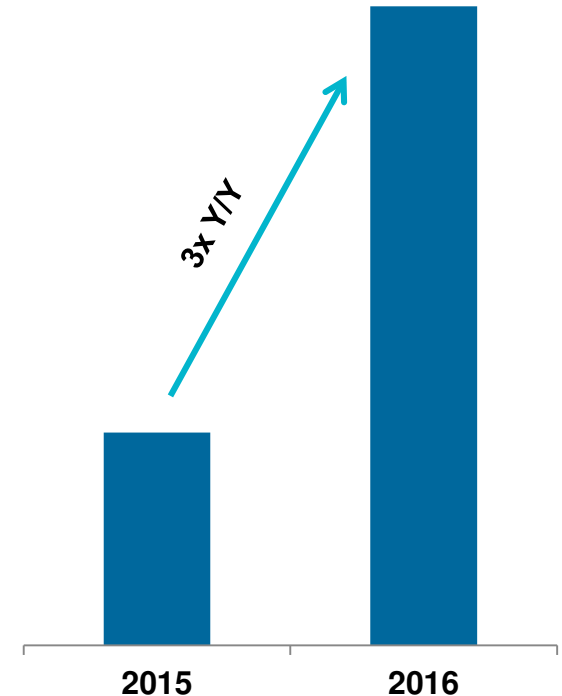
## Taobao App with Livestreaming / Microblog / Personalization



## Cainiao Logistics Smart Label / Routing

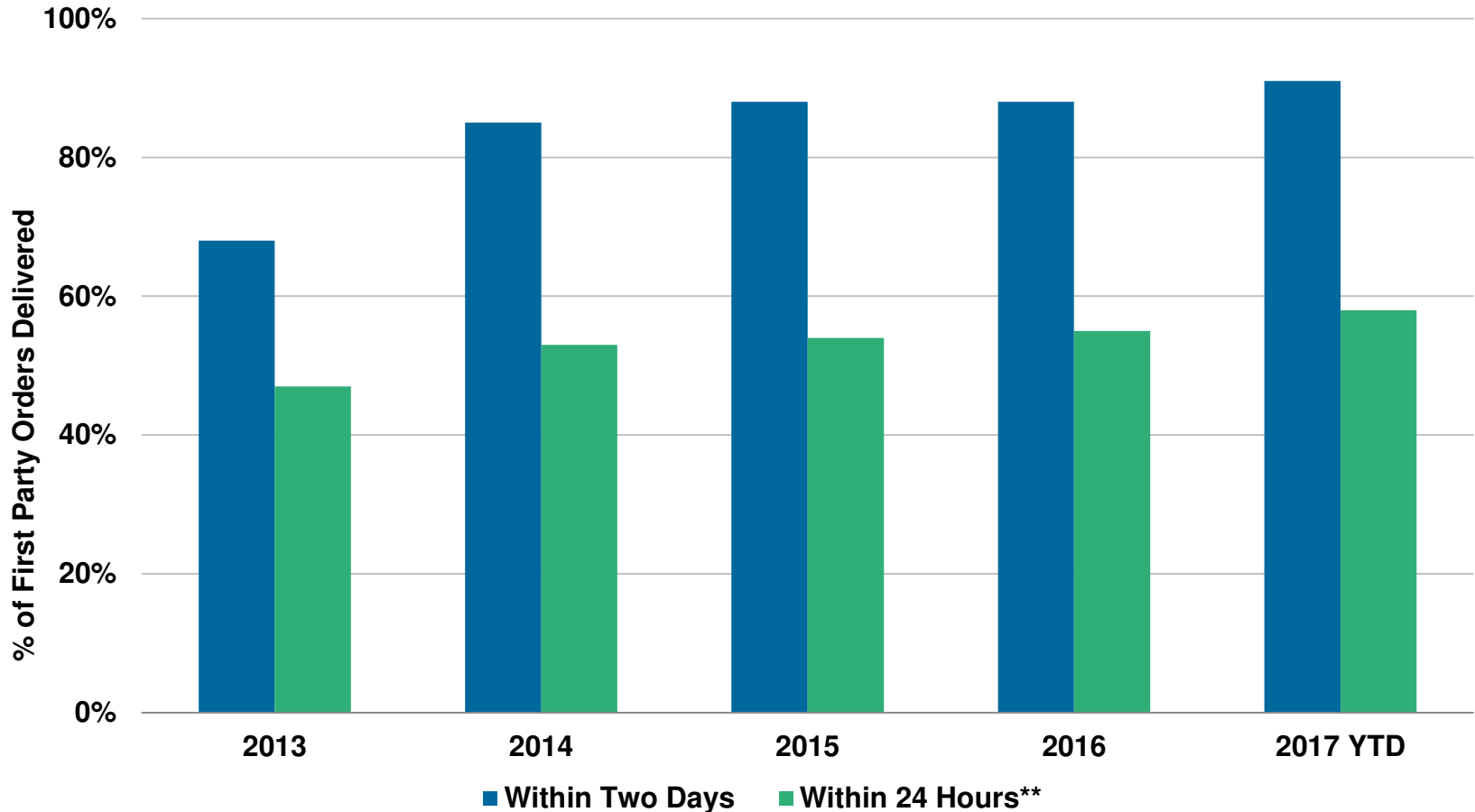


## GMV Generated from Recommendations, 2015-2016



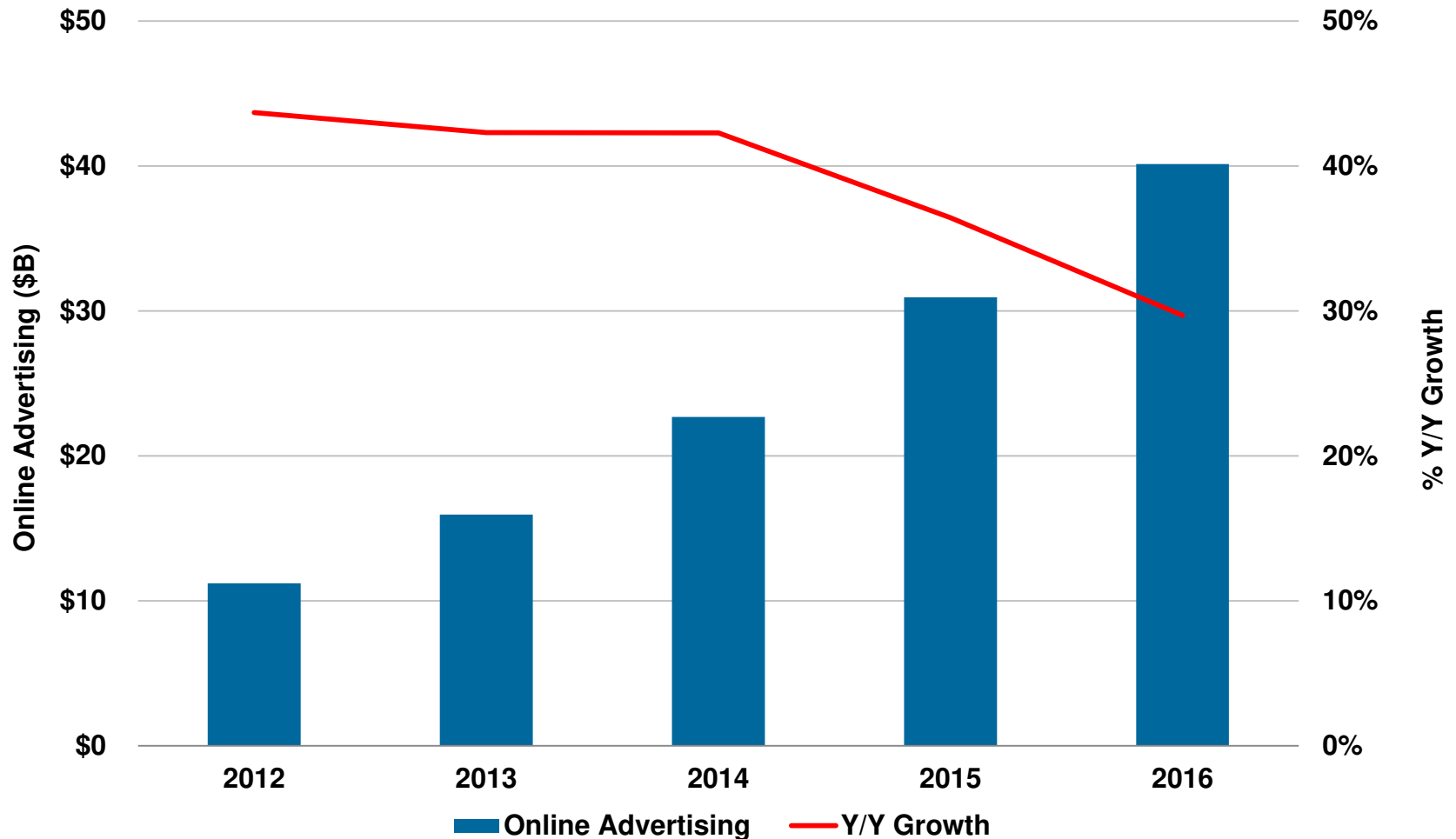
# JD.com = World Class Fulfillment + Delivery...91% / 58% Orders\* Delivered Within 2 Days / 1 Day, Up from 68% / 47% Four Years Ago

## JD.com % of First-Party Orders Delivered by Speed, 2013 – 2017 YTD



# China Online Advertising Revenue = +30% Y/Y @ \$40B

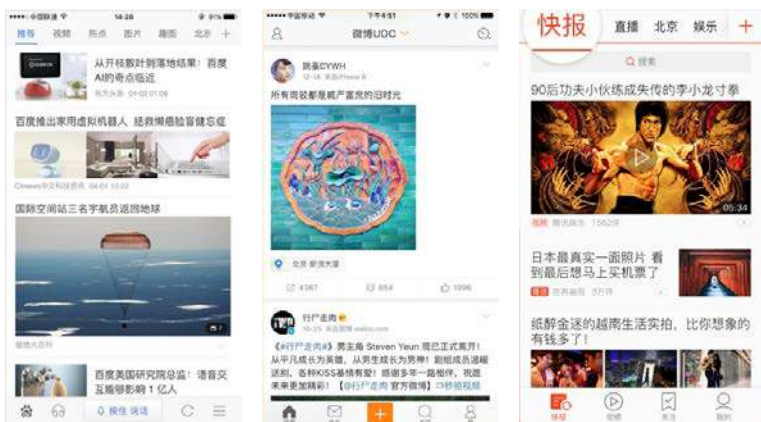
## China Online Advertising Revenue, 2012 - 2016



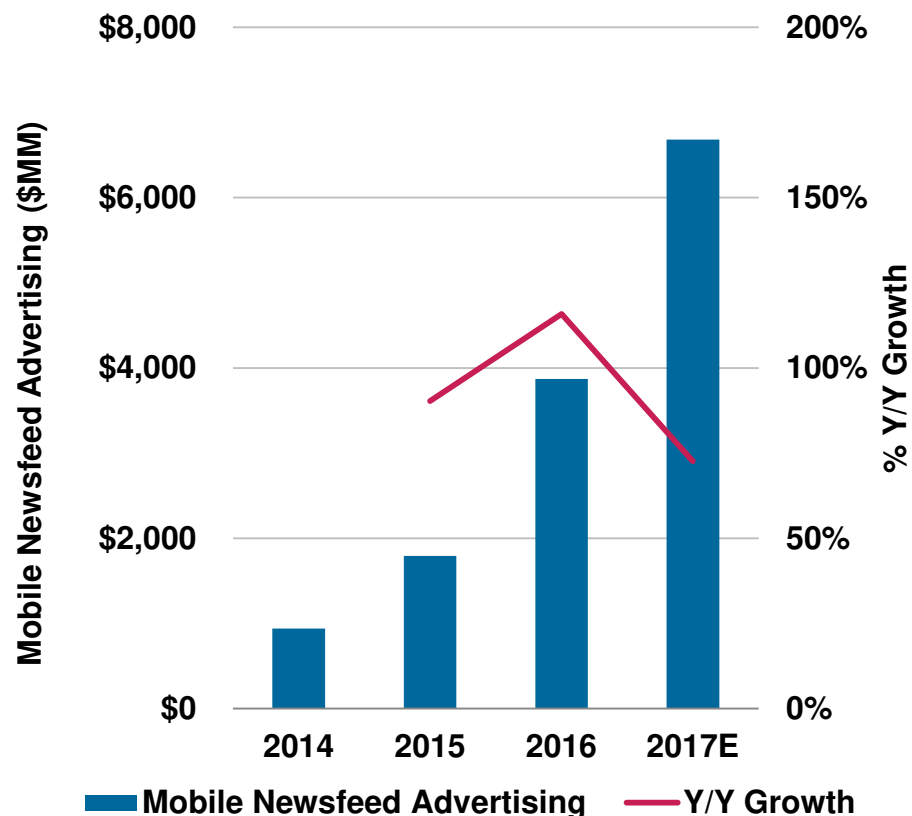


# Algorithmic Mobile Newsfeeds = Driving Usage + Advertising Growth (Toutiao / Baidu / Weibo / Tencent...)

## Toutiao / Baidu / Weibo / Tencent Mobile Newsfeeds with Personalization



## China Mobile Newsfeed Advertising Revenue & Y/Y Growth, 2014 – 2017E



# China Internet = Golden Age of Entertainment + Transportation

- 1) **Macro** = Positive Trends
- 2) **Internet** = Healthy User Growth...Usage Outpacing Users
- 3) **Entertainment** = Online Innovation Driving Robust User + Usage + Monetization Growth...
- 4) **On-Demand Transportation** = China #1 Global Market...Cars + Bikes
- 5) **Mobile Payment Infrastructure** = Enabling Rapid Growth + Monetization of Internet Usage...
- 6) **eCommerce + Advertising** = Innovation + Growth

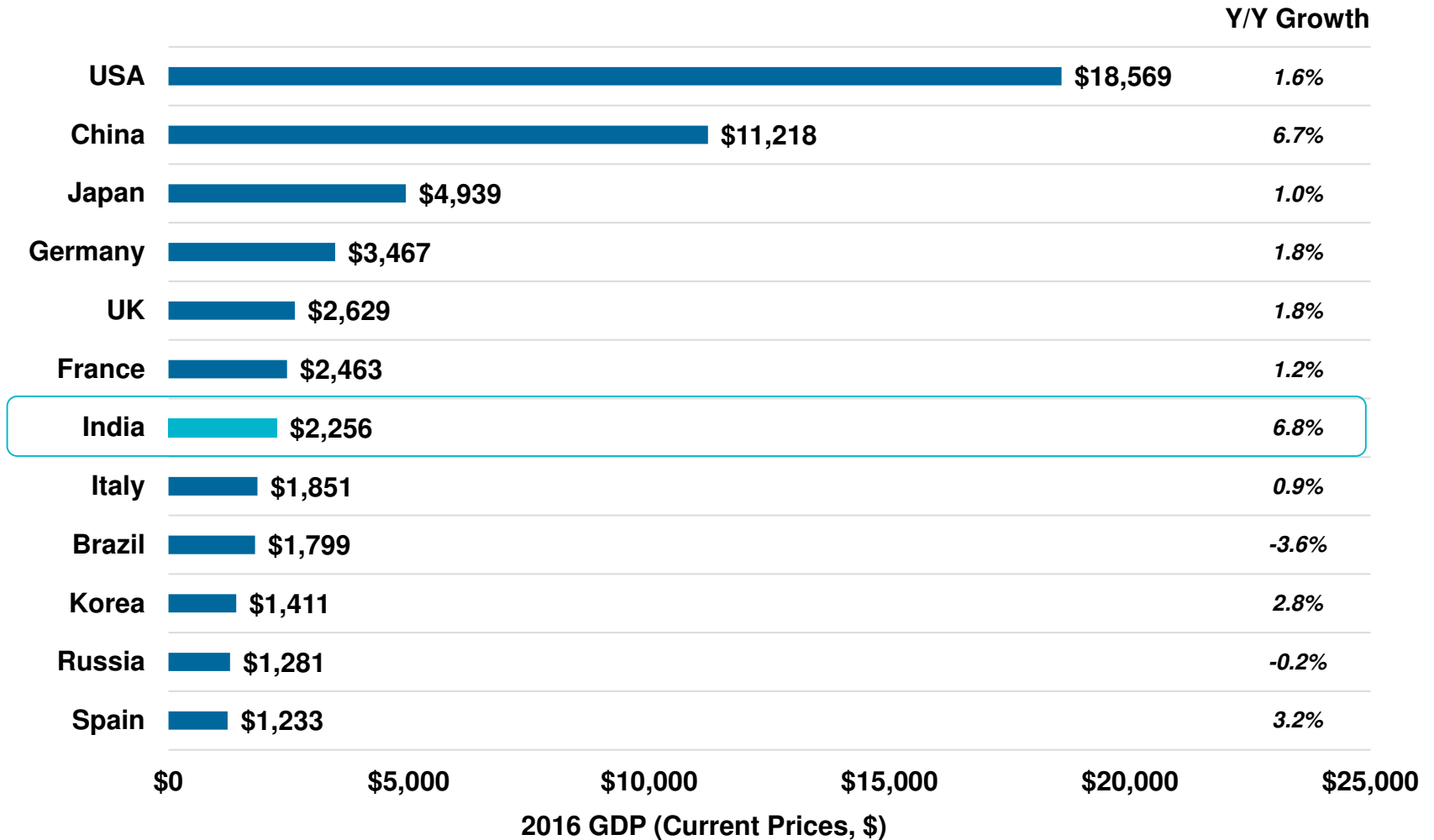
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**INDIA INTERNET =**

**COMPETITION CONTINUES TO INTENSIFY...  
CONSUMERS WINNING**

# India Economy (GDP) = Fastest Large Grower... +7% Y/Y @ #7 Global GDP Rank

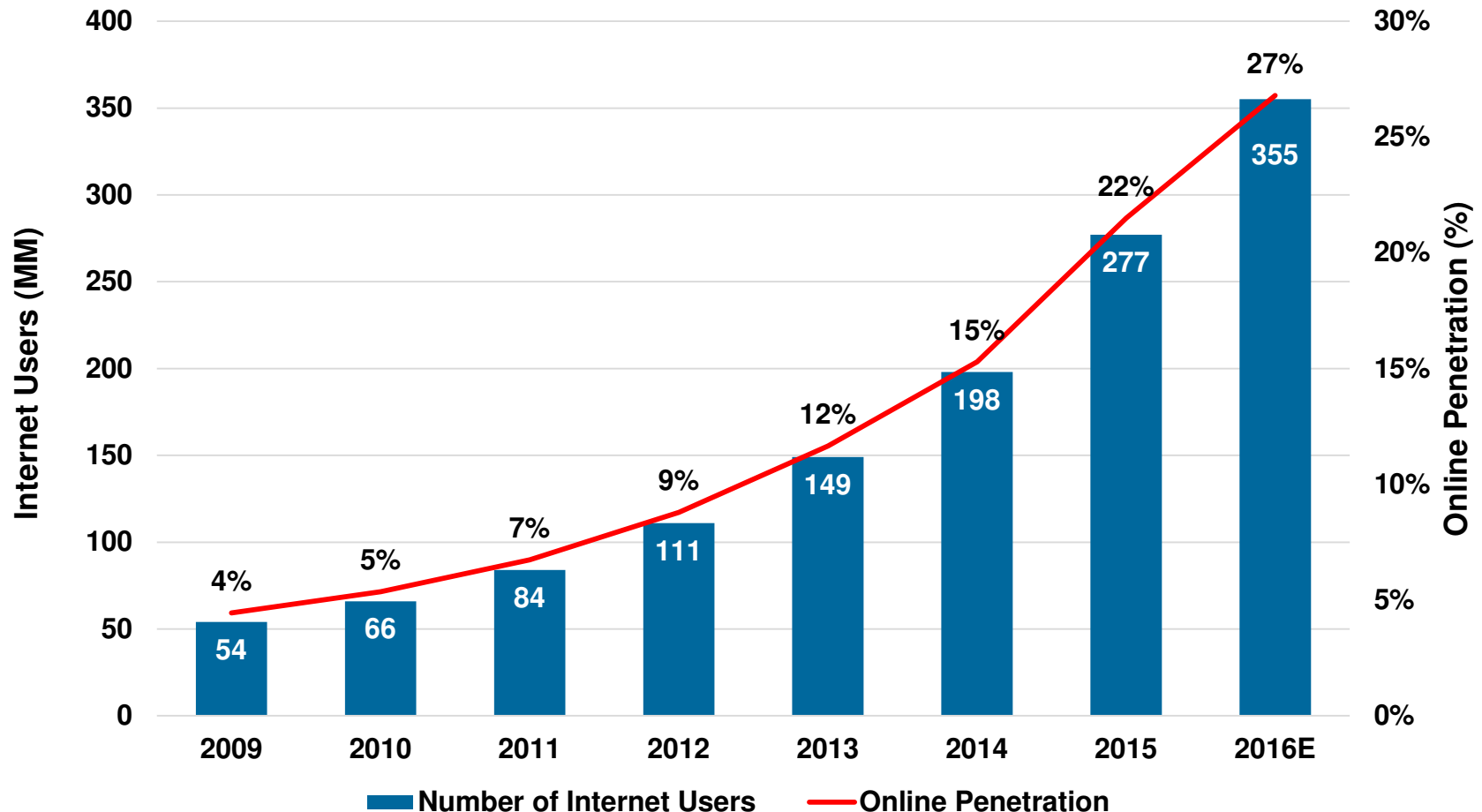
## 2016 GDP (\$B) and GDP Growth Rates (%), Selected Countries >\$1T of GDP



Source: IMF, 4/2017  
Note: Y/Y growth based on constant prices.

# India Internet Users = +28% (2016-June) vs. 40% Y/Y Growth... @ 27% Penetration...355MM Users...#2 Behind China

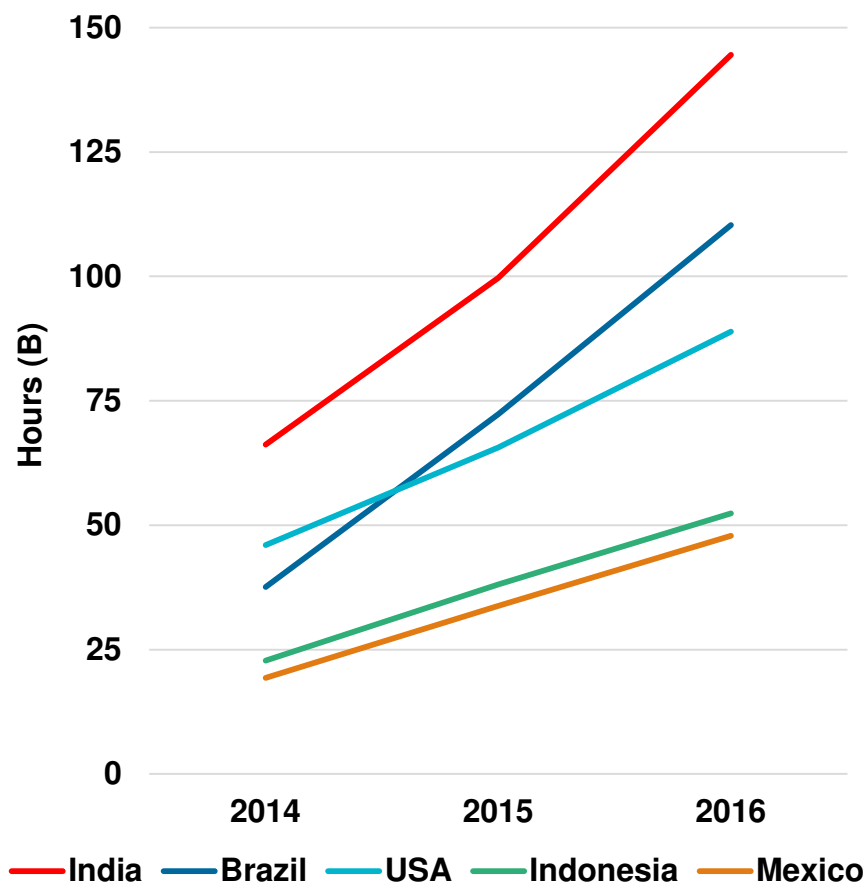
**India Internet Users (MM) & Penetration (%), Monthly Active\*,  
Mid-Year (June) 2009 – 2016E**



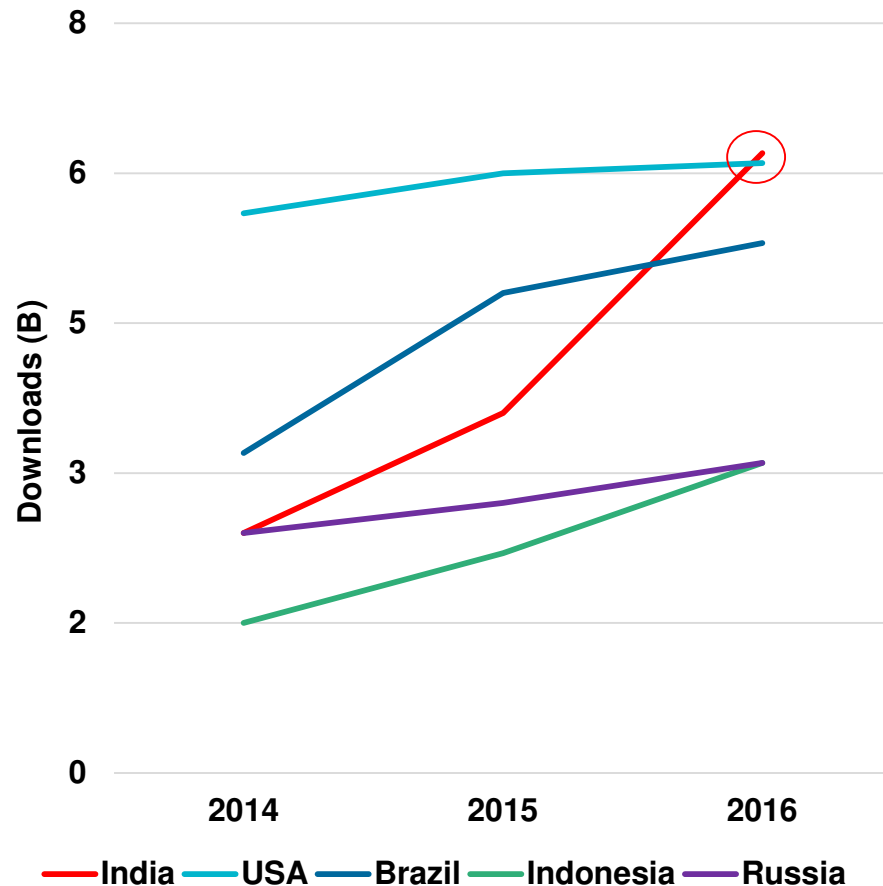
Source: IAMAI, UN Population Division, Worldometer, KPCB estimates based on IAMAI data. Uses mid-year figures.  
\*Note that "Monthly Active Users" are distinct from "Ever" users, which IAMAI defines as anyone who has ever accessed the internet. Owing to increasing activity levels, the number of "Monthly Active Users" may grow faster than "Ever" users.

# India = #1 Global Market (ex-China) Android Phone Time Spent... Google Play Downloads > USA (2016), per App Annie

## Total Time Spent\* on Android Phones, 2014-2016

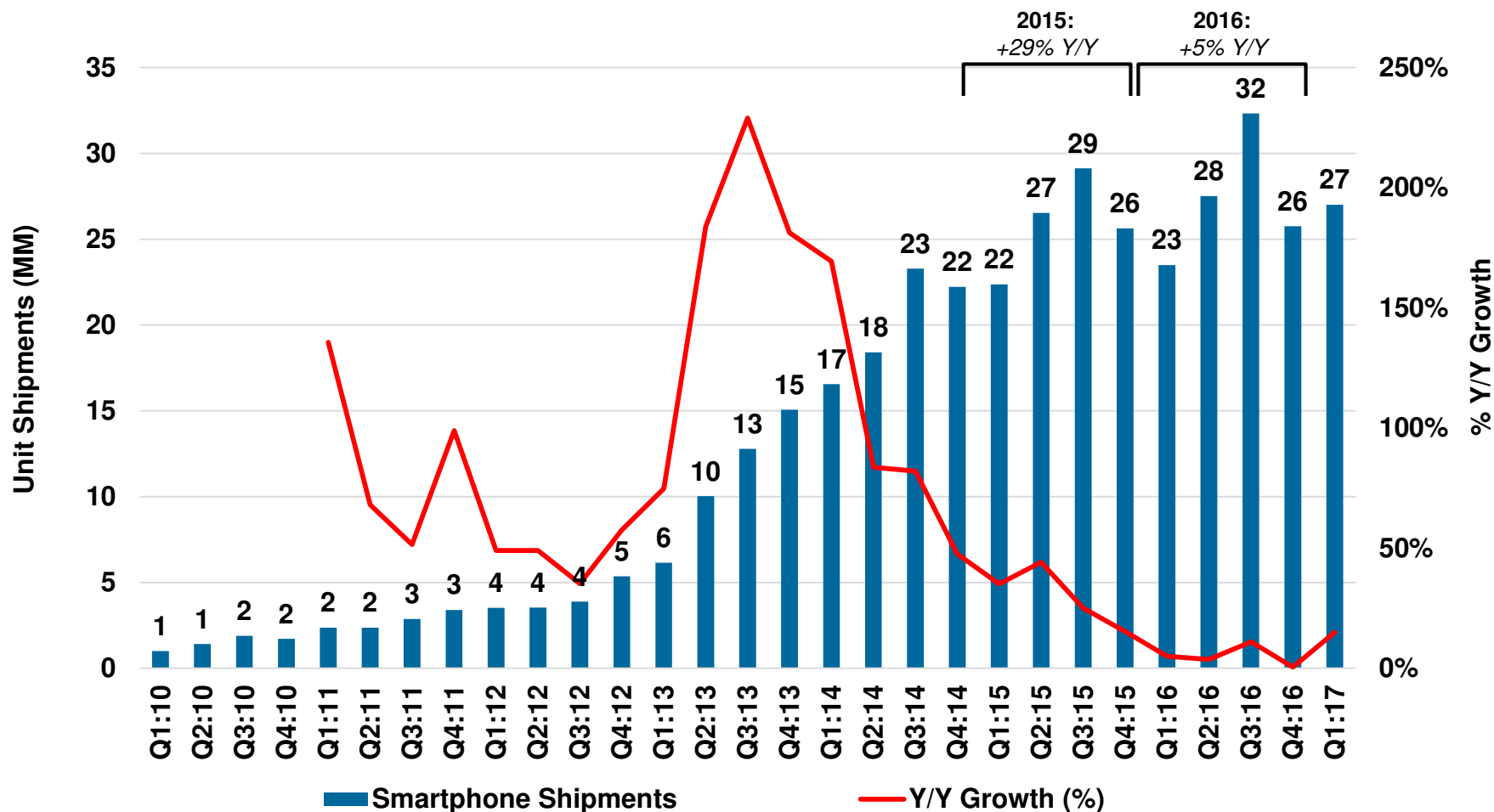


## Total Google Play Downloads, 2014-2016



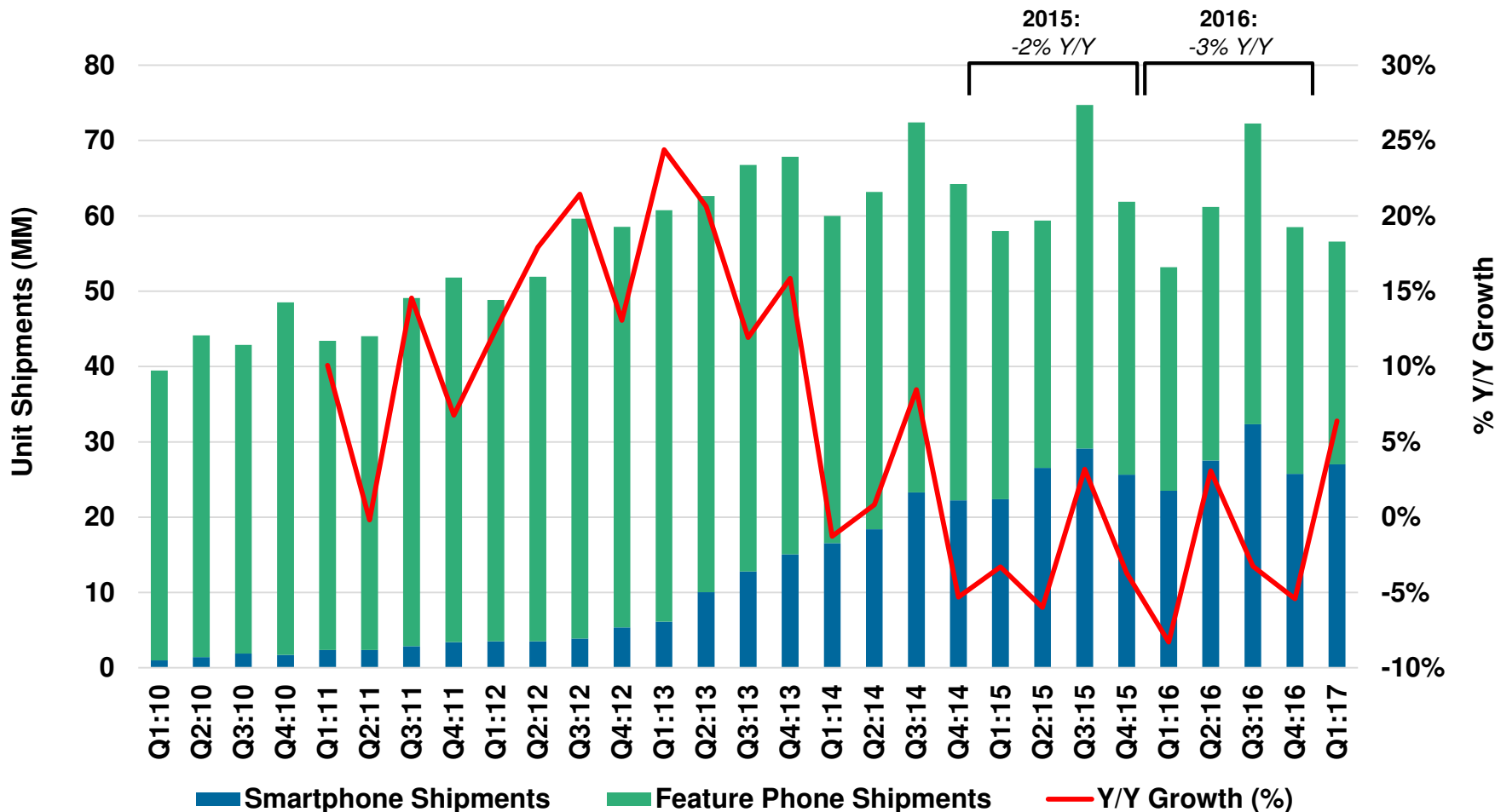
# India Smartphone Shipments = +15% Y/Y (Q1:17)...+5% (2016)...+29% (2015)

## India Smartphone Unit Shipments, Q1:10 – Q1:17



# Smartphone + Feature Phone Shipments = +6% Y/Y (Q1:17)...-3% (2016)...-2% (2015)

## India Mobile Phones Unit Shipments, Q1:10 – Q1:17



Source: Morgan Stanley, IDC

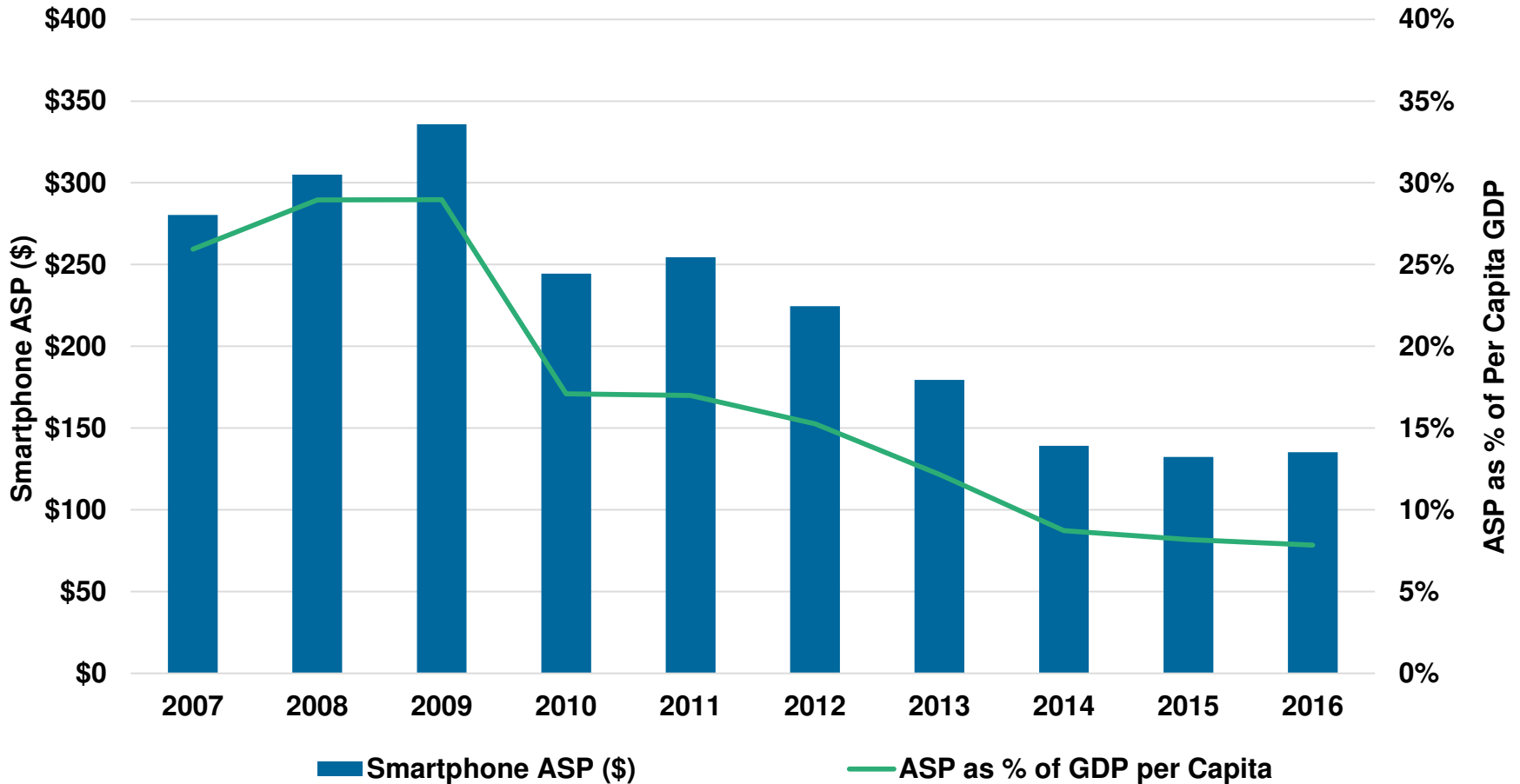


*India Smartphone + Data Costs =*

*Declining But Still High for  
Majority of India's 1.3B Citizens*

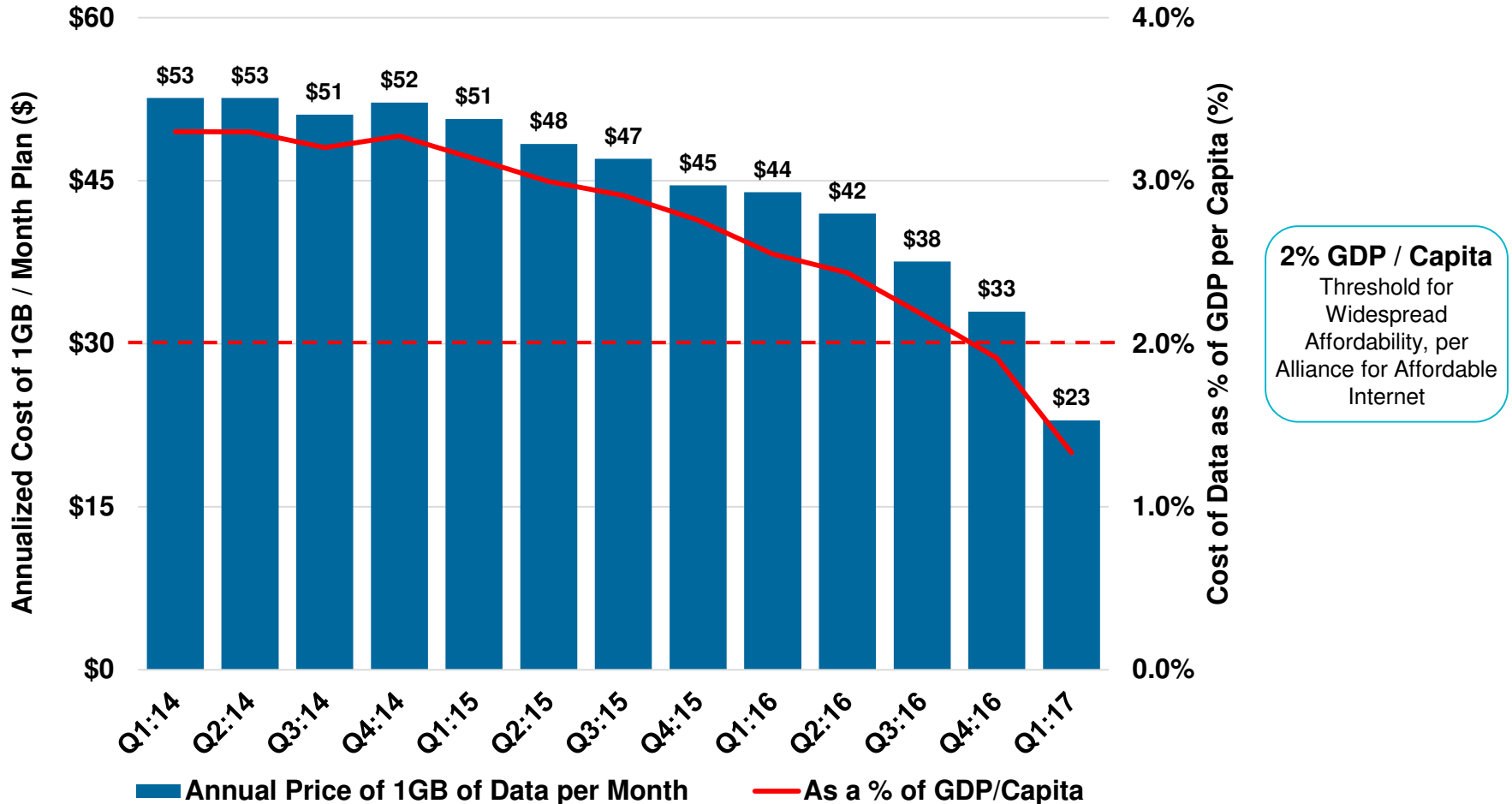
# India Smartphone Cost (excluding Data) = Unaffordable for Many... @ 8% of Annual Average GDP per Capita...

