# Internet Trends 2017

Mary Meeker

May 31 @ Code 2017

# INTERNET TRENDS 2017 – CODE CONFERENCE

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

kpcb.com/InternetTrends

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# Internet Trends 2017



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# 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...

# GLOBAL INTERNET TRENDS =

# SOLID USER GROWTH…
# SLOWING SMARTPHONE GROWTH

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# 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

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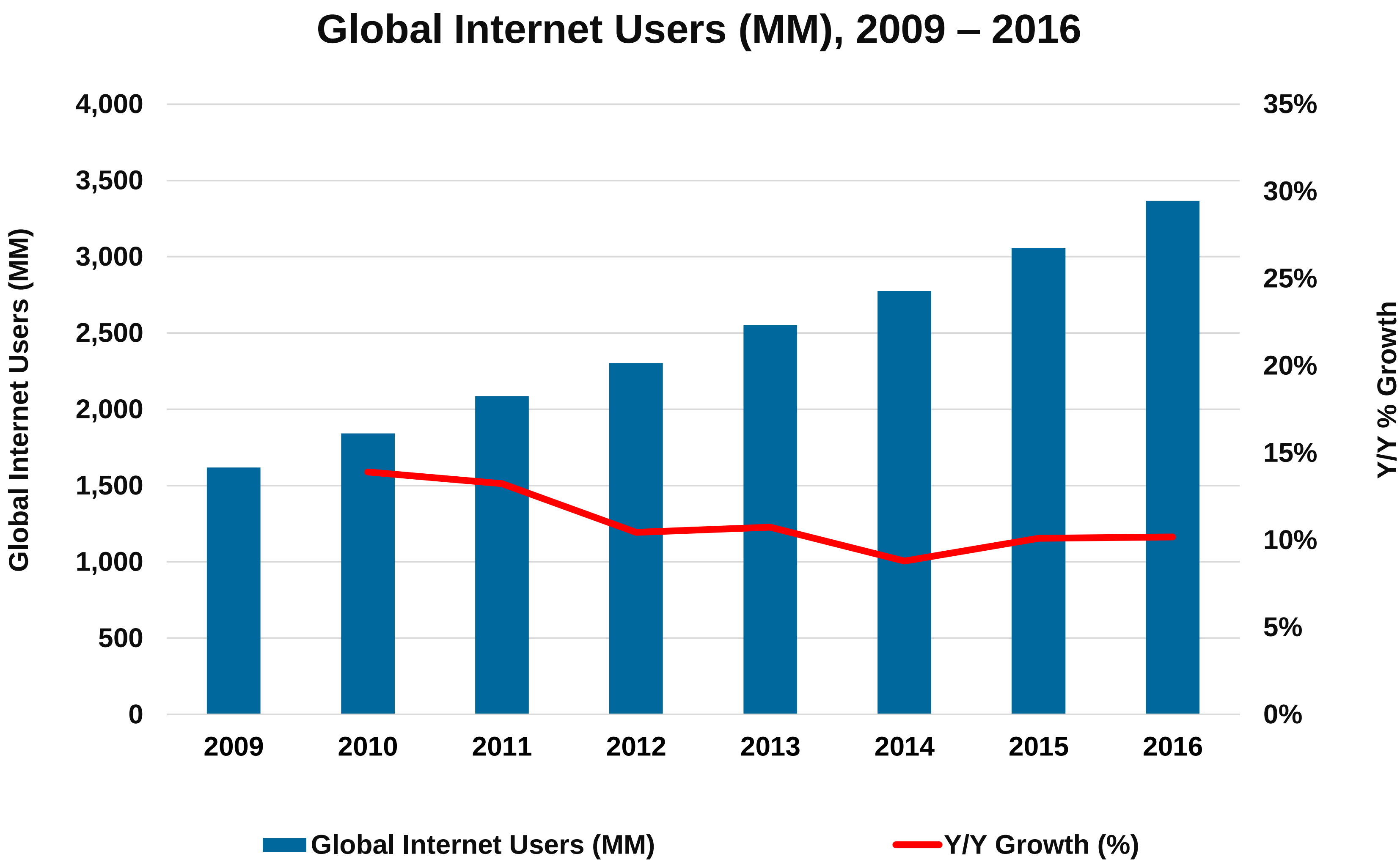
# Global Internet Users = 3.4B @ 46% Penetration...
# +10% Y/Y vs. +10%...+8% Y/Y vs. +8% (Ex-India)

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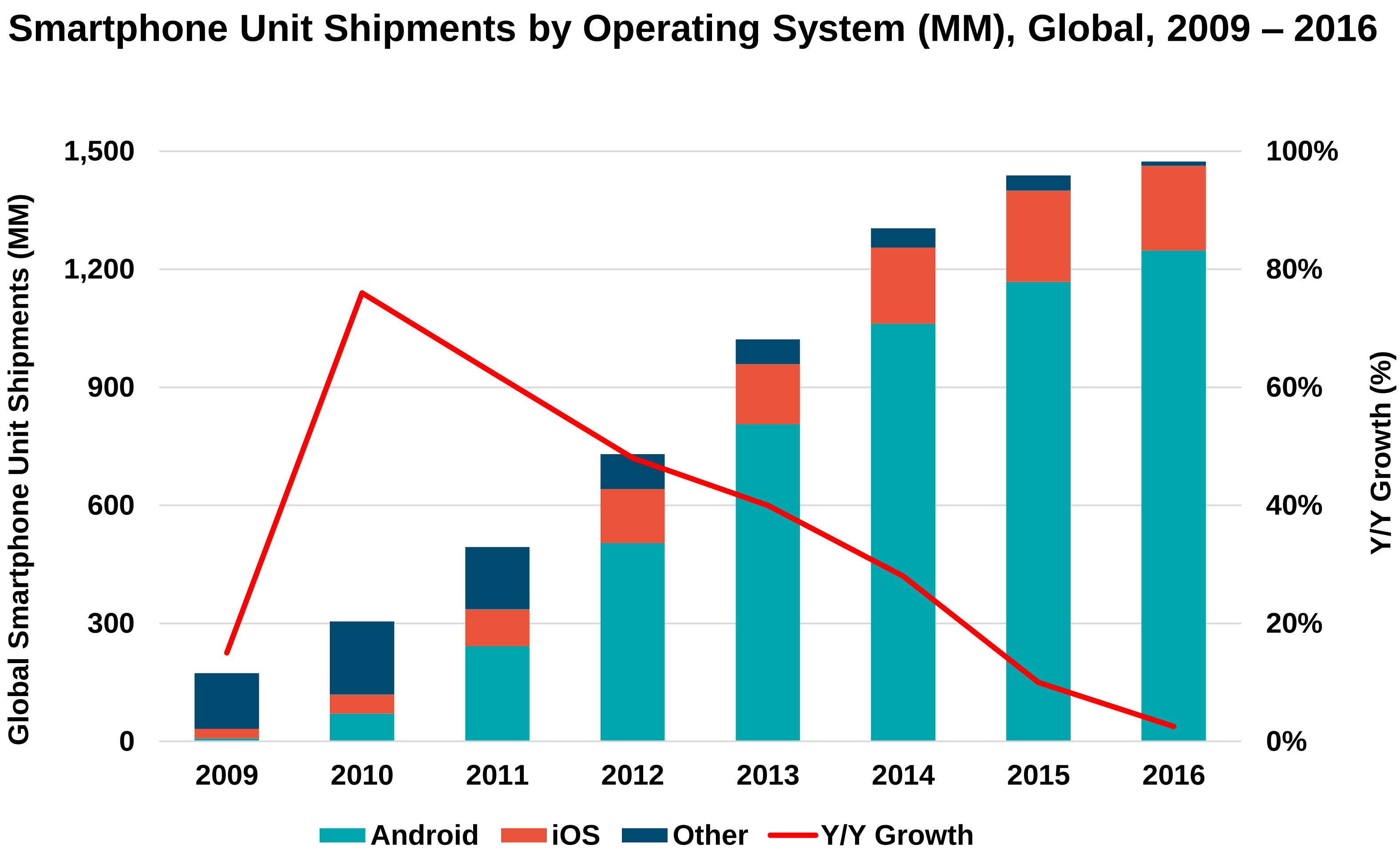
Source: United Nations / International Telecommunications Union, US Census Bureau. Internet user data is as of mid-year. Internet user data for: USA from Pew Research, China from CNNIC, Iran from Islamic Republic News Agency / InternetWorldStats / KPCB estimates, India from KPCB estimates based on IAMAI data, Indonesia from APJII.

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




Source: Morgan Stanley Research (5/17)

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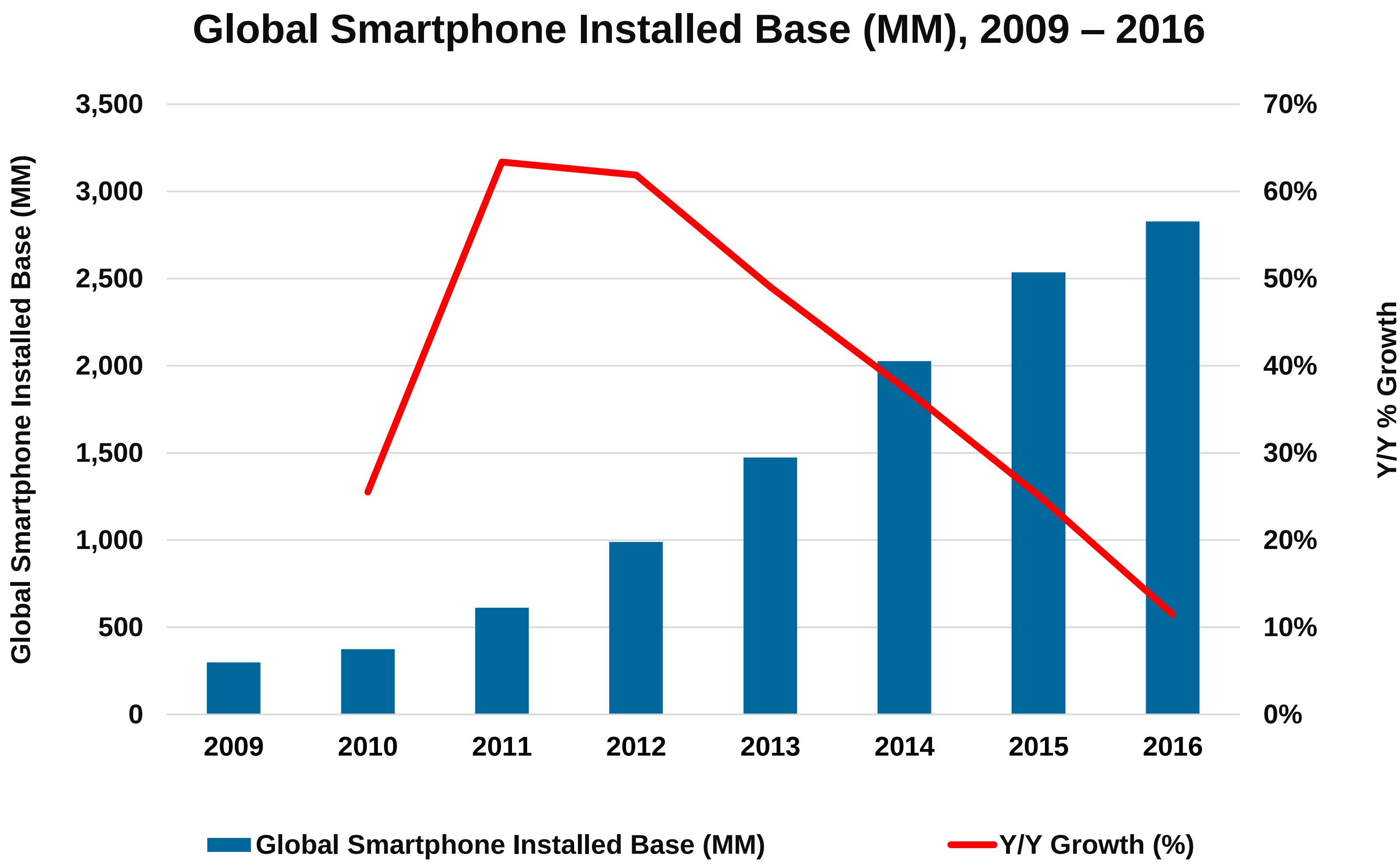
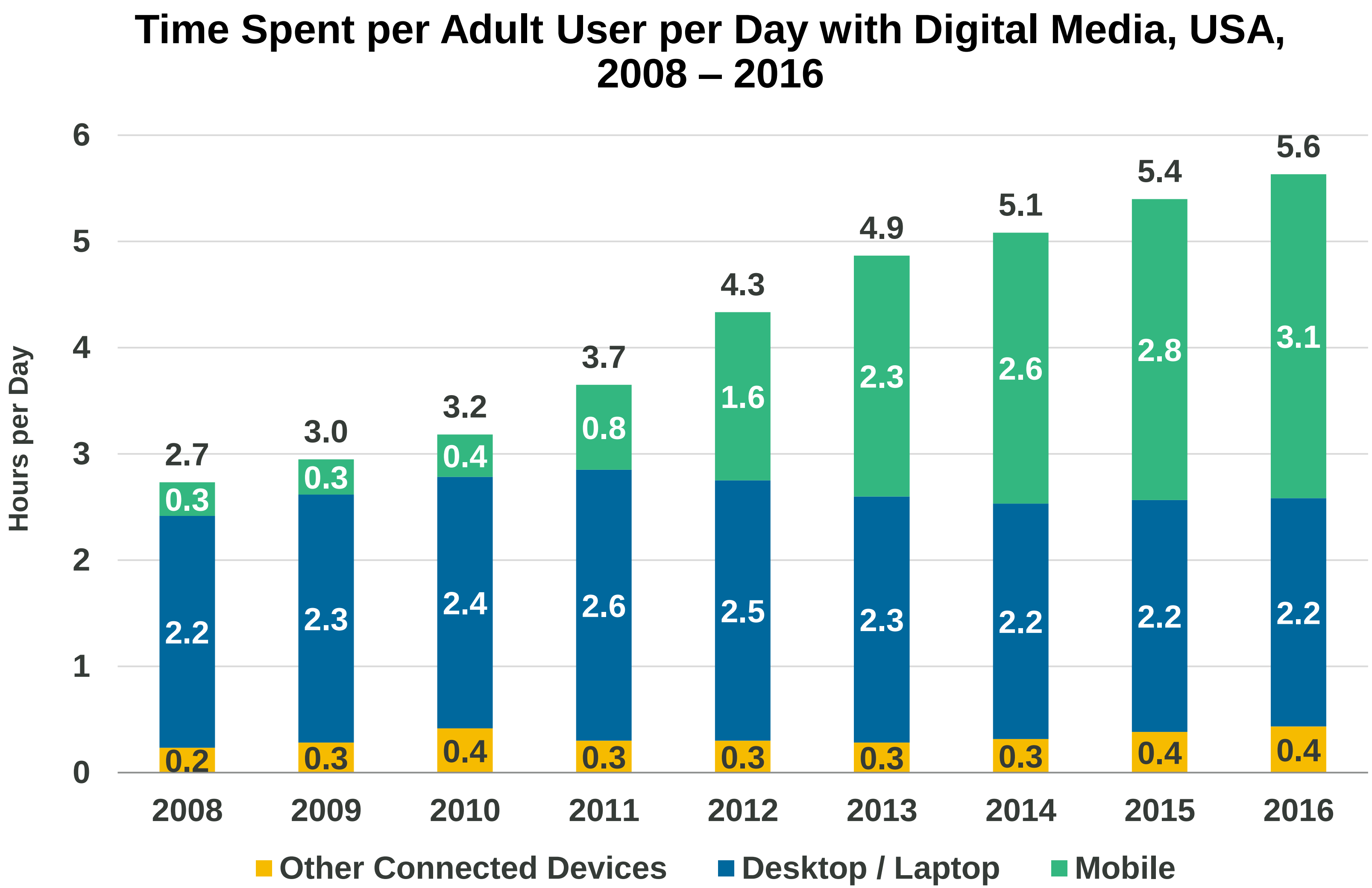
# Global Smartphone Installed Base = 2.8B…
# +12% Y/Y vs. +25% (2015) / +37% (2014)




Source: Morgan Stanley Research (5/17)
Note: Owing to use of different source, prior period data may have slight adjustments vs prior reports. Smartphone installed base based on preceding 8 quarters of smartphone shipments.

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




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.

# ONLINE ADVERTISING (+ COMMERCE) =

# INCREASINGLY MEASURABLE + ACTIONABLE

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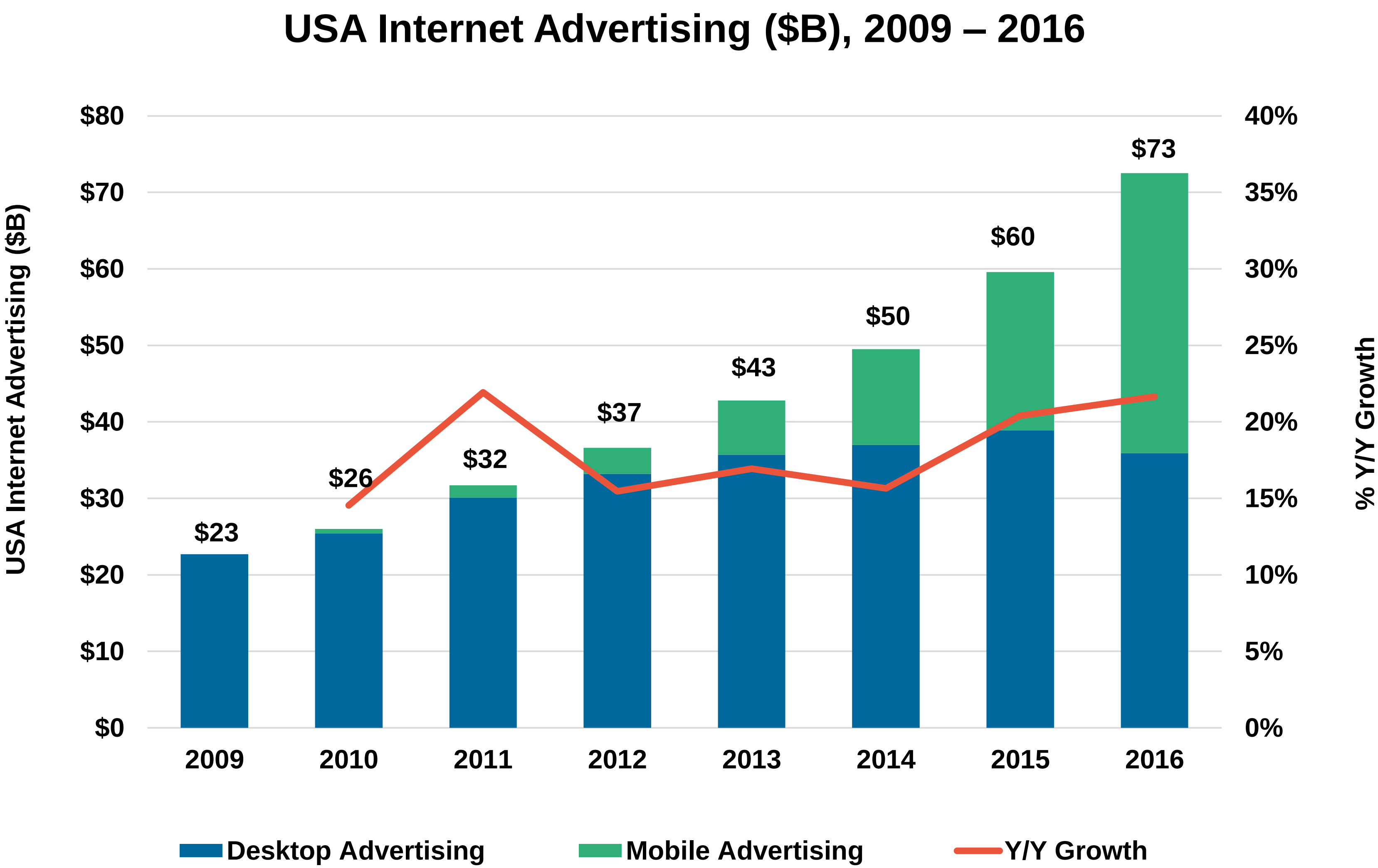
***Ad Growth =***
***Driven by Mobile***

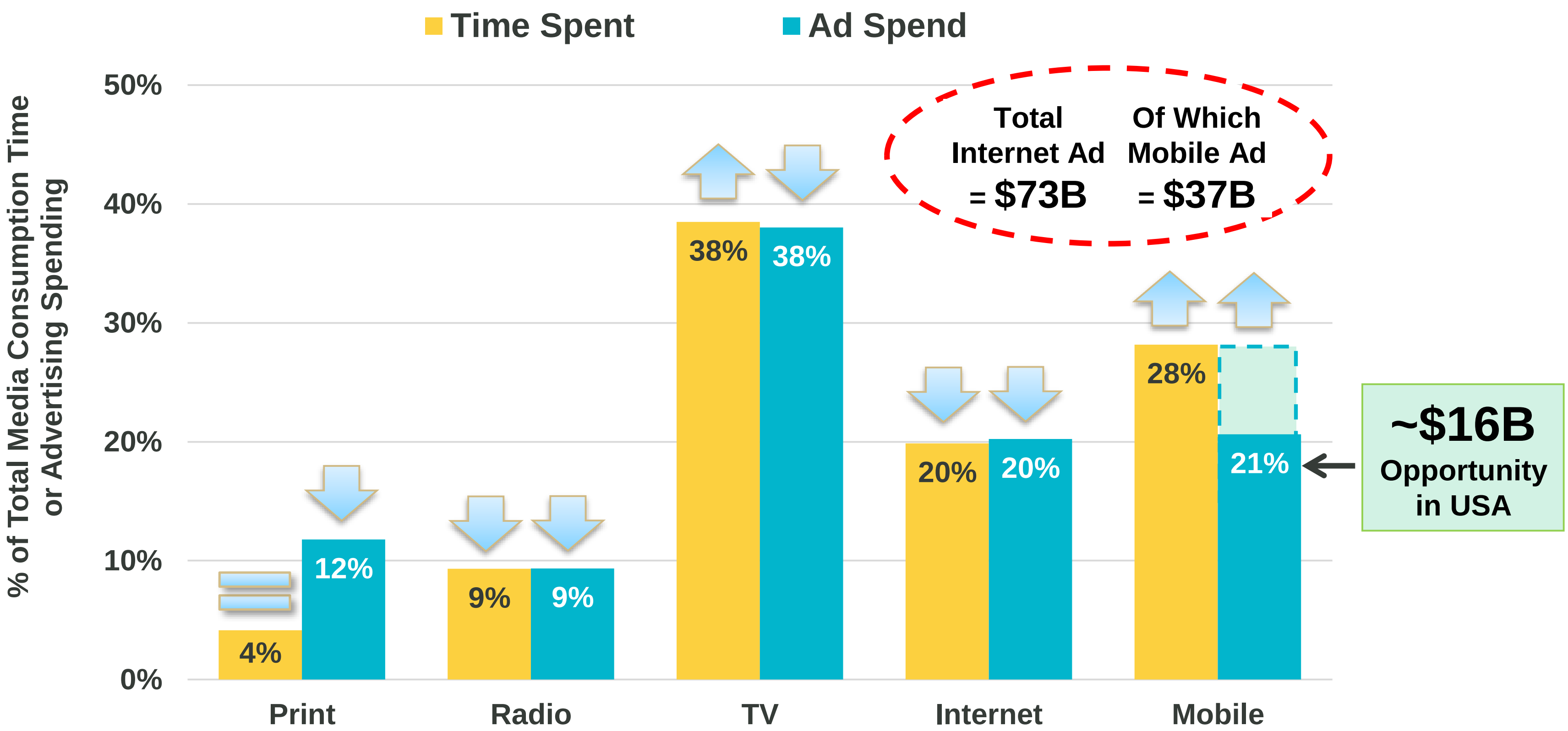
# Online Advertising = Growth Accelerating, +22% vs. +20% Y/Y… Mobile $ > Desktop (2016) on Higher Growth, USA




Source: IAB / PWC Internet Advertising Report (2016)

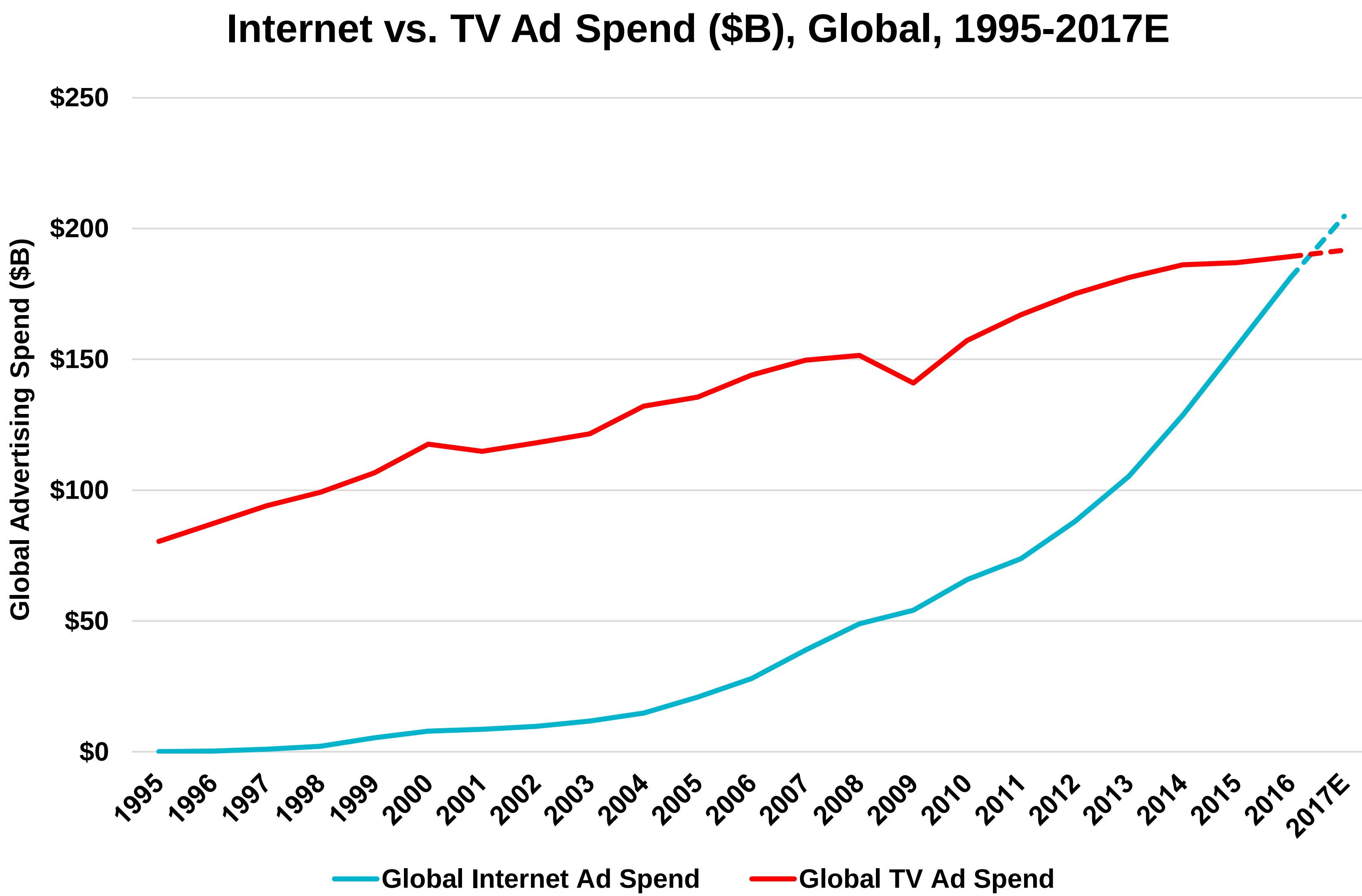
# Advertising $ = Shift to Usage (Mobile) Continues

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




Source: Internet and Mobile advertising spend based on IAB and PwC data for full year 2016. Print, Radio, and TV advertising spend based on Magna Global estimates for full year 2016. Print includes newspaper and magazine. Internet (IAB) includes desktop + laptop + other connected devices. ~$16B opportunity calculated assuming Mobile (IAB) ad spend share equal its respective time spent share. Time spent share data based on eMarketer (4/17). Arrows denote Y/Y shift in percent share. Excludes out-of-home, video game, and cinema advertising.

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




Source: Zenith Advertising Expenditure Forecasts (3/17)

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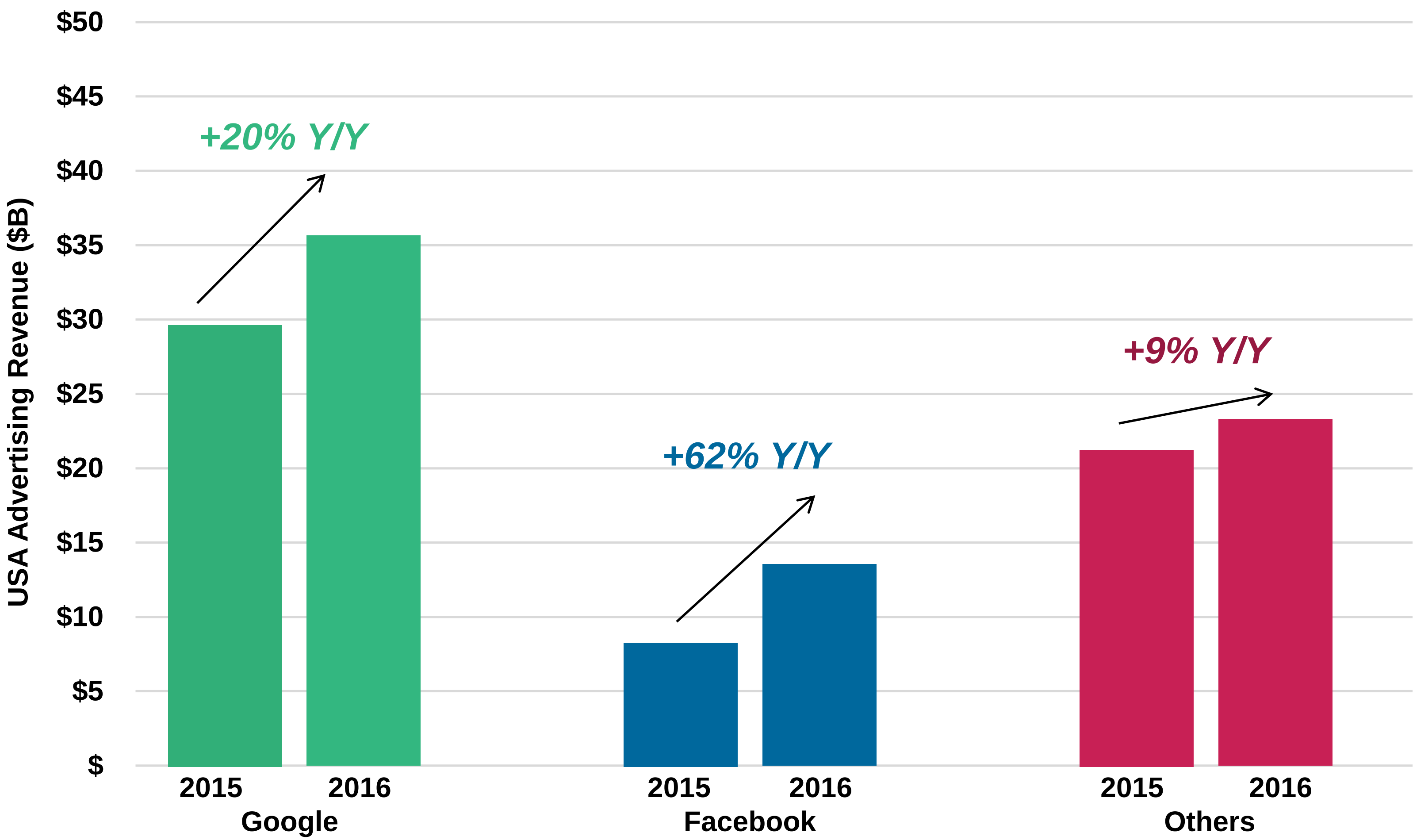
# Google + Facebook =
# 85% (& Rising) Share of Internet Advertising Growth, USA

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




Source: IAB / PWC Advertising Report (2016), Facebook, Morgan Stanley Research
Note: Facebook revenue includes Canada. Google USA ad revenue per Morgan Stanley estimates as company only discloses total ad revenue and total USA revenue. "Others" includes all other USA internet (mobile + desktop) advertising revenue ex-Google / Facebook.

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***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***

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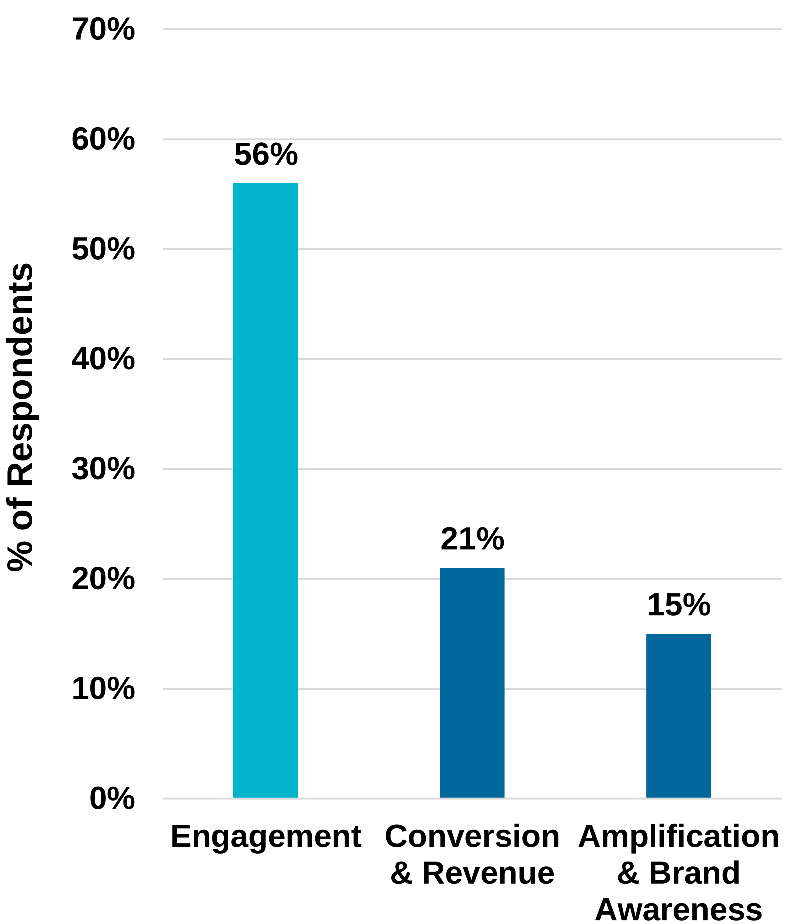
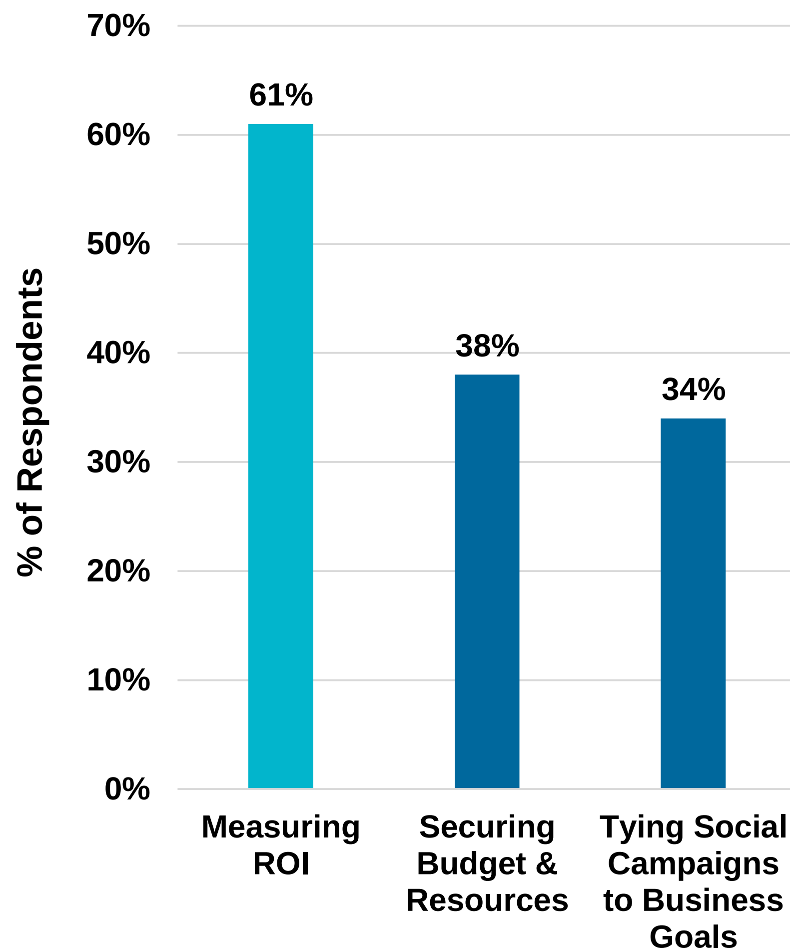
# Advertisers = Like Measurable *Engagement* Metrics But…
# Some Find Measuring *ROI* Challenging (as with Offline)

**Social Advertisers**
Metrics Used to Measure Success, 6/16




**Social Media Marketing**
Top Challenges, 6/16

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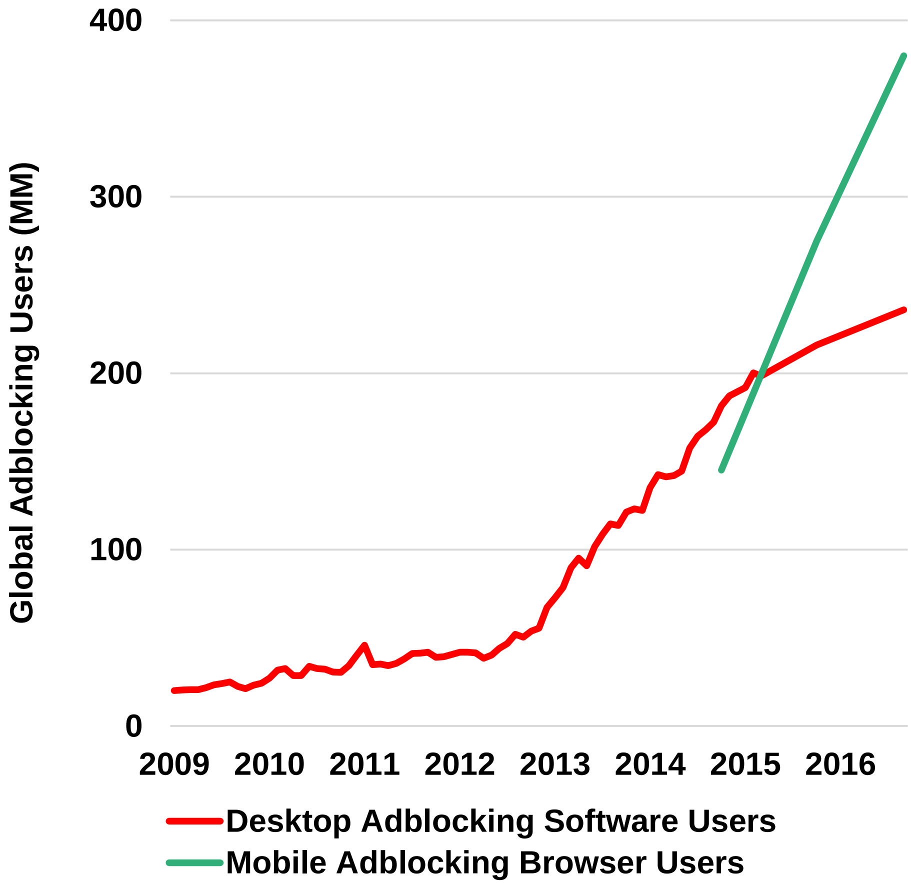
Source: SimplyMeasured State of Social Marketing Annual Report (6/16)
Note: Based on a survey of social media advertisers, n=350.

# 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% | -- |

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Source: PageFair 2015, 2017 reports. These two data sets have not been de-duplicated. The number of desktop adblockers after 1/16 are estimates based on the observed trend in desktop adblocking and provided by PageFair. Note that mobile adblocking refers to web / browser-based adblocking and not in-app adblocking. Desktop adblocking estimates are for global monthly active users of desktop adblocking software between 4/09 – 12/16, as calculated in the PageFair's 2015 and 2017 reports. Mobile adblocking estimates are for global monthly active users of mobile browsers that block ads by default between 9/14 – 12/16, including the number of Digicel subscribers in the Caribbean (added 10/15), as calculated in the PageFair & Priori Data 2016 and PageFair 2017 Adblocking Report.

*Leading Platform Ad Offerings =*

*Rapidly Improving with*
*Back-End Data +*
*Front-End Measurement Tools +*
*Targeted Delivery of Ads*
*Users Increasingly Want*

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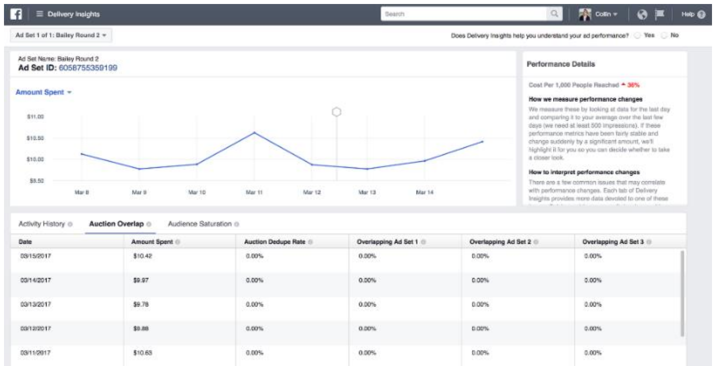
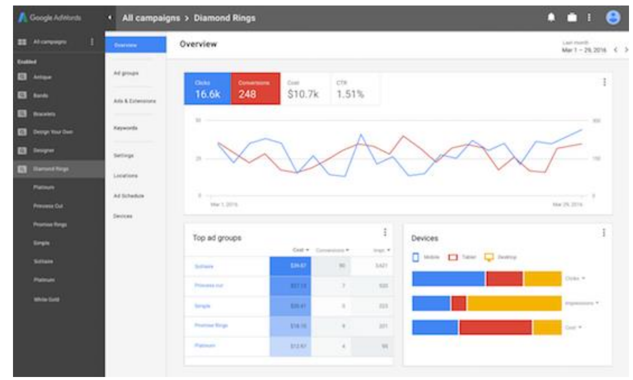
# Leading Online Ad Platforms = Providing More Ways to Target + Measure Ads

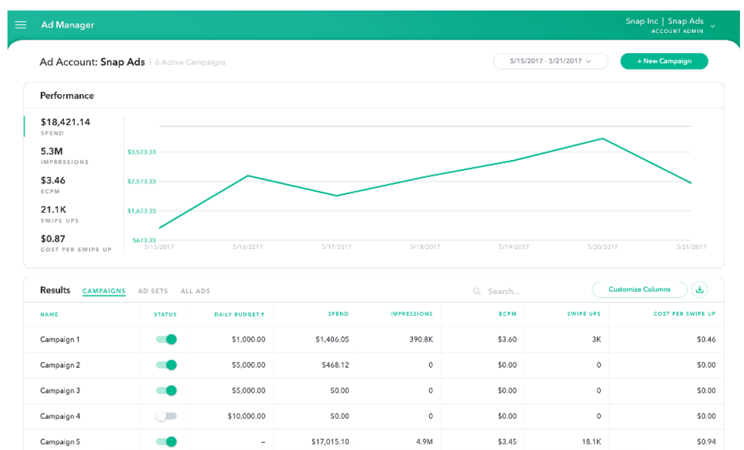
## Facebook (Delivery Insights)




## Google (AdWords)




## Snap (Snap Ads)

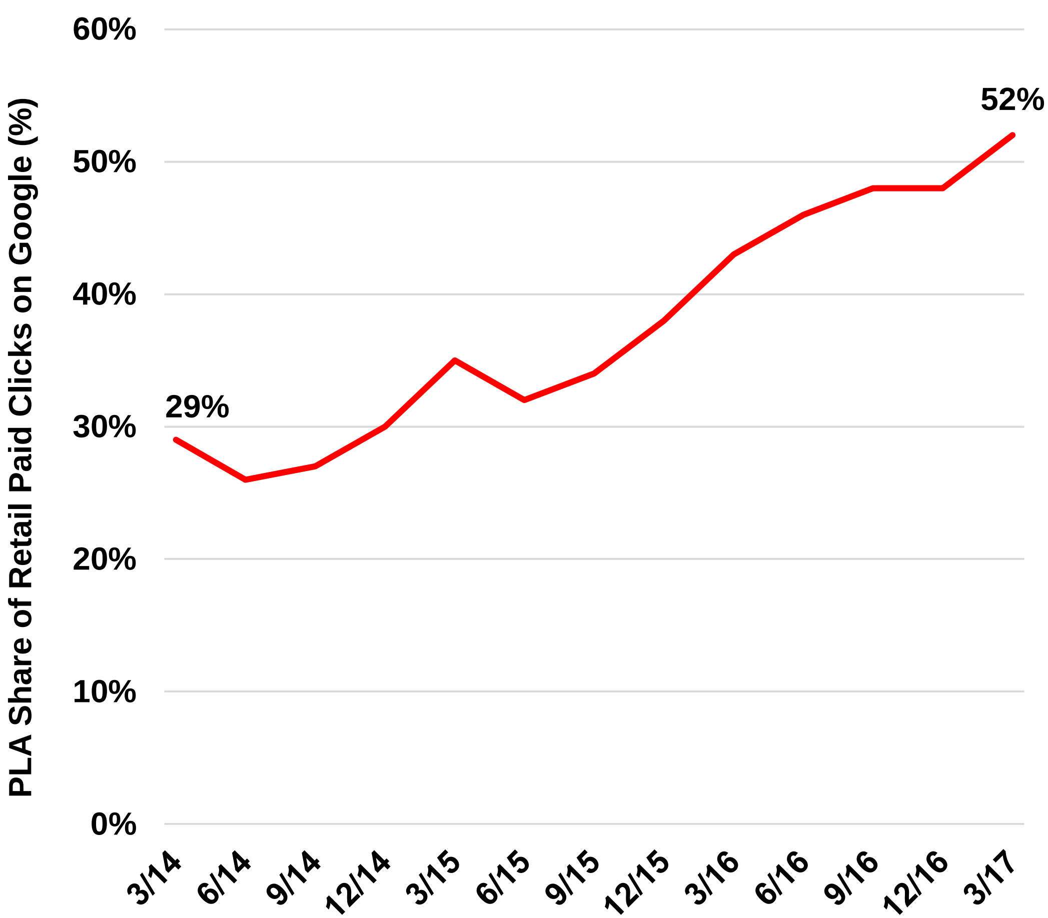



Source: Facebook, Google, Snap

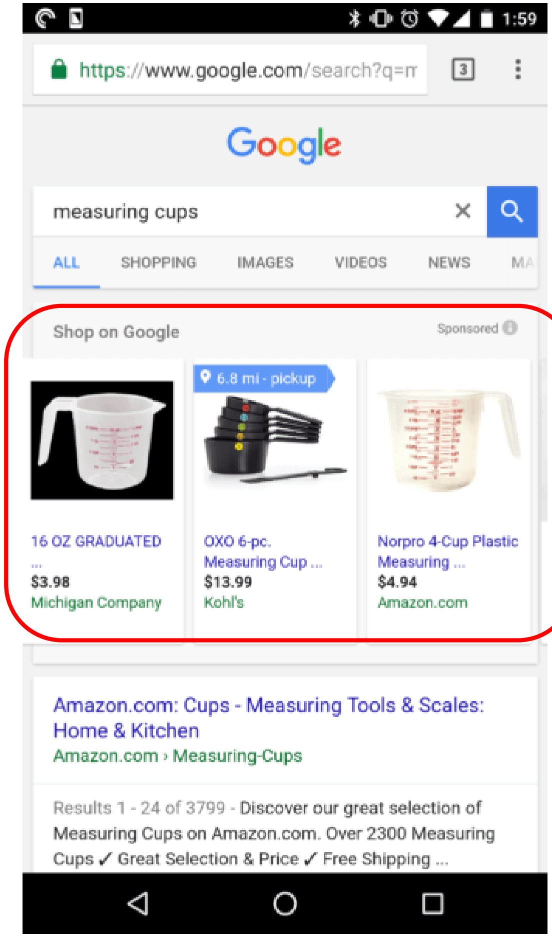
# Product Listing Ads (Google) = Driving Clicks to Product Pages

## Google Product Listing Ads (PLAs)

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




## Google PLA on Mobile Web, 12/16



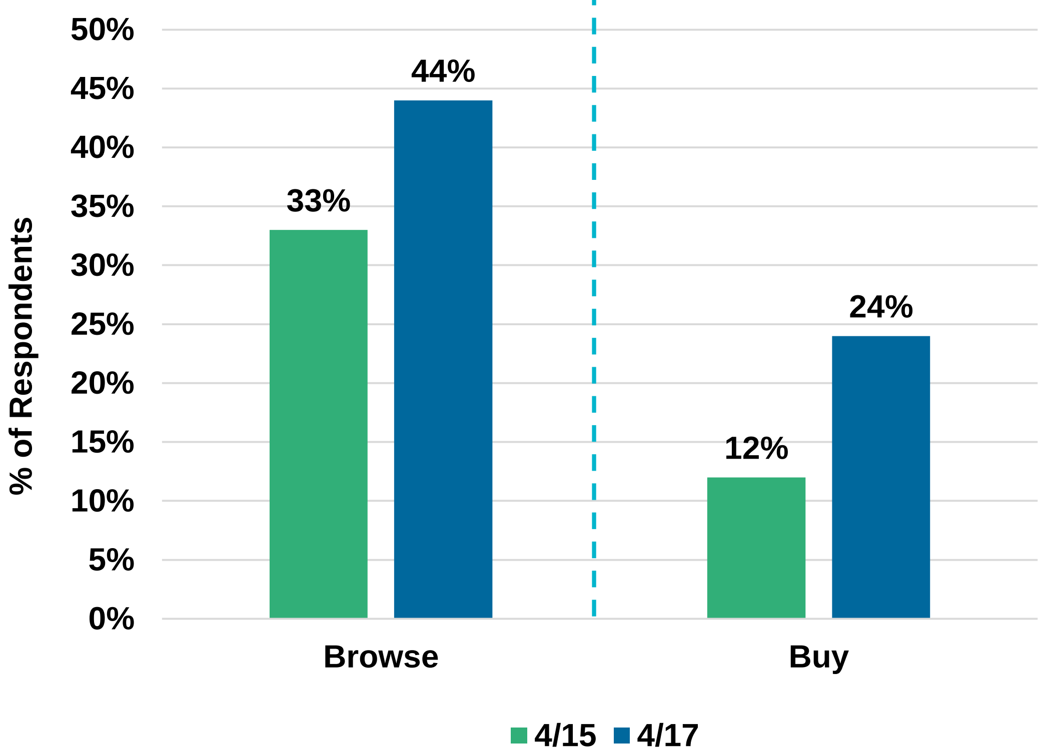

Source: Merkle Digital Marketing Report (Q1:14-Q1:17), Right image: Search Engine Land

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

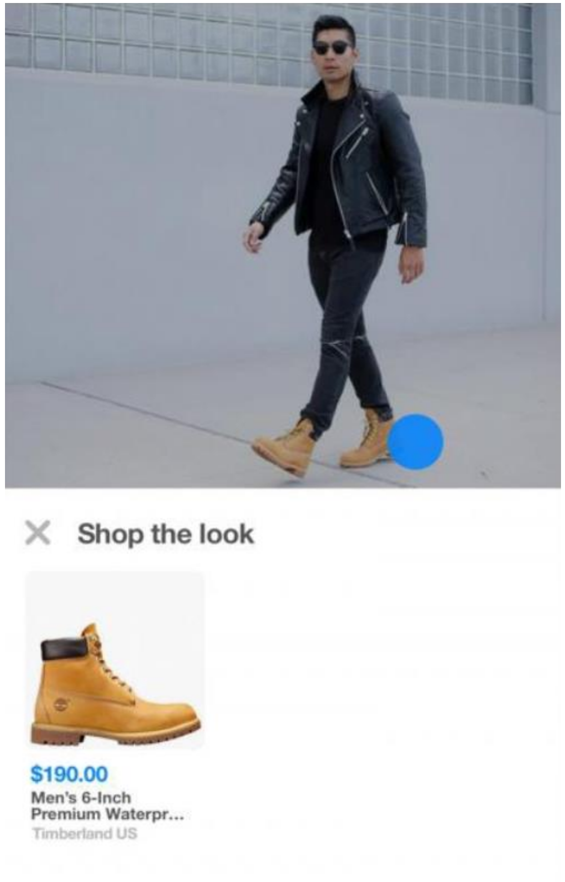
## Pinterest
Browsing Turning into Buying, 4/17

*Which of these services is a great place to browse for things you might want to buy?*

*Which of these services is a great place to buy things online?*




## Shop the Look
Inspired Purchases, 2/17




Source: Pinterest
Note: Based on an internal survey of global internet users, n=12K. Other answers to the questions include Facebook, Instagram, Twitter, Snap, YouTube, and Google with each respondent only allowed to choose one option.

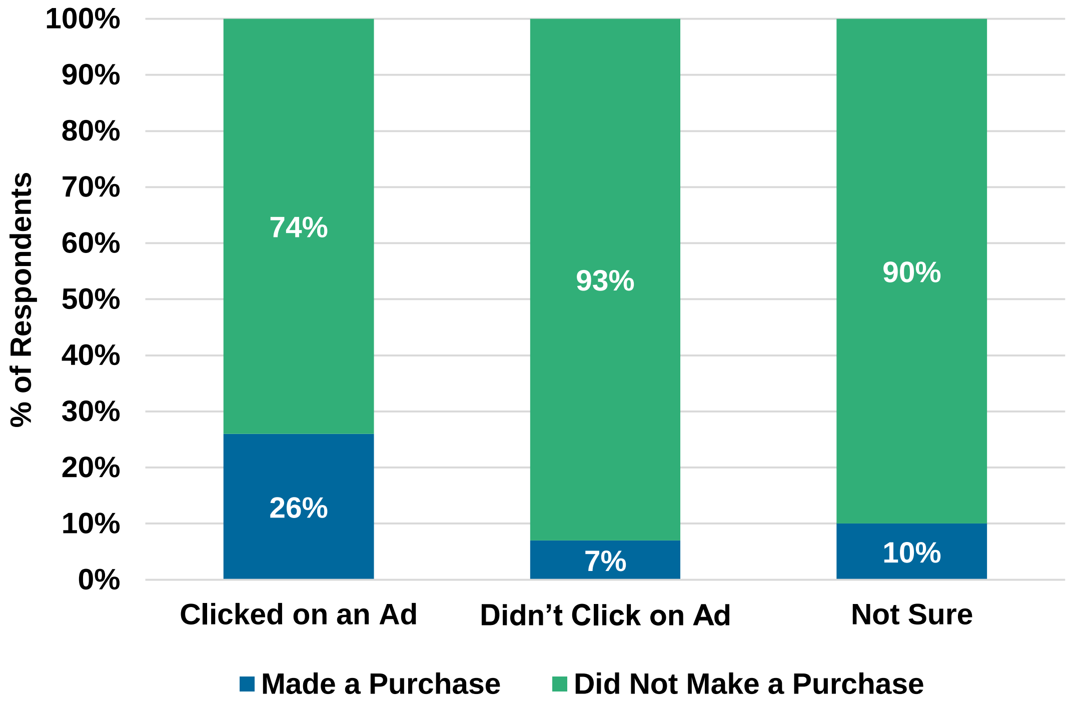
# Contextual Ads (Facebook) = Driving Direct Purchases

## 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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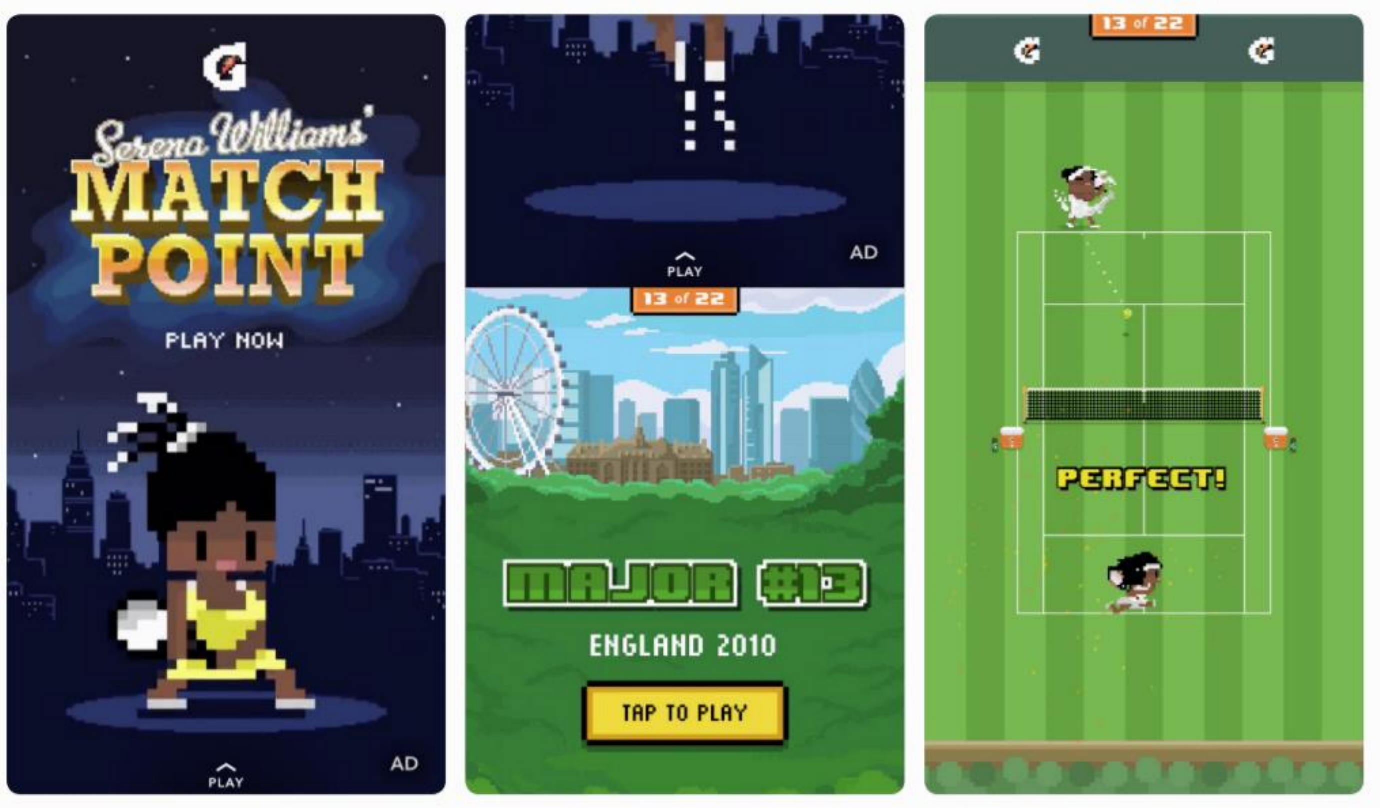
Source: Survata (4/17), Messenger Image: Facebook Blog (9/16)
Note: Based on survey of USA internet users, n=1,500 (3/17).

# 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**



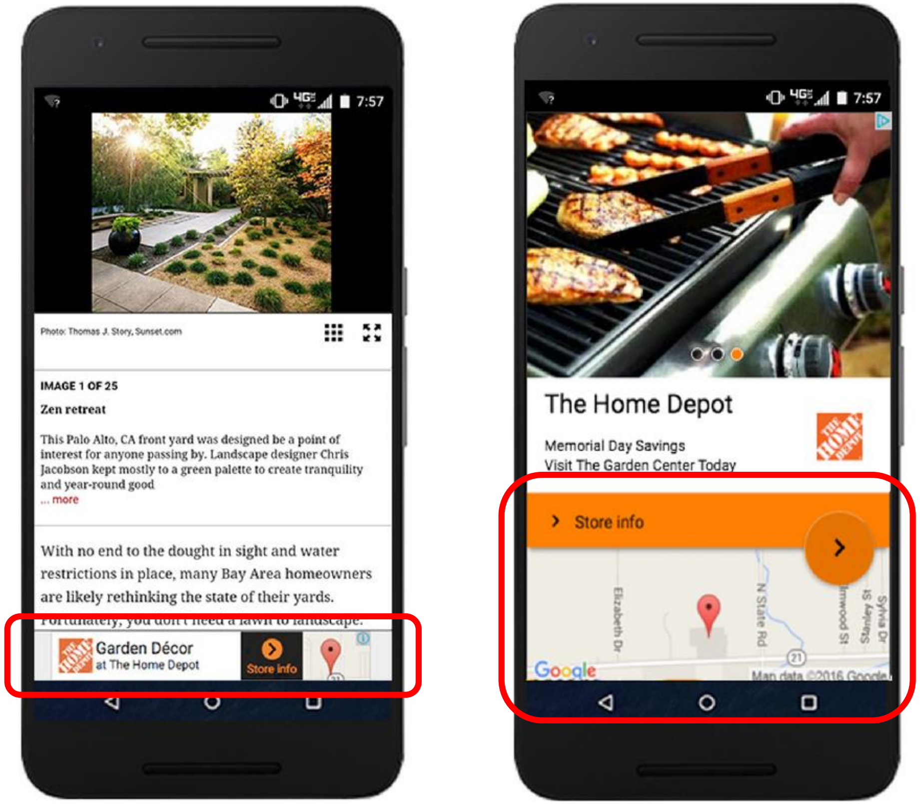

Source: Snap Case Study: Gatorade (8/16)

# 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**



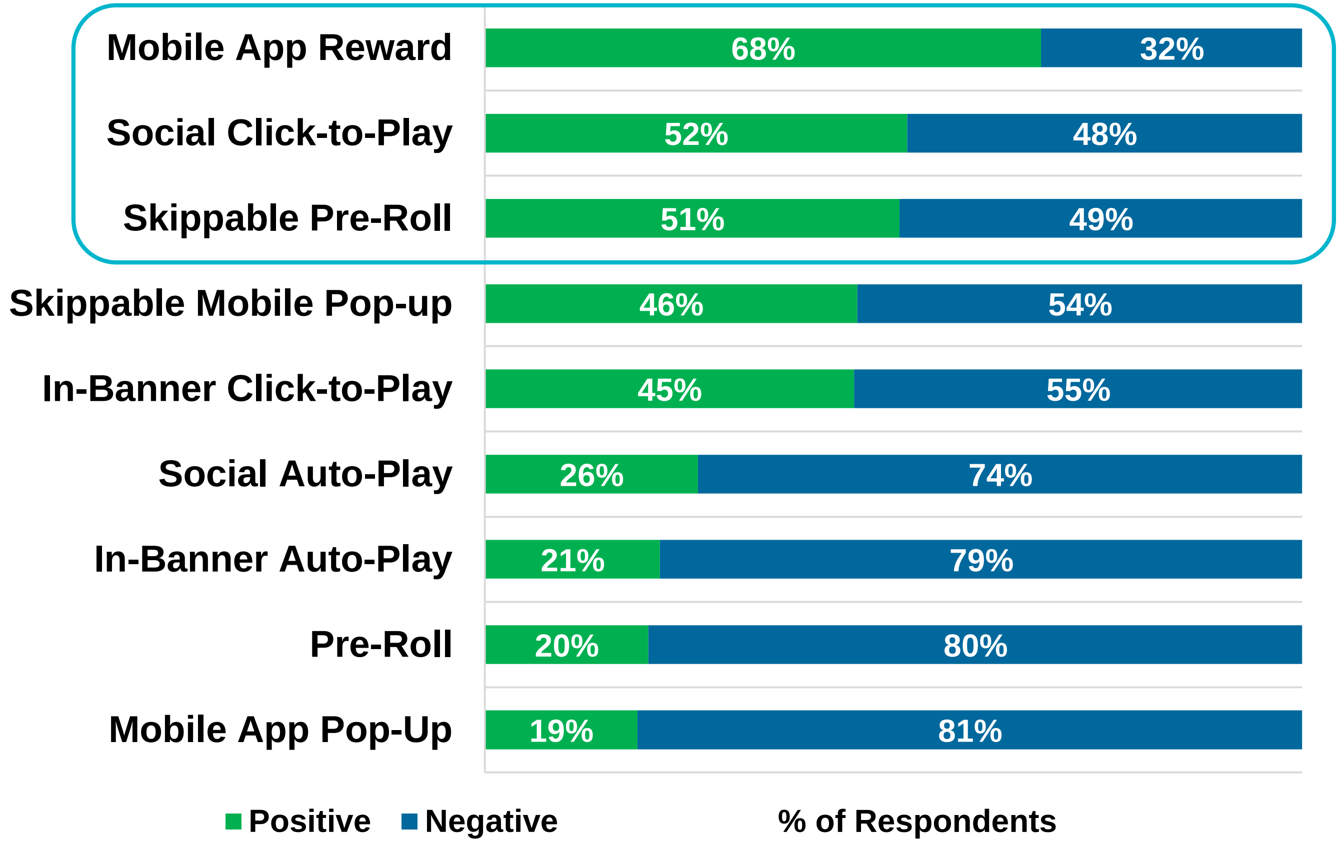

Source: Google Adwords Blog (5/16, 9/16, 5/17), Image: Google Adwords Blog (9/16)
* 5B (5/17) vs. 1B cumulative tracked (5/16).

# 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?*

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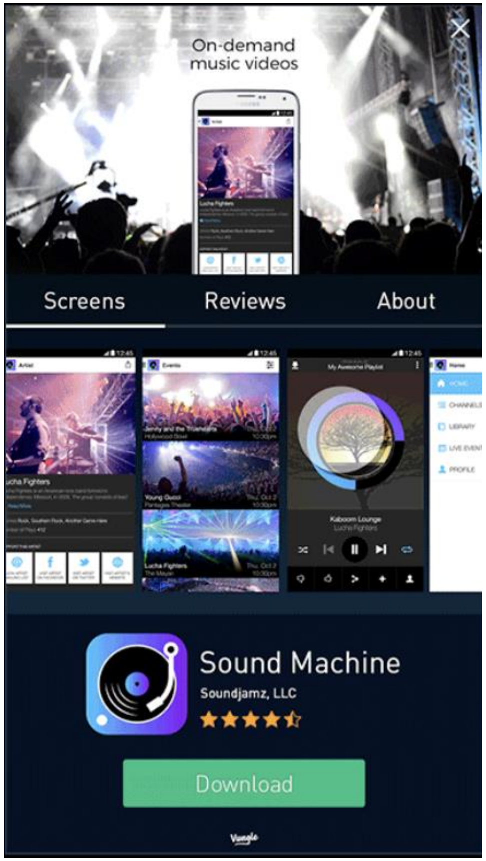
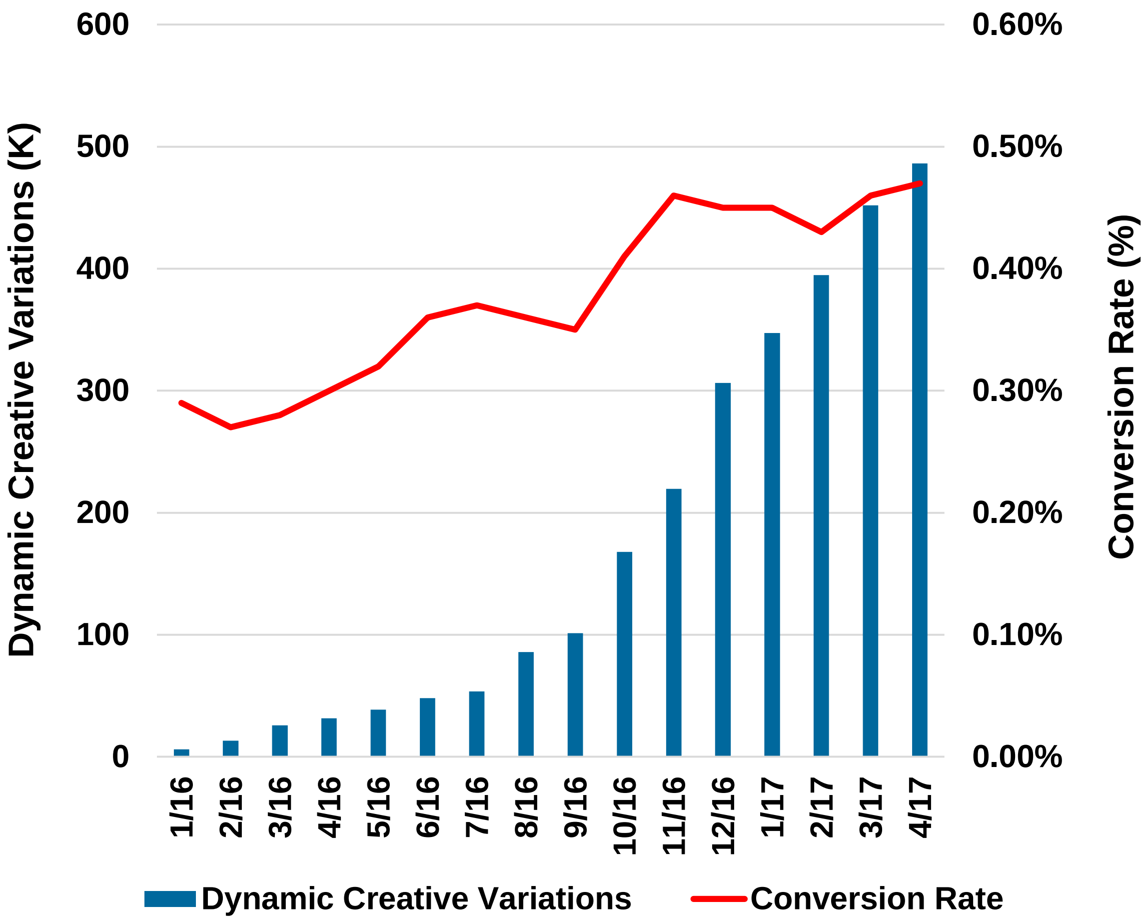
Source: MillwardBrown AdReaction Video Creative in a Digital World (5/16)
Note: Survey of people from Argentina, Australia, Brazil, France, Germany, Mexico, UK, and USA who watched 20 ads (at least 100 per ad) and answered positive or negative, n=10.739. The survey included TV, YouTube skippable pre-roll, Facebook auto-play, Facebook click-to-play, and mobile video ad formats.