## India Smartphone Average Selling Price (ASP, \$) & ASP as % of GDP per Capita, 2007 - 2016



# ...India *Wireless Data Cost\** = Declining to More Affordable Levels... @ 1.3% of Annual Average GDP per Capita (3/17) vs. 3% (3/15)

## Annualized Cost of 1GB / Month vs. % of GDP per Capita, Q1:14 – Q1:17



***India Internet =***

***Fierce Global Battleground  
(Hardware / Carriers / Software /  
Commerce)...***

# India Mobile Hardware (2012-Q1:17) = Intense Competition → Massive Share Shifts

## Rise of India OEMs (2012-H1:14)

Likes of Micromax / Lava / Karbonn Fight for Feature Phone Market Share via Price...ASP's Fall ~40%...Shares Rise

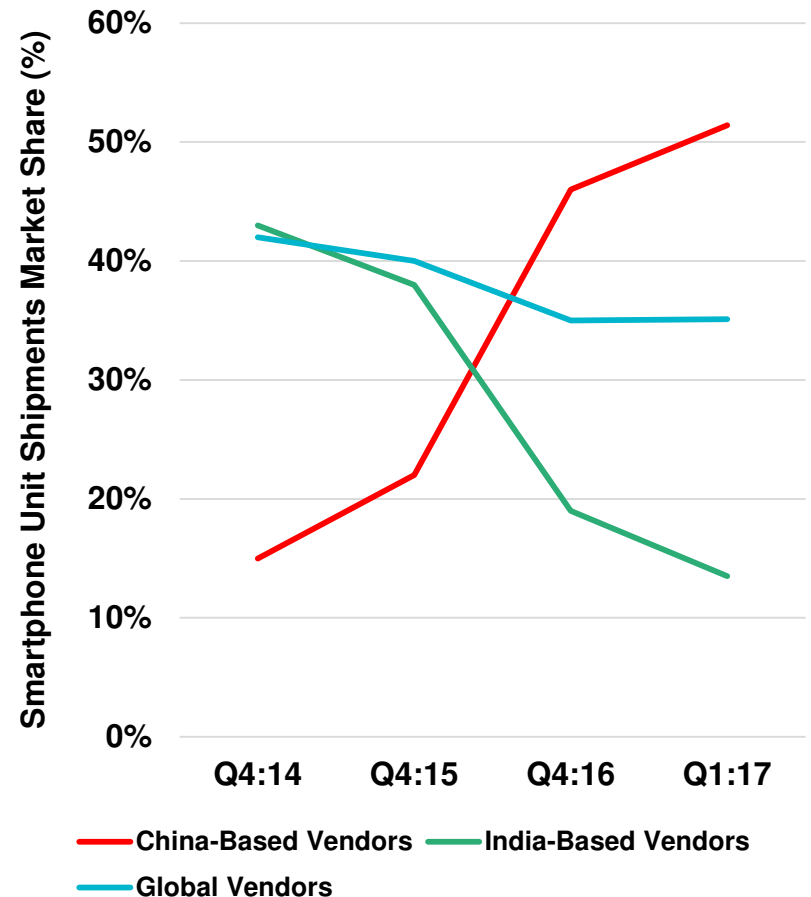
## Rise of China OEMs + Reliance (H2:14-Q1:17)

Likes of Lenovo / Xiaomi / Oppo / Vivo Fight for Smartphone Market Share via Quality / Features / Online Distribution...ASP's Stable...Shares Rise...Reliance Gains Share in 2016 on Launch of Jio 4G Service + LYF-Branded Smartphones...

## Competition Intensifies (H1:17...)

Xiaomi / Oppo / Vivo Share Gains Continue... Smartphones Get Cheaper / Better... Lava / Micromax / Jio Fight for Low-Cost 4G Feature Phone Share...

India Smartphone Shipments Market Share by Vendor Country of Origin (%), Q4:14 – Q1:17



# India Wireless Carriers = Incumbents + New Entrants... Fighting Aggressively for Share Over Past 4 Quarters...

## 2015 – 1H:16

Top 3 India wireless carriers Bharti Airtel / Vodafone / Idea collectively maintain ~60% share of broadband subscribers + ~\$2.80 – \$3.00 monthly ARPU (Voice + Data + Value-Added Services).

## Q2:16

Wireless incumbents begin to cut data rates in anticipation of Reliance Jio launch in 9/16. Data costs per GB decline from \$3.50 to ~\$3.15 (-10%) Q/Q. Voice costs decline 4% Q/Q.

## 9/16

**Reliance Jio – after investing \$25B over 7 years – rolls out 4G Pan-India Jio network + \$0 Monthly ARPU (post 3/17 when ARPU rose to \$4.70)**

## Q4:16 – Q1:17

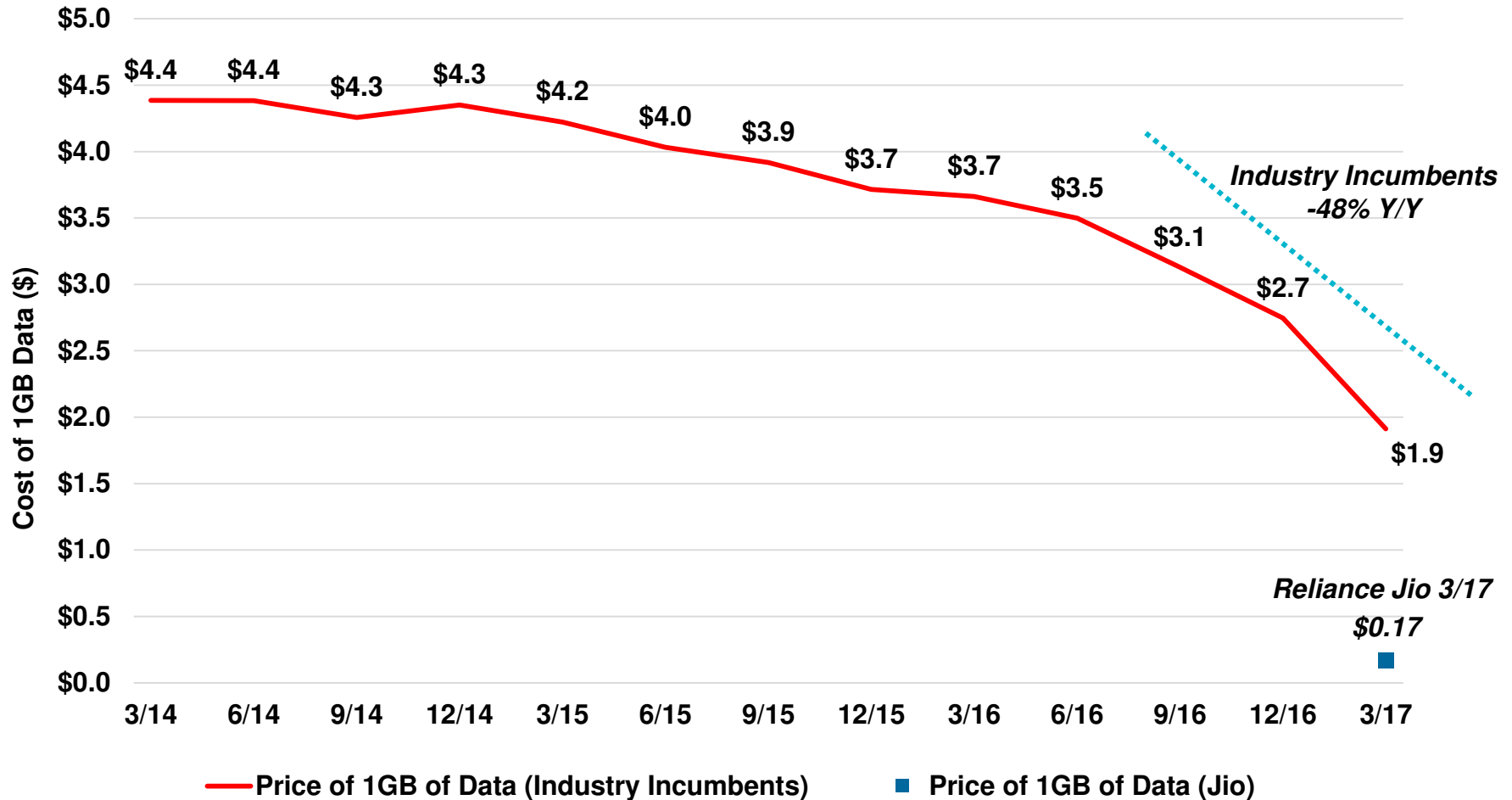
Wireless incumbents begin to lose data subscribers. In response, they cut data prices further over next 2 quarters. As of 3/17, average cost of 1GB of data @ ~\$2 among incumbents, -48% Y/Y...ARPU -20%. Including Jio, average cost of 1GB of data @ \$0.33 (3/17).

## 3/17

Reliance Jio free-data period ends with ~67% paid migration (72MM convert to paid Jio Prime subscribers out of 108MM sign-ups)

# ...India Wireless Consumer Data Prices = -48%+ in Last Year\* as... Incumbent Carriers Responded to Jio's Low Pricing...

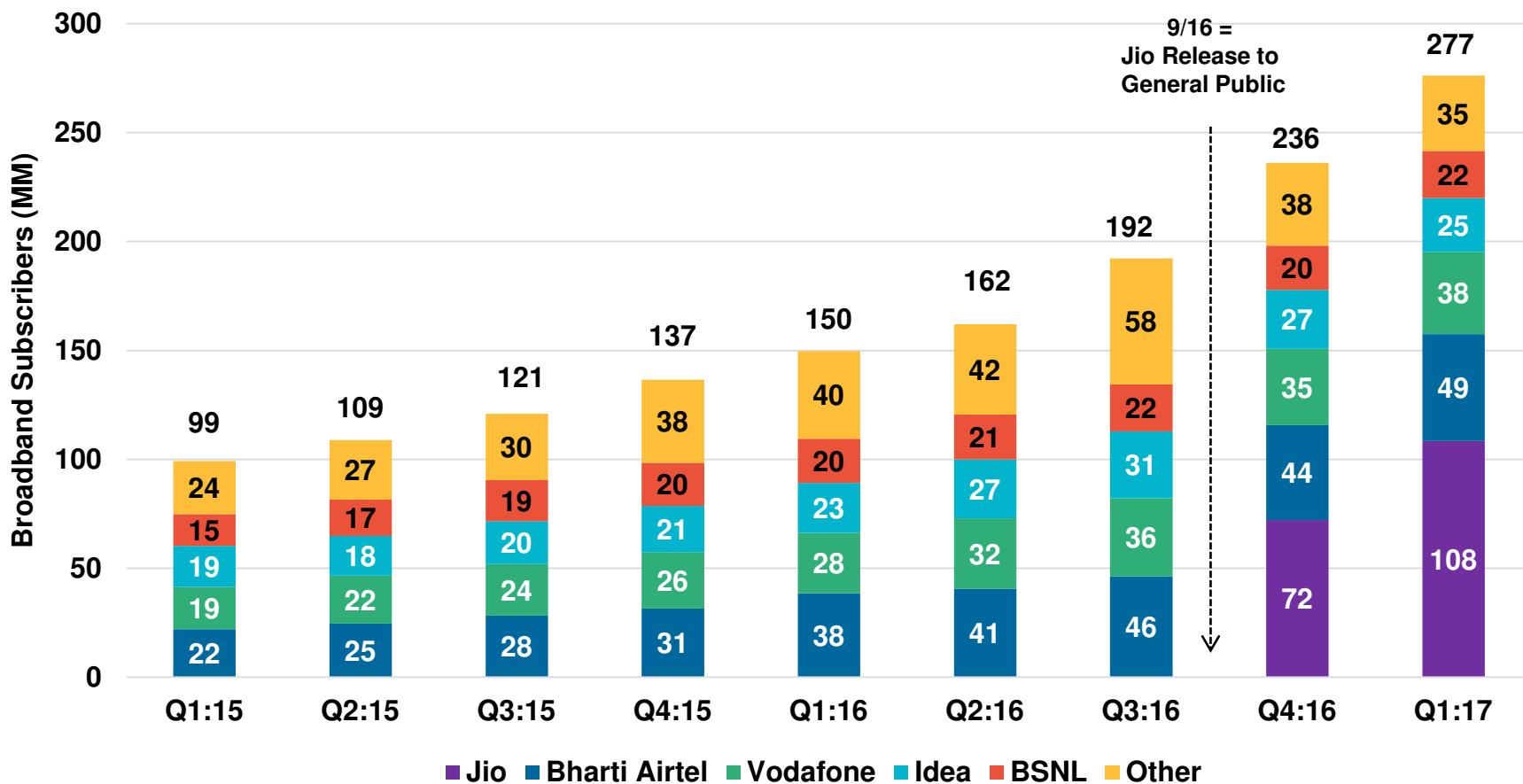
## Data Prices per GB, Industry\*, CQ1:14 – CQ1:17



Source: JP Morgan, Bharti Airtel, Idea Cellular, Reliance Jio.  
\*Industry incumbent average calculated using weighted average cost of 1 GB of data realization from Bharti Airtel / Idea Cellular.  
Reliance Jio data assumed at 10 INR / GB based on March realization.

...India Broadband Subscribers\* = +85% Y/Y (Q1:17)...Accelerating...  
 Reliance Jio Rose to 39% Share vs. 0% (Q3:16) Owing to Low Price Launch

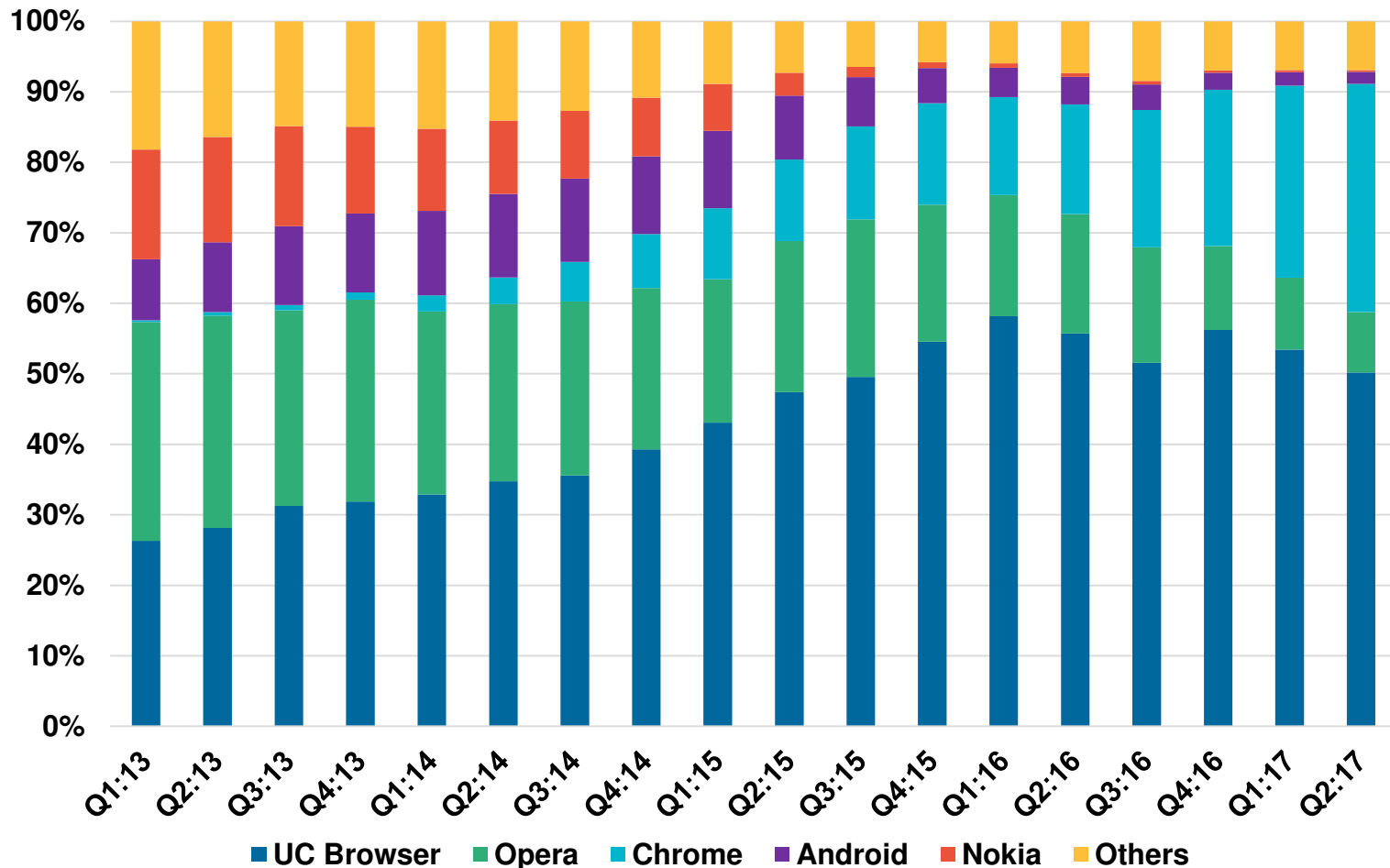
## India Broadband (>512 Kbps) Subscribers\* by Service Provider, CQ1:15 – CQ1:17





# India Software – Mobile Browser Usage Market Share = China (UC/Alibaba) @ 50%...USA (Google Chrome) @ 32%...

## India Mobile Browser Usage Market Share, Q1:13 – Q2:17



Source: Statcounter 2017

Note: Data reflects usage share across calendar year quarters. As Q2 is in progress, data for Q2 2017 reflects current share as of 5/30/17

# ...India Software – Top Downloaded Android Apps = USA @ 4 of 10...China @ 2 of 10...India @ 2 of 10

Google Play Store Rank (5/29/17)	App	Origin	Category	Rank on 5/30/16 (1 Year Ago)
1	WhatsApp (Facebook)	USA	Messaging	1
2	Facebook Messenger	USA	Messaging	3
3	ShareIt	China	Utility – file transfer	5
4	Truecaller	Sweden	Utility – dialer	11
5	Facebook	USA	Social	2
6	UC Browser (Alibaba)	China	Browser	4
7	MX Player	Korea	Utility – video player	13
8	Hotstar	India	Entertainment	6
9	JioTV	India	Entertainment	301
10	Facebook Lite	USA	Social	9

# India eCommerce = Many Players Fighting for Share...

**Flipkart**



**amazon.com**

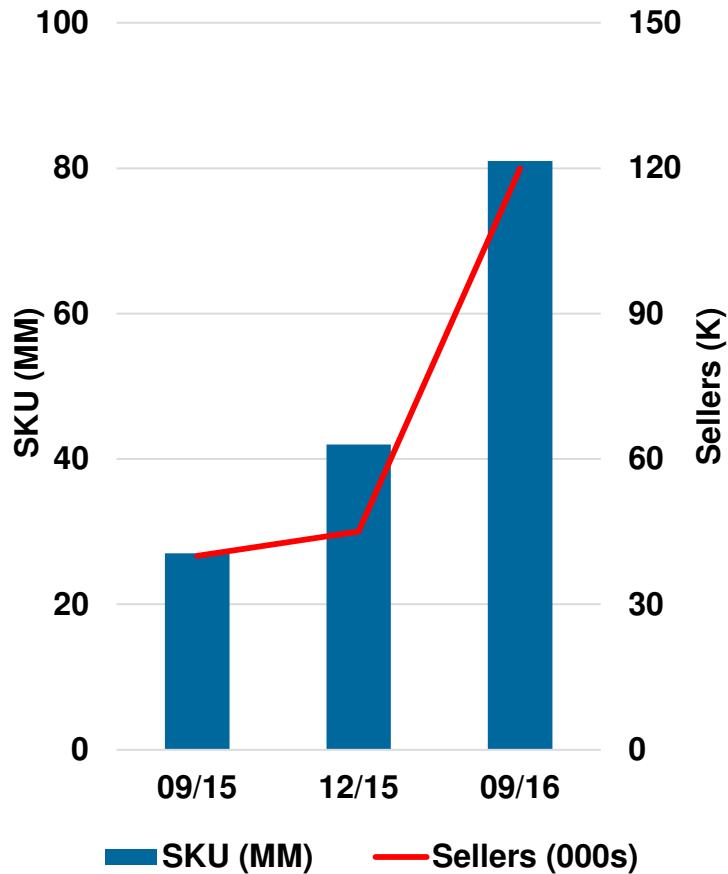
**paytm**

 **snapdeal**

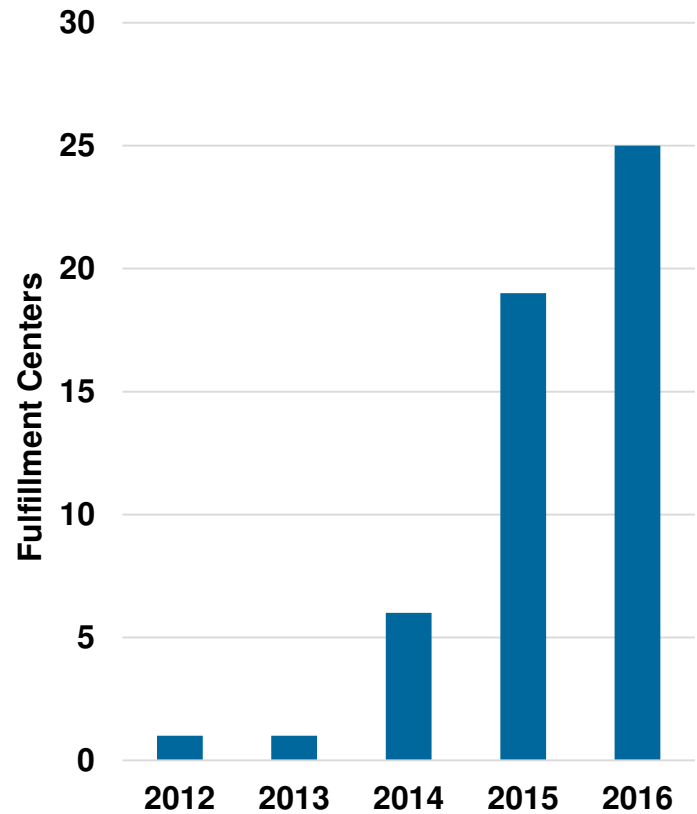
 **SHOPCLUES.COM**

# ...Amazon India = Inventory (SKUs) & Sellers +3x Y/Y... Fulfillment Centers +30% Y/Y...Aggressive / Investing Heavily

### Amazon India SKUs & Sellers, 9/15 – 12/16



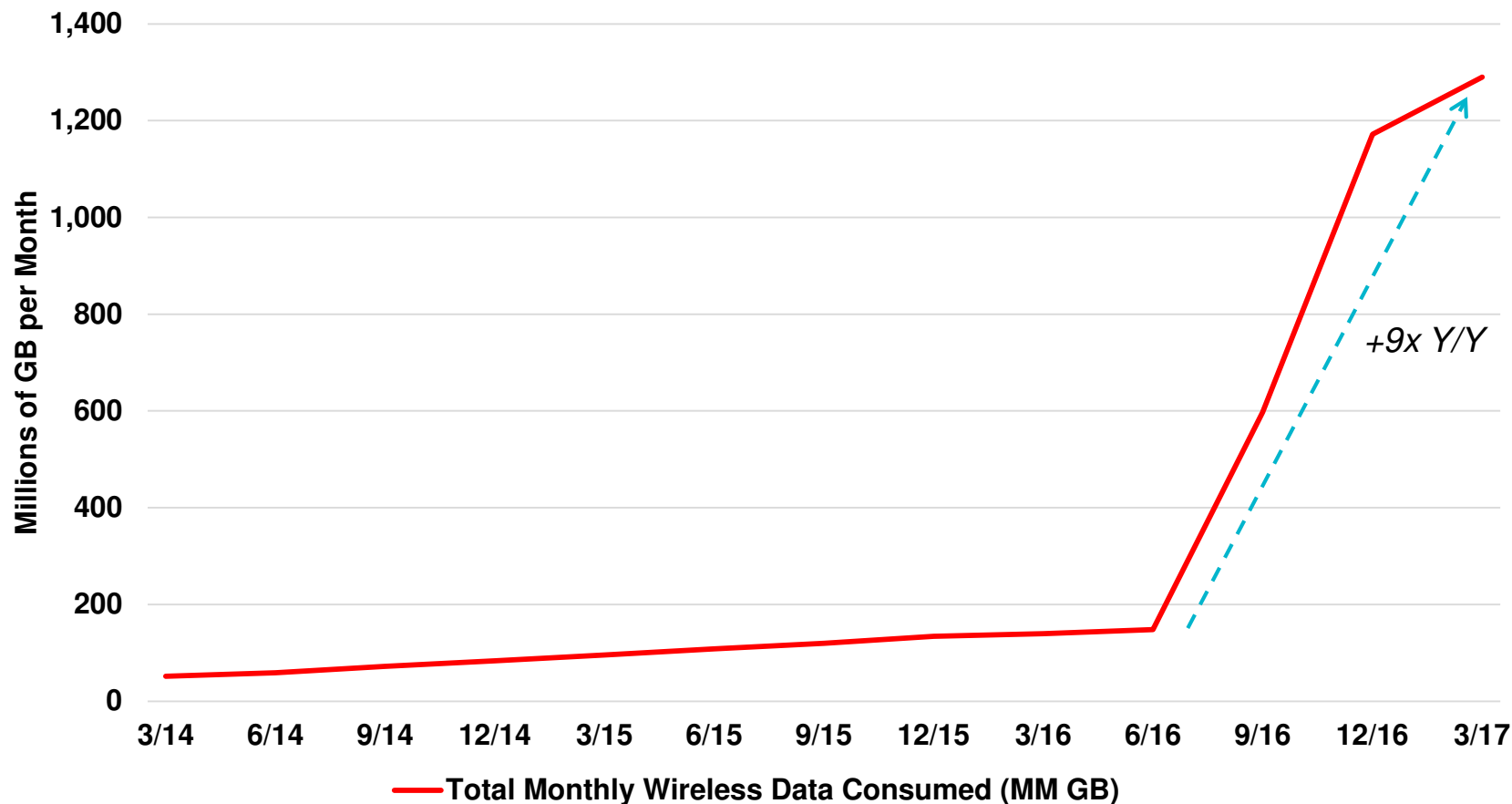
### Amazon India Fulfillment Centers, 2012 – 2016



***India Internet Usage =  
Rising Owing to...  
Cheaper / Faster Access***

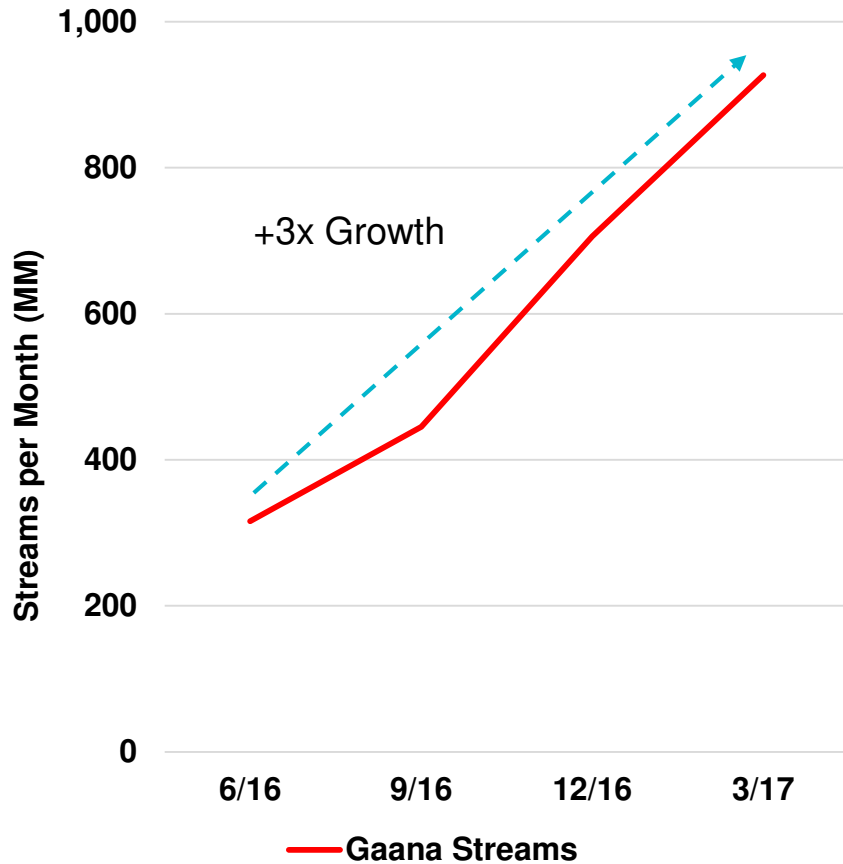
# India Wireless Internet Data Usage = Rising Dramatically as Access Costs Have Fallen...

## Total Monthly Wireless Data Consumed (MM GB)\*, 3/14 - 3/17

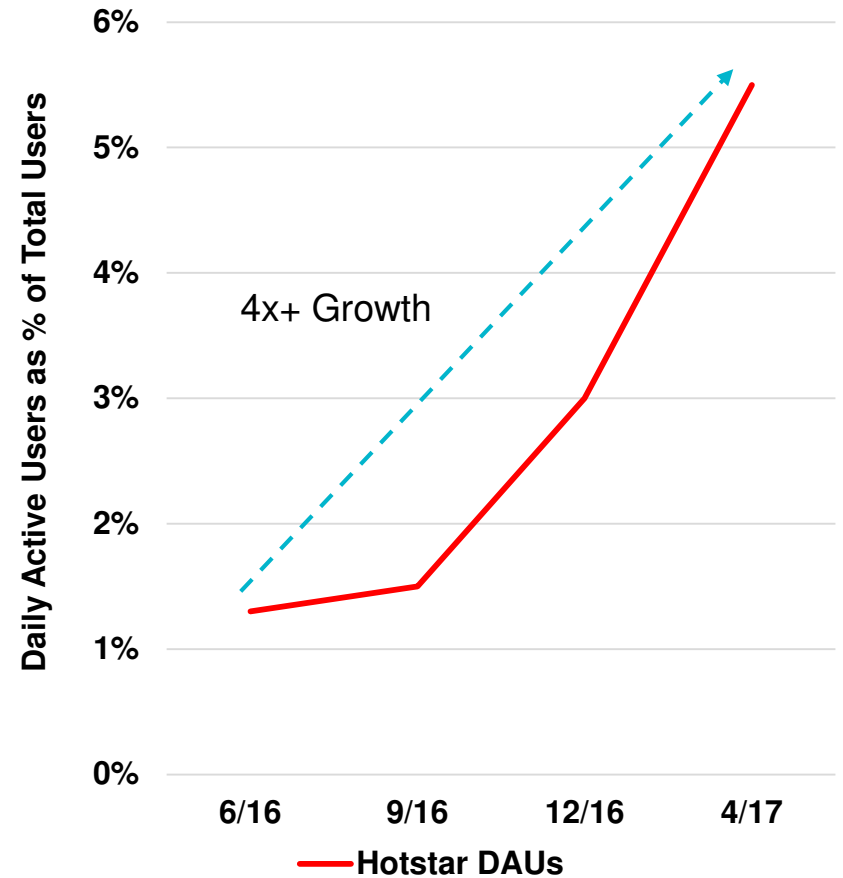


# ...India Wireless Internet Data Usage = Bandwidth Intensive App Usage Growing Dramatically

## Gaana Streams, 6/16 – 3/17 (Music Streaming App)



## Hotstar DAUs, 6/16 – 4/17\* (Video Streaming App)



***India Leadership =  
Focused Pro-Digital Policies***



# India Leadership = Digital-Focused Government Policies Rolled Out with Speed + Scope

## Narendra Modi Elected India Prime Minister = 5/14

### *Key Policies*

#### **'Banking for All' 'Jan Dhan Yojana' = 8/14**

~280MM+ new bank accounts opened to deliver financial services directly to underbanked in effort to bypass corruption

#### **'Power for All' Rural Electrification = 7/15**

Program to electrify 100% of villages by 2019, with 133MM rural households electrified to date...~45MM remaining

#### **Demonetization = 11/16**

~85% of paper currency in circulation replaced overnight to clean 'black' money (estimated at 22%+ of total GDP) & boost digital payment adoption

#### **Nationwide Tax (GST) Reform = 3/17**

Single indirect tax replacing 17 different state & central taxes, turning India into single national market & eliminating double taxation for consumers

### *Other Notable Policies*

#### **Digital India = 7/15**

National rollout of high speed broadband access & digital delivery of land records, income tax filings & other government services

#### **Skills & Entrepreneurship = 6/15**

Dedicated ministry to upgrade youth skills...goal to train 10MM new workforce entrants per year

#### **Startup India = 1/16**

High level support of Indian startups via funding & fast tracking of regulatory support for new companies

#### **Infrastructure Enhancements = 2/17**

\$59B targeted to upgrade railways / airports / roads

*India Internet Usage Growth Strong Owing In Part to  
Broader Availability of Low Cost Data Access...*

*India Internet User Base @ +355MM is Large...*

*Ongoing Smartphone + Access Price Declines  
Key to Onboarding Next 200MM Users...*

*Driving Free Cash Flow for Many Internet  
Businesses Challenging Owing to Fierce Competition...*

*Consumers Benefitting from  
Competition & Government Policies*

# ***India Internet Innovation = Leapfrogging + Re-Imagining***

## ***Leapfrogging***

*Mobile*

*Identity*

*Bandwidth*

*Payments*

## ***Re-Imagining***

*Entertainment*

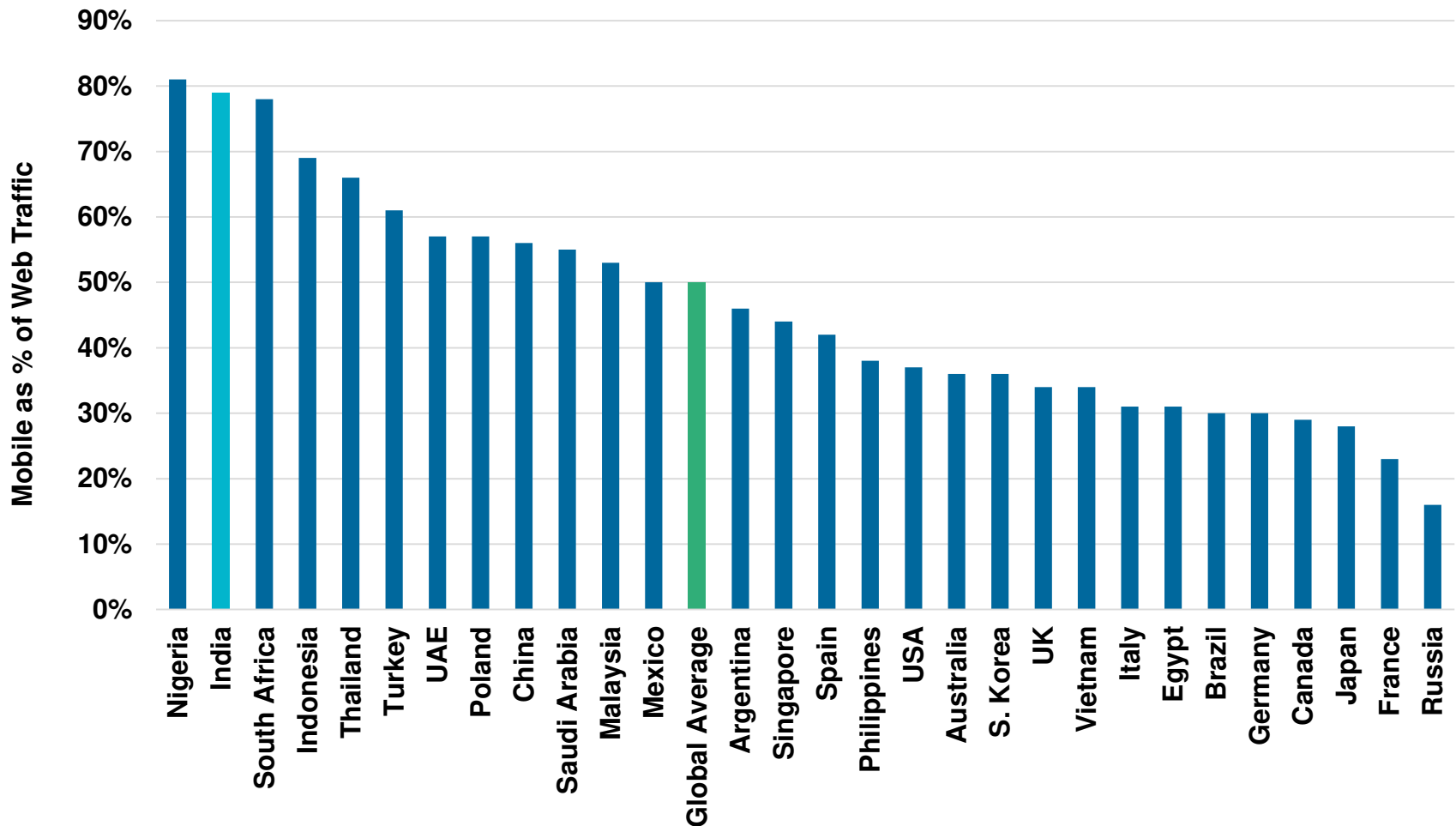
*Education*

*Healthcare*

*Marketplaces*

# India Mobile Usage = A Global Leader vs. Desktop Usage... ~80% of Internet Usage on Mobiles...

## Mobile Share of Web Traffic, 1/17



Source: Hootsuite, Statcounter, 1/17.

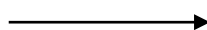
# India Identity = Aadhaar + eKYC – Digital Authentication for 1B+ People... Use Growing Rapidly @ 16MM Authentications per Day (3/17) vs 3MM Y/Y...

## Aadhaar Authentication =

### Are You Who You Claim To Be?

- Binary Yes / No Answer Only
- Uses Biometrics (Fingerprint + Iris)  
+ Unique 12-Digit Number to Verify

If Yes

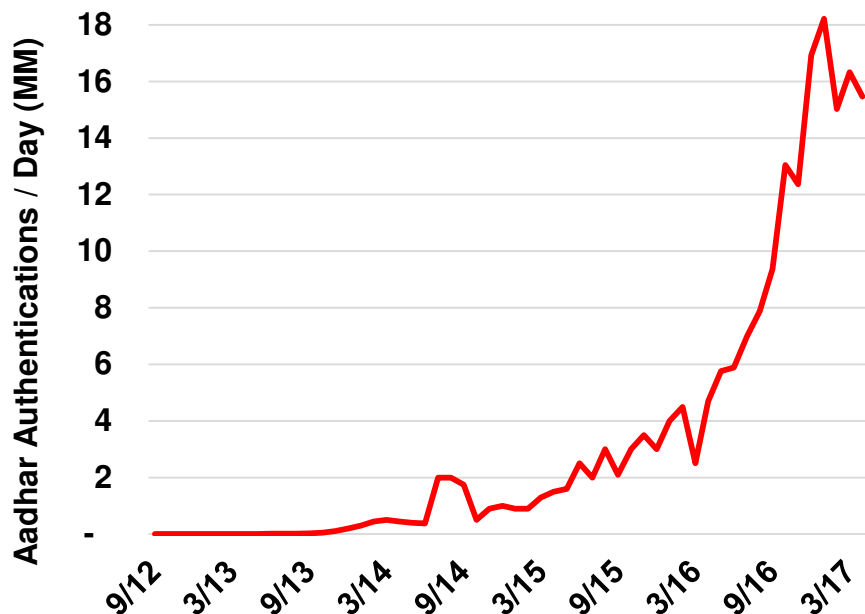


## eKYC Authentication

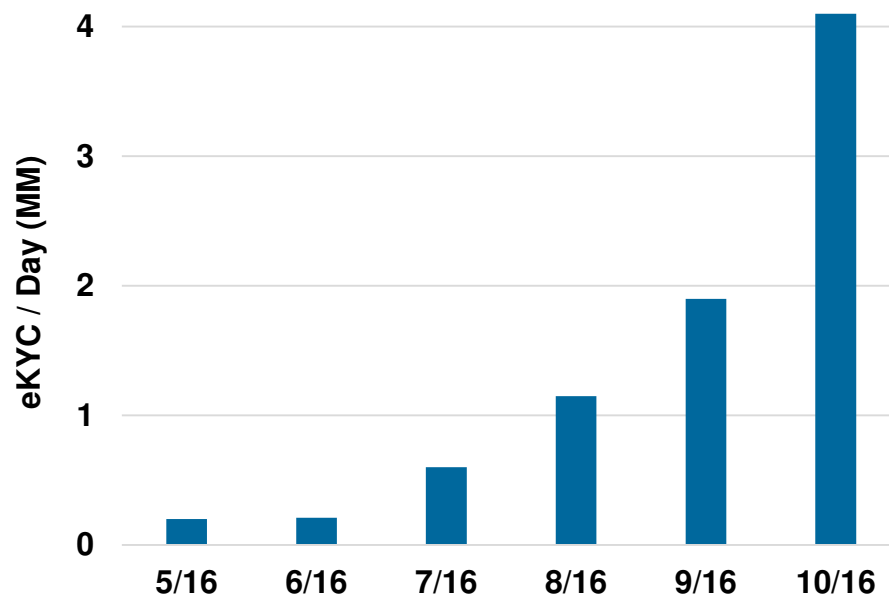
### Proof of Address / Birth / Photos...

- Secure Dropbox for Basic Paper Records
- Can Only be Accessed if Aadhaar ID is Authenticated + User Gives Consent

### Aadhaar Authentications / Day, 9/12 - 3/17

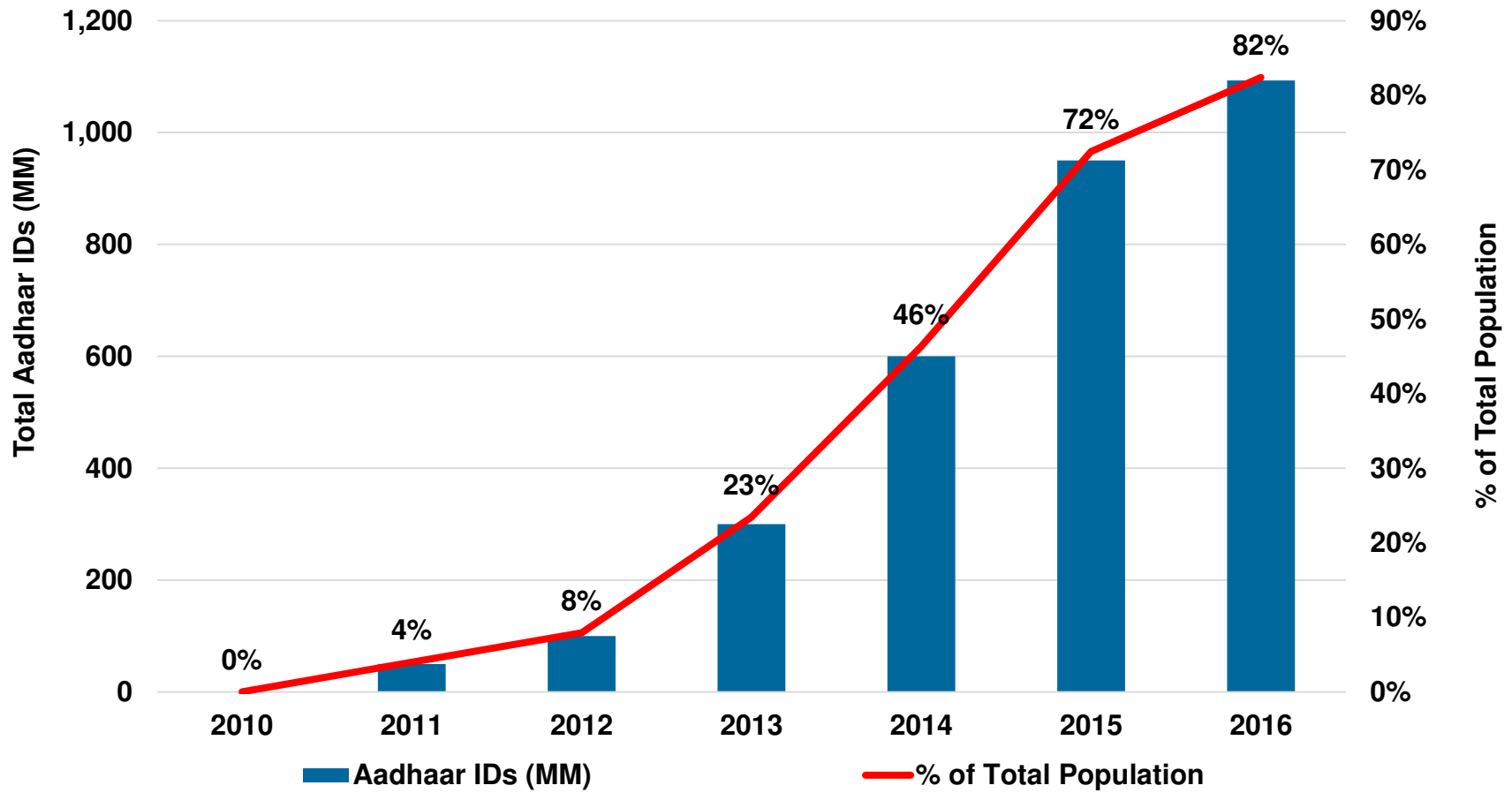


### eKYC Verifications / Day, 5/16 – 10/16



...India Identity = India Aadhaar Digital IDs Have Broad Coverage...  
@ 82% of Population (1.1B People) vs. Zero 6 Years Ago...#1 in World...

## Total Aadhaar IDs (MM), 2010 – 2016



# ...India Identity = Aadhaar IDs + eKYC Improving Foundational Access to Broad Services

## Sim Card Activation

**Before Digital ID = 1-3 Days**

Proof of Address / original photo IDs / attested photocopies + potential fraud...



**After-Digital ID = 15 Minutes**

Aadhaar number + fingerprint / biometric eSign



## Bank Account & Digital Wallet Opening

**Before Digital ID =**

Physical visit to bank, paper-based KYC, lack of ability to scale, improper documentation



**After-Digital ID =**

Open account on mobile phone...  
in secure / scalable way



## Pensions & Social Services

**Before Digital ID =**

Cash-based / leakage of payments to government officials / corruption / fraud



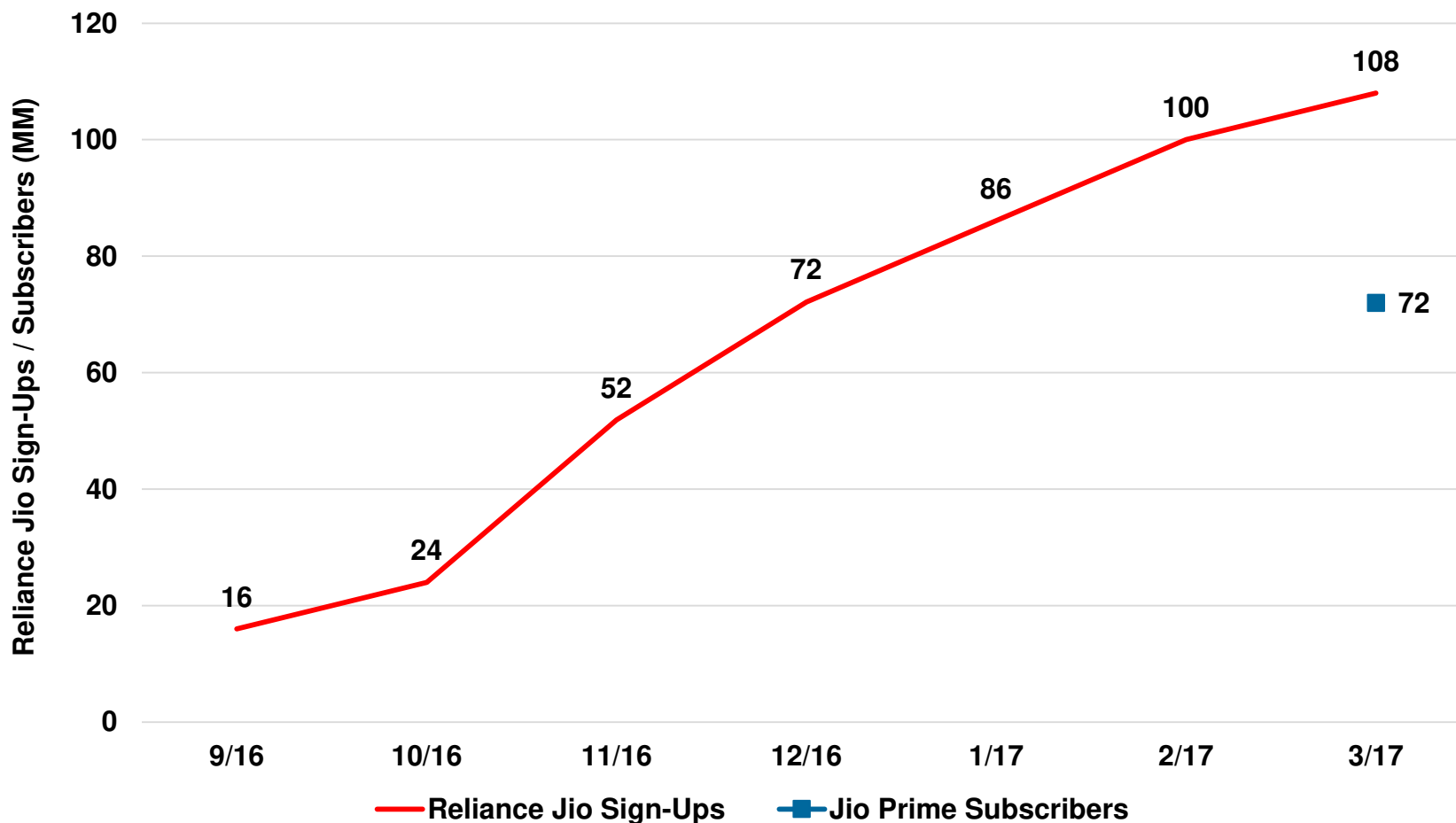
**After-Digital ID =**

12-15% increase in final payouts to workers  
owing to reduced leakage



# India Bandwidth = Reliance Jio High-Speed Bandwidth Ramp... @ 108MM Sign-Ups\* in 7 Months...72MM Converted to Paying Subscribers

## Reliance Jio Sign-Ups and Subscribers (MM), 9/16 – 4/17



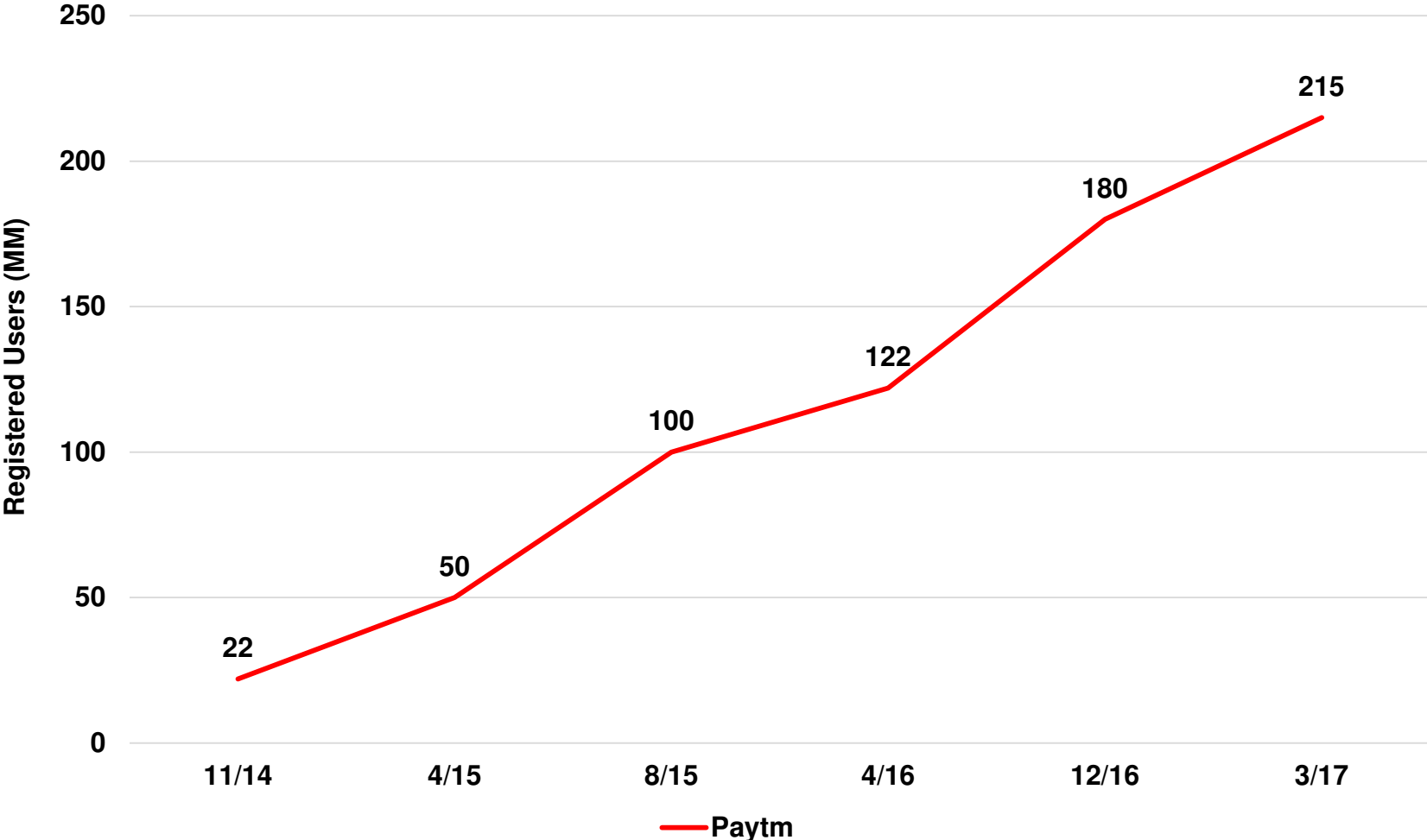


# India Payments = Evolution of Building Blocks for... Digital Payment / Data Infrastructure for 1B+ Indians (2009 → 2017)...

Phase	Project	Functionality	Results
<b>1) Identity</b>	Aadhaar (1/09) + eKYC (5/13)	Single digital ID + authentication database	<ul style="list-style-type: none"> <li>• 1B+ Aadhaar cards issued since 2010</li> <li>• ~16MM authentications/day (4/17)</li> </ul>
<b>2) Banking</b>	Jan Dhan Yojana (8/14) 'Banking for All'	Bank accounts tied to Aadhaar for previously non- banked citizens	<ul style="list-style-type: none"> <li>• 280MM+ accounts opened in 3 years... 50% of existing bank accounts</li> <li>• Direct subsidies to citizen bank accounts have saved \$775M owing largely to reduced corruption leakage (12/16)</li> </ul>
<b>3) Mobile Services</b>	Universal Payments Interface (UPI) (7/16)	Instant money transfer between bank accounts via phone numbers	<ul style="list-style-type: none"> <li>• ~\$380MM monthly transaction volume (4/16)</li> <li>• Use accelerated after demonetization (11/16)</li> </ul>
	Bharat Interface for Money (BHIM) (12/16)	Government App for UPI based payments	<ul style="list-style-type: none"> <li>• 17MM+ downloads within 2 months of launch (2/17)</li> </ul>

# ...India Payments = Online Leader Paytm Ramping Users Rapidly... Bolstered by Uptake of Online + Offline Commerce...

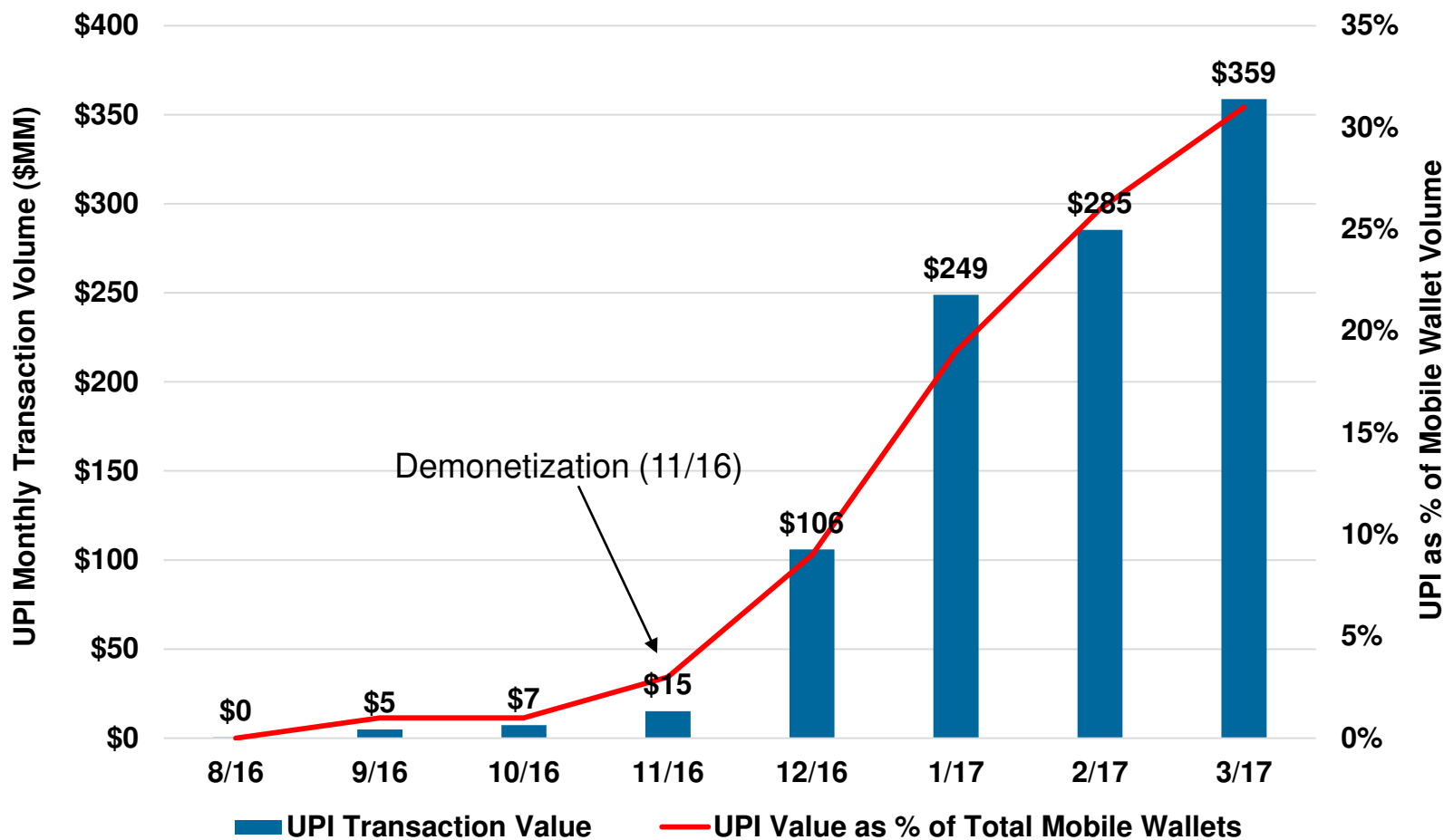
Paytm Registered Users (MM), 11/14 - 3/17



Source: Paytm.

# ...India Payments = UPI (Universal Payments Interface)... Rapidly Enabling Bank-to-Bank Mobile Money Transfers

## Monthly Digital Payments Volume in India via UPI (\$MM), 8/16 – 3/17



Source: Reserve Bank of India, Monthly Bulletin (Payments and Settlement Systems)

# ***India Internet Innovation = Leapfrogging + Re-Imagining***

## *Leapfrogging*

*Mobile*

*Identity*

*Bandwidth*

*Payments*

## ***Re-Imagining***

*Entertainment*

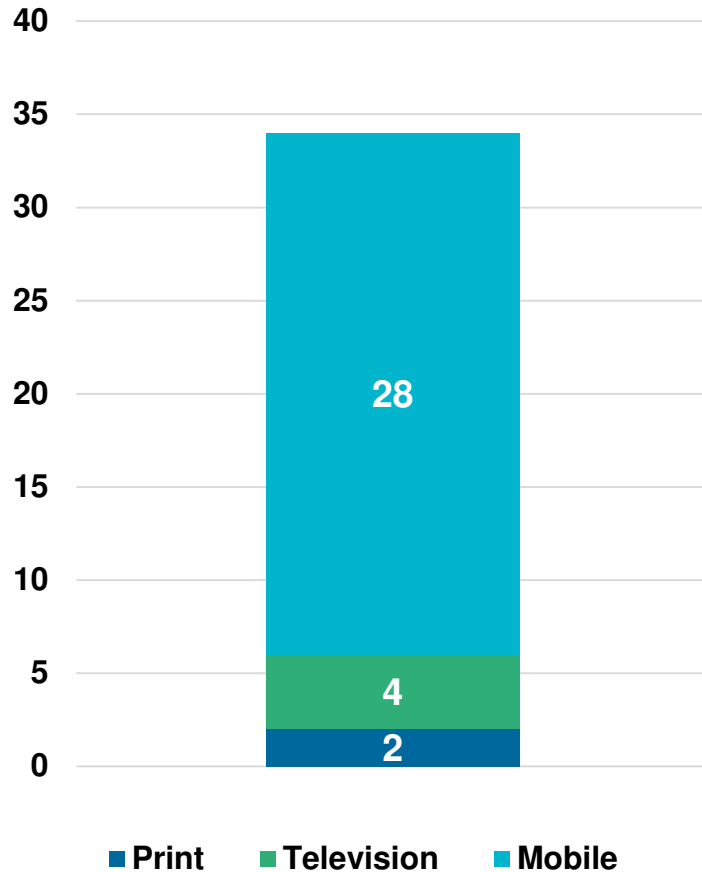
*Education*

*Healthcare*

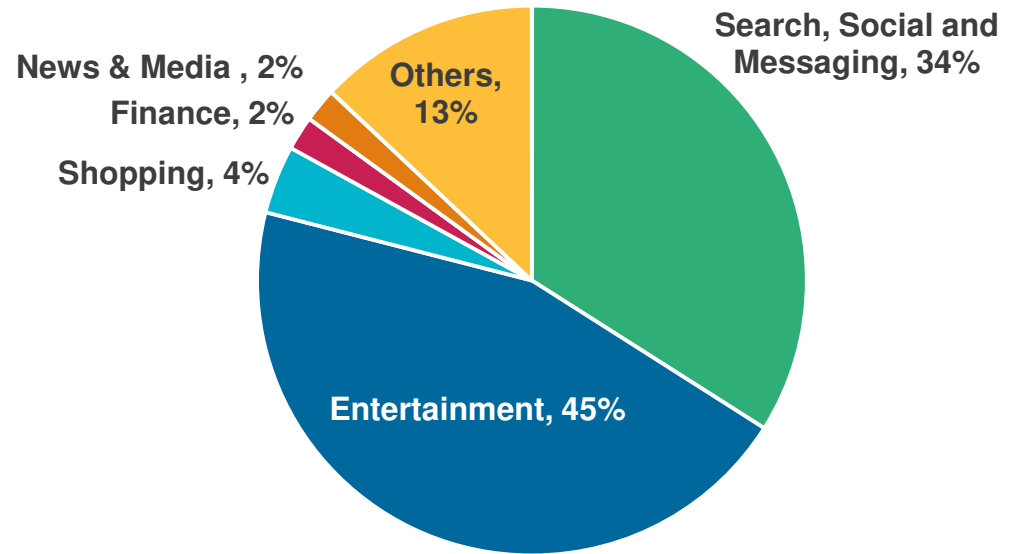
*Marketplaces*

# India Entertainment = Weekly Mobile Time Spent @ 7x TV... 45% Mobile Time = Entertainment...

### Time Spent with Media per Week (Hours), 2016



### Percent of Time Spent on Mobile by Category, 2016



# ...India Entertainment Re-Imagined = Internet-First Shows Optimized for Mobile... Replacing Longer / Linear Programming Optimized for TV

*THEN*

## TV Soap Operas + Reality Shows

- Scripted, family-focused dramas targeted @ older viewers + families with 'rinse & repeat' plots
- Produced for linear programming without user data / feedback
- Little to no user data, often based on small TV rating sample sizes / surveys



*NOW*

## On-Demand Web-Video Shows

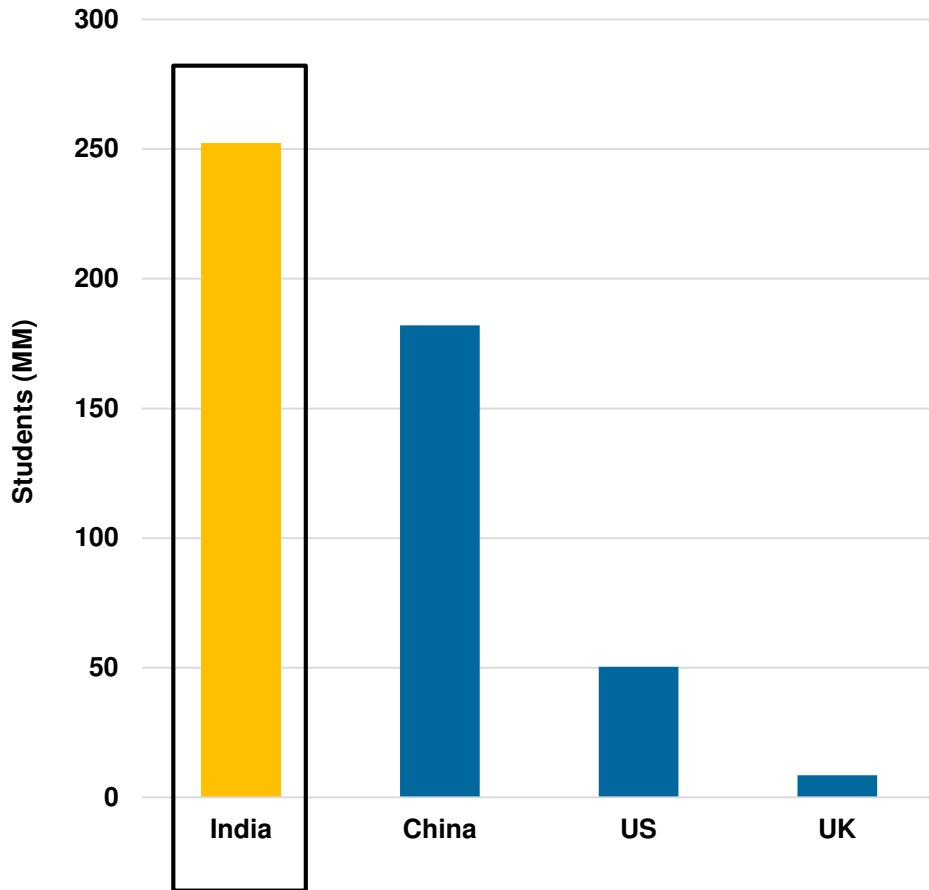
ex. AIB Roasts, Hotstar

- Millennial focused / short-form content such as 'Hinglish' standup comedy
- Made for mobile / shared via messaging channels (Whatsapp, FB, etc)
- Instant user data + feedback (Views, Geos, Replays etc.)
- Dramatic growth assisted by 4G rollout of Jio...AIB Channel @ 100MM+ views

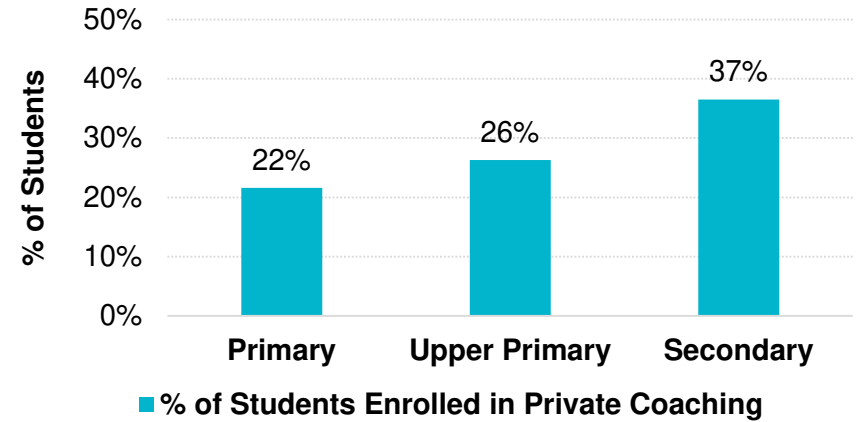


# India Education = Largest K-12 School System (250MM+ Students) in World With... High Demand for After-School Education...

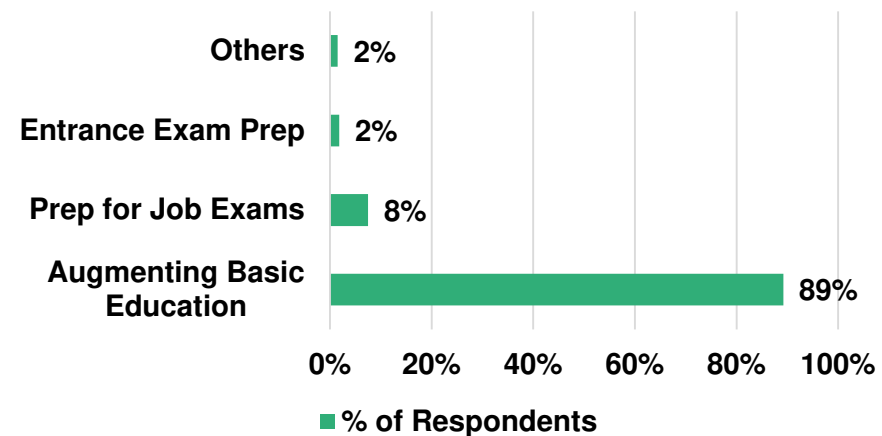
## Total K-12 Student Enrollments by Country (MM), 2015



## Indian Private Coaching Industry, 2014



## Reasons for Private Coaching



Source: Nielsen K-12 India Book Publishing Report, 2016. UNESCO Education & Literacy China Statistics, 2015. U.S Department of Education, 2016. UK Department for Education National Statistics, 1/15.

# ...India Education Re-Imagined = Increasingly Accessible (via Mobiles) + Self-Paced + Personalized

THEN

## Offline Private 'Tuition' Centers

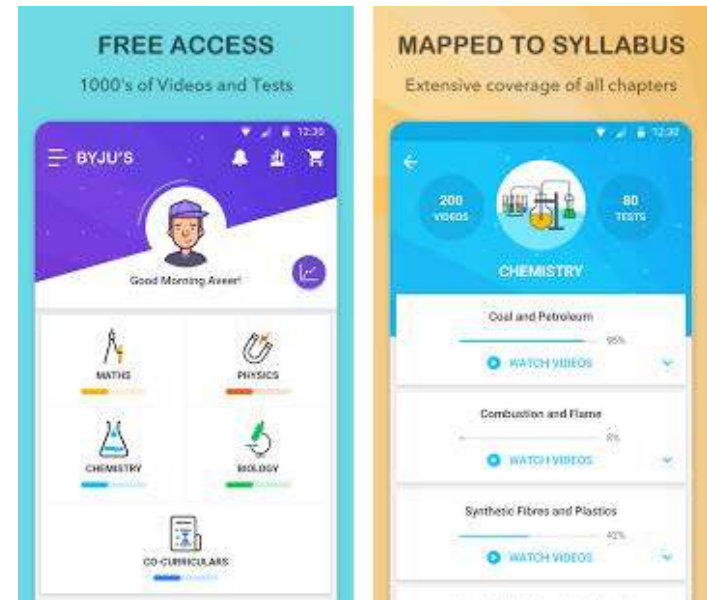
- Offline lectures + in-person testing
- Directly based on income & geography
- 1:35+ student-teacher ratio
- One-size-fits-all approach
- Extreme focus on test taking



NOW

## Mobile Self-Paced Learning ex. Byju's

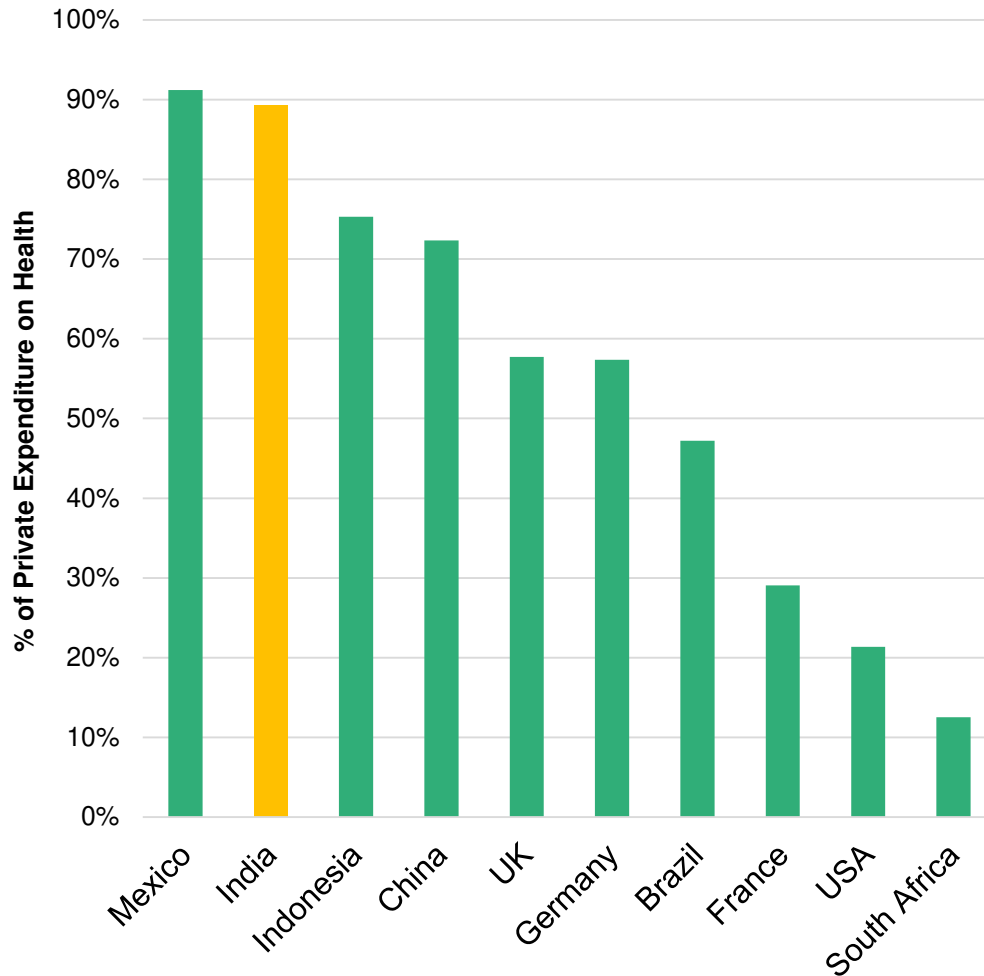
- Math + science with games + videos
- Anyone / anywhere with smartphone
- 40+ minutes average daily usage
- Personalized
- Learning outcomes\* improved 15%+





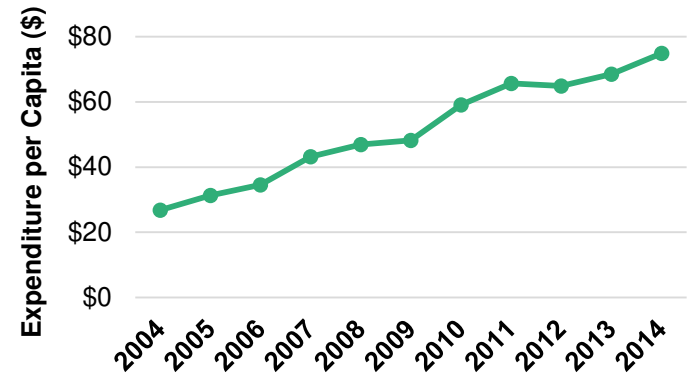
# India Healthcare = High (& Rising) Out-of-Pocket Spend... <20% Insurance Penetration...