# 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




Source: Vungle (5/17)
Note: "Dynamic creative" is any creative ad that changes automatically based on information about the user (behavior, location, or context). A dynamic tab ad includes multiple interactive promotional modules alongside a video ad.

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# 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

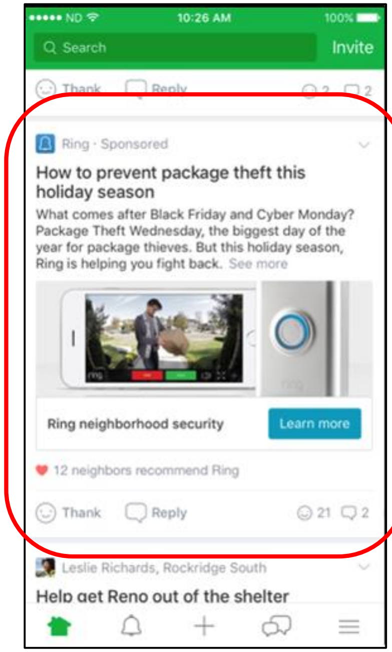
"Latte and Snickerdoodle - delicious quick snack. Clean facility, good coffee, good service and friendly staff."

Source: Uber (4/17)

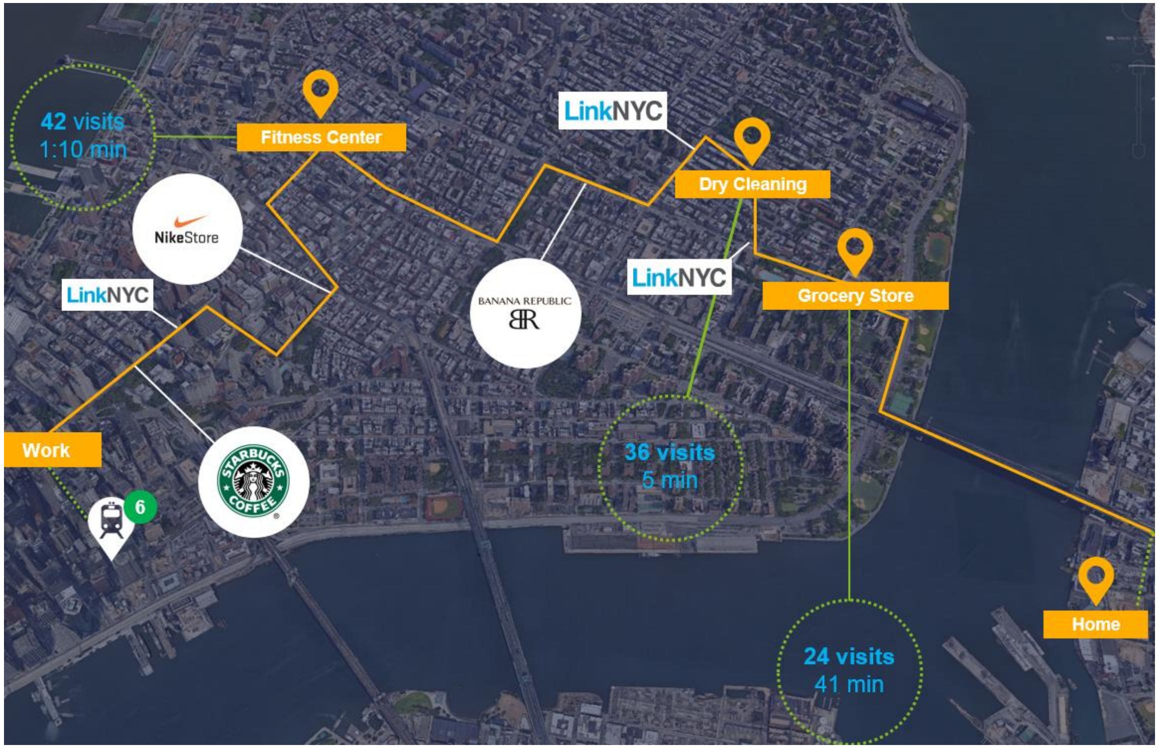
# Hyperlocal Targeting (Nextdoor…xAd) = From Home (Neighborhood) to Work (Commute)

**Nextdoor**
Neighbors Drive Word of Mouth

+8% Engagement Lift for Ring




**xAd**
Tracking Where / When Purchases Likely to be Made




Source: Nextdoor, xAd

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

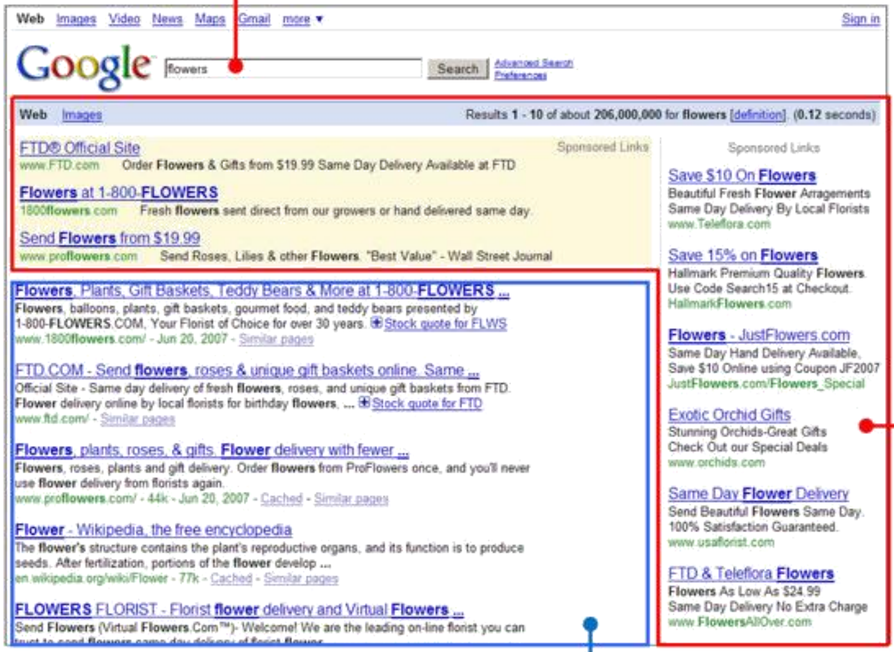
*Right 'Ad' @ Right Place / Time*

# 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.

Source: Historyofinformation.com, Google

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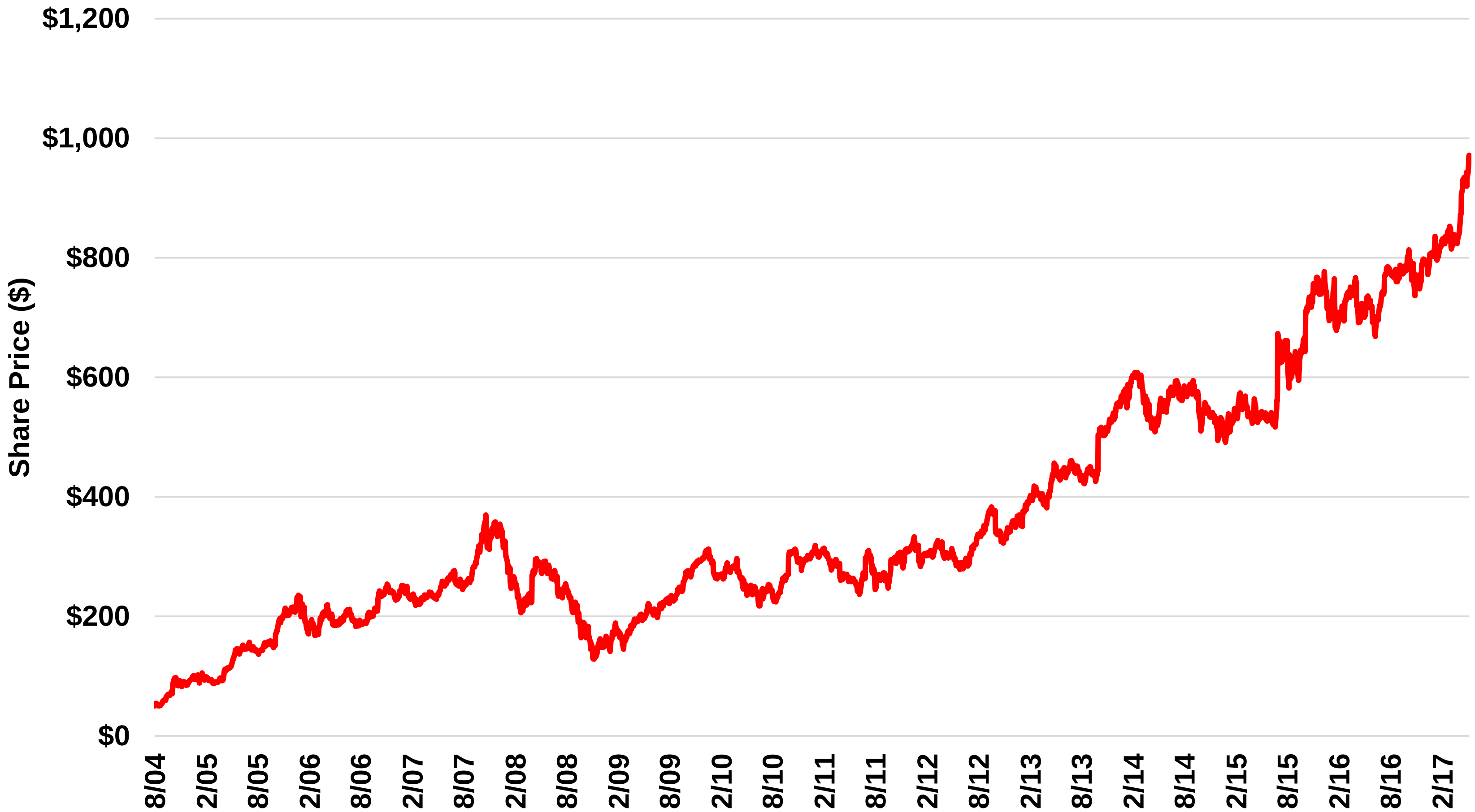
# …Right Ad @ Right Place / Time…
# Based on *User-Typed Input (Words)* = Big Business for Google

**Google = $679B Market Capitalization**

+30x vs. IPO

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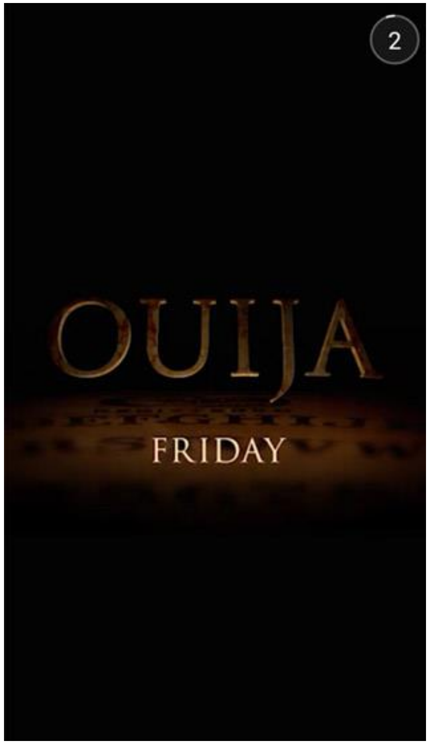
Source: Yahoo Finance
Note: Priced as of 5/26/17 market close. Google IPO'ed @ $85 / share on 8/19/04.

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

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

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





Source: Image: Adweek (10/14)

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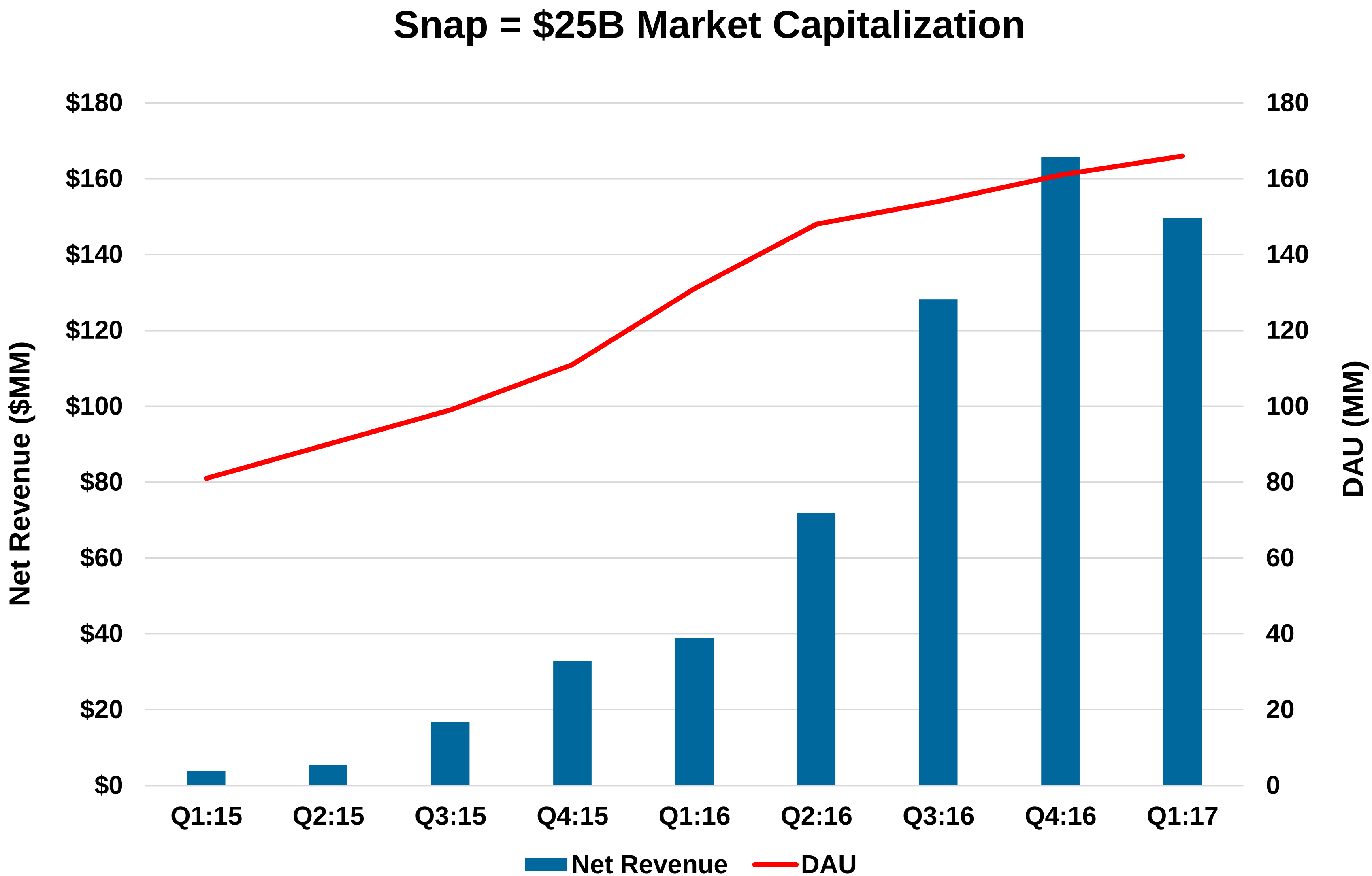
# …Right Ad @ Right Place / Time…
# Based on *User-Uploaded Input (Images)* = Big Business for Snap




Source: Snap Filings
Note: Priced as of 5/26/17 market close. Snap IPO'ed @ $17 / share on 3/2/17.

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

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

Source: CNBC interview (4/3/17)

***Ads Evolving Rapidly =***

***Often Organic + Data @ Core***

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*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**


Source: Mavrck Facebook UGC Benchmark Report (2/17), Image: benandjerrys Instagram featuring mistress_spice (4/17)
Note: Study based on 536,238 micro-influencer brand activations completed via Mavrck Platform from 1/1/16-12/13/16.

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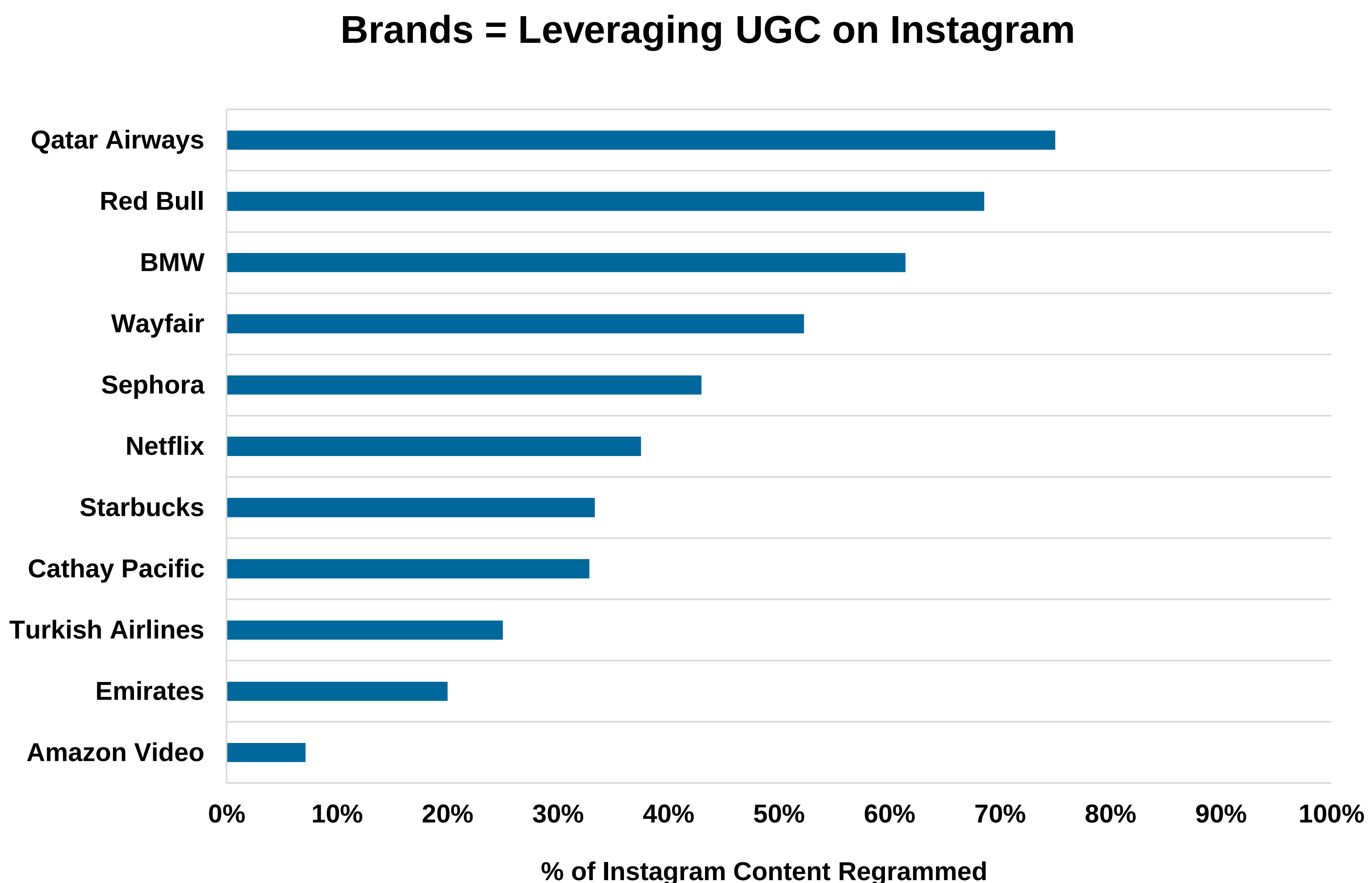
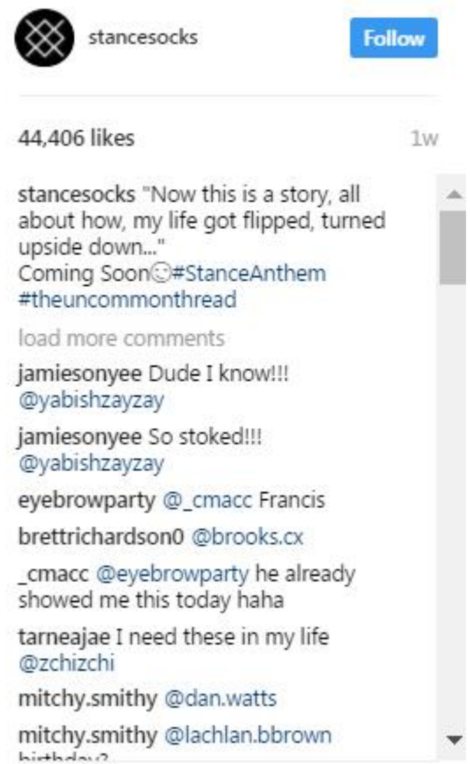
# …Brands + Consumers =
# Brands Sourcing Content from Fans…




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


Source: Stance

*…Emerging Retailers + Crafty Big Brands =*

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

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

**'Front-End'**

User-Generated Real-Time Geolocated Images



Source: Left Image: Snap, Right Image: Instagram blog (3/17)

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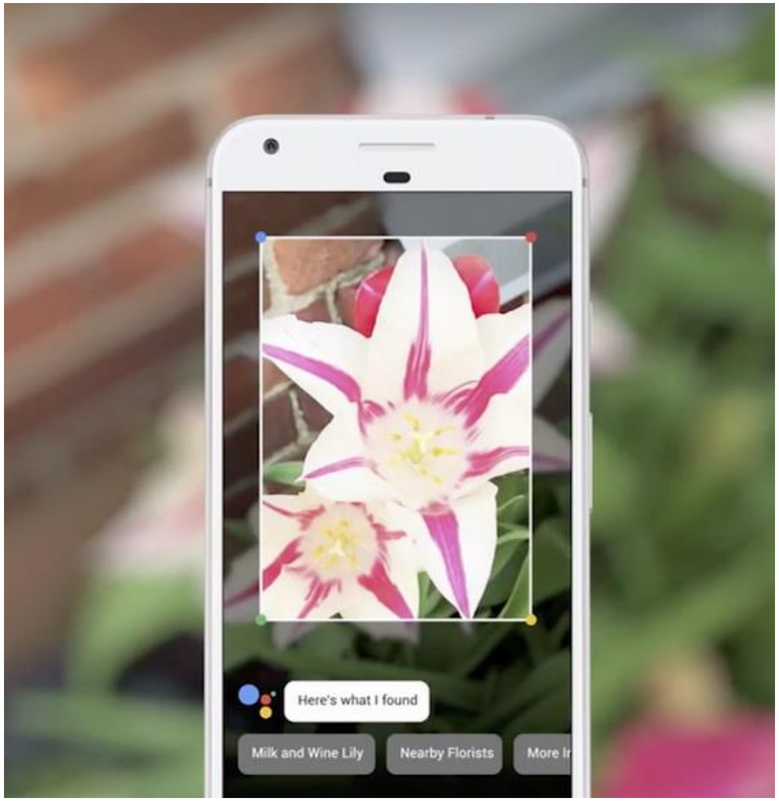
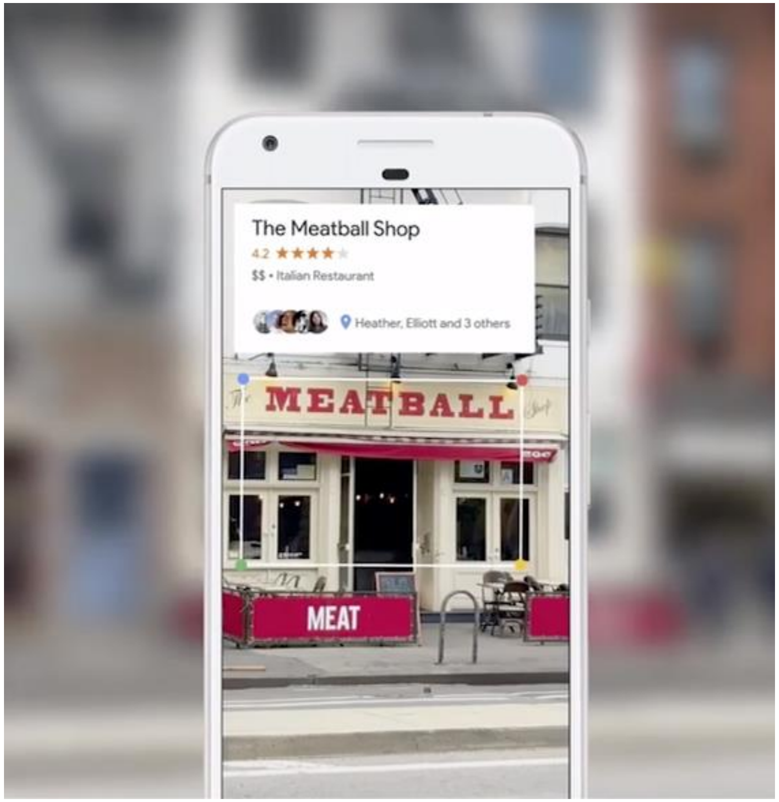
# …Image-Based Platform *Front-Ends* = Taking Pictures Can Replace Typing…

**‘Front-End’**

Google Lens Will Provide Greater Context to Images



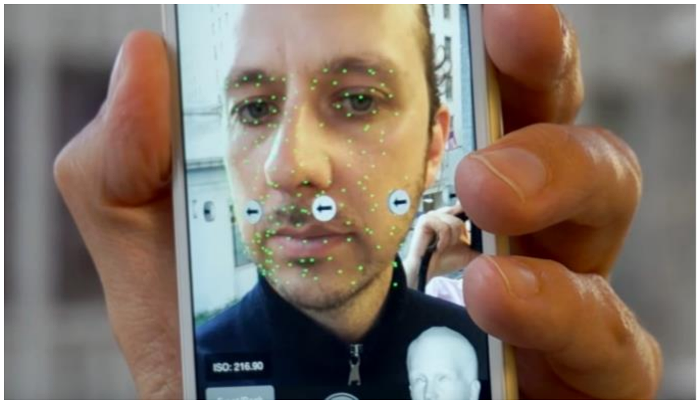



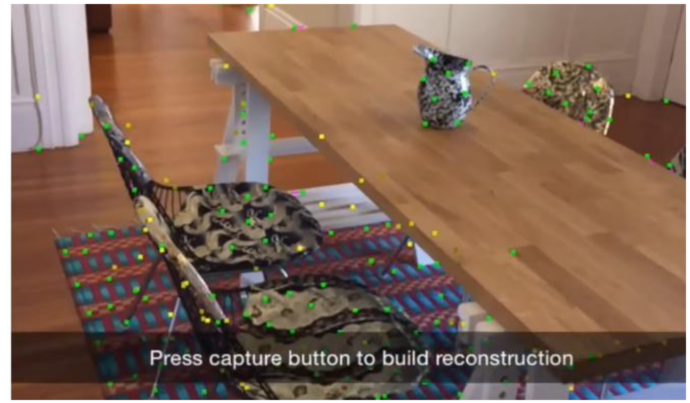

Source: Google I/O (5/17)

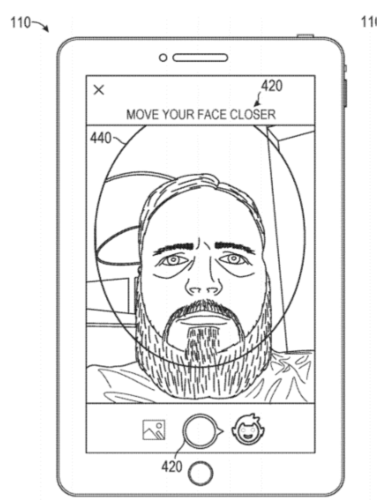
# …Image-Based Platform *Back-Ends* = Algorithms Infer User Context from *Images*…

## ‘Back-End’

Algorithms Infer Images / Project AR Objects into Scenes







Source: Images: CB Insights, Seene Patents (acquired by Snap in 6/16) and Looksery Patents (acquired by Snap in 9/15)

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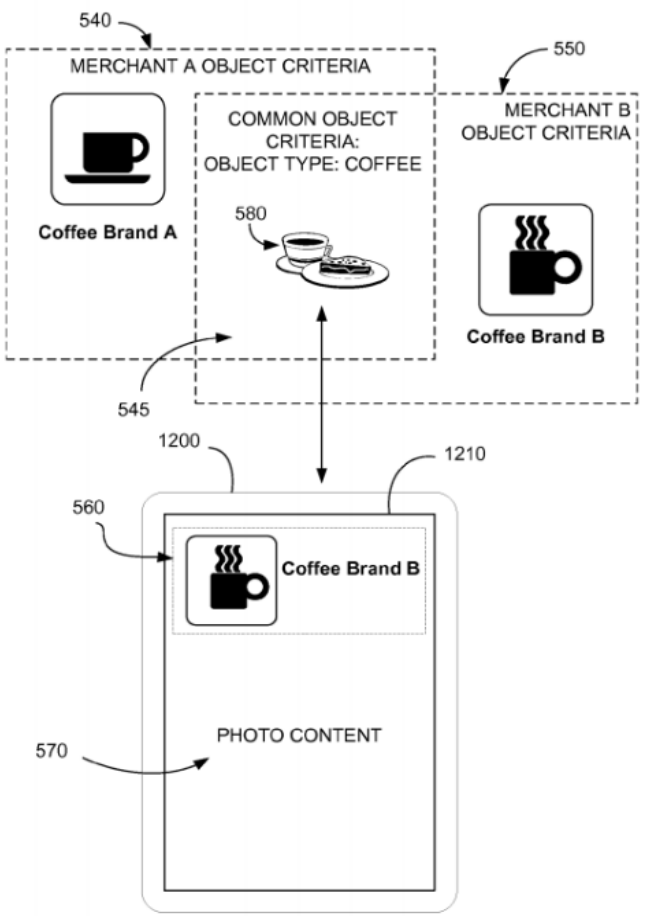
# …Image Recognition *Back-Ends* = Can Provide Contextual Relevance for Advertisers

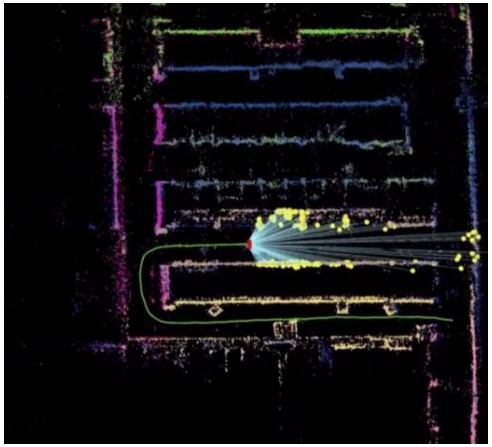
## Snap Image Recognition

Potential Ad Targeting Tool




## Google Visual Positioning Service

Tracking Path to Purchase…In-Store



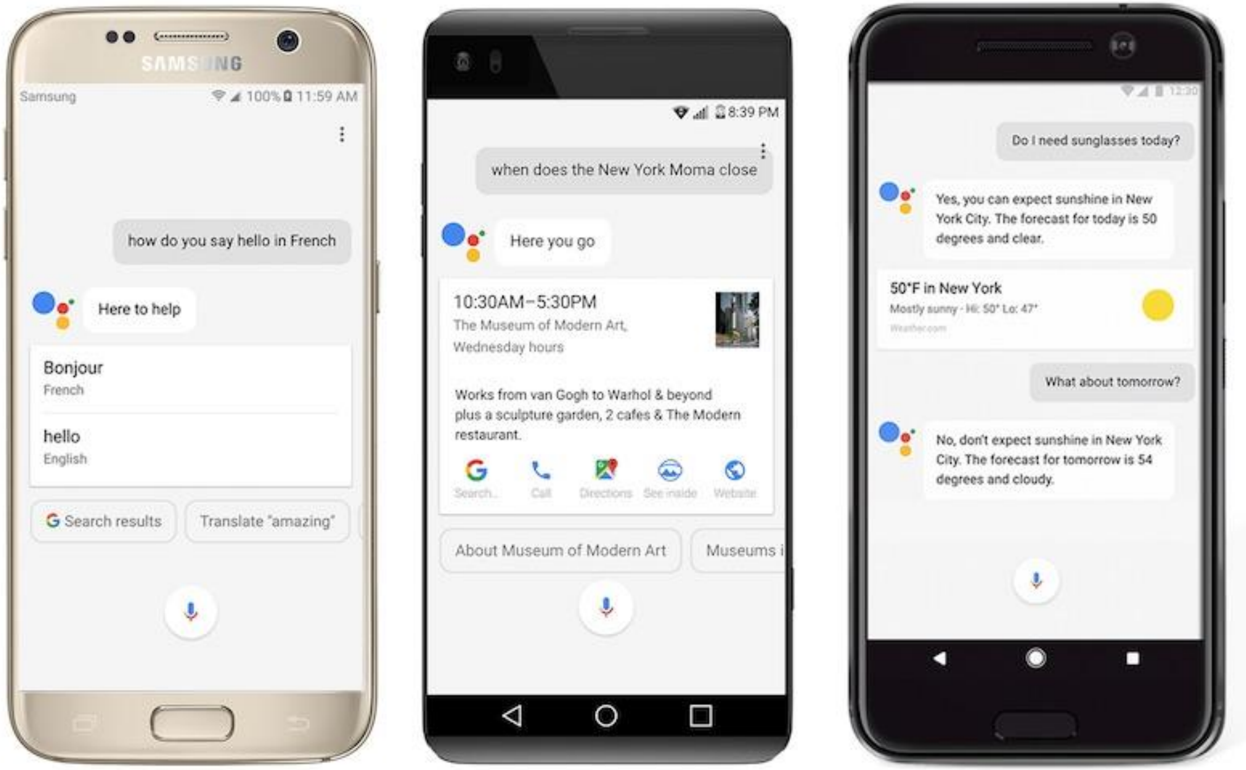
Source: Left Image : Snap Patent (7/16), Right Image: Google I/O (5/17)

# 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**



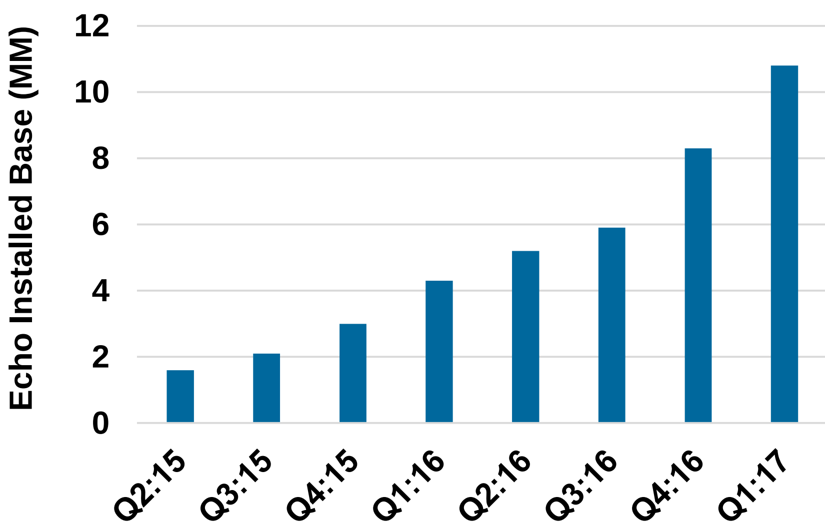

Source: Google I/O (5/16), Image: Macrumors (2/17)

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

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

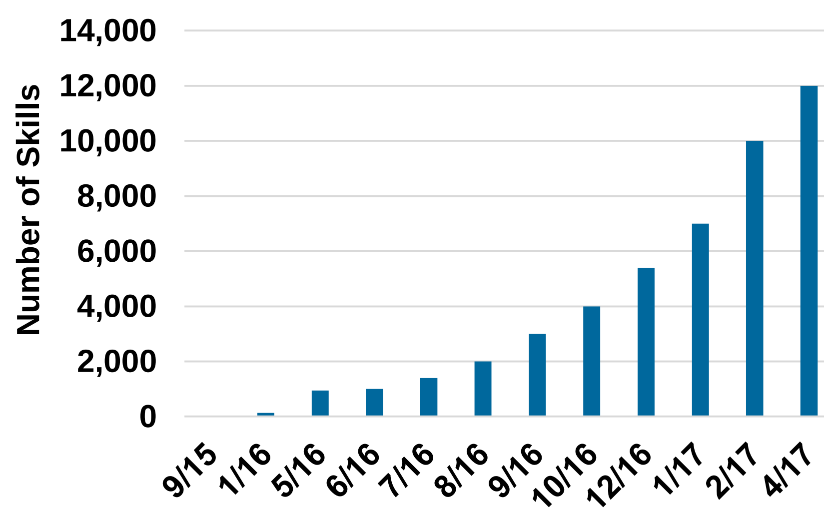

**Echo =** Shopping + Media
**Echo Look =** Shopping + Recommendations
**Echo Show =** Video + Voice Calls

### 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

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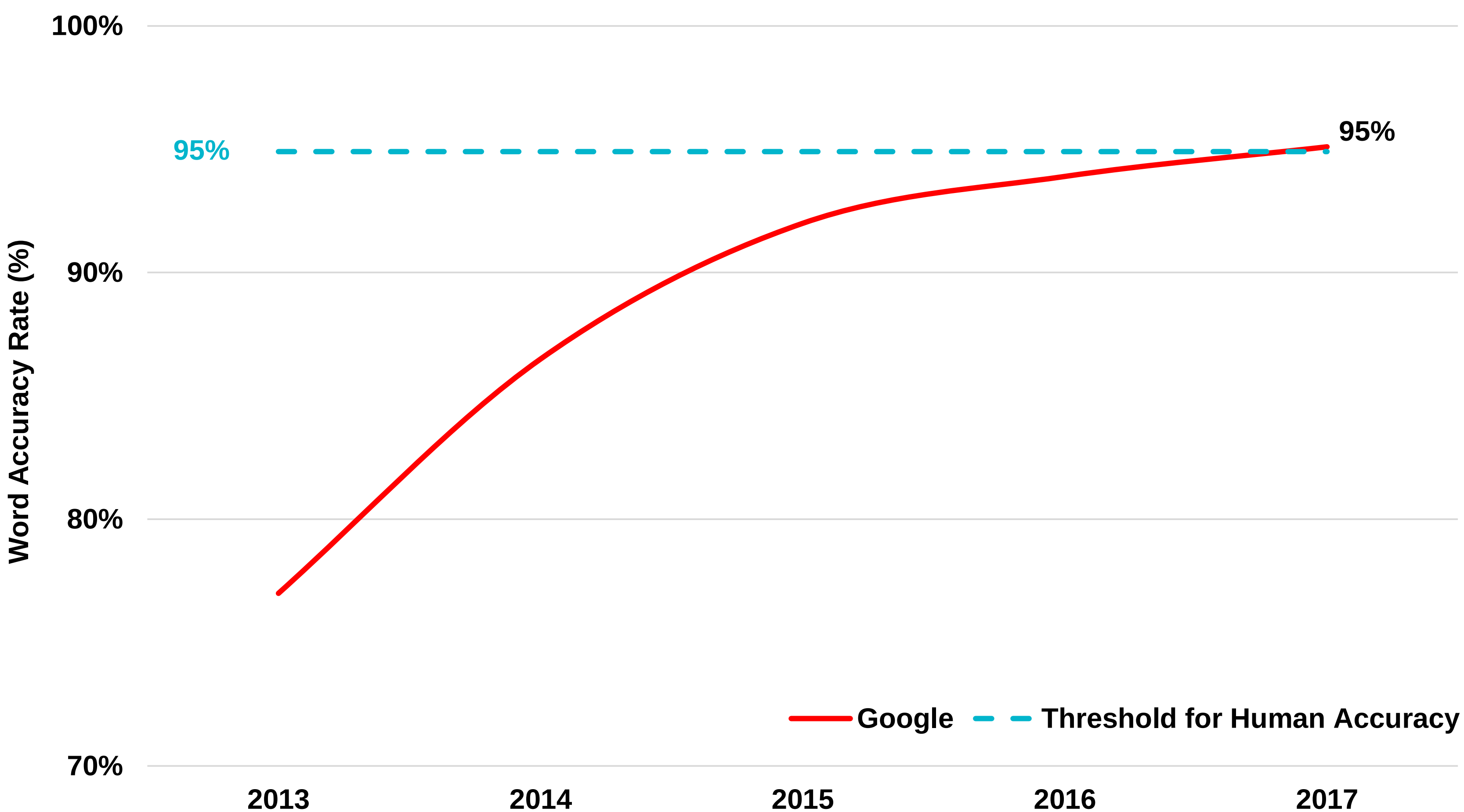
# …Voice-Based Platform *Back-Ends* = Voice Recognition Accuracy Continues to Improve

**Google Machine Learning**

Achieving Higher Word Accuracy, 2013-2017



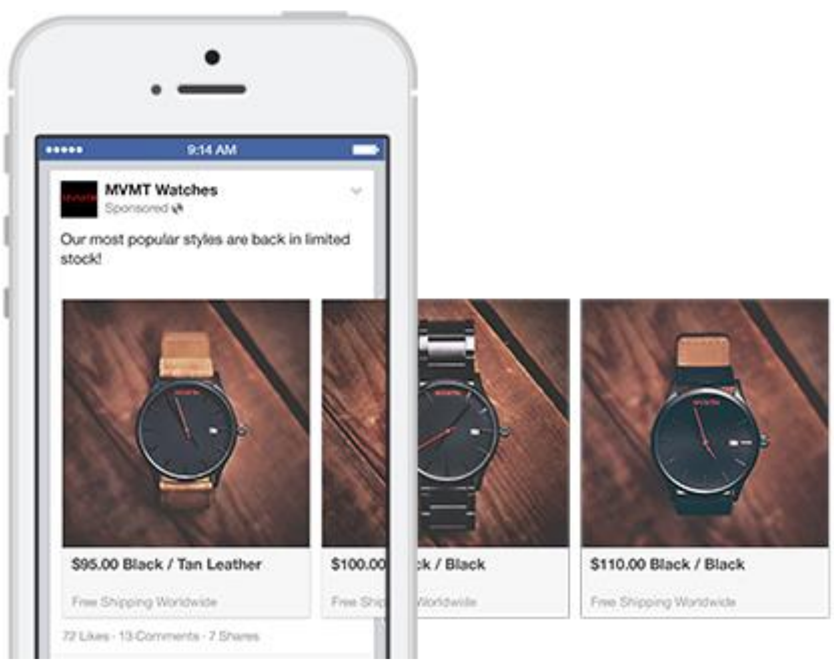

Source: Google (5/17)
Note: Data as of 5/17/17 and refers to recognition accuracy for English language. Word error rate is evaluated using real world search data which is extremely diverse and more error prone than typical human dialogue.

# ***Ads =***
# ***Becoming Targeted Storefronts***

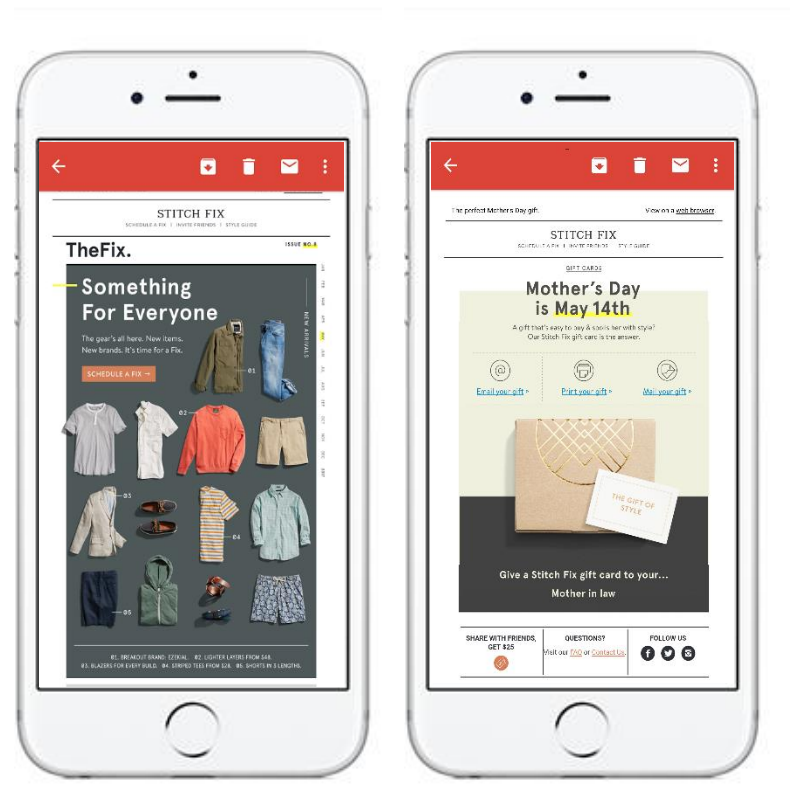
# Ads / Content / Products / Transactions = Lines Blurring. Fast…

## *The Content = The Store*

**Facebook Feed**
Browsable Storefronts




**Emails**
Curated Storefronts

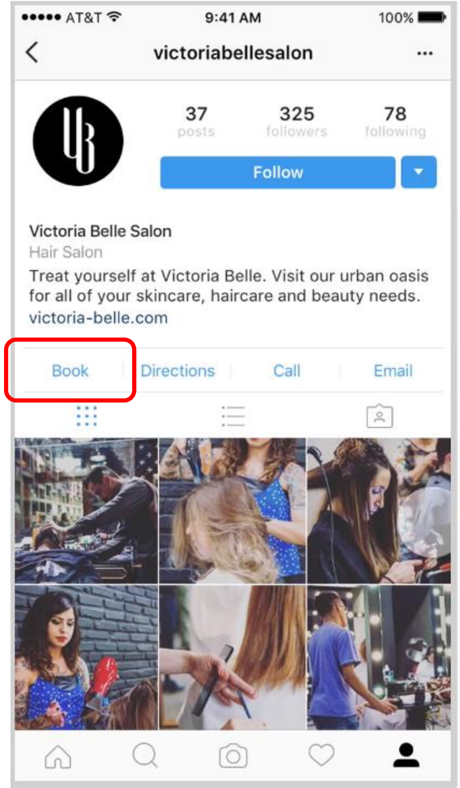



Source: Left Image: Facebook, Right Image: Stitch Fix

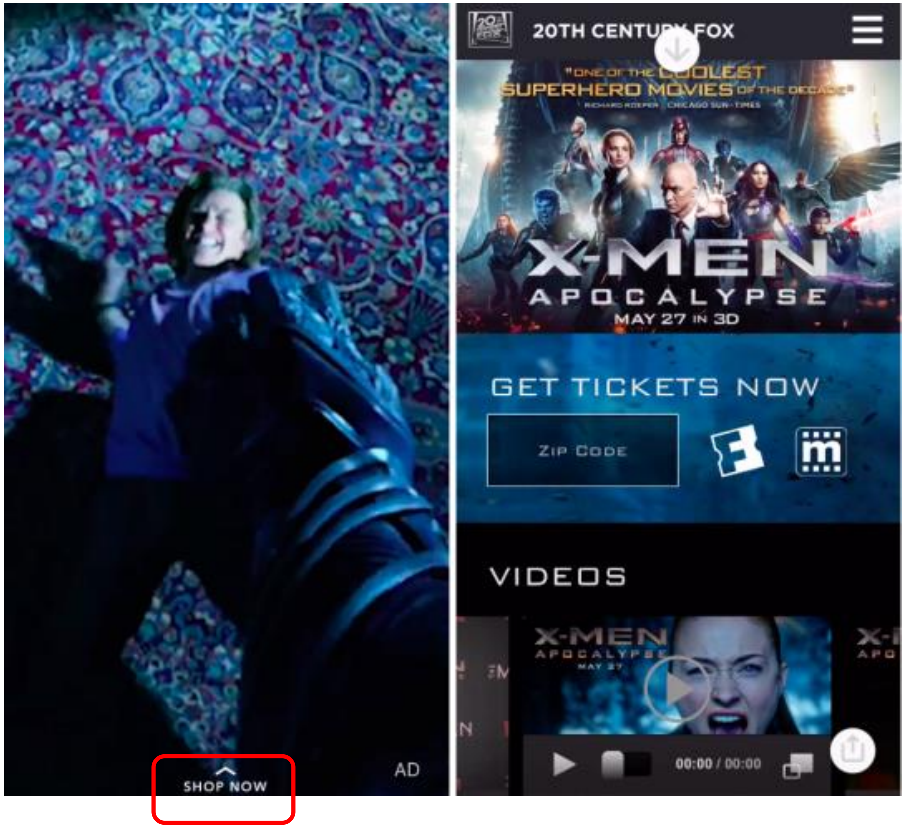
# …Ads / Content / Products / Transactions = Lines Blurring. Fast.

## *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

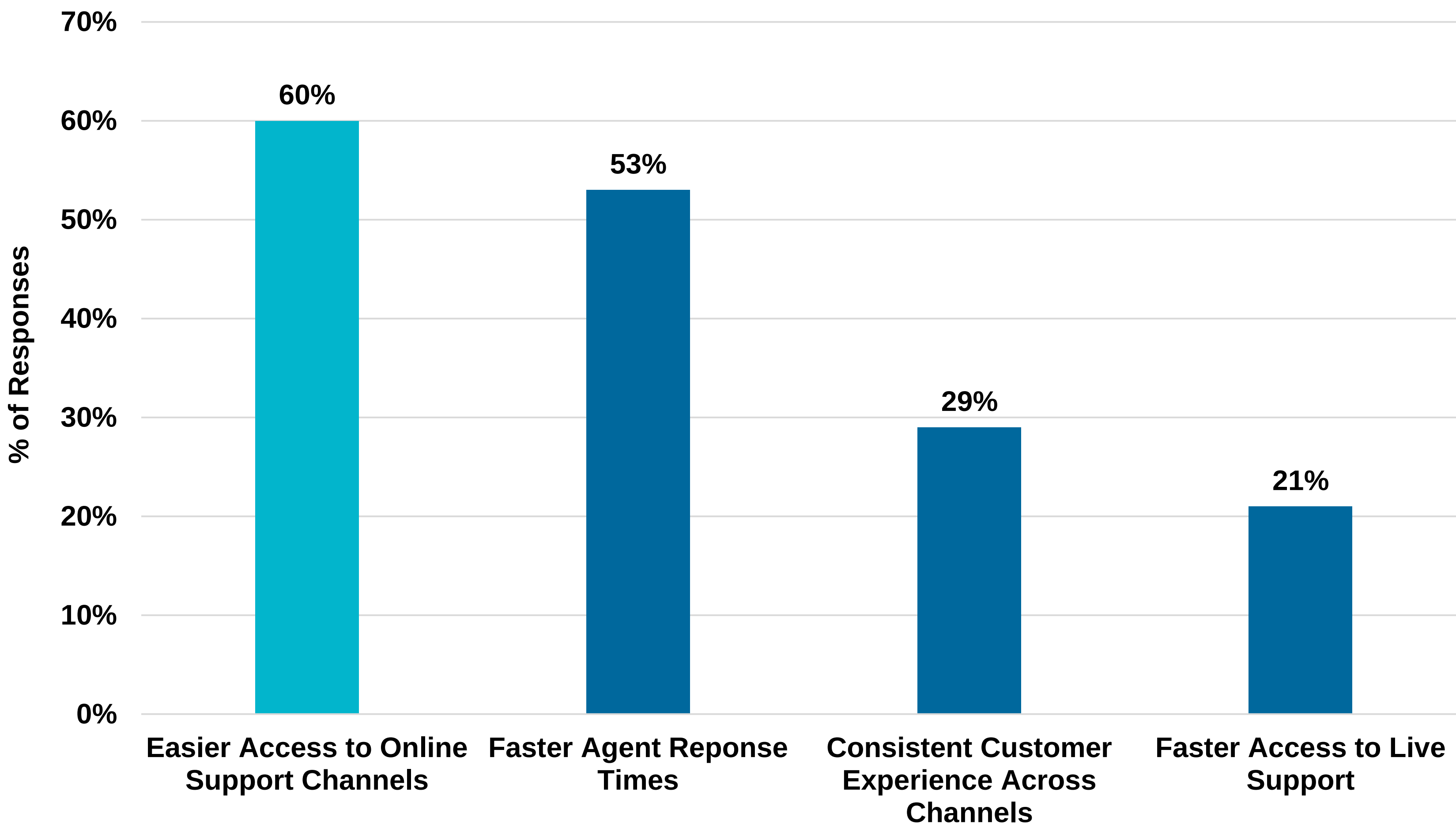
*Product Quality + Customer Support + Transparency*

*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.

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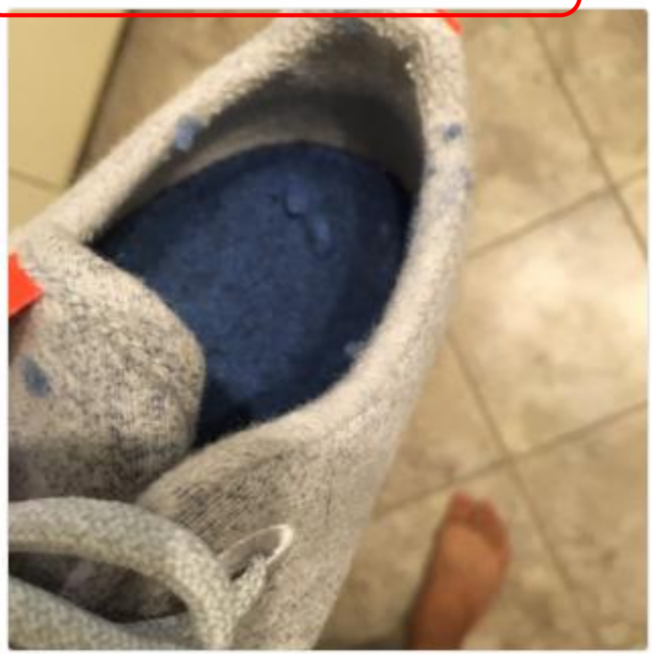
# …Social Media =
# Can Drive Accountability…

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

Rachit Shukla @rachitshukla · 12 Aug 2016
@allbirds like your shoes but hope that the shedding of the liner inside is temporary and not a quality issue.



2

Allbirds
@Allbirds

Follow

Replying to @rachitshukla

oh no - that shouldn't be happening! Shoot us a note at help@allbirds.com so we can make it right.

2:04 PM - 12 Aug 2016

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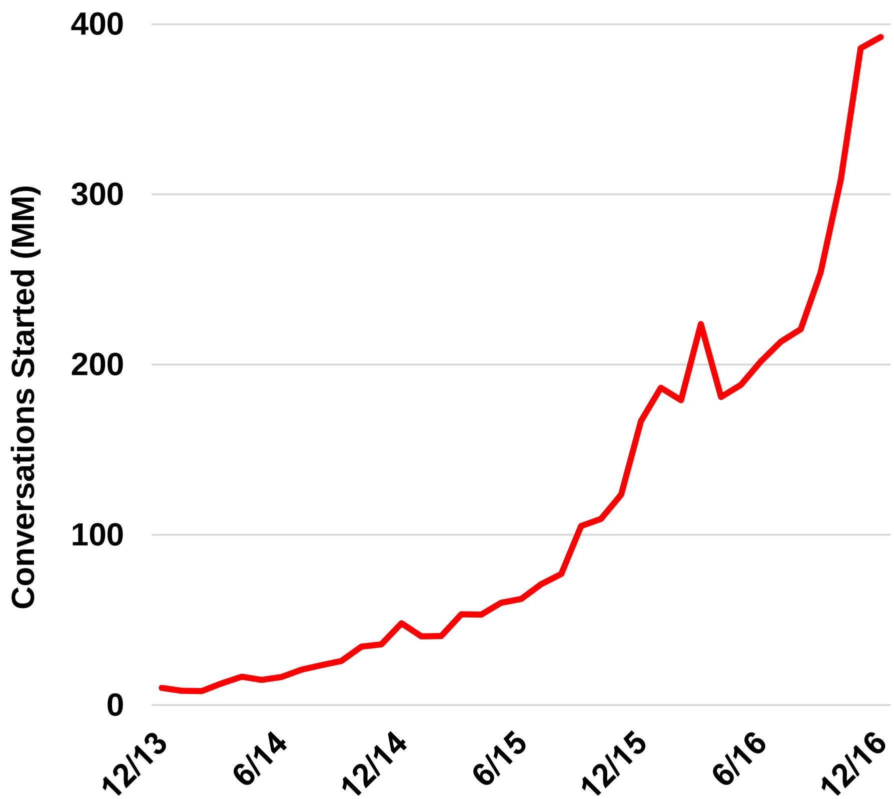
Source: Image: Allbirds, Ovum Get It Right: Deliver the Omni-Channel Support Customers Want (8/16)
Note: Survey based on consumers ages 18-80 in Australia, Europe, New Zealand, and USA; n=400.

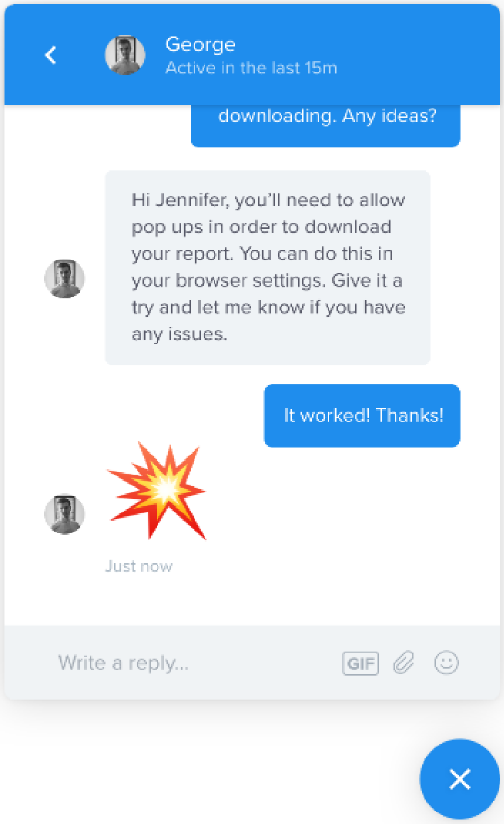
# …Real-Time Online Customer Conversations = Rising Rapidly…

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




**Intercom**

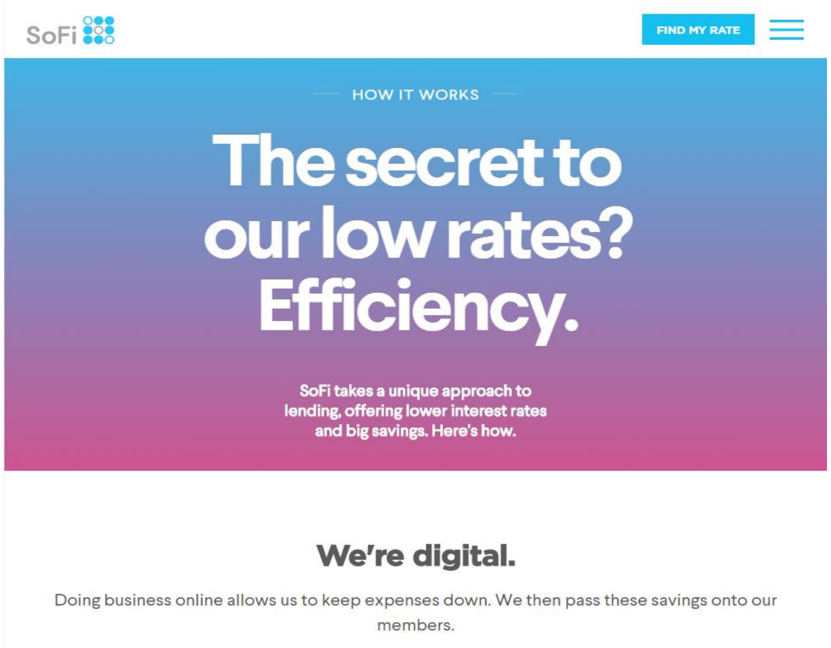
Simple + Engaging UI



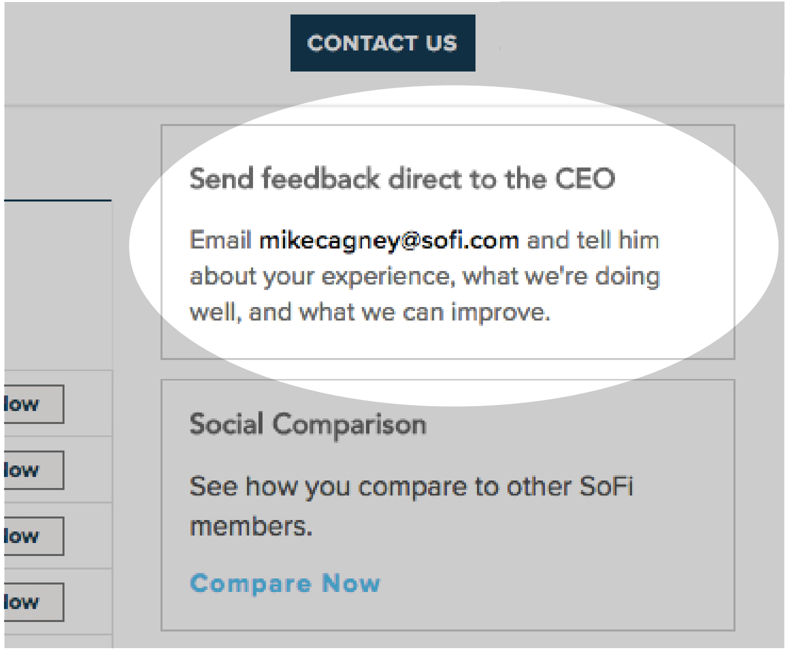

Source: Intercom
Note: Conversations include messages initiated by businesses & consumers.

# Customers = Increasingly Expect to Understand How Things Work

**SoFi 'How It Works'**
Most Viewed Content, After Home Page




**SoFi Member Dashboard**
Send Questions Directly to CEO



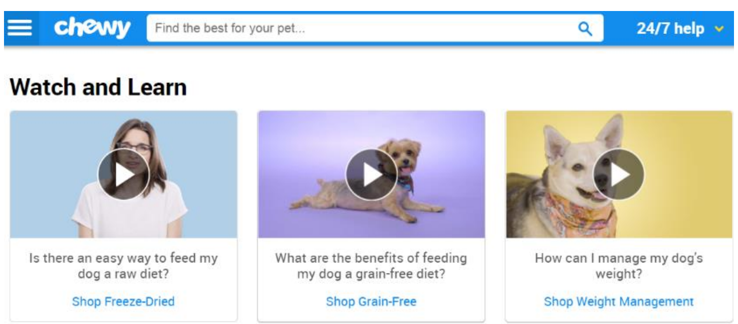

Source: SoFi

*Retailers Emerging With Especially Effective Strategies…*

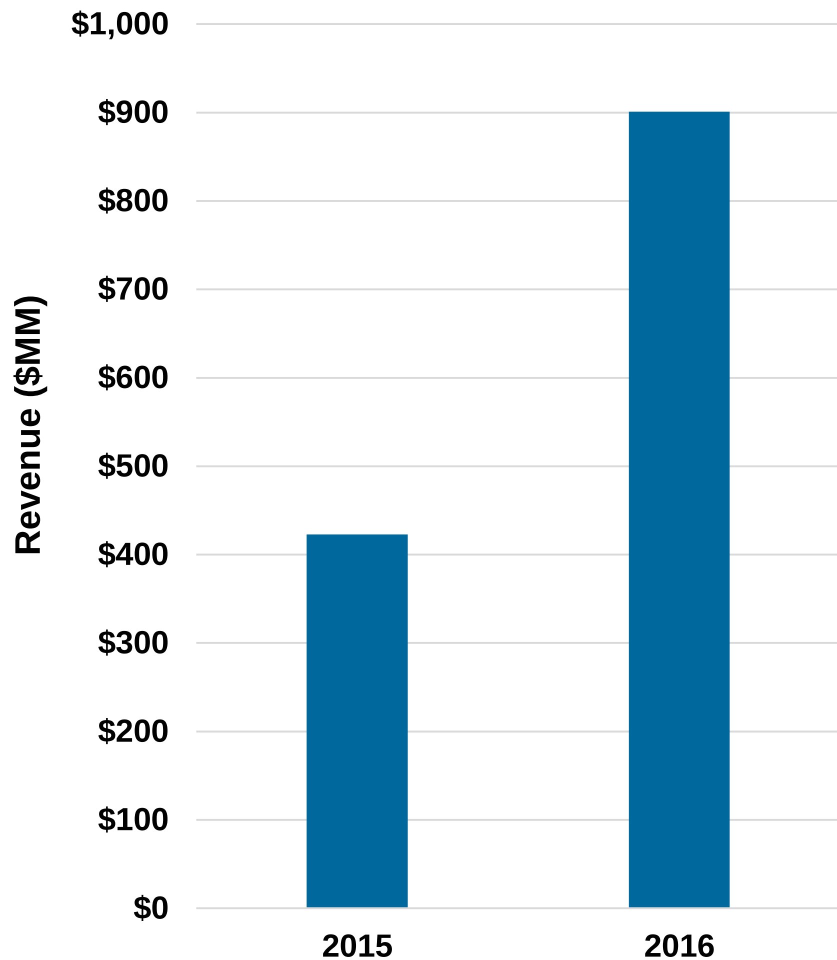
# Chewy.com = Pet Treats / Food / Supplies…
# Strong User Community + Great Target Market

## Engaged Community + High Customer Satisfaction


## Dynamic Customer Service




## Strong Revenue Growth




Source: Chewy.com

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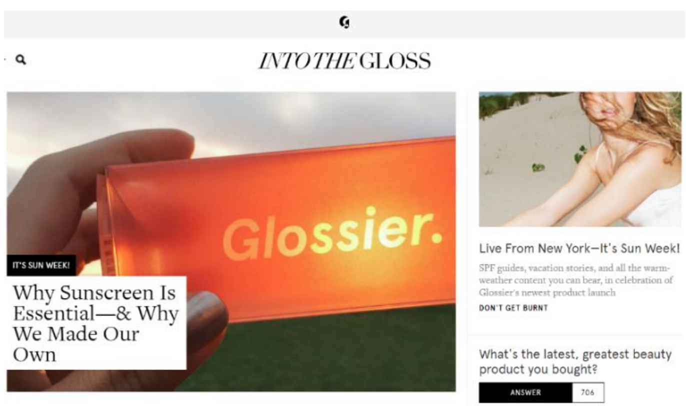
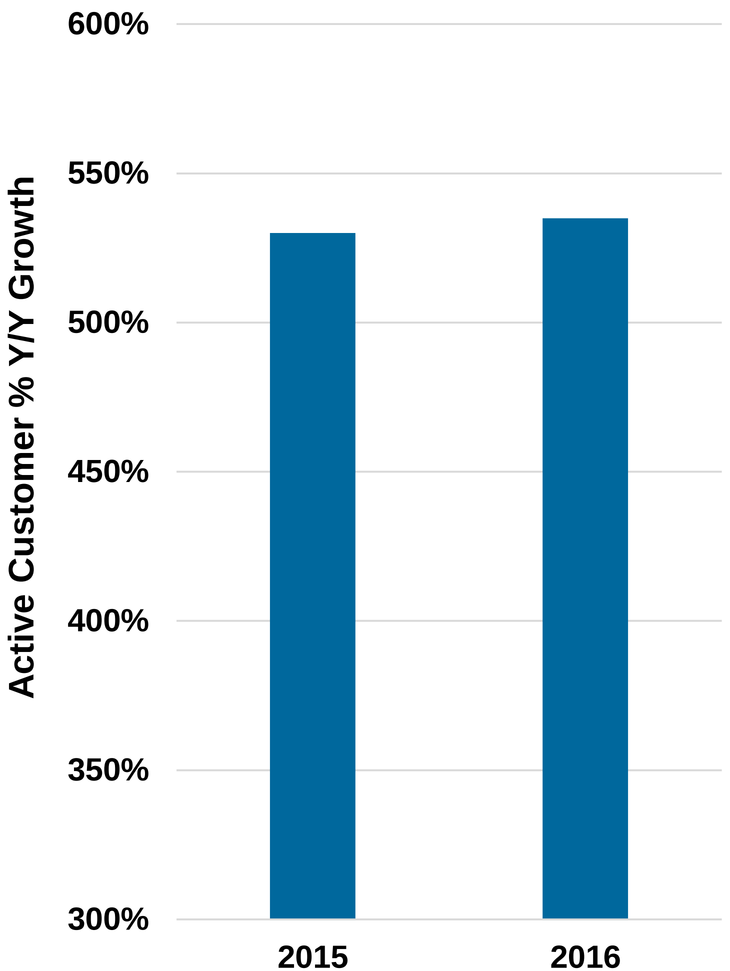
# Glossier = Skincare & Beauty Products... Content Marketing

## User Generated Content = Influencers


## 'Into the Gloss' = Content Marketing




## Accelerating Active Customer Growth




Source: Glossier, Top Left Image: Instagram user genius_hotel, Bottom Left Image: Glossier

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# UNTUCKit = Shirts…
# Online-Offline Synergies in Marketing + Merchandising

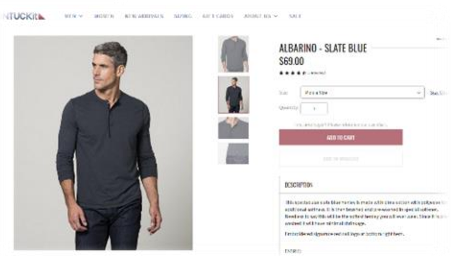
**Digital-Physical Feedback Loop**
Deliberate Branding + Clear Messaging @ Core

**Offline Engagement**
Direct Touchpoints in Physical World



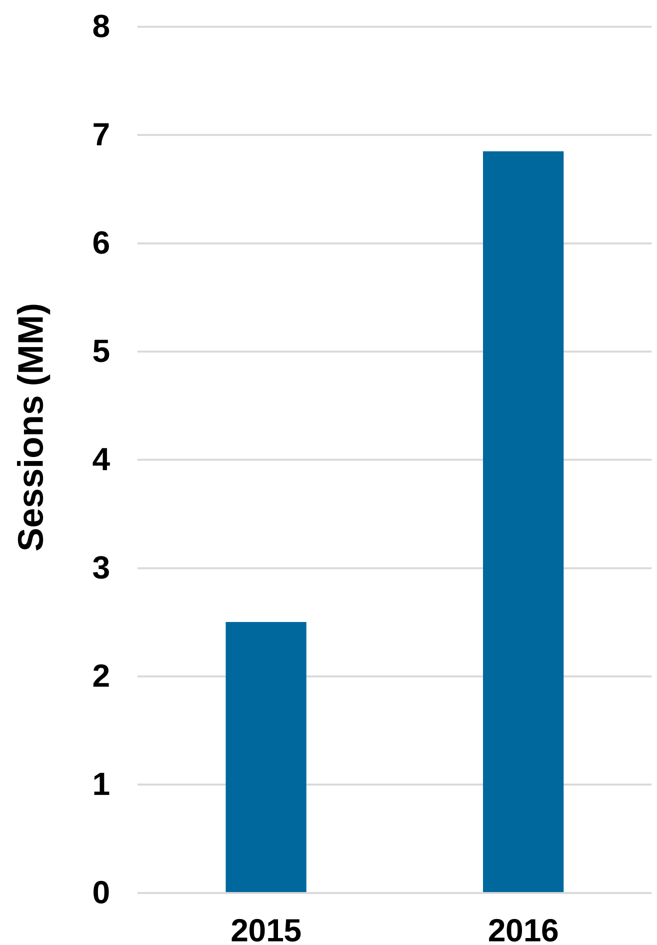
UNTUCKit

**In-Store Interactions**
Intimacy + Active Dialogue




**Online Storefront**
Digital Merchandising Insights

**Online Sessions**
**Up >2.5x Y/Y**



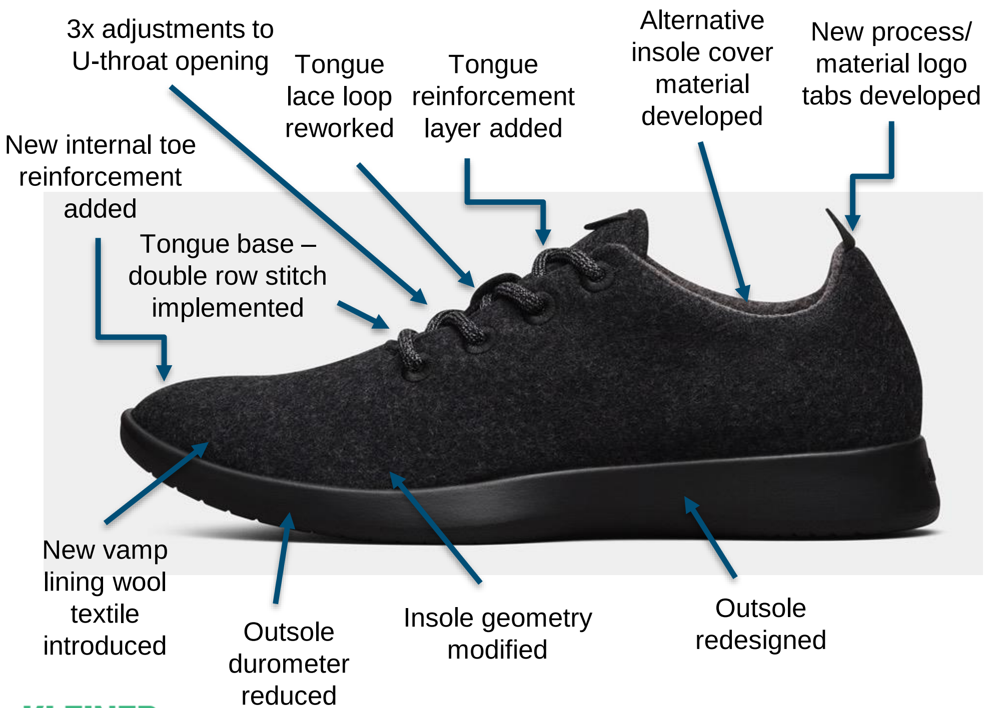

Source: UNTUCKit
Note: Online session defined as website visit.