## India Out-of-Pocket Spend (% of Private Expenditure on Health), 2014

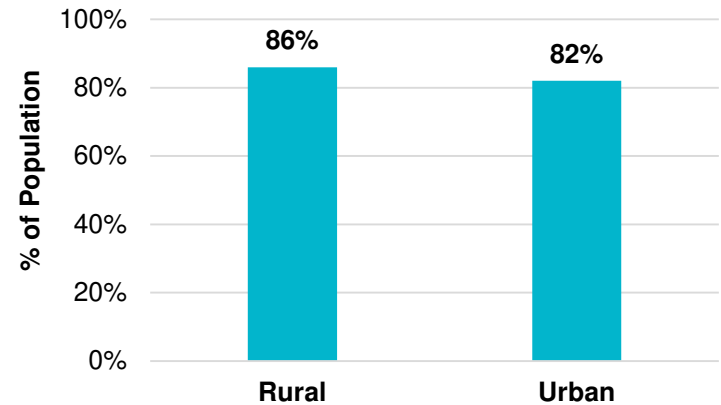


Source: World Bank 2014 Census.

## Health Expenditure per Capita in India (\$), 2004 - 2014



## Percent of Indian Population Not Covered by Insurance, 2014



# ...India Healthcare Re-Imagined = Increasingly Accessible (via DIY / Mobile) + Affordable (via Online Aggregation + Pricing Transparency)

*THEN*

## Offline Labs & Pharmacies

- Long wait times for standard lab tests
- Limited drug inventory
- Geography dependent
- Up to 60-80% price variance for identical drugs owing to lack of price transparency



*NOW*

## Online Health Hubs

ex. 1Mg, Portea

- In-home tests ordered online
- Access to aggregated inventories of multiple pharmacies in metro
- 40-50% lower prices for lab tests
- Instant drug price comparisons offer transparency, saving users 20 - 30% per prescription



# India Marketplaces = Organizing the Un-Organizable... Replacing Middlemen with Smartphones + Direct to Consumer Marketplaces

THEN

## Hyperlocal Offline Markets

ex. Fish Mandis

- Multiple middlemen
- High price variance
- No consumer visibility into quality



NOW

## Mobile / Direct-to-Consumer

Ex. Freshtohome.com

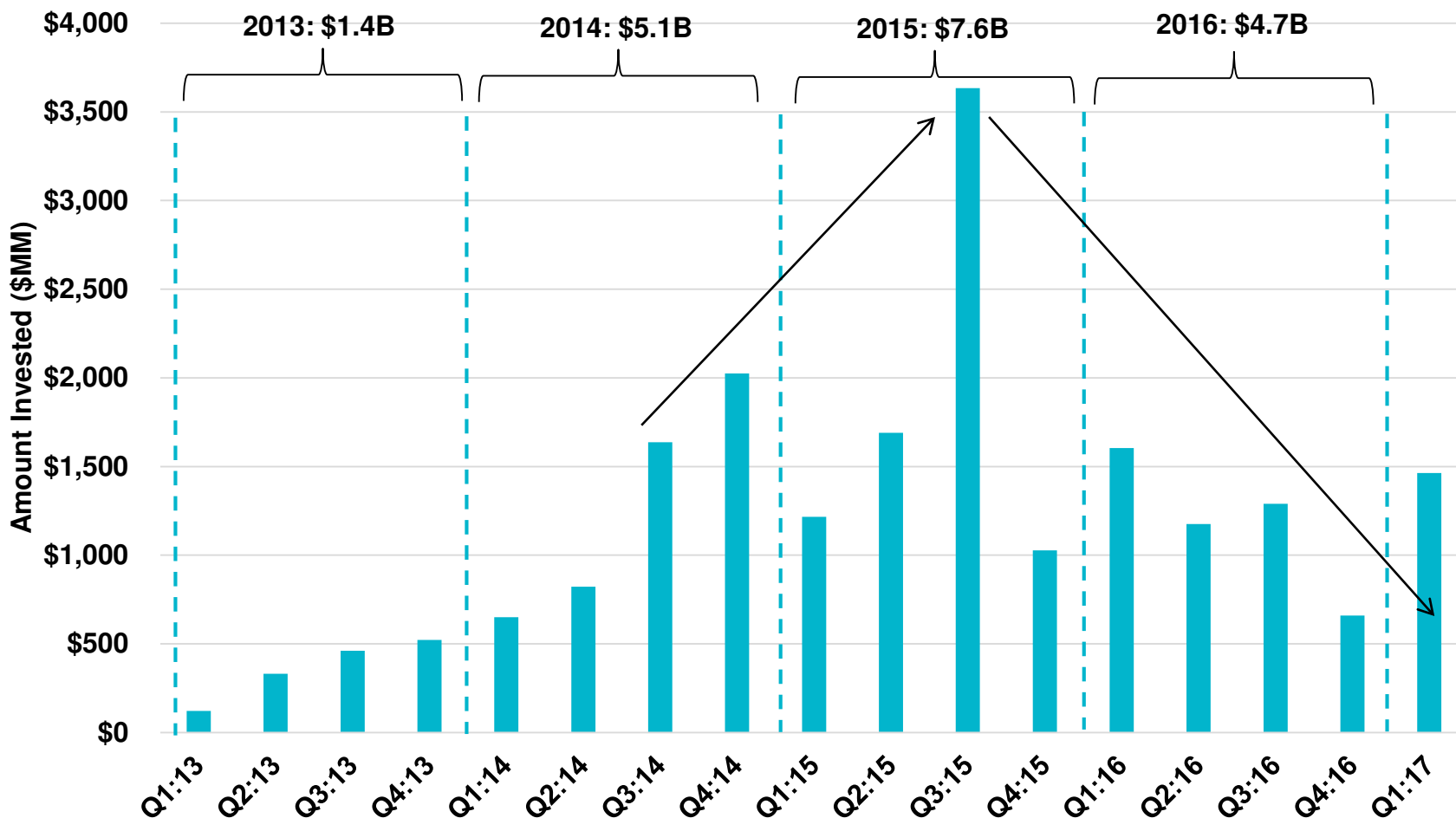
- High quality produce sourced directly from fishermen
- Online distribution allows 20-25% lower prices for consumers



***India Internet Challenges =  
Fundraising Environment +  
Language***

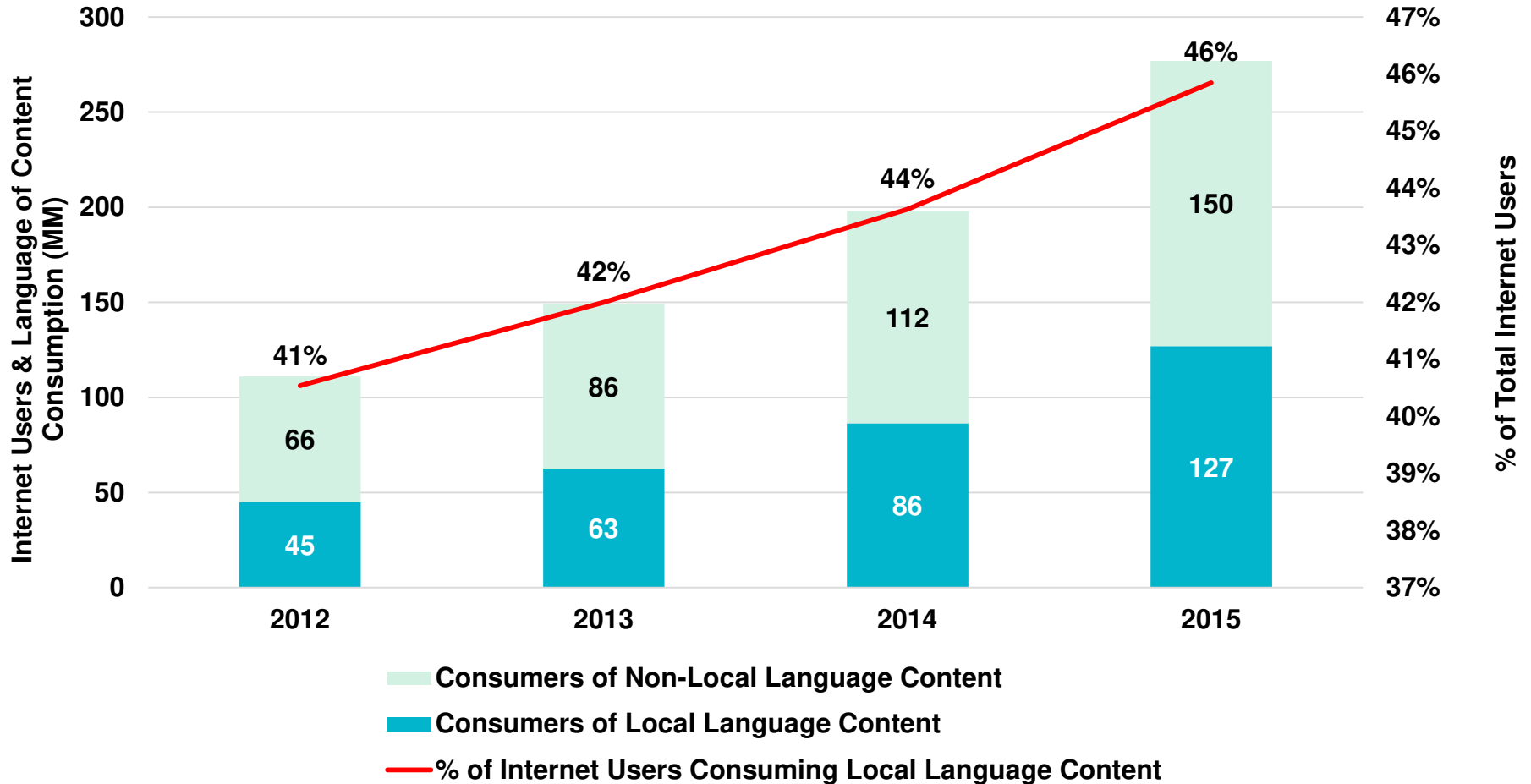
# India = Especially High Venture Capital Funding in H2:14 – 2015... Helped Drive Aggressive Start Up Valuations + Spending + Competition

## Indian VC Funding by Quarter, Q1:13 – Q1:17



# India = 29 Languages Spoken by >1MM People...6 >50MM (ex-English)... 46% of Internet Users Primarily Consume Local Language Content

## Indian Internet Users & Primary Language for Content Consumption, 2012 – 2015



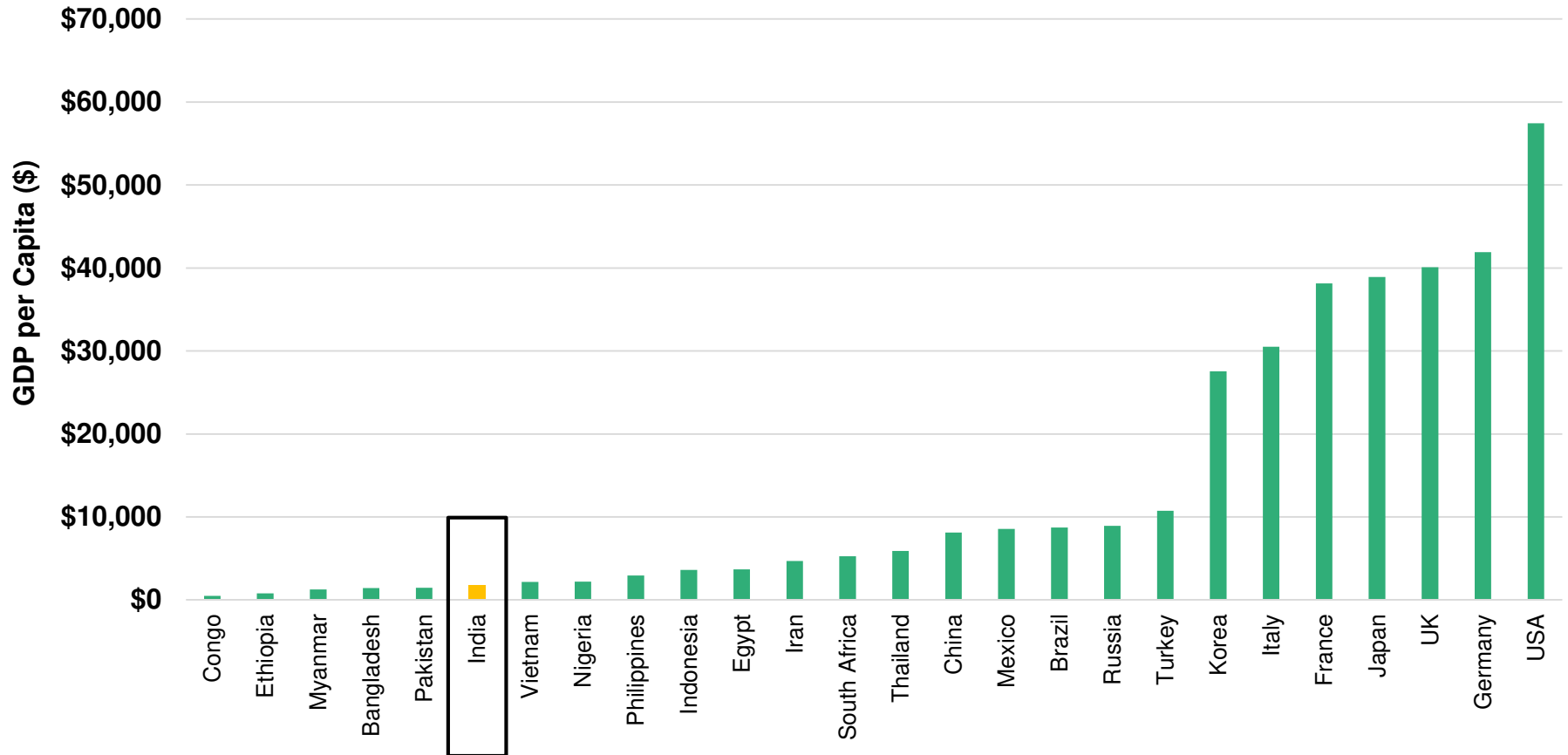
***India Macro...***  
***Demographics = Bad & Good***

***Other Challenges =***

- 1) Job Creation***
- 2) Business Basics***
- 3) Education***
- 4) Logistics***
- 5) Gender Disparity***

# India = Low Relative GDP per Capita...Poverty Levels... While Improving...Remain High

**GDP per Capita (\$) Among Countries >50MM in Population,  
Current Prices, 2016**

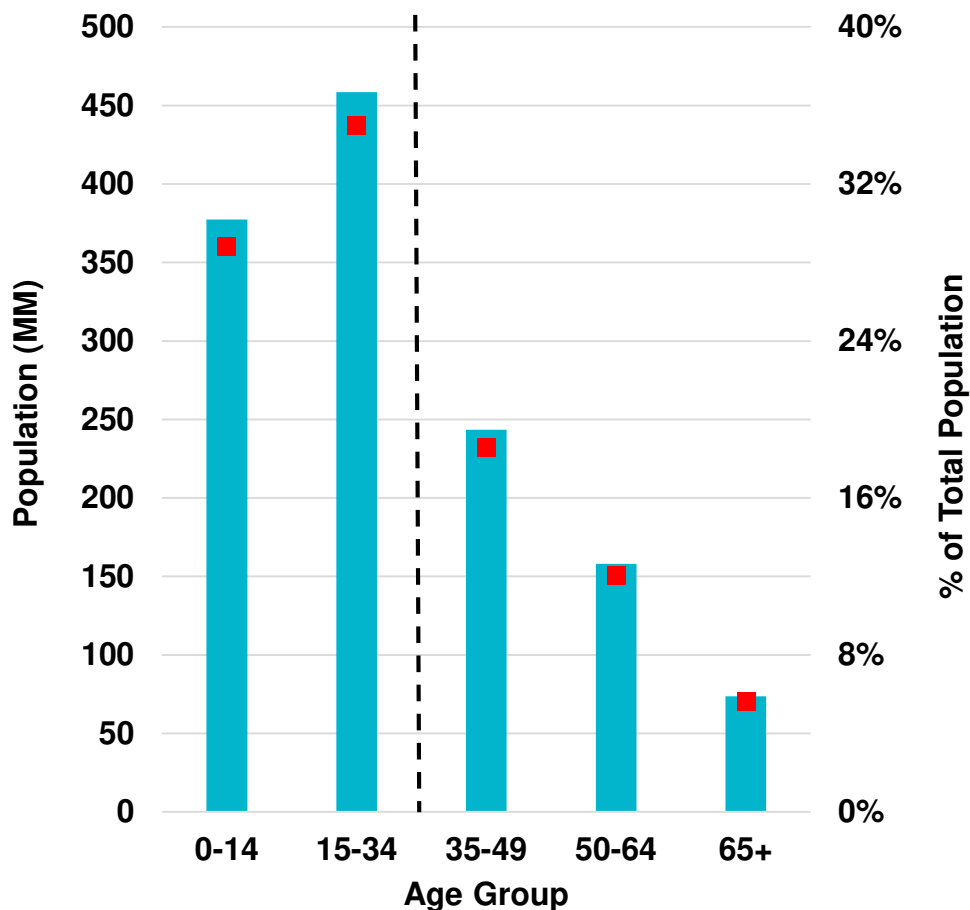




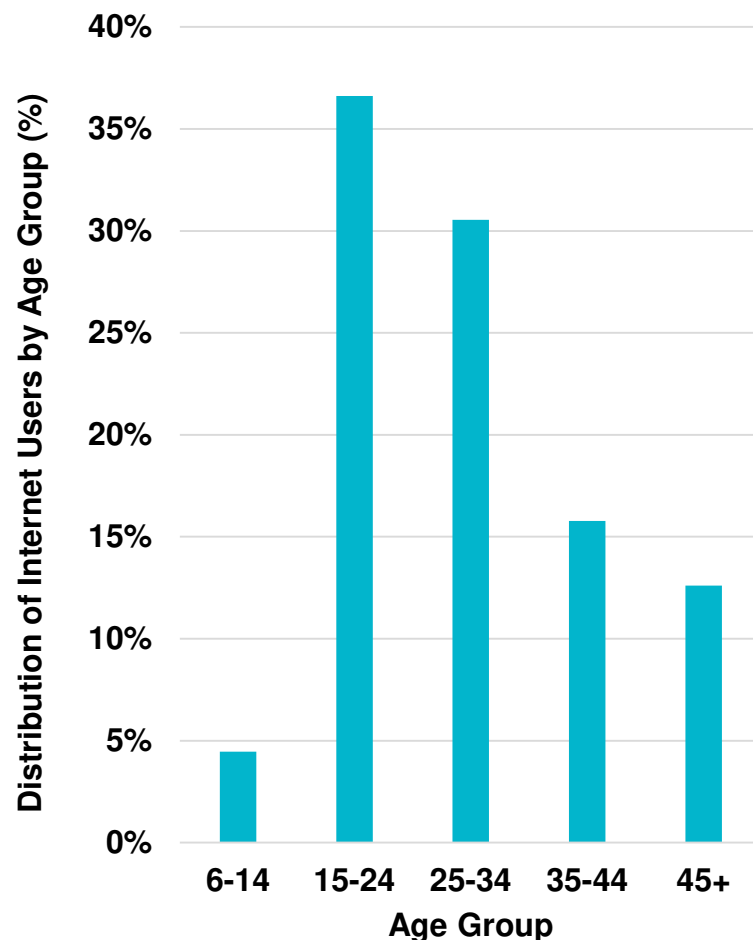
# India = Lots of Young People...

## 64% of Population...72% of Internet Users <35 Years Old...

### India Population by Age Group, 2015



### Distribution of India Internet Users by Age Group, 2017

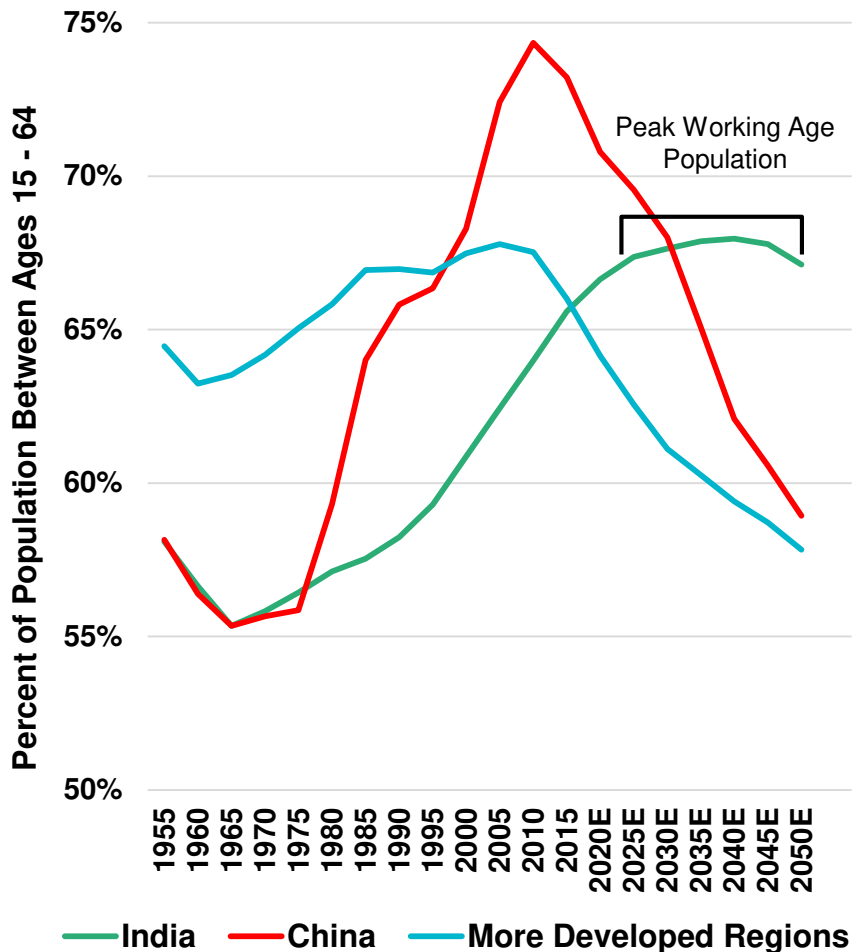


■ Population by Age Group (MM) ■ % of Population

■ Internet Users by Age Group

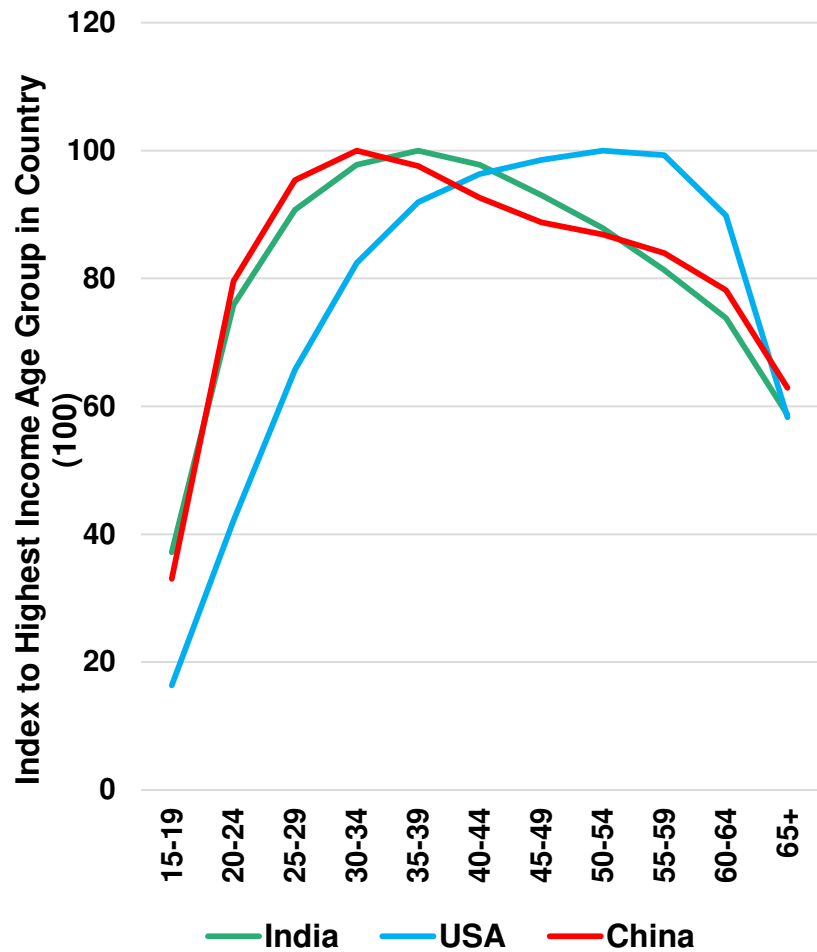
# India = Working Age Population Growth + Millennial Per Capita Income... Compare Favorably with Other Countries

**Percent (%) of Population 15 – 64 Years Old, India vs. China vs. More Developed Regions, 1950 – 2050E**



**Per Capita Income Distribution, India / USA / China by Age, 2015**

(Index to the Highest Income Age Category for Corresponding Country)

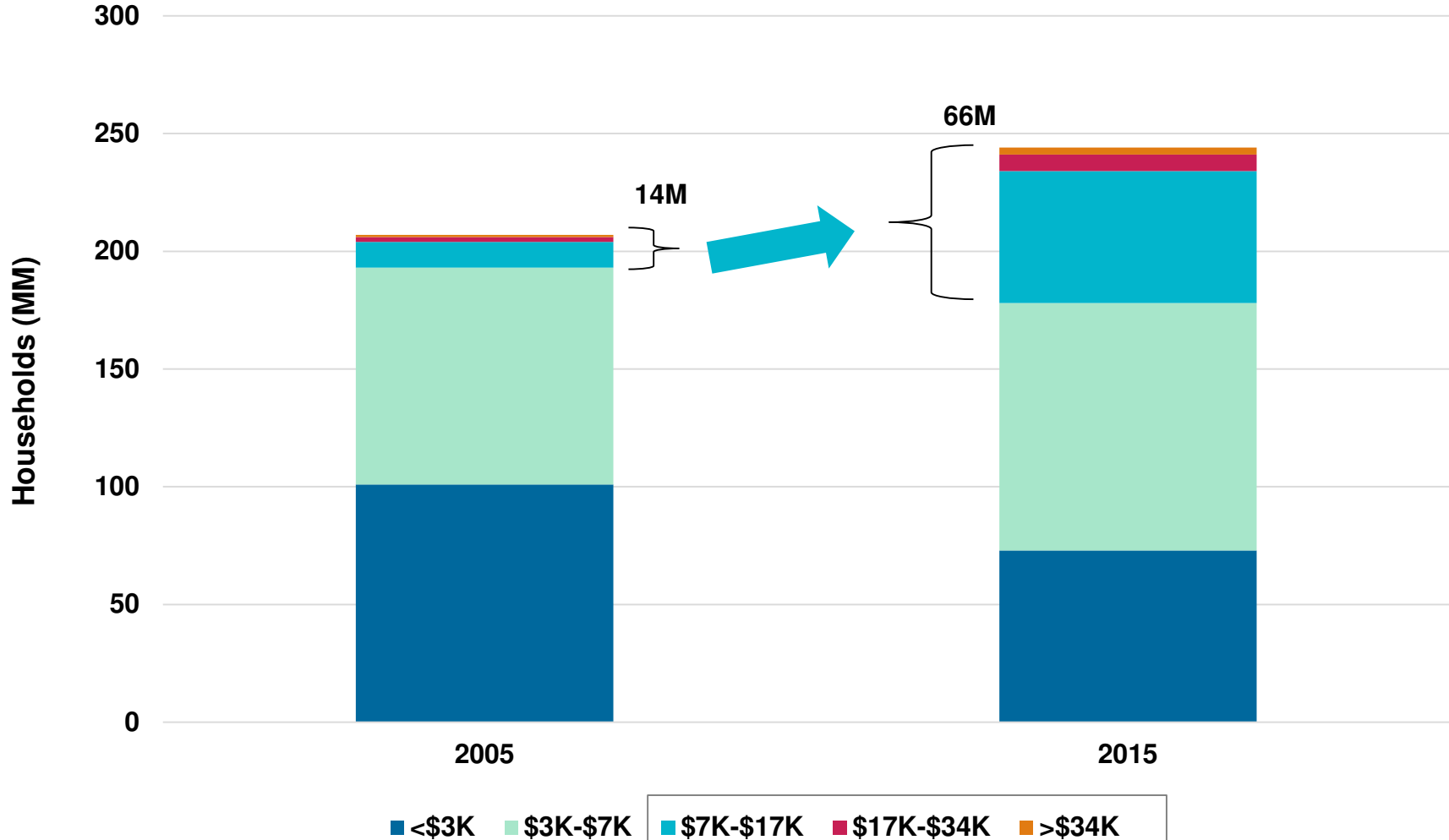


Source: UN Population Division, Euromonitor, Morgan Stanley. Projections data based on medium variant estimates. "More Developed Regions" comprised of N. America, Europe, Japan, Australia, New Zealand. Projections begin after 2015. UN provides projections on a 5-year time frame.

# India = 'Consumption Class' Growing Rapidly... @ 27% of Households (66MM) vs. 7% Ten Years Ago

## India Households by Income Bracket, 2005 vs. 2015

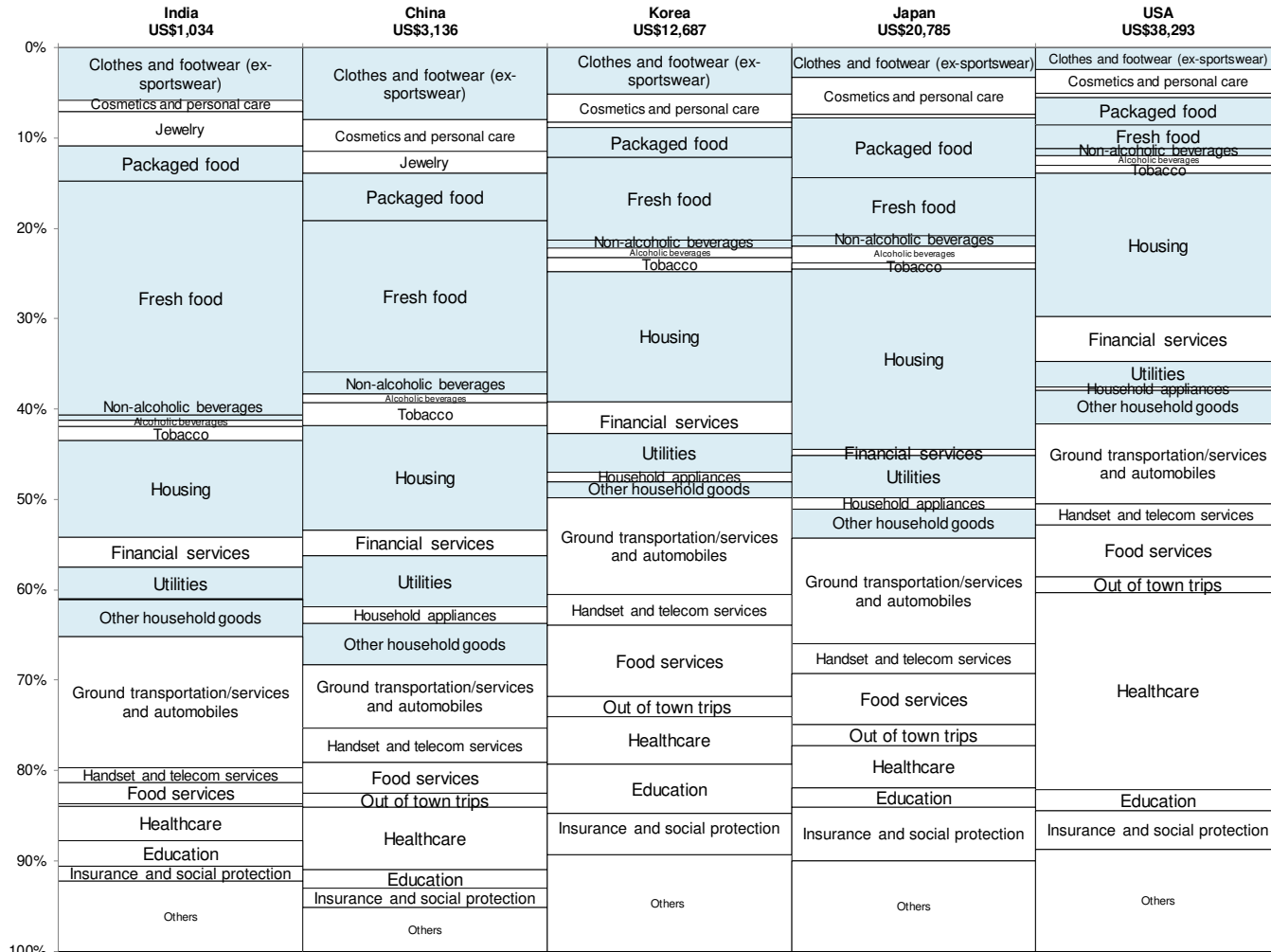
(in constant 2015 dollars)



■ <\$3K ■ \$3K-\$7K ■ \$7K-\$17K ■ \$17K-\$34K ■ >\$34K  
*Consumption Class = income levels at which consumers start to spend beyond basic necessities*

# India Consumption = Mostly Focused on Basics... “Roti, Kapda Aur Makaan”... @ 54% of Personal Consumption Expenditure

## Personal Consumption Expenditure by Category, 2016

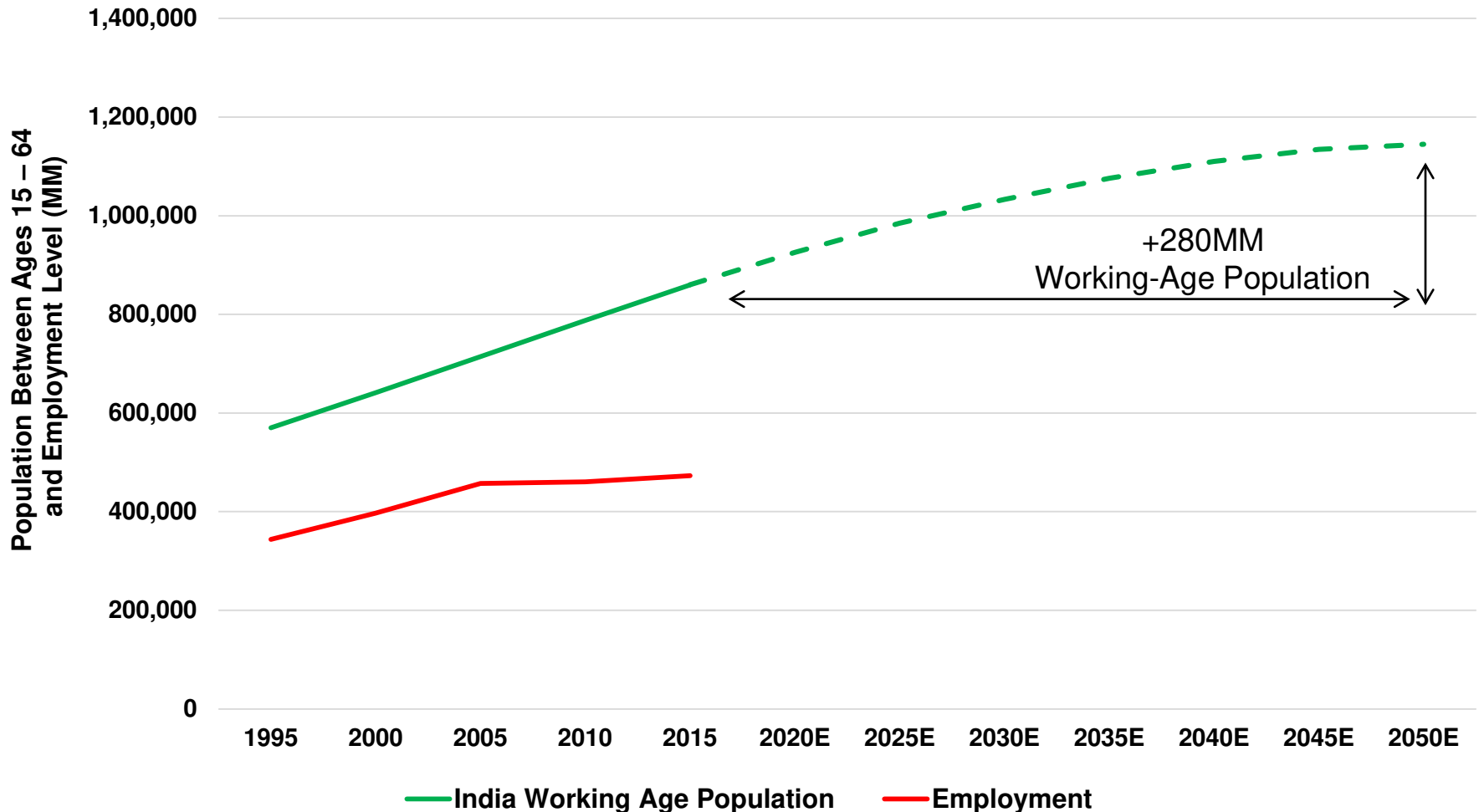


Basics

Source: Euromonitor, Goldman Sachs Investment Research.