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

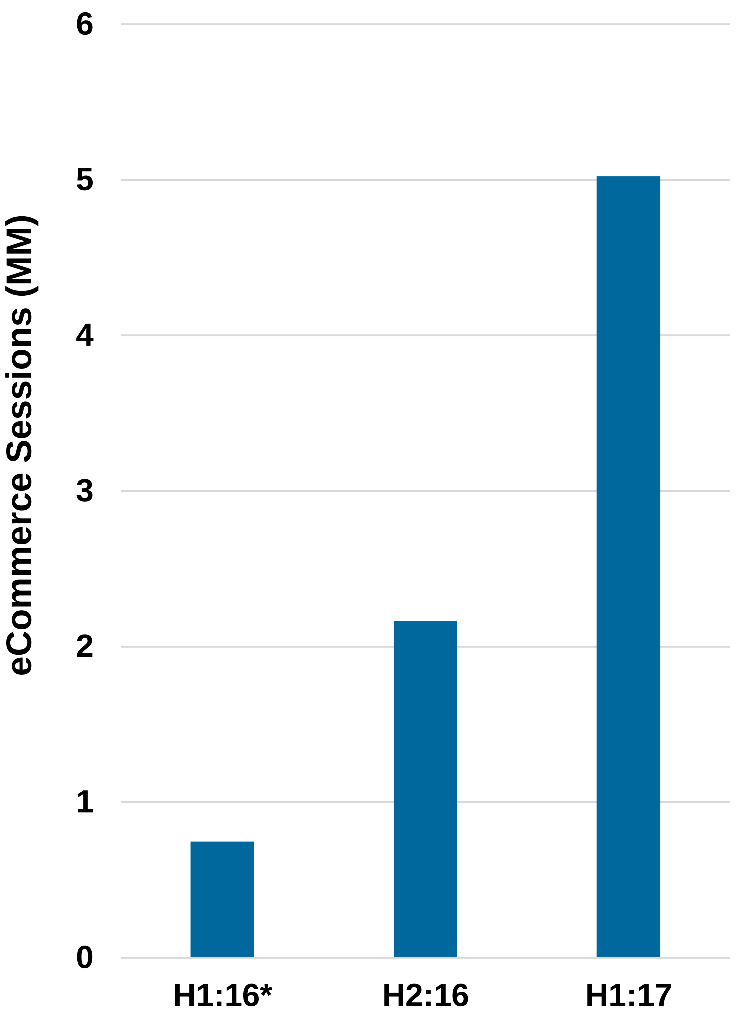
## Two Comfortable, High Quality Styles



## Product Changes Based on Customer Input




## Growing eCommerce Sessions






Source: Allbirds
* 3/16-6/16, H1:17 data from 1/17-5/17.

# Trendyol = Apparel...
# Private Label + Local Sourcing for Local Consumers (Middle East)

## Private Label + Local Sourcing
Low Prices + Short Lead Times

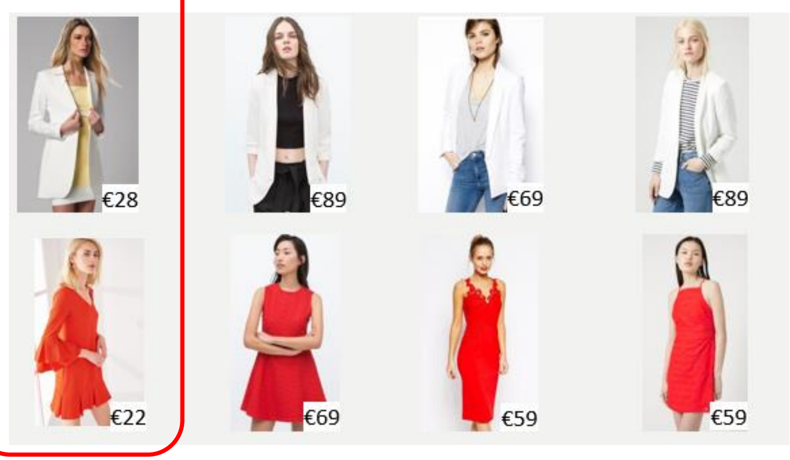
**~1K Suppliers 50km from Trendyol HQ**

**Fast Replenishment (7-10 days)**

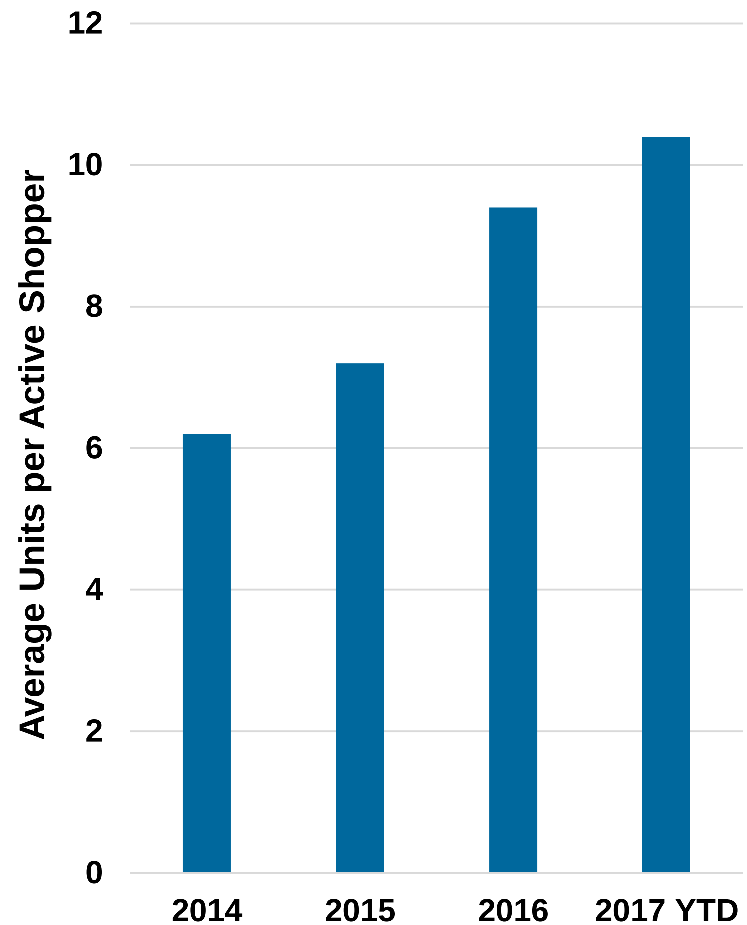
**Private Label @ 38% of Revenue**

trendyol.com

**Other Fashion Brands**




## High Purchase Re-Engagement
Items Purchased per Shopper Continue to Rise




Source: Trendyol
Note: Average units per active shopper calculated over the course of shopper lifetime.

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

## Wardrobe Survey
Algorithmic Optimization

What's your typical weekday dress code?

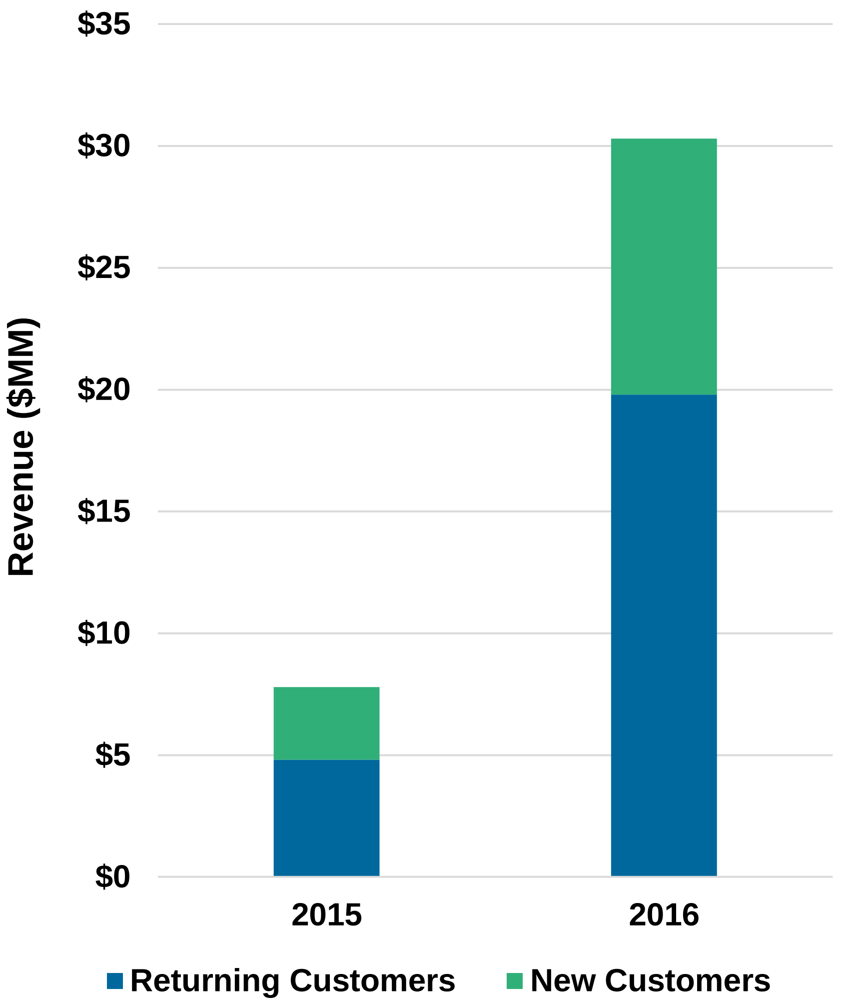
| | |
|---|---|
| Business Formal | Business Casual |
| Casual | Fashion-forward |

## Bento Box
Curated Impressions

## Online Shopping
Ongoing Customer Engagement


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

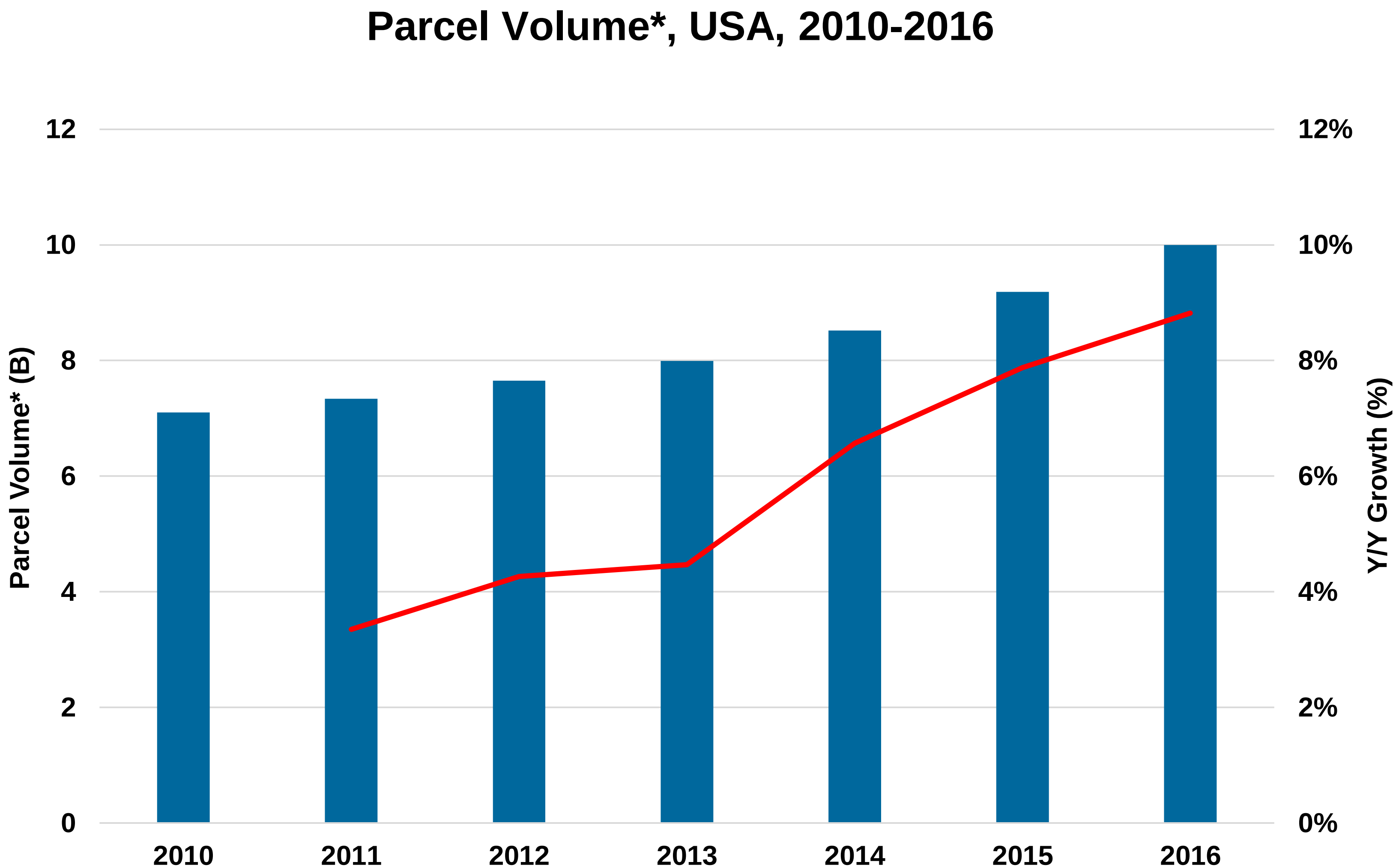
## High Growth + Retention




Source: MM.LaFleur

# *eCommerce A-Ha's*

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




Source: USPS, Fedex, UPS Filings
*Combines USPS's Domestic Shipping and Package Services volumes, Fedex's calendar year Domestic Package volumes, and UPS's Domestic Package volumes.

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

**Landlords**

Expanding Package Rooms to Accommodate Rising Online Order Delivery

Source: Image: NYTimes Photographer Tony Cenicola

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# …Unwrapping Boxes…
# Becoming Entertainment…

**Unboxing YouTube Top 5 Channels =**

33MM+ Subscribers, 5/17

Source: YouTube: Ryan's Toy Review, Fun Toys Collector Disney Toys Review, Disney Car Toys, Toys AndMe, Blu Toys Club Surprise, Images: CKN Toys

# …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**


Source: DoorDash, Left image: Pexels, Right image: DoorDash

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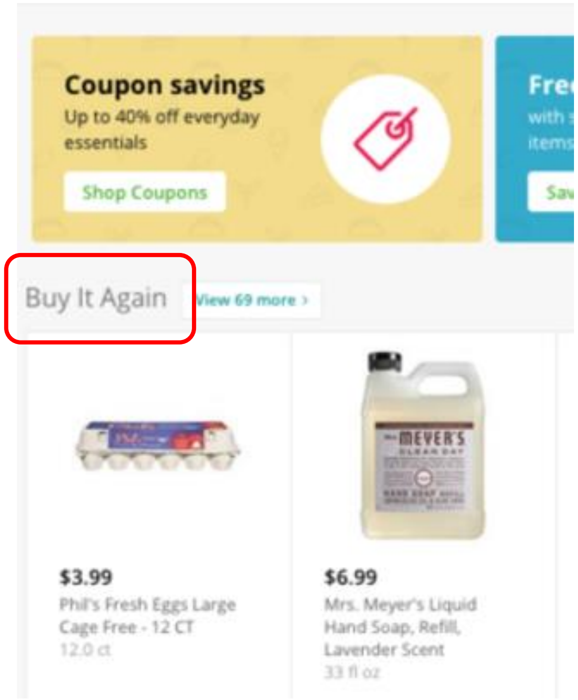
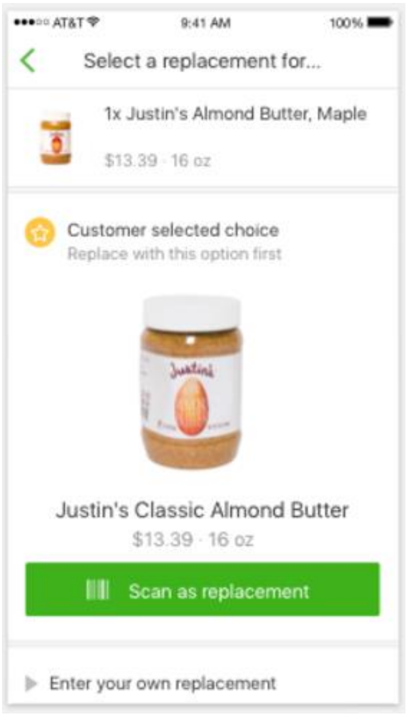
# …Grocery Shopping…
# Getting Personal / Fast / Easy…

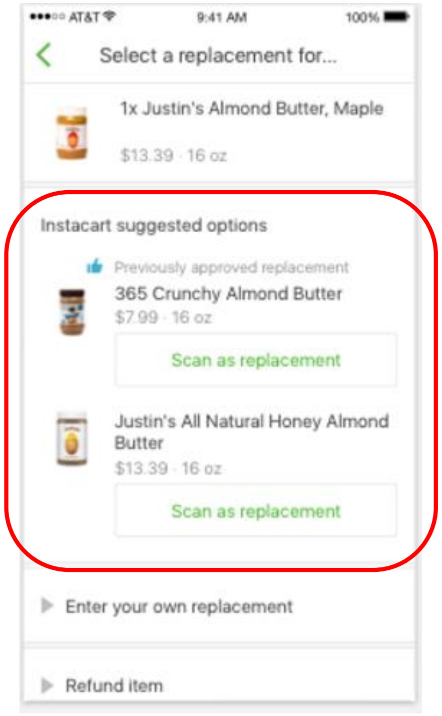
## Instacart = Personalized Grocery Recommendations

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




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



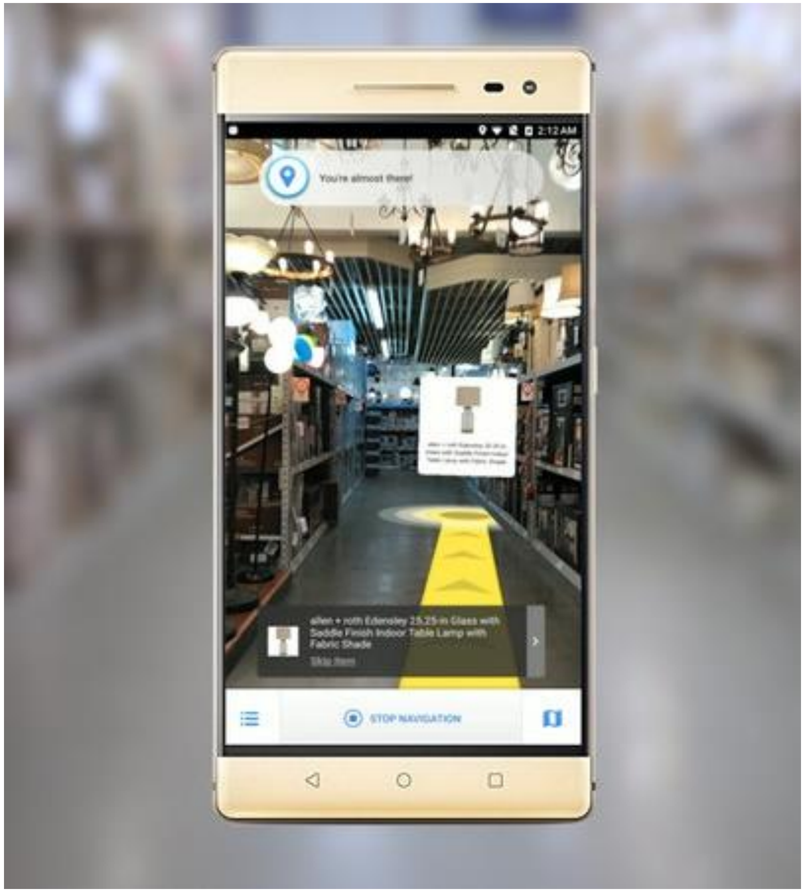



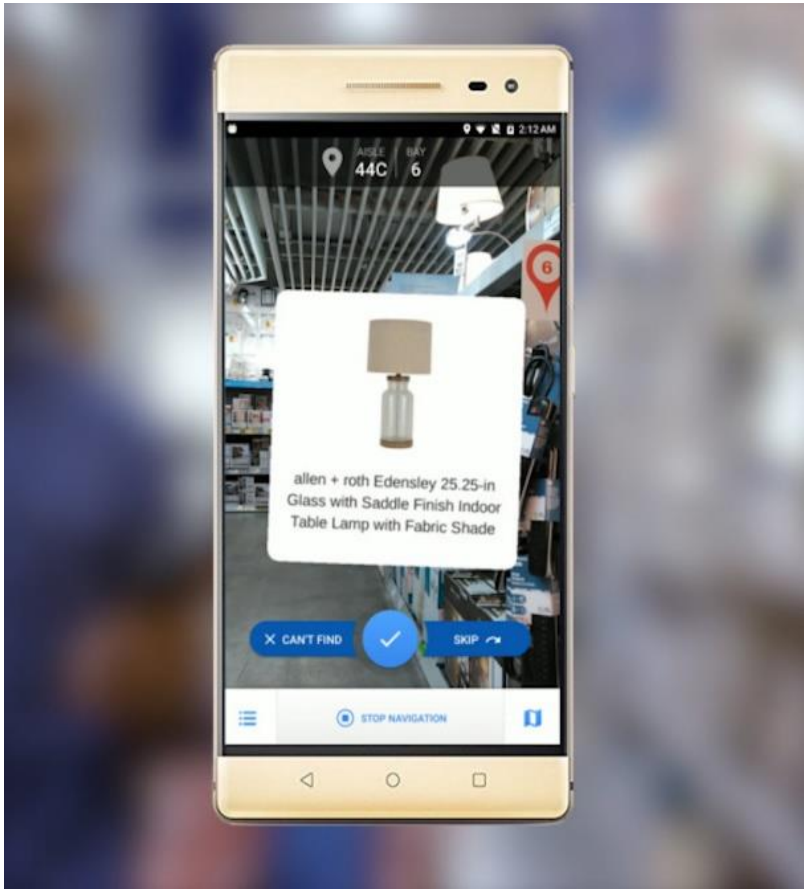

Source: Instacart

# …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

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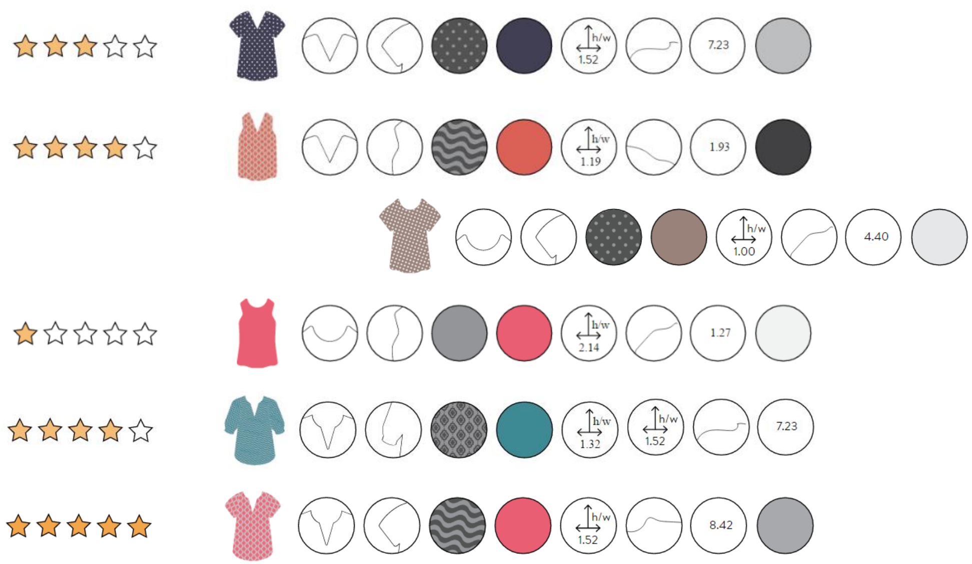
Source: Google, Lowe's

# …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

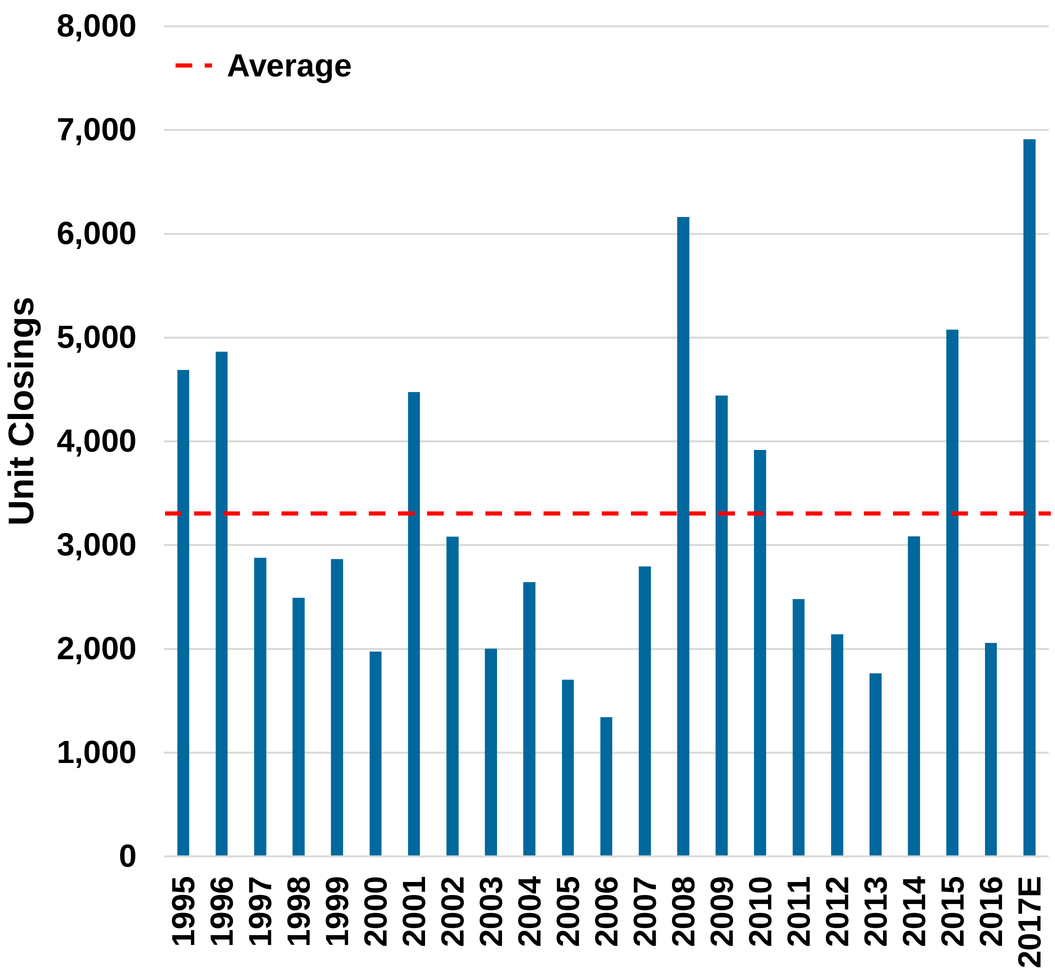



### Cassie Crochet Detail Top


Source: Stitch Fix, Left Image: Stitch Fix Algorithms Tour, Right Image: Stitch Fix

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

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




## Amazon Looks to Expand its Physical Footprint



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

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# …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

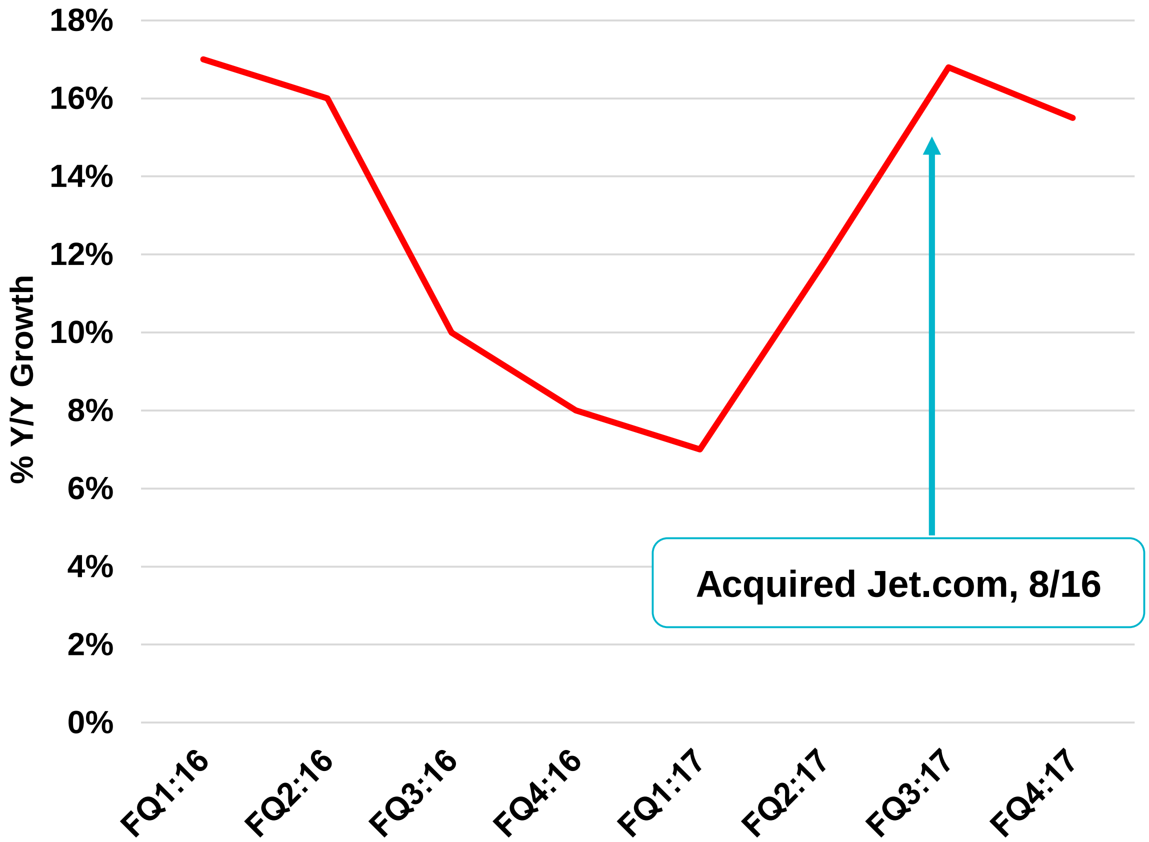

**Bonobos Guide Shops**
Try On In-Store…Ship to Home

Source: WSJ interview 1/23/17, Left image: Pinterest, Right image: Fashion Trends Daily

# …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

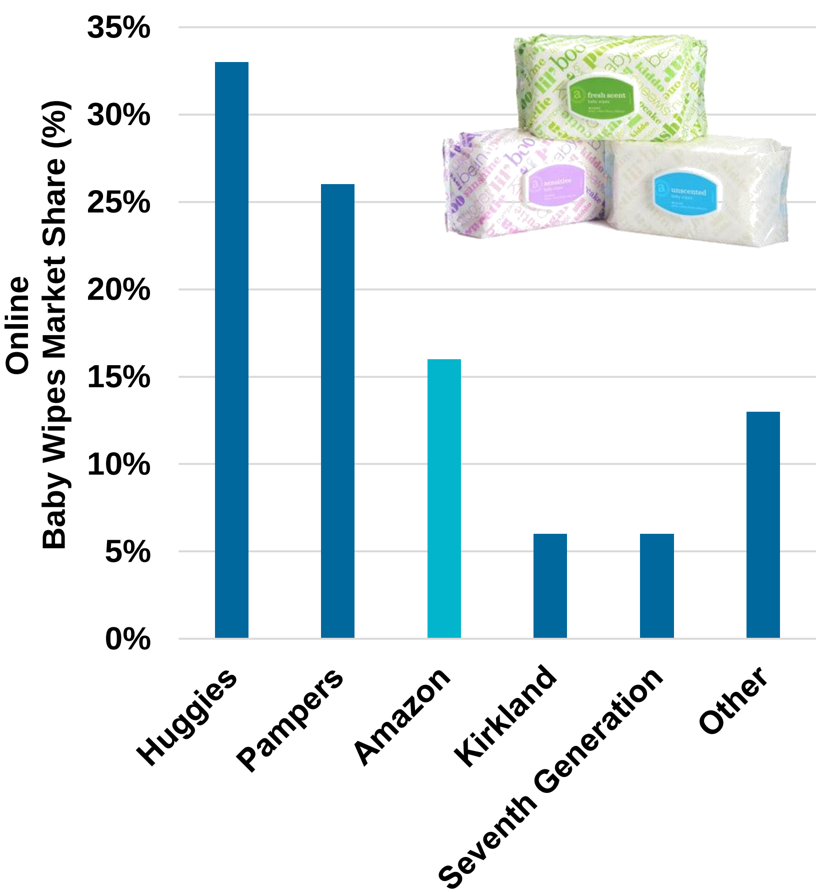
JD.com (Increased to 12%), 2/17

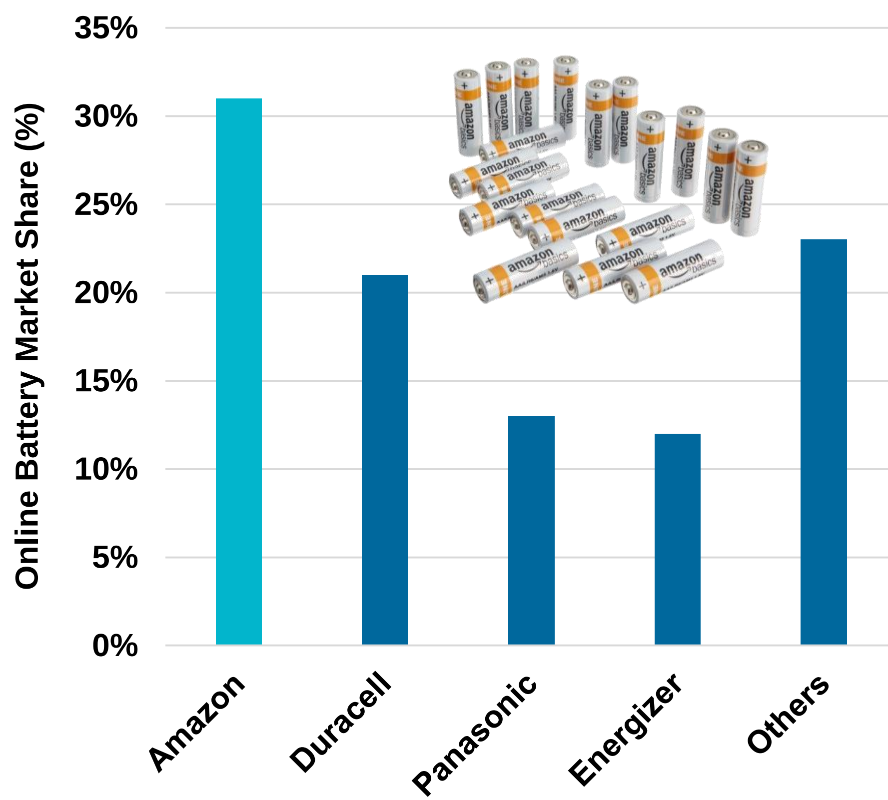
Shoebuy, 1/17

Source: Wal-Mart
Note: Fiscal year ends January. Wal-Mart stopped disclosing global eCommerce revenue growth after FQ4:17 and began disclosing USA eCommerce revenue growth.

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

## Amazon Basics Market Share, 8/16 USA

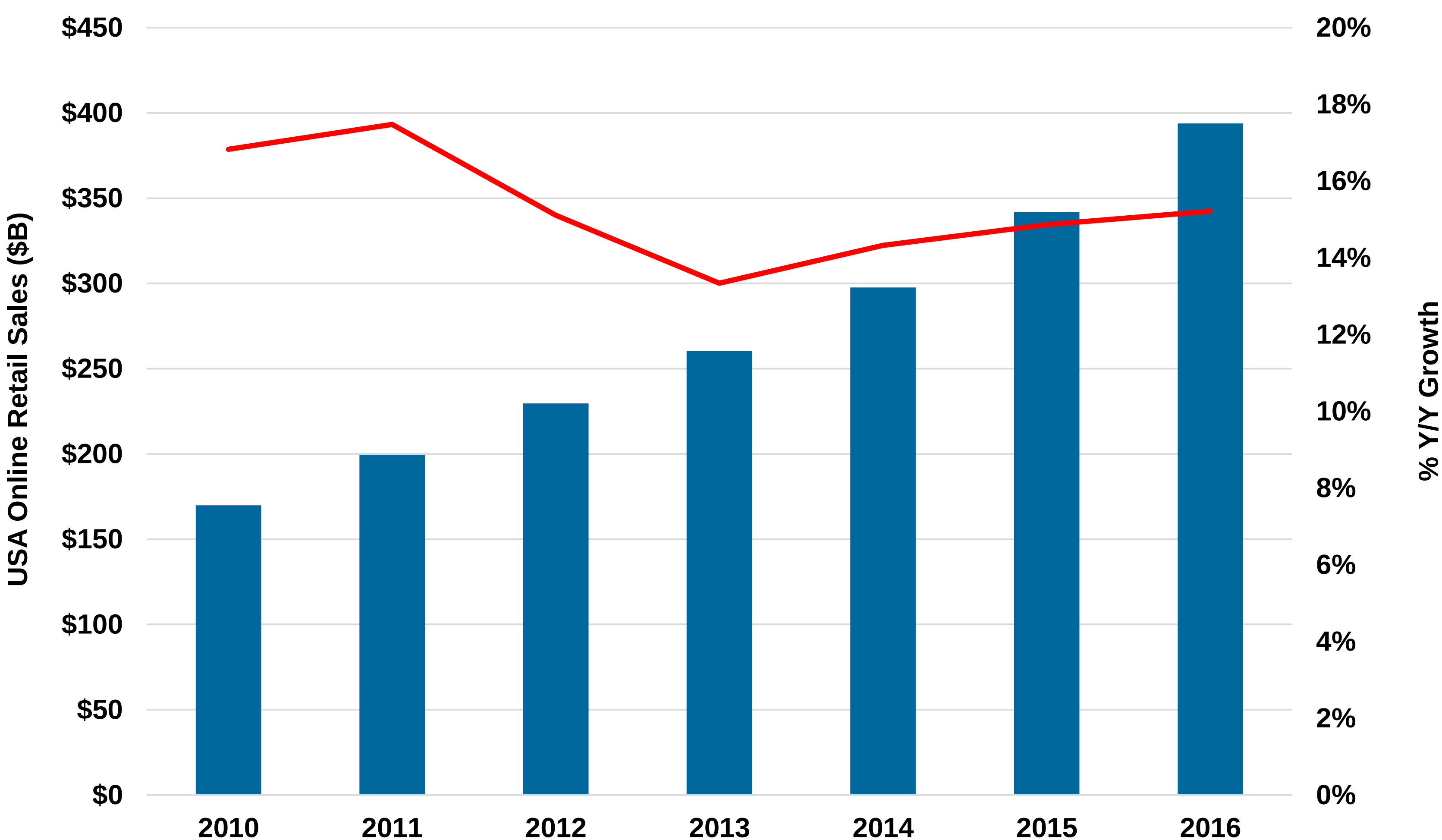



Source: Images: Amazon, 1010 Data
Note: Data collected from 9/15-8/16

# …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

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## 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…**

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# INTERACTIVE GAMES =

# MOTHERLODE OF…

# TECH PRODUCT INNOVATION / EVOLUTION + MODERN LEARNING

***WITH THANKS TO BING GORDON FOR INSIGHT + INSPIRATION***

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# Global Interactive Gaming = Mainstream / Evolving Rapidly / Still Early Days…

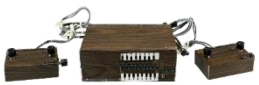
# 2.6B Gamers* vs. 100MM in 1995

Source: Unity Q1:17 estimate (5/17), Electronic Arts 2016 estimate (12/16), Electronic Arts 1995 estimate (5/17)
*Unity estimates reflect the total number of users seen playing mobile games (at least once every three months) powered by both proprietary and leading 3rd party game engines. This number assumes all PC or Console gamers also play at least 1 mobile game.

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

**Moore's Law (Processing)** → **Zuckerberg's Law* (Sharing)** →

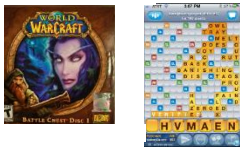
**1 Player = Arcade**



**2 Players = Consoles**

**2+ Players = Consoles + LAN**

**Millions of Players = Online Network**



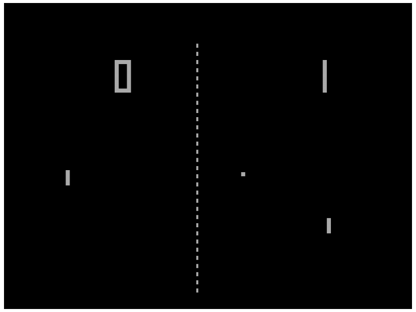
**Millions of Players + Spectators = eSports**

MLG

ESL

twitch

**Solo – Living Room…**



**45 Years**

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

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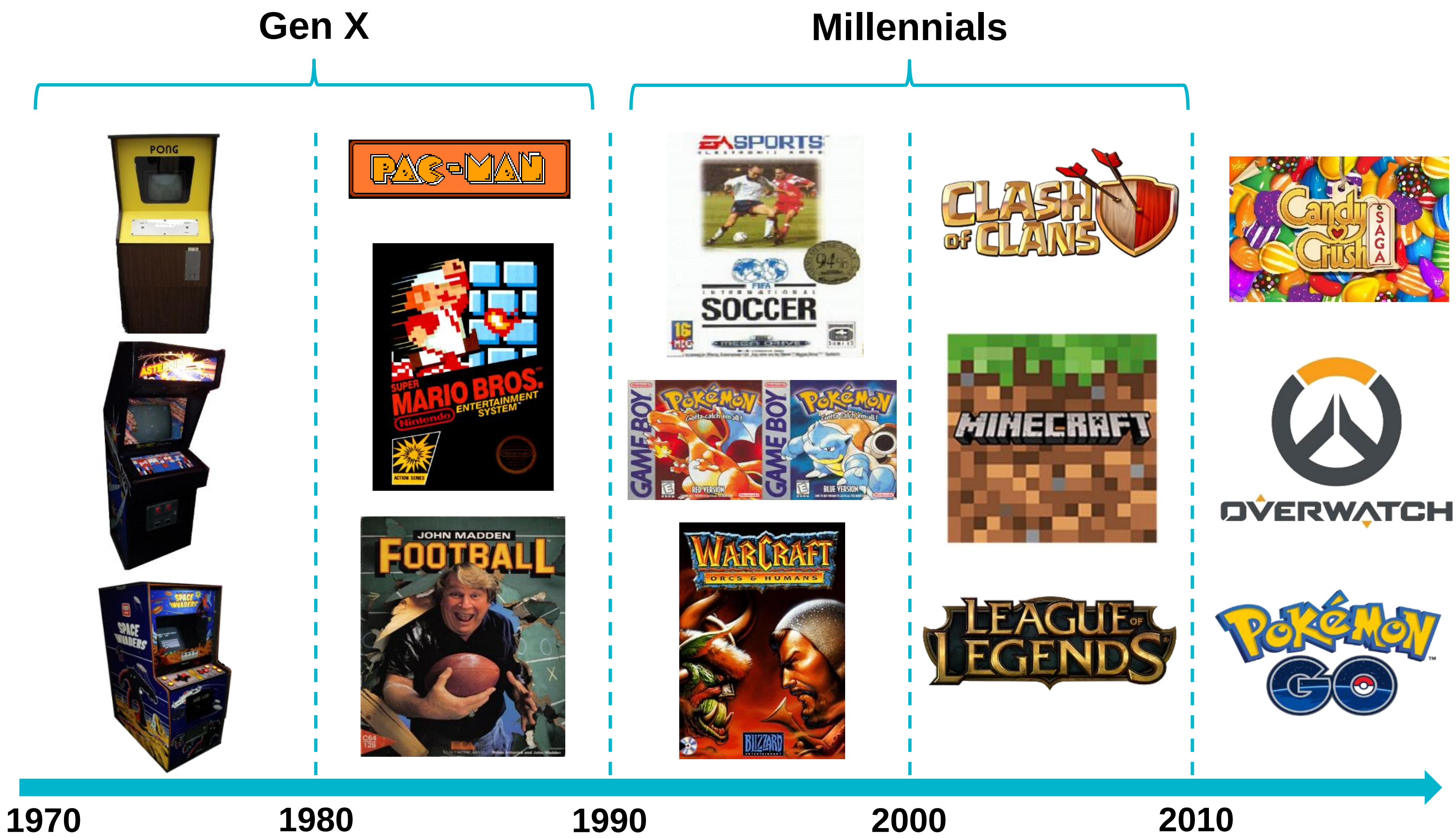
Source: Images: National Museum of American History (Brown Box), Wikipedia Creative Commons (Pac-Man, Atari 2600, SG-1000, SNES, N64, PS1, Xbox, PS2), Flickr user Sham Hardy (World of Warcraft), Flickr user coneybeare (Words with Friends), ESL (ESL Logo), Twitch (Twitch Logo), Major League Gaming (MLG Logo), Wikimedia Creative Commons (Pong), Flickr user BagoGames (eSports Stadium)
Note: In 1967 TV Game Unit #7, also known as the "Brown Box" was launched as a prototype and is considered the father of video game consoles per the National Museum of American History.
*Zuckerberg's Law describes the exponential growth of online social networks as per Saul Hansell in NY Times, 11/6/08.

# …Gen X + Millennials = Gamified Since Birth

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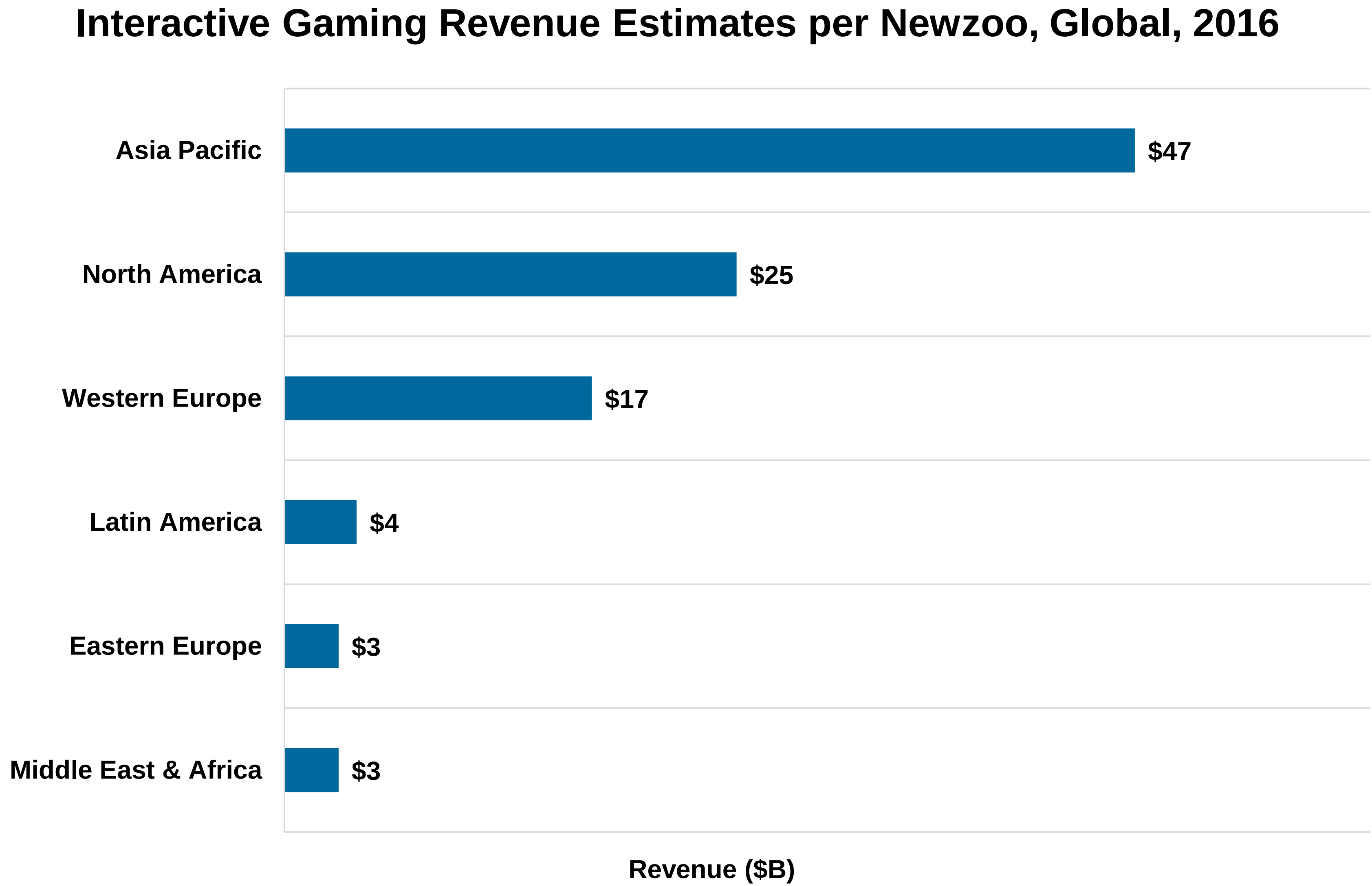
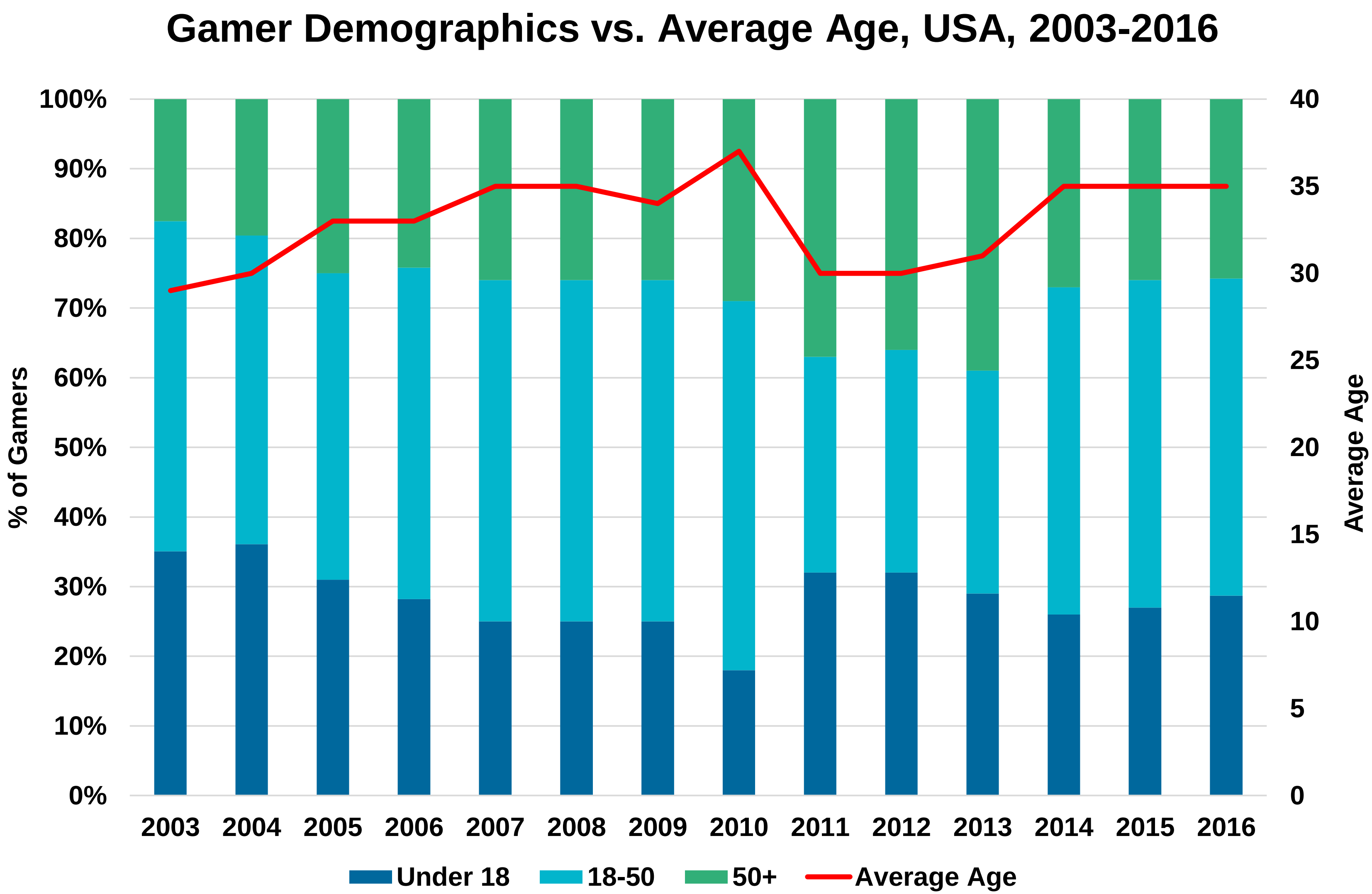
Source: Images: Wikimedia Creative Commons (Pong, Asteroids, Space Invaders, Pac-Man), Flickr user BagoGames (Mario Bros), Mobygames (John Madden Football), Electronic Arts (FIFA), Pokémon (Pokémon Red and Blue versions), World of Warcraft (Warcraft), Supercell (Clash of Clans), Minecraft (Minecraft Logo), Riot Games (League of Legends), King (Candy Crush Saga), Activision Blizzard (Overwatch), Pokémon Go (Pokémon Go)

# Gaming = Large + Broad + Growing Business… Revenue @ $100B, +9% Y/Y




Source: Newzoo Global Games Market Report (2016)
Note: Excludes console / gaming PC hardware revenue.

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

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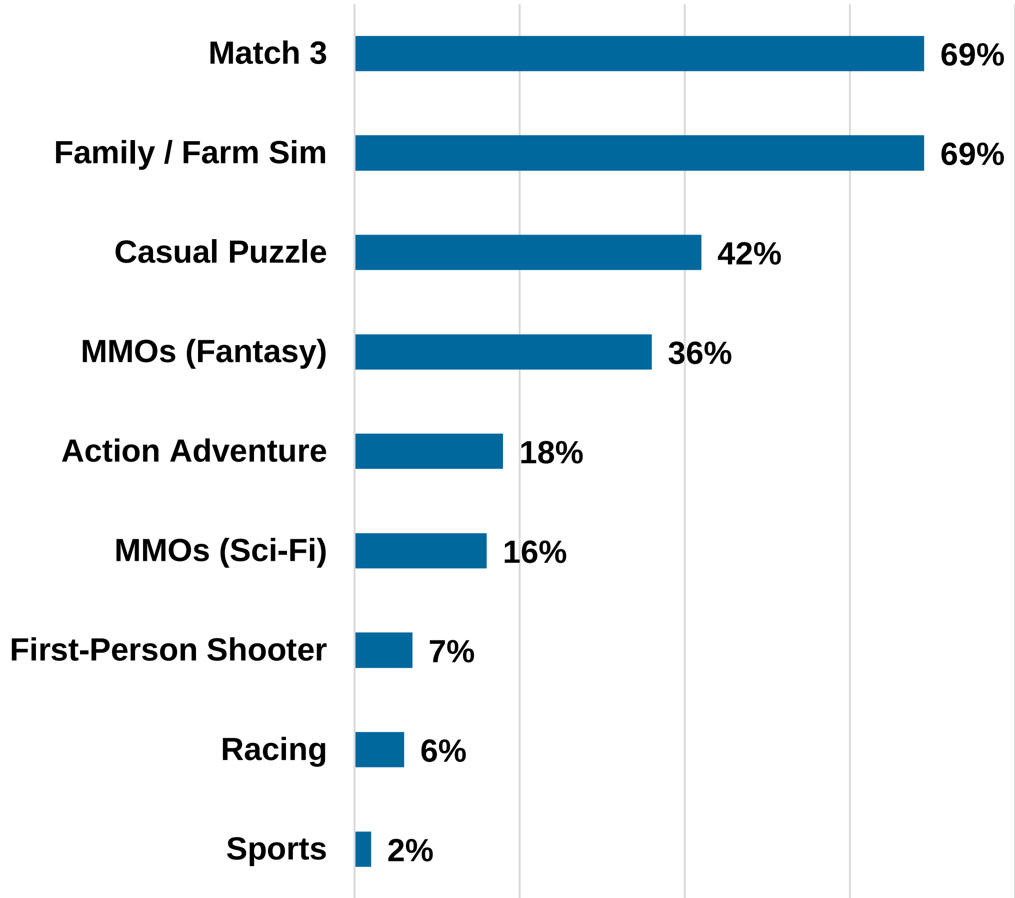
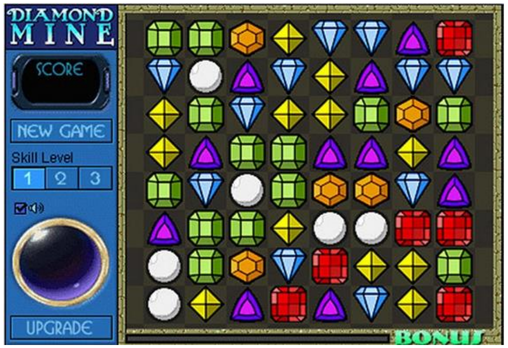
Source: Entertainment Software Association (ESA) Essential Facts About the Computer and Video Game Industry 2003-2016
Note: Based on a survey of 4,000 U.S. households.

# 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

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Source: Quantic Foundry, Top Right Image: Popcap, Bottom Left Image: MoMA
Note: Each genre analyzed contained between 3-5 game titles. The median sample size for each game title was 1,184. And the median sample size for each genre was 4,657.

***Gaming Tools = Pervasive Online…***

***Can Optimize Learning + Engagement…***

***Foundational for Internet Services***

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# *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***

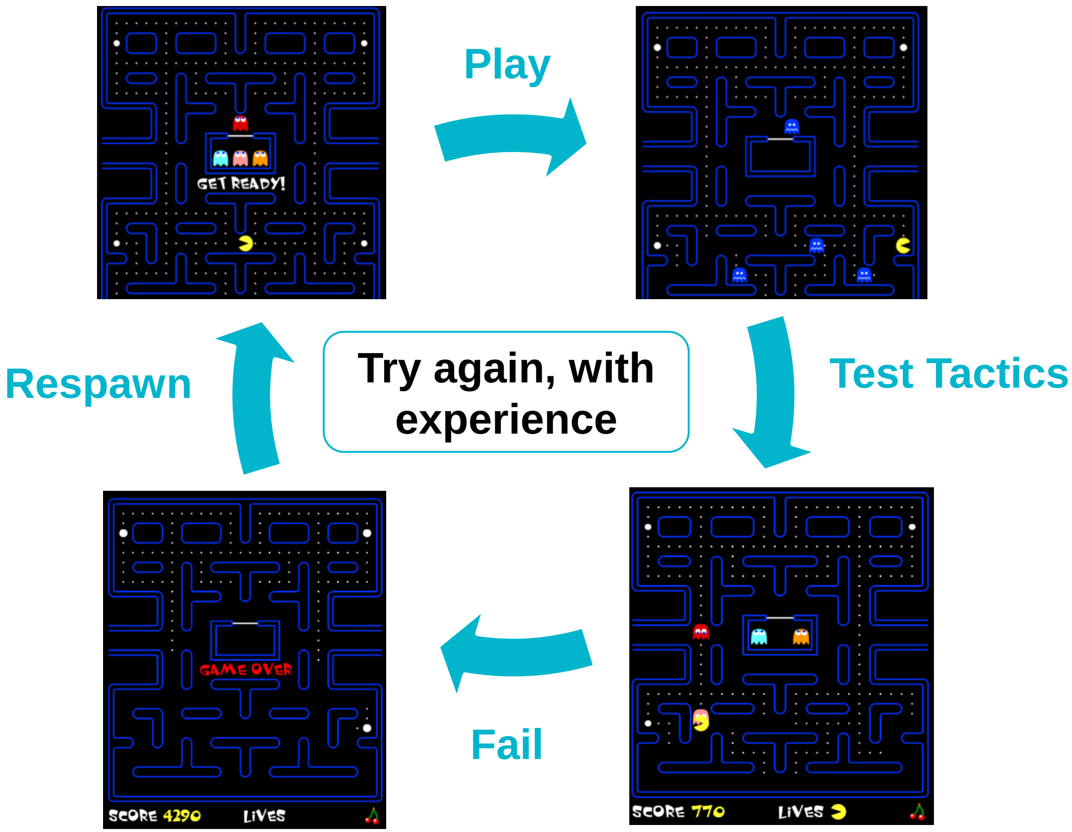
***Interacting With / Analyzing Data***

***Self Optimizing***

***Creative Story Telling***

# Repetition =
# Learn from Losing…

## Trial & Error
Gaming Lifecycle

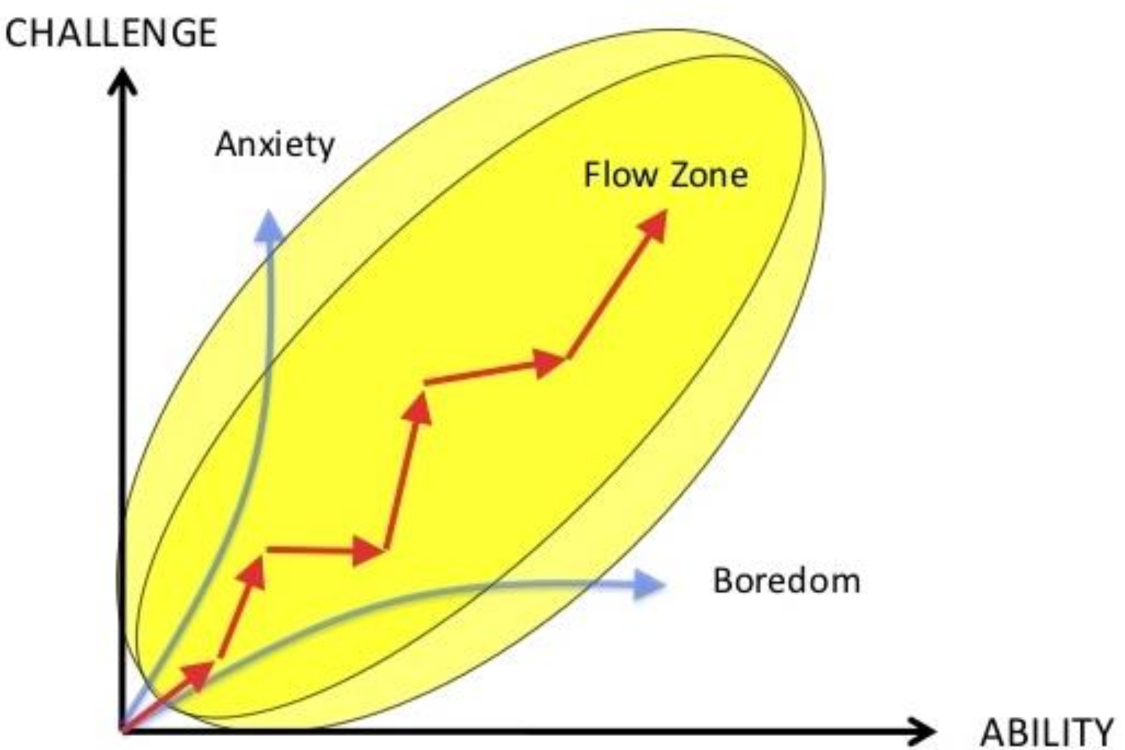



Source: Center quote from Len Schlesinger: "Failure doesn't mean the game is over, it means try again with experience," Global Leadership Summit (8/11/11), Images: Playpacmanonline.net

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

**Engaging Learning Process**

Machine-Learning Fine-Tunes Gaming Mechanics

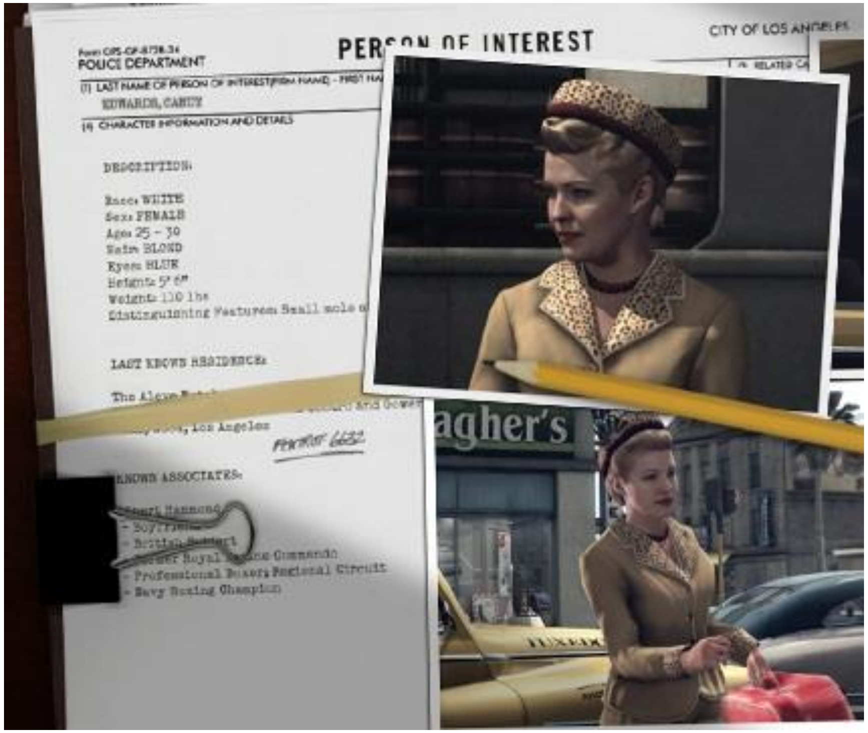



Source: Image: Games for Learning Institute

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

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

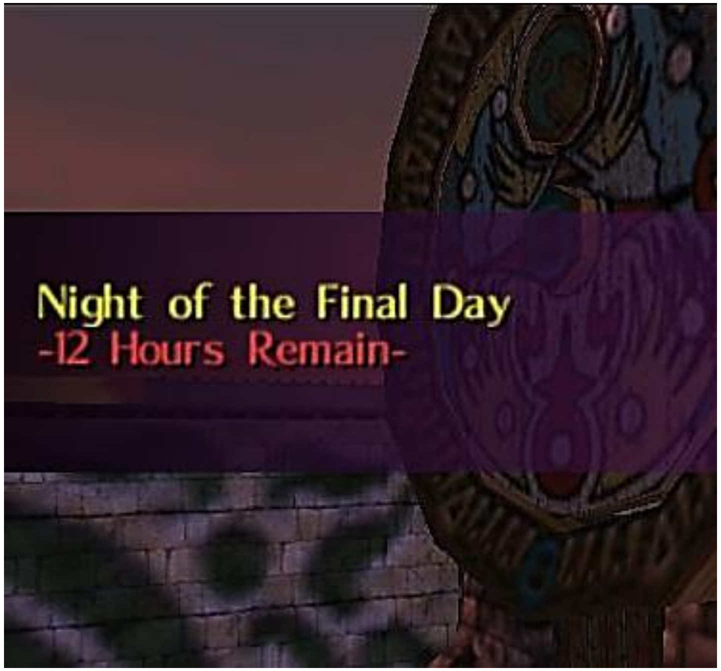

**Unstructured Puzzles**
**(Long-Form)**
L.A. Noire Detective Cases




Source: Left image: Game Set Watch, Right image: L.A. Noire (Rockstar Games)

# …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'

Source: Left image: Zelda Informer, Right image: Activision Blizzard Battle.net

# …Completing Projects = Track Finish Line from Start…

**Focus on End Goal**
Pokémon ‘Gotta catch ‘em all!’


**Track Experience**
Skyrim


Source: Left Images: Logos Wikia, Bulbapedia, Right Images: Skyrim, YouTube user HighlandMarker, Portforward.com, metagamebook, Stack Exchange

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

**Leveling Up**
Candy Crush Saga



**Gain Experience Completing Puzzles**



**Quantified Mastery**
Max Level in World of Warcraft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Source: Left Images: Apptipper, King, Right Image: Blizzardwatch

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

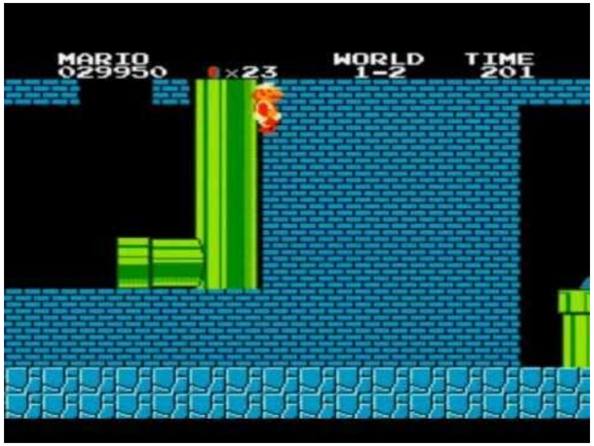
**Competing Against Yourself**
Time Trials in Mario Kart 64


**Competing Against Others**
Scoring Goals Online in Rocket League

Source: Left Image: YouTube user Drew Weatherton, Right Image: GameSpot

# …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



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Source: Left Images: Nintendo, Right Images: Digital Trends, Games Radar

# …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…**

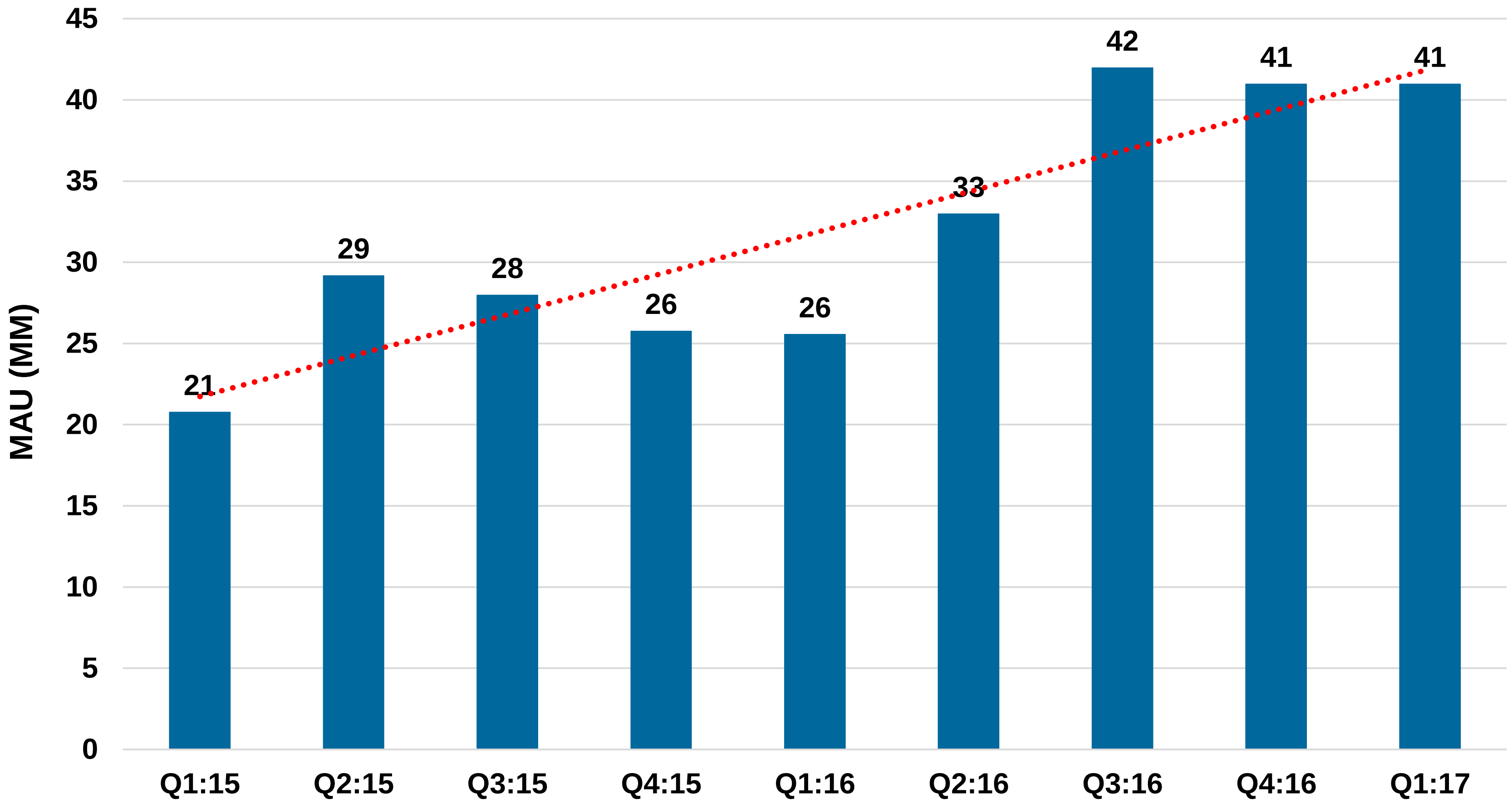

**…But = Consequences**

Source: Salen & Zimmerman, Rules of Play: Game Design Fundamentals, Left image: YouTube user Ross Campbell, Right image: YouTube user x Pepper

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

**Blizzard = Millions Playing Together Online, Global**

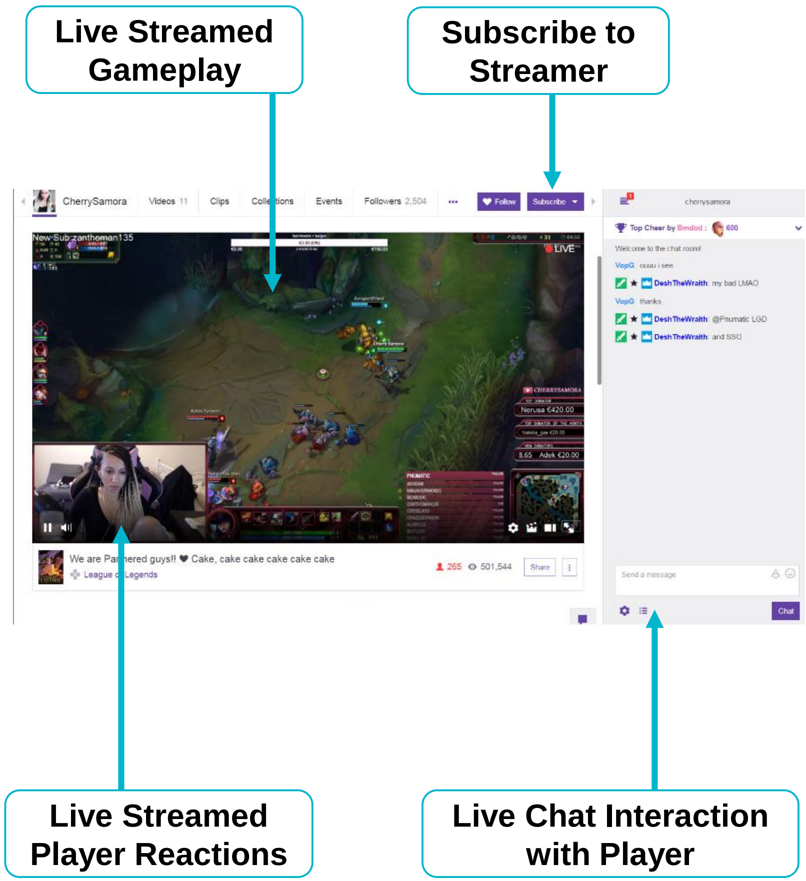
Key Multiplayer Franchises = World of Warcraft + Diablo + Starcraft + Overwatch



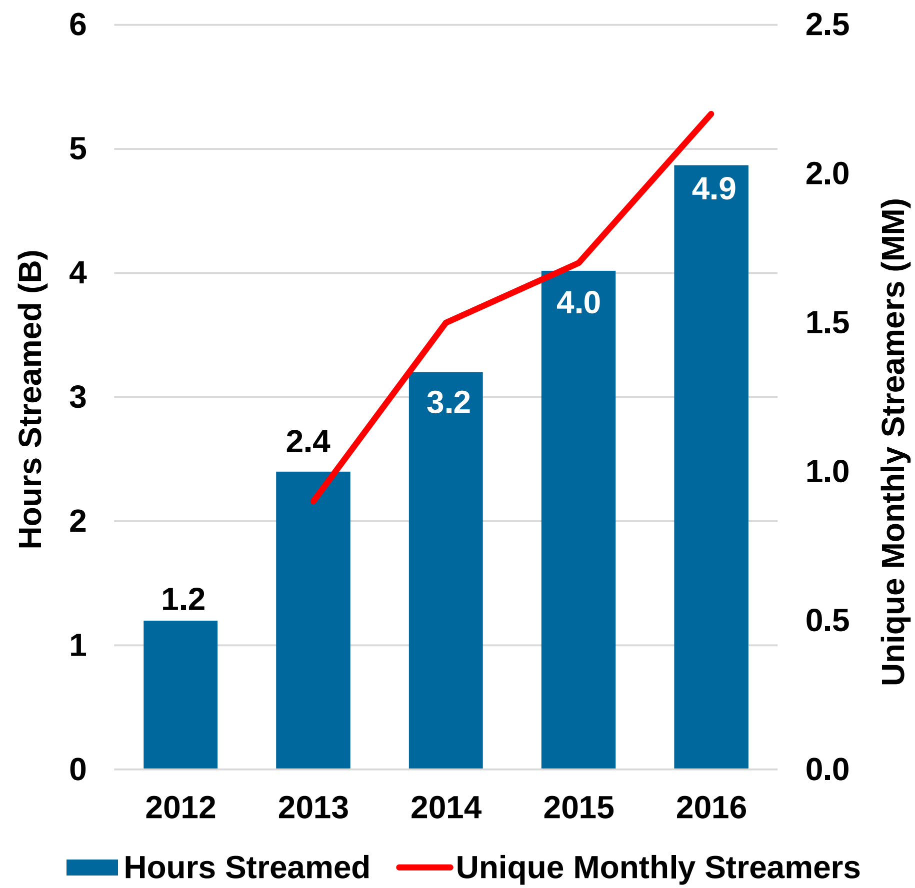

Source: Activision, Morgan Stanley
Note: Graph emphasizes Blizzard over Activision and King users due to the multiplayer nature of most Blizzard franchises.

# …Observing =
# Learn From Watching Others Perform…

## Twitch Streaming
10MM DAU, 2/17




## Twitch Hours Streamed vs. Unique Monthly Streamers




Source: Left image: Twitch Streamer: cherrysamora, Twitch Annual Reports 2013-2016

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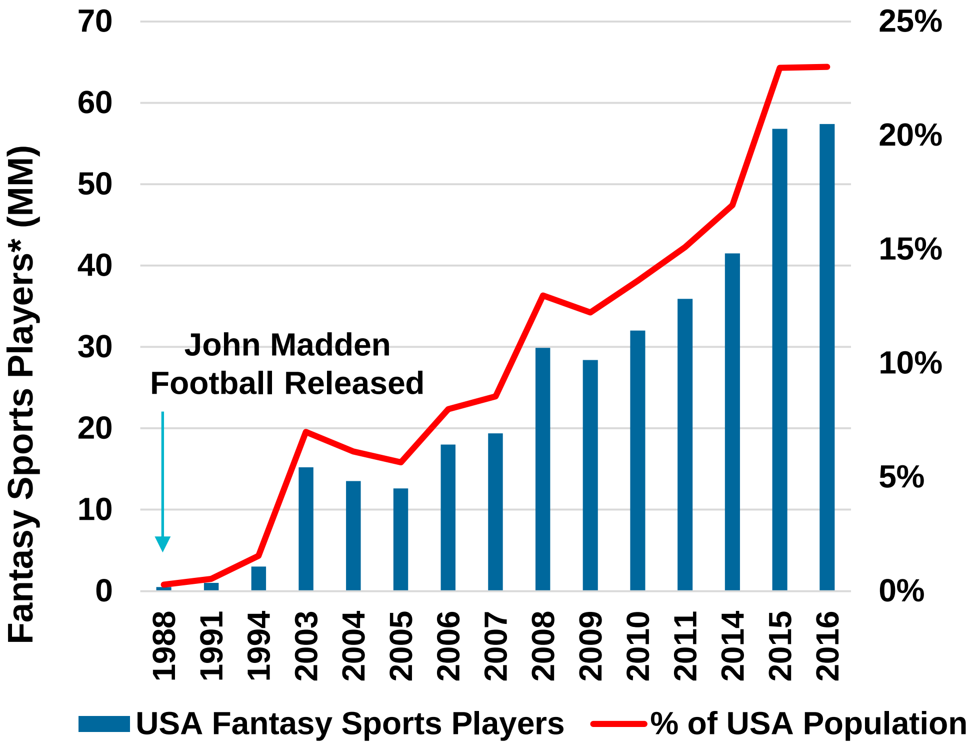
# …Interacting With / Analyzing Data = Many Games Have Strong Math Underpinnings…

**Live Stats**
Feed Into Video Games + Fantasy Sports

**Fantasy Sports**
Fans Engaged in Analytics, USA, 1988-2016




Source: FSTA, Left image: Flickr user We Are Social, U.S. Census Bureau
*Fantasy Sports Players are defined as U.S. individuals aged 18+ having played fantasy sports in the past year. Based on survey of USA individuals aged 18+, n=1,000.

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

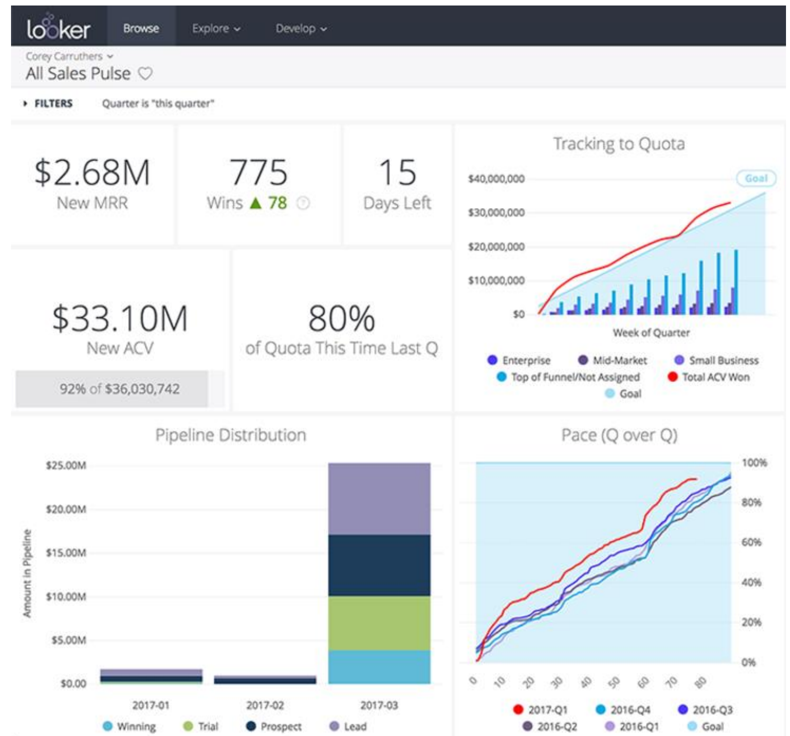
## In-Game Player Analytics / Dashboards

Increasingly Found in Enterprise / Consumer Products / Services

### Madden 2017 Player Stats



### Looker Business Intelligence Dashboard




Source: Top left image: YouTube user Brian Mazique, Bottom left image: Uproxx, Right Image: Looker

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

## Choosing Gameplay Experience
Mass Effect 3


## Laying Building Blocks of a Virtual World
Minecraft

Source: Left image: Gamepedia blog, Right image: Kotaku 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***

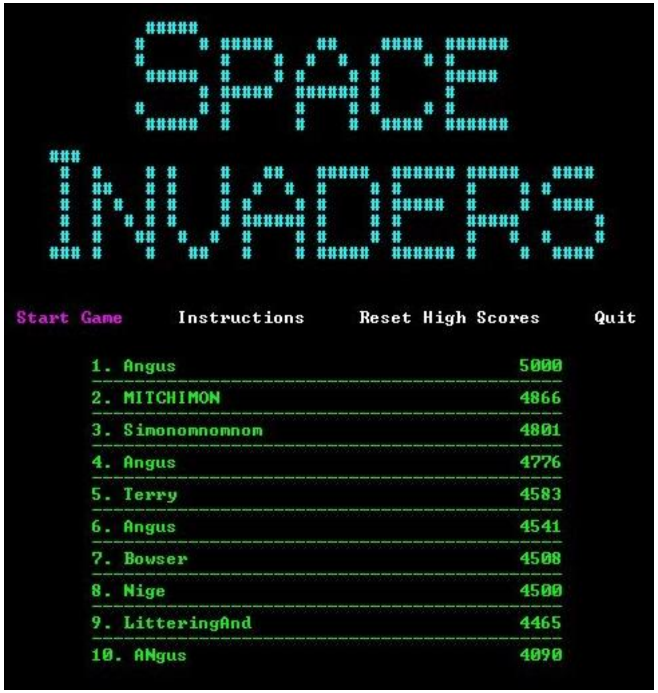
***Live Camera Angles***

***Graphics Computation***

# Reputation / Rankings = Deep Roots in Gaming…

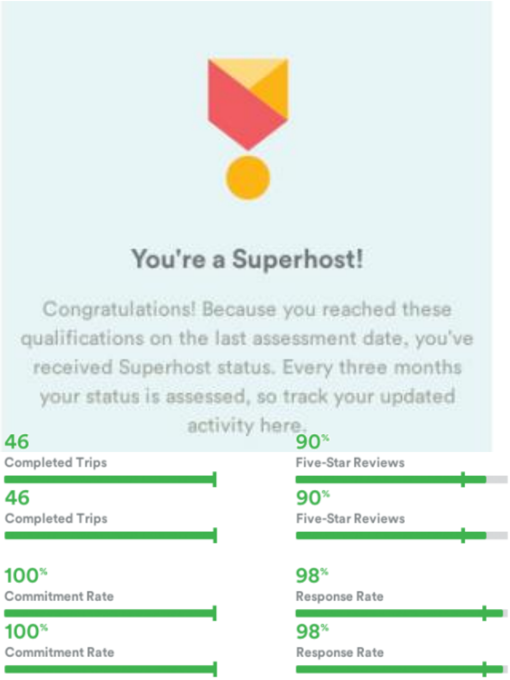
## Early Gaming (1978)

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




## Mainstream Internet (Now)

**Airbnb**
Superhost Program Recognizes Top Performing Hosts



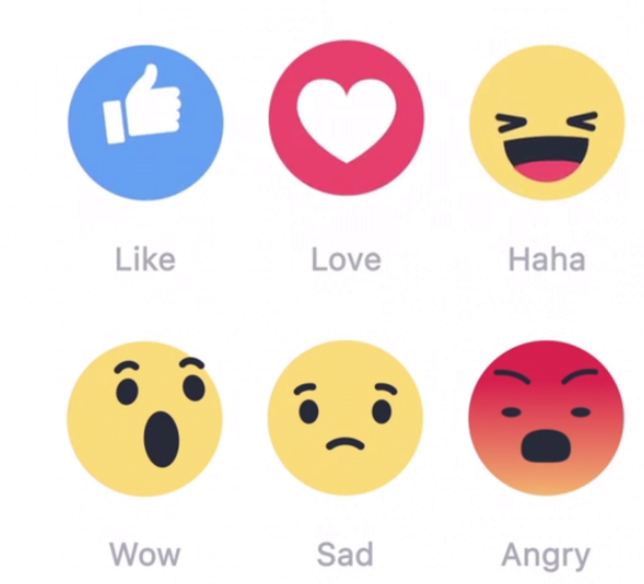

Source: Left image: Codexdex, Right image: Airbnb, Probnb

# …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

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Source: Left image: Atari Age, Right image: Facebook

# …Interactive Storytelling = Deep Roots in Gaming…

| Early Gaming (1980) | ↔ | Mainstream Internet (Now) |
|---|---|---|

**Atari**
First Role Playing Game


**Netflix + Amazon / Twitch**
Experimenting with Interactive Shows

NETFLIX

twitch

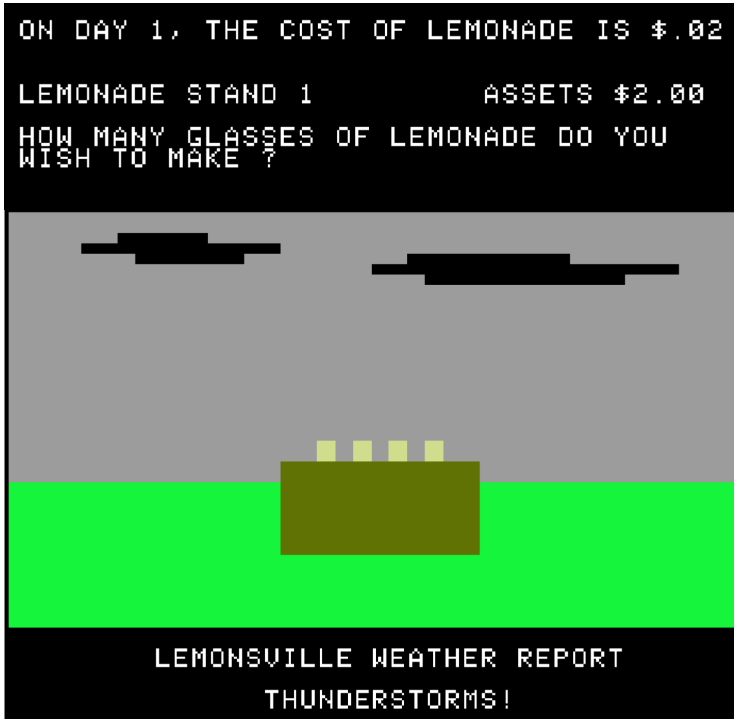
amazon

Source: Left image: mprd.se, Right images: Netflix, Amazon

# …Interactive Learning = Deep Roots in Gaming…

| **Early Gaming (1979)** | **Mainstream Internet (Now)** |
|---|---|

**Lemonade Stand**
Teaching Economics 101




**Duolingo**
Leveling Up in Languages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Source: Left Image: Archive.org, Right Image: Duolingo,

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

**Early Gaming (1993)** ↔ **Mainstream Internet (Now)**

**Sega**
Downloadable Content via Cable

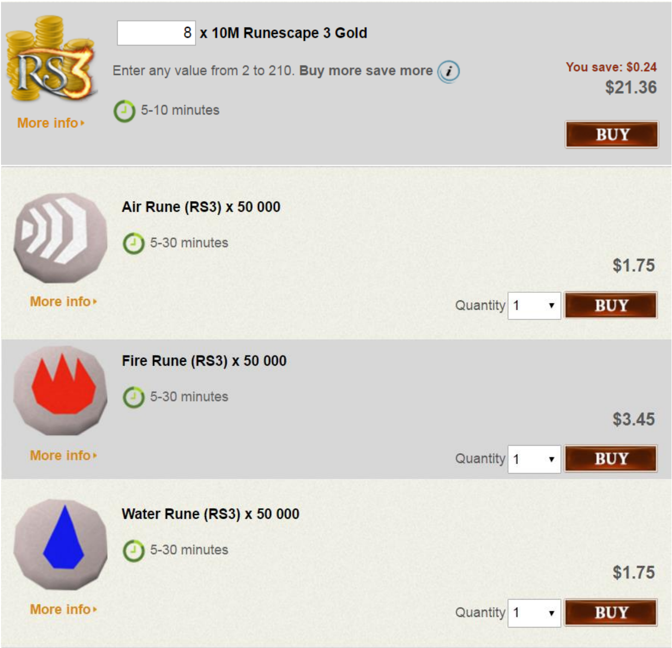

**Tesla**
Over-the-Air Software Updates

Source: Left image: Gamecrate, Right image: Tesla

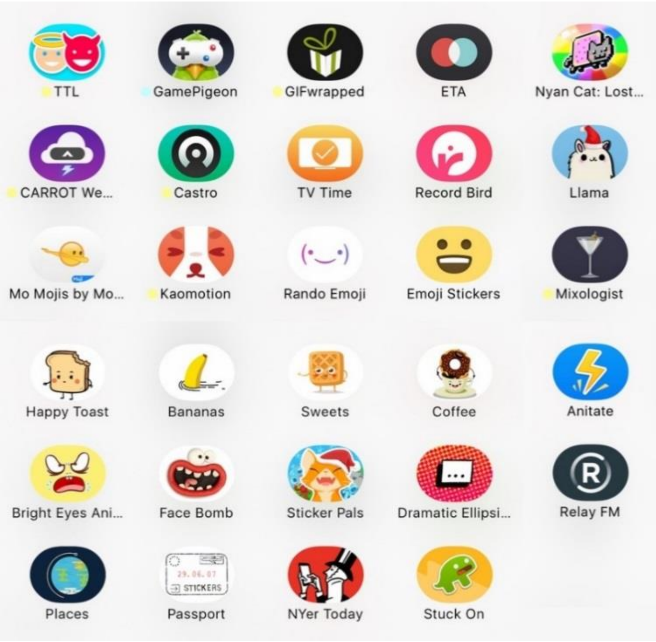
# …Secondary Markets = Deep Roots in Gaming…

**Early Gaming (2001)** ⟷ **Mainstream Internet (Now)**

## Runescape
Secondary Markets for Items / Currency




## Apple iMessage
3rd Parties Offer Sticker Packs




Source: Left image: RPGStash, Right image: Macstories

# …Messaging = Deep Roots in Gaming…

| Early Gaming | Mainstream Internet (Now) | |
|---|---|---|
| **1999** OICQ | WeChat, QQ | **768MM DAU 12/16** |
| **2009** Tiny Speck | slack | **5MM DAU 1/17** |
| **2013** Hammer & Chisel | Discord | **9MM DAU 5/17** |

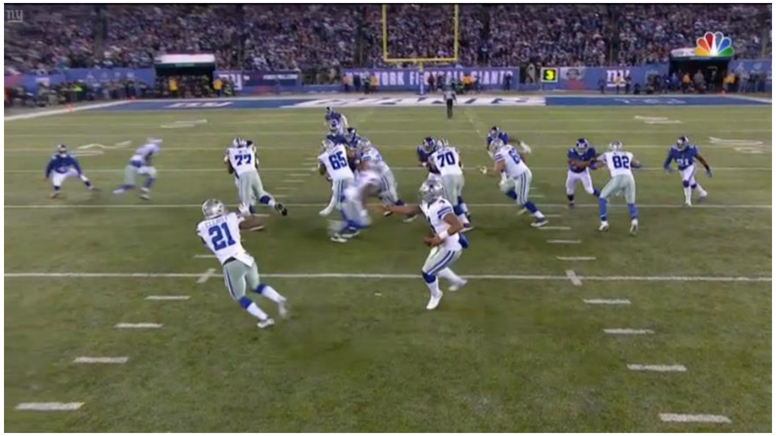
Source: WeChat 2016 Year End Report (12/16), Ali Rayl Interview (Head of Global Customer Experience at Slack) (1/17), Venture Beat (5/17), Top left image: Pingwest, Top right images: Tencent, Middle images: SiteProNews, Bottom left image: ifeng, Bottom right image: Corsair

# …Live Camera Angles = Deep Roots in Gaming…

**Early Gaming (1996)** ↔ **Mainstream Media (Now)**

**Madden Football**
Unique Game Perspectives


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



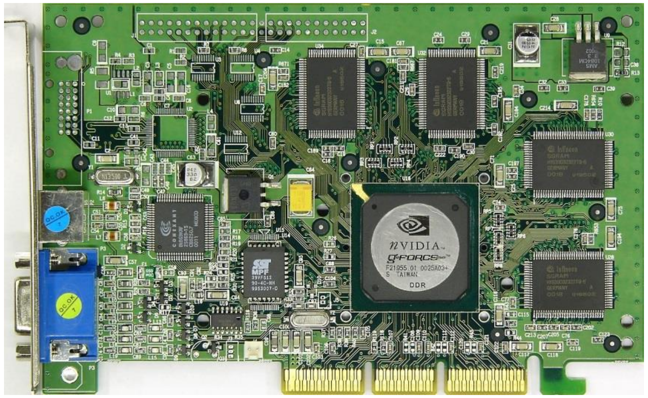
Source: Left image: Electronic Arts, Right image: Giants NFL

# …Graphics Computation = Deep Roots in Gaming

| Early Gaming (1999) | Mainstream Internet (Now) |
|---|---|

**NVIDIA**
Launches GeForce 256 GPU

NVIDIA



**Many Companies**
GPUs Used for Artificial Intelligence

amazon web services

IBM Watson

Google DeepMind

Source: Left Images: NVIDIA, VGA Museum, Right images: Google Deepmind, Amazon, IBM

*In Era of*
*Perceived Disengagement =*

*'Engagement' + Measurement Rising…*

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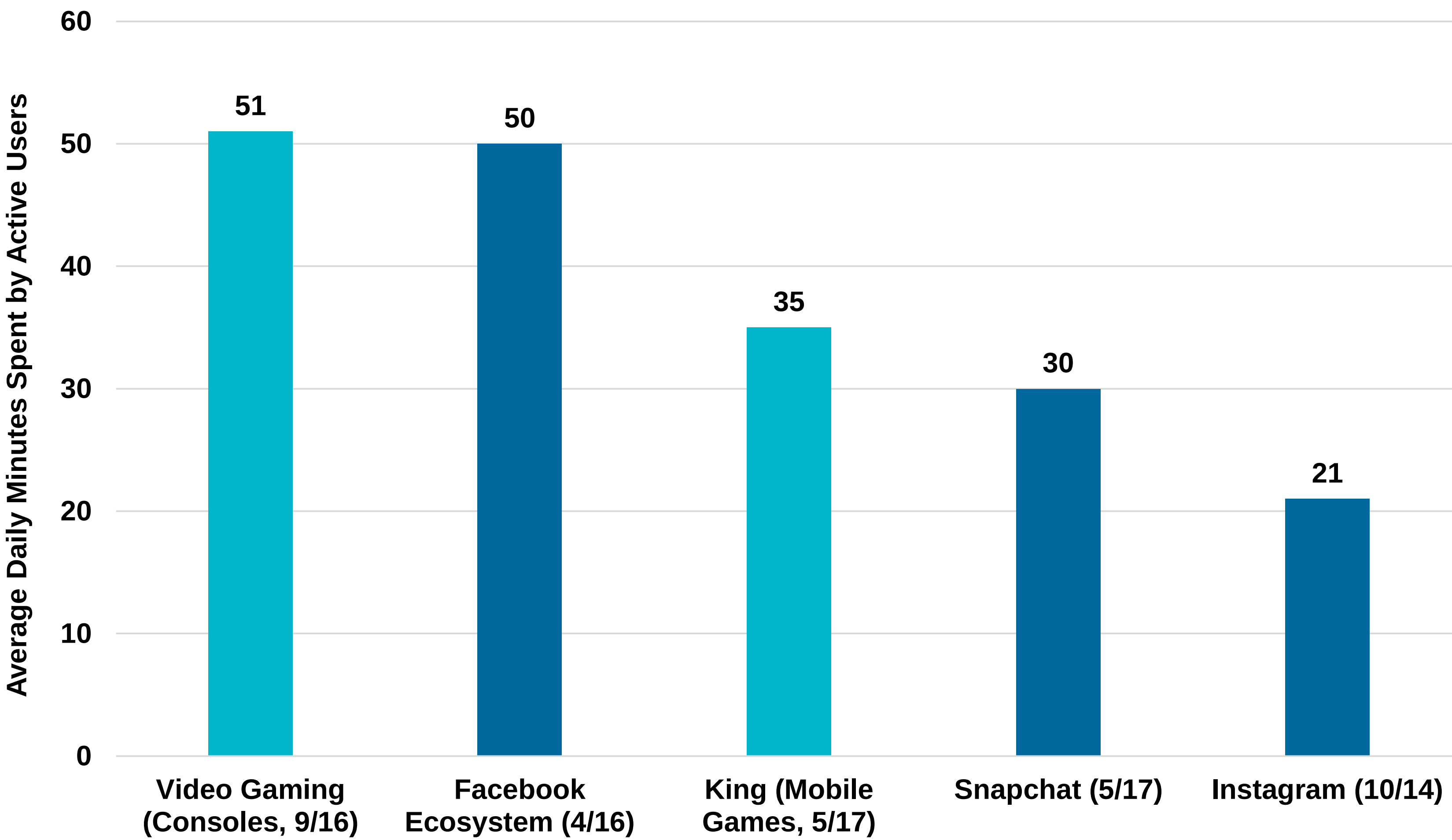
# Video Gaming =
# Most Engaging Form of Social Media

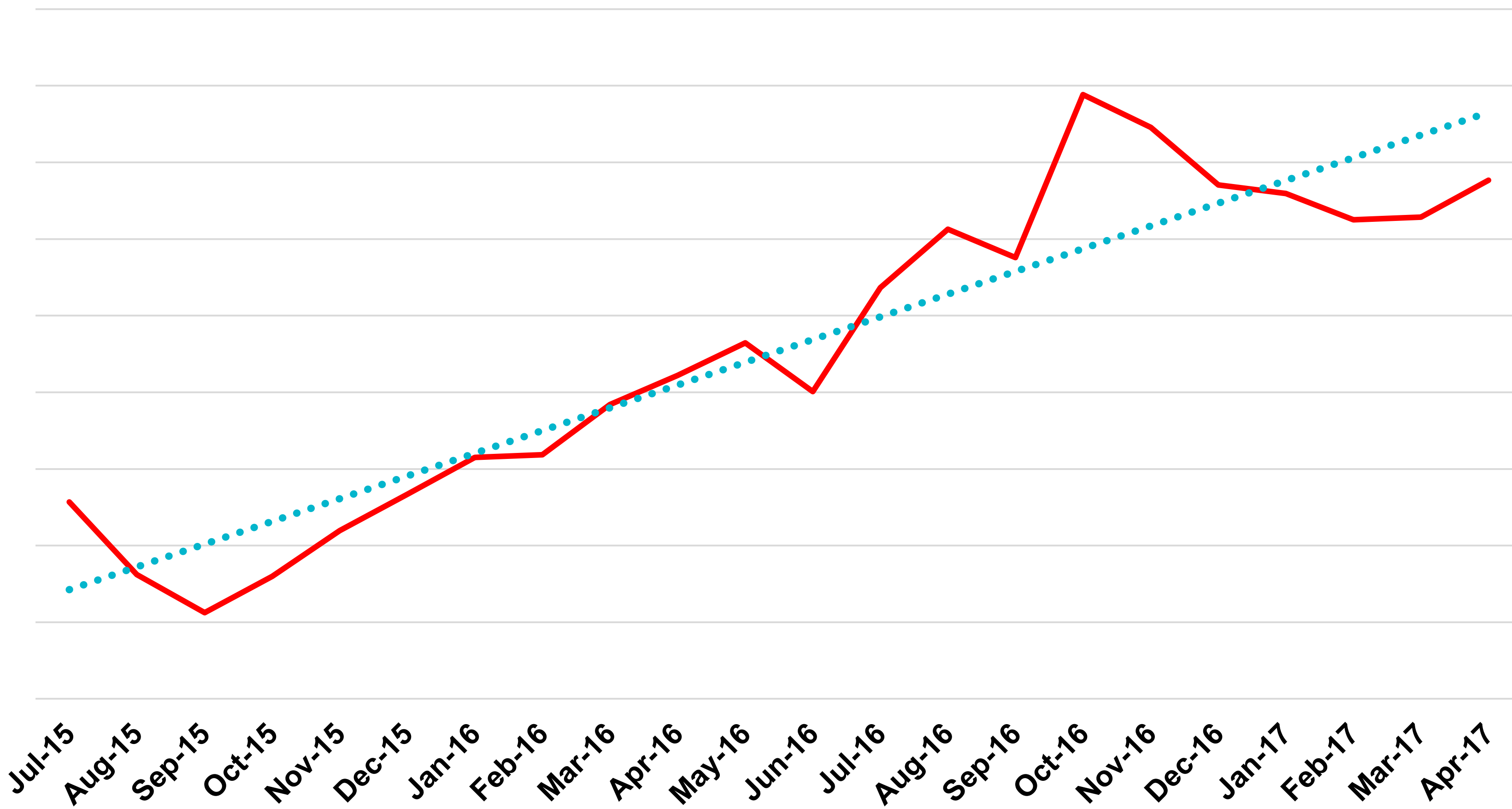
## Daily Minutes Spent per User Across Select Digital Media Platforms




Source: Global Web Index (9/16), Facebook Q1:16 Earnings Call (4/16) & Q3:14 Earnings Call (10/14), Activision Q1:17 Earnings Call (5/17), Snapchat Q1:17 Earnings Call (5/17)
Note: Video Gaming (Consoles): Global survey, n=17,990, of console users aged 16-64 asking "Roughly how many hours do you spend playing on game consoles during a typical day." Includes Xbox One, Nintendo Wii U, PS4, Xbox 360, PS3, Nintendo Wii King: Average time spent per DAU. King used to illustrate mobile gaming time spent given the global nature of the platform and large base of daily active users (peaked at 158MM as of Q1:15, 128MM in Q4:15 was last disclosure). Snapchat: Average of the 25-30 minutes of daily usage found in the S-1 filing.

# 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




Source: Unity

*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

Source: GamesBeat Summit 2017: How games, sci-fi, and tech create real-world magic (5/12/17)

*Perhaps Interactive Gaming Evolution / Growth / Usage…*

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

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***Gaming Tools =***

***Improving Human Performance…***

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

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*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


Source: STRIVR Labs, Inc.

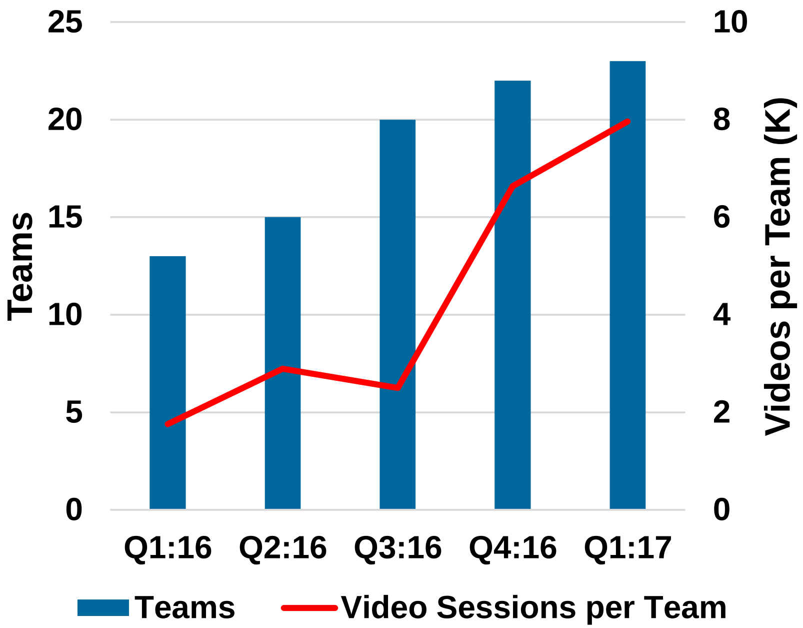
# Video + Machine Learning = Visuals + Deep Analytics Can Improve Performance

## Second Spectrum

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

### Video Analytics of Key Plays


### Teams vs. Video Sessions per Team

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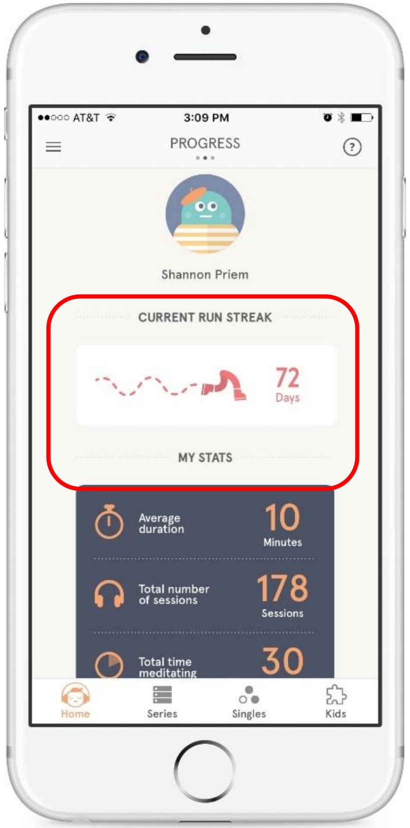
Source: Second Spectrum
Note: Video session is defined as every time a user at a team watches a play using the Second Spectrum system.
*Events are data surrounding key in-game actions such as pick-and-roll defenses, off-ball screens, shot probability or rebound probability. This allows players to query specific tactical actions during a game to gain better insight into how individuals / the team played.

# 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*

Source: Headspace

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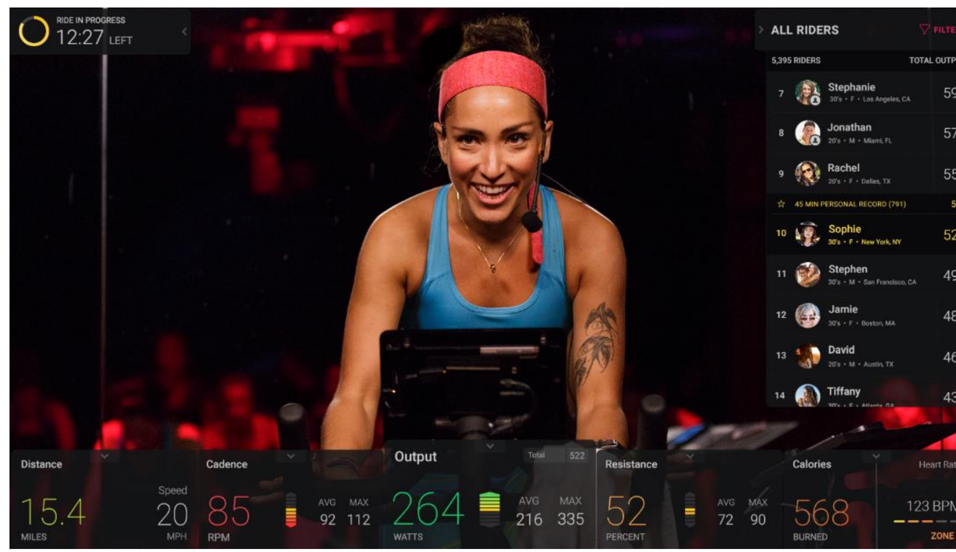
# Physically Interactive Media (PIM) = Real-Time Activity / Analytics Can Boost Intensity / Focus for Athletes

## Peloton

**2 Workouts per Week per Subscriber**

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

**1MM+ Home Workouts Streamed in 3/17**




Source: Peloton

# 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**

Source: I Am Zlatan: My Story On and Off the Field 2014, Left Image: New York Times (10/16), Right Image: The Sun

# …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


### Hoffenheim Scout Discovers Roberto Firmino…
Using Football Manager Video Game, 11/16


Source: Left Image: Twitter user Michy Batshuay, Right Image: Hardware Zone

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# …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 | **Patriots** | **27-24** | Patriots | 34-28 |
| Super Bowl L | 2016 | Broncos vs. Panthers | **Panthers** | **24-20** | Broncos | 24-10 |
| Super Bowl XLIX | 2015 | Patriots vs. Seahawks | **Patriots** | **25-24** | Patriots | 28-24 |
| Super Bowl XLVIII | 2014 | Broncos vs. Seahawks | **Broncos** | **31-28** | Seahawks | 43-8 |
| Super Bowl XLVII | 2013 | 49ers vs. Ravens | **Ravens** | **27-24** | Ravens | 34-31 |
| Super Bowl XLVI | 2012 | Patriots vs. Giants | **Giants** | **27-24** | Giants | 21-17 |
| Super Bowl XLV | 2011 | Steelers vs. Packers | **Steelers** | **24-20** | Packers | 31-25 |
| Super Bowl XLIV | 2010 | Saints vs. Colts | **Saints** | **35-31** | Saints | 31-17 |
| Super Bowl XLIII | 2009 | Steelers vs. Cardinals | **Steelers** | **28-24** | Steelers | 27-23 |
| Super Bowl XLII | 2008 | Patriots vs. Giants | **Patriots** | **38-30** | Giants | 17-14 |
| Super Bowl XLI | 2007 | Colts vs. Bears | **Colts** | **38-27** | Colts | 29-17 |
| Super Bowl XL | 2006 | Steelers vs. Seahawks | **Steelers** | **24-19** | Steelers | 21-10 |
| Super Bowl XXIX | 2005 | Patriots vs. Eagles | **Patriots** | **47-31** | Patriots | 24-21 |
| Super Bowl XXXVIII | 2004 | Patriots vs. Panthers | **Patriots** | **23-20** | Patriots | 32-29 |

Source: Electronic Arts, ESPN, USA Today, Forbes

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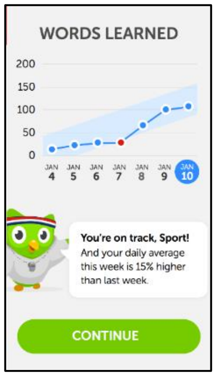
*…Immersive Gaming Tools =*

*Improving Performance Across Disciplines*

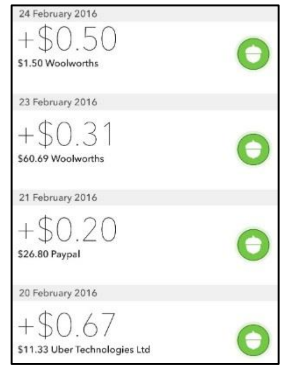
# Gamification =
# Influencing Multiple Consumer Services…

**Education**
Duolingo

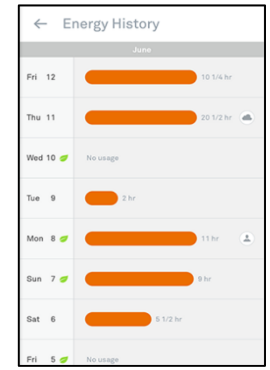



**Personal Health**
Mango Health


**Personal Finance**
Acorns

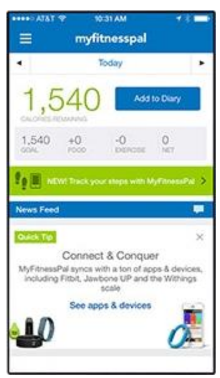



**Energy Conservation**
Nest

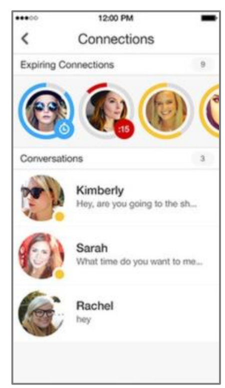



**Food**
Starbucks

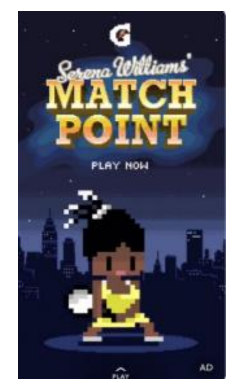

**Exercise**
myfitnesspal




**Dating**
Bumble




**Advertising**
Snapchat

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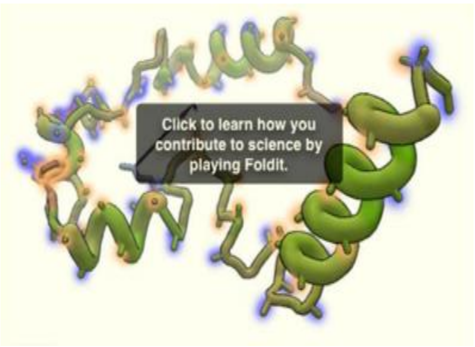
Source: Top Row Images: Duolingo, Mango, Acorns, Nest, Bottom Row: iPhone in Canada (Starbucks), Consumer fitness news (Myfitnesspal), 5why.com (Bumble), Snapchat

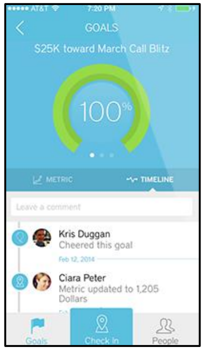
# …Gamification = Influencing Multiple Businesses…

## Healthcare Research
Foldit




## Military Training

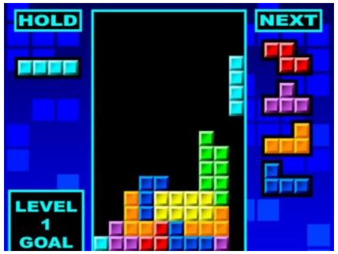
## Work Productivity
Betterworks




## Pilot Training
Boeing

## Healthcare Training
Simulated Surgery

## Neuroscience
PTSD Therapy

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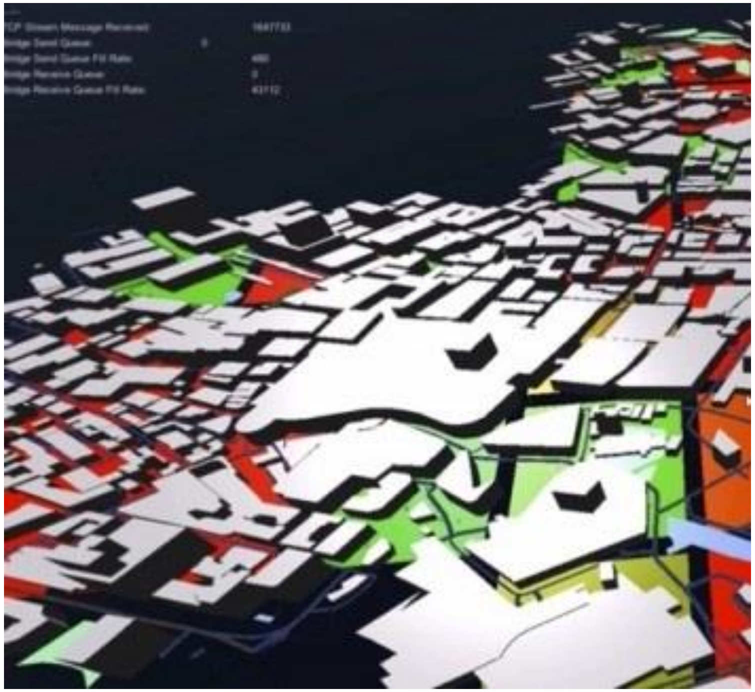
Source: Top Left Image: Fold.it, Top Middle Image: US Army Sgt 1st Class Caleb Barrieau, Top Right Image: Betterworks, Bottom Left Image: Boeing, Bottom Center Image: Simulated Surgical Systems, Bottom Right Image: Archpaper.com

…Gamification =
Influencing Complex Virtual Worlds + Real-World Simulations

**Improbable in Gaming**
Simulate Vast Virtual Worlds

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



Source: Worlds Adrift: Bossa Studios, Improbable

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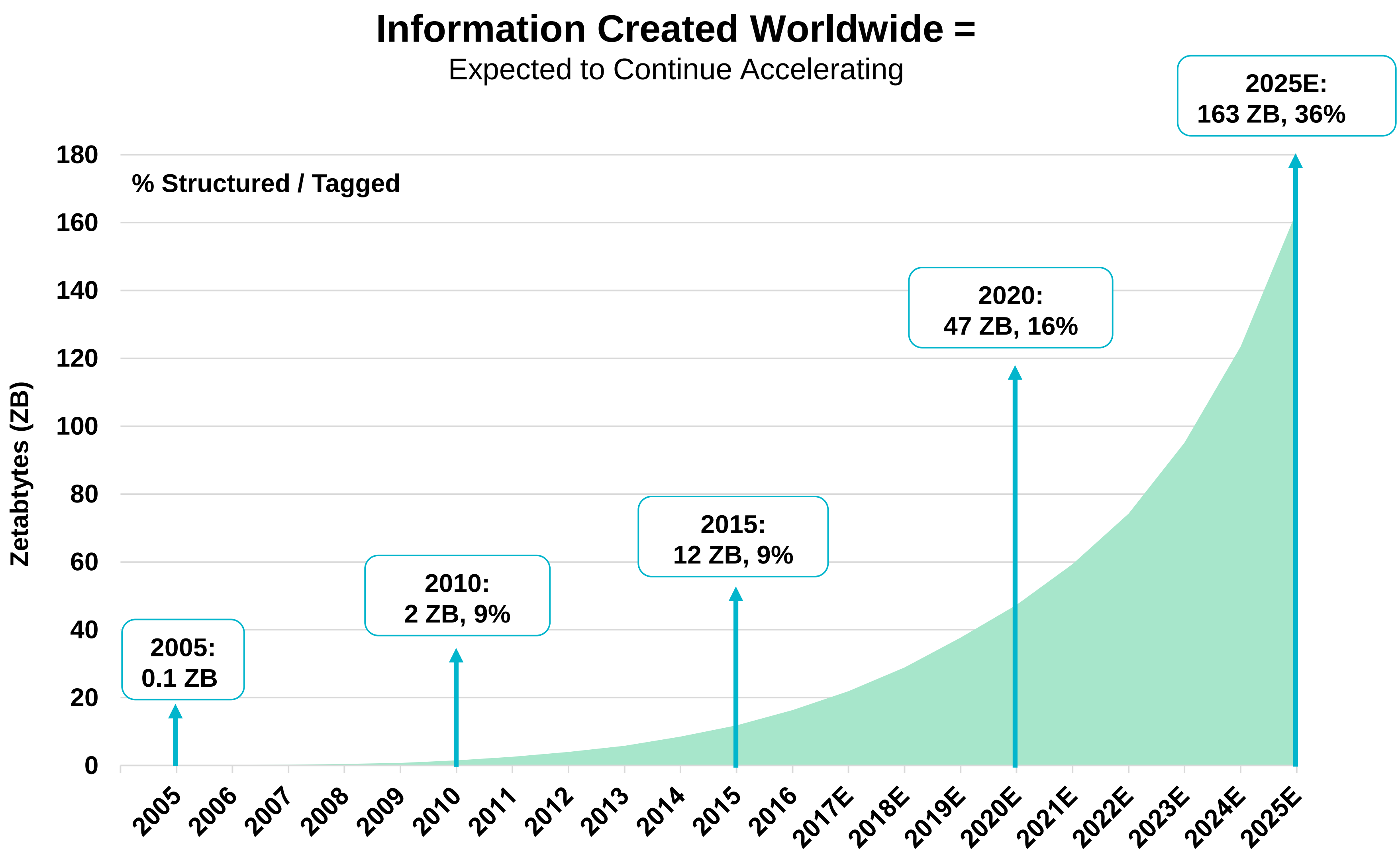
*As Rapid Data Growth Continues =*

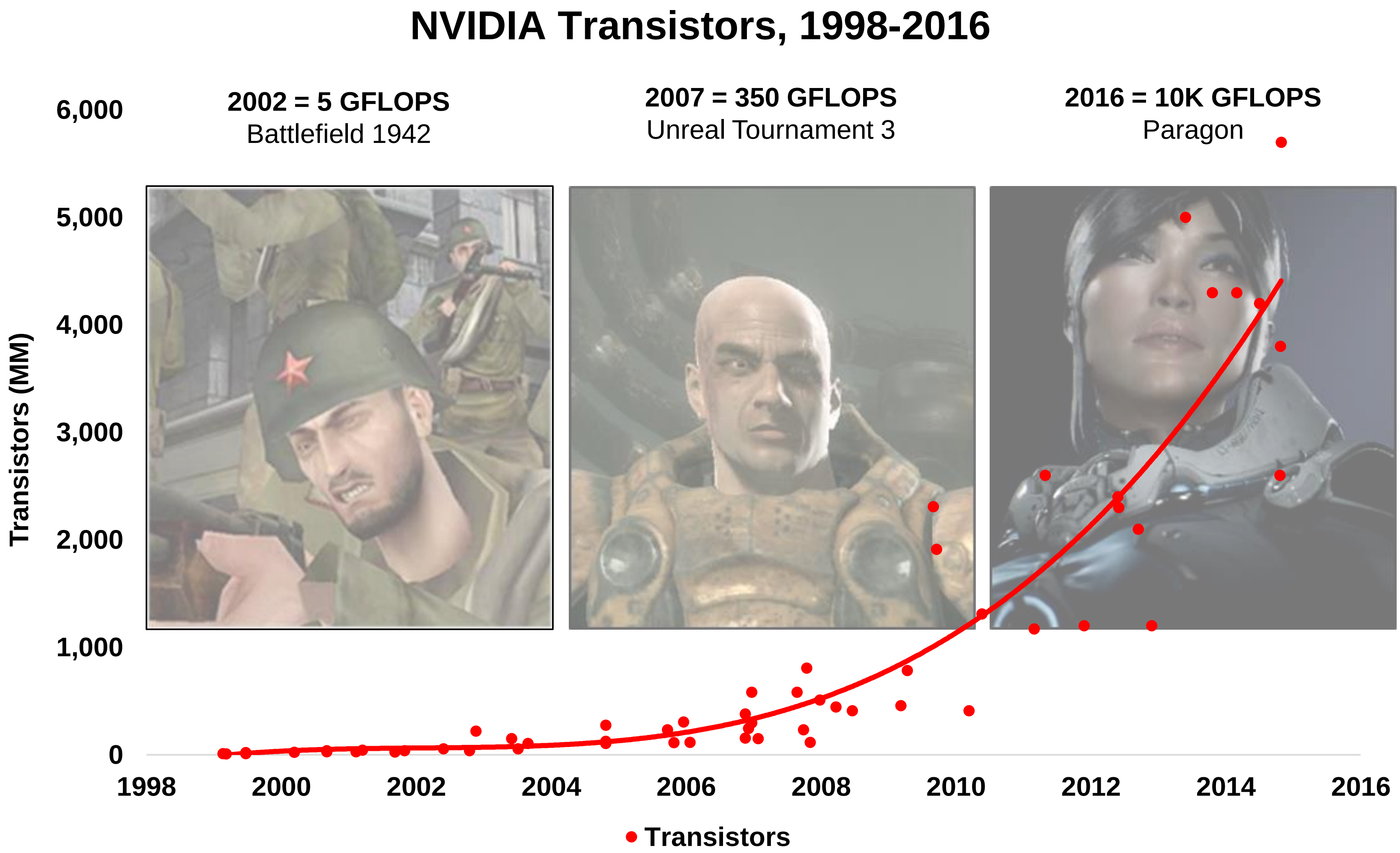
*Gaming Tools / Interfaces / Processors*
*Will Continue to*
*Organize + Drive Usefulness*

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




Source: IDC DataAge 2025 Study, sponsored by Seagate (3/17)
Note: 1 petabyte = 1MM gigabytes, 1 zeta byte = 1MM petabytes

# …GPU Processing Power Ramp Continues




Source: NVIDIA
Note: 1 GFLOP = 1B FLOPS, or "floating point operations per second."

***Gaming Platforms =***

***Evolving @ High Speed***

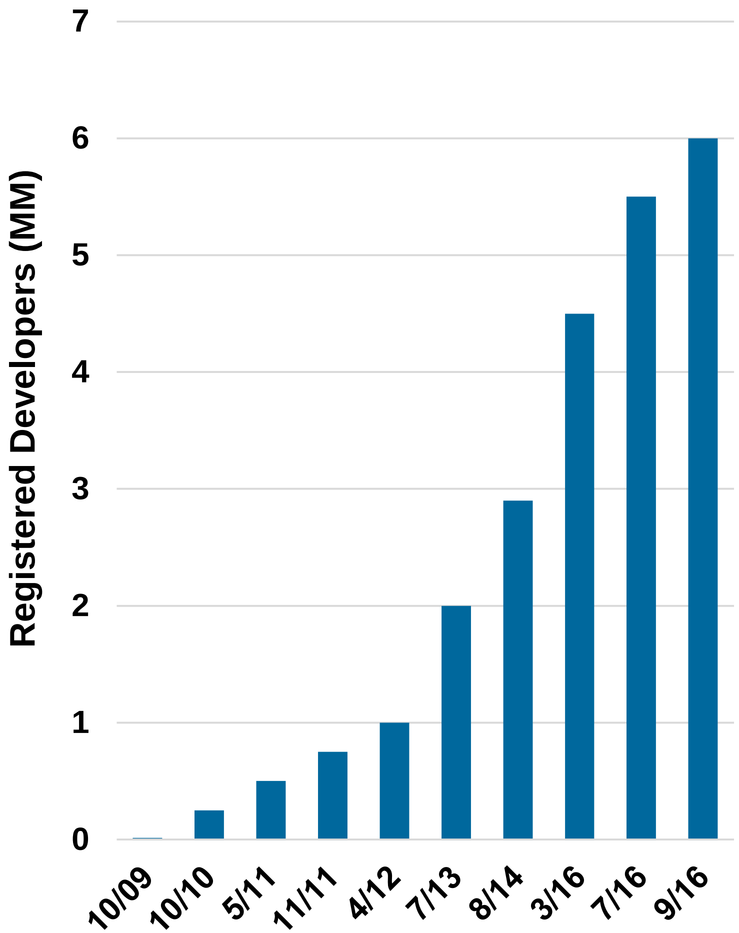
# New Gaming Development Tools / Platforms = Evolving to Continue to Build Virtual Worlds…

| Developers | | Players |
|---|---|---|
| Build Virtual Worlds / Share Ideas | **Development Platforms** | 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 |

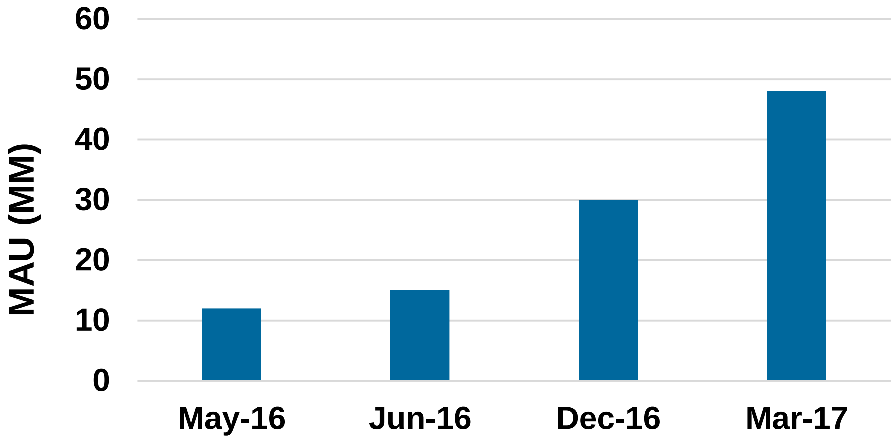
Source: Unreal, Unity, HTC Vive, Oculus (Facebook) Microsoft, Minecraft, Roblox, Tencent, Steam (Valve), Sony

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

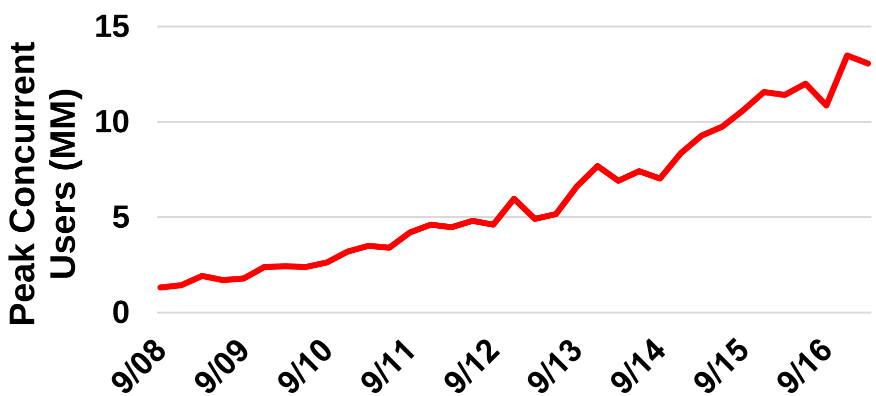
### Unity = Registered Developers




### Roblox = Monthly Active Users




### Steam = Peak Concurrent Users*

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Source: Unity, Roblox, Steam (Valve), Forbes, Venturebeat, Bloomberg
*Taken on the last available day of each month using waybackmachine.org.