# India Job Creation = Employment Levels @ 55% of Working Age Population... Employment Trending Slower than Population Growth

## India Working Age (15-64 Years Old) Population vs. Employment, 1995 – 2050E



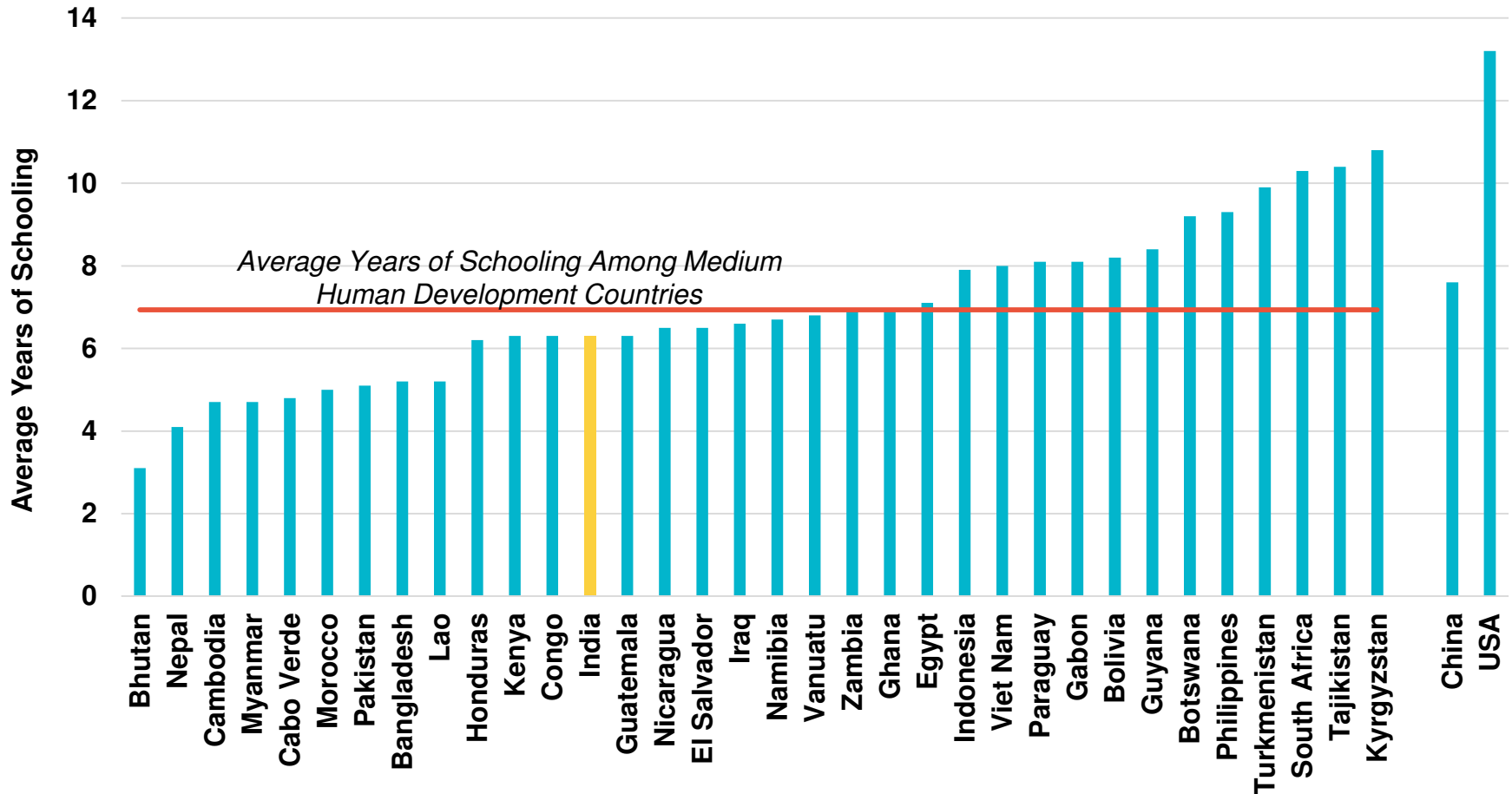
# India Business Basics = Ease-of-Doing Business Lags Behind Many Countries

Topics	India	China	USA	OECD
Overall Ease of Doing Business (Rank out of 190)	130	78	8	--
Ease of Starting a Business (Rank out of 190)	155	127	51	--
# Procedures to Register Business (Number)	14	9	6	5
Time to Register Business (Days)	26	28	4	8
Cost to Register Business (% of Income Per Capita)	16.5%	0.6%	1.3%	3.1%

Source: The World Bank, 2017 (<http://www.doingbusiness.org/rankings>). Rankings apply to 190 countries.  
Number of procedures, time to register, and cost as % of income per capita reported here based on statistics that apply to men.

# India Education = Average Years of Schooling Lags Peers

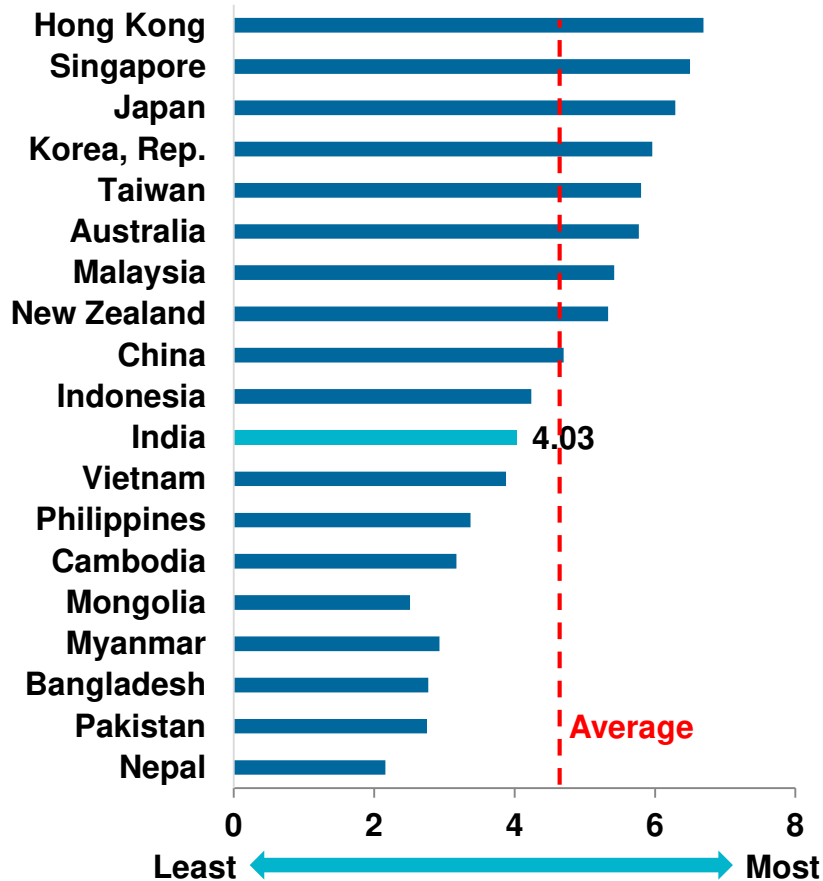
Average Years of Schooling Among Selected Medium Human Development Countries, 2015



# India Logistics = Low Infrastructure Competitiveness

## Infrastructure Rankings Across Asia, 2016

World Bank Infrastructure Competitiveness Score



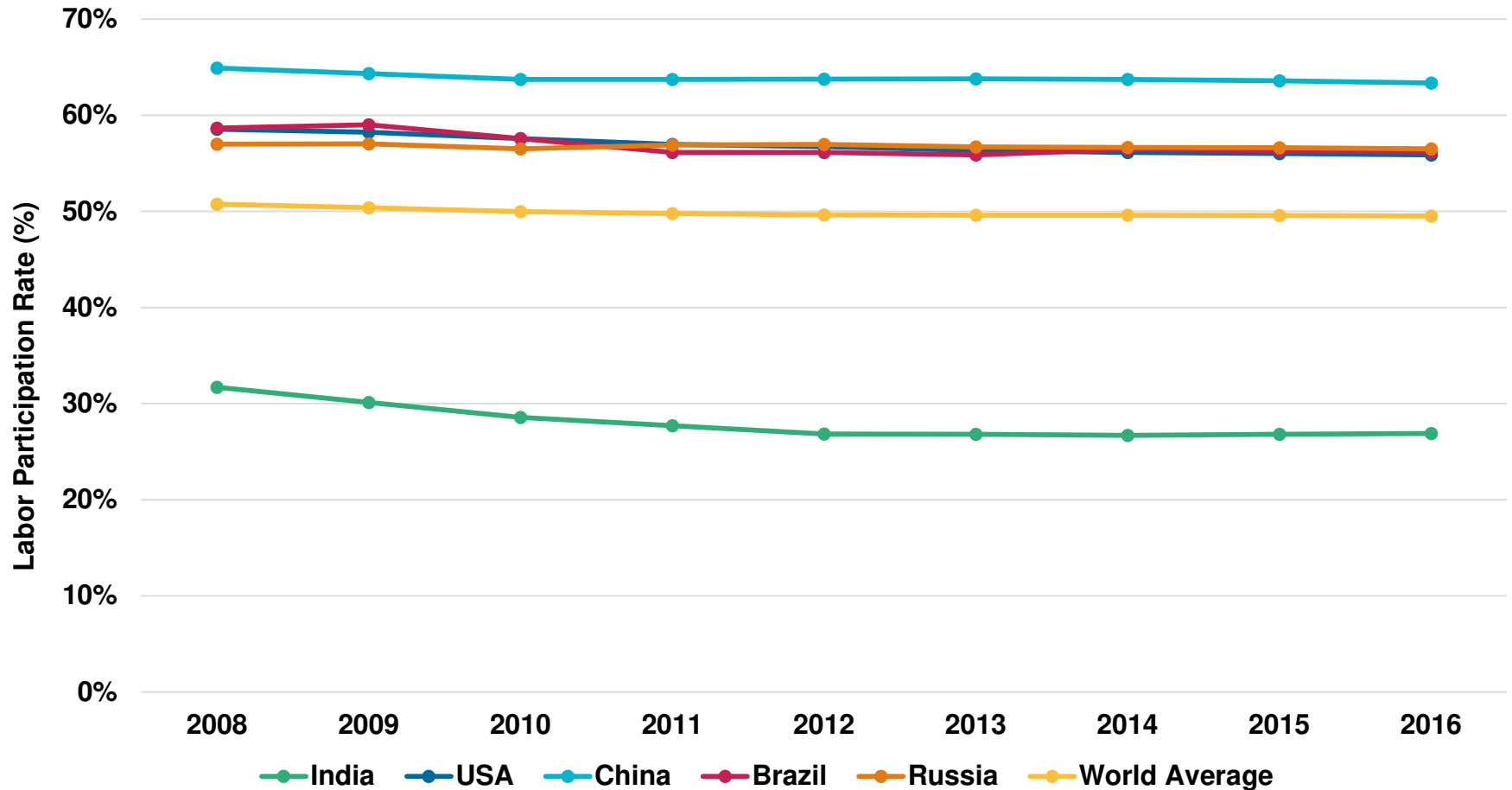
## Top 10 Most Congested Cities Globally, 2016\*

Rank	City	Country	Traffic Index	2015 Population (MM)
1	Kolkata	India	337	12MM
2	Dhaka	Bangladesh	317	18MM
3	Mumbai	India	308	21MM
4	Sharjah	UAE	298	1MM
5	Nairobi	Kenya	295	4MM
6	Manila	Philippines	283	13MM
7	Jakarta	Indonesia	280	10MM
8	Tehran	Iran	272	8MM
9	Mexico City	Mexico	272	21MM
10	Istanbul	Turkey	263	14MM



# India Gender Disparity = Female Labor Participation Rate @ 27%...Below World Average

## Female Labor Force Participation Rate, 2008 - 2016



Source: International Labor Organization, 2016

Note: ILO defines female labor force participation rate as the proportion of the female population of age 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.

# India Internet = Competition Continues to Intensify...Consumers Winning

- 1) **Economy** = Strong Growth
- 2) **Internet Users** = Solid Growth
- 3) **Mobiles** = Choppy Growth...Recent Acceleration
- 4) **Internet** = Fierce Global Battleground (Hardware / Carriers / Software / Commerce)
- 5) **Internet Usage** = Rising Owing to Cheaper / Faster Access
- 6) **Leadership** = Focused Pro-Digital Policies
- 7) **Internet Innovation** =  
*Leapfrogging* = Mobile...Identity...Bandwidth...Payments  
*Re-Imagining* = Entertainment...Education...Healthcare...Marketplaces
- 8) **Internet Challenges** = Financing Environment...Language Diversity
- 9) **India Macro** = Demographics = Bad & Good...Challenges = Job Creation...Business Basics...Education...Logistics...Gender Disparity

---

# HEALTHCARE @ DIGITAL INFLECTION POINT

*NOAH KNAUF @ KLEINER PERKINS*

# Healthcare @ Digital Inflection Point

## 100 Years Ago Human Touch



## 25 Years Ago Machine Assisted / Analog



## Today Technology Enabled / Digital



# Digitization of Healthcare = Virtuous Cycle of Innovation

**1) Digital Inputs** = Rapid Growth in Sources of Digital Health Data



**2) Data Accumulation** = Proliferation of Digitally-Native Data Sets



**3) Data Insight** = Generated Following Accumulation & Integration of Data



**4) Translation** = Impact on Therapeutics & Healthcare Delivery

**5) Outcomes** = Measure Outcomes & Iterate...  
Innovation Cycle Times Compressing



***Digital Inputs =***  
***Rapid Growth in Sources of***  
***Digital Health Data***

# Measurement = Most Widely Used Medical Technology Now Digital / Connected...

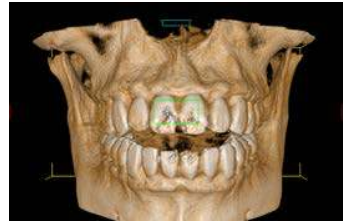
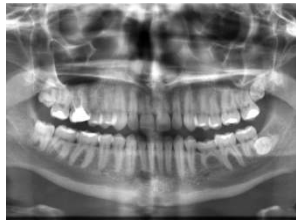
2000's

2017

2D / Analog

3D / Digital

X-Ray



2000's

2017

Manual / Analog Automatic / Digital

Blood Pressure



Paper-Based / Analog Wearable / Digital

ECG



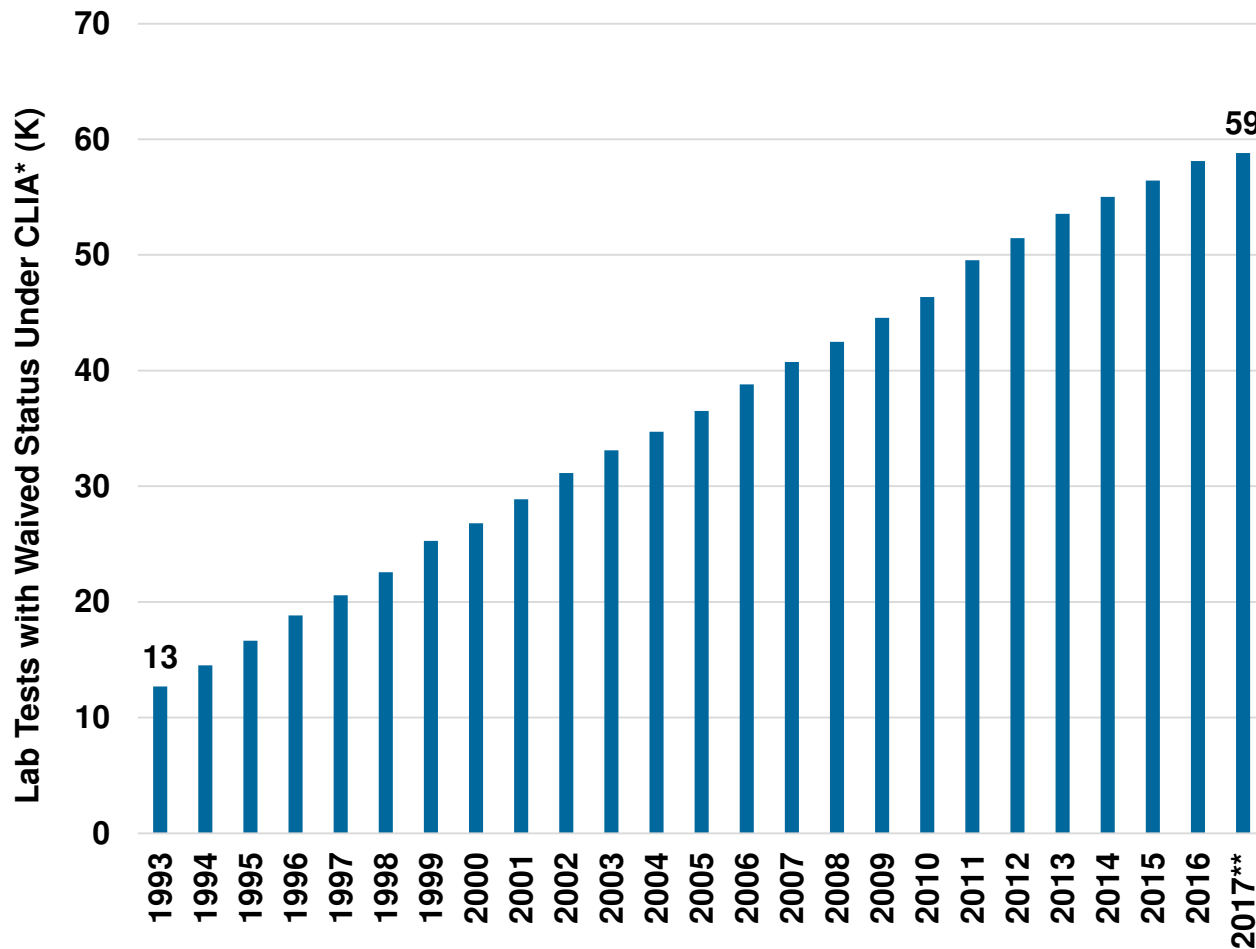
In-Room / Analog Remote / Digital

Hospital Monitoring



# ...Diagnostic Technology = Measured / Monitored Data Attributes Rising Rapidly...

## Commercially Available Lab Tests, 1993-2017



**A**mylase

988 Distinct  
Analytes

**Z**inc

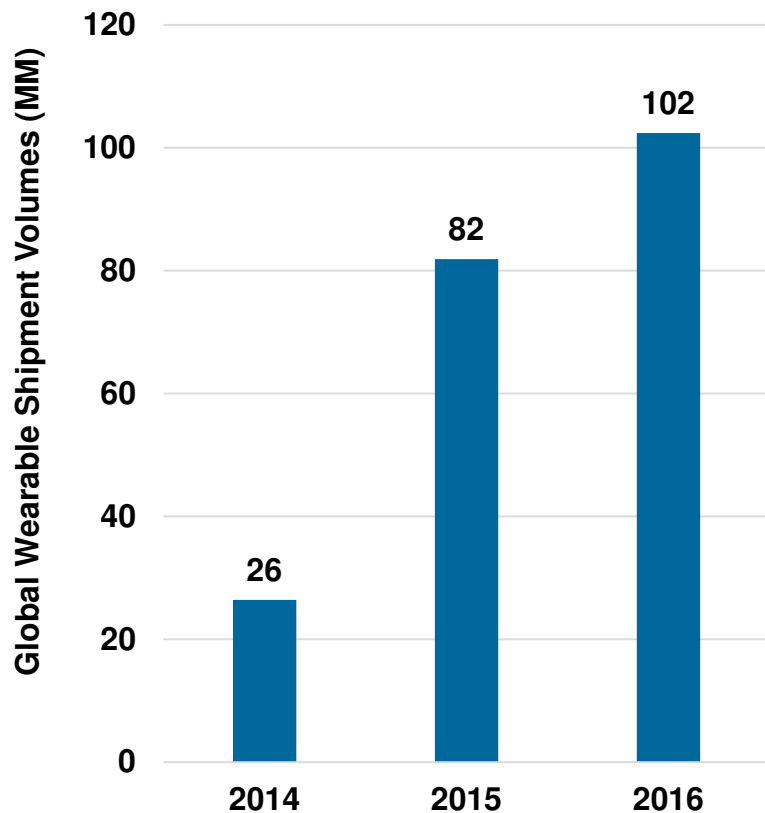


# ...Wearables = Consumer Health + Wellness Data Capture Rising Rapidly...

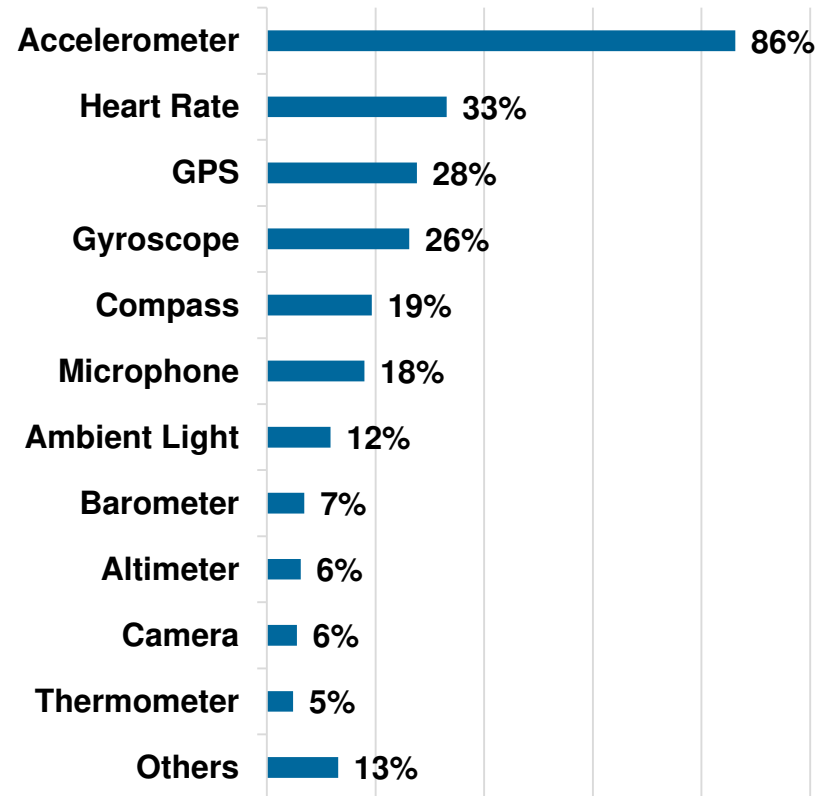
## Wearables = Gaining Adoption

~25% of Americans own a Wearable, +12% Y/Y, 2016

### Global Wearable Shipments



### Sensors in Wrist Wearables, 9/16

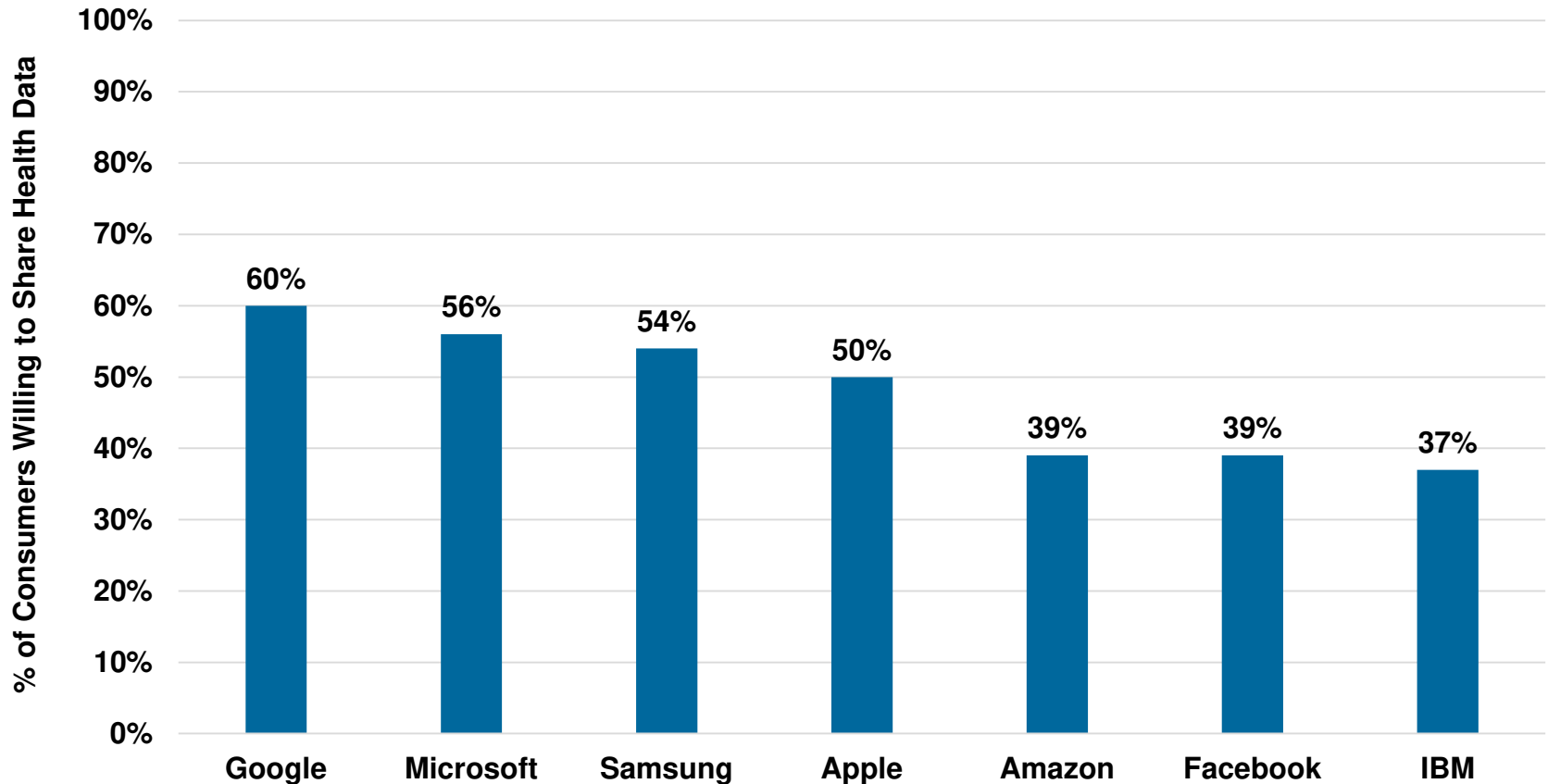


% of Wrist Wearables\*

# ...Consumers = Willing to Share Health Data

## Leading Tech Brands Positioned Well for Digital Health, 2016

*With which tech company would you share your data?*



Source: Rock Health 2016 Consumer Survey  
Note: Based on consumer survey with 4,015 participants; as % of respondents willing to share their health data with tech company at all.

***Data Accumulation =***

***Proliferation of***

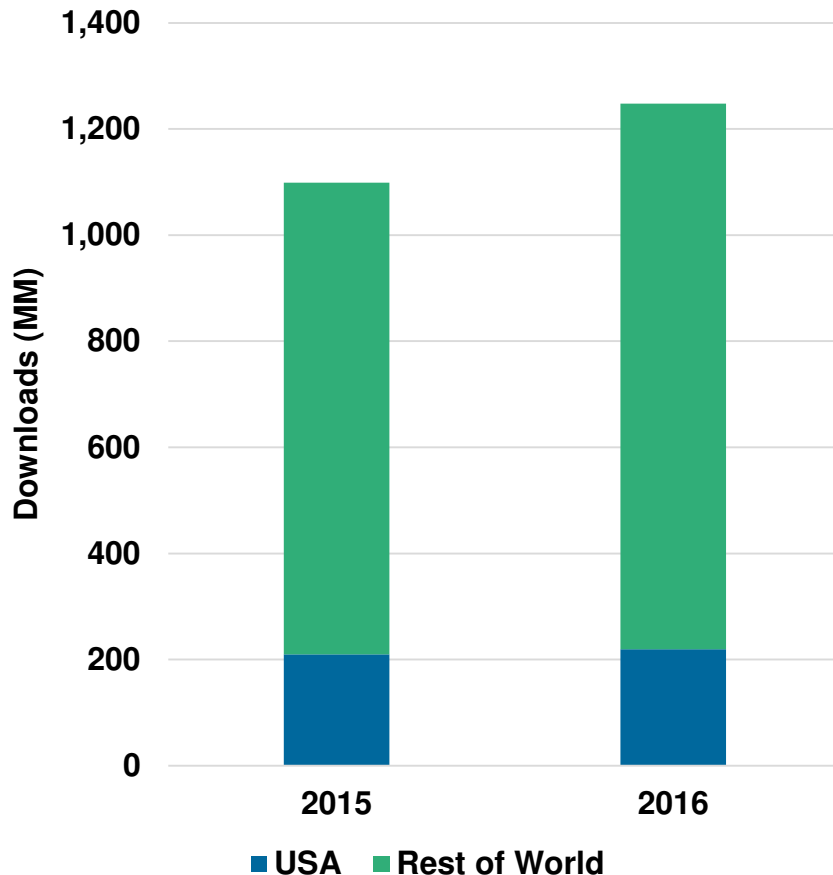
***Digitally-Native***

***Health-Related Data Sets***

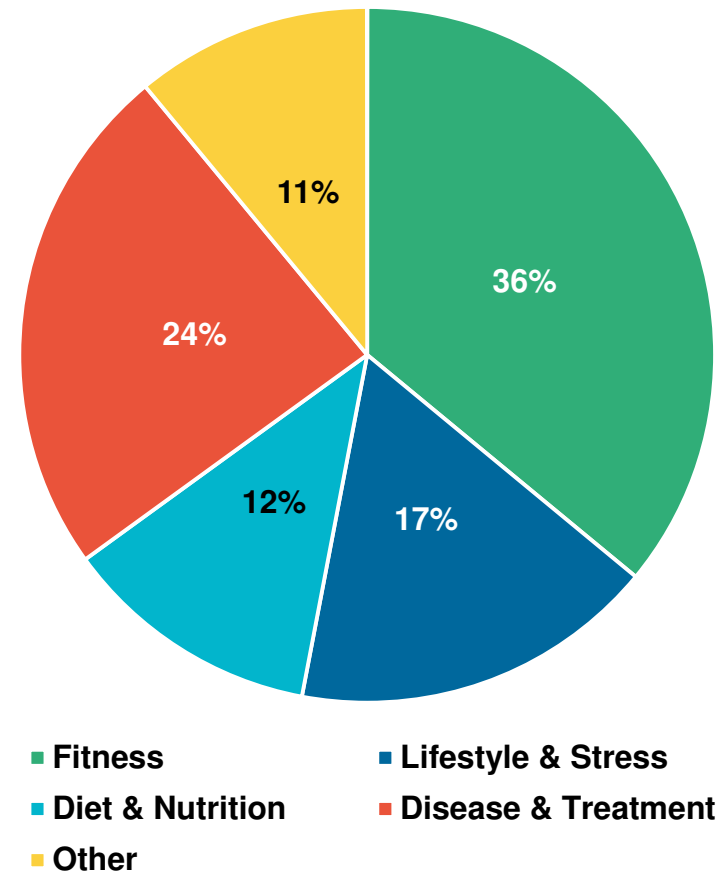
# Proliferation of Health Apps = Rapid Rise of Empowering Data in Consumer Hands...

## Health & Fitness App Downloads\*, Per App Annie

+5% Y/Y in US, +15% Y/Y in ROW

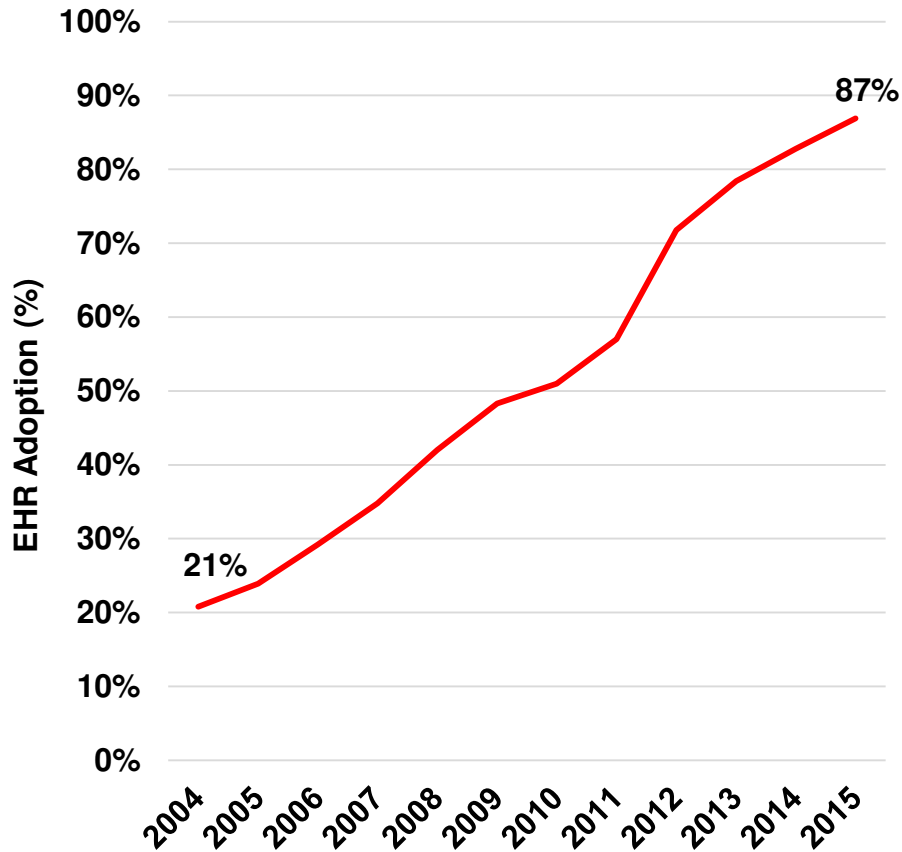


## Health Apps by Category, Global, 2015

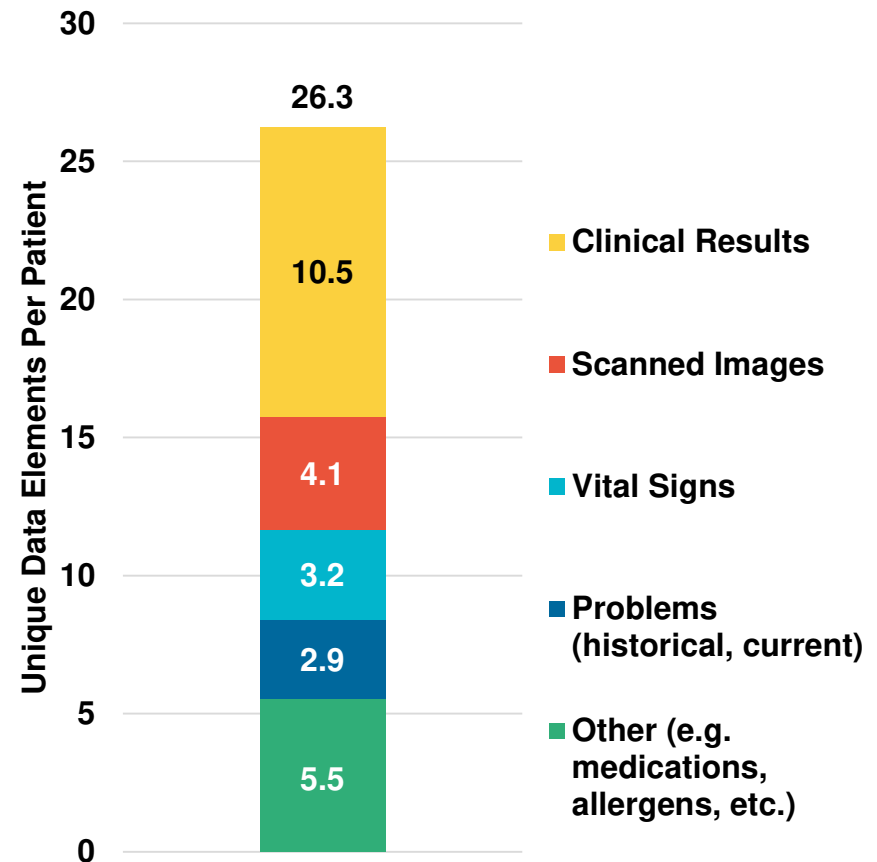


# ...Electronic Health Record (EHR) Adoption = Broad + Centralized Accumulation of Data...

## EHR Adoption Among Office-Based Physicians, USA 2004-2015



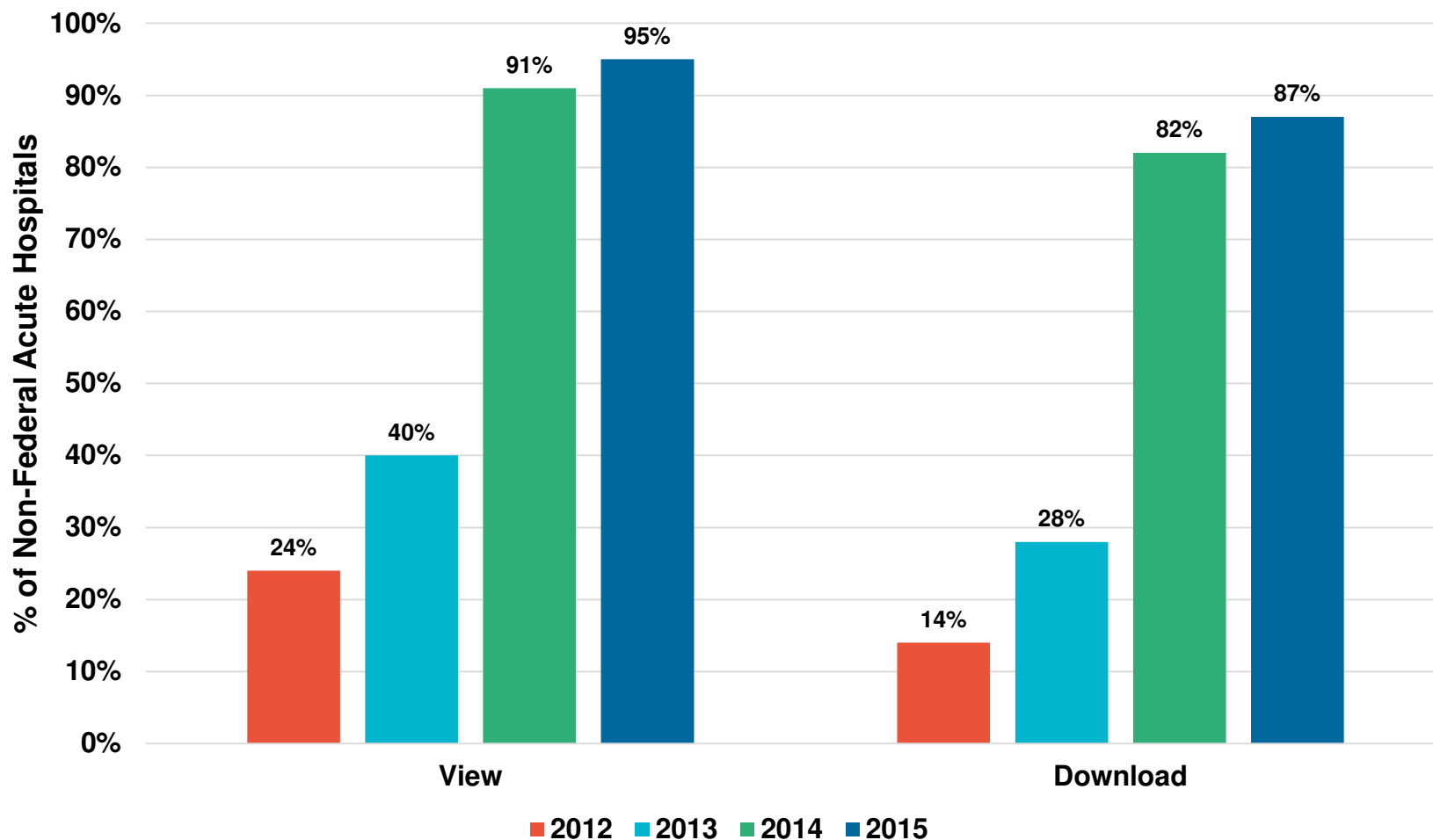
## Average Amount of Clinical Data Elements per Patient per Year\*, 8/16



Source: Office of the National Coordinator for Health Information Technology (12/16), Galen Healthcare (8/16)  
\*Estimated per year clinical data element collection based on data elements collected over 6 years for 165,399 patients, average 49yrs old

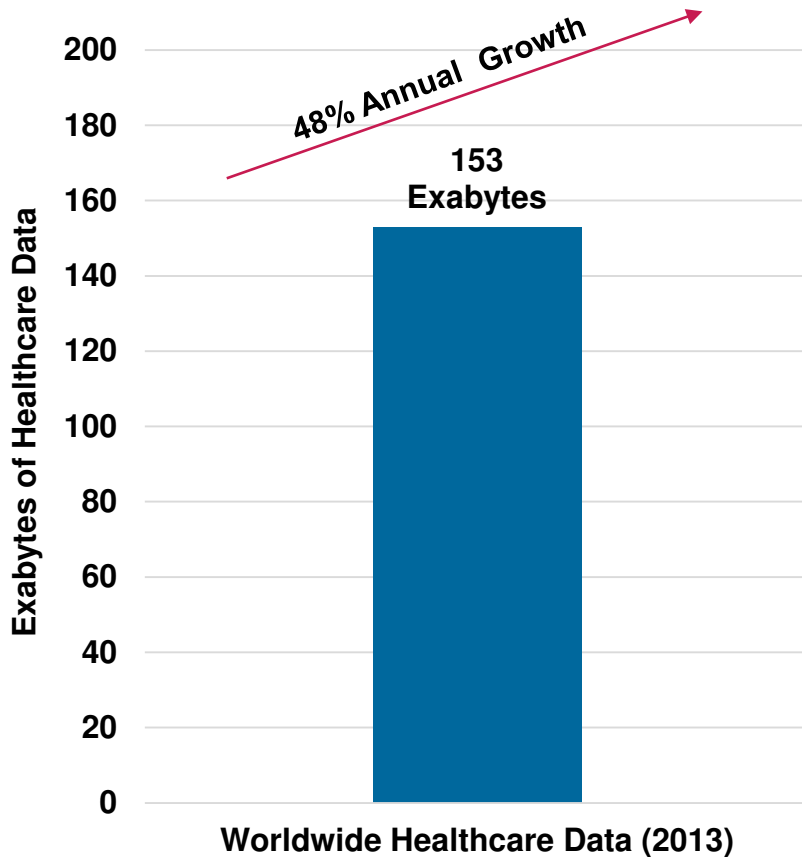
# ...Hospitals Providing Digital Access to Healthcare Information = +7x Since 2013...