***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**

ESL KeSPA 사단법인 한국e스포츠협회

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

## Evolution of Global eSports

**2006**

Justin.tv

twitch

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

**2009**

LEAGUE OF LEGENDS

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

**2012**

OGN OGN GLOBAL

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

**2016**

LEAGUE OF LEGENDS WORLD CHAMPIONSHIP

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

Source: Spacewars image: Kokatu, Atari image: Ausretrogamer.com, Red Annihilation image: timetoast, Fortune (7/15), ESL logo: ESL, MLG, KeSPA Logo: Team Liquid, MLG Logo: MLG, Halo 2 Logo: Pinterest, Justin.tv Logo: startupgenome.com, Twitch Logo: Twitch, Riot Games (10/08), League of Legends Logo: League of Legends, Forbes (9/16), na.lolesports, OGN Logo: Twitch, eSports.inquirer.net, eSportsTV logo: mb.cision.com, League of Legends World Championship

# eSports =
# People Watch What They Play…

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

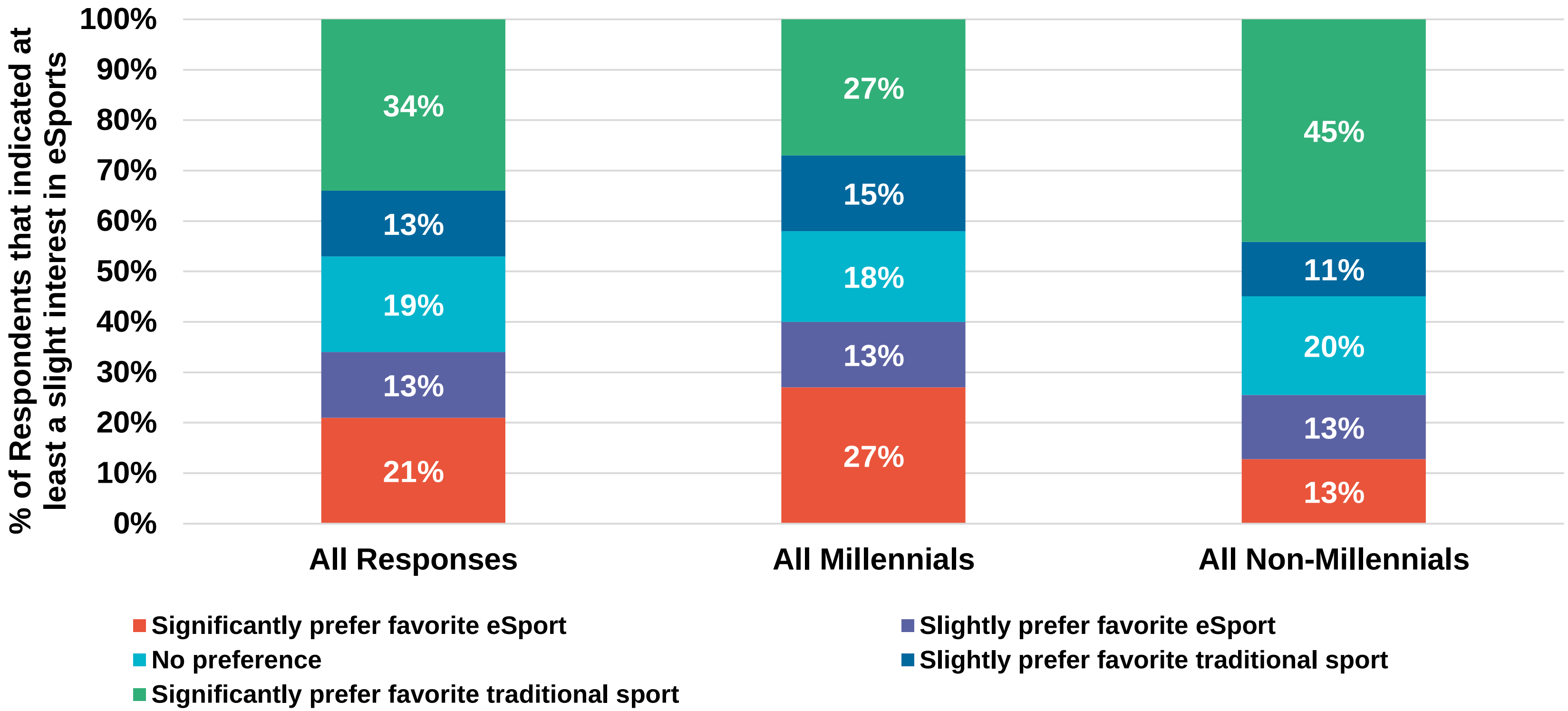
Source: Top left image: Mel Melcon Los Angeles Times, Bottom left image: Dexerto, Top right image: Red Bull, Bottom right image: YouTube

# …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 eSport?*




Source: L.E.K. Sports Survey, Digital Engagement Part One: Sports and the "Millennial Problem" (2/17)

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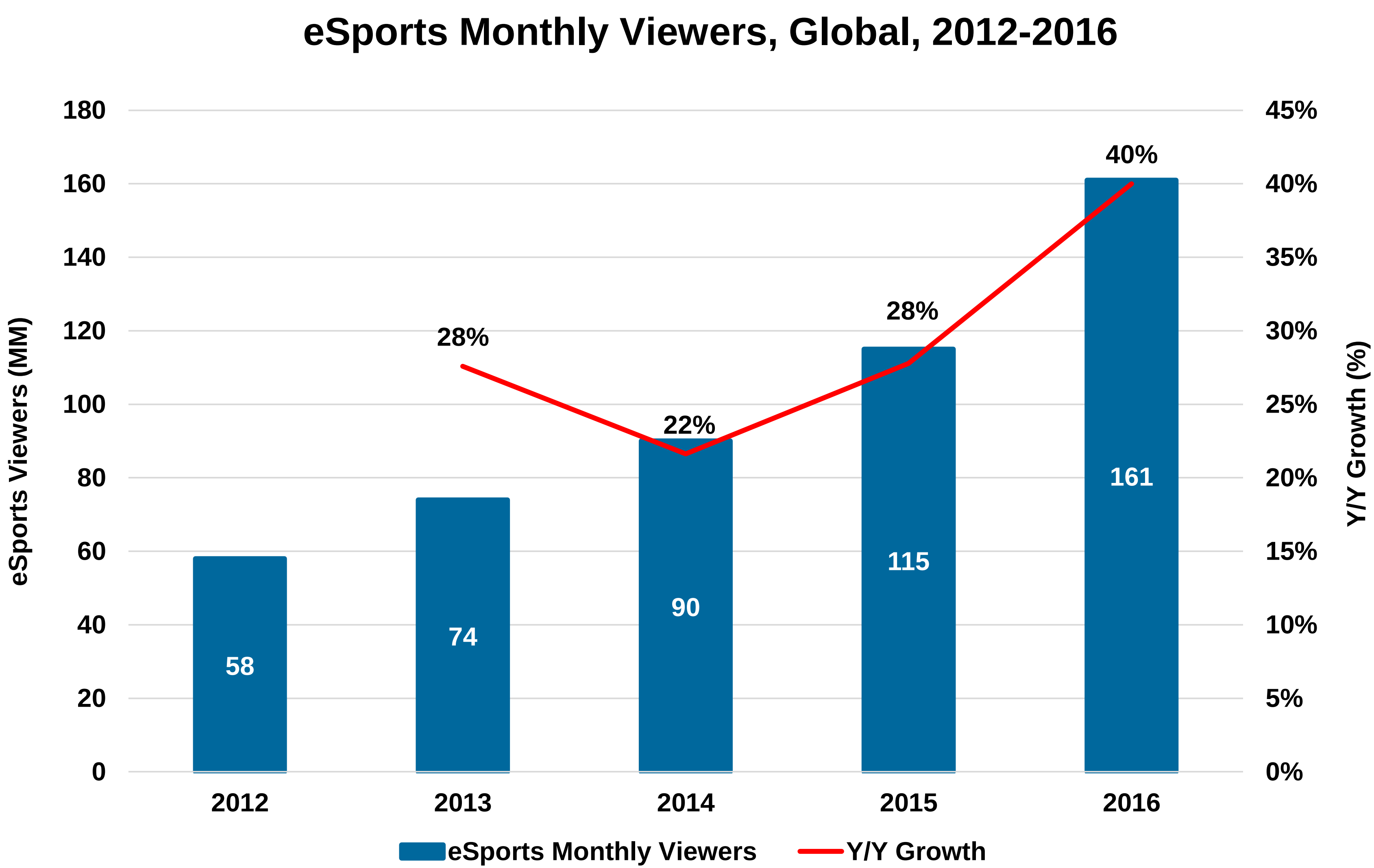
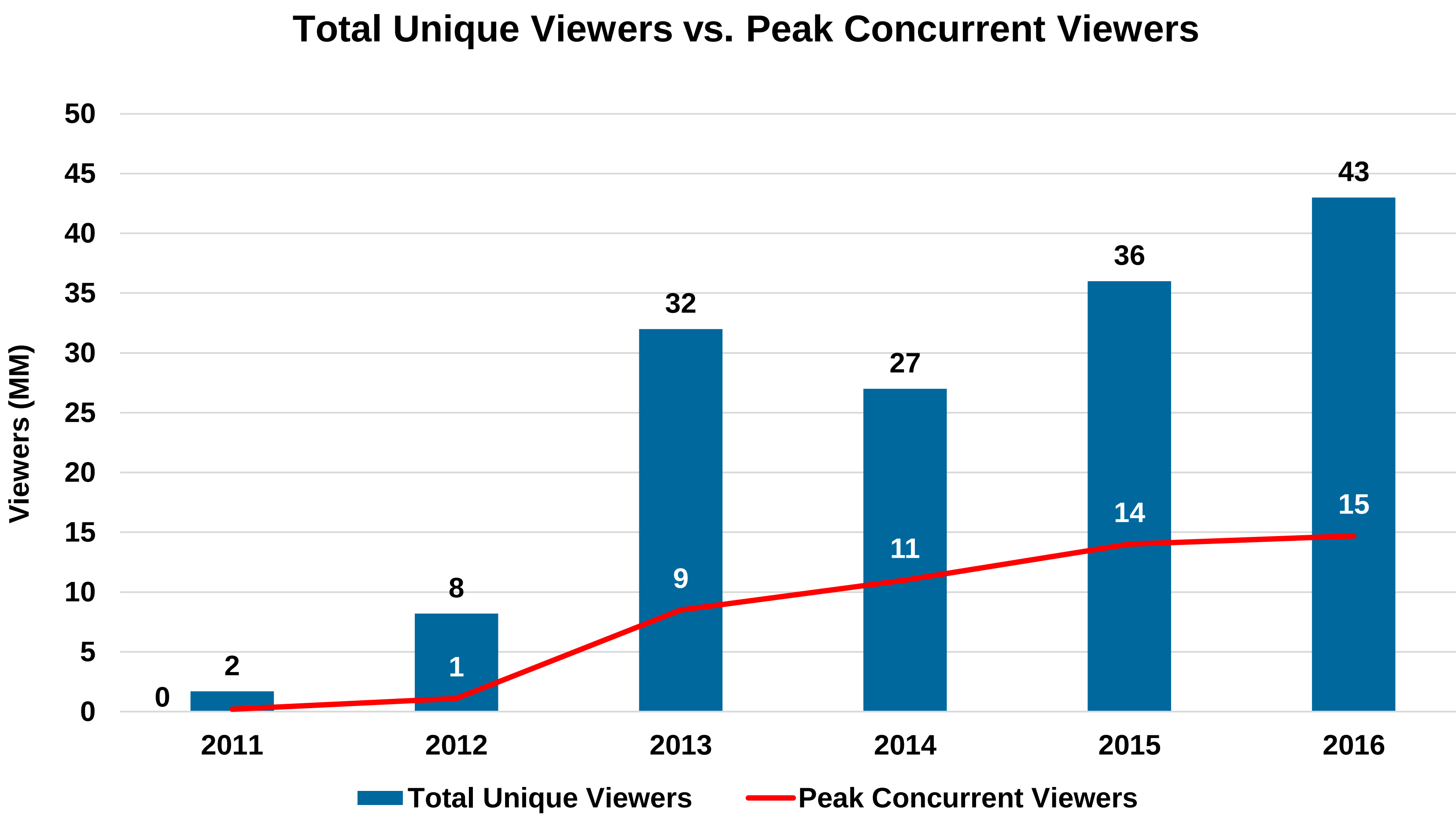
# eSports Monthly Viewers @ 161MM…
# +40% Y/Y & Accelerating




Source: Newzoo Global eSports Market Report (2/17), Newzoo press release (1/16), Newzoo Casual Connect Europe Presentation (2/15)
*eSports Enthusiasts watch eSports once a month and/or participate in tournaments.

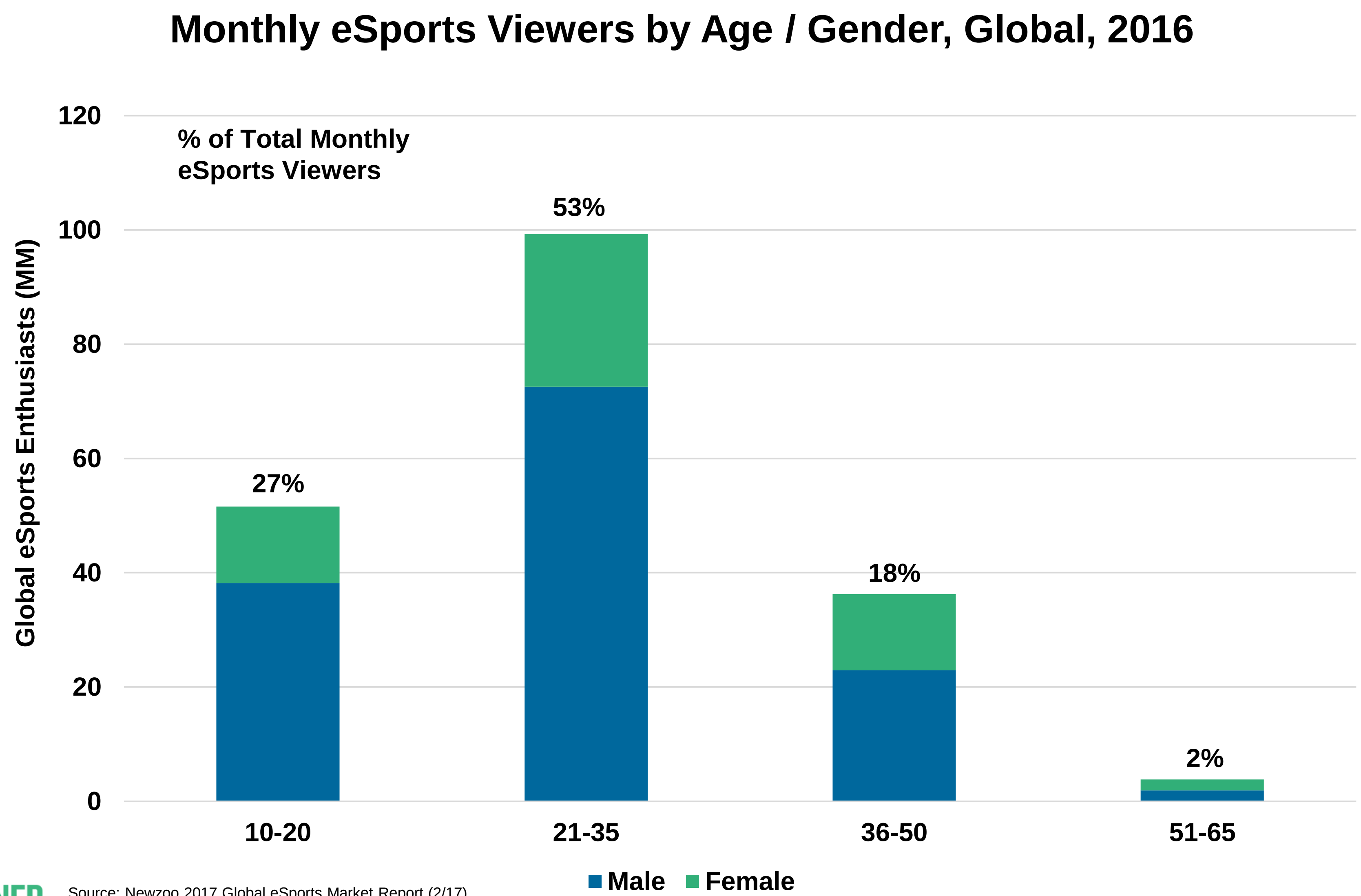
# eSports League of Legends Championship Viewers @ 43MM…
# +19% Y/Y

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




Source: Engadget, Polygon, The Verge, eSports Marketing, LoLeSports

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




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

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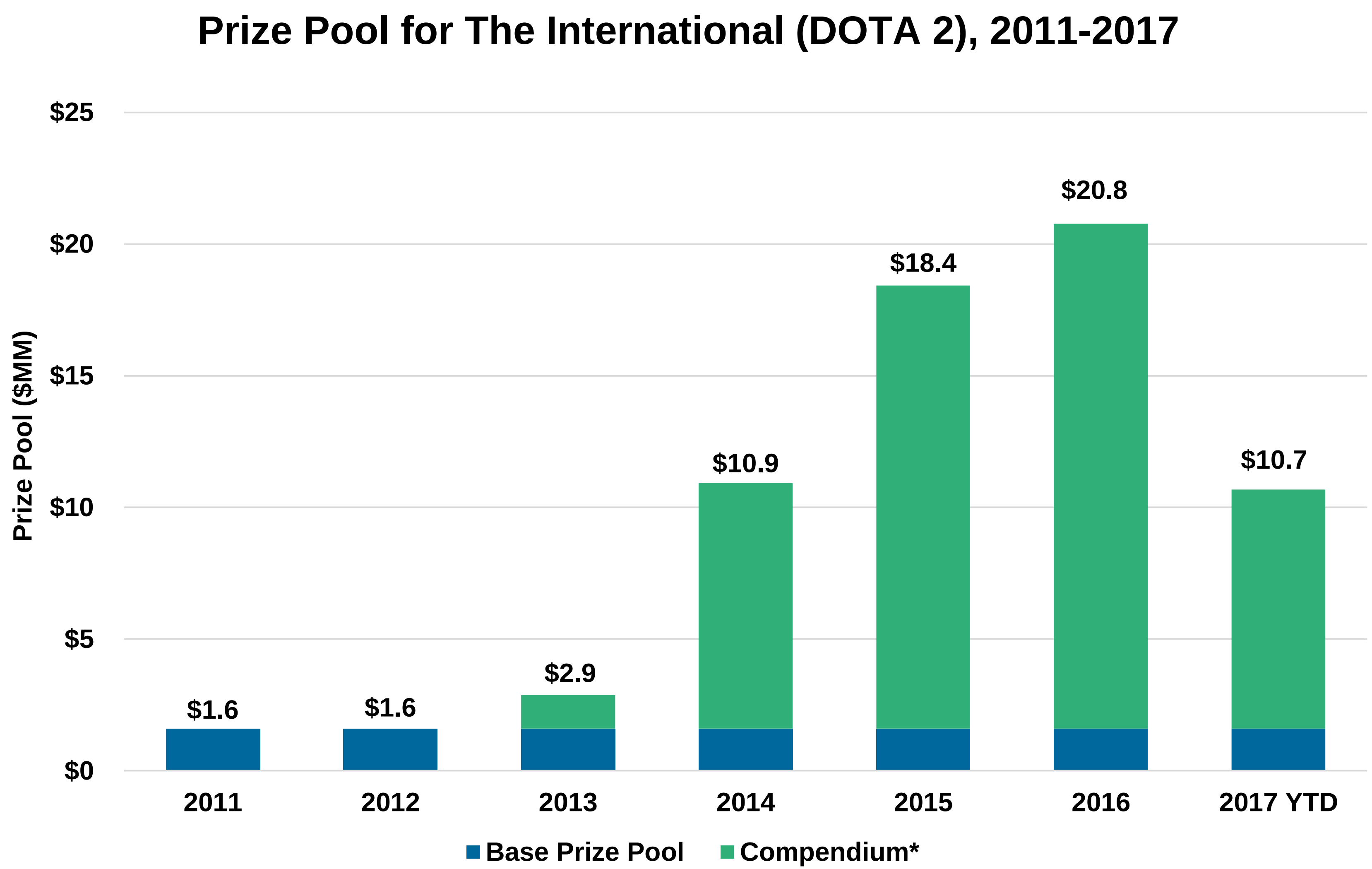
# eSports (Like Sports) = Money Follows Viewers + Winners…
# Fan In-Game Purchases Boost Prize Pools




Source: ESPN, eSports Earnings, DOTA 2 (5/24/17)
Note: * The International Compendium represents 25% of in-game purchases during a promotional period leading up to the event. Players can buy virtual items, levels, and other in-game content. As the total prize pool reaches different milestones all players who participated gain access to more exclusive content. 2017 YTD as of 5/25/17.

# Partnerships + Investments = Helping Bring eSports into Mainstream

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

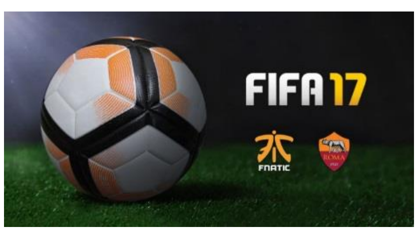
**Philadelphia 76ers = Acquire eSports Teams, Dignitas & Apex, 9/16**

**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**

Source: ESPN, Engadget, Yahoo Sports, Live Production, Dot eSports, Forbes

***Gaming Experience =>***

***Technology Leadership + Innovation?***

# Ten Years Ago (2007) =
# A Stanford Professor Said…

*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

Source: Byron Reeves

# …~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

Source: Elon Musk: Forbes Interview (10/1/16), Reid Hoffman: Interview on the Tim Ferris Show (8/31/15), Mark Zuckerberg: Facebook Q&A Session (5/14/15)

*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?*

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# 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?

# MEDIA =

# DISTRIBUTION DISRUPTION @ TORRID PACE

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***Digital Leaders =***

***Transforming Media With***

***Better User Experiences +***
***Lower Prices…Data + Scale***

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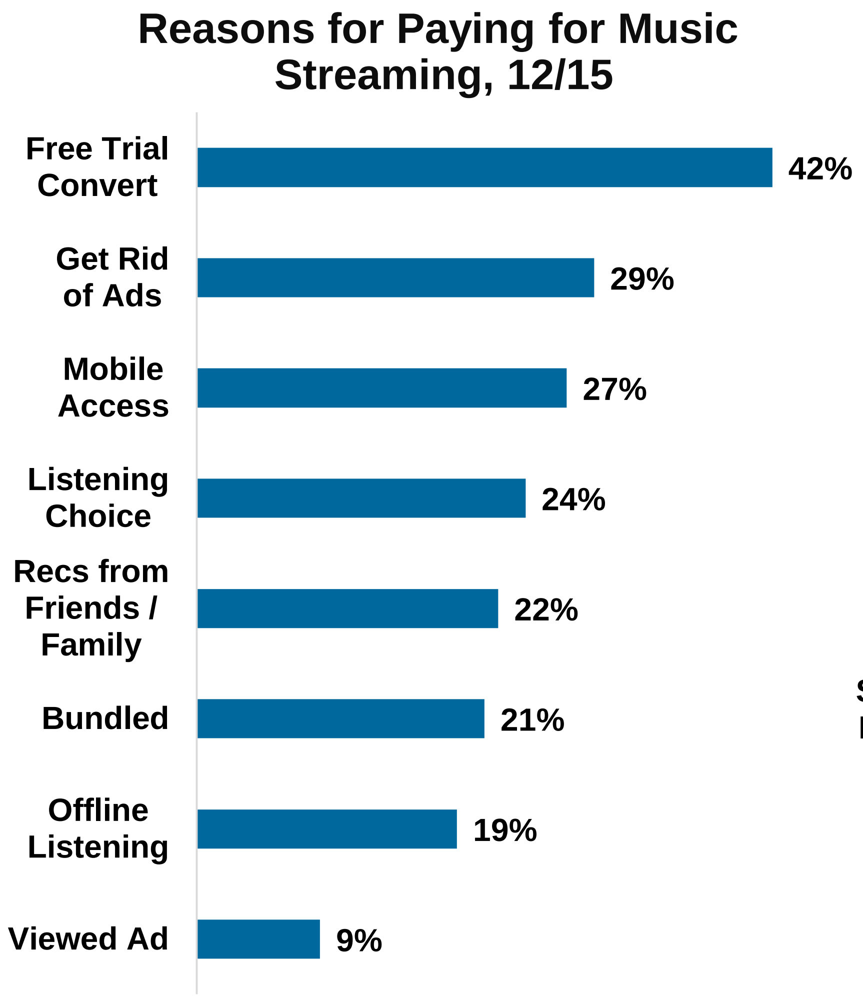
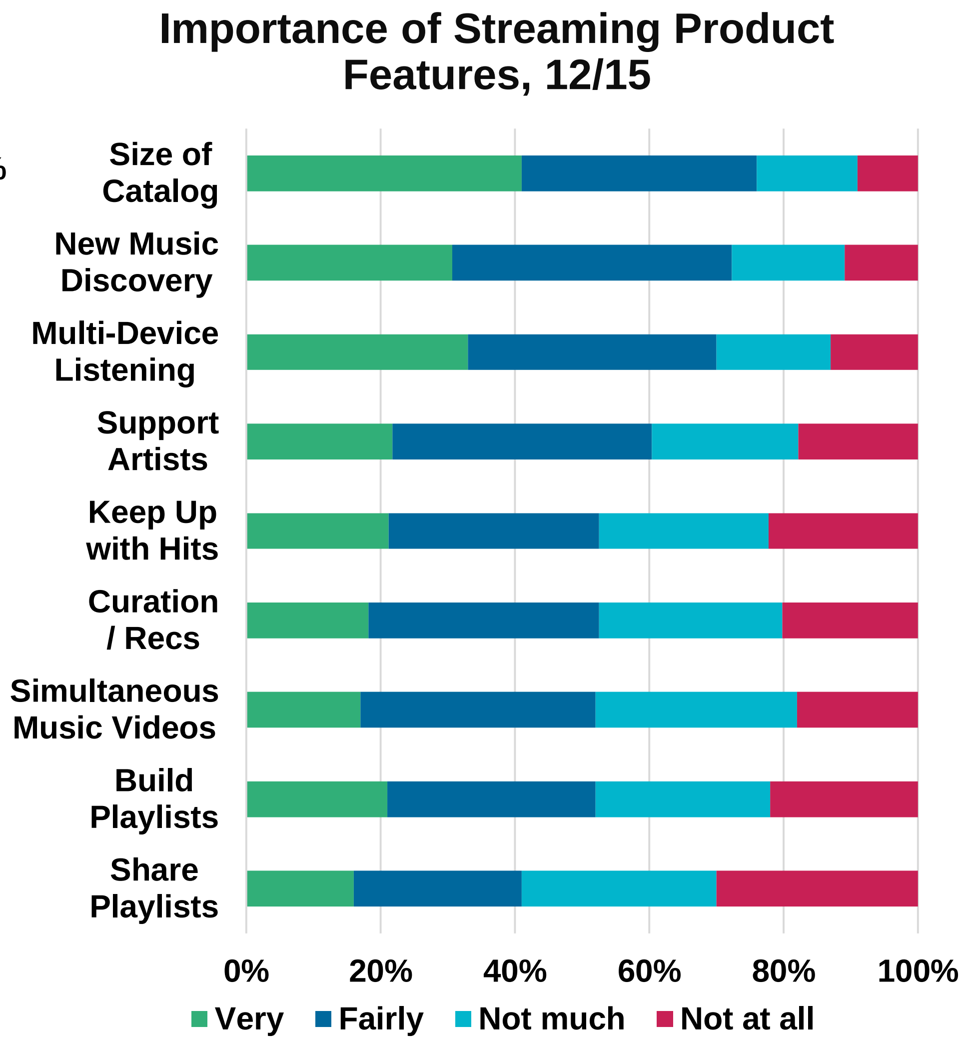
# Music = Why Streaming?
# Access / Choice / Discovery / Personalization / Mobile / Fewer Ads




Source: Goldman Sachs Research, BPI
Note: BPI Survey as of 12/15, n=1,000 (UK only). Questions: "Why did you decide to pay for a music streaming subscription?" and "Thinking about music streaming, to you, how important are the following?"

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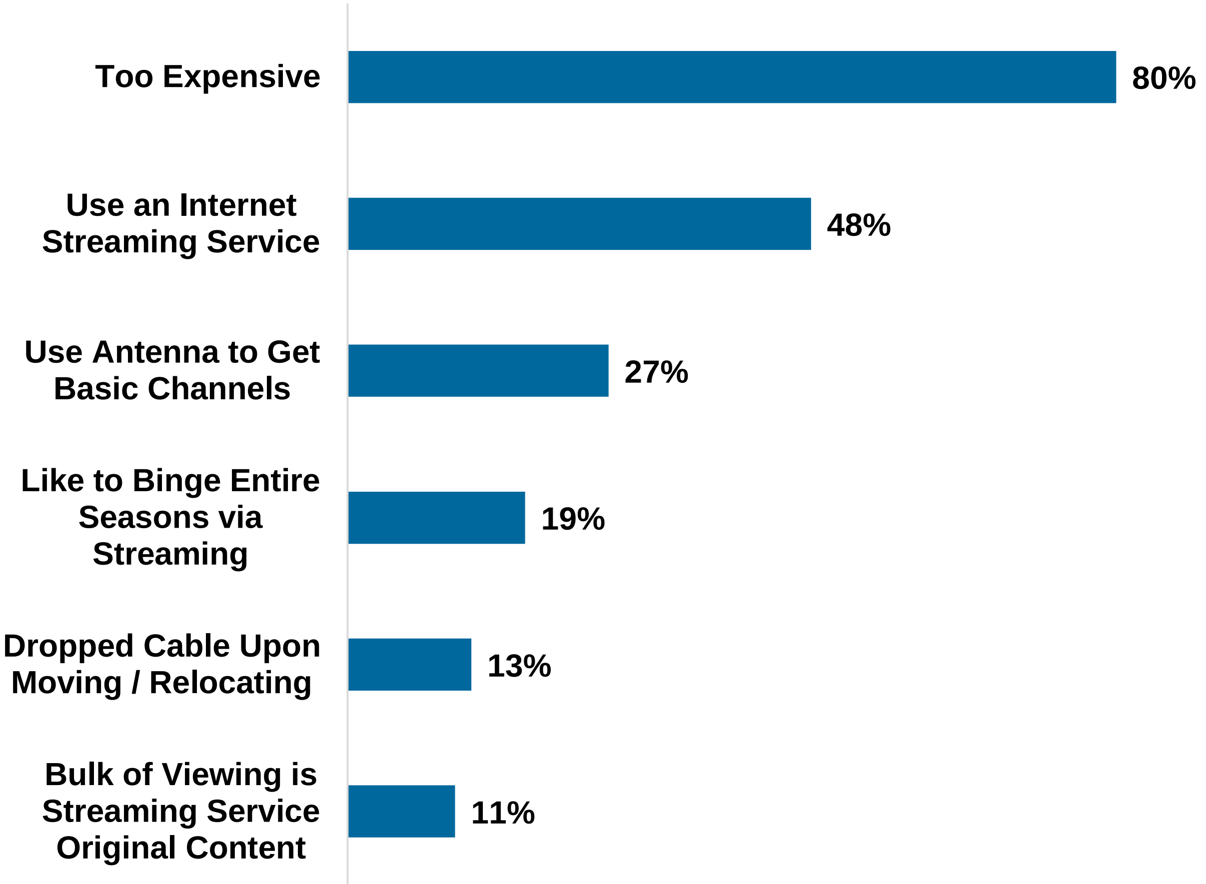
# Video = Why Cord-Cutting? Lower Price + Convenience

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

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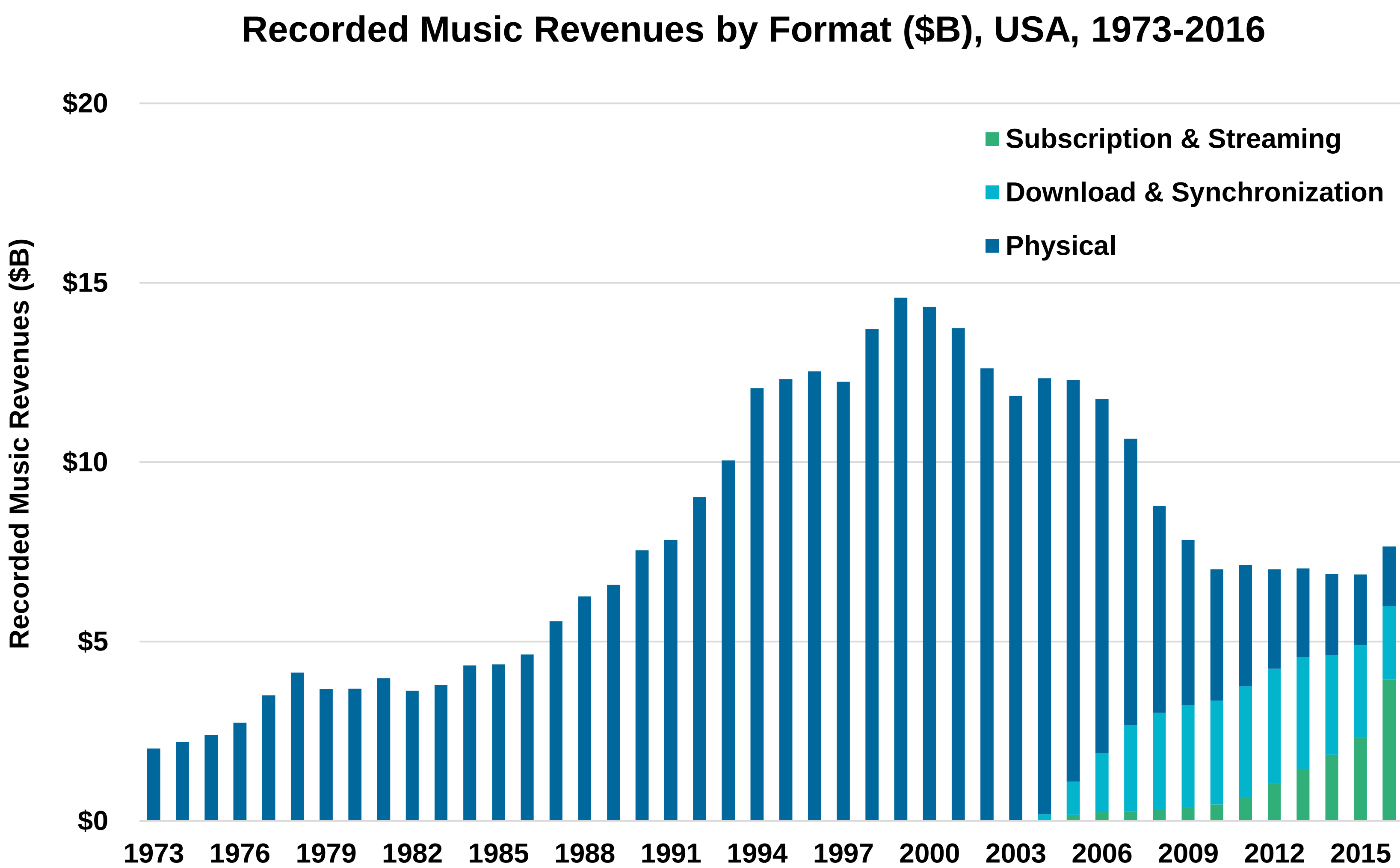
Source: TiVo Q4 2016 Video Trends Report
Note: Survey includes 18+ year olds in USA and Canada, n=3,079. Other categories omitted include “Not My Choice,” “Share SVOD Login,” “Moved In With New Roommate,” “Other.”

*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

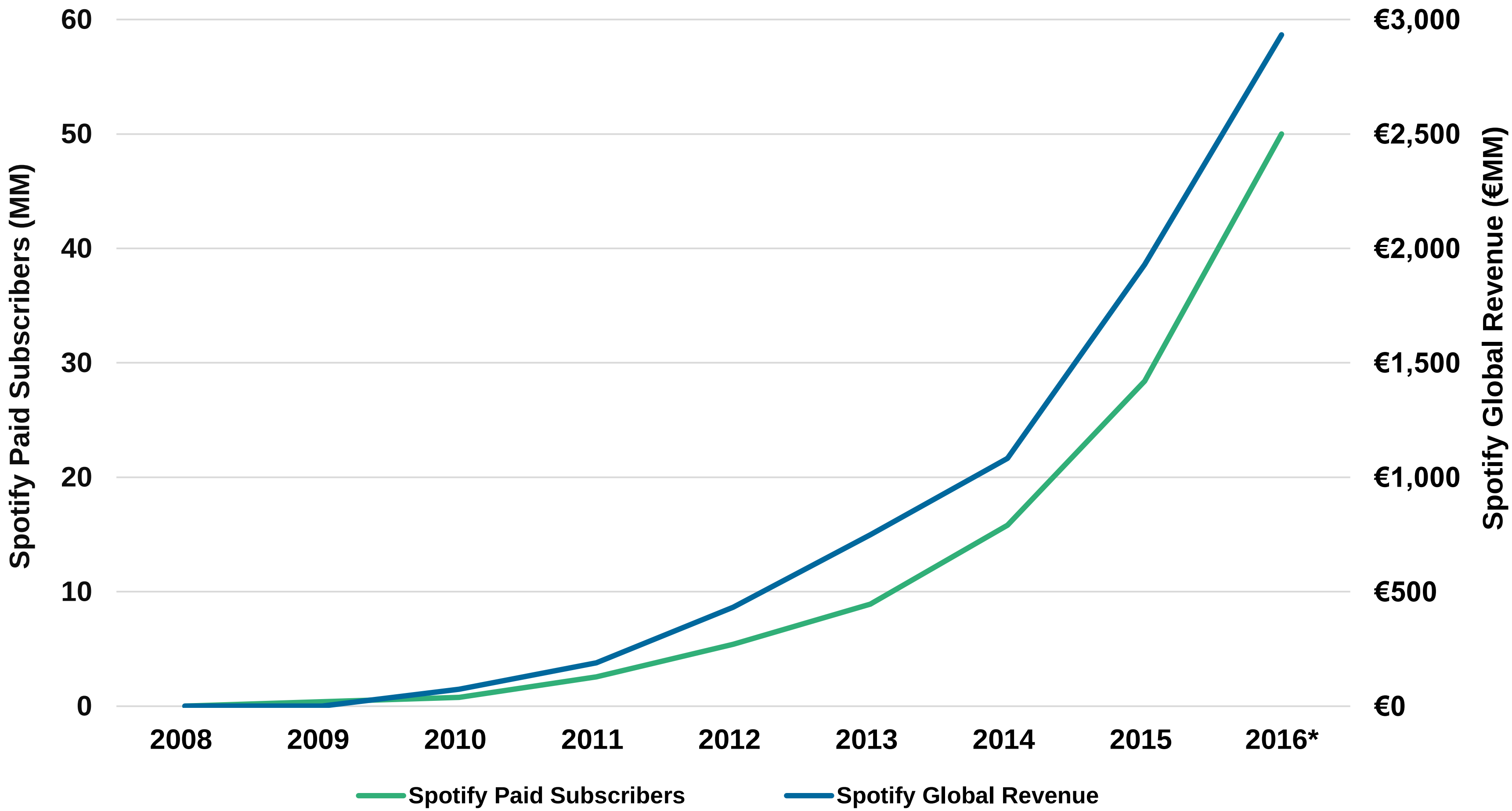



Source: Recording Industry Association of America
Note: “Subscription and Sttreaming” includes paid subscriptions (full and limited tier), SoundExchange, ad-supported streaming and other digital. “Download & Synchronization” includes download single / album, kiosk, download music video, ringtone / ringback, and synchronization. “Physical” includes LP / EP, vinyl single, 8-track, cassette (full / single), CD / CD single, music video, DVD audio and SACD.

# 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**

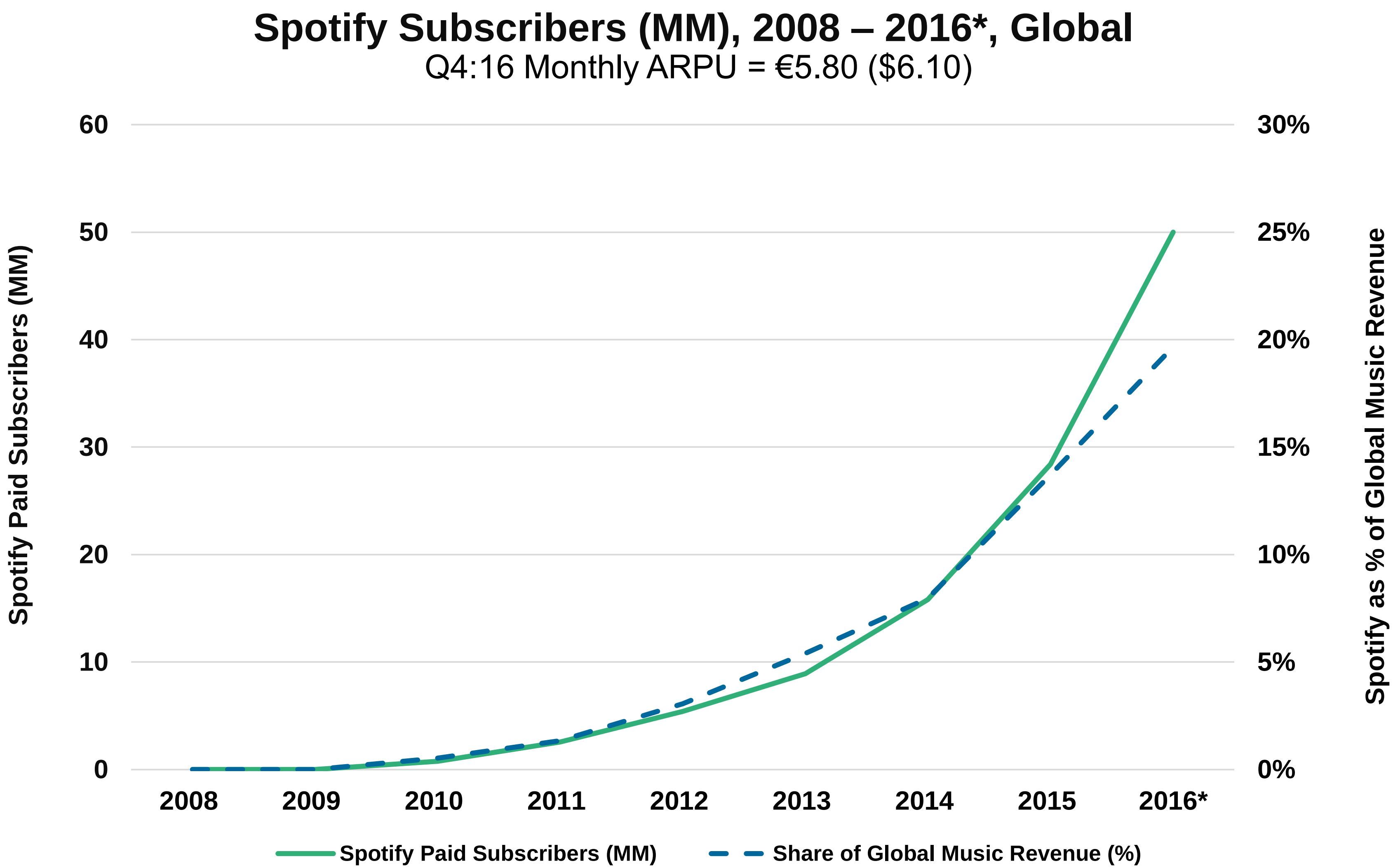
Q4:16 Monthly ARPU = €5.80 ($6.10)




Source: Spotify

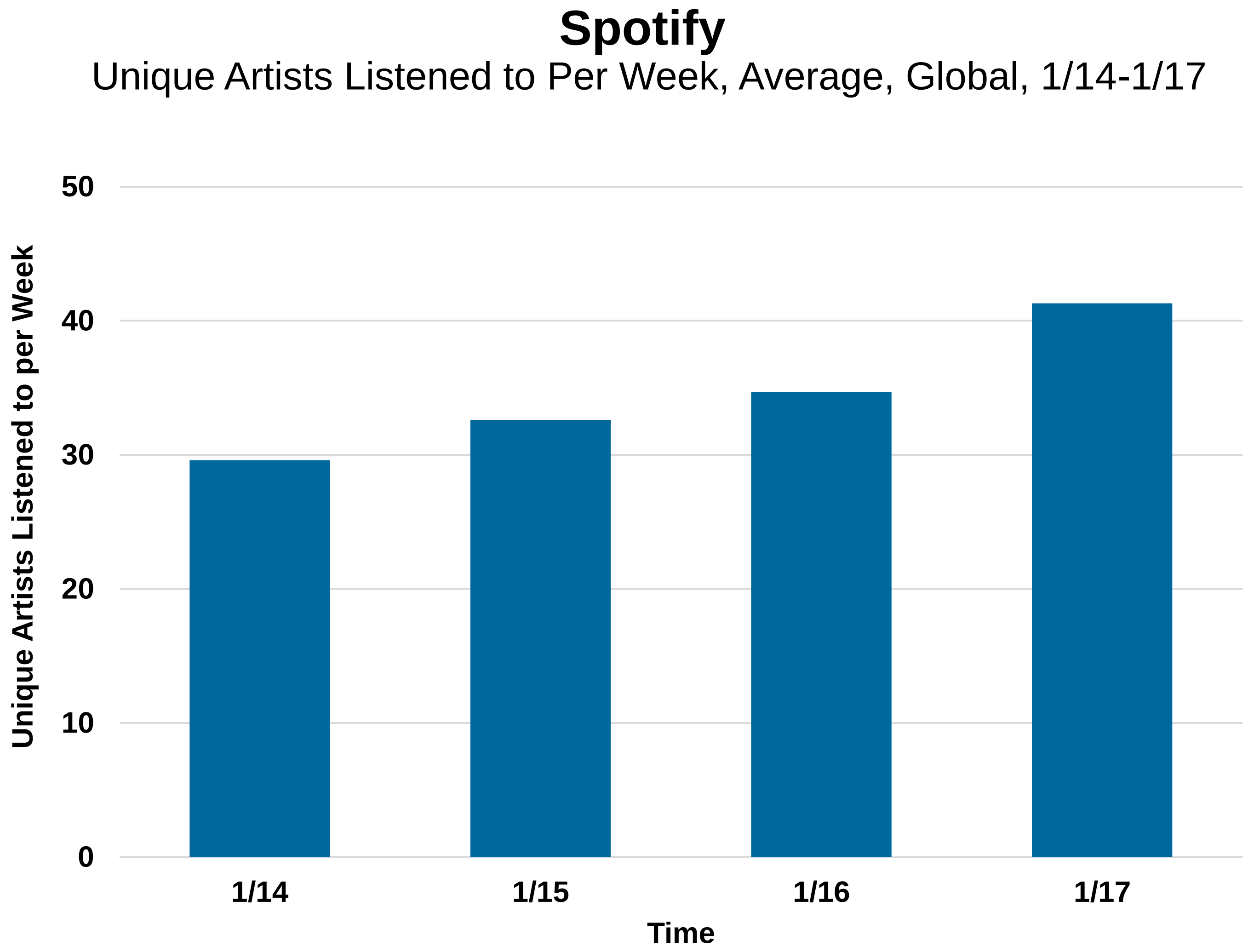
* Subscribers as of 3/2017, when Spotify announced they had reached the 50 million subscriber mark.

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




Source: Spotify, IFPI 2017 Global Music Report
* Subscribers as of 3/2017, when Spotify announced they had reached the 50 million subscriber mark.

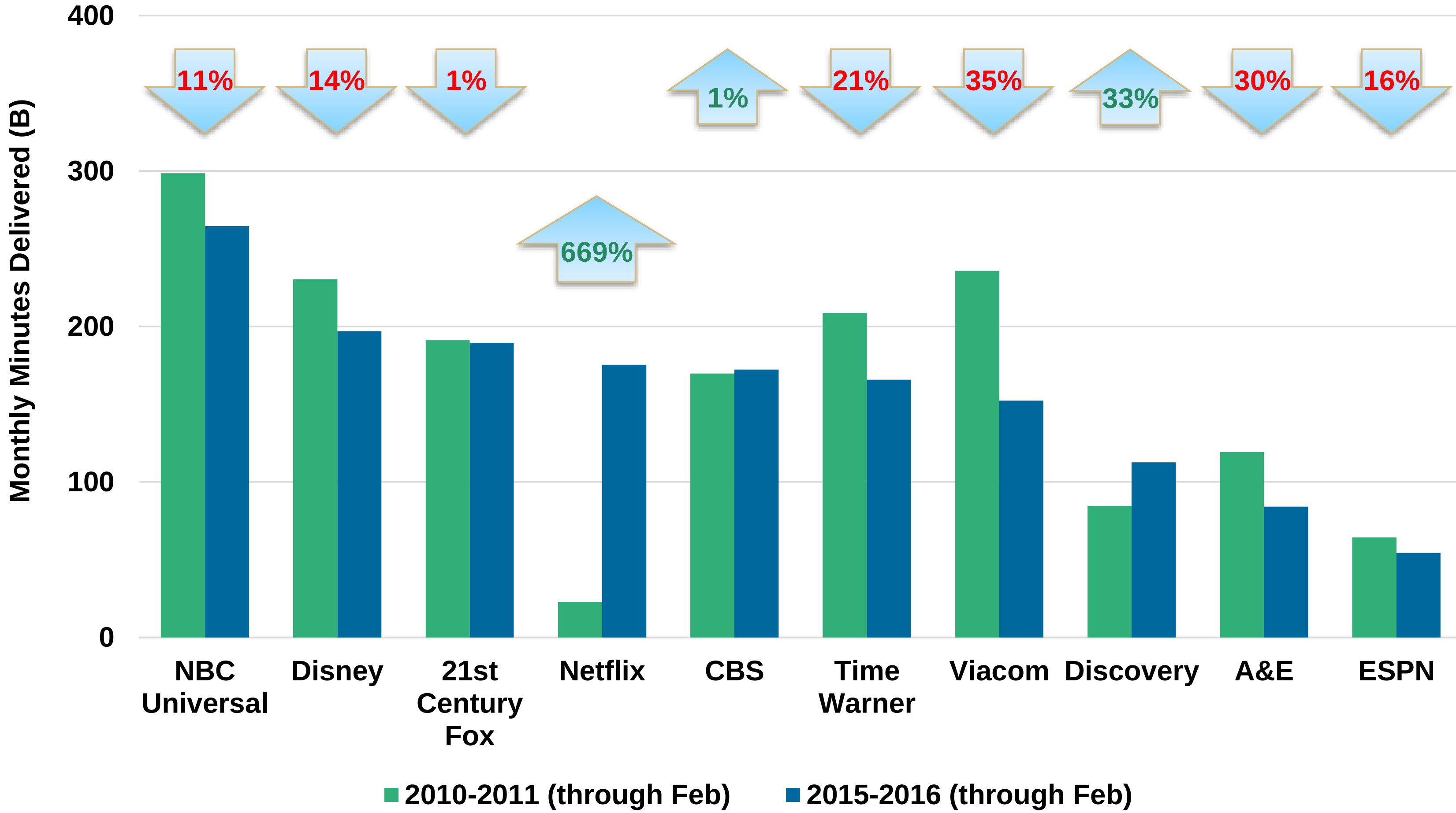
# Spotify = Users Listen to 41 Artists per Week, +40% (vs. 1/14) Owing to… Recommendation Engine (Data + Algorithms)




Source: Spotify

# 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

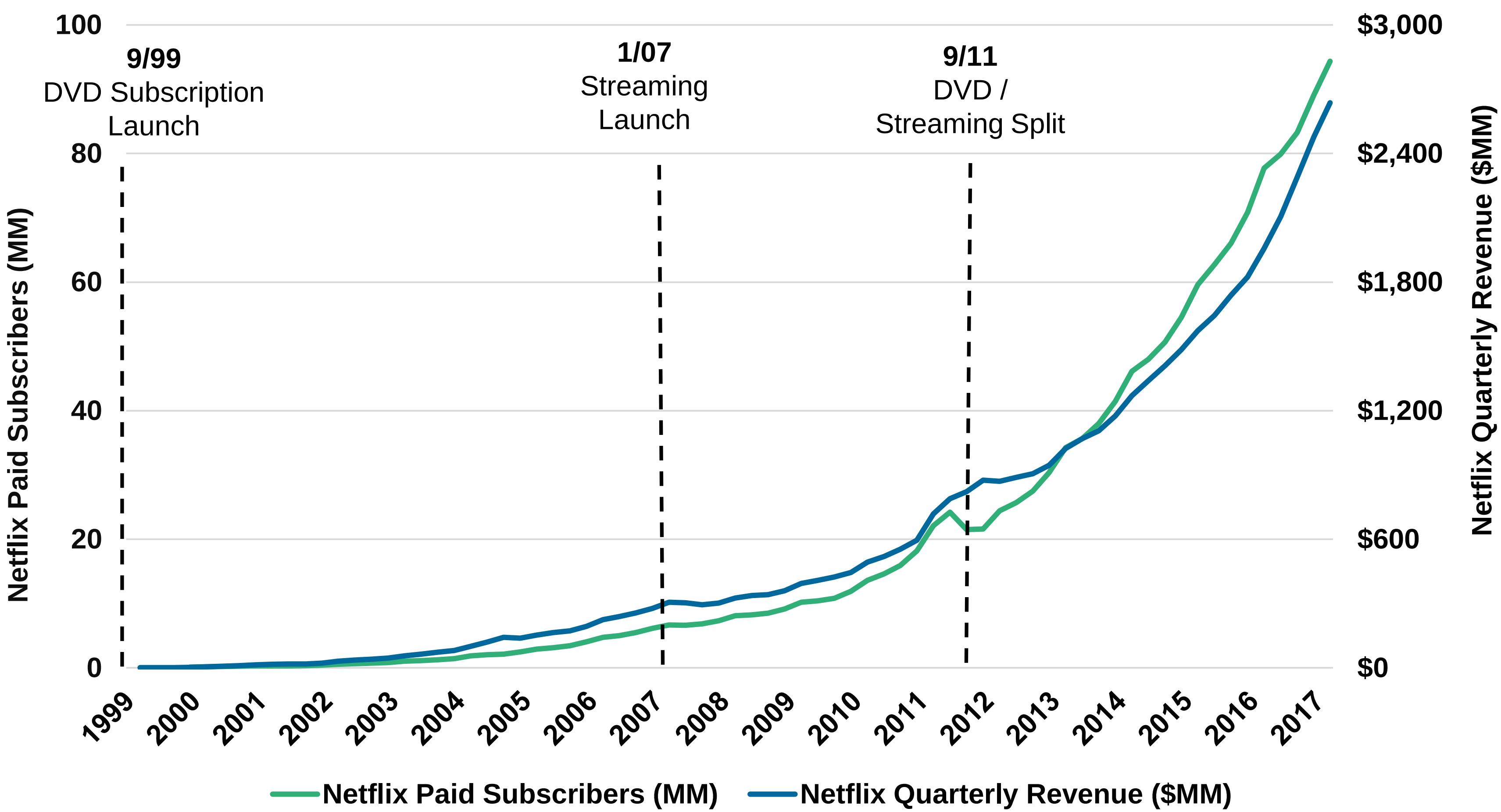



Source: Matthew Ball – REDEF Original 3/14/16, Nielsen, Sandvine, Netflix, SNL Kagan, BTIG
Note: Inclusive of Broadcast + Basic Cable + Premium Cable, C7 Live + VOD + DVR. Does not account for multiple viewers (i.e. unique minutes delivered) or TV everywhere (though note that even if every TV Everywhere stream started in 12/15 was completed and 1 hour long, consumption would have increased national TV time by only 1.9%).

# 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

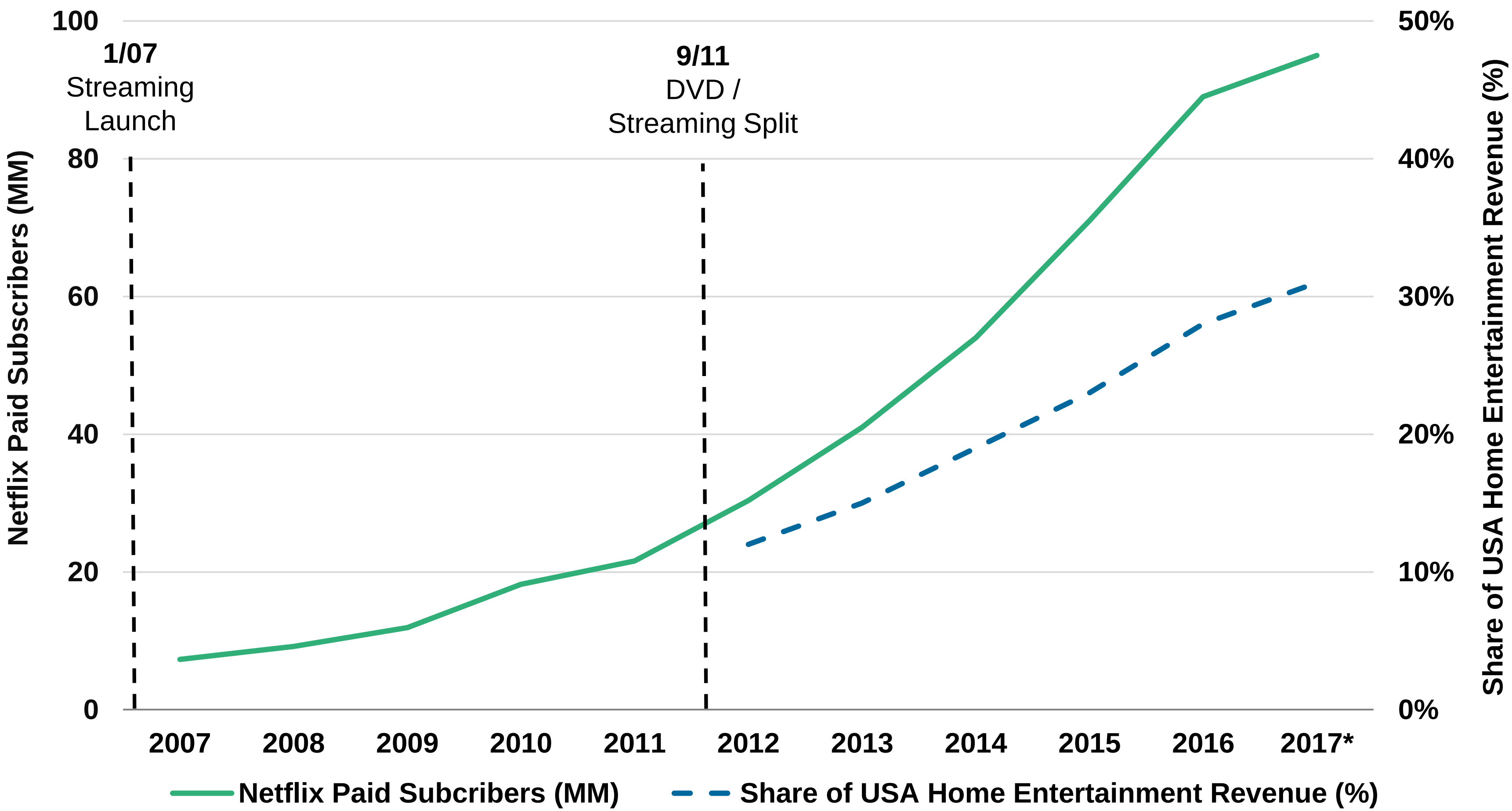



Source: Netflix
Note: Netflix subscription DVD service launched 9/1998. Data before Q3 2001 represents all subscribers because paid subscribers not broken out. Netflix split streaming subs from DVD subs in Q3 2011; graph shows only streaming subs thereafter. ARPU shown ex-DVD.

# …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




Source: Netflix

Note: Share represented by Netflix domestic streaming revenue over total home entertainment revenue in USA. Domestic streaming not broken out as individual segment until 2012. Netflix split streaming subs from DVD subs in Q3 2011; graph shows only streaming subs thereafter.

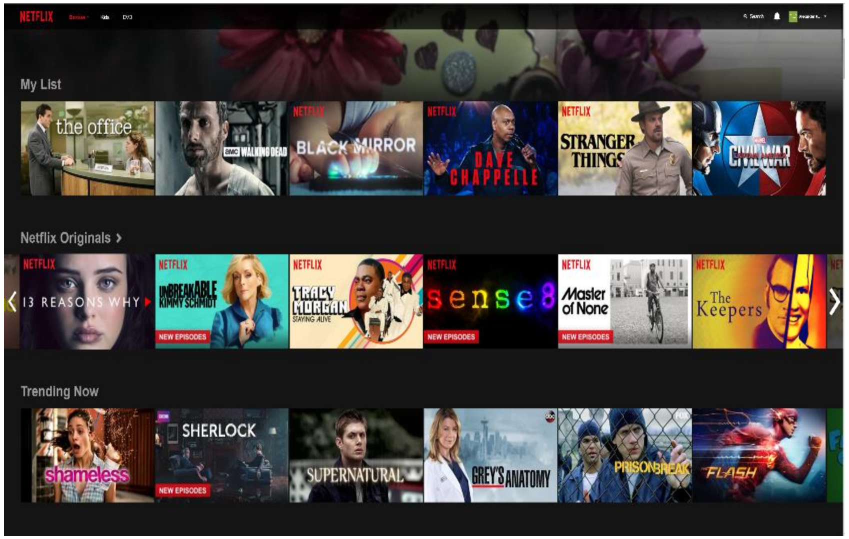
* Q1:17 represents Netflix annualized domestic streaming revenue figure. ARPU shown ex-DVD

# 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*

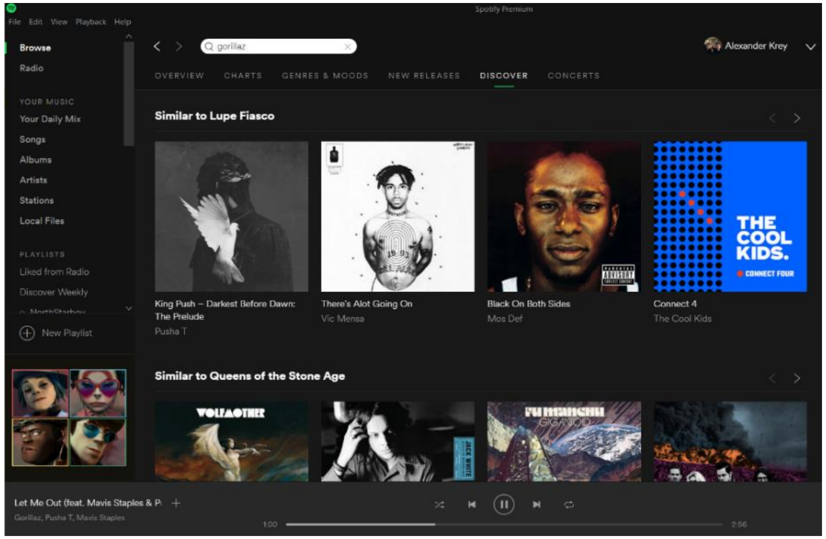
### *98MM Different Netflixes...*

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




### *126MM Different Spotifys…*

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




Source: Netflix; Spotify; Michelle Ufford, "Data-Driven at Netflix", talk given at PASS 10/31/16; Gomez-Uribe and Hunt (both Netflix), "The Netflix Recommender System: Algorithms, Business Value, And Innovation", *ACM Transactions on Management Information Systems* 6.4, 12/15
Note: Netflix estimated cost savings due to improved engagement and reduction of monthly churn, driving lower need for subscriber acquisition cost in the future.

*Digital Evolution of Music + Video =*

*Multiple Approaches…*

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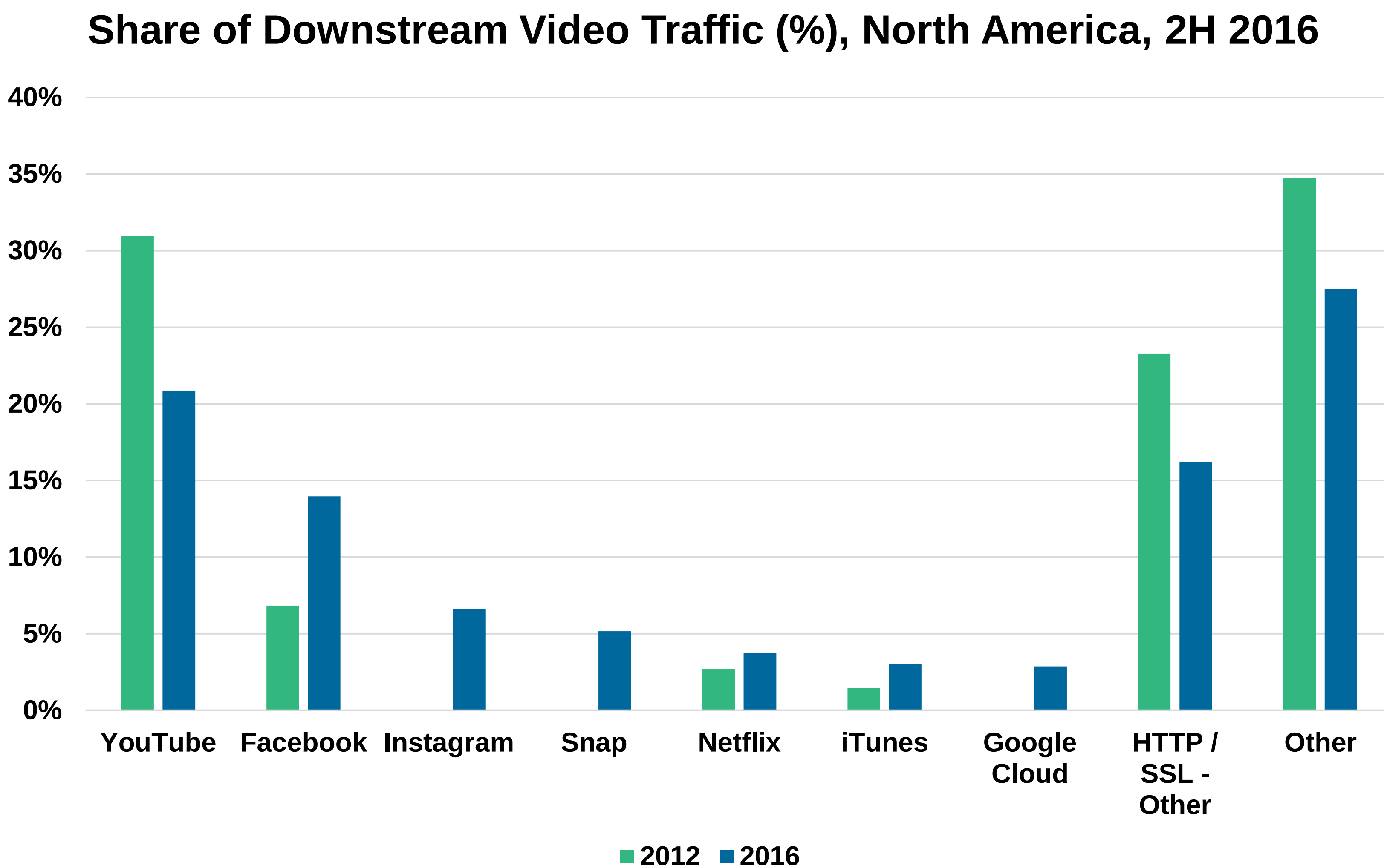
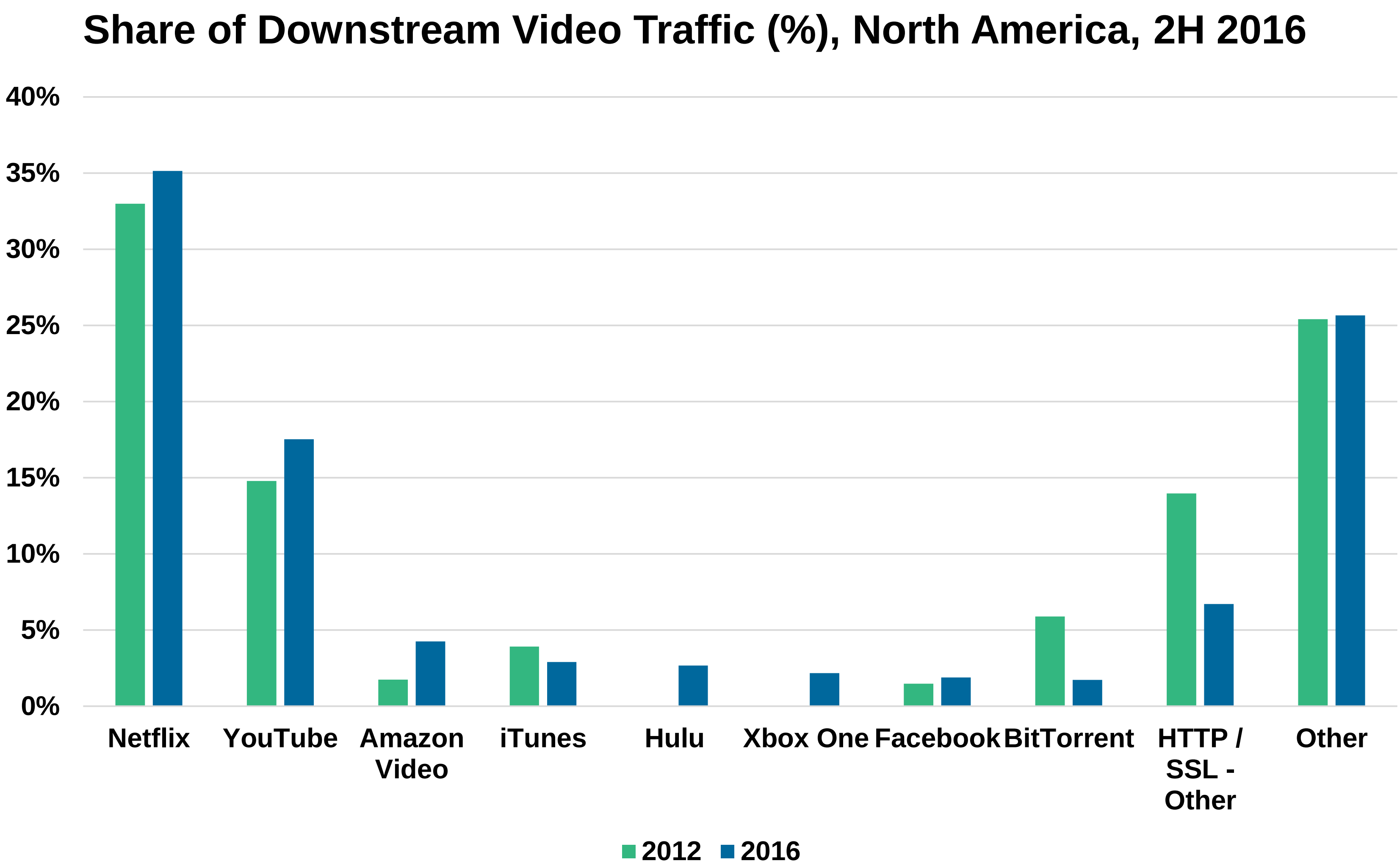
# Facebook / Instagram / Snap = *Mobile* Video Traffic Share Gainers Over 4 Years…




Source: Sandvine Global Internet Phenomena Report (2H 2012 and 2016)

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




Source: Sandvine Global Internet Phenomena Report (2H 2012 and 2016)

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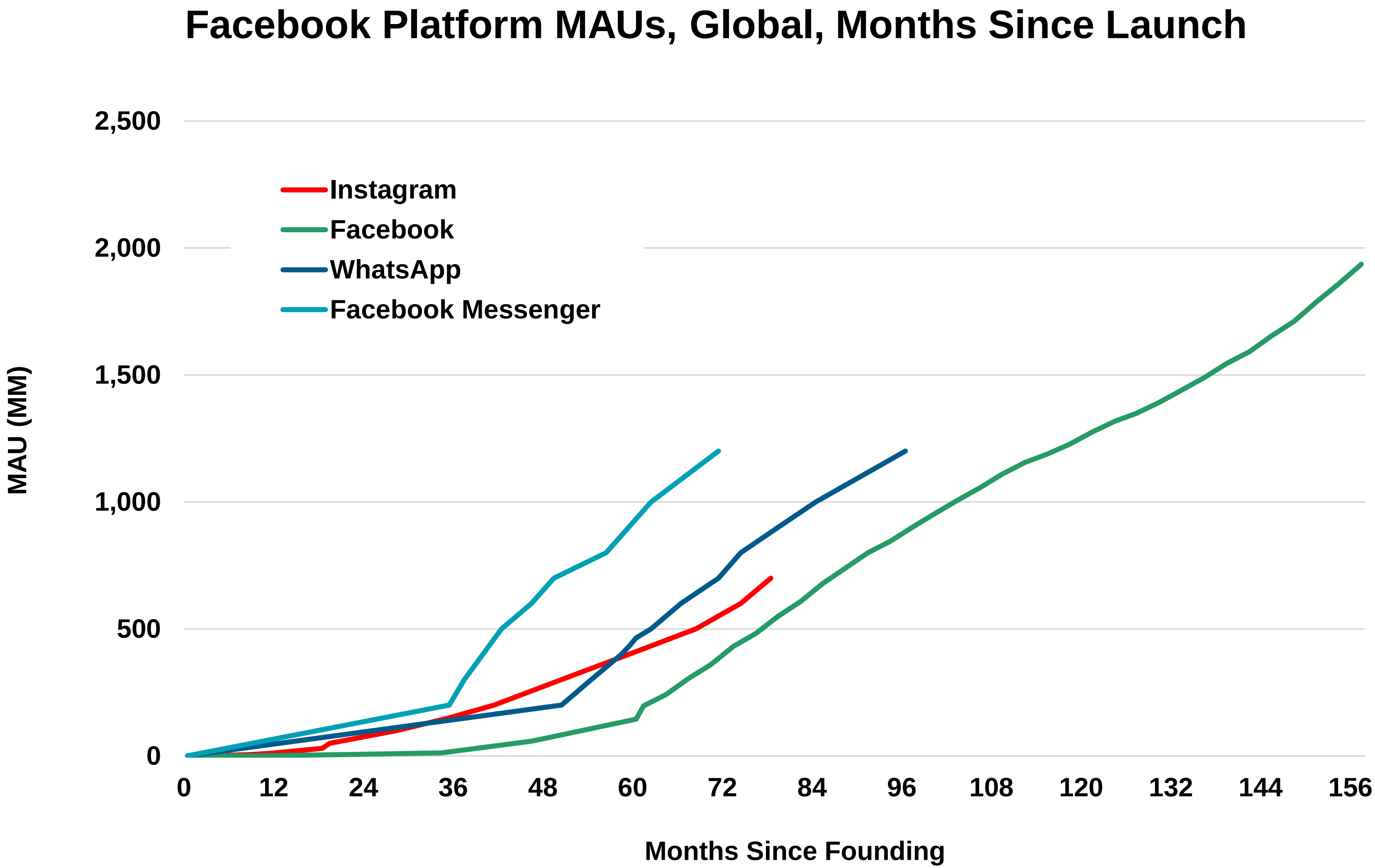
# Facebook (Facebook / WhatsApp / Messenger / Instagram) = Video Ramping Across Platform



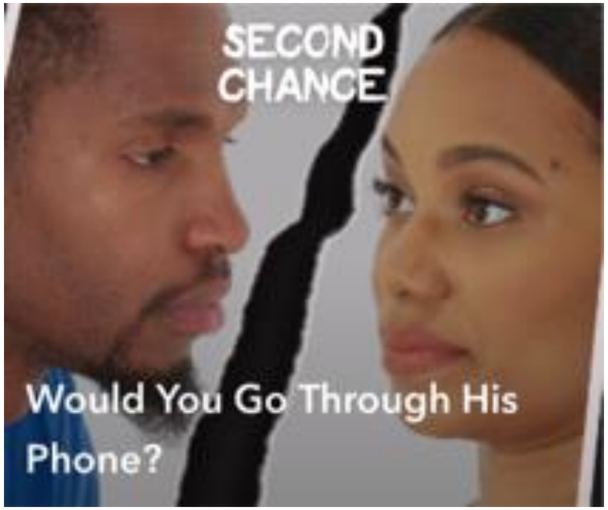

Source: Facebook, Instagram, Whatsapp, Financial Times, TechCrunch

# Snap = Ramping Original Short-Form Content

## Snap 'Original Shows'

**Phone Swap**
10MM+ Views for 1st Episode, 5/17


**Second Chance**
8MM+ Views for 1st Episode, 5/17




Source: Snap

# *Generational Media Usage =*

# *Chasm Increasing…*

# *Shifts to Internet-Enabled Media Continue*

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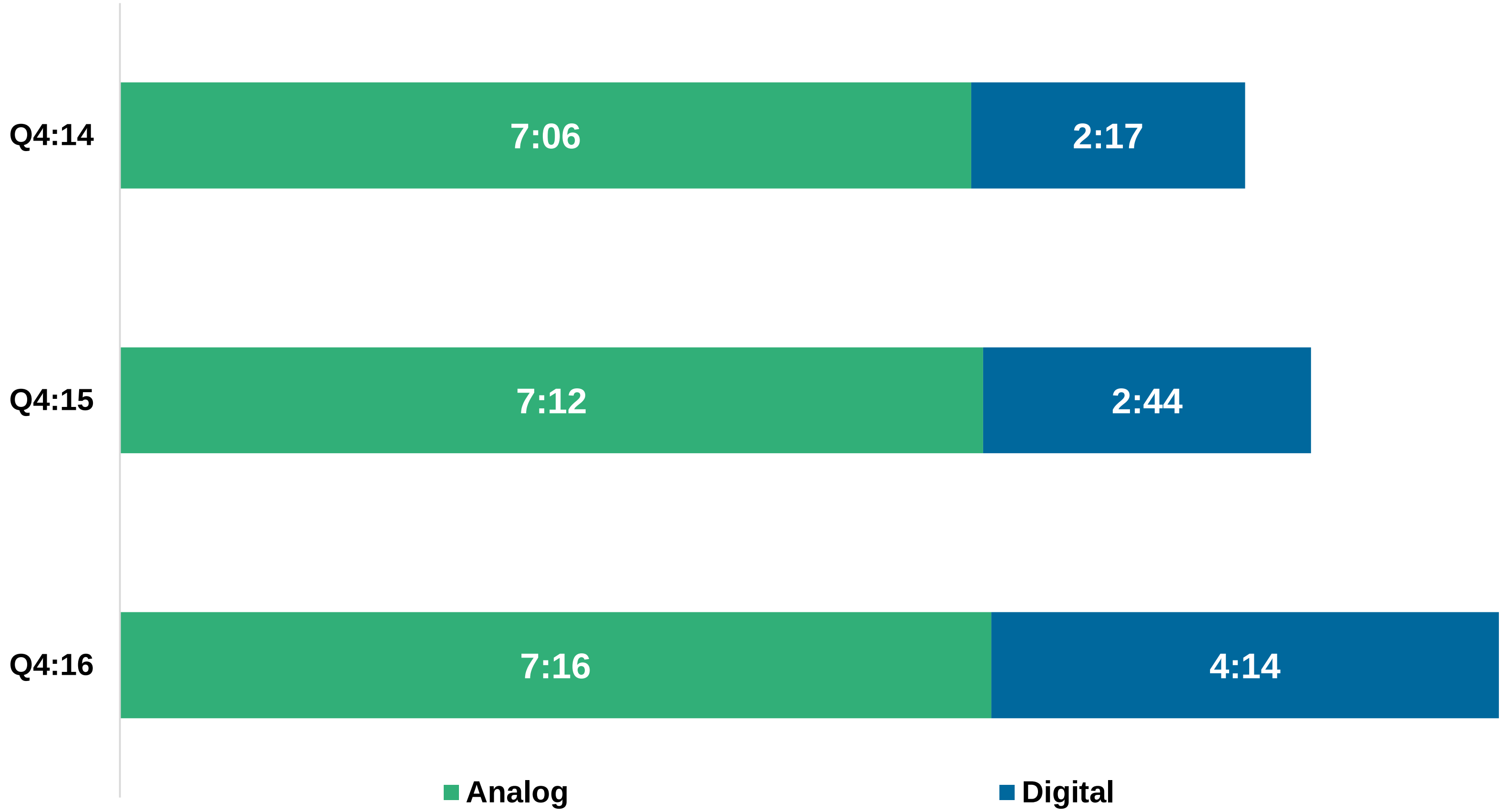
# Mobile Device Time per Day = +2x Over 2 Years…

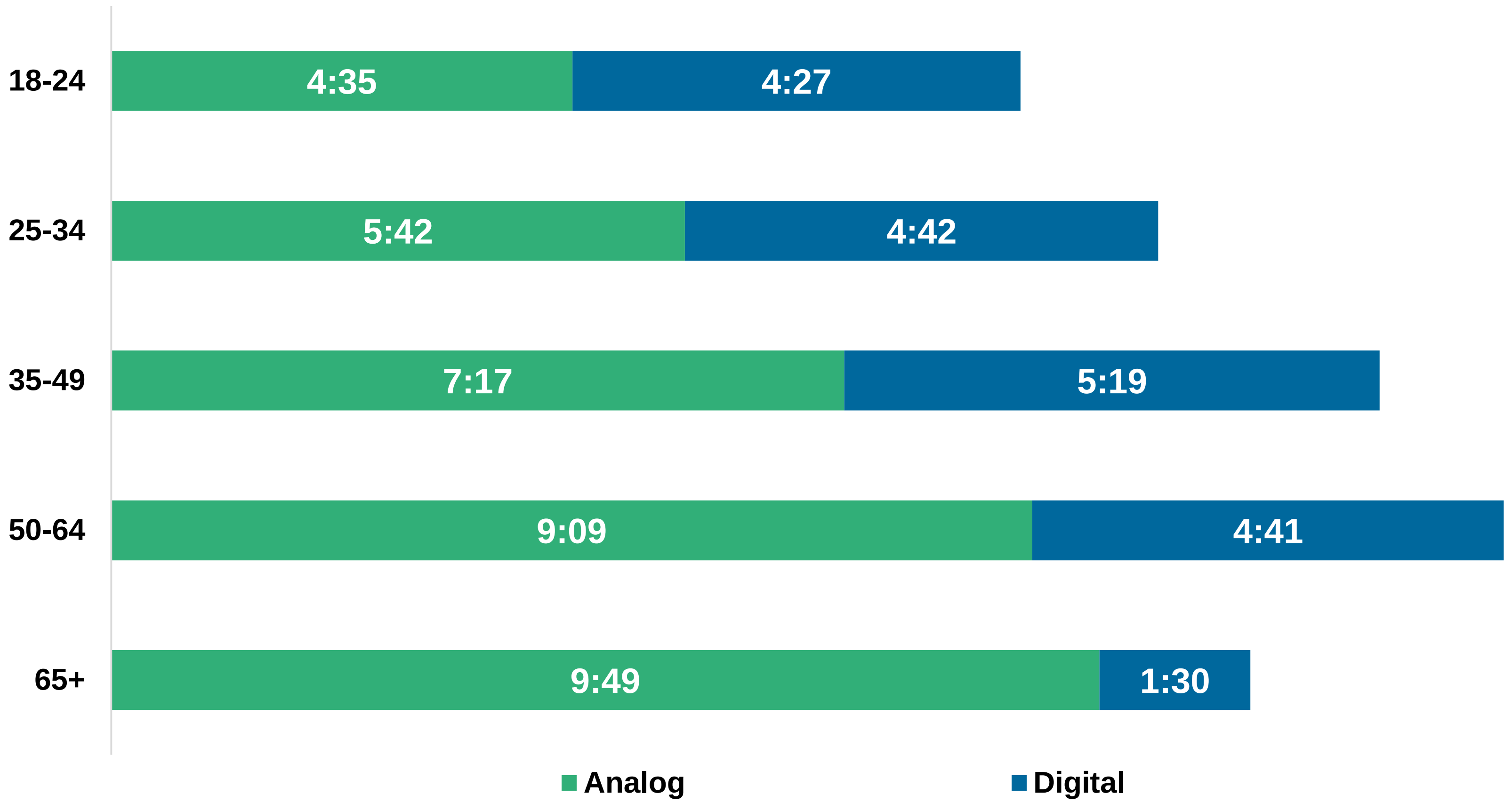
## Daily Time Spent by Media (Not De-Duped), USA, Q4:14-Q4:16




Source: Nielsen Total Audience Report Q4:16
Note: "Analog" includes Live / DVR / Time-shifted TV, DVR / time-shifted TV, AM / FM radio, DVD / Blu-ray, and game consoles. "Digital" includes Multimedia devices (viewing on Apple TV, Roku, Chromecast, smartphone, computer etc. connected to TV), internet on PC, video on PC, app / web on smartphone / tablet, and video on smartphone.