## Hospitals that Enable Patient Digital Data Access, 2012 - 2015



# ...Increasing Digitization of Inputs = Healthcare Data Growing at 48% Y/Y

## Growth in Healthcare Data



## Data Drivers

### Typical 500 Bed Hospital

- 500 Beds
- 8,000 Employees
- 400 Applications
- 500 Databases
- 1,000 Interfaces
- 10,000 Desktops
- 500 Owned/Controlled Tablets
- 2,000 Owned/Controlled Mobile Devices

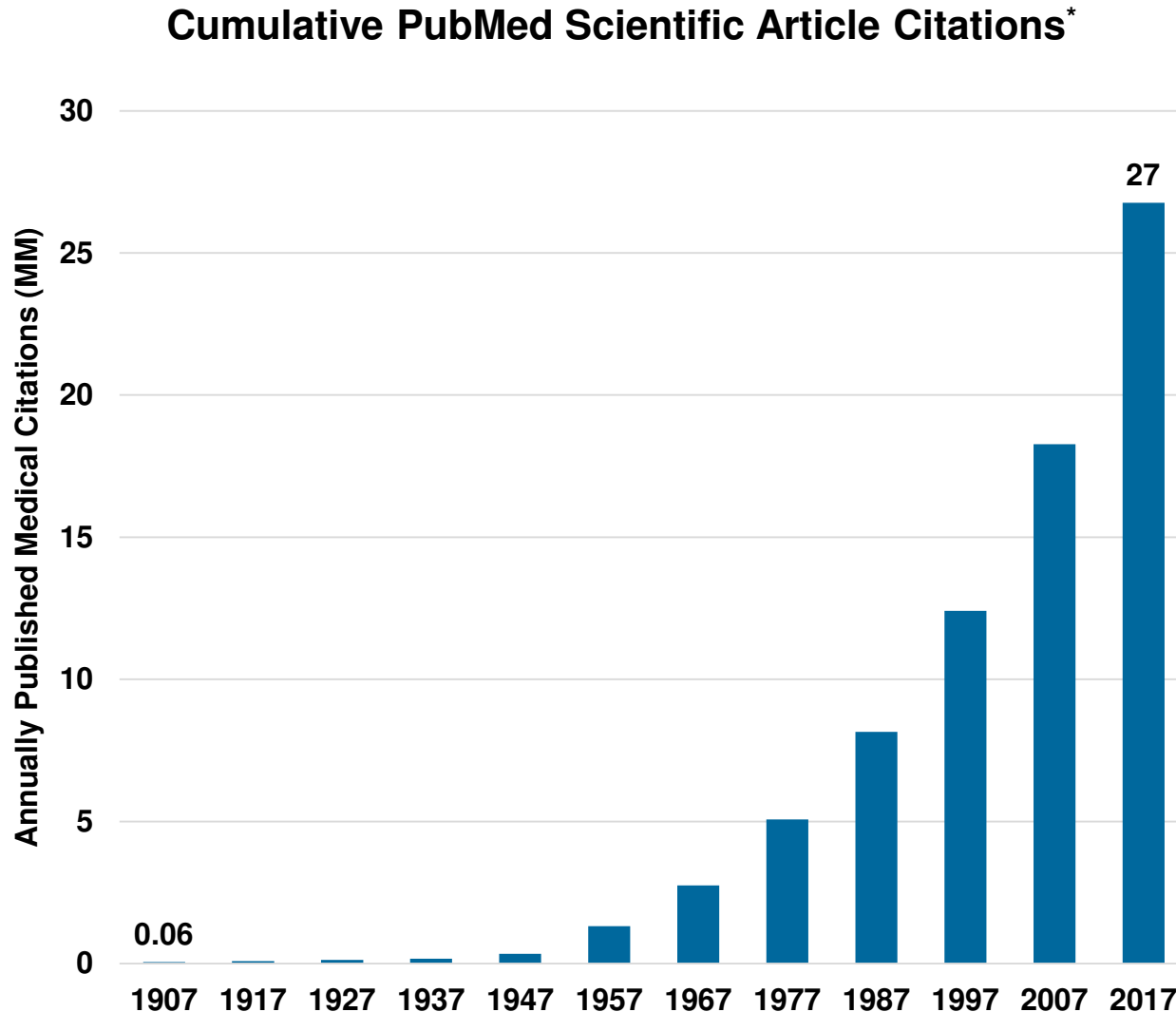
**50  
Petabytes  
of Data per  
Hospital**

***Data Insight + Translation =***

***Early Innings of Impact on  
Therapeutics***



# Rise in Inputs + Data = Medical Research / Knowledge Doubling Every 3.5 Years...



### Years to Double Medical Knowledge\*\*

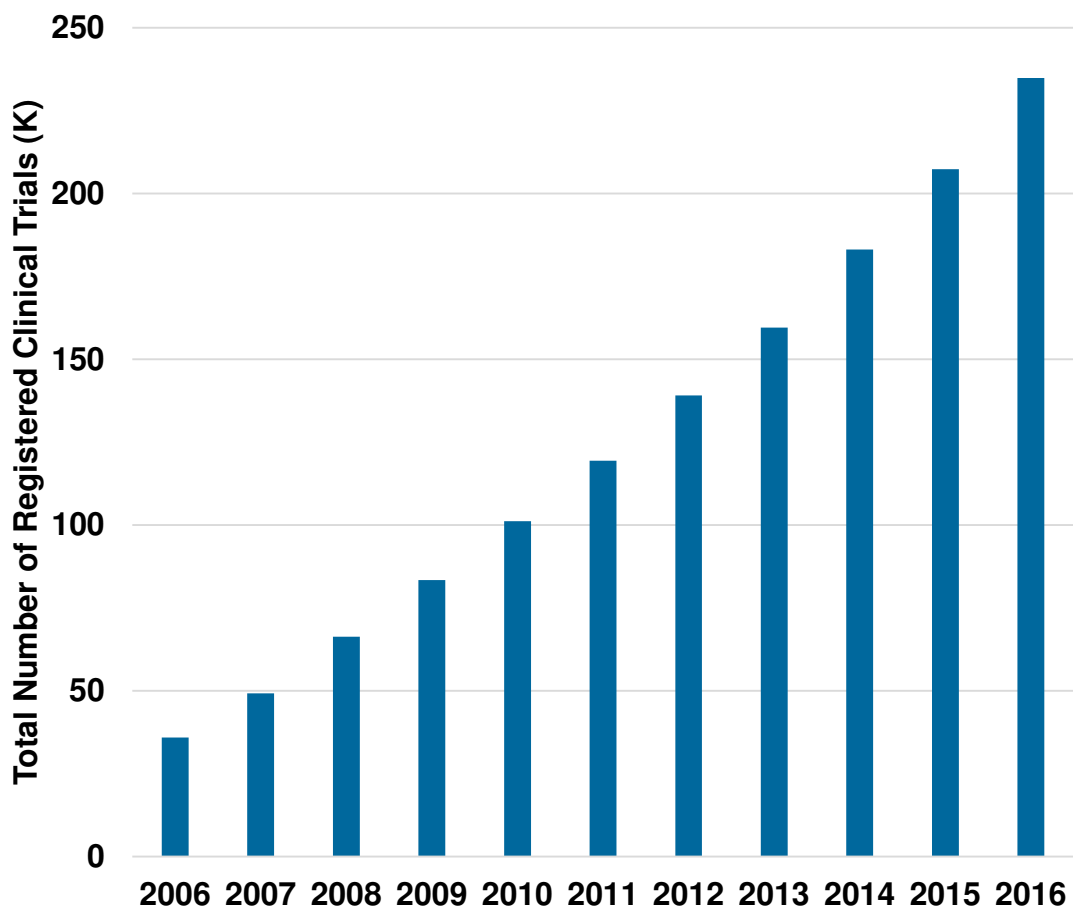
**1950**  
50 years

**1980**  
7 years

**2010**  
3.5 years

# ...Clinical Trials = Follow Expansion of Research Insight But... Clinical Impact Lags Owing to Length of Trials...

## Growth in Clinical Trials



## Average Clinical Trial Duration

### Phase 0

~3.5 Years

### Phase 1

1.8 Years

### Phase 2

2.1 Years

### Phase 3

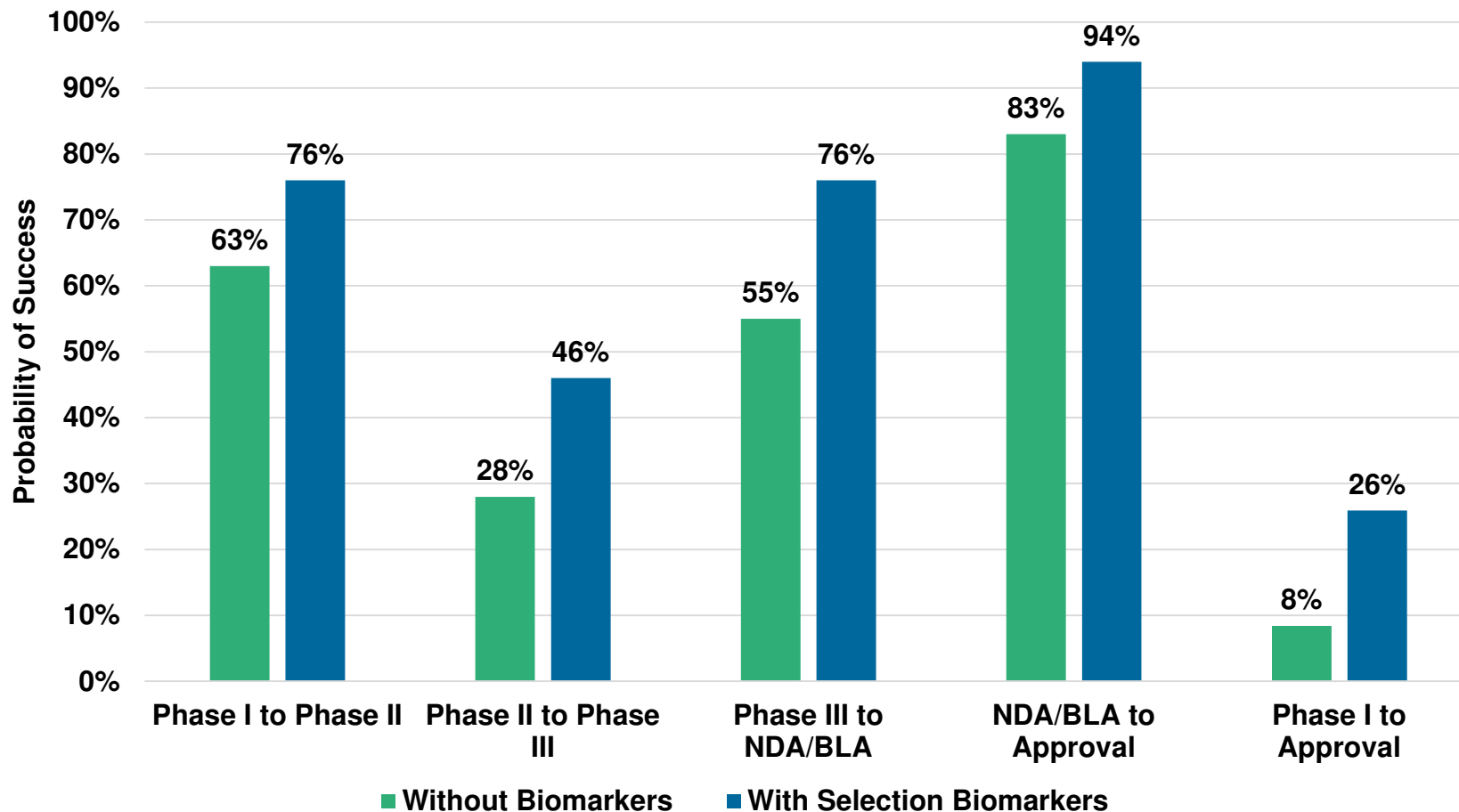
2.5 Years

## Average Time to Market (New Drug)

~12 Years

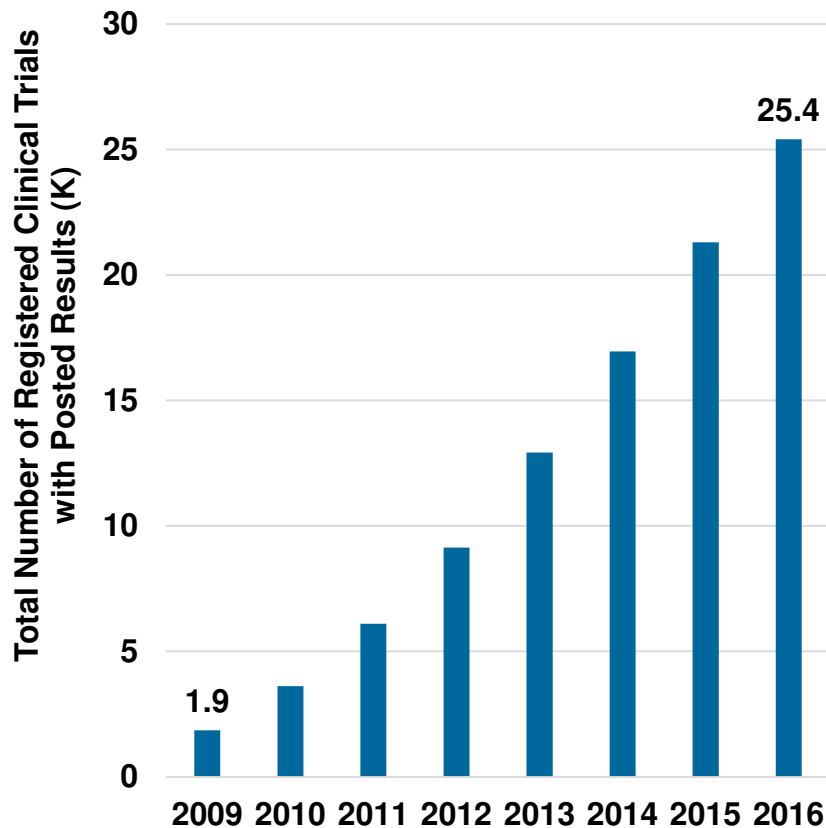
# ...New Data Streams = Enhancing & Perhaps Accelerating Clinical Trials...

## Selection Biomarkers (Enabled by DNA Sequencing) for Enrolling Patients in Clinical Trials Improves Probability of Success



# ...Data Silos = Breaking Down Owing to Broad Efforts to... Share Data Among Scientific Community...

## Growth in Publically-Available Clinical Trial Results



In 2014, Nature launched a peer reviewed open-access scientific journal focused on publishing datasets in machine-readable format for sharing across the natural sciences. Nature encourages authors to submit to Scientific Data in parallel but requires authors to enter the following data in community-endorsed, public repository prior to publishing in Nature:

Mandatory deposition	Suitable repositories
Protein sequences	Uniprot
DNA and RNA sequences	Genbank DNA DataBank of Japan EMBL Nucleotide Sequence Database
DNA and RNA sequencing data	NCBI Trace Archive NCBI Sequence Read Archive
Genetic polymorphisms	dbSNP dbVar European Variation Archive
Linked genotype and phenotype data	dbGAP The European Genome-phenome Archive
Macromolecular structure	Worldwide Protein Data Bank Biological Magnetic Resonance Data Bank Electron Microscopy Data Bank
Microarray data	Gene Expression Omnibus ArrayExpress
Crystallographic data for small molecules	Cambridge Structural Database

# ...As Data Accumulates & Silos Breakdown... Research Insights Could Accelerate...

## Growing Evidence That Data = Cheaper + Faster Clinical Trials

Traditional Trial vs. Simulation		
	Traditional UK Department of Health Study	Archimedes Data Simulation
<b>Number of Patients</b>	2,838	50,000
<b>Years of Data</b>	7 Years	30 Years
<b>Length of Study</b>	7 Years	2 Months
<b>Conclusion</b>	Out of 4 principal findings Archimedes predicted 2 exactly right, 1 within the margin of error, and 1 slightly below.	

Archimedes Simulation = a mathematical model to simulate (1) human physiology and disease, (2) care process models, and (3) healthcare system resources. Ran virtual trials of large, simulated populations in a fraction of the time and cost of a traditional study.

Source: Wired (11/09), National Academy of Engineering (David Eddy, 2015)

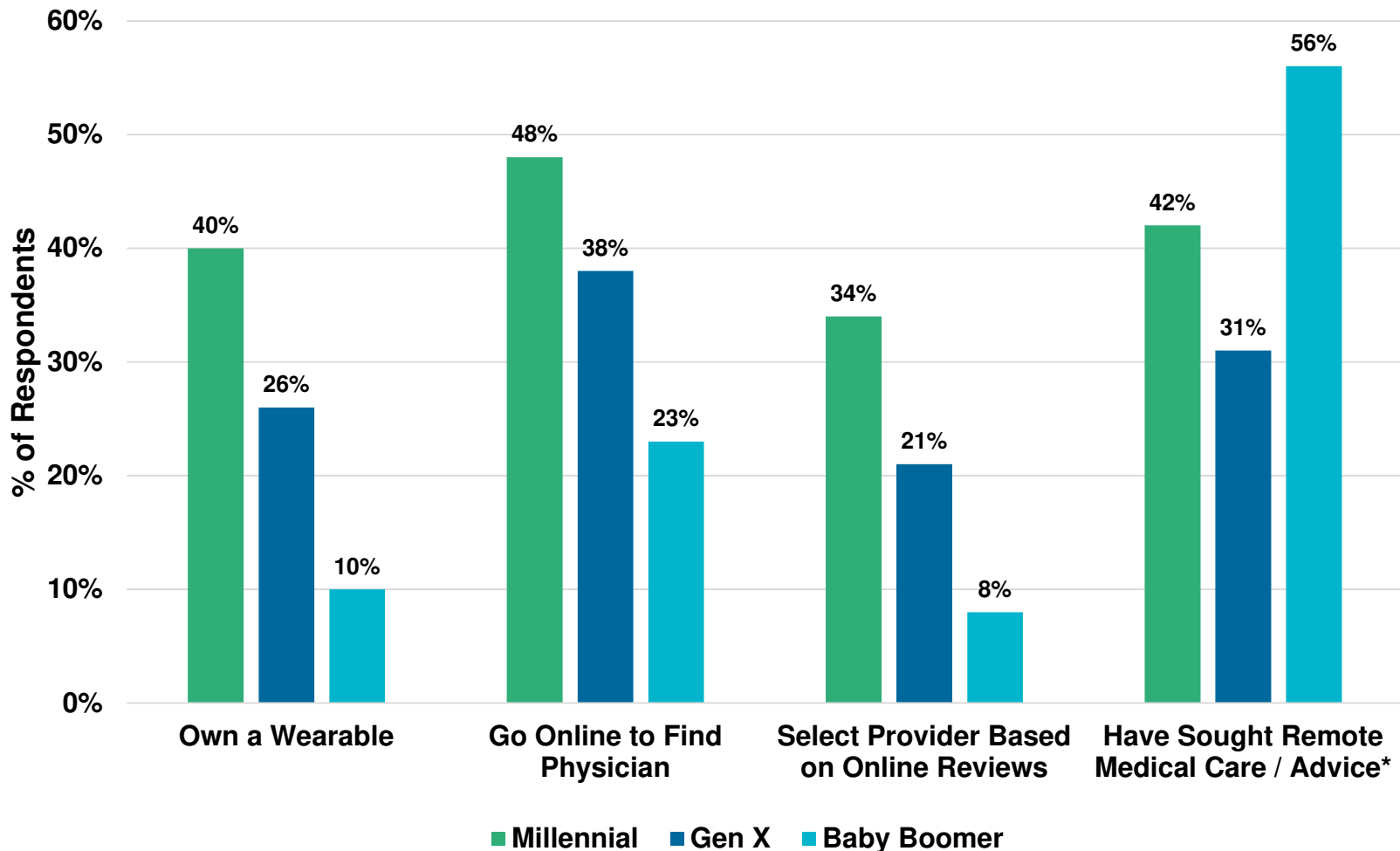
Note: The UK Department of Health launched a trial study, Collaborative Atorvastatin Diabetes Study (Cards), and the American Diabetes Association asked David Eddy to conduct a simulation addressing the same issues before the UK results were released.

***Data Insight + Translation =***

***Healthcare Delivery  
Could Change Faster With  
Consumer Engagement &  
Faster Innovation Cycles***

# Consumers = Increasingly Expect Digital Health Services... Especially Millennials...

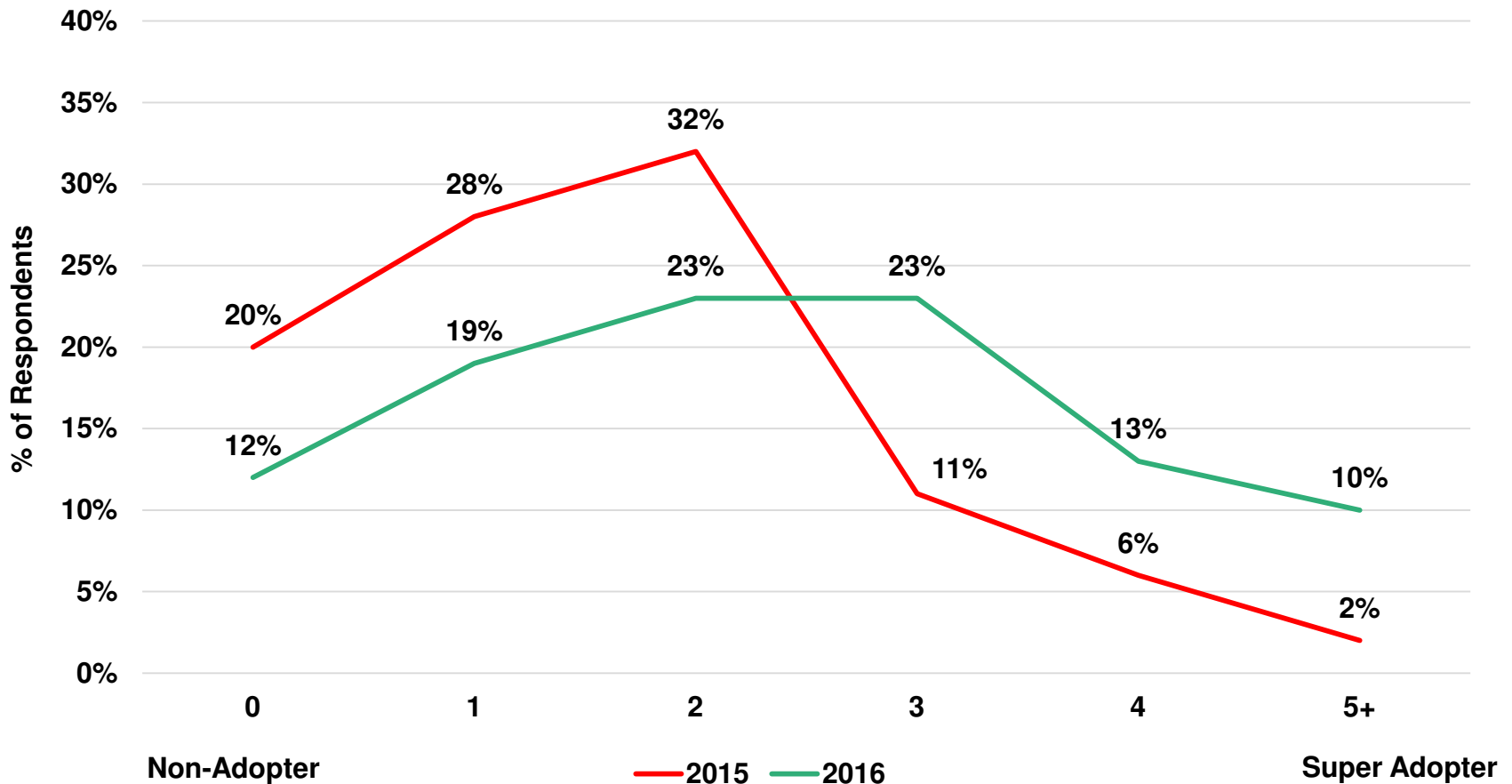
## Digital Health Adoption Across Generations



# ...Consumers = Increasingly Use Digital Health Tools

## Consumers Using Digital Health Tools (Telemedicine, Wearables, etc.)

88% Using at Least One Tool, 1 in 10 are Super Adopters





# Healthcare Practices = Being Re-Imagined... Leveraging Data to Optimize Outcomes

## Patient Empowerment & Health Management

Propeller Health + Bluetooth  
Inhaler Sensor = Improved  
Medication Adherence +  
Insights



Livongo + Connected Glucose  
Meter = Personalized Coaching  
+ \$100/Month Savings for  
Payers



## Improvements to Clinical Pathways / Protocol

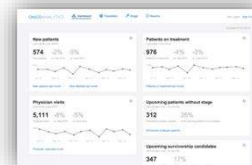
Ayasdi AI + Mercy Health  
System Patient Data = Clinical  
Anomaly Detection + Improved  
Clinical Pathway Development

AYASDI



Flatiron + Foundation Med (FMI)  
= 20,000 Liked Cancer Patients  
Records + Personalized  
Medicine

FLATIRON



## Preventative Health

Kinsa + Crowdsourced  
Temperature Data = Local Flu  
Predictions + Proactive  
Treatments for Populations

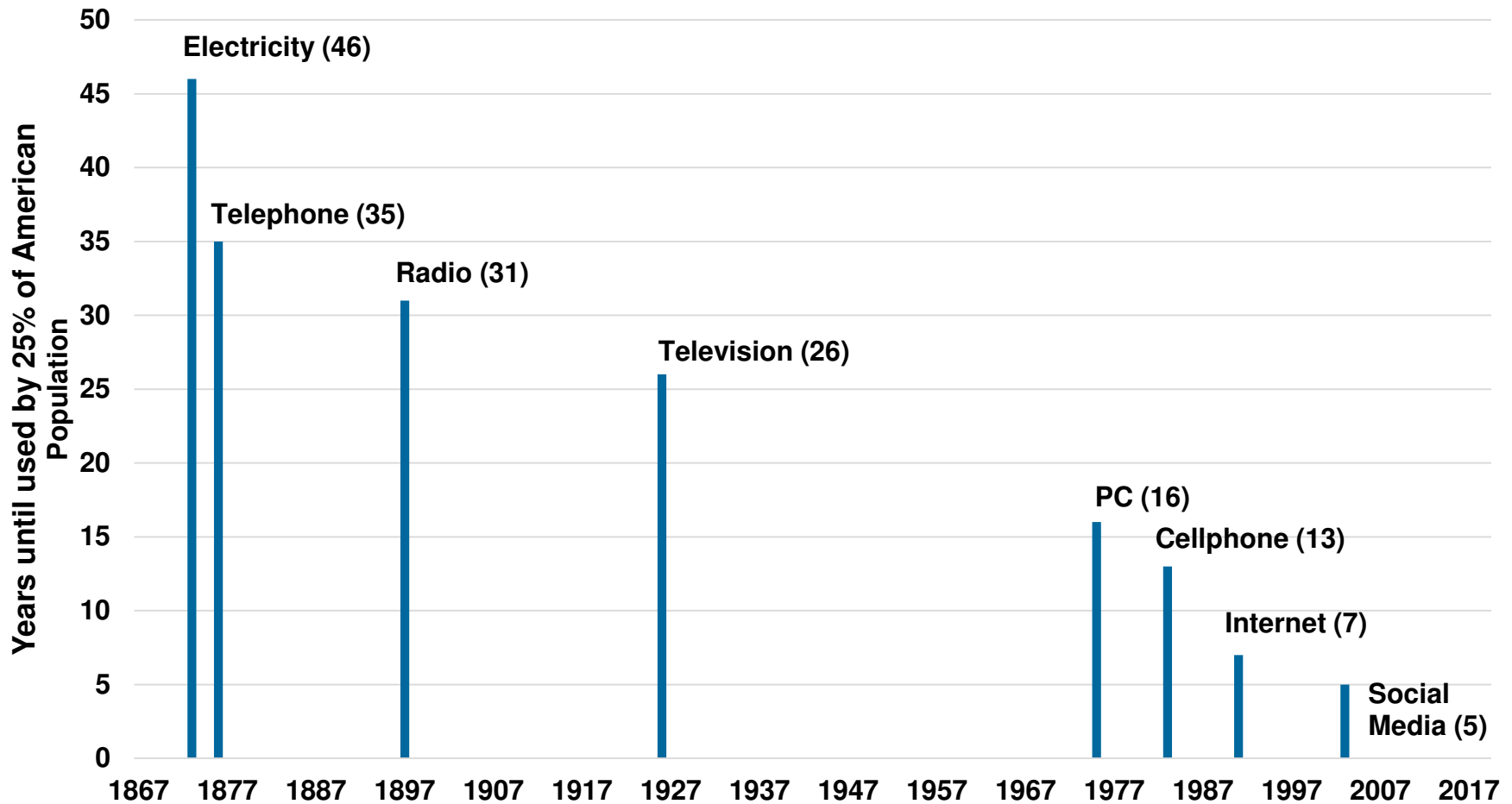


Omada + Preventative Program  
= 4-5% Body Weight Reduction  
+ Reduced Risk for Stroke and  
Heart Disease



# Digital Health = Could It Follow Tech-Like Rapid Adoption Curves?

## Acceleration of Technological Adoption Curves 1867-2017



Source: The Economist (12/15), Pew Research Center (1/17)

\*Social Media Adoption based on founding date of MySpace (2003) and Social Media Penetration calculated by Pew Research Center

***Evolution of Genomics =***

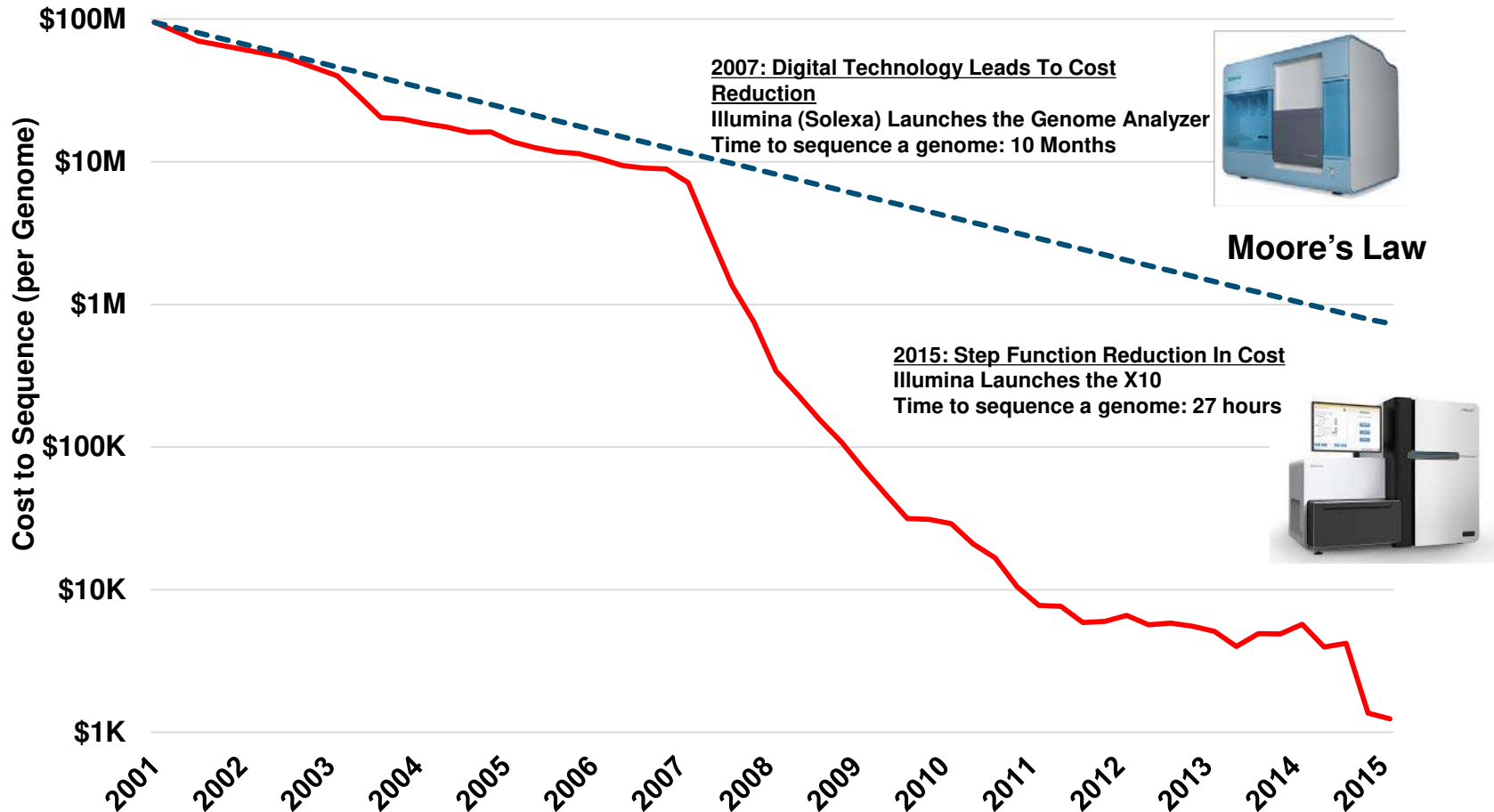
***Case Study in  
Virtuous Cycle of Innovation...***