# …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




Source: Nielsen Total Audience Report Q4:16
Note: "Analog" includes Live / DVR / Time-shifted TV, DVR / time-shifted TV, AM / FM radio, DVD / Blu-ray, and game consoles. "Digital" includes Multimedia devices (viewing on Apple TV, Roku, Chromecast, smartphone, computer etc. connected to TV), internet on PC, video on PC, app / web on smartphone, and video on smartphone.

***Traditional Cable Conundrum =***

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

***Subscribers Falling***

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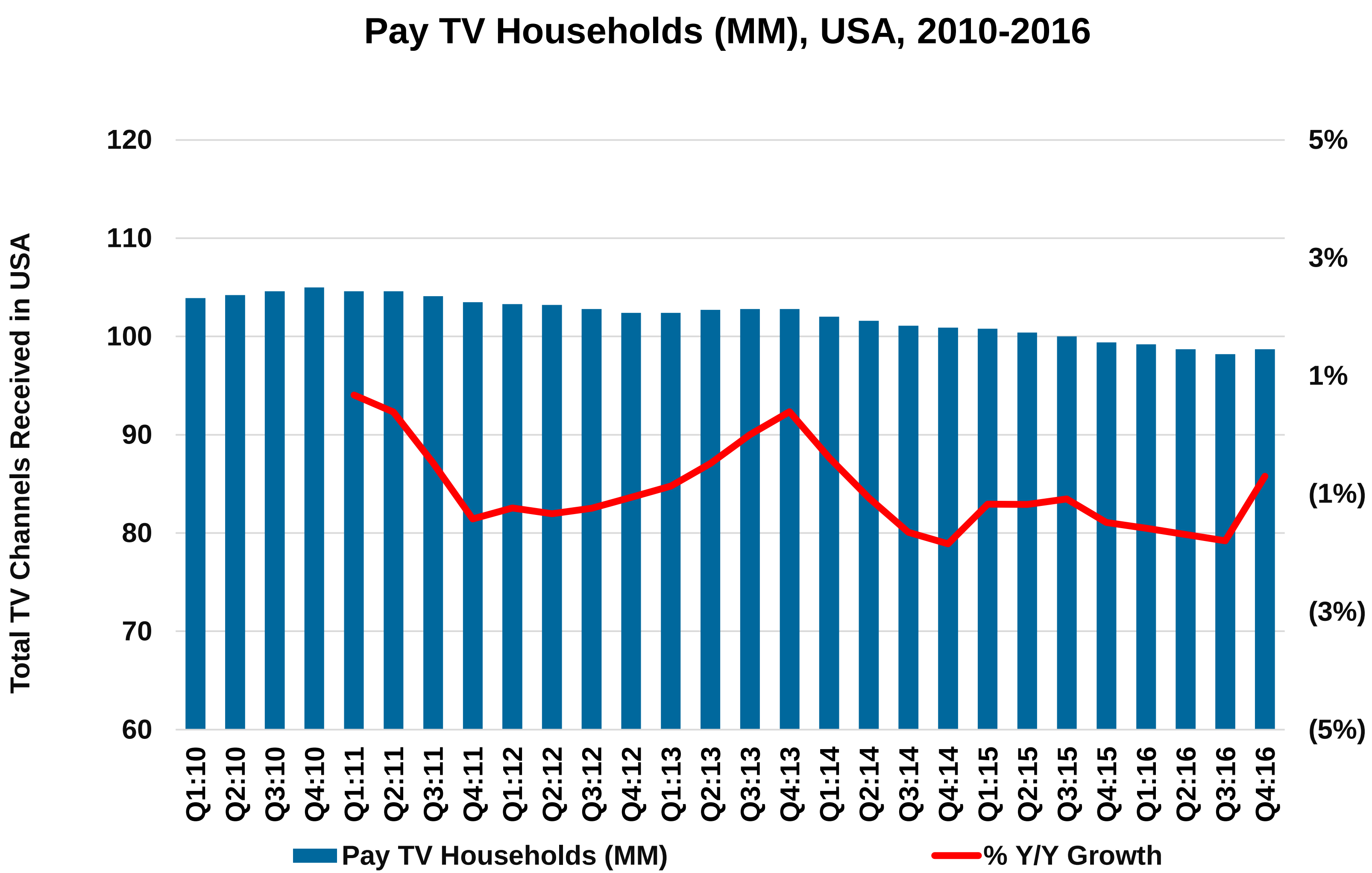
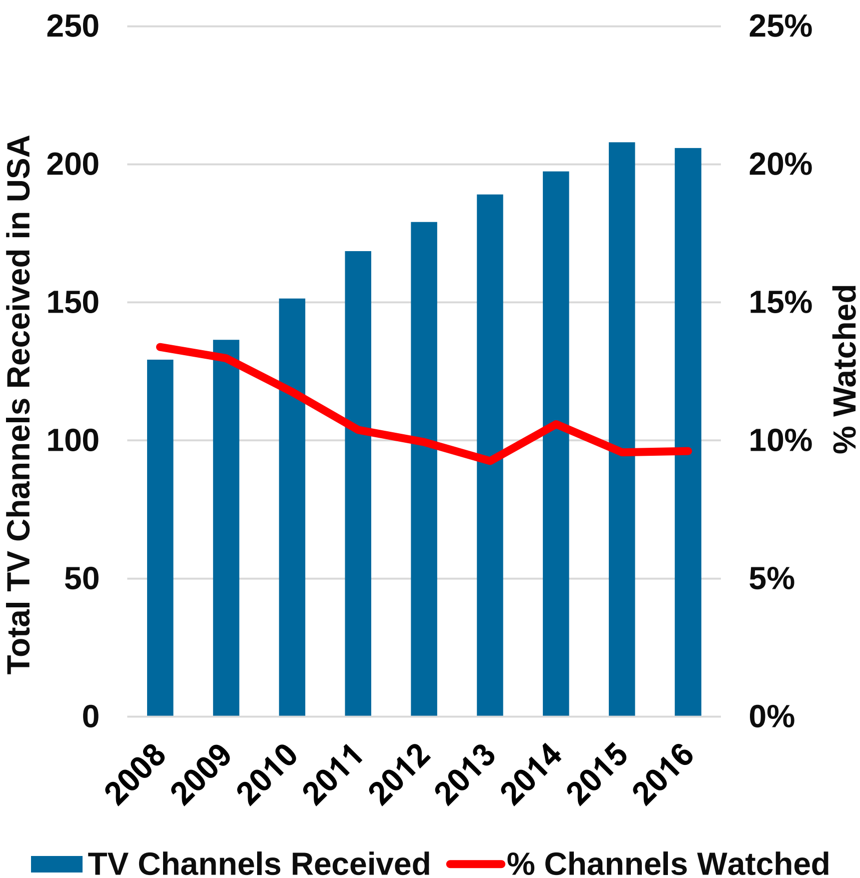
# Pay TV Household Growth = -1.3% Average for Last 12 Quarters…
# While Programming Costs >2x+ since 2006…



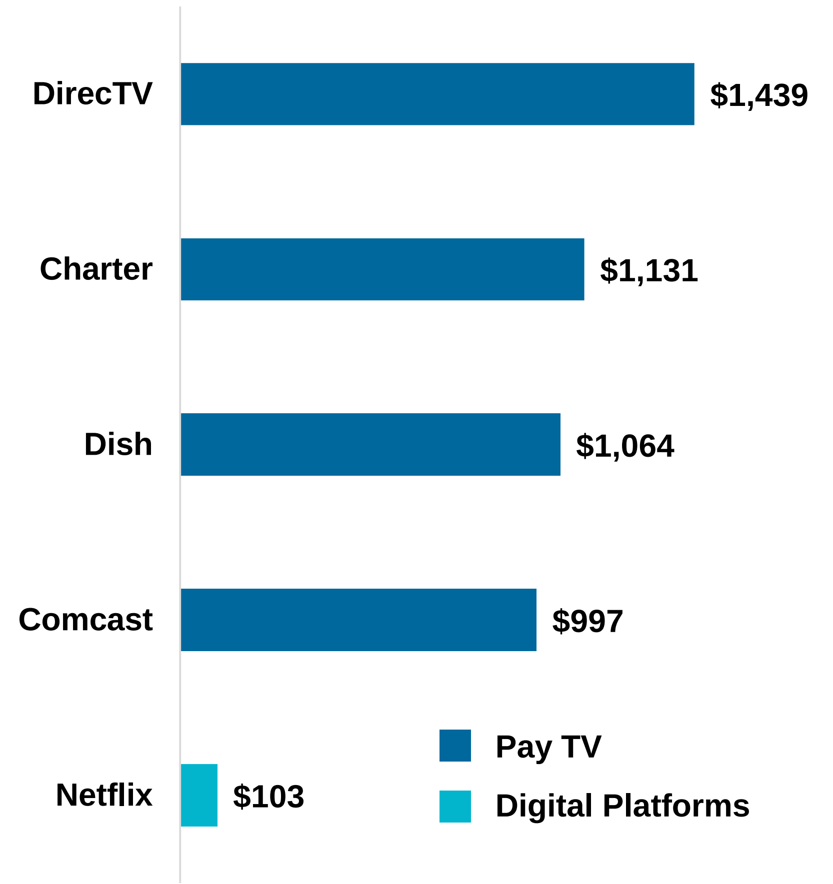

Source: Nielsen Total Audience / Cross Platform Reports, US Census Bureau, St. Louis Federal Reserve FRED Database
Note: Pay TV households represented by Nielsen "Cable Plus" metric, which includes households who receive television via Wired Cable (No Telco), Telco, or Satellite. "Programming Costs" includes total program and production costs for Cable and Other Subscription Programming firms, 2006-2015, as per US Census Services Annual Survey for Employer Firms ($25B in 2015, up from $12B in 2006).

# …# 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

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Source: Nielsen, Matthew Ball & Tal Shachar, REDEF Original 3/9/16, DirecTV, AT&T, Charter, Dish Network, Comcast
Note: TV channel data as of mid-year. DirecTV ARPU calculated by dividing the 2016 Video Entertainment revenue by the average number of Linear Video Connections during 2016. Charter ARPU calculated by dividing 2016 Video revenue by average Video Residential Primary Service Units during 2016. Dish Network ARPU calculated by multiplying the 2016 Pay-TV Average Monthly Revenue per Subscriber by 12. Comcast ARPU calculated by dividing the 2016 Residential Video revenue by the average Video Customers in 2016. Netflix ARPU is based off the Global Streaming revenue and average subscribers in 2016. All estimates are global.

***Digital Subscriptions =***

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

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

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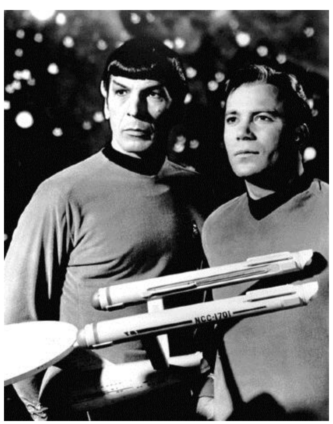
# Media Evolution (1950-2017) = Market of Millions → Market of One x Millions

| Network Era<br>1950s-1980s | → | Cable Era<br>1980s-2010s | → | Digital Era<br>Current |
|---|---|---|---|---|
| *Cater to All / High Viewership / No Personalization* | | *Broad Genres / Focus on Programming / Limited Bundle Choices* | | *Cater to Sub-Genres / Power Users / A La Carte + Subscription* |




amc

ESPN

HISTORY

**Digital Distributors**

crunchyroll

SHUDDER

FANDOR

SEE SO

**Digital Studios**

YouTube Red

cheddar

fullscreen

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Source: Amanda Lotz, *The Television Will Be Revolutionized*, New York: NYU Press, 2007, Wikimedia Commons, Google Image Commons, Crunchyroll, Shudder, Fandor, Seeso, Cheddar, Fullscreen

# 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***

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# 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

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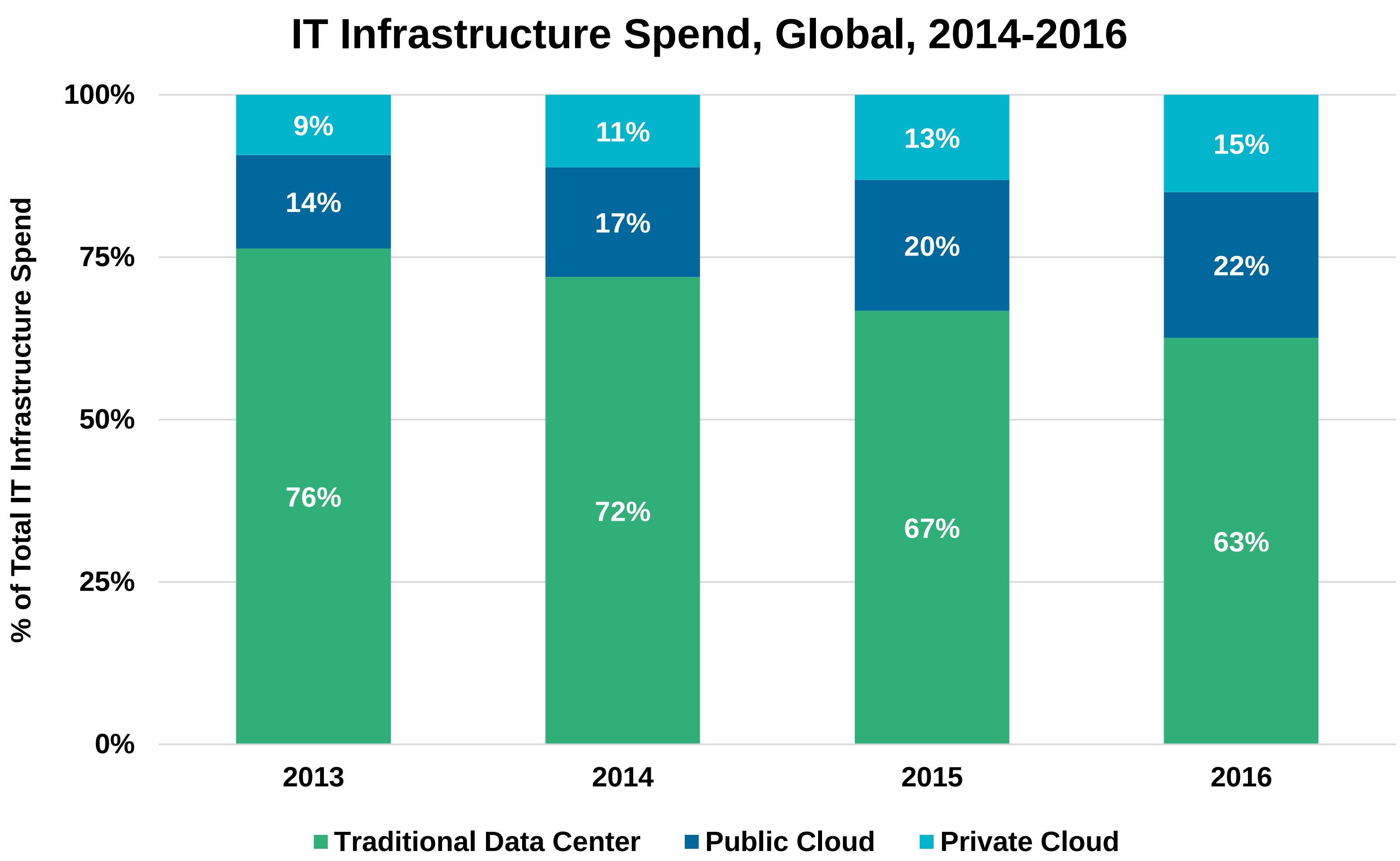
***Cloud Adoption =***

***Reaching New Heights +***

***Creating New Opportunities***

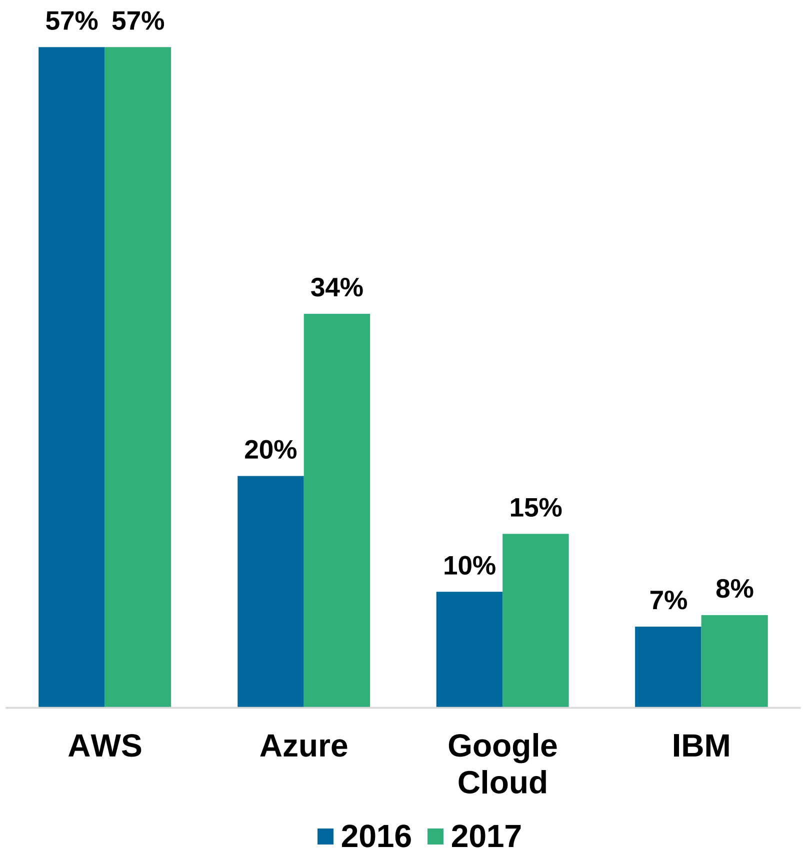
# Public + Private Clouds = Approaching Traditional Data Center Spend… +37% to $36B vs. 2014



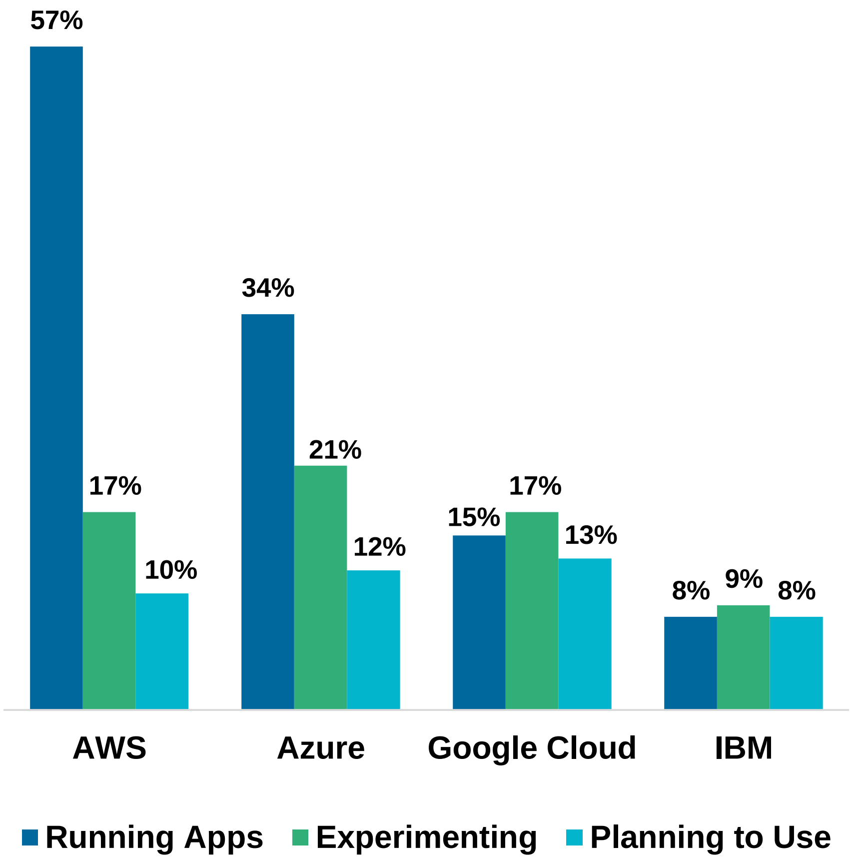

Source: IDC Worldwide Quarterly Cloud IT Infrastructure Tracker; Gartner; CloudHealth estimates

# 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*

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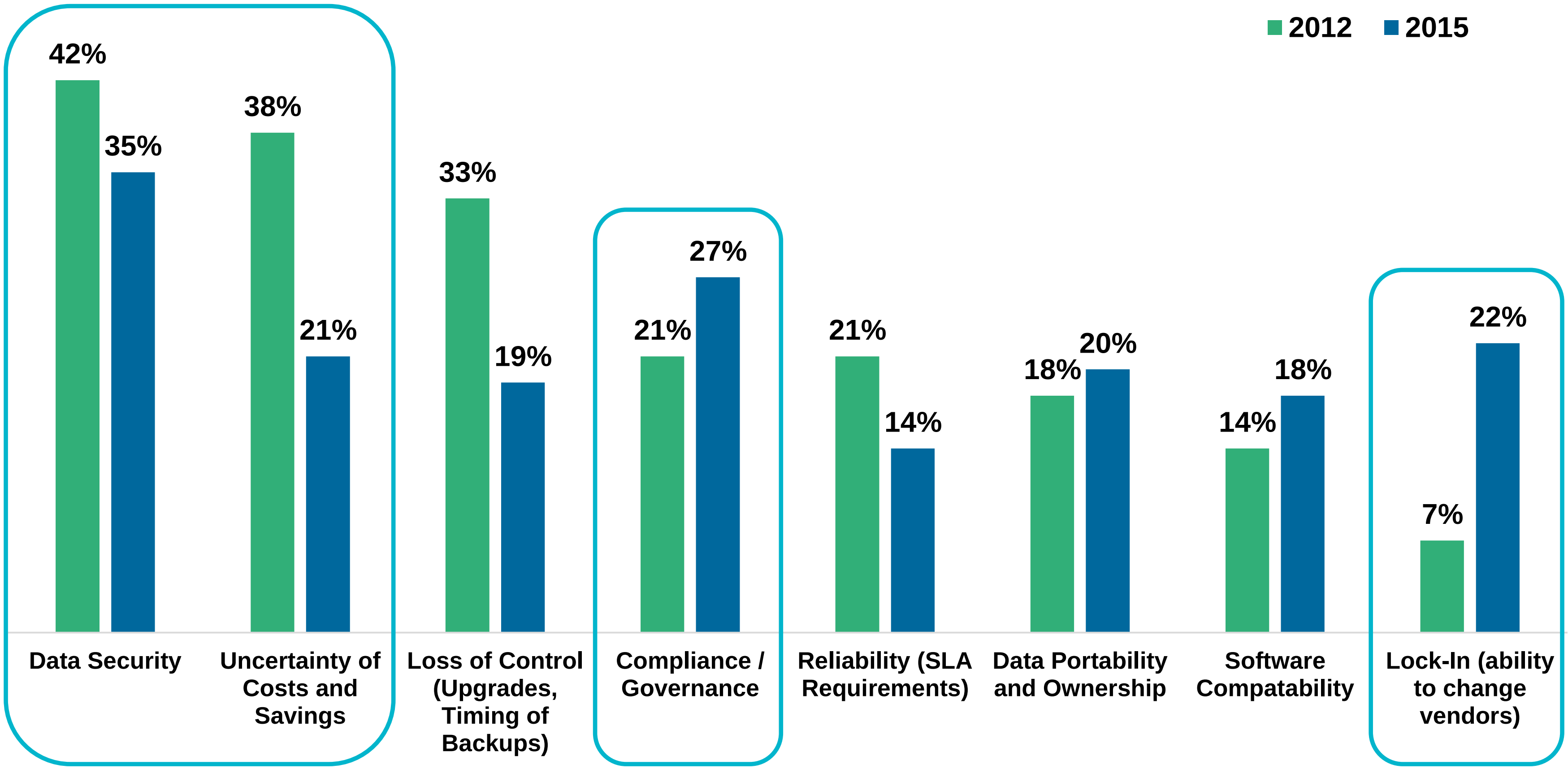
Source: Rightscale 2017 State of the Cloud Report
Note: Based on survey of IT Professionals, n=1,002.

# 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




Source: Bain Cloud Computing Survey, 2015 (n=347); Morgan Stanley AlphaWise Survey of IT Managers (n=304)

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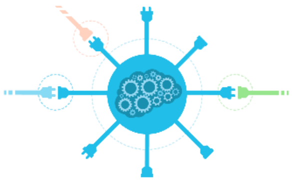
# Cloud Evolution / Tools = Paving Way for… Innovation Across Infrastructure Landscape…



**New Methods of Software Delivery =**

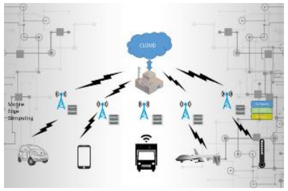
APIs / Browser Extensions…creating new wave of capabilities (+ companies) for both companies and end users

**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 =**

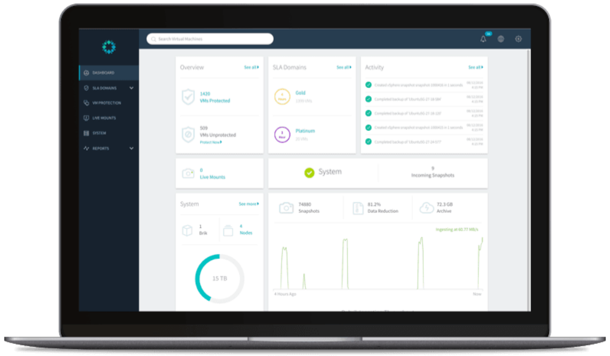
Pushing compute away from centralized nodes & closer to sources of data… addresses many IT challenges when running data-centric workloads in cloud – reduces latency / can have security + compliance benefits…

Source: Lloyd Tabb, Looker Founder & CTO; Happiest Minds; Azuqua; TheServerSide; Forbes

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

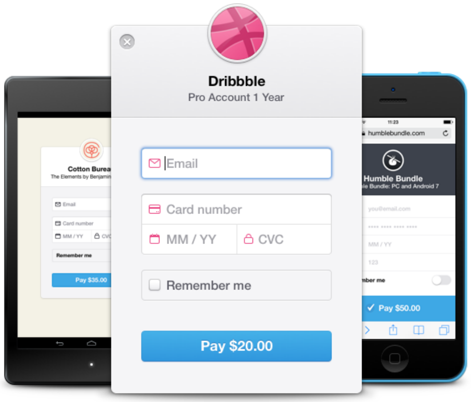
## Rubrik

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

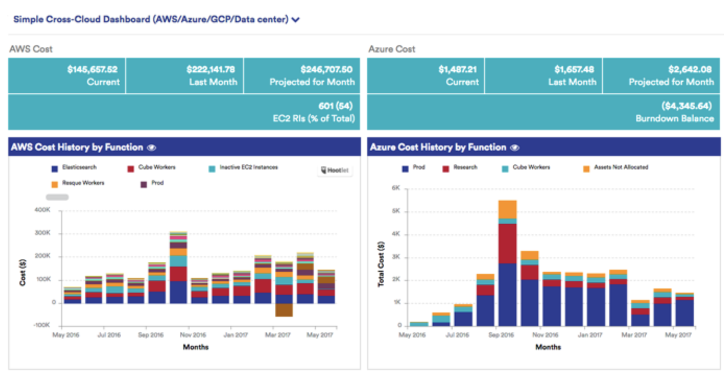



## Looker

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




Source: Company-provided & publicly available data; Snipcart

## ***Enterprise Software =***

## ***Customer Expectations → Mirroring Those of Consumer Apps***

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

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

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

| | 2010 - 2012 | 2017 |
|---|---|---|
| Atlassian | 1 designer : 25 developers | 1 designer : 9 developers |
| Dropbox | N/A | 1 designer : 6 developers |
| IBM | 1 designer : 72 developers | 1 designer : 8 developers<br>On Mobile – 1 designer : 3 developers |
| INTERCOM | N/A | 1 designer : 5 developers |
| LinkedIn | 1 designer: 11 developers | 1 designer : 8 developers |

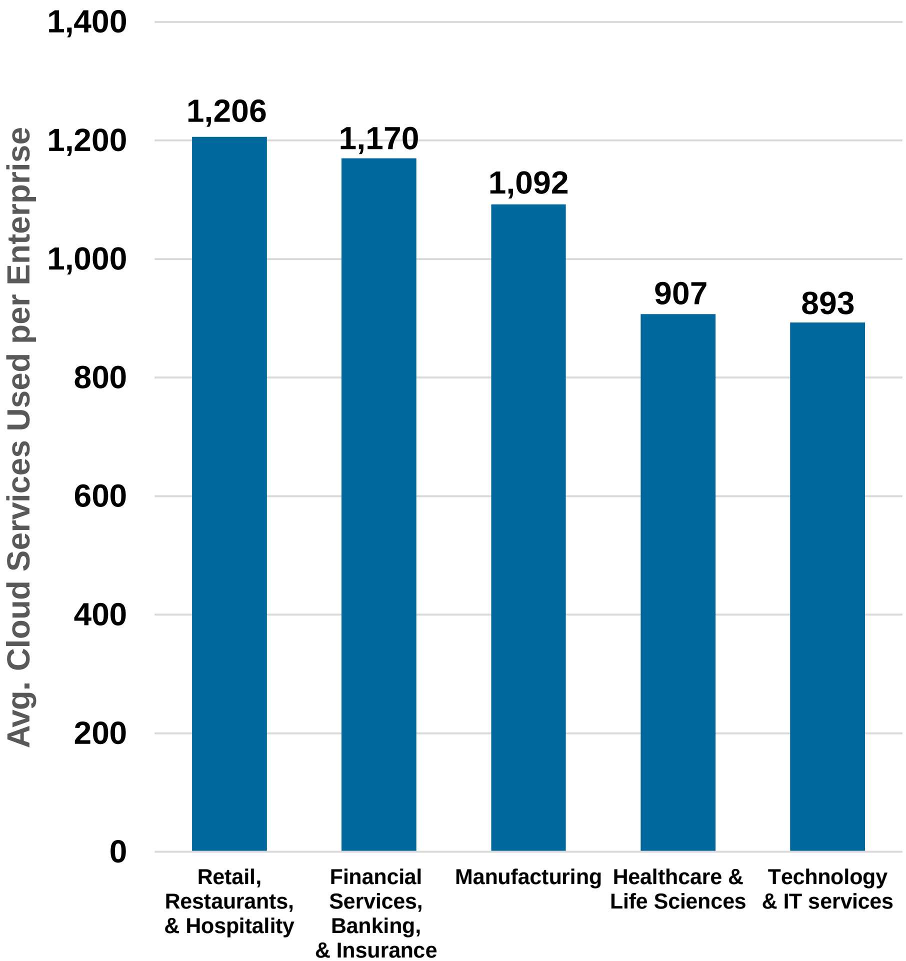
Source: Company data, Figma
Note: Ratios for entire orgs, unless noted otherwise. Atlassian historical ratio from 2012; Dropbox data for product org only; IBM historical ratio from 2012, data for product org only; Intercom data for product org only; LinkedIn historical ratio from 2010.

***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

Source: Netskope April 2017
Note: 461 cloud apps in April 2017, one year ago = average of 917 from Feb-16 report & 935 from Jun-16 report; "Not enterprise ready" = received a rating of "medium" or below in the Netskope Cloud Confidence Index.

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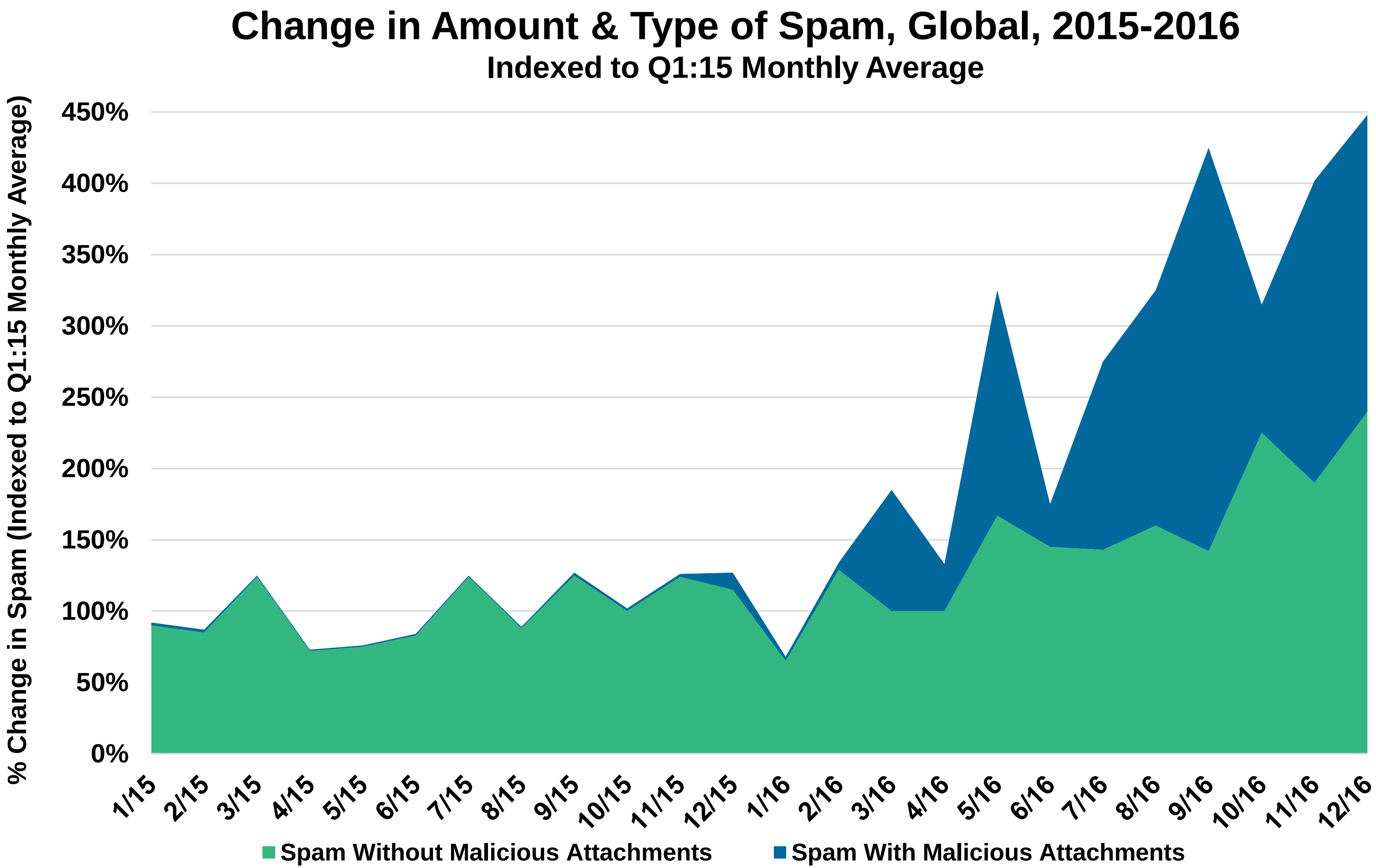
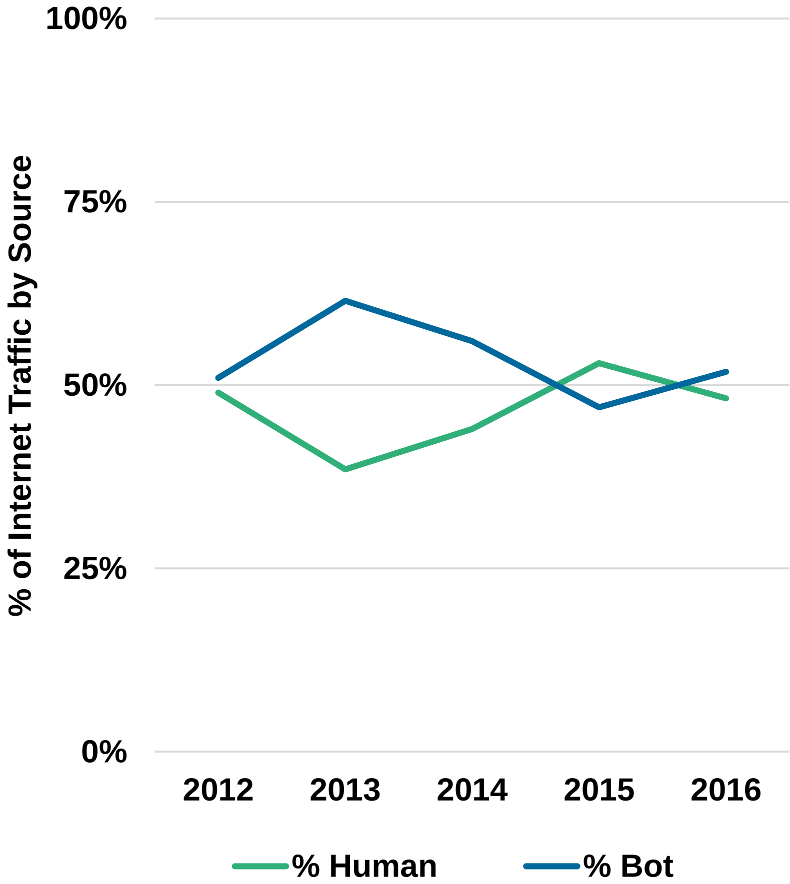
# …Network Breaches = Increasingly Caused by Email Spam / Phishing… Spam +350% vs. Q1:15 Monthly Average…



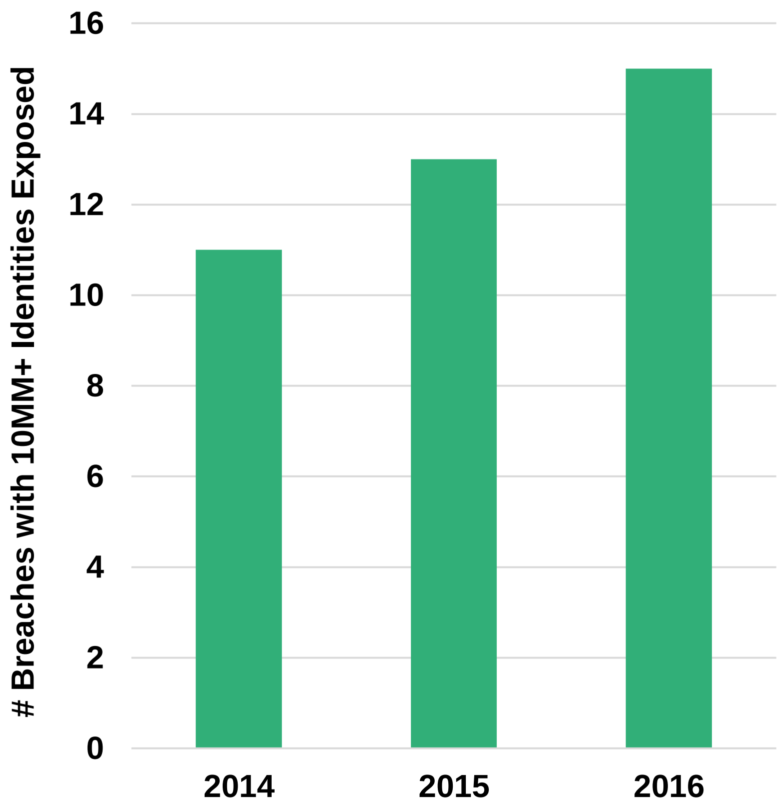

Source: AntiPhishing Working Group Phishing Activity Trends Report - Q4 2016; IBM X-Force Threat Intelligence Index 2017

# …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**




Source: Incapsula 2016 Bot Traffic Report (100k Randomly Selected Domains); 2017 Verizon Data Breach Investigations Report

# CHINA INTERNET =

# GOLDEN AGE OF ENTERTAINMENT + TRANSPORTATION

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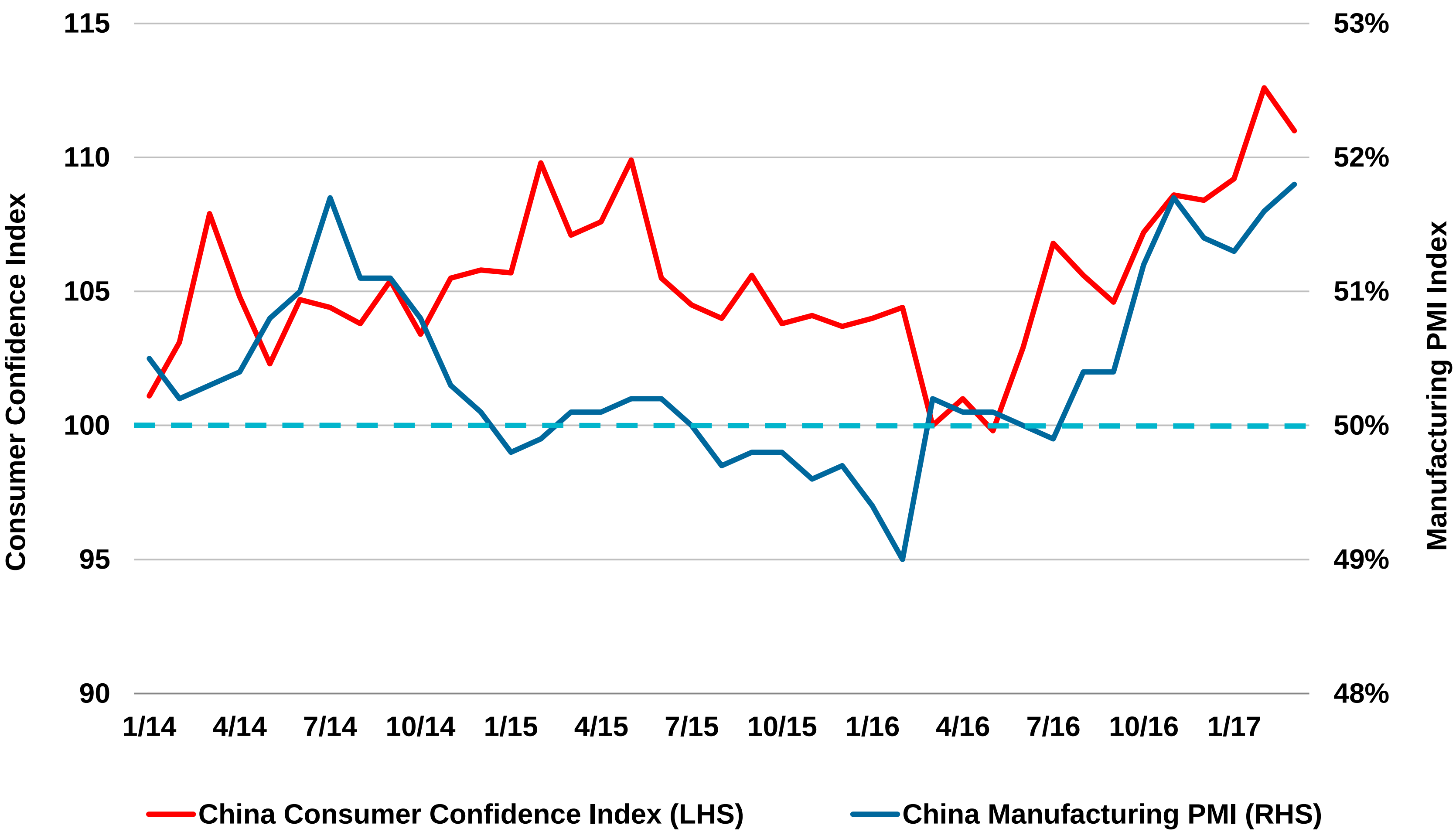
***China Macro =***

***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

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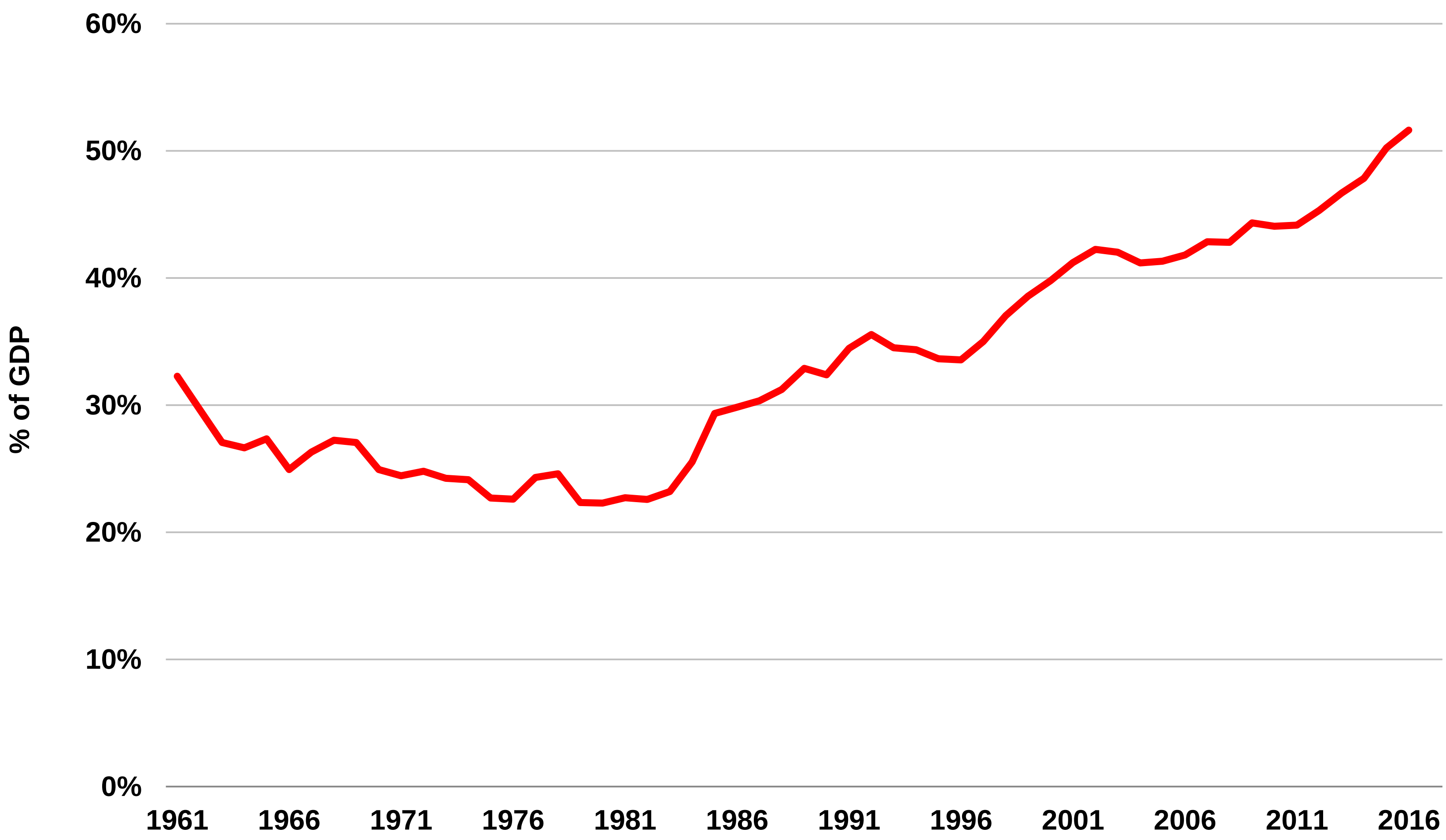
# China Macro =
# Service Sector @ 52% GDP Share vs. 23% Thirty-Five Years Ago

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




Source: China National Bureau of Statistics, Morgan Stanley Research
Note: Service sector defined as all industries outside of agriculture, forestry, animal husbandry and fishery industries (except support services to agriculture, forestry, animal husbandry and fishery industries), mining (except auxiliary activities of mining), manufacturing (except repairs for metal products, machinery and equipment), production and supply of electricity, steam, gas and water, and construction.

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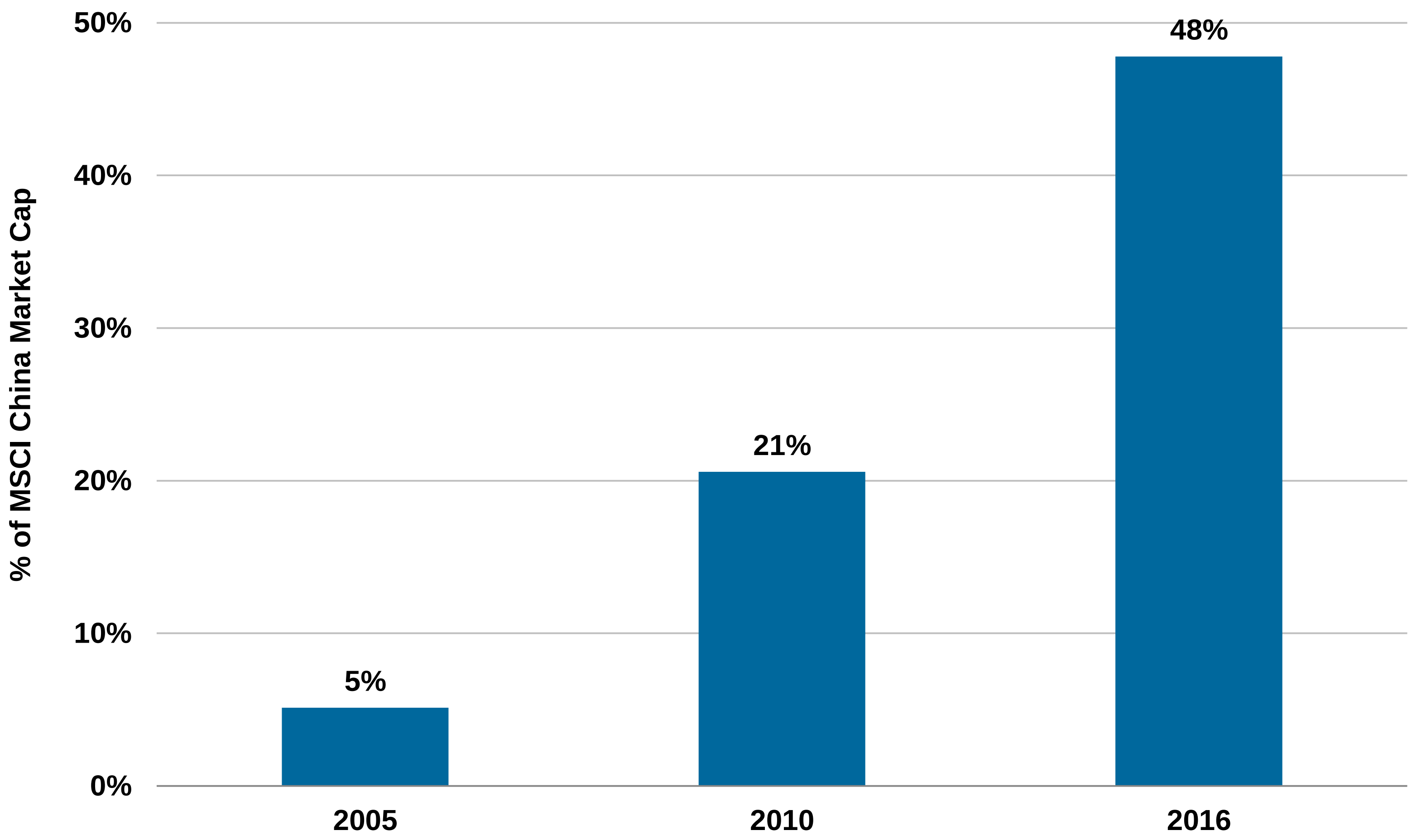
# China Macro = Private (Non-SOEs) Enterprises…
# Increasingly Driving Wealth Creation + Economic Growth + Jobs

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




Source: Morgan Stanley Research, MSCI
*SOE = State Owned Enterprise.

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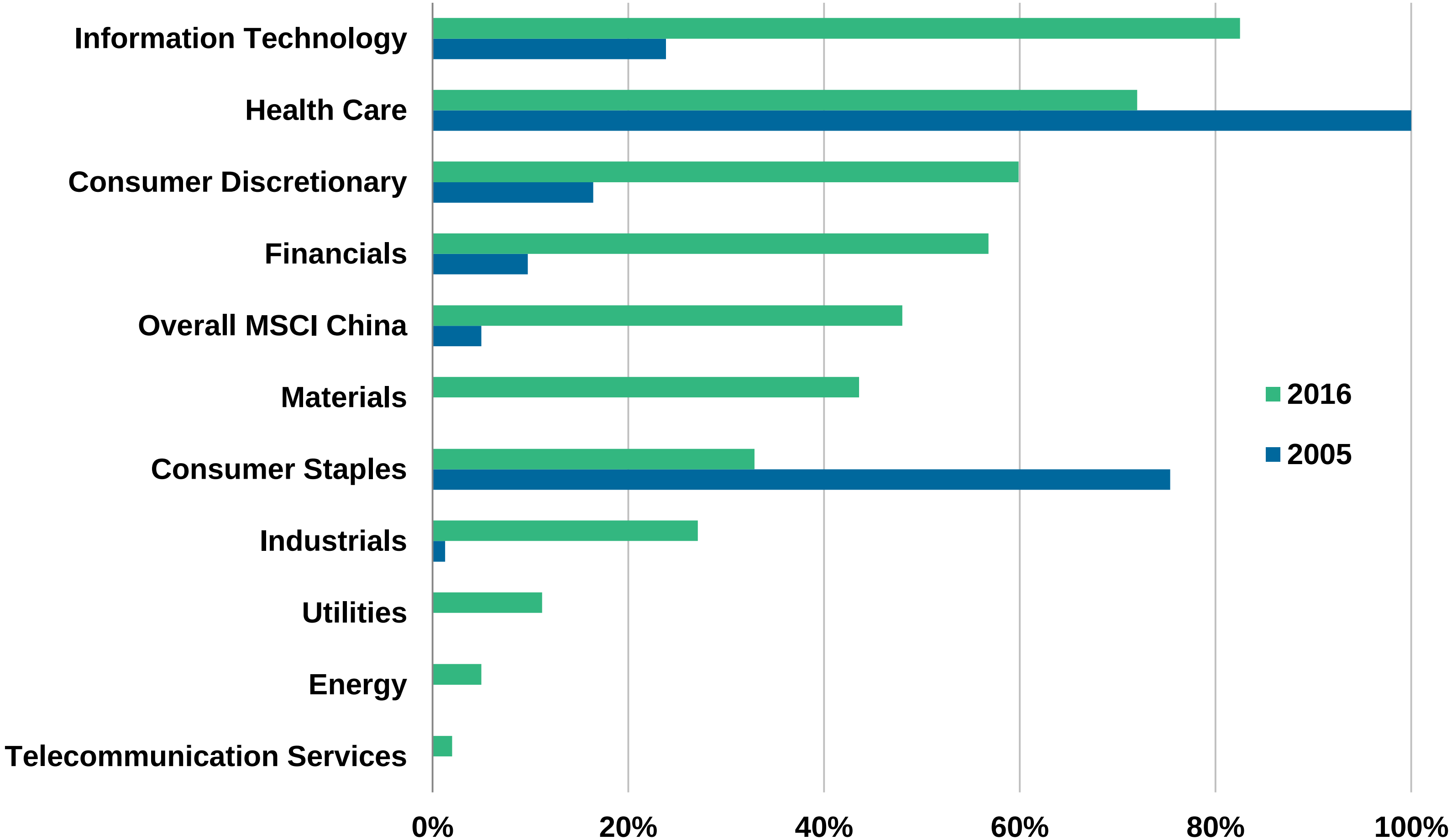
# China Macro =
# Technology Companies Lead Public Market Wealth Creation

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

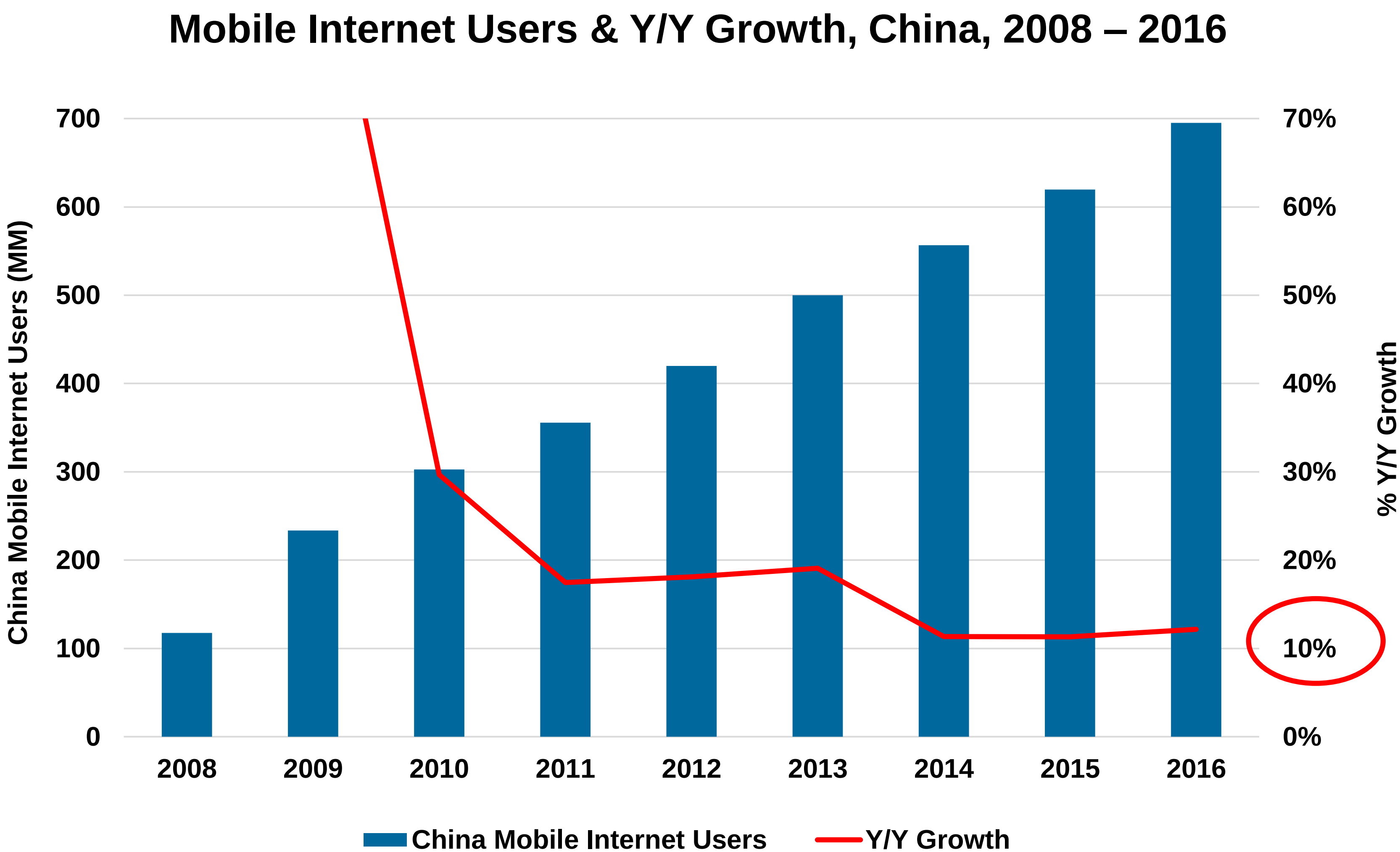



Source: Morgan Stanley Research, MSCI
*SOE = State Owned Enterprise.

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

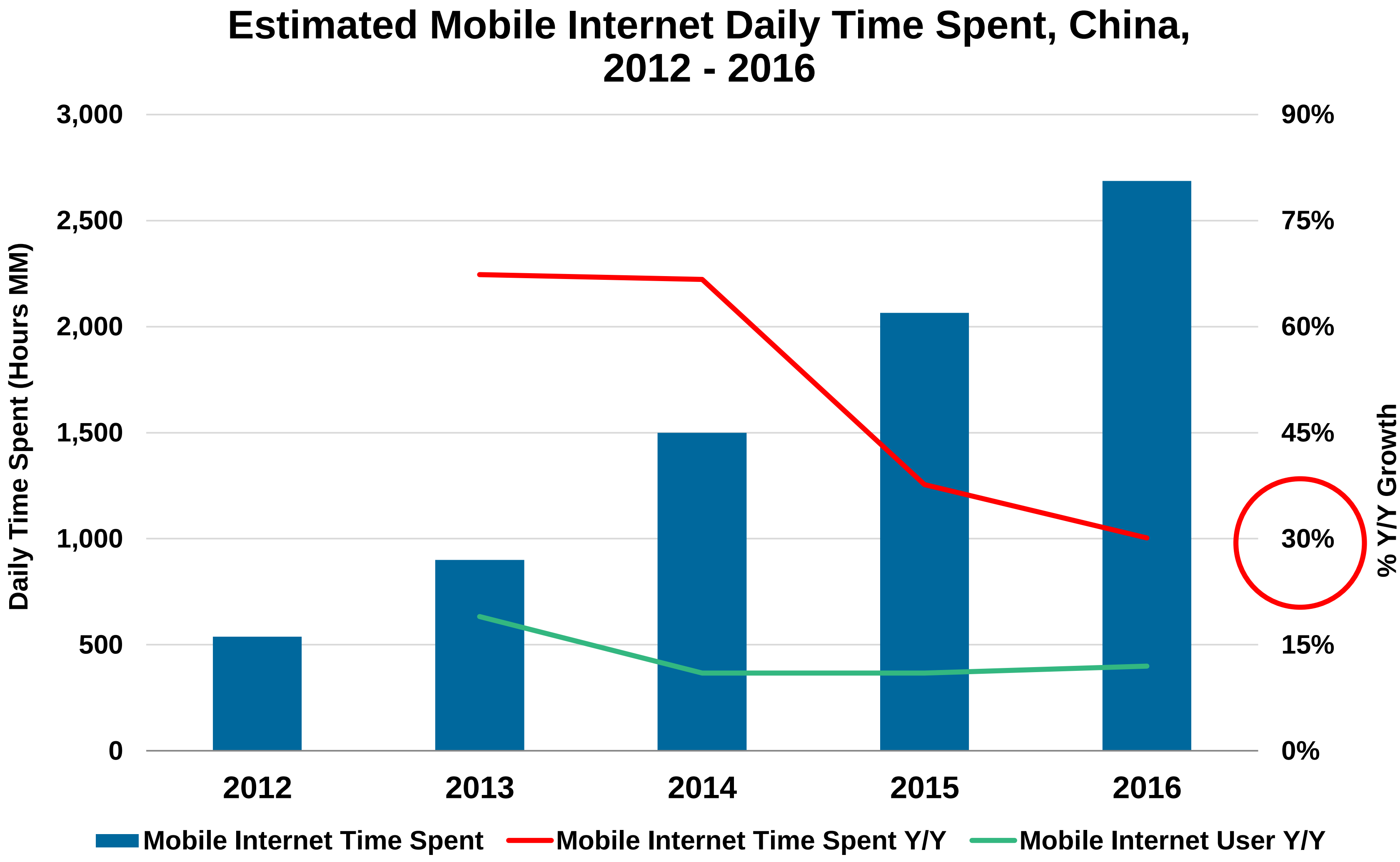
***Healthy User Growth…***
***Usage Outpacing Users***

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




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

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

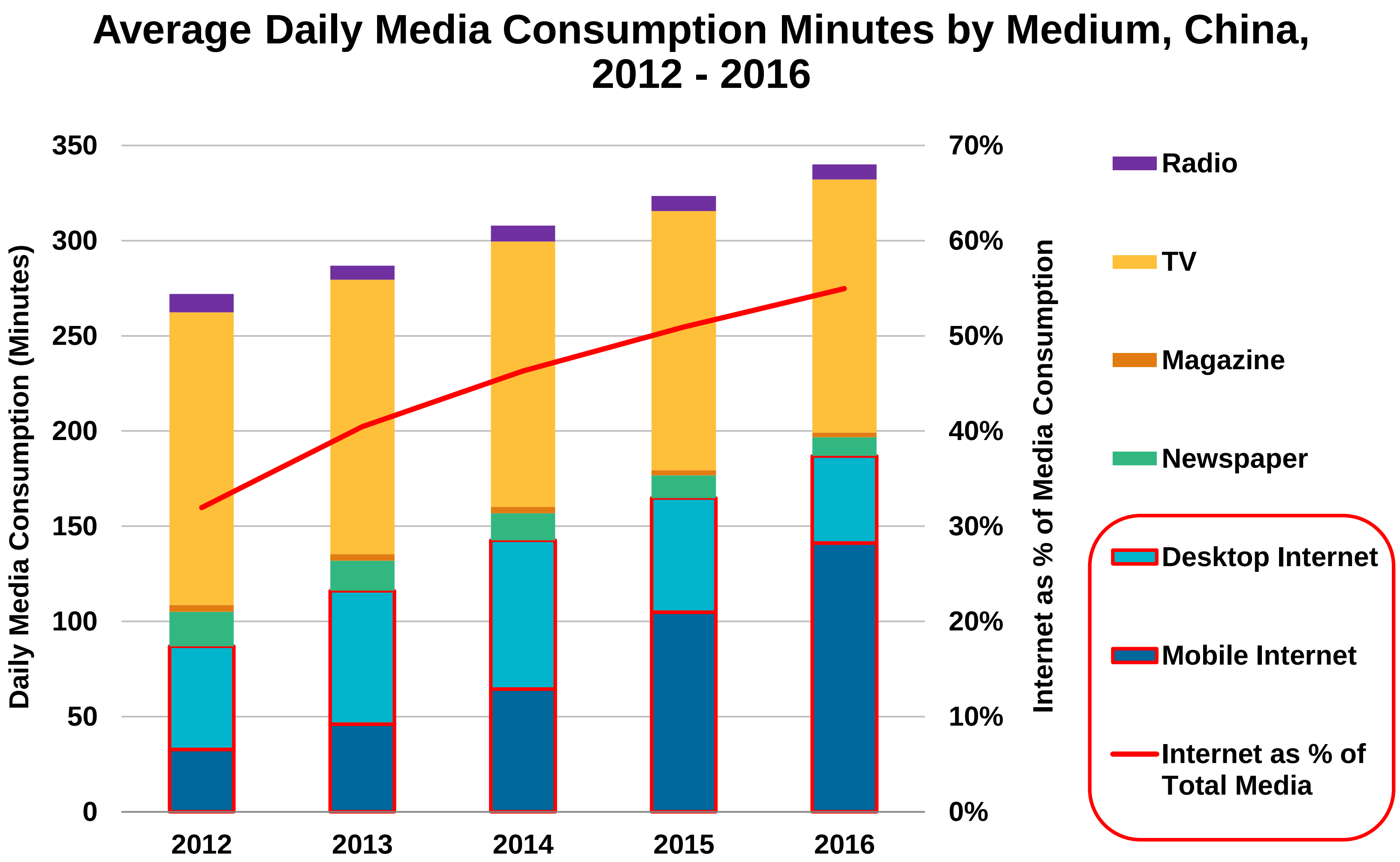



Source: Hillhouse estimates based on daily media time spent data from ZenithOptimedia and mobile data from QuestMobile

***China Entertainment =***

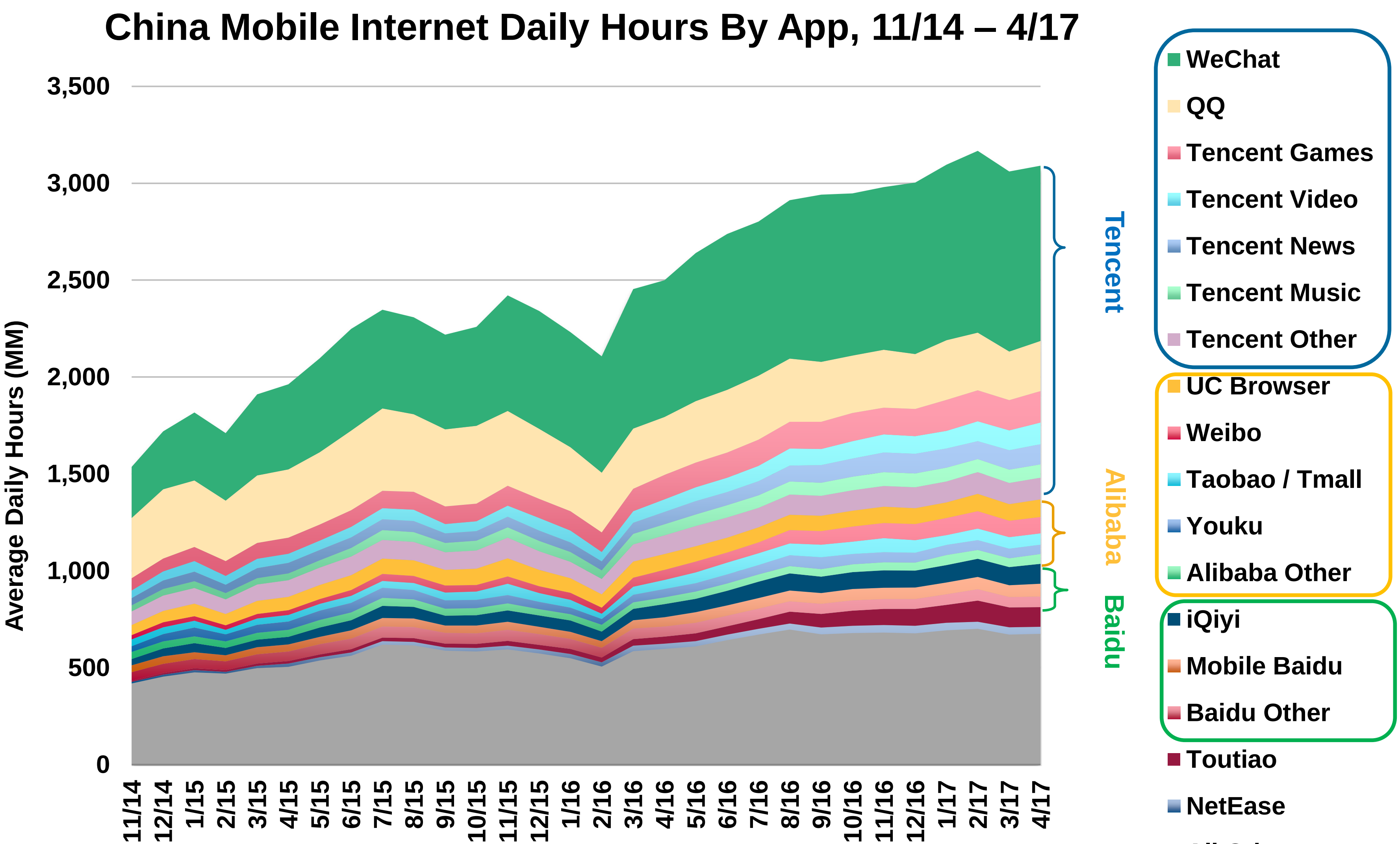
***Online Innovation Driving Robust User + Usage + Monetization Growth***

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




Source: Zenith Optimedia

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




Source: QuestMobile
Note: Only top 100 apps by time spent are categorized by company affiliation. Tencent, Alibaba and Baidu affiliates include strategically invested companies.

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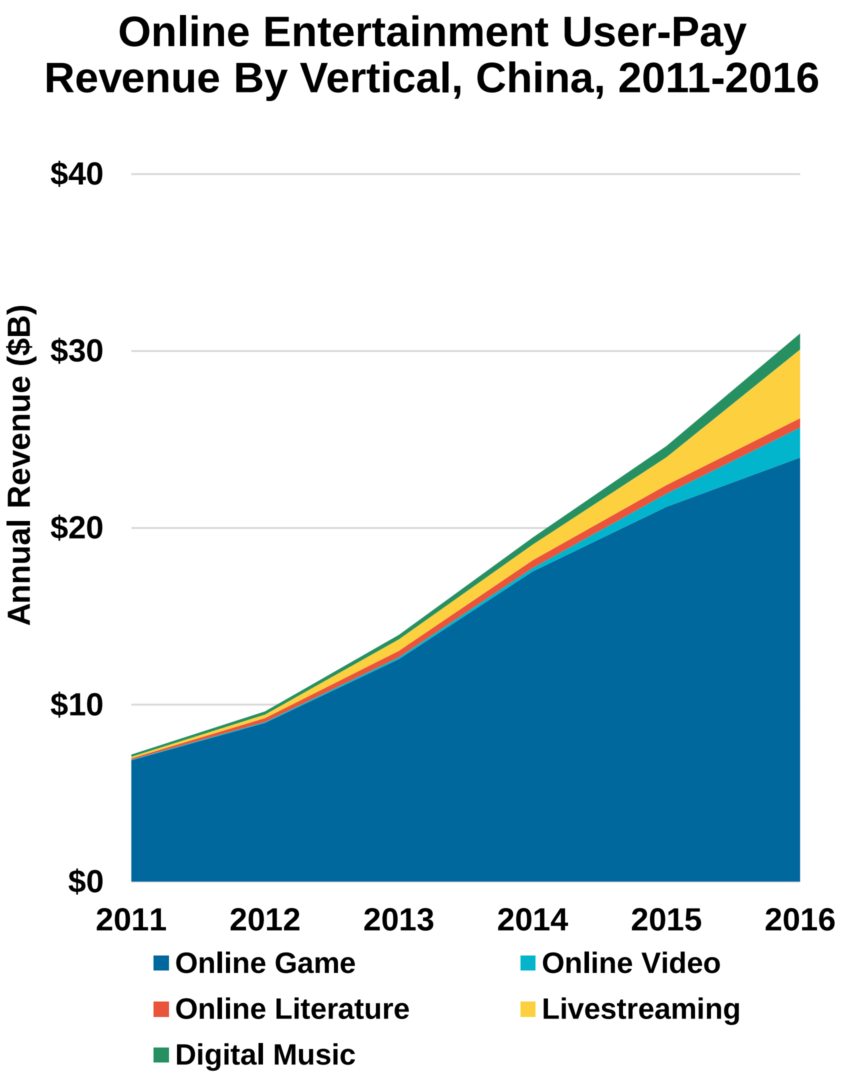
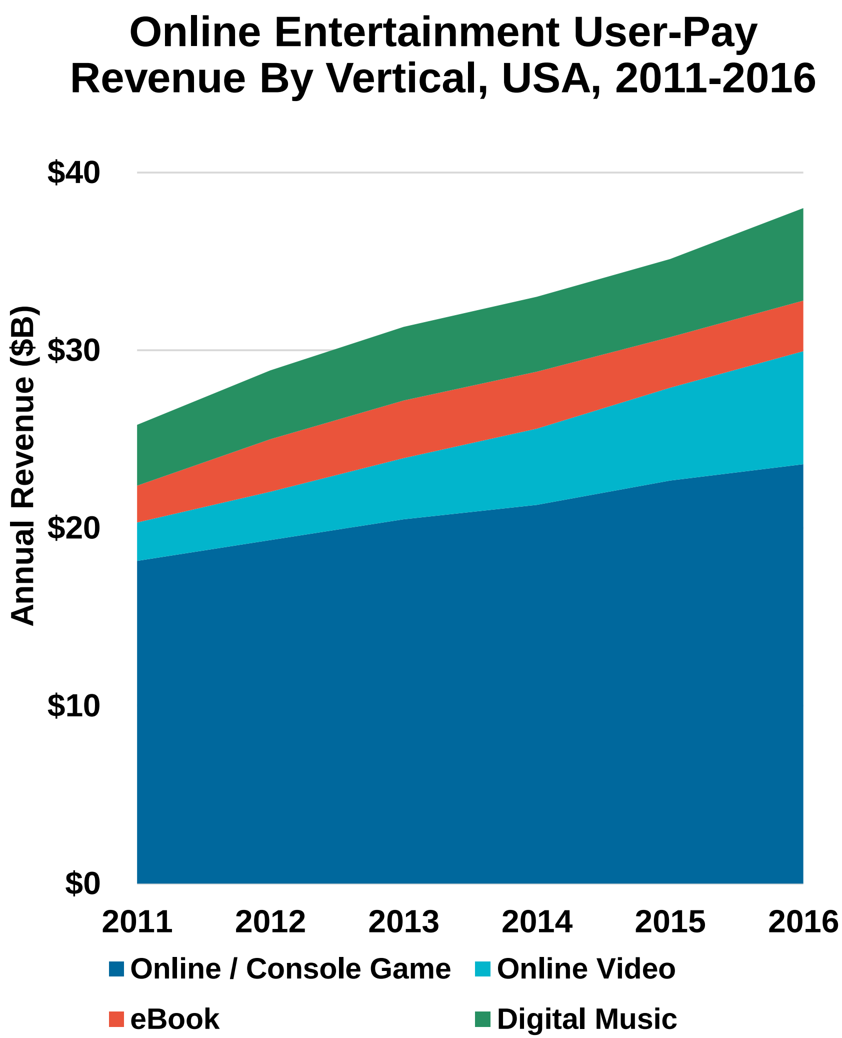
# China Online Entertainment = Consumers Increasingly Willing to Pay… Led by Games + Livestreaming + Video

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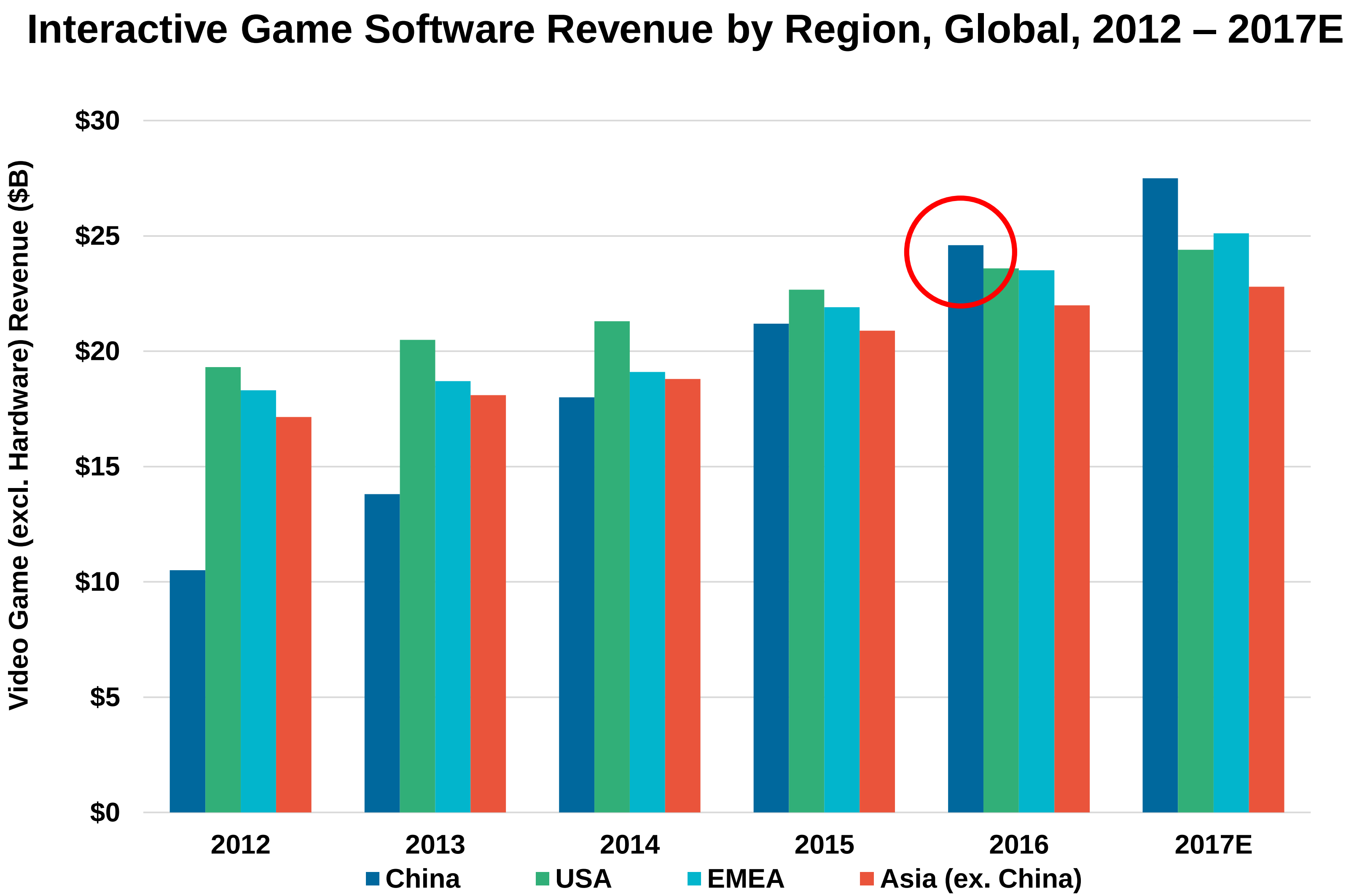
Source: Game industry data per per Newzoo and Hillhouse estimates, excludes console or PC hardware related revenue. Online video data per iResearch (China) and Hillhouse estimates (USA), excludes advertising related revenue. Digital music data (excl. advertising) per iResearch (China) and RIAA (USA). Livestreaming (China) data per Hillhouse estimates. eBook data per Hillhouse estimates (China) and AAP and Hillhouse estimate (USA)

HILLHOUSE Hillhouse Capital

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

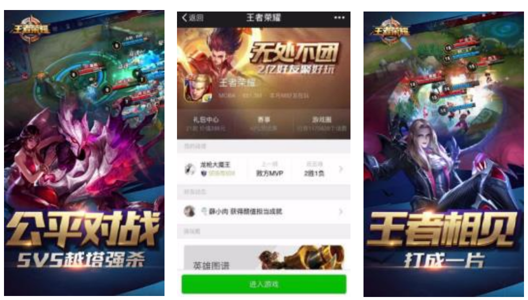



Source: Newzoo
* Excluding console / gaming PC hardware revenue.

# 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

Source: Tencent, NetEase

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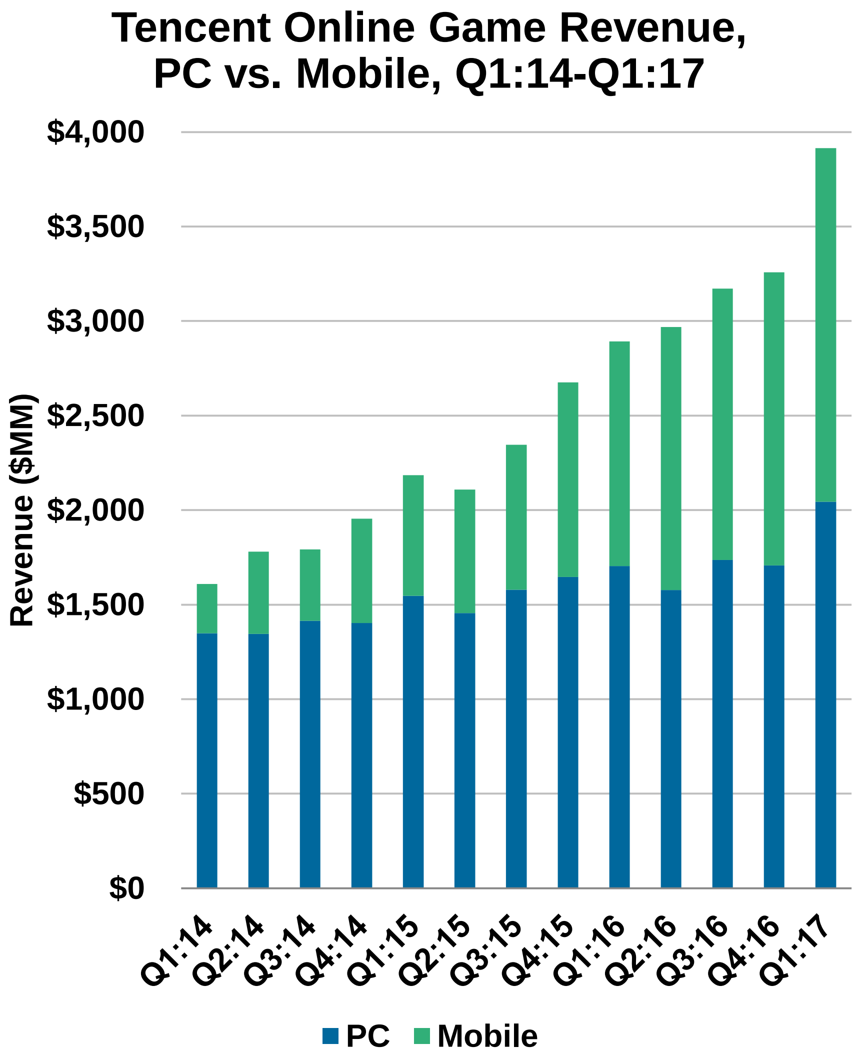
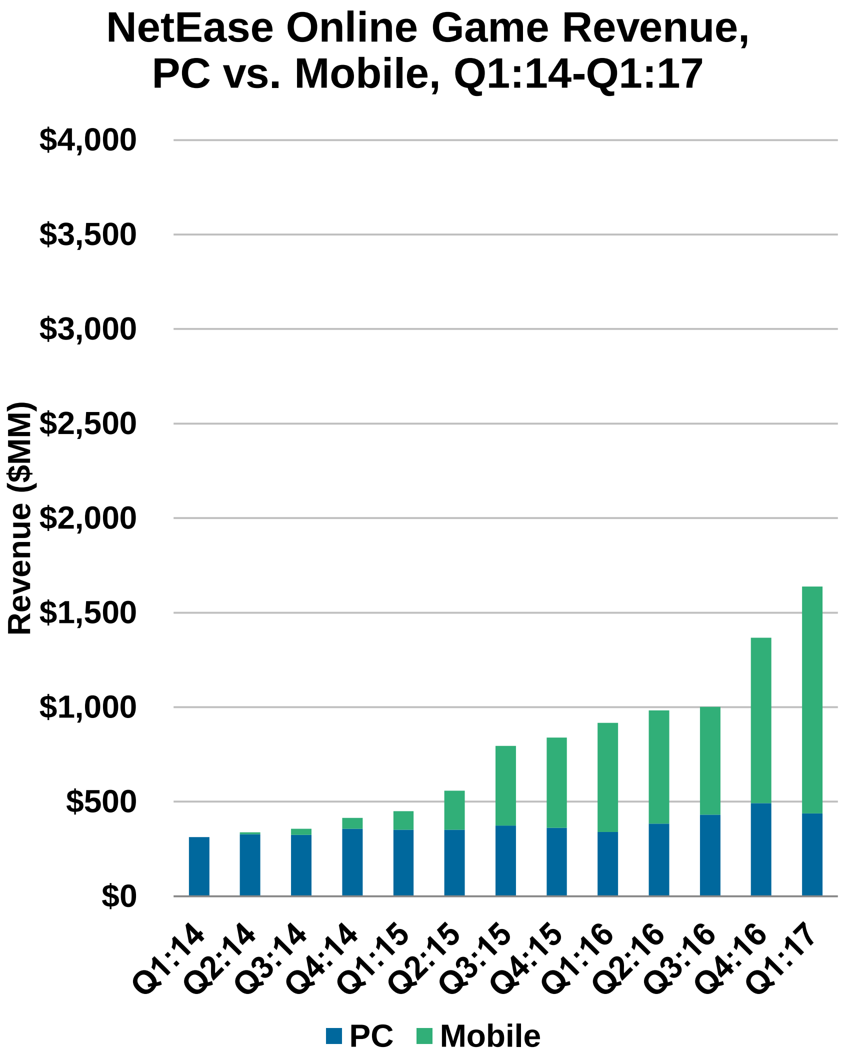
# …China Online Gaming = Tencent + NetEase Driving Mobile Innovation + Revenue

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

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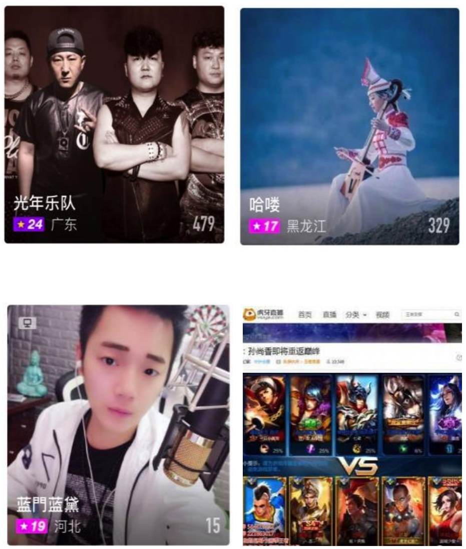
# China Livestreaming =
# High Consumer Engagement + Willingness to Pay…

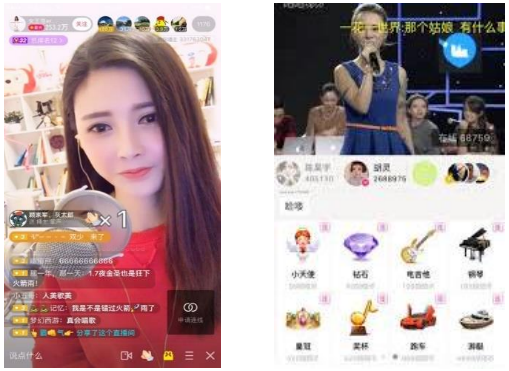
## Diverse Live Content Type

Singing / Dancing /
Talk Show / Game Play…




## Interactive / Social / Gamified

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



## 20+ Virtual Gift Categories

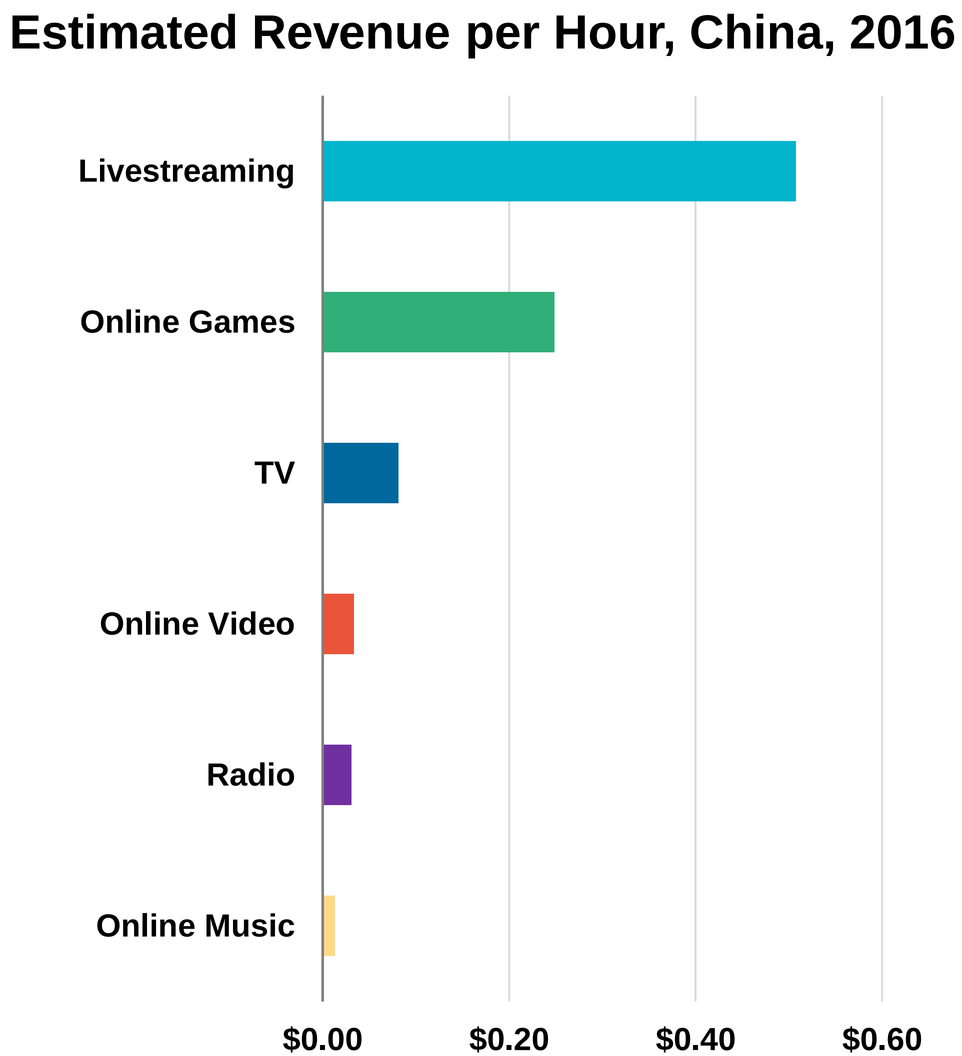
priced from Rmb0.01


## Local / Social

Nearby Livestreams /
Chat & Add Friends


Source: Hillhouse research

# …China Livestreaming = Compelling Monetization

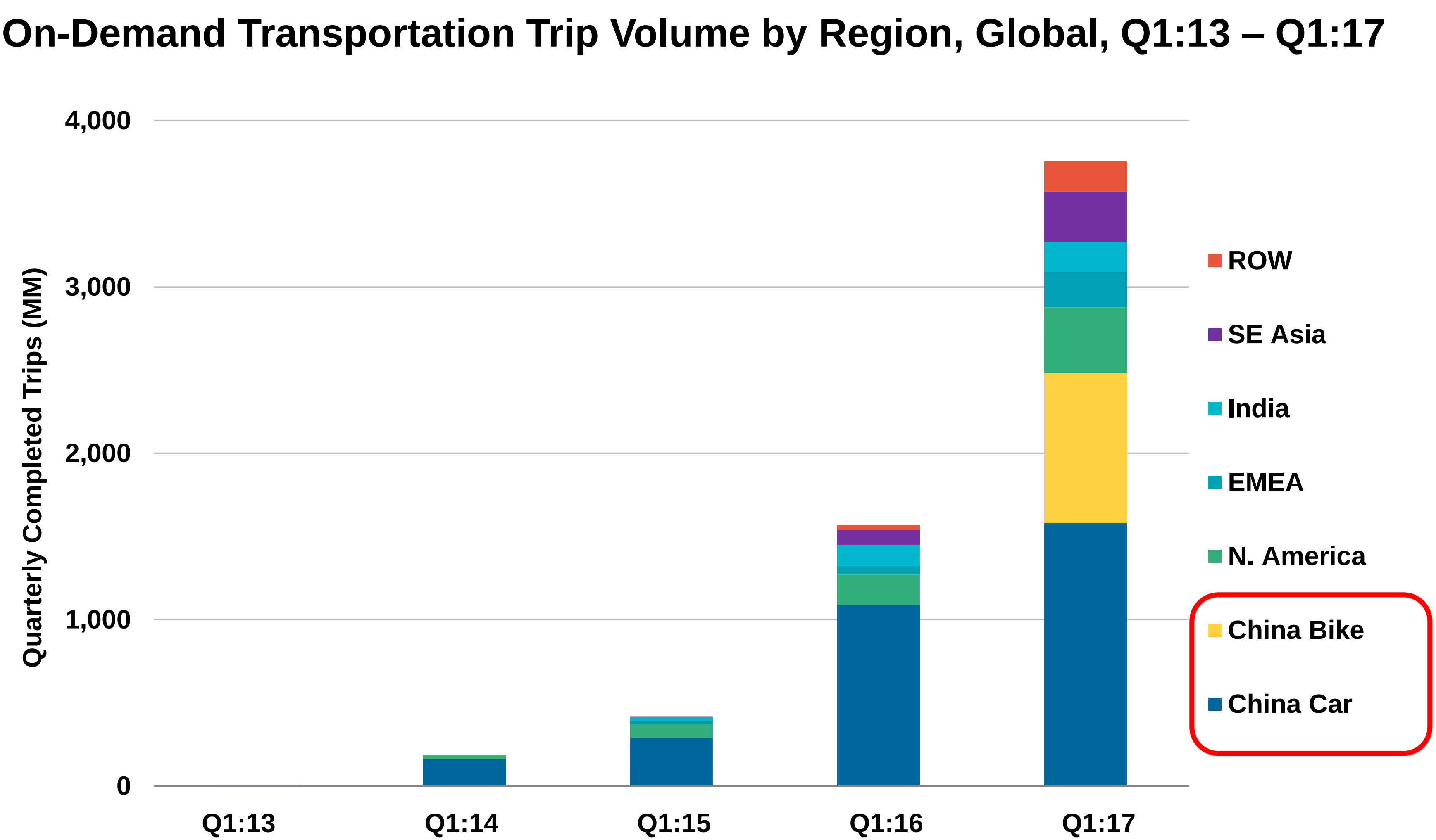



Source: Hillhouse estimates based on Newzoo, iResearch, Questmobile, and select company disclosures
Note: Revenue data includes subscription, advertising and paid download revenue streams.

***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)




Source: Hillhouse Capital estimates, include on-demand taxi, private for-hire vehicles, as well as on-demand for-hire motorbike and bike trips booked through smartphone apps

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

## Mobike Product Innovation

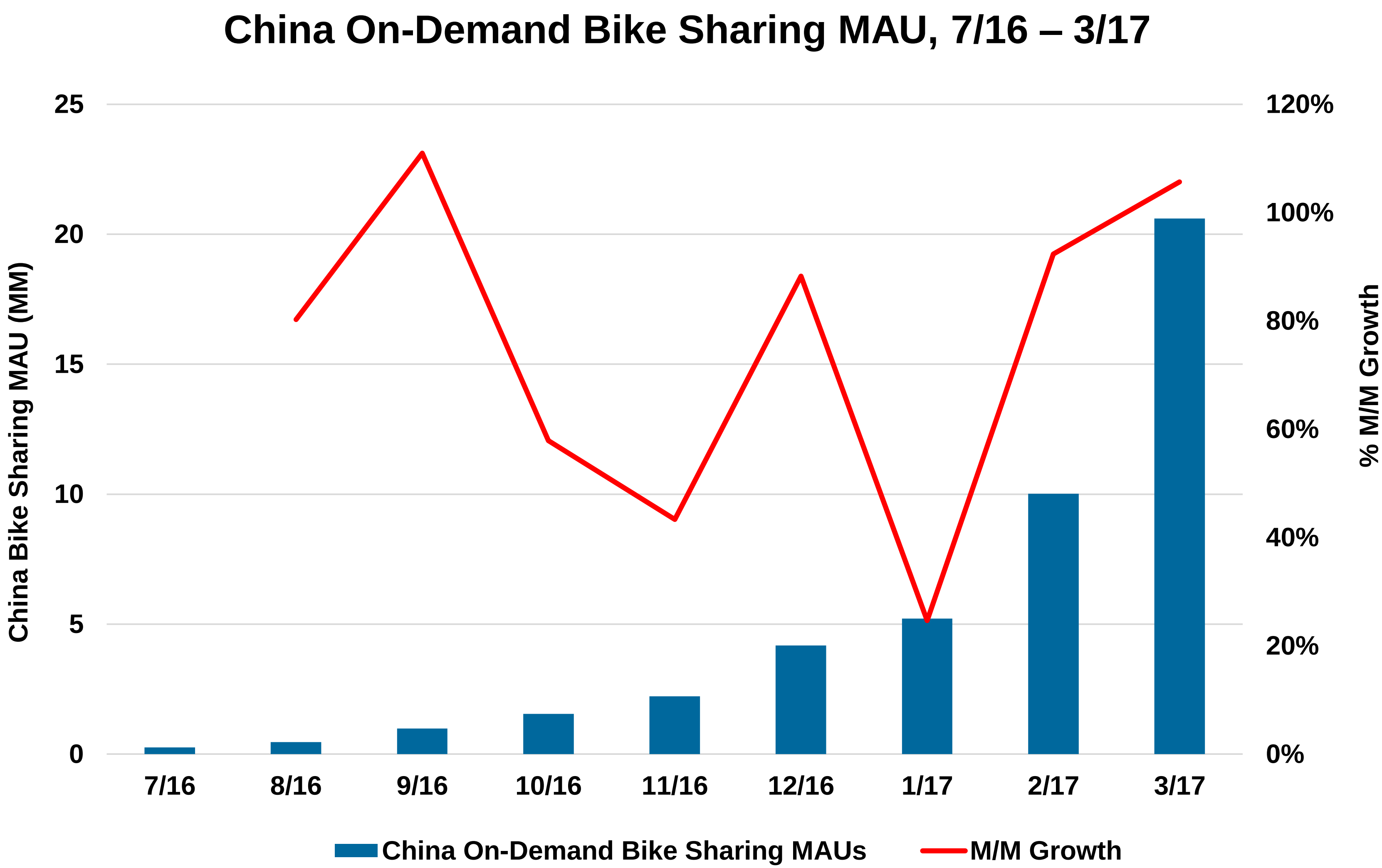
**In-Bike GPS + Smartphone**
Bike Sharing Without Stations…Location-Based Virtual Red Envelope Drives Utilization


**QR Code + Mobile Payment**
Easy Unlock & Low Friction Payment


**Ubiquity + Low Cost (¥1/~$0.15 per 30 min) + Convenience**
Mass Adoption & Bike Utilization


Source: Mobike

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

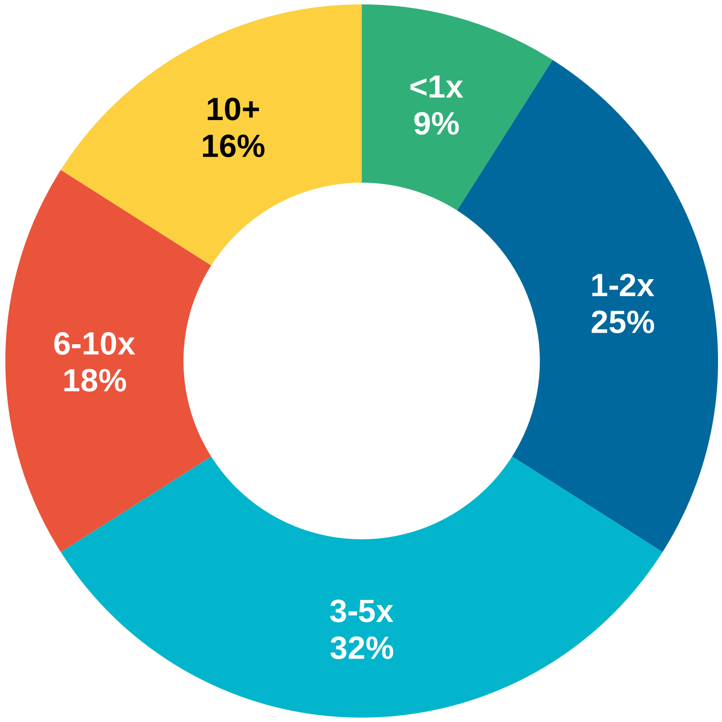



Source: TrustData
Note: Dip in M/M growth rate in 1/17 was driven by Chinese New Year.

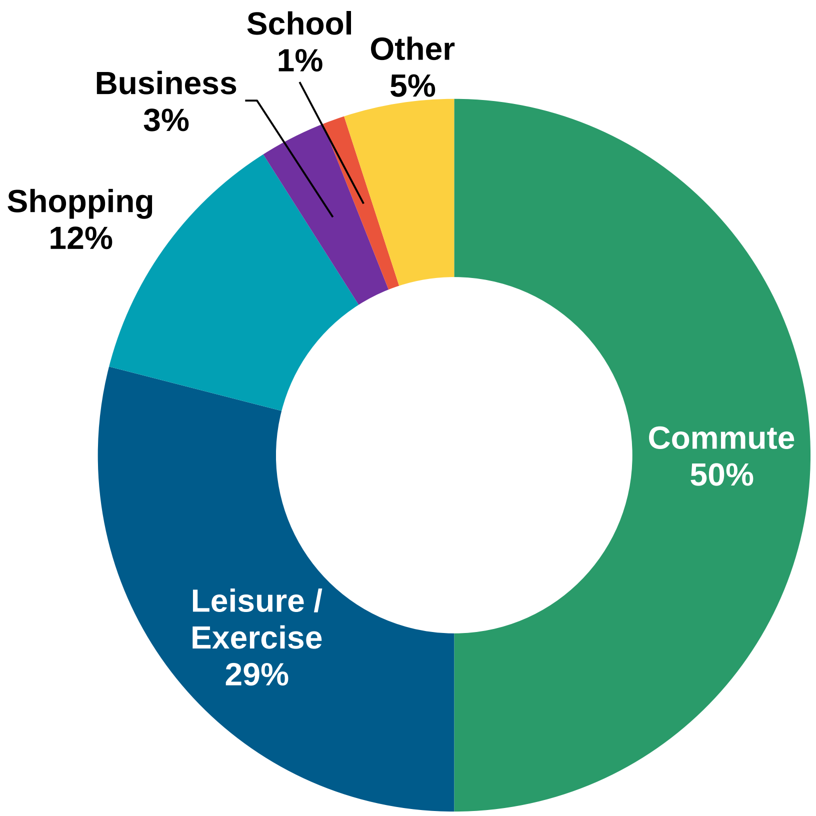
# China On-Demand Bike Sharing = High Frequency…
# 2/3 Users Ride 3+ Times Per Week

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

### On-Demand Bike Trips per Week




### Purpose of On-Demand Bike Trips




Source: Transport Commission of Shenzhen Municipality study on bike sharing, based on operating data from four participating companies and survey data between 10/16 and 3/17, n=16,546

# 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

Source: Transport Commission of Shenzhen Municipality study on bike sharing, based on operating data from four participating companies and survey data between 10/16 and 3/17, n=16,546
* Based on following assumptions – 250k reduction in daily private car trips, avg. trip length of 10km, avg. fuel consumption of 6.9 L/100km, avg. CO2 emission of 2kg/L of fuel.

# 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**<br>**~5 Miles** | **2 KM**<br>**1.2 Miles** |
| **Average Trip Cost** | **20 RMB**<br>**~3 USD** | **~1 RMB**<br>**~0.15 USD** |
| **Cost per Km** | **~2.50 RMB** | **~0.50 RMB** |
| **Cost per Mile** | **~0.60 USD** | **~0.12 USD** |

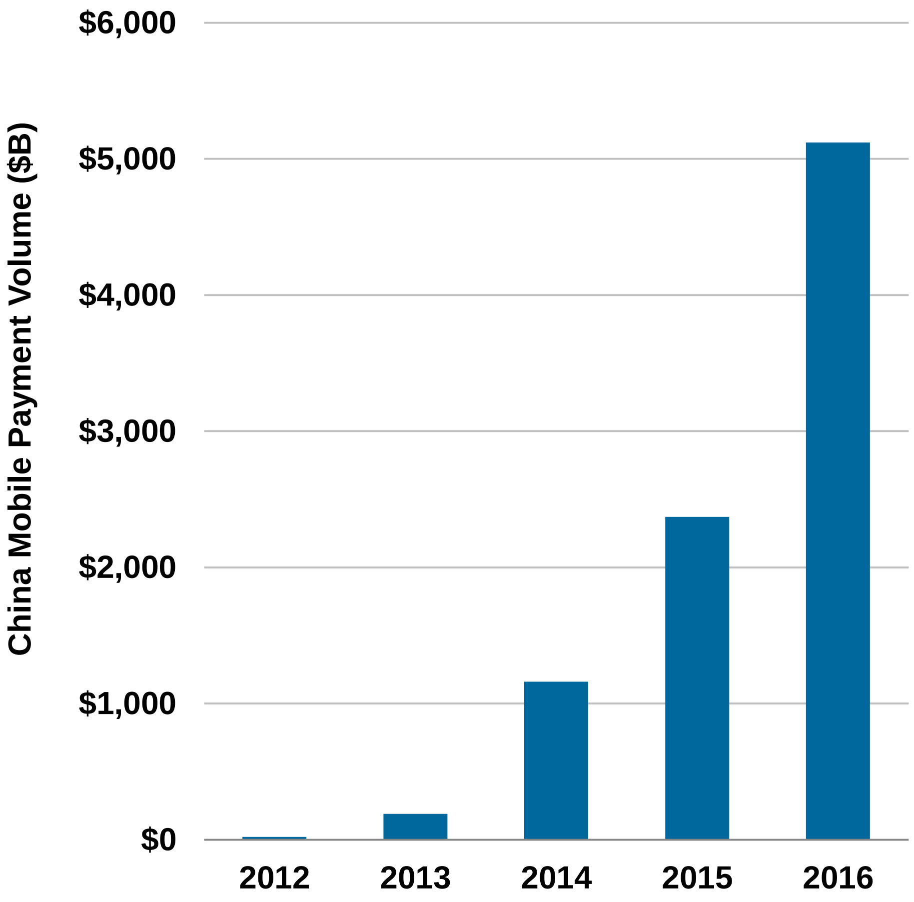
Source: On-demand car share data per Hillhouse estimate. On-demand bike share data per Transport Commission of Shenzhen Municipality study on bike sharing, based on operating data from four participating companies and survey data between 10/16 and 3/17, n=16,5466.92

***China Mobile Payment Infrastructure =***

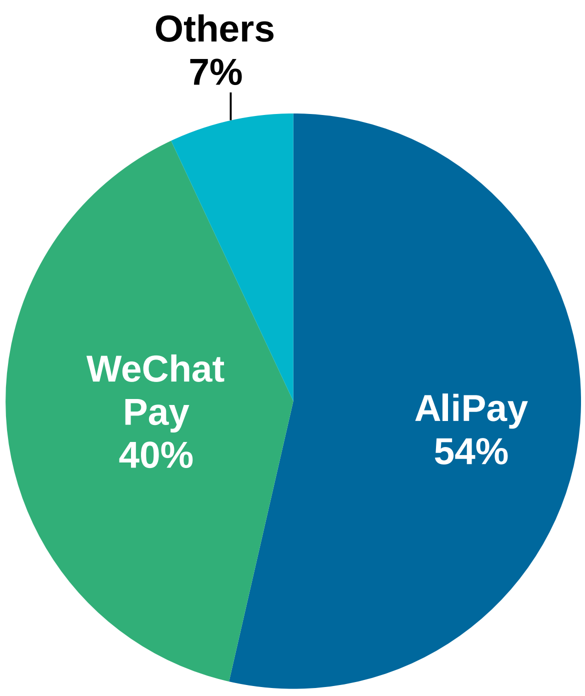
***Enabling Rapid Growth + Monetization of Internet Usage***

# 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

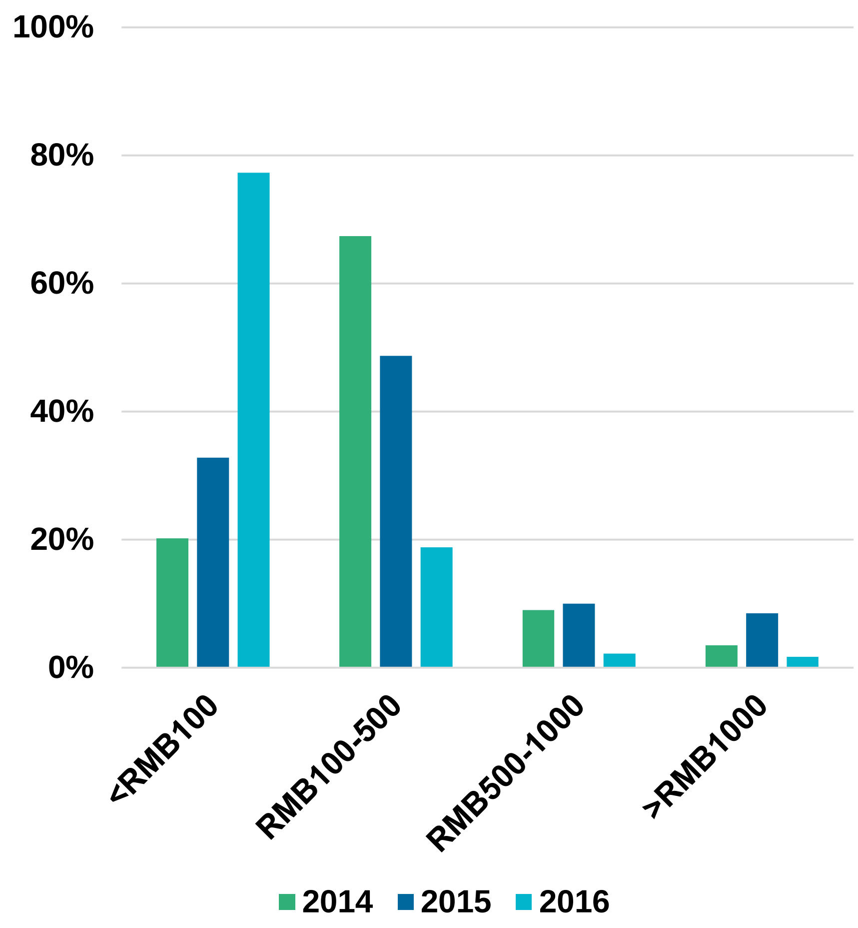




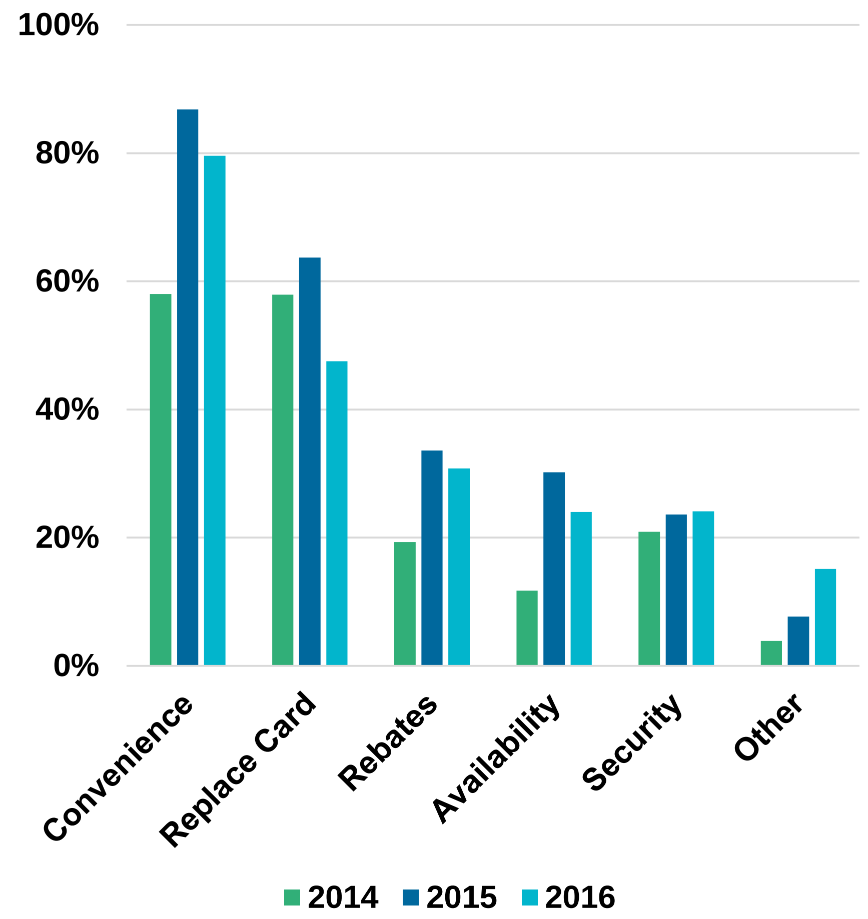

Source: Analysys
*Excludes certain P2P and transfer payments. Assume constant FX rate of 1USD = 6.9RMB.

# 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




Source: PCAC, Bernstein Analysis

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

**~$0.15 for On-Demand Bike**

Alipay

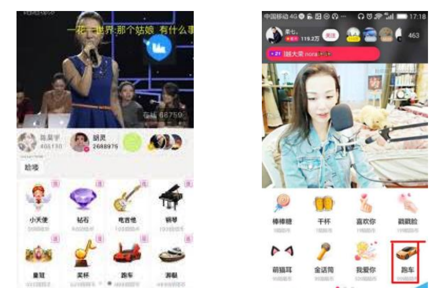
WeChat Pay

**$0.01+ for Article / Author Tipping**


**~$0.15 for On-Demand Mobile Recharge**

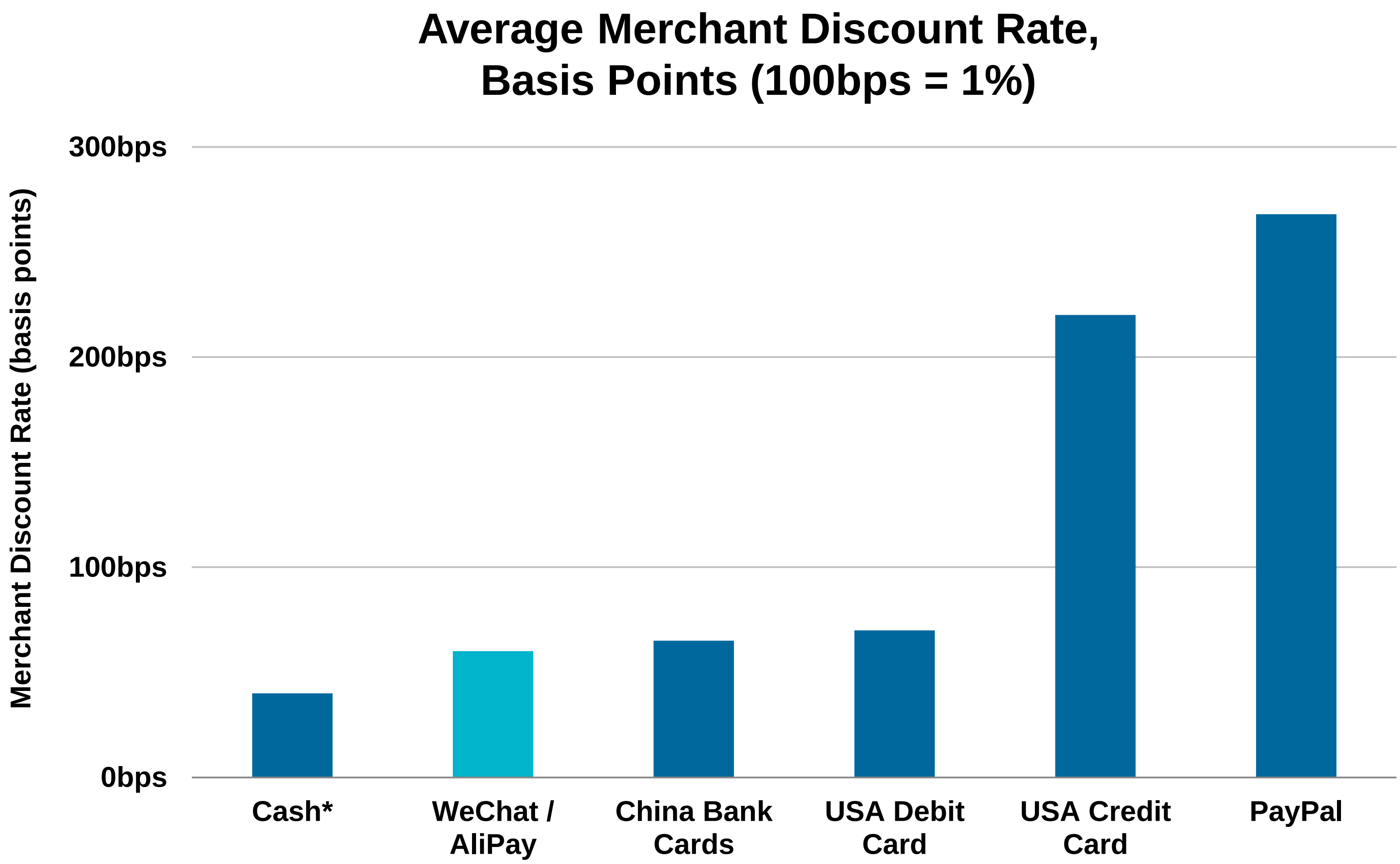

**$0.50+ for Street Food**

**$0.01+ for Livestreaming Tipping**



Source: Hillhouse estimates

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




Source: Hillhouse estimates based on published rate schedule, JPMorgan Research estimates and transaction take rate for PayPal in 2016
*Cash payment there is no merchant discount rate, ~40bps of marginal cost of processing cash payment is an estimate per European Commission study in 2014. USA debit and credit card merchant discount rate is an estimated offline average, online (card-not-present) merchant discount rate is higher.

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

| | Payment | Wealth Management | Financing | Insurance | Credit Rating / History |
|---|---|---|---|---|---|
| **Ant Financial** | 支付宝 ALIPAY<br>**451MM** Annual Active Users[1] | 余额宝 YU'E BAO<br>**>300MM** Cumulative Users[2] | 蚂蚁花呗 ANT CREDIT PAY<br>蚂蚁借呗 ANT CASH NOW<br>蚂蚁小贷 ANT MICRO LOAN<br>**>100MM** Cumulative Consumer Finance Users[3], **>5MM** Cumulative SME Borrowers[4] | 蚂蚁保险服务 Ant Insurance Service<br>**380MM** Cumulative Users[5] | 芝麻信用 ZHIMA CREDIT<br>**130MM** Cumulative Users[6] |
| **Tencent** | WeChat Pay<br>**>600MM** MAU[7] | 腾讯理财通<br>**>80MM** Cumulative Users[8] | 微粒贷<br>**>30MM** Cumulative Users[9] | | 腾讯信用 |
| **JD Finance** | 京东支付 JD Pay<br>**119MM** Annual Active Users[10] | 小金库 JD Golden Wallet<br>**>20MM** Cumulative Users[11] | 白条 Credit Pay<br>金条 Cash Loan<br>京保贝 JD Factoring & Microloan<br>**>30MM** Cumulative Users[11] | 保险 京东金融 JD Finance Insurance<br>**168MM** Cumulative Users[11] | 小白信用 JD credit<br>**>35MM** Cumulative Users[11] |

Source: Alibaba / Ant Financial, Tencent, JD Finance
[1]Number of users of Alipay with one or more successful transactions in 2015; [2]As of 3/16; [3]As of 4/17; [4]As of 1/17; [5]As of 2015; [6]As of 3/16; [7]For 12/16; [8]As of 11/16; [9]As of 5/17; [10]As of 12/16; [10]Number of users of JD Pay with one or more successful transactions in 2016; [11]As of 5/17

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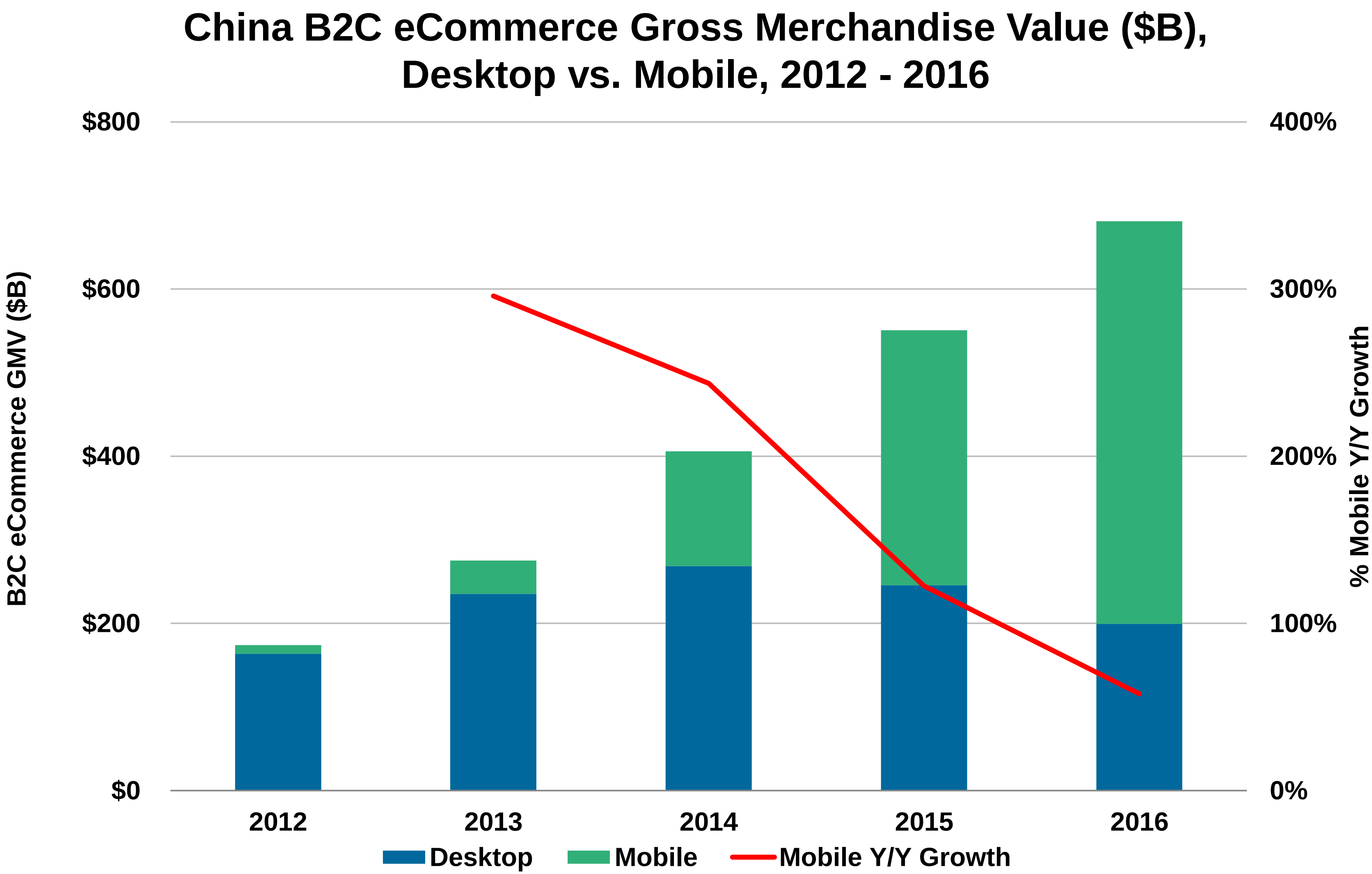
***China eCommerce + Advertising =***

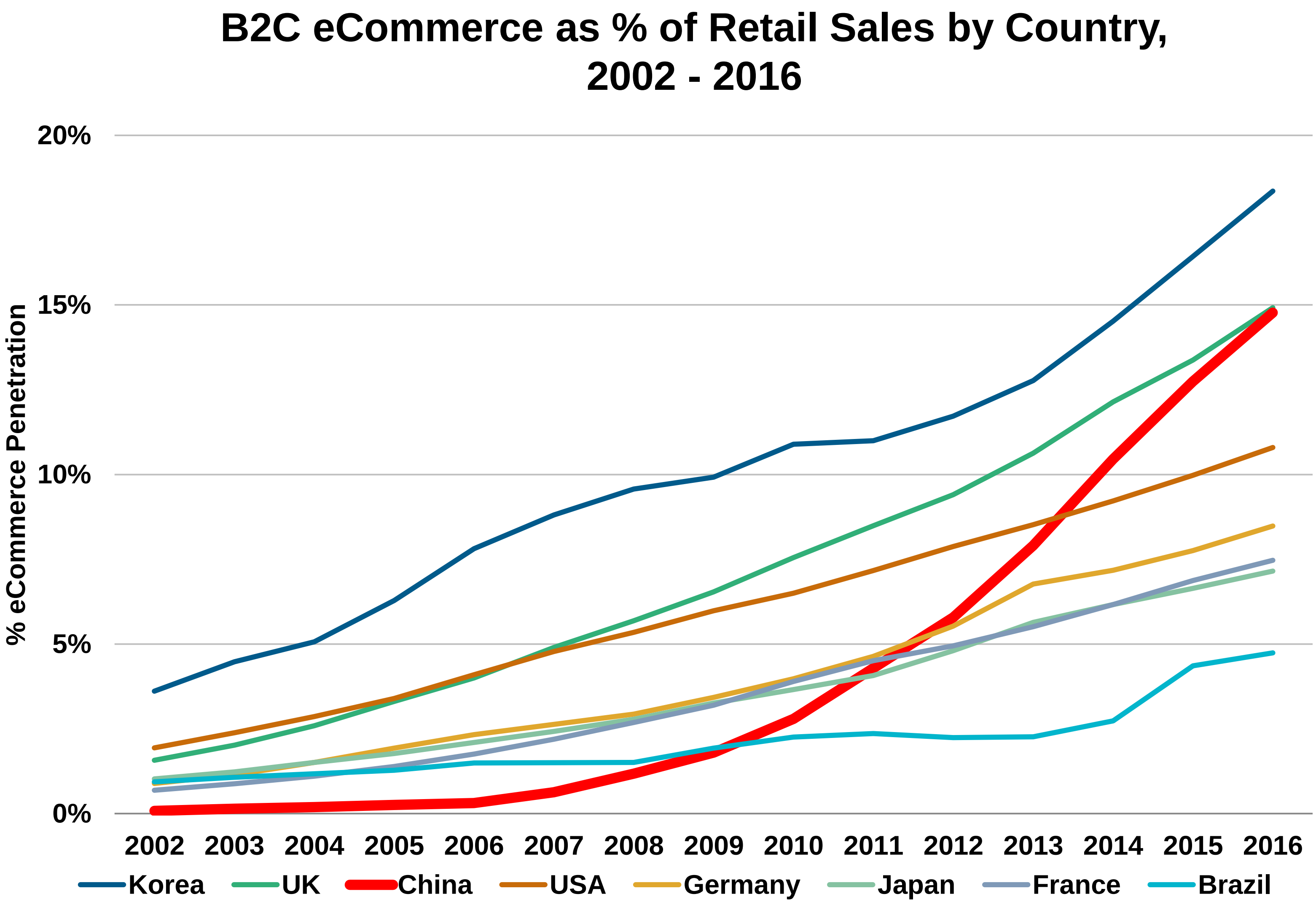
***Innovation + Growth***

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




Source: iResearch
Note: Assuming constant FX 1USD = 6.9RMB

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

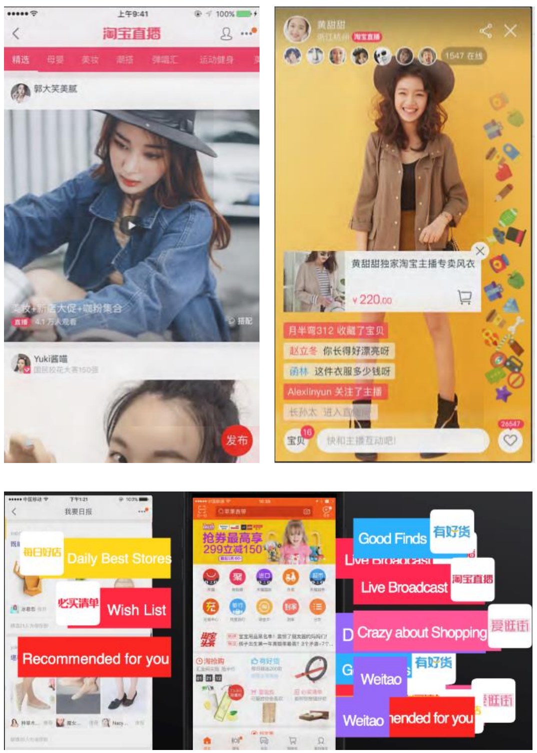



Source: Euromonitor

# Alibaba = Massive Scale + Engagement + Innovation…

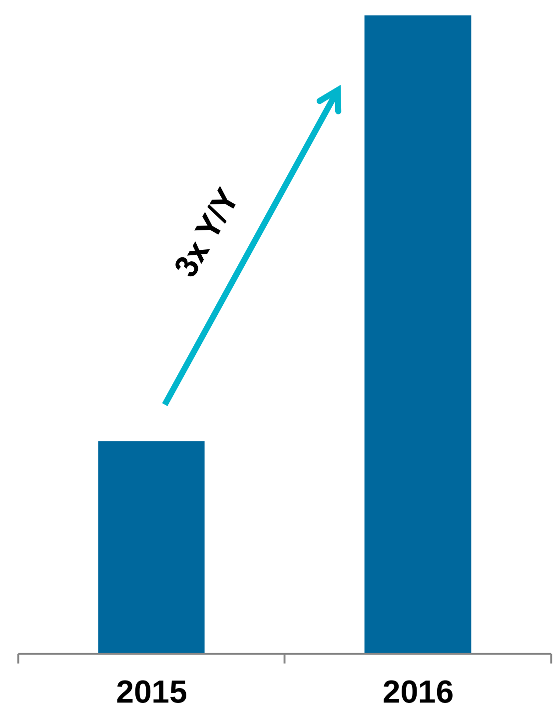
***507MM Mobile MAUs, +24% Y/Y…41% DAU/MAU Ratio…***
***24+ Minutes Daily Time Spent per User***

## Taobao App with Livestreaming / Microblog / Personalization




## Cainiao Logistics Smart Label / Routing


## GMV Generated from Recommendations, 2015-2016




Source: Alibaba
Note: MAU data as of 3/17, DAU/MAU ratio data refers to mobile Taobao app, as of 5/16. Daily time spent per DAU limited to Taobao app, per QuestMobile data in 4/17. GMV generated from recommendations data are indexed, 4/15 vs. 4/16.