***Input...Data Accumulation...***

***Insight...Translation...***

# Genomics Digitizes = Gets Faster / Better / Cheaper...

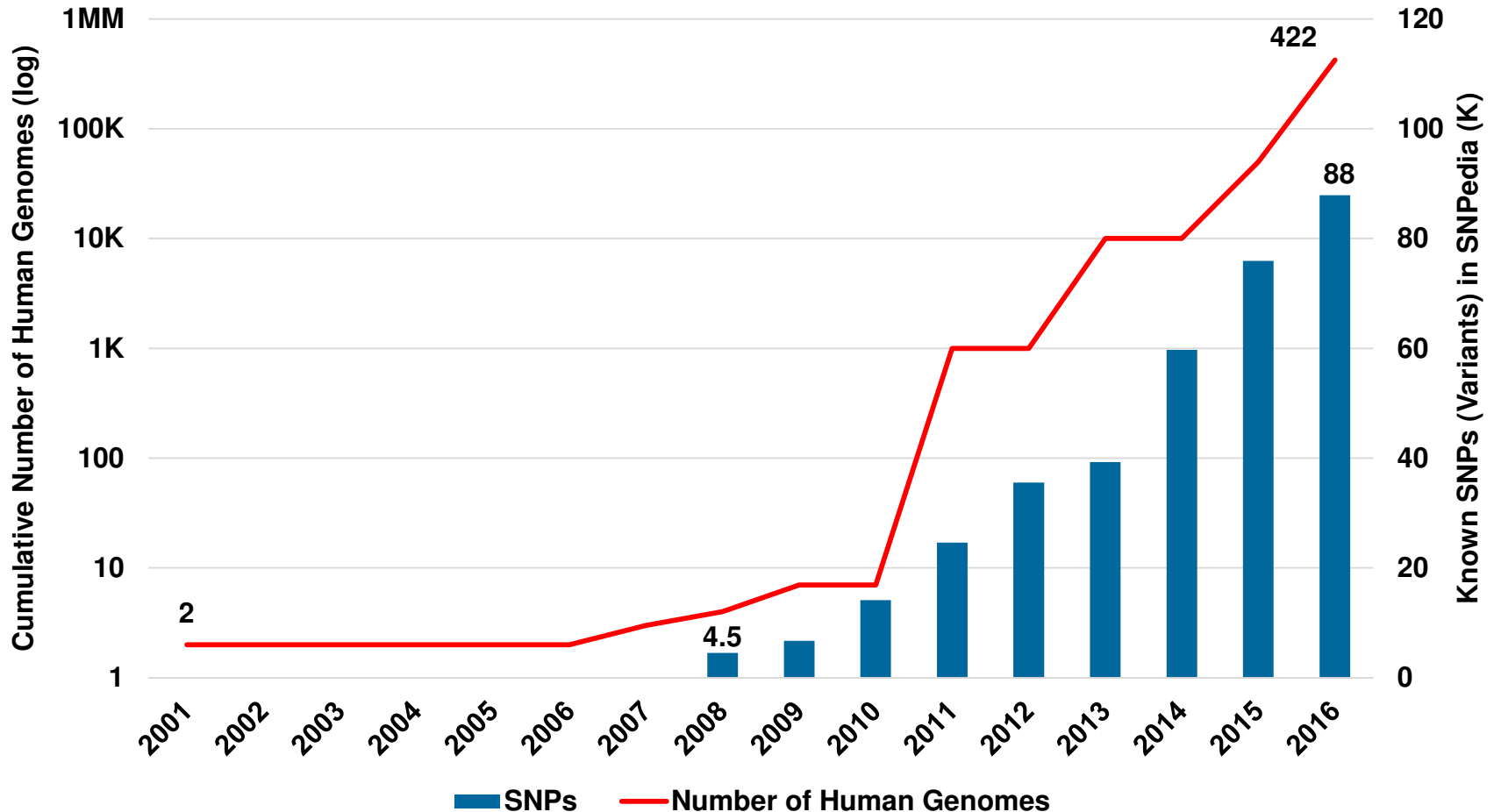
## Introduction of Digital Technology Accelerates Cost Reduction Faster Than Moore's Law



Source: National Institute of Health, National Human Genome Research Institute (7/17), Biology Reference, Illumina

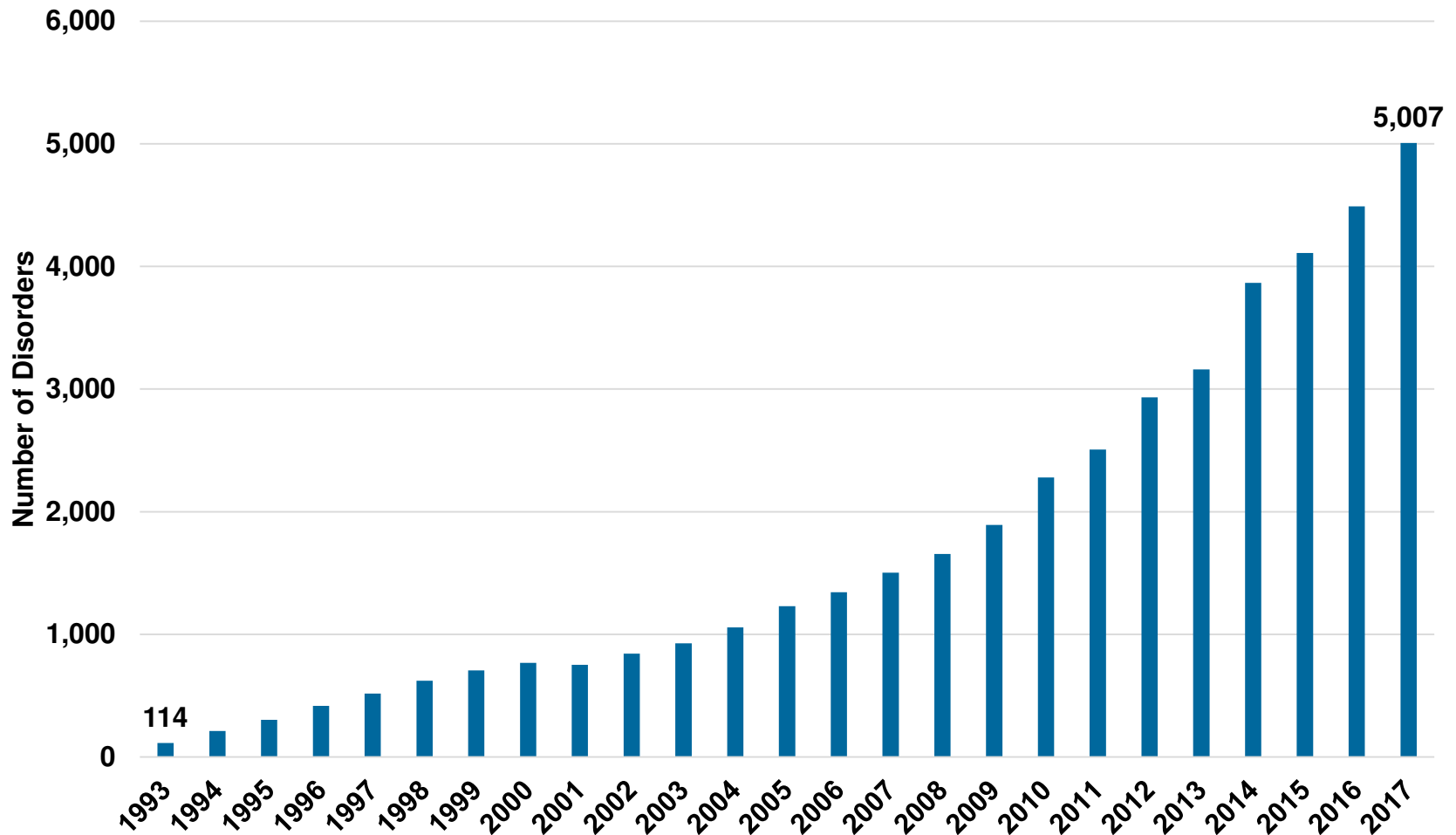
# ...Accumulation of Genomic Data Leads to... 19x Increase in Genomic Knowledge...

## Insight (Measured in Known Variants) Tracks Number Of Genomes Sequenced



# ...Genomics Research & Insights Lead to Rapid Increase in... Available Genetic Tests...

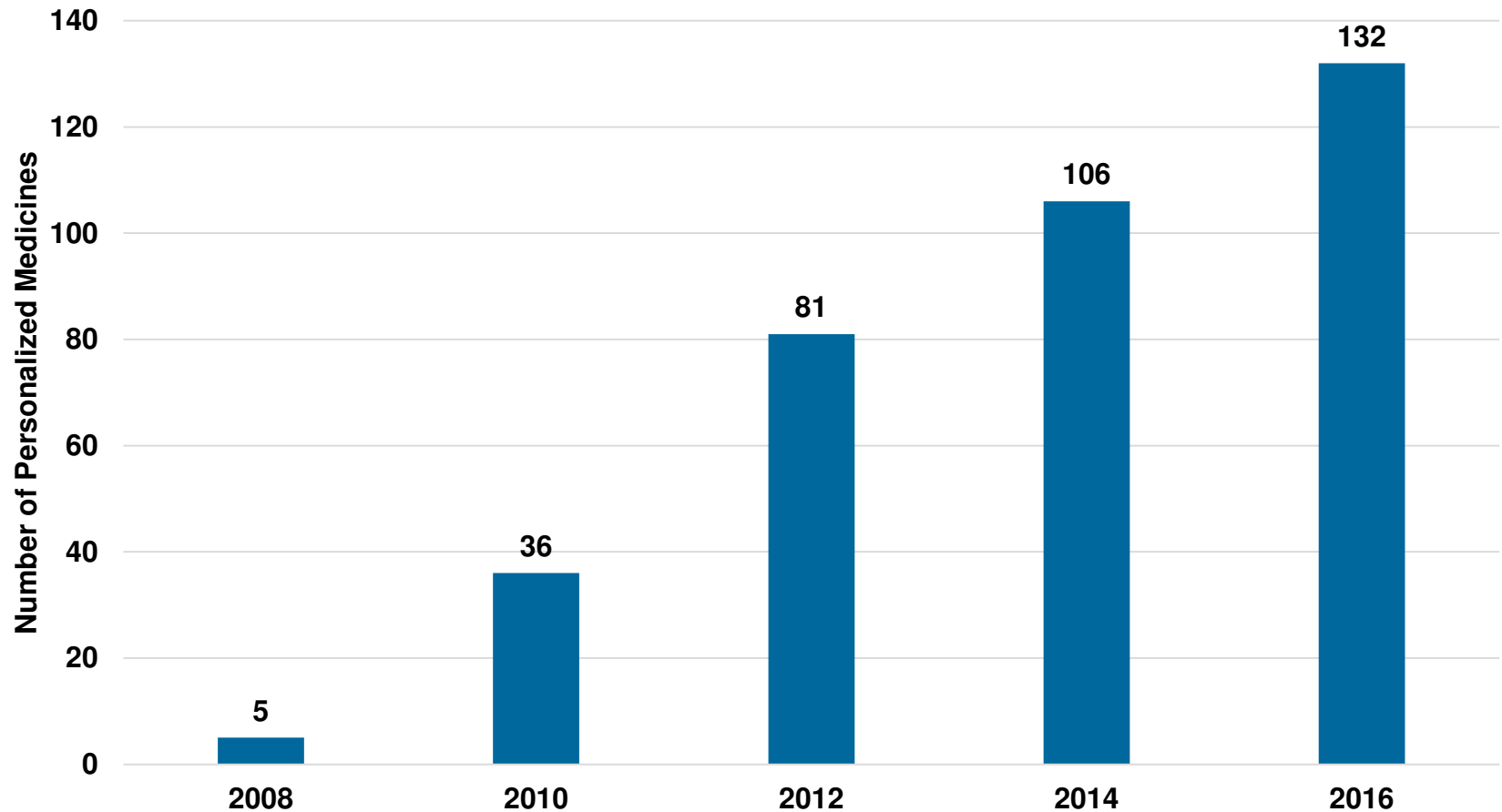
## Genetic Disorders with Diagnostic Tests Available, 5/29/2017



Source: Genetests (5/17)

# ...Genomics Insight Translates to Therapeutics...

## Number of Personalized\* Medicines Up From Almost None in 2008, 2008-2016



Source: Personalized Medicine Coalition (2017)

\*Number of personalized medicines calculated based on PMC's Case for Personalized Medicine and the FDA's Table of Pharmacogenomic Biomarkers in Drug Labeling

# ...Evolution of Genomics Technologies Enable Deeper Research... Consumer Genomics Evolving Similarly...

## Research

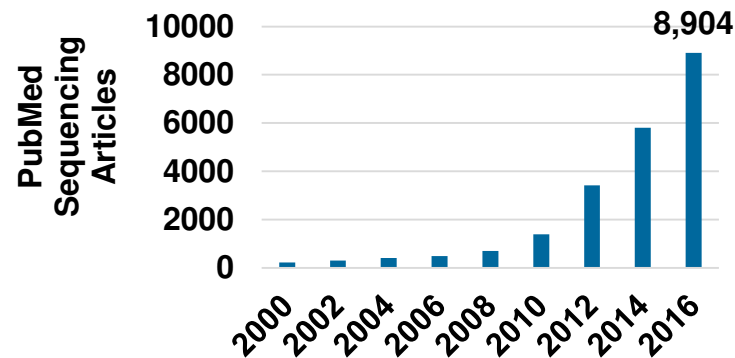
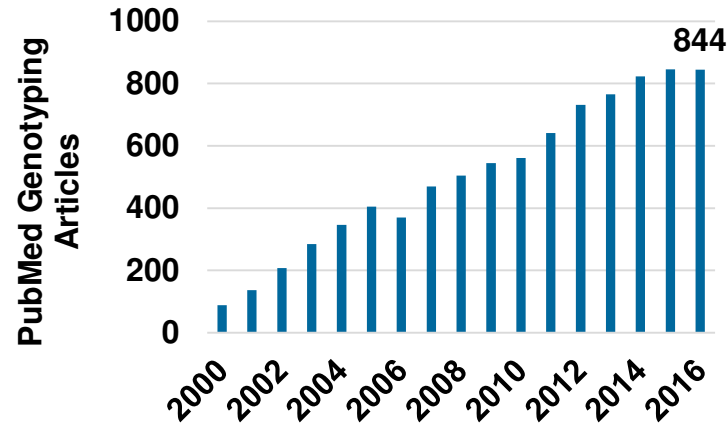
### SNP Arrays and Genotyping (v1.0)

Identifies variations in specific, pre-defined single letters within a gene



### Next Generation Sequencing (v2.0)

Looks for variations throughout the entire gene



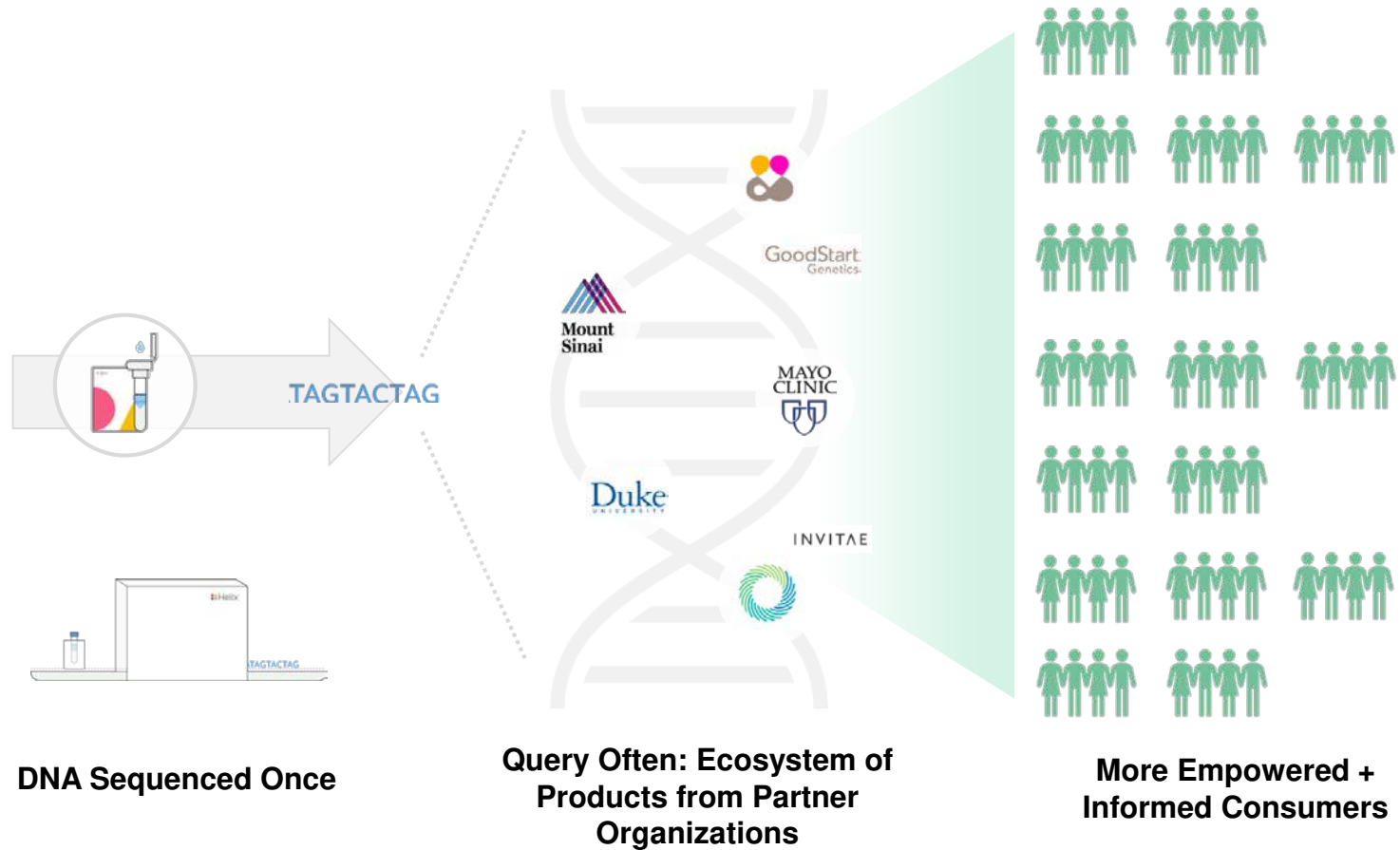
## Consumer





# ...Digitization = Democratization

## Digitization = Enabling New Business Models in Genomics



Source: Helix (5/17)

# Healthcare @ Digital Inflection Point

## 100 Years Ago Human Touch



## 25 Years Ago Machine Assisted / Analog



## Today Technology Enabled / Digital



---

**GLOBAL PUBLIC / PRIVATE  
INTERNET COMPANIES =**

**IT'S BEEN A GOOD TIME TO BE A  
LEADER / INNOVATOR**

*Global Internet Companies =*

*An Epic Half-Decade for  
Public + Private  
Internet Companies*

# 2017 Global Internet Market Capitalization Leaders = Most Extending Leads... Apple / Google-Alphabet / Amazon / Facebook / Tencent / Alibaba

Rank	Company	Region	Current Market Value (\$B)
1	Apple	USA	\$801
2	Google - Alphabet	USA	680
3	Amazon	USA	476
4	Facebook	USA	441
5	Tencent	China	335
6	Alibaba	China	314
7	Priceline	USA	92
8	Uber	USA	70
9	Netflix	USA	70
10	Baidu	China	66
11	Salesforce	USA	65
12	Paypal	USA	61
13	Ant Financial	China	60
14	JD.com	China	58
15	Didi Kuaidi	China	50
16	Yahoo!	USA	49
17	Xiaomi	China	46
18	eBay	USA	38
19	Airbnb	USA	31
20	Yahoo! Japan	Japan	26
<b>Total</b>			<b>\$3,827</b>

Source: CapIQ, CB Insights, Wall Street Journal, media reports. Market value data as of 5/26/17.

Note: For public companies, colors denote current market value relative to Y/Y market value. Green = higher. Red = lower. Yellow = private companies, where market value represents latest publicly announced valuation. Ant Financial and Didi Kuaidi valuation per latest media reports as of 6/16 and 4/17 respectively. Xiaomi valuation per latest media reports as of 4/17. 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.

*Global Public Companies =*

*An Epic Half-Decade for  
Internet Companies*

# 2017 Global Market Capitalization Leaderboard = Tech = 40% of Top 20 Companies...100% of Top 5...

Rank	Company	Region	Industry Segment	Current Market Value (\$B)	2016 Revenue (\$B)
1	Apple	USA	Tech – Hardware	\$801	\$218
2	Google / Alphabet	USA	Tech – Internet	680	90
3	Microsoft	USA	Tech – Software	540	86
4	Amazon	USA	Tech – Internet	476	136
5	Facebook	USA	Tech – Internet	441	28
6	Berkshire Hathaway	USA	Financial Services	409	215
7	Exxon Mobil	USA	Energy	346	198
8	Johnson & Johnson	USA	Healthcare	342	72
9	Tencent	China	Tech – Internet	335	22
10	Alibaba	China	Tech – Internet	314	21
11	JP Morgan Chase	USA	Financial Services	303	90
12	ICBC	China	Financial Services	264	85
13	Nestlé	Switzerland	Food / Beverages	263	88
14	Wells Fargo	USA	Financial Services	262	85
15	Samsung Electronics	Korea	Tech – Hardware	259	168
16	General Electric	USA	Industrial	238	120
17	Wal-Mart	USA	Retail	237	486
18	AT&T	USA	Telecom	234	164
19	Roche	Switzerland	Healthcare	233	51
20	Bank of America	USA	Financial Services	231	80
<b>Total</b>				<b>\$7,207</b>	<b>\$2,497</b>

Source: CapIQ. Market value data as of 5/26/17

Note: For public companies, colors denote current market value relative to Y/Y market value. Green = higher, red = lower.

# ...2012 Global Market Capitalization Leaderboard = Tech = 20% of Top 20 Companies...40% of Top 5

Rank	Company	Region	Industry Segment	5/31/2012 Value (\$B)	2011 Revenue (\$B)
1	Apple	USA	Tech – Hardware	\$540	\$128
2	Exxon Mobil	USA	Financial Services	368	434
3	PetroChina	China	Energy	267	318
4	Microsoft	USA	Tech – Software	245	72
5	ICBC	China	Financial Services	227	70
6	Wal-Mart	USA	Retail	224	447
7	IBM	USA	Tech – Hardware	223	107
8	China Mobile	China	Telecom	203	84
9	General Electric	USA	Industrial	202	143
10	AT&T	USA	Telecom	200	127
11	Royal Dutch Shell	Netherlands	Energy	197	470
12	Berkshire Hathaway	USA	Financial Services	196	141
13	Chevron	USA	Energy	194	236
14	Google / Alphabet	USA	Tech – Internet	189	38
15	Nestlé	Switzerland	Food / Beverages	180	90
16	China Construction Bank	China	Financial Services	173	58
17	Johnson & Johnson	USA	Healthcare	171	65
18	Procter & Gamble	USA	Consumer Goods	171	84
19	Wells Fargo	USA	Financial Services	170	73
20	BHP Billiton	Australia	Metals / Mining	170	75
<b>Total</b>				<b>\$4,512</b>	<b>\$3,257</b>

Source: CapIQ. Market value data as of 5/31/12.

Note: For public companies, colors denote current market value relative to Y/Y market value. Green = higher, red = lower.



*Big Get Bigger =  
& Go After Other Bigs...*

*Often Led by Founder-Driven  
Innovation / Seeing Around Corners*

# Internet Bigs Expansion / Growth = A Long Way from Where They Started

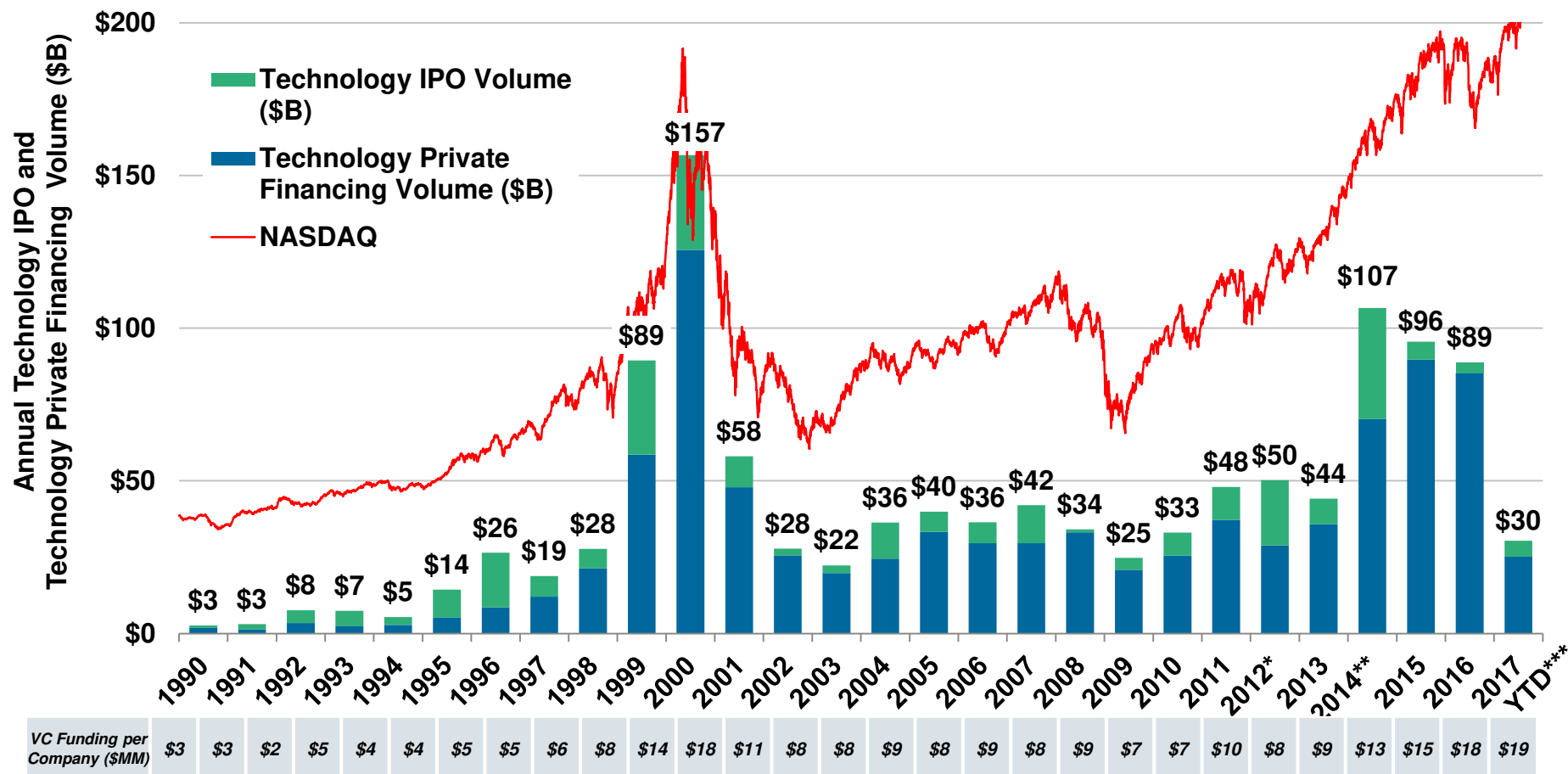
Company	Founding Year	Original Business	Current Businesses
<b>Apple</b>	1976	<b>Personal Computer Maker</b>	Smartphone / Computer / Tablet Maker...Content / Media Marketplace...Cloud Services
<b>Google - Alphabet</b>	1998	<b>Online Search Engine</b>	Online Search Engine...Ad Ecosystem...Web Browser...Mobile Operating System(s)...Digital Video Platform...Content Marketplace...Mobile + IoT / OTT Device Maker...Navigation Tools...Productivity Software...Cloud Services...AR / VR Software + Hardware...Moonshot Chaser
<b>Amazon</b>	1994	<b>Online Bookseller (USA)</b>	Global B2B B2C / C2C Commerce...Content Ecosystem...Digital Video / Music Platform...eReader / Tablet / IoT / OTT Device Maker...Cloud Services...Logistics...Ad Ecosystem
<b>Facebook</b>	2004	<b>Social Network (USA)</b>	Global Social Network...Instant Messaging Platform...Image Sharing Platform...AR / VR Software / Hardware...Ad Ecosystem
<b>Tencent</b>	1998	<b>Instant Messaging Platform (China)</b>	Instant Messaging Platform...Gaming...Content Ecosystem...Social Network...Ad Ecosystem...Payments...Digital Video / Music Platform...Cloud Services
<b>Alibaba</b>	1999	<b>B2B Commerce Platform (China)</b>	Global B2B / B2C / C2C Commerce Platform...New Retail...Ad Ecosystem... Payments...Cloud Services...Logistics Data Platform...Digital Media & Entertainment Platform...Content Ecosystem...Content Creator...Web Browser

*Global Technology Financings =*

*Strong Relative to History...  
Slowing @ Margin*

# Global Technology Financings = Strong Relative to History...Slowing @ Margin

## Global USA-Listed Technology IPO Issuance & Global Technology Venture Capital Financing, 1990 – 2017YTD



VC Funding per Company (\$MM)

\$3	\$3	\$2	\$5	\$4	\$4	\$5	\$5	\$6	\$8	\$14	\$18	\$11	\$8	\$8	\$9	\$8	\$9	\$8	\$9	\$7	\$7	\$10	\$8	\$9	\$13	\$15	\$18	\$19
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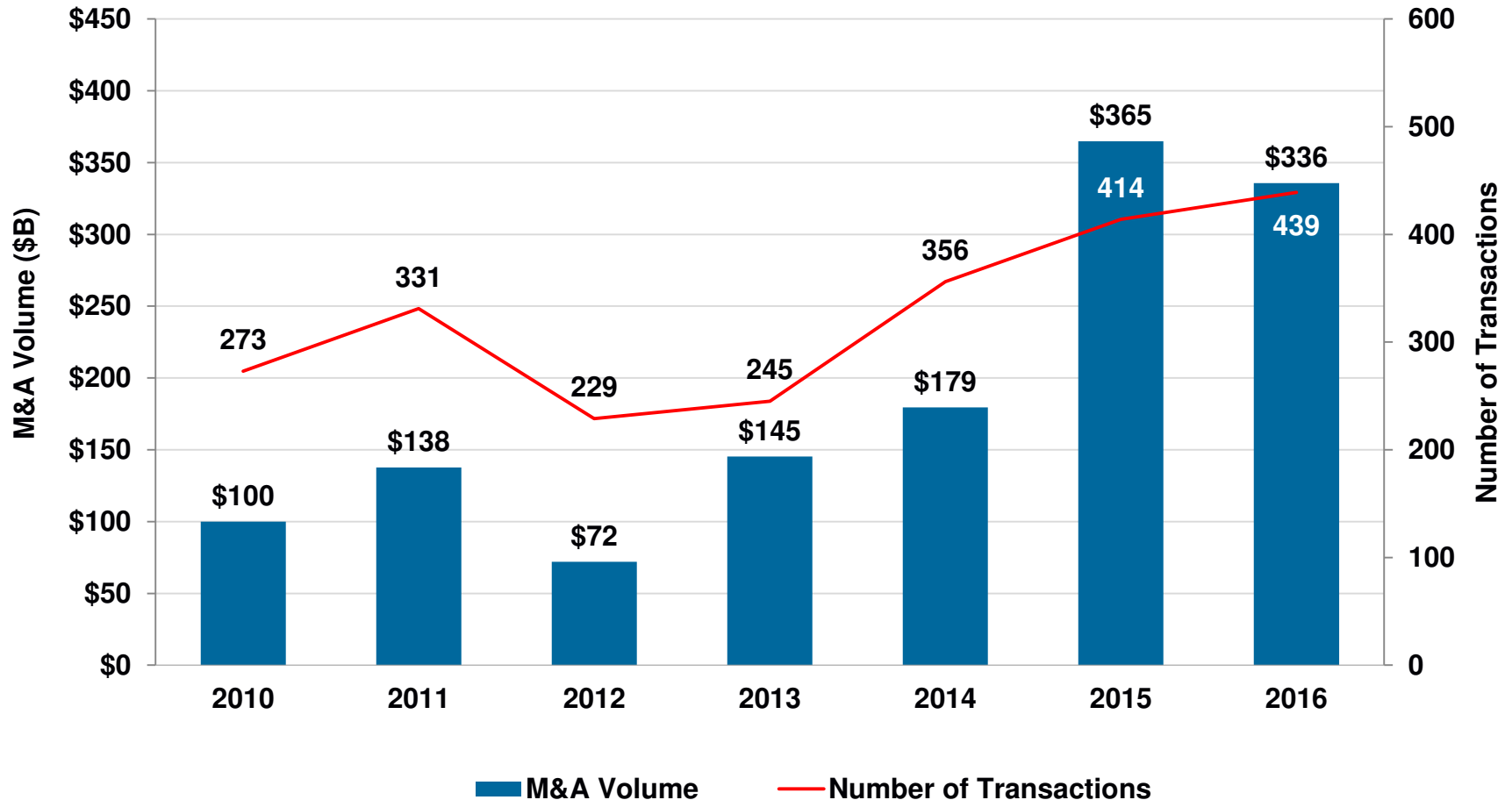
Source: Morgan Stanley Equity Capital Markets, 2017YTD as of 5/12/17, Thomson ONE 2017YTD as of 5/12/17. All global U.S.-listed technology IPOs over \$30MM, data per Dealogic, Bloomberg, & Capital IQ. VC Funding per Company (\$MM) calculated as total venture financing per year divided by number of companies receiving venture financing.

\*Facebook (\$16B IPO) = 75% of 2012 IPO \$ value. \*\*Alibaba (\$25B IPO) = 69% of 2014 IPO \$ value. \*\*\*Snap (\$4B IPO) = 74% of 2017 YTD \$ value.

*Global Technology  
Mergers & Acquisitions =  
Robust Relative to History*

# Global Technology Merger & Acquisition Volume = Robust Relative to History

## Global Technology M&A Deals, 2010-2016



*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.*

# Global Public / Private Internet Companies = It's Been a Good Time to be a Leader / Innovator

- 1) **Global Internet Companies** = An Epic Half-Decade for Public + Private Internet Companies
- 2) **Global Public Companies** = An Epic Half-Decade for Internet Companies
- 3) **Big Get Bigger** = & Go After Other Bigs...Often Led by Founder-Driven Innovation / Seeing Around Corners
- 4) **Global Technology Financings** = Strong Relative to History...Slowing @ Margin
- 5) **Global Technology Mergers & Acquisitions** = Robust Relative to History
- 6) **Value of a Business...**



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# SOME MACRO THOUGHTS

***USA, Inc.\* =***

***Understanding Where Your  
Tax Dollars Go***

\* USA, Inc. Full Report: <http://www.kpcb.com/blog/2011-usa-inc-full-report>

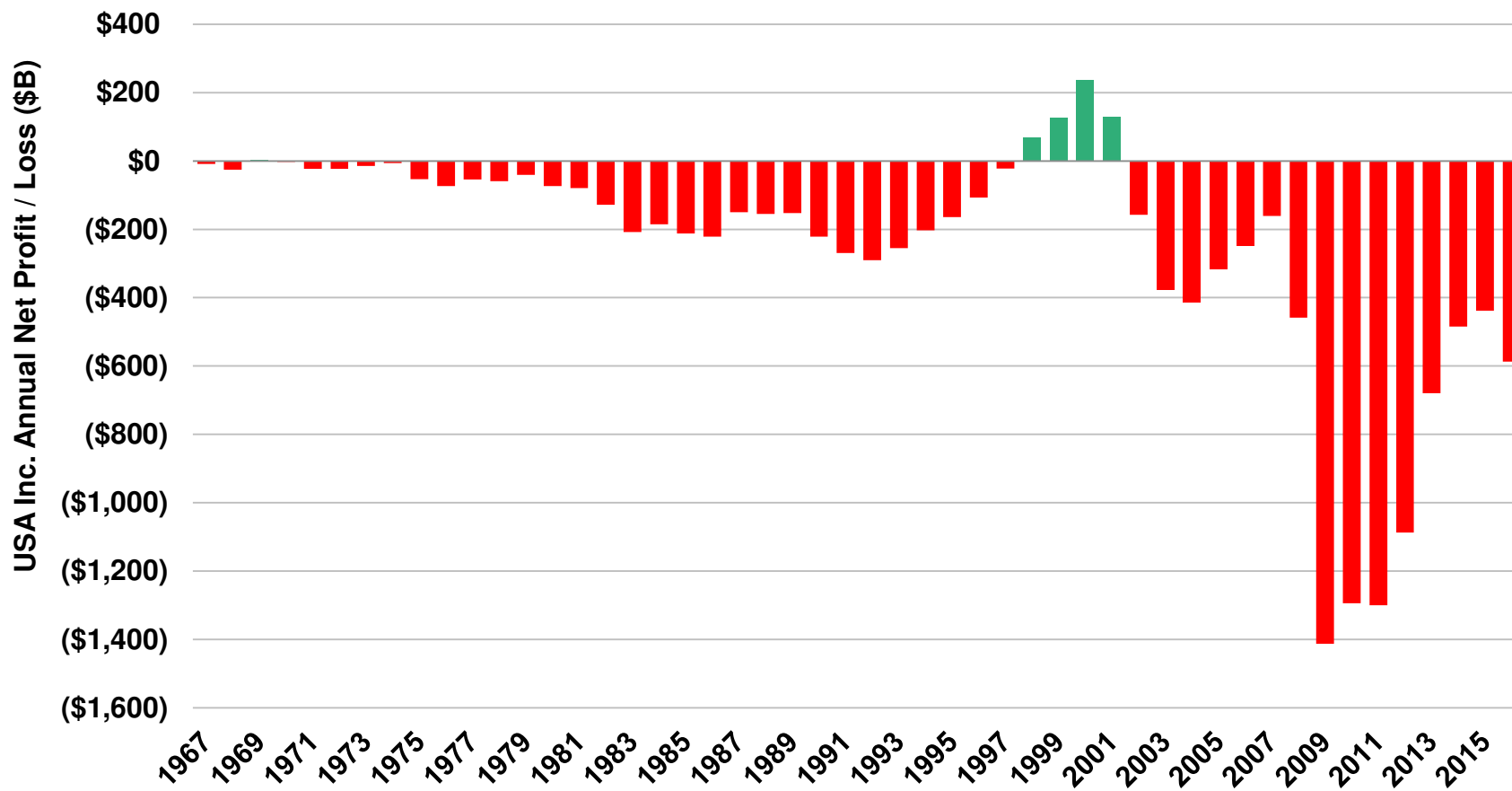
# USA Income Statement = -19% Average Net Margin Over 25 Years...

## USA Income Statement, F1986 – F2016

	F1986	F1991	F1996	F2001	F2006	F2011	F2016	Comments
<b>Revenue (\$B)</b>	<b>\$769</b>	<b>\$1,055</b>	<b>\$1,453</b>	<b>\$1,991</b>	<b>\$2,407</b>	<b>\$2,303</b>	<b>\$3,267</b>	<b>+5% Y/Y average over 25 years</b>
<b>Y/Y Growth</b>	<b>5%</b>	<b>2%</b>	<b>7%</b>	<b>-2%</b>	<b>12%</b>	<b>7%</b>	<b>1%</b>	
Individual Income Taxes*	\$349	\$468	\$656	\$994	\$1,044	\$1,091	\$1,546	Largest driver of revenue
<i>% of Revenue</i>	<i>45%</i>	<i>44%</i>	<i>45%</i>	<i>50%</i>	<i>43%</i>	<i>47%</i>	<i>47%</i>	
Social Insurance Taxes	\$284	\$396	\$509	\$694	\$838	\$819	\$1,115	Social Security & Medicare payroll tax
<i>% of Revenue</i>	<i>37%</i>	<i>38%</i>	<i>35%</i>	<i>35%</i>	<i>35%</i>	<i>36%</i>	<i>34%</i>	
Corporate Income Taxes*	\$63	\$98	\$172	\$151	\$354	\$181	\$300	Fluctuates with economic conditions
<i>% of Revenue</i>	<i>8%</i>	<i>9%</i>	<i>12%</i>	<i>8%</i>	<i>15%</i>	<i>8%</i>	<i>9%</i>	
Other	\$73	\$93	\$115	\$152	\$171	\$212	\$316	Estate & gift taxes, duties / fees...
<i>% of Revenue</i>	<i>10%</i>	<i>9%</i>	<i>8%</i>	<i>8%</i>	<i>7%</i>	<i>9%</i>	<i>10%</i>	
<b>Expense (\$B)</b>	<b>\$990</b>	<b>\$1,324</b>	<b>\$1,560</b>	<b>\$1,863</b>	<b>\$2,655</b>	<b>\$3,603</b>	<b>\$3,854</b>	<b>+4% Y/Y average over 15 years</b>
<b>Y/Y Growth</b>	<b>5%</b>	<b>6%</b>	<b>3%</b>	<b>4%</b>	<b>7%</b>	<b>4%</b>	<b>4%</b>	
Entitlement / Mandatory	\$416	\$597	\$787	\$1,008	\$1,412	\$2,026	\$2,429	Risen owing to rising healthcare costs + aging population
<i>% of Expense</i>	<i>42%</i>	<i>45%</i>	<i>50%</i>	<i>54%</i>	<i>53%</i>	<i>56%</i>	<i>63%</i>	
Non-Defense Discretionary	\$165	\$214	\$267	\$343	\$497	\$648	\$600	Education / law enforcement / transportation / general government...
<i>% of Expense</i>	<i>17%</i>	<i>16%</i>	<i>17%</i>	<i>18%</i>	<i>19%</i>	<i>18%</i>	<i>16%</i>	
Defense	\$274	\$320	\$266	\$306	\$520	\$699	\$584	2006 increase driven by War on Terror
<i>% of Expense</i>	<i>28%</i>	<i>24%</i>	<i>17%</i>	<i>16%</i>	<i>20%</i>	<i>19%</i>	<i>15%</i>	
Net Interest on Public Debt	\$136	\$194	\$241	\$206	\$227	\$230	\$241	Recent benefit of historic low interest rates
<i>% of Expense</i>	<i>14%</i>	<i>15%</i>	<i>15%</i>	<i>11%</i>	<i>9%</i>	<i>6%</i>	<i>6%</i>	
<b>Surplus / Deficit (\$B)</b>	<b>(\$221)</b>	<b>(\$269)</b>	<b>(\$107)</b>	<b>\$128</b>	<b>(\$248)</b>	<b>(\$1,300)</b>	<b>(\$587)</b>	<b>-19% average net margin, 1991-2016</b>
<b>Net Margin (%)</b>	<b>-29%</b>	<b>-26%</b>	<b>-7%</b>	<b>6%</b>	<b>-10%</b>	<b>-56%</b>	<b>-18%</b>	

# ...USA Income Statement = What Net Losses in 45 of 50 Years Look Like...

## USA Annual Profits & Losses, 1967 – 2016



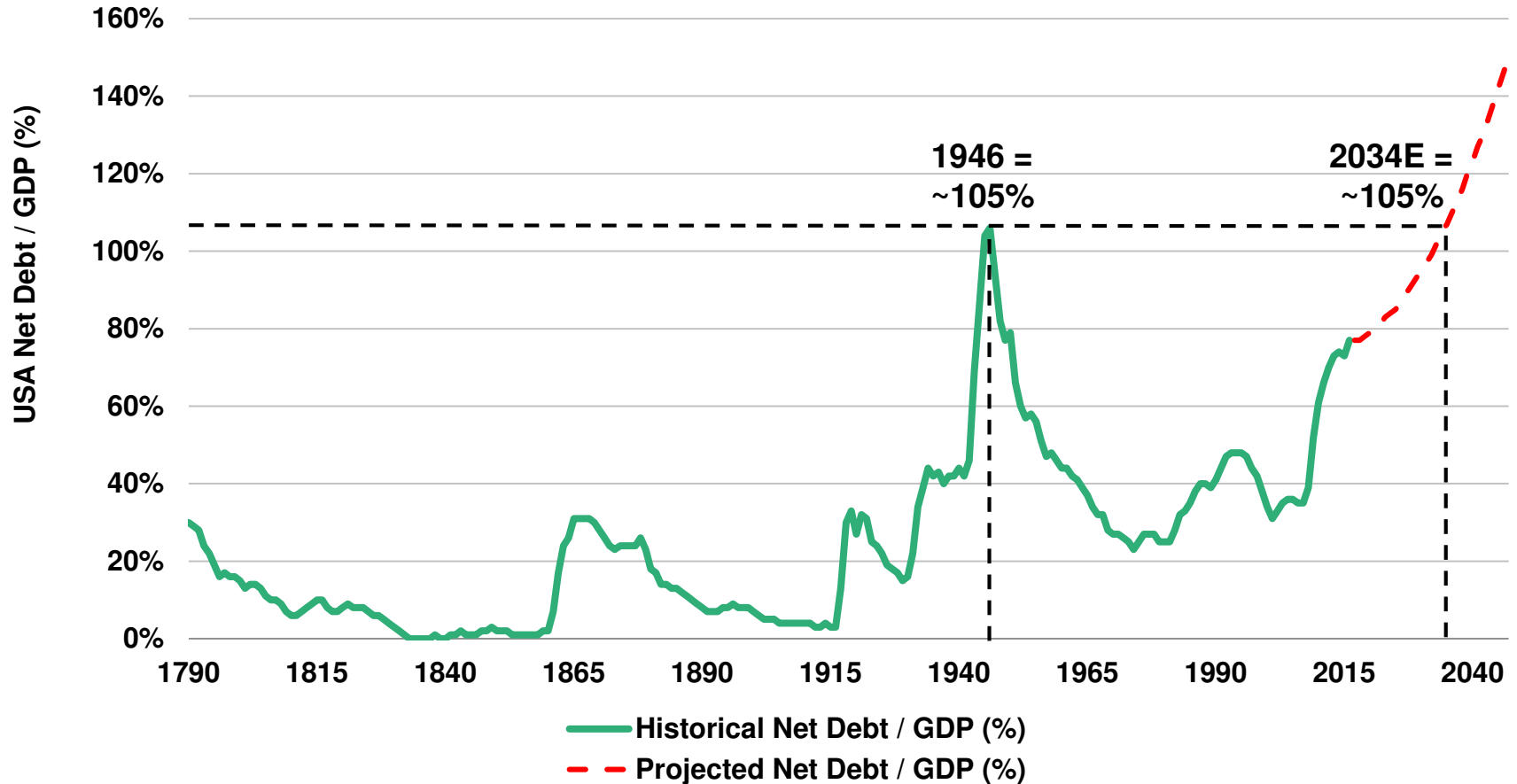
...When Spending > Income → Debt Rises =  
Net Debt / GDP @ 77%...Higher than 97% of USA's History...

## USA Net Debt / GDP Ratio, 1790 – 2016



# ...@ Current Course / Speed (& If Government Projections are Correct)... USA Net Debt / GDP Ratio Will Break WWII Record by 2035...

## USA Net Debt / GDP Ratio, 1790 – 2047E



Source: Congressional Budget Office Long-Term Outlook (3/17), Wall Street Journal

# ...USA = 9th Highest Public Debt / GDP Level... Relative to Other Major Economies

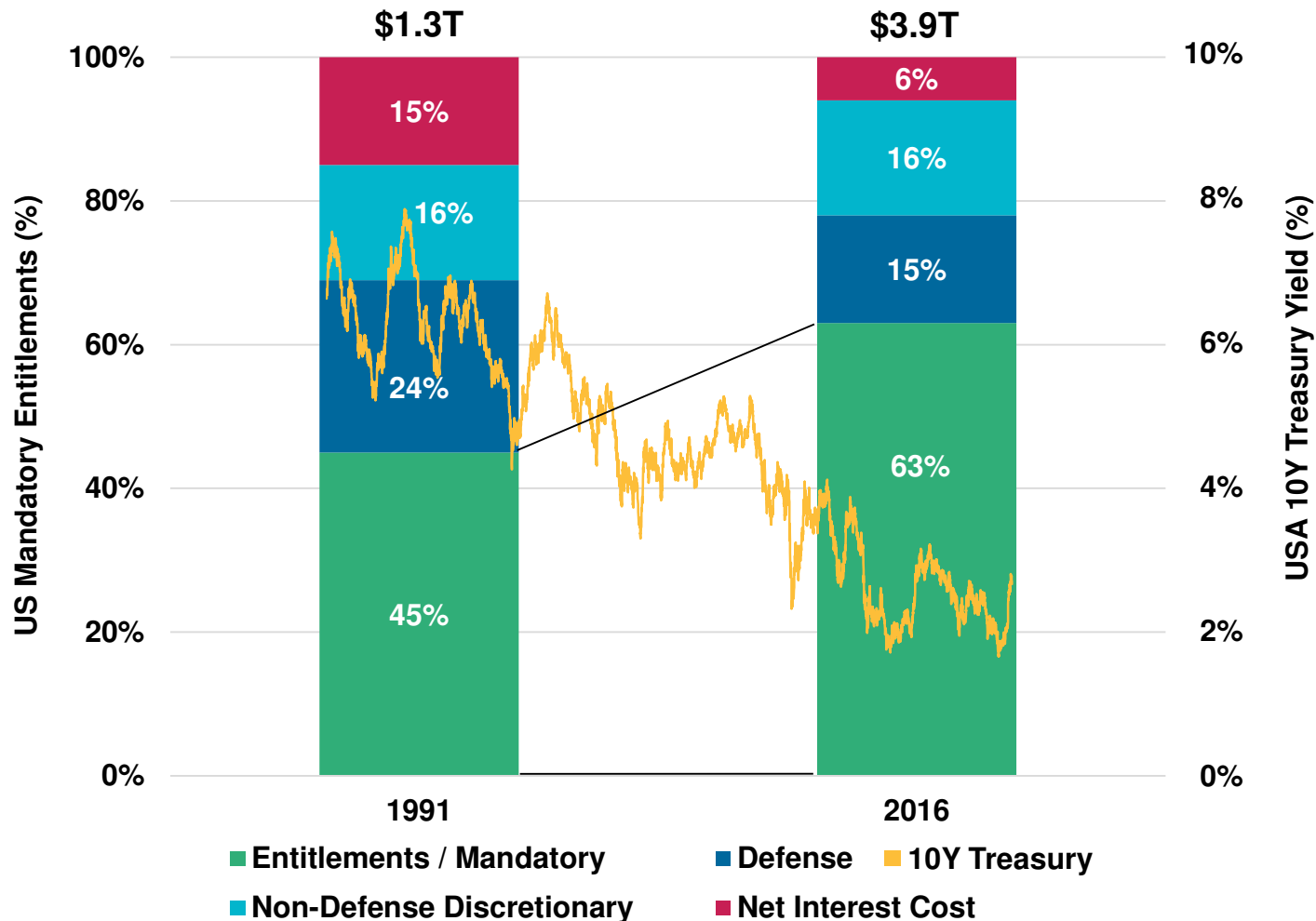
Rank	Country	% of GDP	2015 Public Government Debt (\$B)
1	Japan	248%	\$10,083
2	Greece	177	347
3	Lebanon	138	68
4	Italy	133	2,342
5	Portugal	129	257
6	Jamaica	120	20
7	Cyprus	109	20
8	Belgium	106	478
9	<b>United States</b>	<b>105</b>	<b>18,870</b>
10	Singapore	105	302
11	Spain	99	1,124
12	France	96	2,236
13	Jordan	93	33
14	Canada	91	1,335
15	United Kingdom	89	2,458
16	Egypt	89	280
17	Croatia	87	40
18	Austria	86	302
19	Slovenia	83	30
20	Ukraine	80	37

Source: IMF

Note: Ranking excludes countries with public debt less than \$10B in 2015. Public debt includes federal, state and local government debt but exclude unfunded pension liabilities from government defined-benefit pension plans and debt from public enterprises and central banks.

# USA Entitlements = 63% of Spending vs. 45% 25 Years Ago... Interest Expense Down as % Owing to Interest Rate Declines...

## USA Expenses by Category, 1991-2016



### Change by Category, 1991-2016

**Debt:**  
+\$11T / +427%

**Entitlements:**  
+\$1.8T / +307%

**Non-Defense Discretionary:**  
+\$387B / +181%

**Defense:**  
+\$264B / +83%

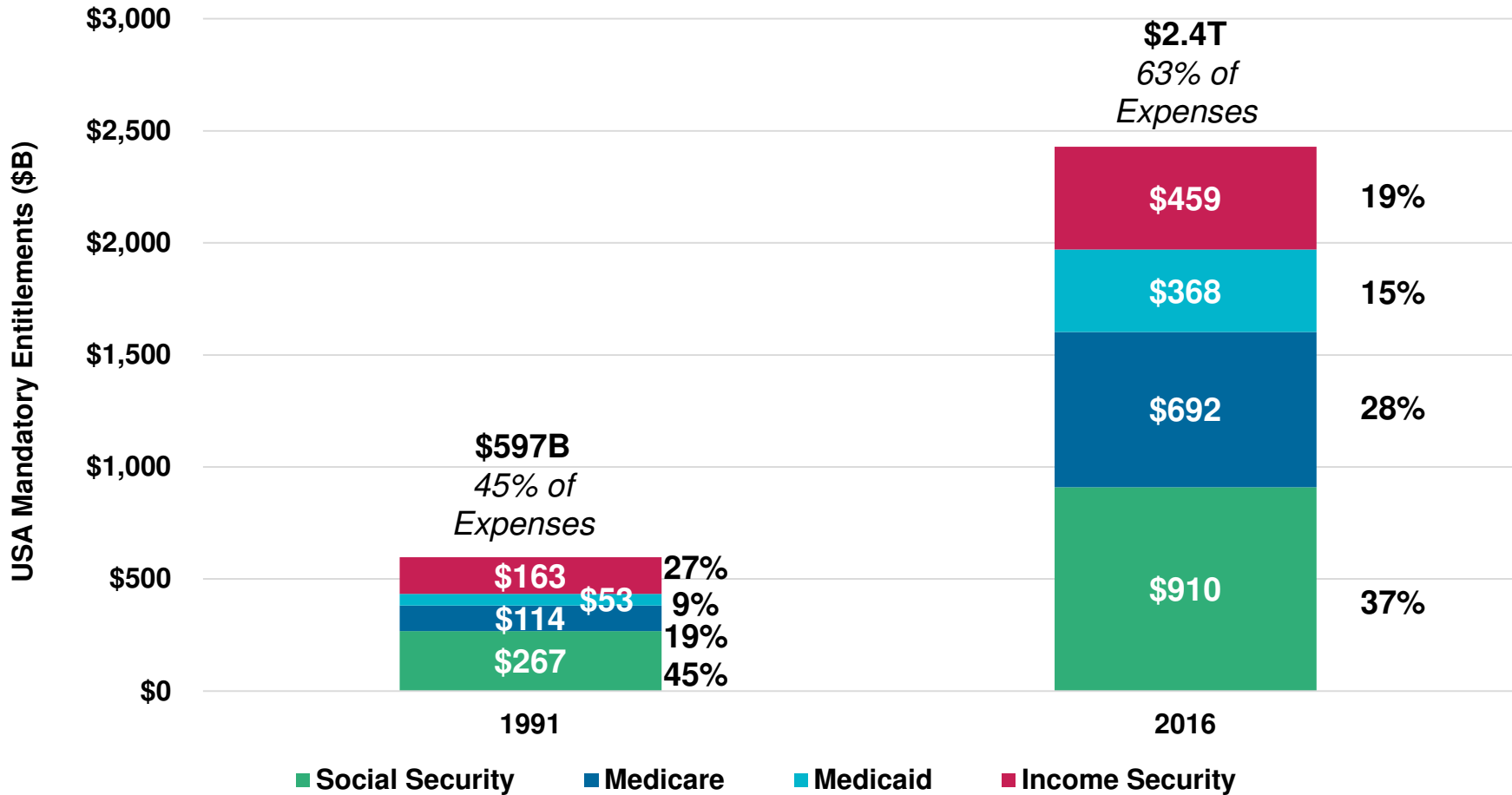
**Net Interest Cost:**  
+\$46B / +24%

Source: Congressional Budget Office, White House Office of Management and Budget, US Treasury  
 Note: Yellow line represents yield on 10-year US Treasury bill from 12/31/91 to 12/31/16.



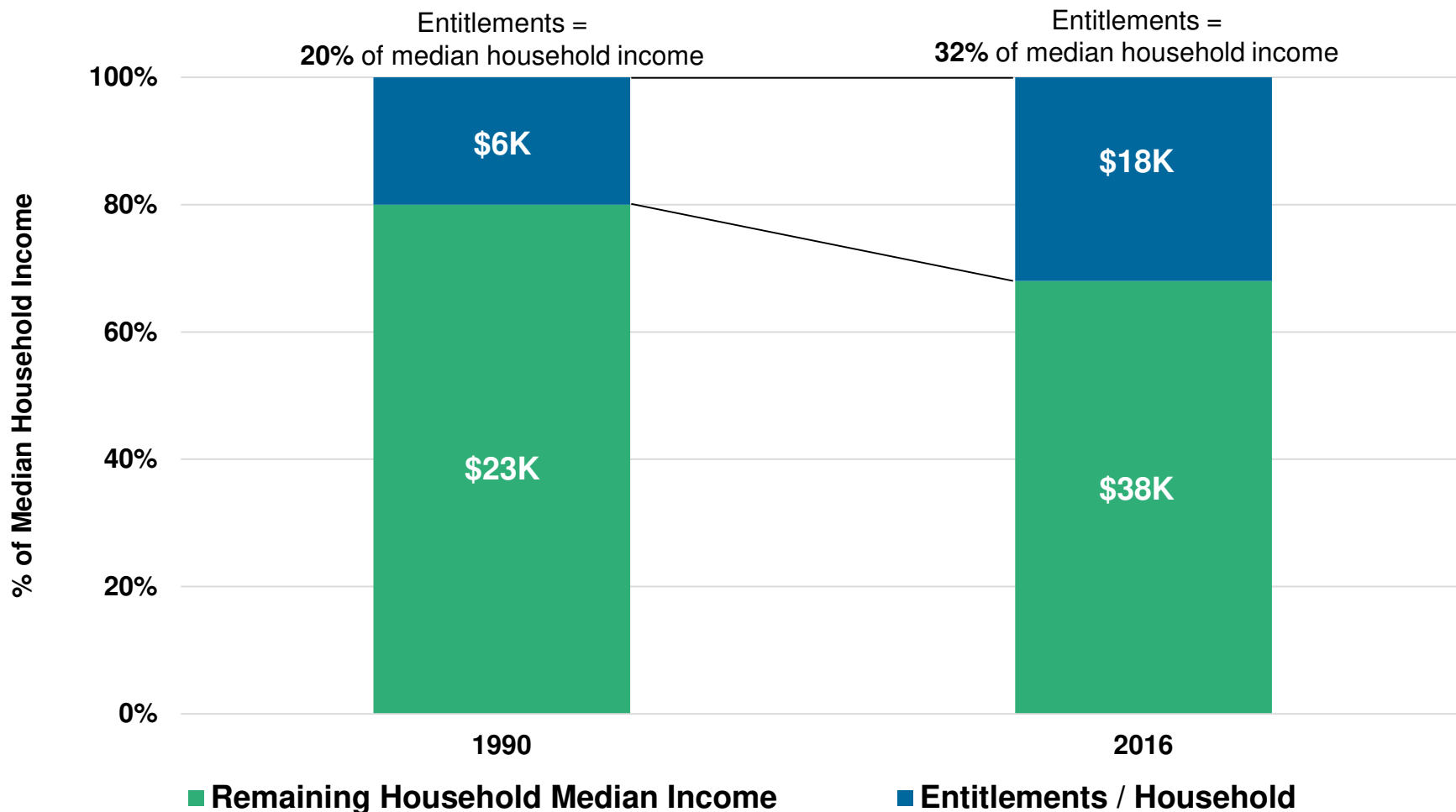
# ...USA Entitlements = +\$1.8 Trillion Over 25 Years... Paced by Medicare + Medicaid Growth...

## USA Mandatory Outlays by Category (\$B), 1991-2016



# ...USA Entitlements = Equivalent to... 32% of Average Annual Income per Household vs. 20% 25 Years Ago...

## Median Household Income vs. Effective Entitlement \$ Paid per Household, USA, 1990-2016

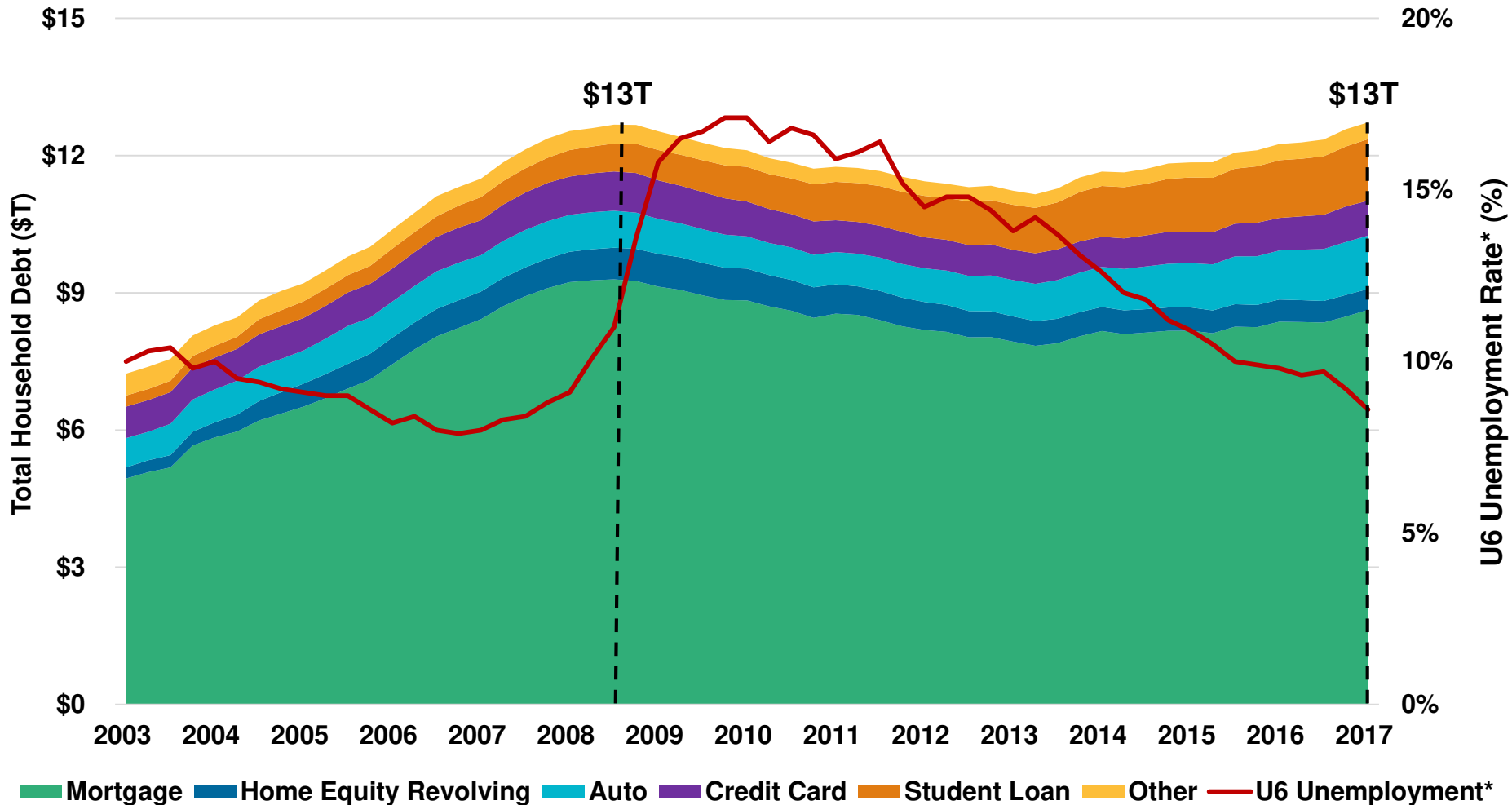


Source: Congressional Budget Office, US Census Bureau  
 Note: Based on median income math. Median income in current \$ as of year specified. Effective entitlement dollars per household represents total entitlements over total US households (current \$ as of year specified).

Household Debt = Back @ Peak (Q3:08) Level & Rising...

Now vs. Q3:08 = Mortgage Debt (-7%) / Student Loans (+44%) / Auto Loans (+44%)

## Household Debt By Category (\$T) & U6\* Unemployment (%), USA, 2003-2017



*USA Rising  
Debt Commitments =*

*Non-Trivial Challenges that  
Need to Be Addressed*

***Immigration =***

***Important for USA***

***Technology Job Creation***

Immigration Full Report: <http://www.kpcb.com/blog/immigration-in-america-the-growing-shortage-of-high-skilled-workers>

# USA = 60% of Most Highly Valued Tech Companies Founded By... 1st Or 2nd Generation Americans...1.5MM Employees, 2016

## Immigrant Founders / Co-Founders of Top 25 USA Valued Public Tech Companies, Ranked by Market Capitalization

Rank	Company	Mkt Cap (\$MM)	LTM Rev (\$MM)	Employees	1st or 2nd Gen Immigrant Founder / Co-Founder	Generation
1	Apple	\$800,898	\$220,457	116,000	Steve Jobs	2nd-Gen, Syria
2	Alphabet / Google	\$679,533	\$94,765	73,992	Sergey Brin	1st-Gen, Russia
3	Microsoft	\$540,127	\$87,247	114,000	--	--
4	Amazon.com	\$475,958	\$142,573	341,400	Jeff Bezos	2nd-Gen, Cuba
5	Facebook	\$440,900	\$30,288	18,770	Eduardo Saverin	1st-Gen, Brazil
6	Oracle	\$186,230	\$37,429	136,000	Larry Ellison / Bob Miner	2nd-Gen, Russia / 2nd-Gen, Iran
7	Intel	\$170,748	\$60,481	106,000	--*	--
8	Cisco	\$157,502	\$48,510	73,390	--	--
9	IBM	\$143,264	\$79,390	380,300	Herman Hollerith	2nd-Gen, Germany
10	Priceline	\$91,597	\$11,014	20,500	--	--
11	Qualcomm	\$84,982	\$23,243	30,500	Andrew Viterbi	1st-Gen, Italy
12	NVIDIA	\$84,395	\$7,542	10,299	Jensen Huang	1st-Gen, Taiwan
13	Texas Instruments	\$80,822	\$13,764	29,865	Cecil Green / J. Erik Jonsson	1st-Gen, UK / 2nd-Gen, Sweden
14	Adobe Systems	\$70,193	\$6,153	15,706	--	--
15	Netflix	\$70,007	\$9,510	3,300	--	--
16	Salesforce.com	\$64,611	\$8,863	25,000	--	--
17	PayPal	\$61,492	\$11,273	18,100	Max Levchin / Luke Nosek / Peter Thiel / Elon Musk***	1st-Gen, Ukraine / 1st-Gen, Poland / 1st-Gen, Germany / 1st-Gen, South Africa
18	Applied Materials	\$48,896	\$12,942	15,600	--	--
19	Yahoo!	\$48,570	\$5,409	8,500	Jerry Yang	1st-Gen, Taiwan
20	Automatic Data Processing	\$45,345	\$12,213	57,000	Henry Taub	2nd-Gen, Poland
21	Activision Blizzard	\$43,923	\$6,879	9,400	--	--
22	VMware	\$39,538	\$7,093	18,905	Edouard Bugnion	1st-Gen, Switzerland
23	Cognizant Technology	\$39,339	\$13,831	261,200	Francisco D'souza / Kumar Mahadeva	1st-Gen, India** / 1st-Gen, Sri Lanka
24	eBay	\$37,774	\$9,059	12,600	Pierre Omidyar	1st-Gen, France
25	Intuit	\$35,501	\$5,089	7,900	--	--

Source: CapIQ as of 5/31/17. "The 'New American' Fortune 500" (2011), a report by the Partnership for a New American Economy, as well as "Reason for Reform: Entrepreneurship" (10/16); "American Made, The Impact of Immigrant Founders & Professionals on U.S. Corporations."

\*While Andy Grove (from Hungary) is not a co-founder of Intel, he joined as COO on the day it was incorporated.

\*\*Francisco D'souza is a person of Indian origin born in Kenya.

\*\*\*Max Levchin / Luke Nosek / Peter Thiel's startup Confinity merged with Elon Musk's startup X.com to form Paypal in March 2000.

# USA = ~50% of Most Highly Valued Private Tech Companies Founded By... 1<sup>st</sup> Generation Immigrants...>48K Jobs, 5/17

Company	Immigrant Founder	Country of Origin	Market Value (\$B)
Uber	Garrett Camp	Canada	\$68
Palantir	Peter Thiel	Germany	20
WeWork	Adam Neumann	Israel	17
SpaceX	Elon Musk	South Africa	12
Stripe	John Collison, Patrick Collison	Ireland	9
Slack	Stewart Butterfield, Serguei Mourachov, Cal Henderson	Canada / Russia / UK	4
Credit Karma	Kenneth Lin	China	4
Tanium	David Hindawi	Iraq	4
Instacart	Apoorva Mehta	India	3
Wish (ContextLogic)	Peter Szulczewski, Danny Zhang	Canada	3
Moderna Therapeutics	Noubar Afeyan, Derrick Rossi	Armenia / Canada	3
Bloom Energy	KR Sridhar	India	3
Oscar Health	Mario Schlosser	Germany	3
Houzz	Adi Tatarco, Alon Cohen	Israel	2
Avant	Al Goldstein, John Sun, Paul Zhang	Uzbekistan / China / China	2
Zenefits	Laks Srini	India	2
ZocDoc	Oliver Kharraz	Germany	2
AppNexus	Mike Nolet	Holland	2
Sprinklr	Ragy Thomas	India	2
The Honest Company	Brian Lee	South Korea	2
Zoox	Tim Kentley-Klay	Australia	2
Jawbone	Alexander Asseily	UK	2
JetSmarter	Sergey Petrossov	Russia	2
Quanergy	Louay Eldada, Tianyue Yu	Lebanon / China	2
Mu Sigma	Dhiraj Rajaram	India	2

Company	Immigrant Founder	Country of Origin	Market Value (\$B)
Razer	Min-Liang Tan	Singapore	\$2
Unity Technologies	David Helgason	Iceland	2
FanDuel	Nigel Eccles, Tom Griffiths, Lesley Eccles	UK	1
Medallia	Borge Hald	Norway	1
Apttus	Kirk Krappe	UK	1
Robinhood	Baiju Bhatt, Vlad Tenev	India / Bulgaria	1
Rubrik	Bipul Sinha	India	1
Infinidat	Moshe Yanai	Israel	1
Warby Parker	Dave Gilboa	Sweden	1
Actifio	Ash Ashutosh	India	1
Anaplan	Guy Haddleton, Michael Gould	New Zealand / UK	1
Gusto	Tomer London	Israel	1
Proteus Digital Health	Andrew Thompson	UK	1
AppDirect	Daniel Saks, Nicolas Desmarais	Canada	1
Carbon3D	Alex Ermoshkin	Russia	1
CloudFlare	Michelle Zatlyn	Canada	1
Compass	Ori Allon	Israel	1
Eventbrite	Renaud Visage	France	1
Evernote	Stepan Pachikov, Phil Libin	Azerbaijan / Russia	1
Offerup	Arean Van Veelen	Netherlands	1
Tango	Uri Raz, Eric Setton	Israel / France	1
Udacity	Sebastian Thrun	Germany	1
Zscaler	Jay Caudhry	India	1
Zoom Video	Eric Yuan	China	1
ForeScout	Noga Alon, Hezy Yeshurun, Oded Comay, Doron Skikmoni	Israel	1

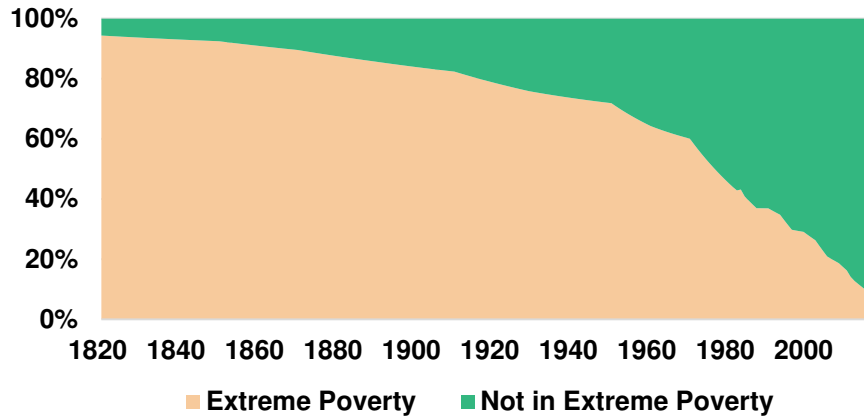
***High Level,  
For All the Angst,  
Consider This...***



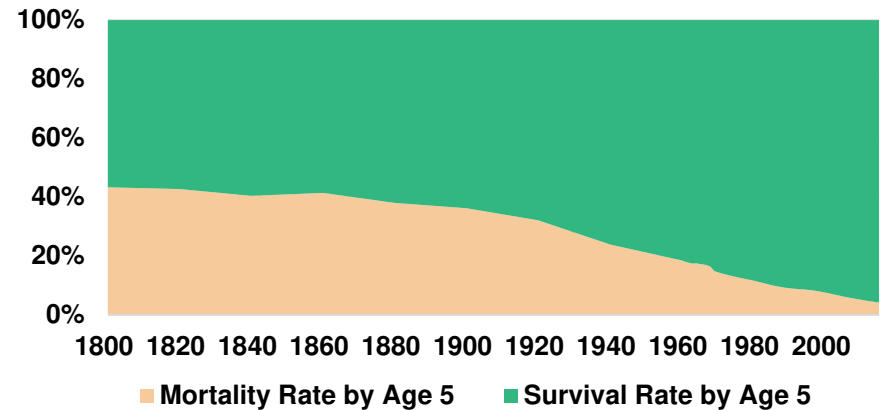
# World = Getting Better in Many Ways...

Down = Poverty + Child Mortality...Up = Democracy + Literacy

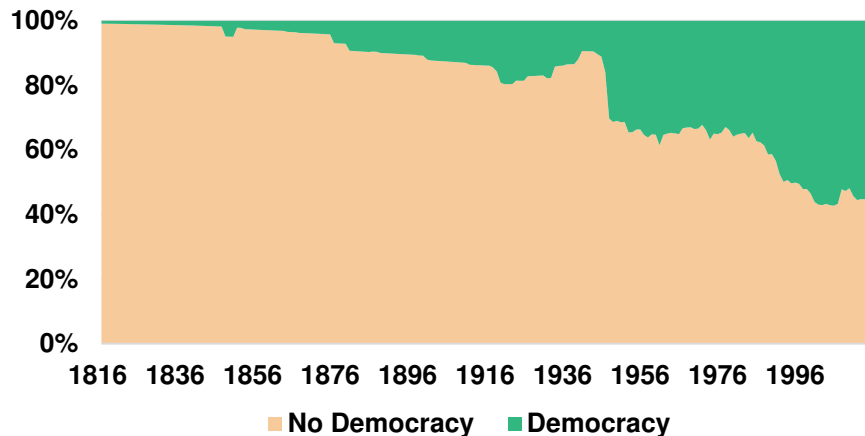
### % of People in Extreme Poverty, Global, 1820-2015



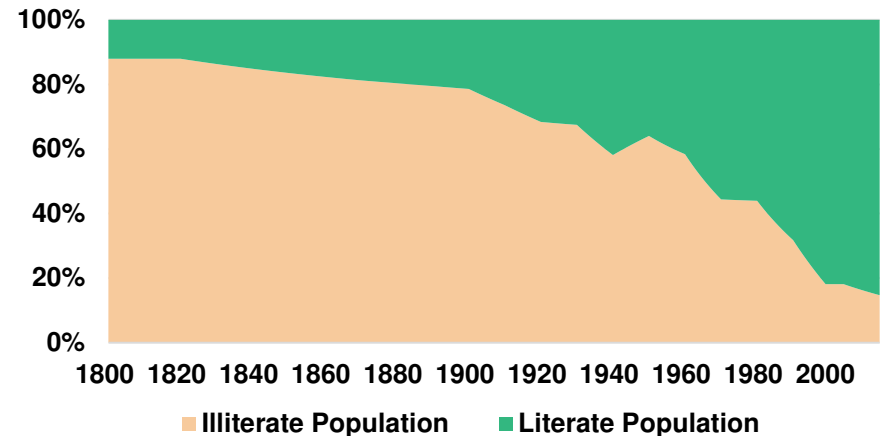
### Child Mortality Rates, Global, 1800-2015



### % of People Living in Democracy, Global, 1816-2015



### Literacy Rate, Global, 1800-2014



- 1) USA, Inc.\* =**  
Understanding Where Your Tax Dollars Go
- 2) Immigration =**  
Important for USA Technology Job Creation
- 3) High Level =**  
For All the Angst, Consider This...

\* USA, Inc. Full Report: <http://www.kpcb.com/blog/2011-usa-inc-full-report>

\*\* Immigration Full Report: <http://www.kpcb.com/blog/immigration-in-america-the-growing-shortage-of-high-skilled-workers>

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# CLOSING THOUGHTS...

# Economic Growth Drivers = Evolve Over Time

## Century

## Economic Growth Drivers

Pre-18<sup>th</sup>

**Cultivation & Extraction**

19<sup>th</sup>-20<sup>th</sup>

**Manufacturing & Industry**

21<sup>st</sup>

**Compute Power + Human Potential**

# Internet Trends 2017

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- 1) **Global Internet Trends** = Solid...Slowing Smartphone Growth 4-9
- 2) **Online Advertising (+ Commerce)** = Increasingly Measurable + Actionable 10-80
- 3) **Interactive Games** = Motherlode of Tech Product Innovation + Modern Learning 80-150
- 4) **Media** = Distribution Disruption @ Torrid Pace 151-177
- 5) **The Cloud** = Accelerating Change Across Enterprises 178-192
- 6) **China Internet** = Golden Age of Entertainment + Transportation  
(Provided by Hillhouse Capital) 193-231
- 7) **India Internet** = Competition Continues to Intensify...Consumers Winning 232-287
- 8) **Healthcare @ Digital Inflection Point** 288-319
- 9) **Global Public / Private Internet Companies...** 320-333
- 10) **Some Macro Thoughts...** 334-351
- 11) **Closing Thoughts...** 352-353

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