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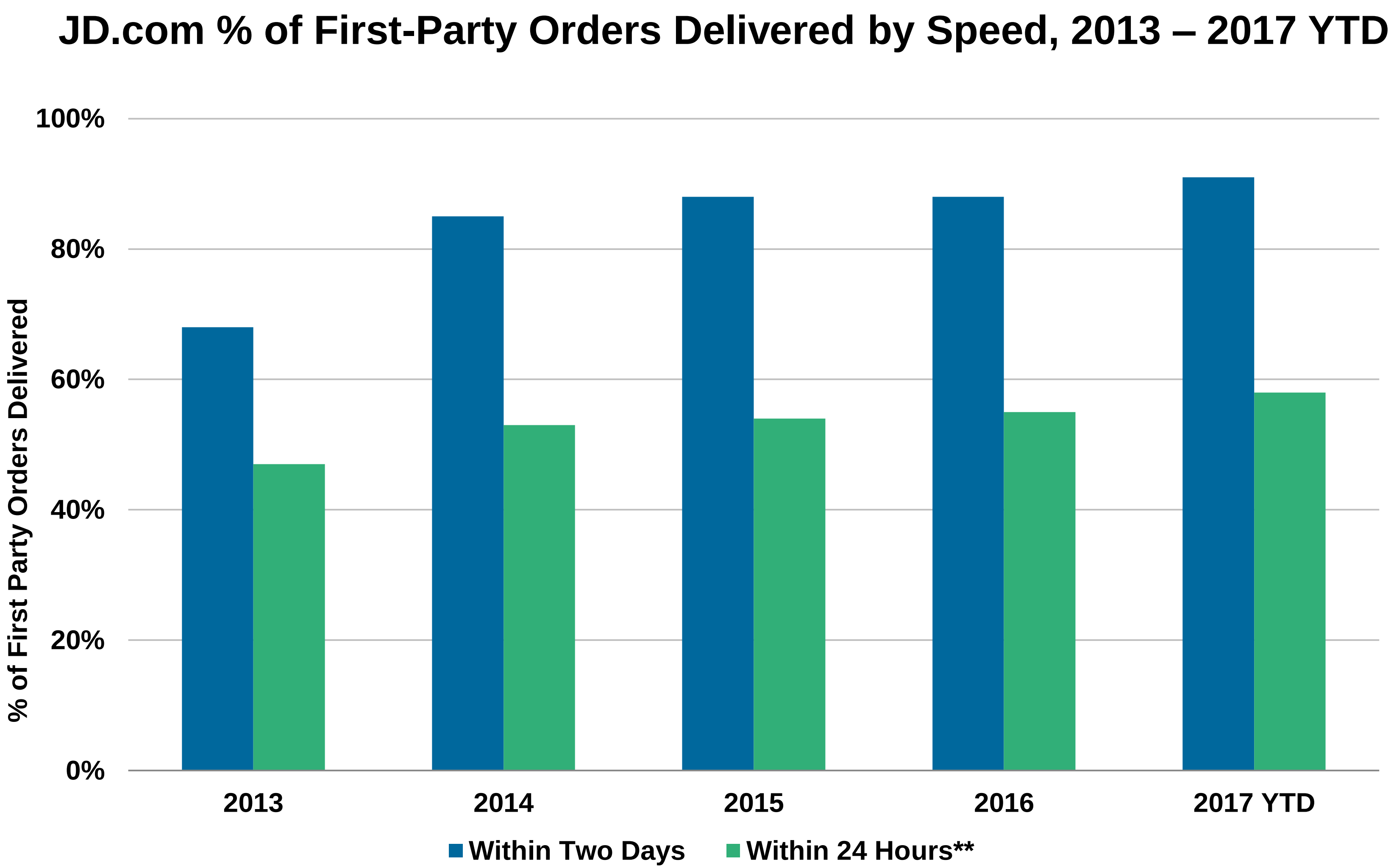
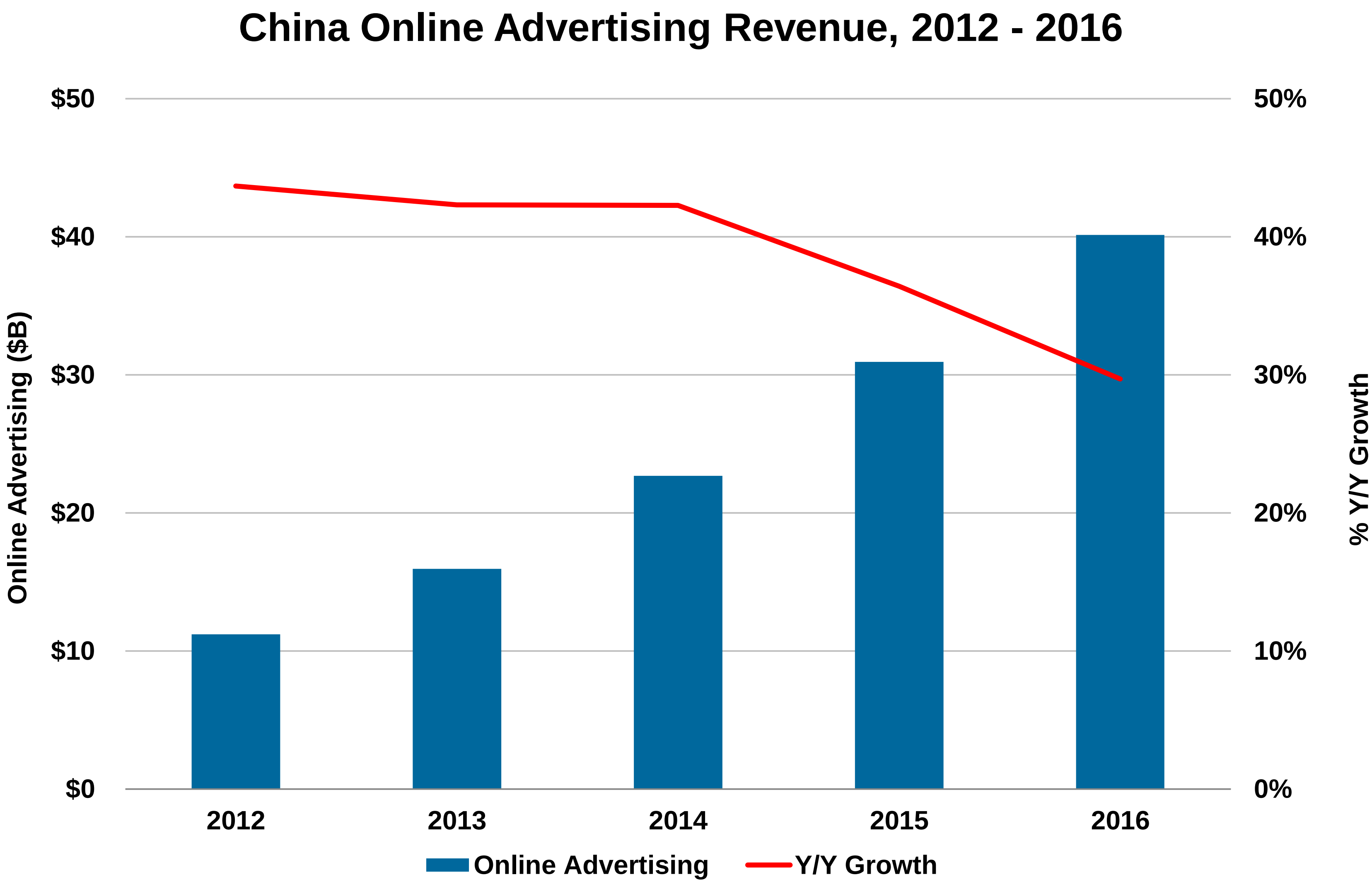
# JD.com = World Class Fulfillment + Delivery…91% / 58% Orders* Delivered Within 2 Days / 1 Day, Up from 68% / 47% Four Years Ago




Source: JD.com
*Orders exclude third party sellers. **Defined as JD's 211 program – any orders received by 11am will be delivered on the same day, and any orders received by 11pm will be delivered by 3pm on the following day. Bulk of orders are delivered within 3-18 hours. Customers also can request that orders placed by 3pm be delivered in the evening on the same day in selected cities. There is no extra charge for delivery under the 211 program for orders that satisfy the minimum size requirement. The program does not cover delivery to addresses through third-party couriers or products shipped directly from third-party sellers. Bulky items such as refrigerators are also eligible for same-day or next-day delivery in selected areas. Customers can also request expedited delivery within two hours by paying an extra charge in select cities. JD's 211 service covered 1,410 counties and districts across China as of 2016. 2017 YTD data as of Q1.

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

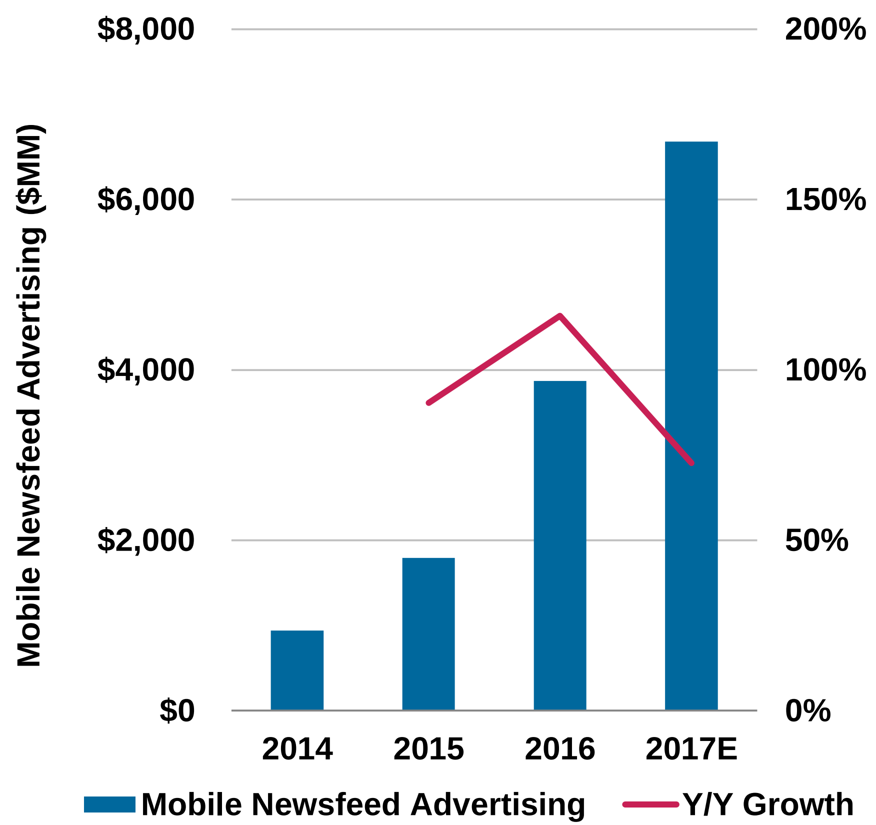



Source: iResearch
Note: Assuming constant FX 1USD = 6.9RMB.

# 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




Source: iResearch
Note: Assuming constant FX 1USD = 6.9RMB.

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# 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

# INDIA INTERNET =

# COMPETITION CONTINUES TO INTENSIFY… CONSUMERS WINNING

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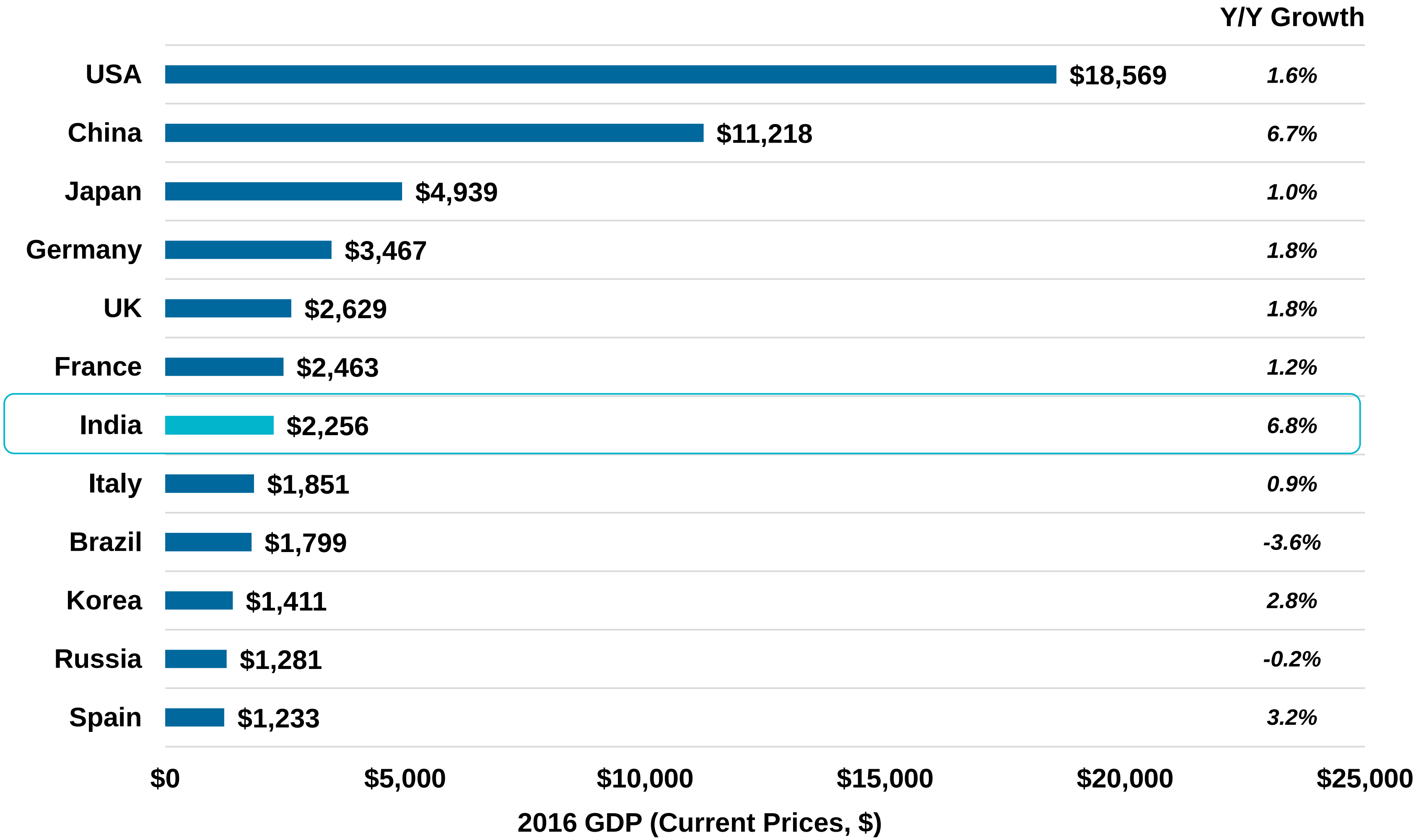
# India Economy (GDP) = Fastest Large Grower…
# +7% Y/Y @ #7 Global GDP Rank

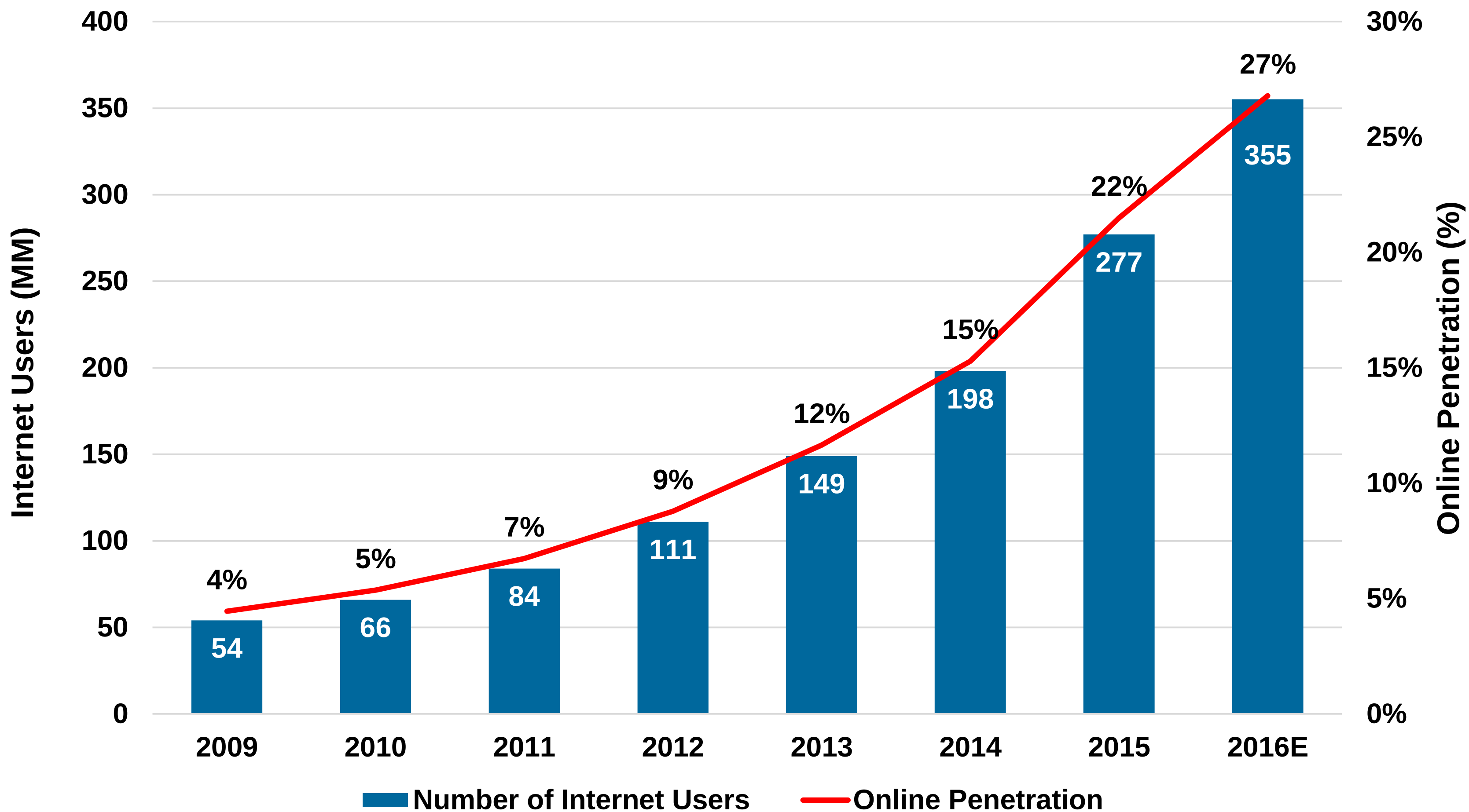
## 2016 GDP ($B) and GDP Growth Rates (%), Selected Countries >$1T of GDP




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

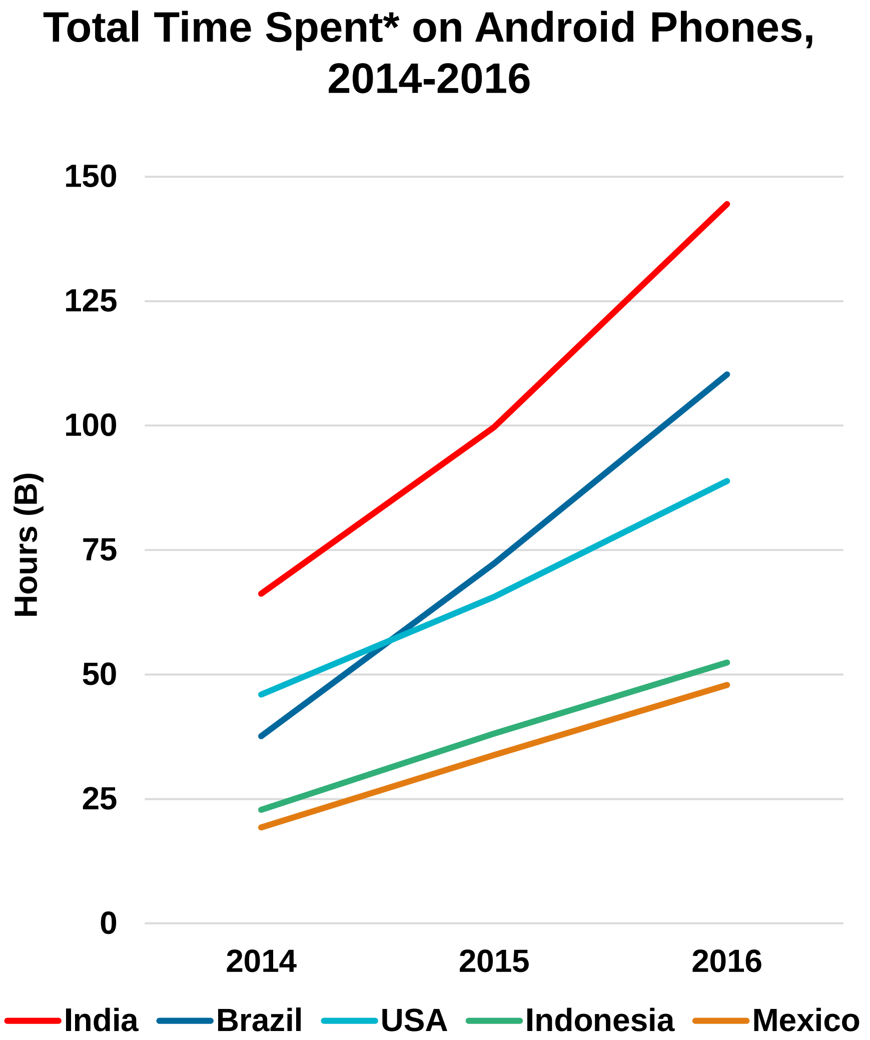
# India Internet Users = +28% (2016-June) vs. 40% Y/Y Growth… @ 27% Penetration…355MM Users…#2 Behind China

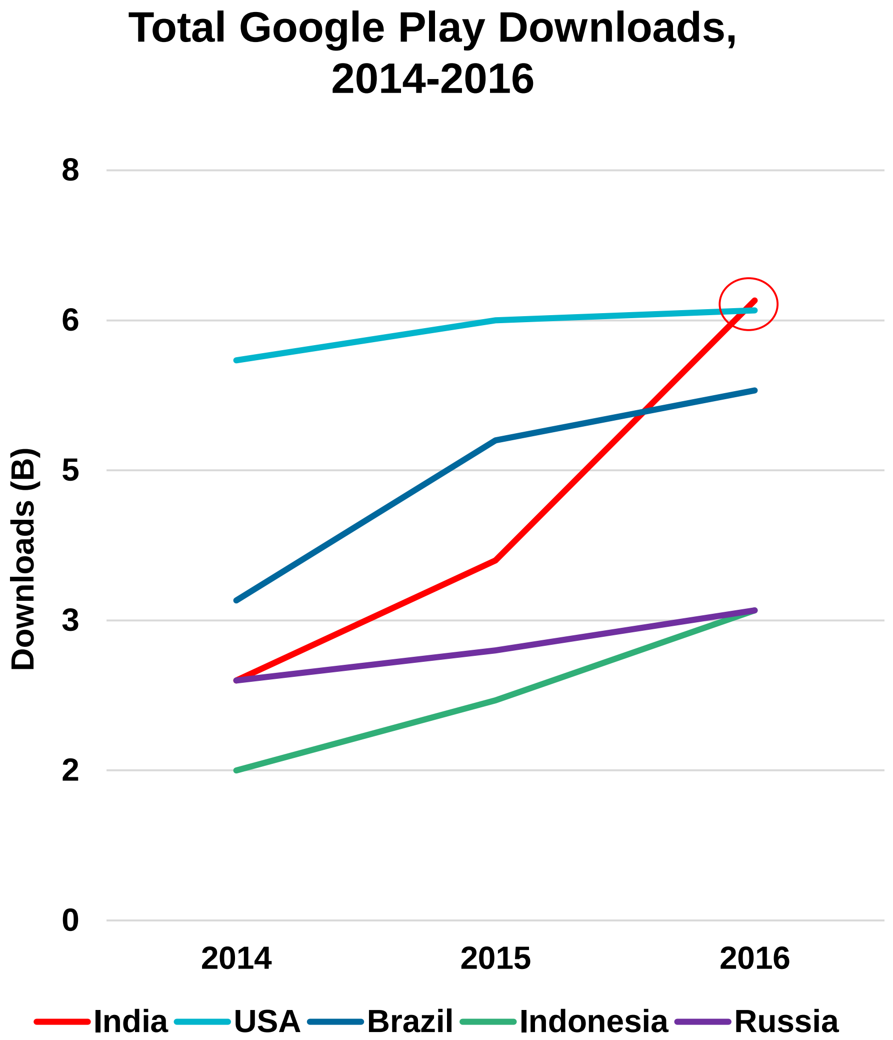
**India Internet Users (MM) & Penetration (%), Monthly Active*, Mid-Year (June) 2009 – 2016E**




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

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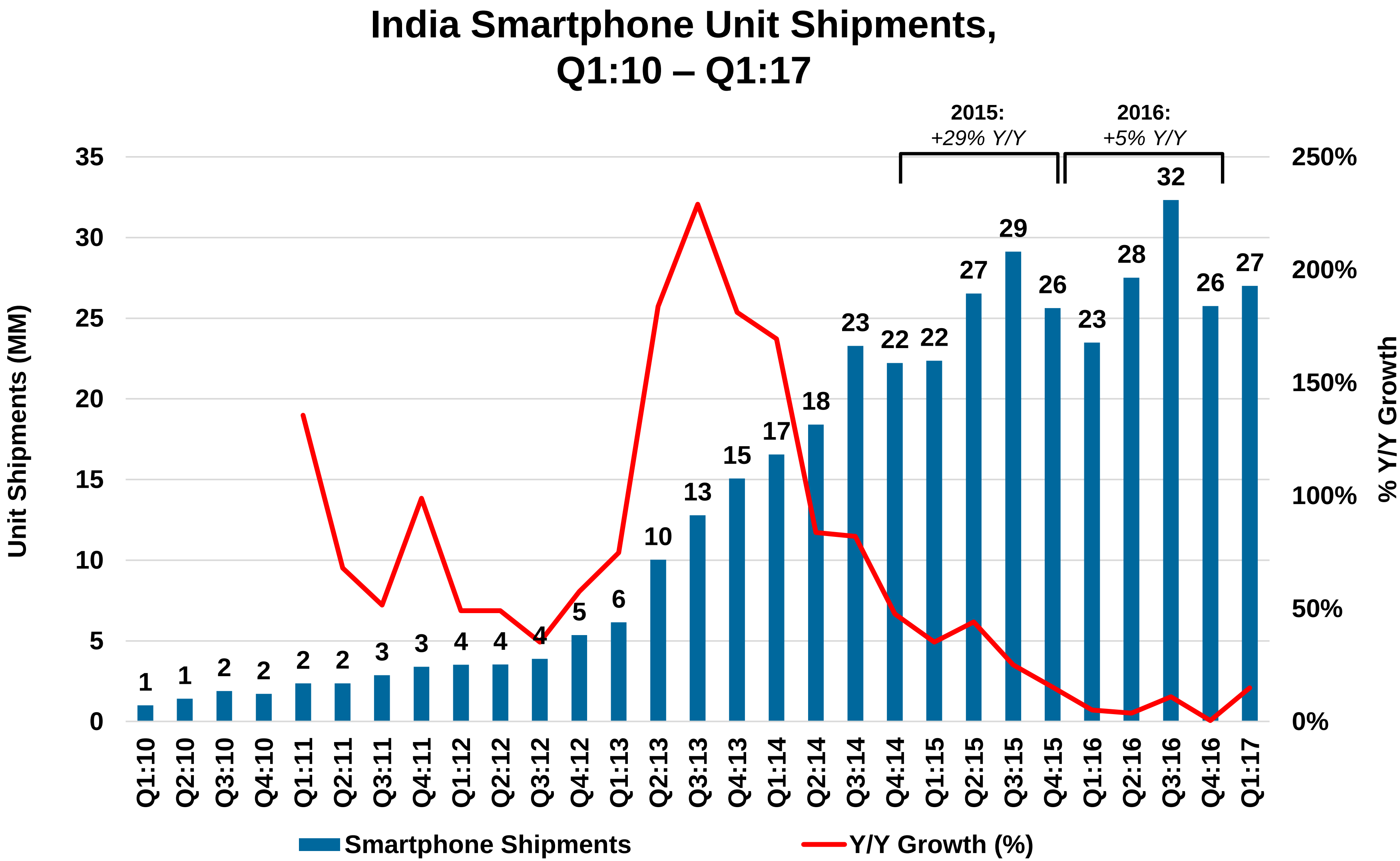
Source: App Annie 2016 Retrospective
Note: USA @ ~59% vs India 78% Android share of total mobile Internet traffic (Statcounter, 5/17)
* Data excludes China

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




Source: Morgan Stanley, IDC

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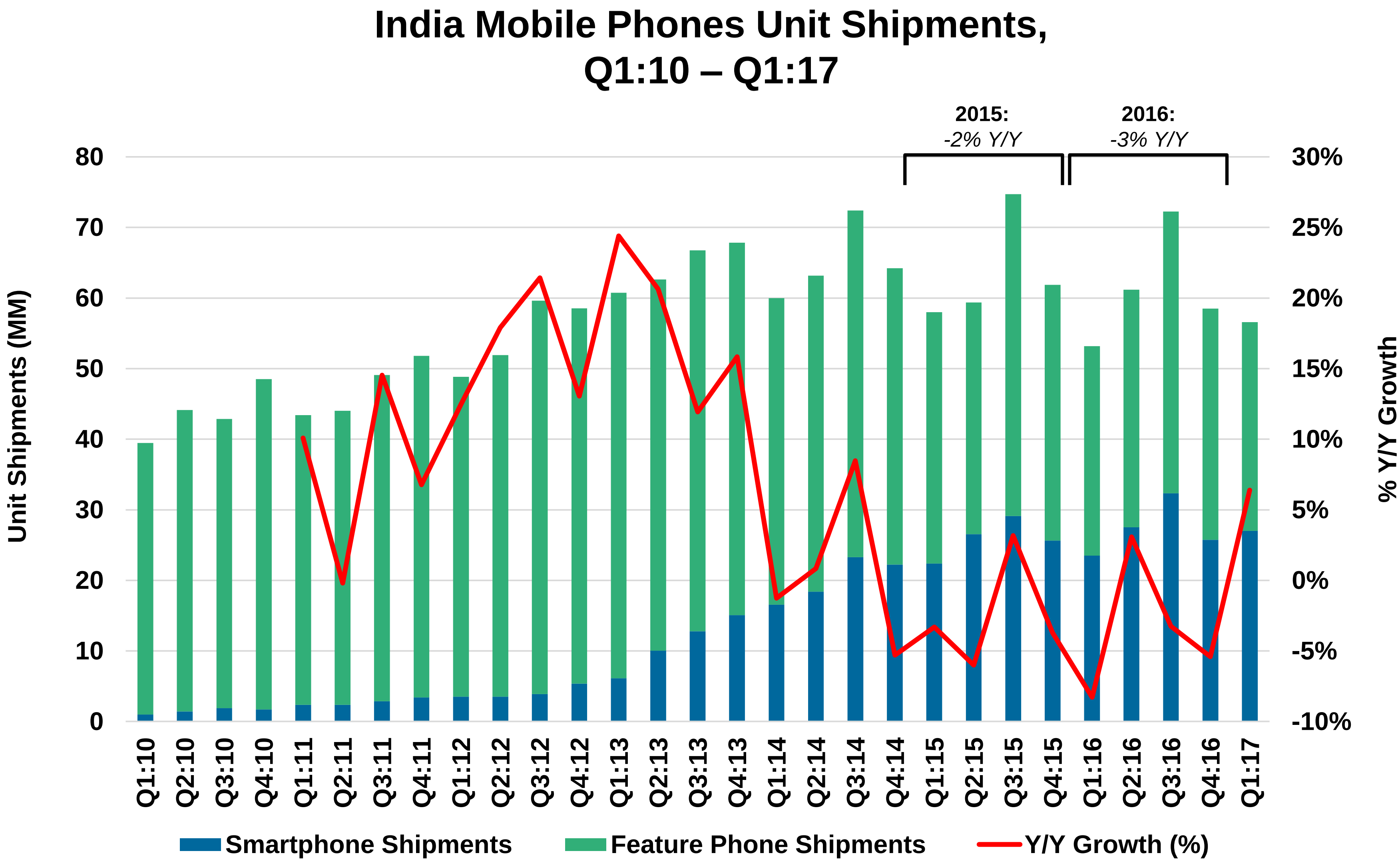
# Smartphone + Feature Phone Shipments = +6% Y/Y (Q1:17)…-3% (2016)…-2% (2015)




Source: Morgan Stanley, IDC

*India Smartphone + Data Costs =*

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

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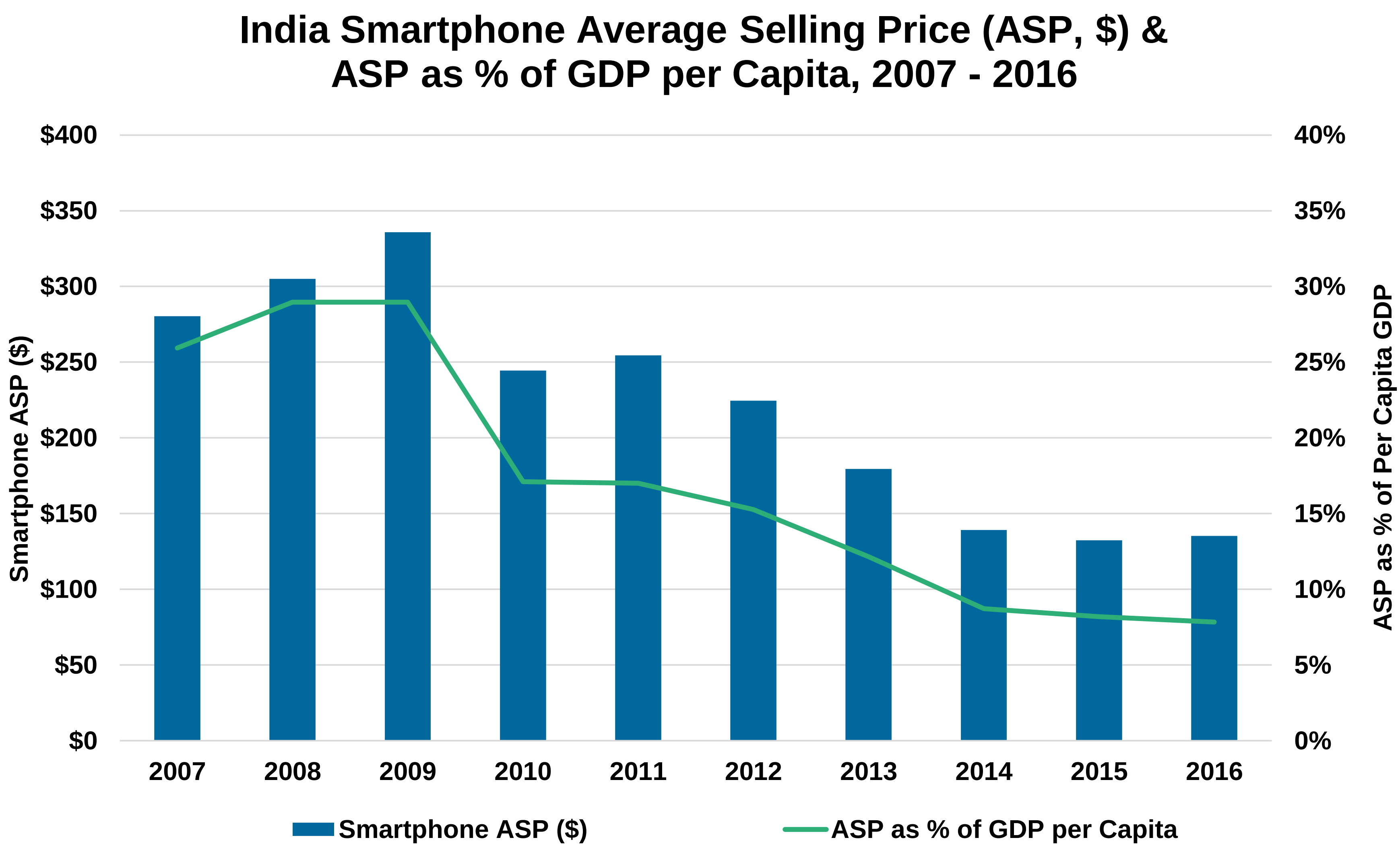
# India *Smartphone* Cost (excluding Data) = Unaffordable for Many… @ 8% of Annual Average GDP per Capita…




Source: Morgan Stanley, IDC. GDP per Capita data based on IMF, 4/17.

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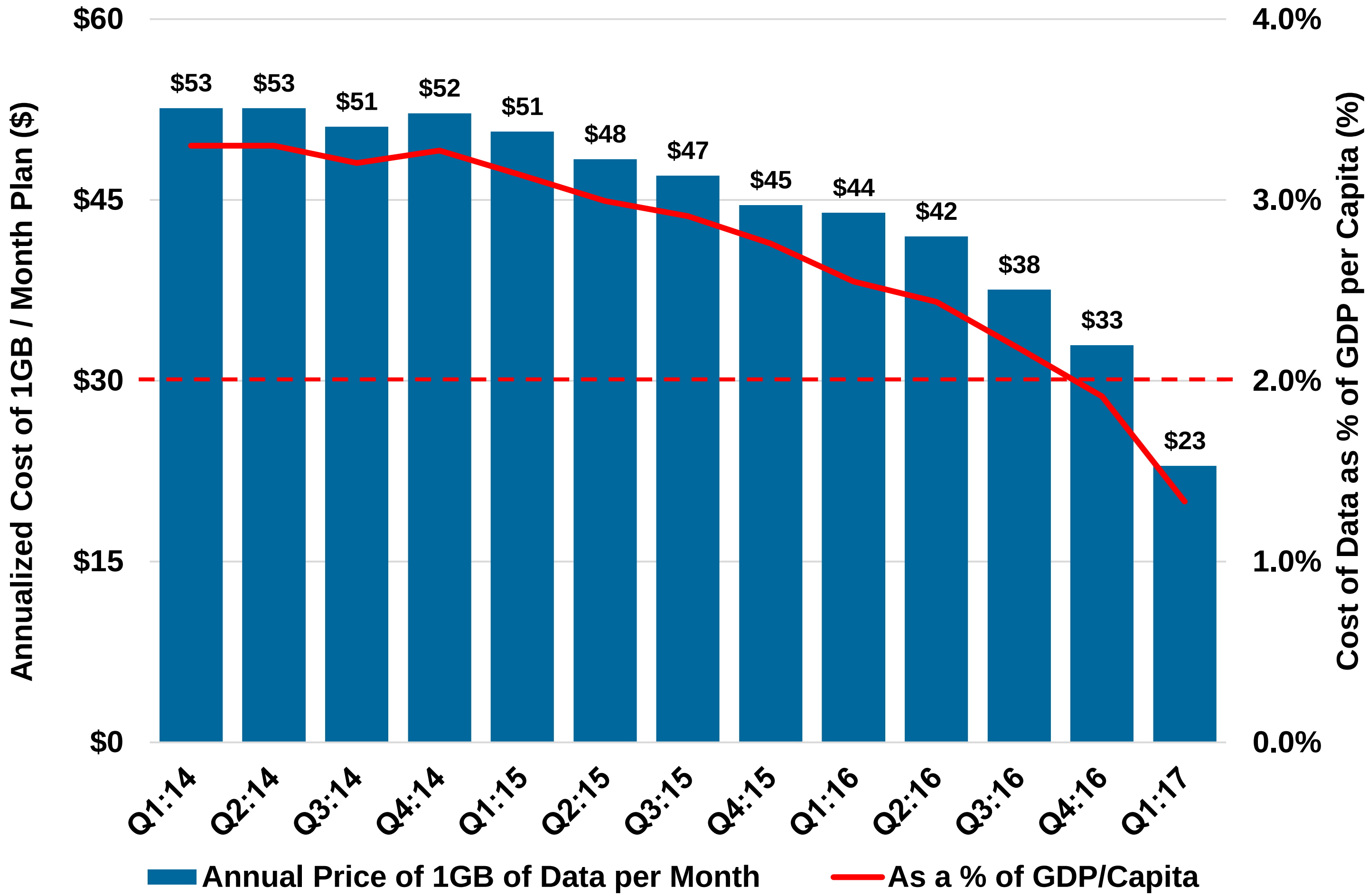
# …India *Wireless Data* Cost* = Declining to More Affordable Levels… @ 1.3% of Annual Average GDP per Capita (3/17) vs. 3% (3/15)

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




**2% GDP / Capita**
Threshold for Widespread Affordability, per Alliance for Affordable Internet

Source: JP Morgan, Bharti Airtel, Idea Cellular, IMF, Alliance for Affordable Internet.
*Industry average calculated using average cost of 1 GB of data from Bharti Airtel and Idea Cellular and exclude the impact of Reliance Jio. Chart is illustrative and assumes an average consumption of 1GB / month. Alliance for Affordable Internet data suggests that 2% of monthly income for 1GB of data is within affordable range.

***India Internet =***

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

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# 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…ASPs Fall ~40%…Shares Rise

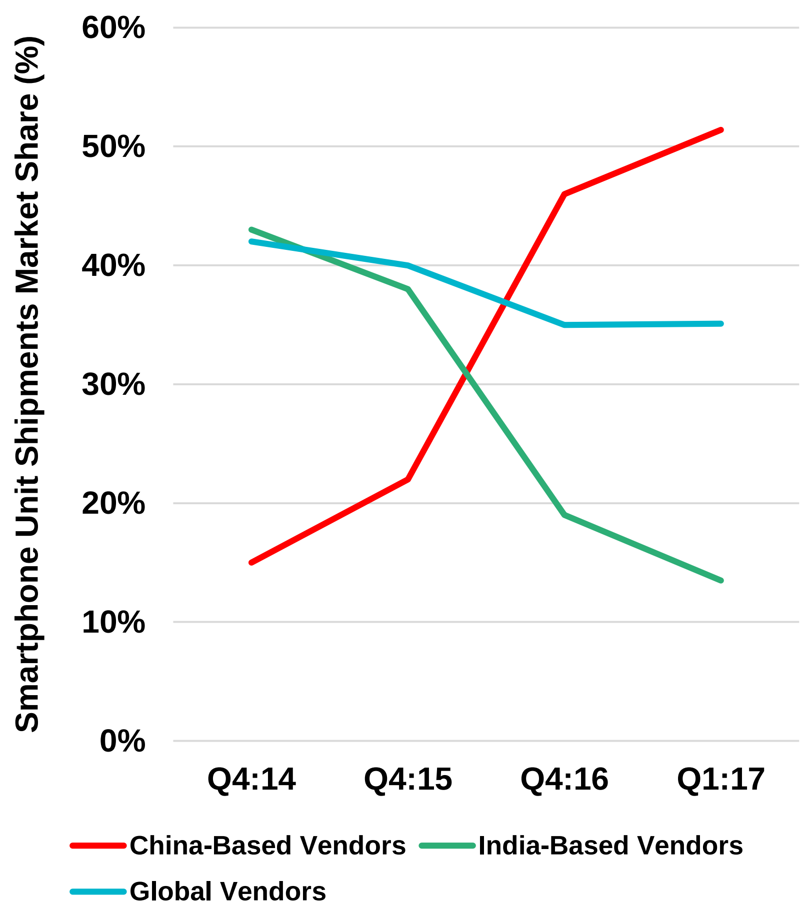
**Rise of China OEMs + Reliance** (H2:14-Q1:17)

Likes of Lenovo / Xiaomi / Oppo / Vivo Fight for Smartphone Market Share via Quality / Features / Online Distribution…ASPs 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**




Source: IDC, Morgan Stanley, Lava, Micromax, Jio.

# 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.

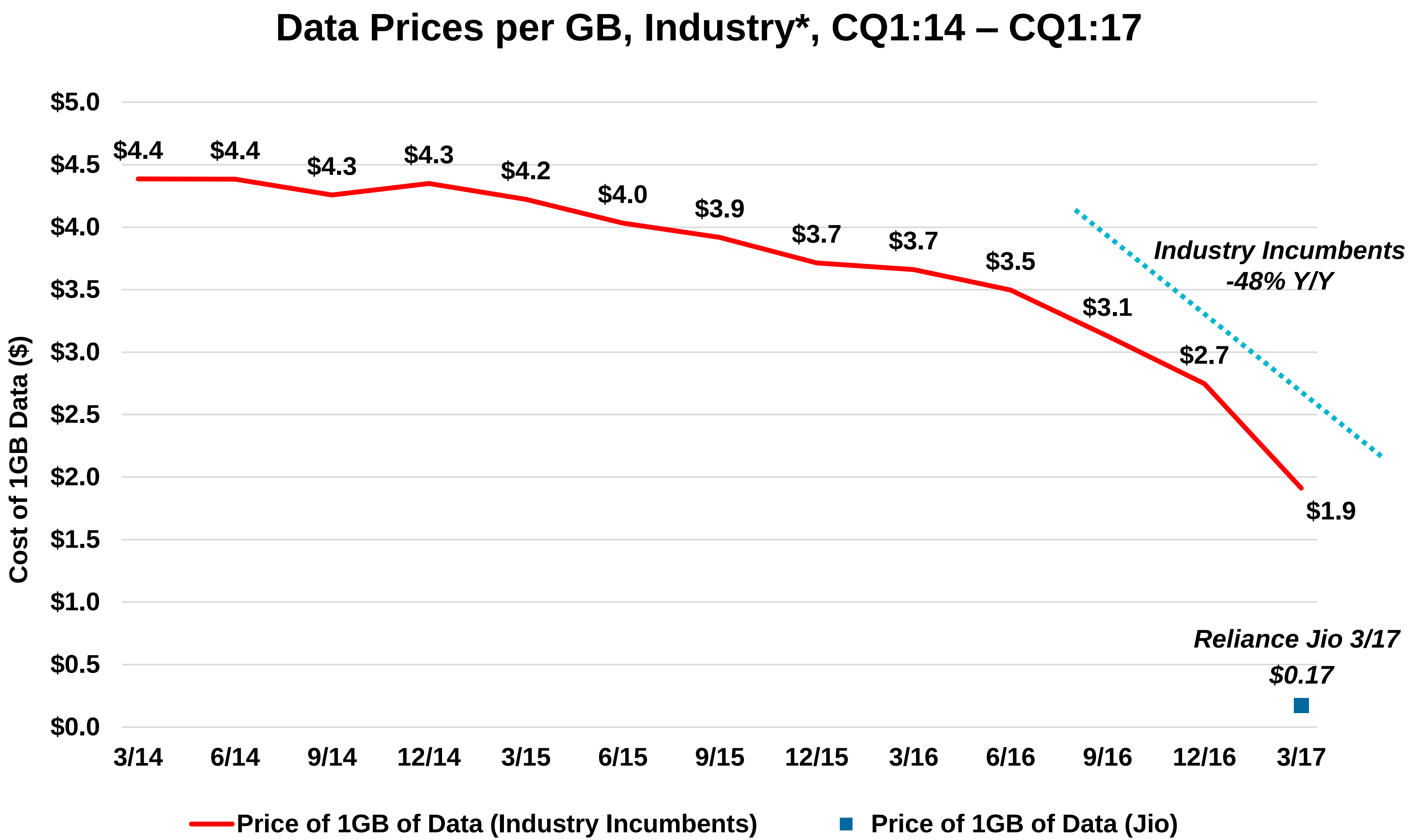
**9/16**
**Reliance Jio – after investing $25B over 7 years – rolls out 4G Pan-India Jio network + $0 Monthly ARPU (post 3/17 when ARPU rose to $4.70)**

**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)

Source: JP Morgan, Public Filings, TRAI, Reliance Jio.
Jio sign-ups are total number of Jio SIMs registered, while paying subscribers are a subset of sign-ups who have later converted to Jio Prime paid subscription. Data for incumbents based on average of Idea and Bharti Airtel.

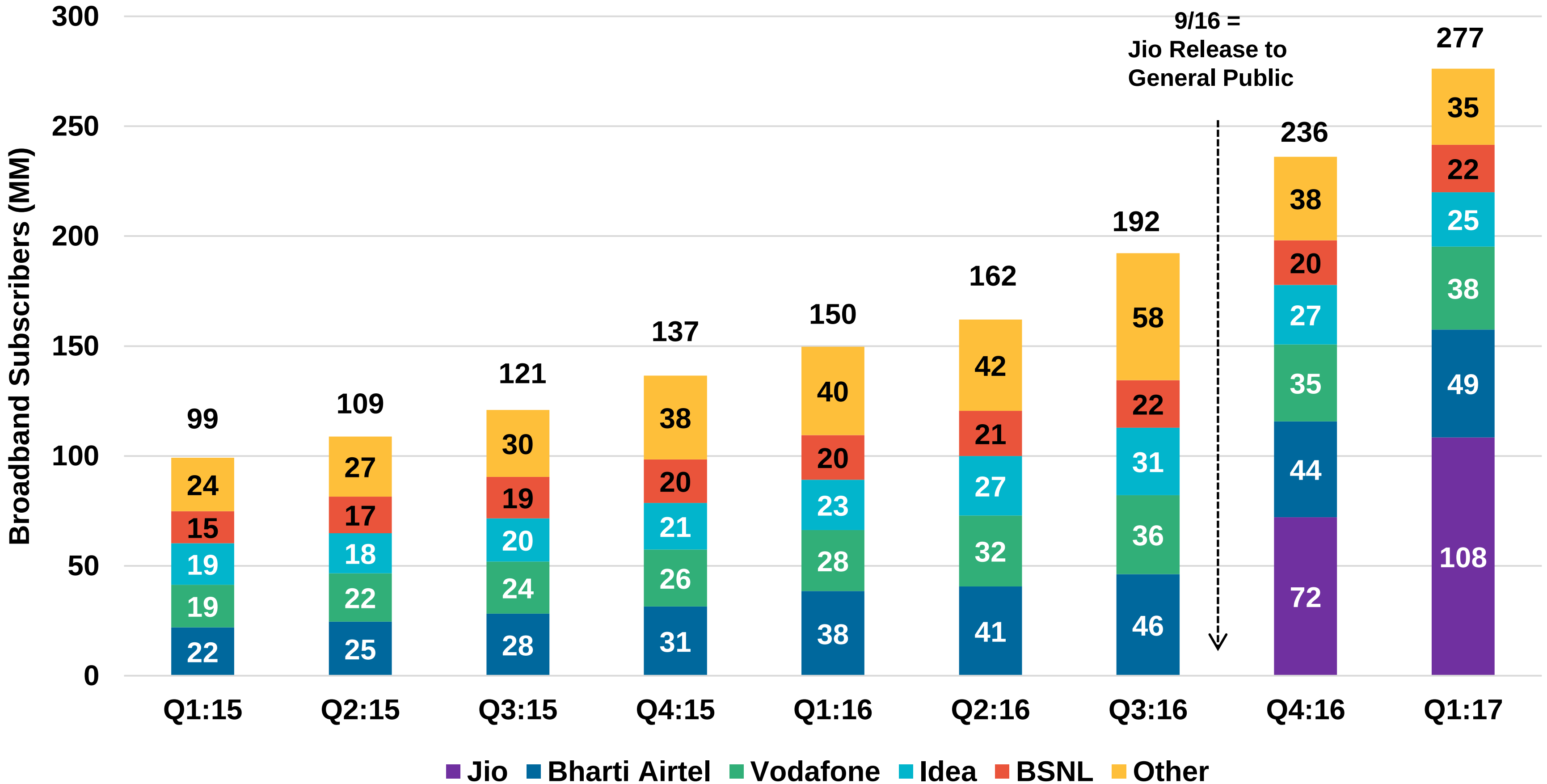
# …India Wireless Consumer Data Prices = -48%+ in Last Year* as… Incumbent Carriers Responded to Jio's Low Pricing…




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.

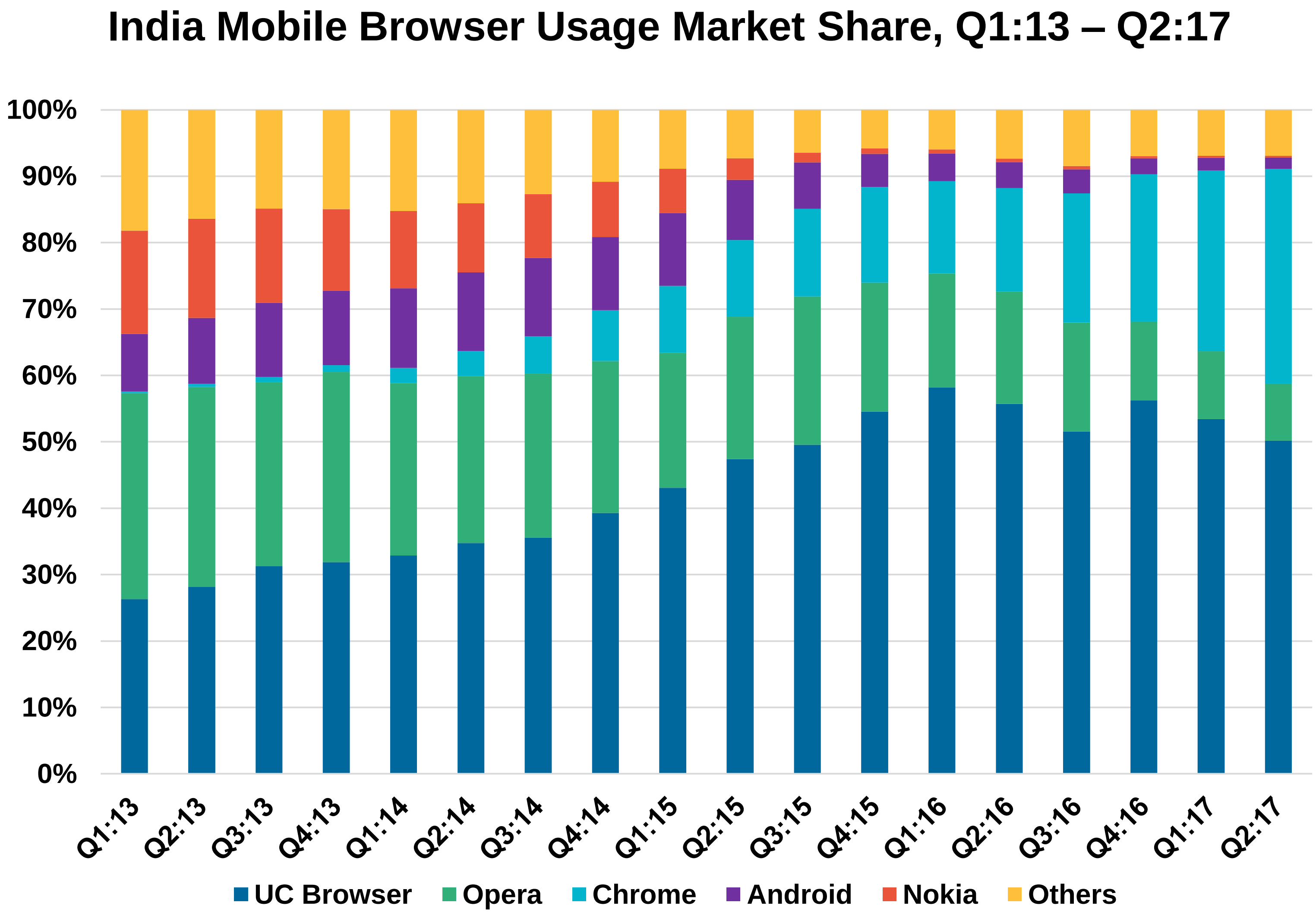
# …India Broadband Subscribers* = +85% Y/Y (Q1:17)…Accelerating… Reliance Jio Rose to 39% Share vs. 0% (Q3:16) Owing to Low Price Launch

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




Source: TRAI reports.
*Subscribers are defined as all unique SIMs within a carrier's database, less test/service cards, employees, stock in hand, SIMs where the subscriber retention period has expired, and service suspended pending disconnection.
Note that as of 3/17, Jio's subscribers mentioned here were on free data plans. Subsequent to this free trial period, 72MM so far have converted to paying subscribers.

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




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 |

Source: *Top 10 Non Gaming Apps, Google Play Store, India, 5/29/17
Note: Google Play Store ranks reflect rankings based on **daily** download volumes
Blue indicates a Facebook app. Green indicates an app owned by Alibaba.

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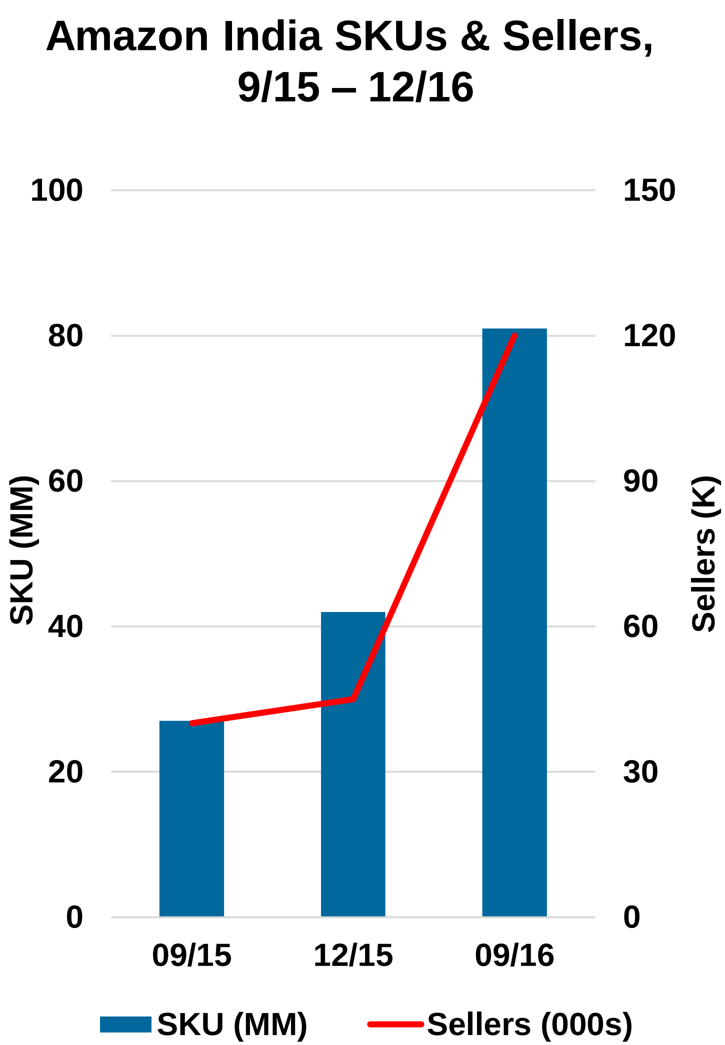
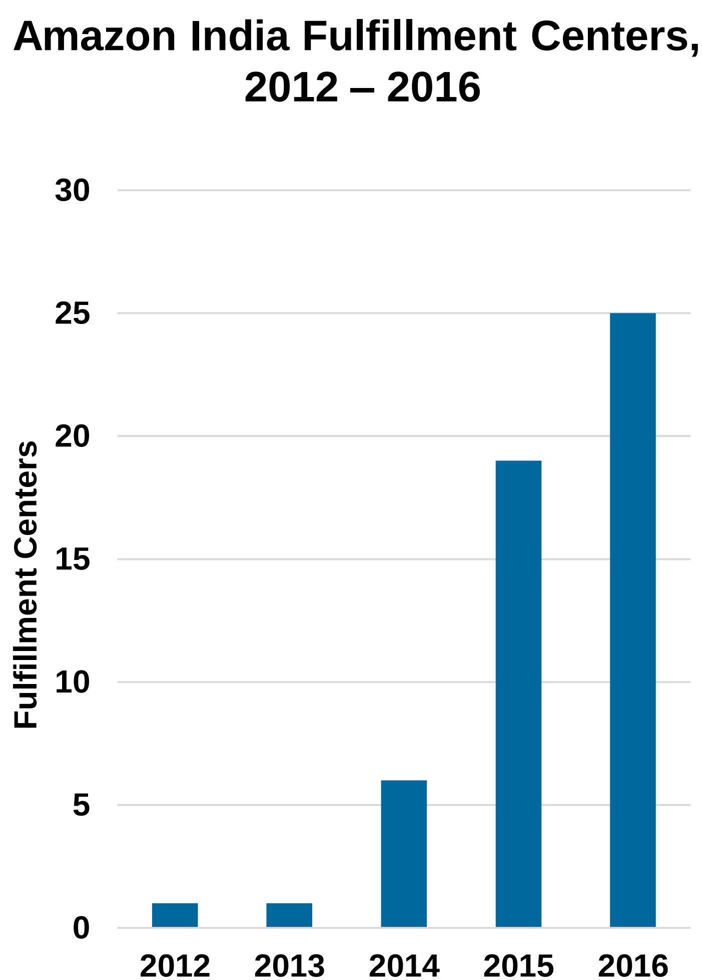
# India eCommerce = Many Players Fighting for Share...

Source: Company logos

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




Source: Barclays Research, Amazon.com, MWPVL International
Per public statements, Amazon has pledged to invest $5B into India

***India Internet Usage =***

***Rising Owing to…***
***Cheaper / Faster Access***

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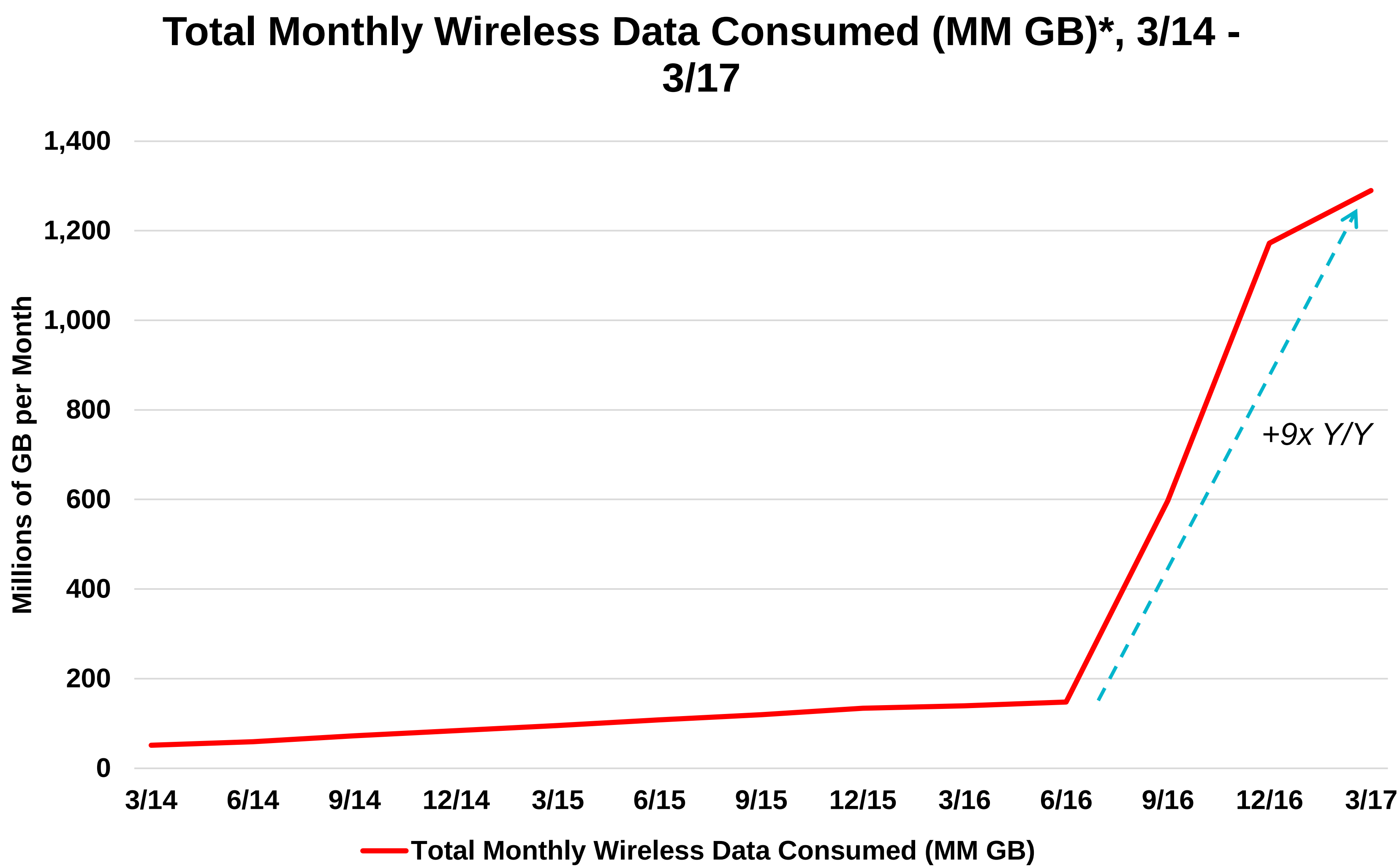
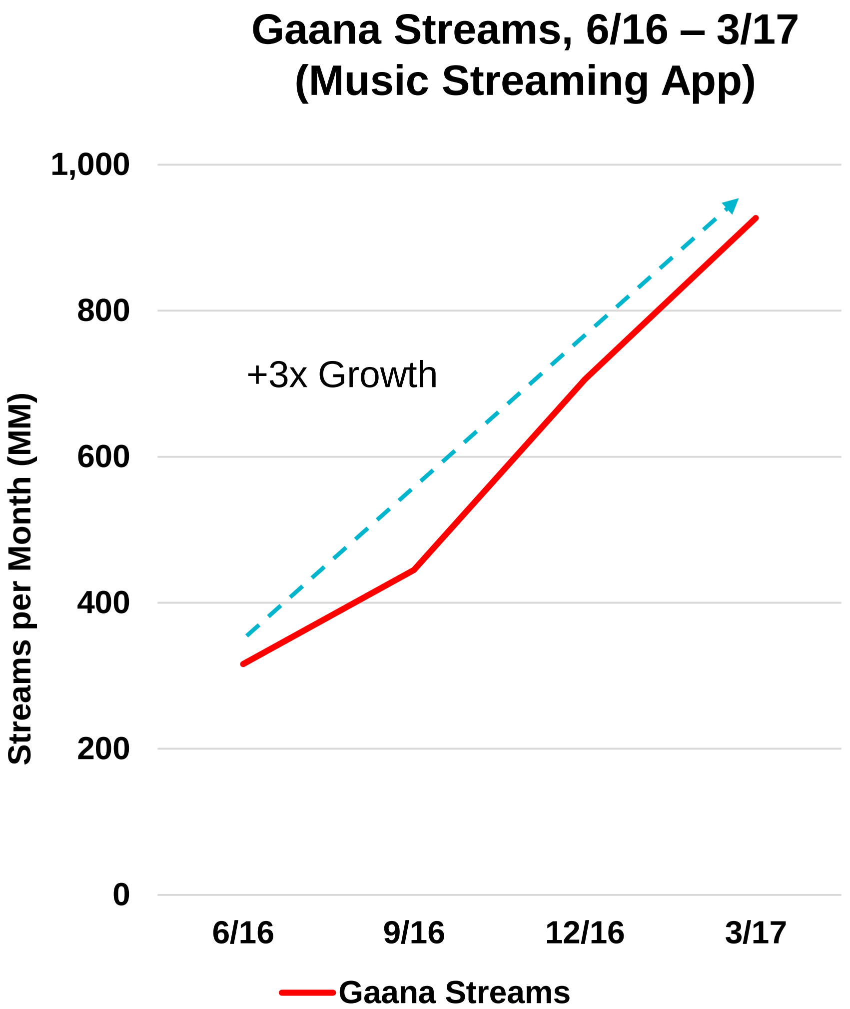
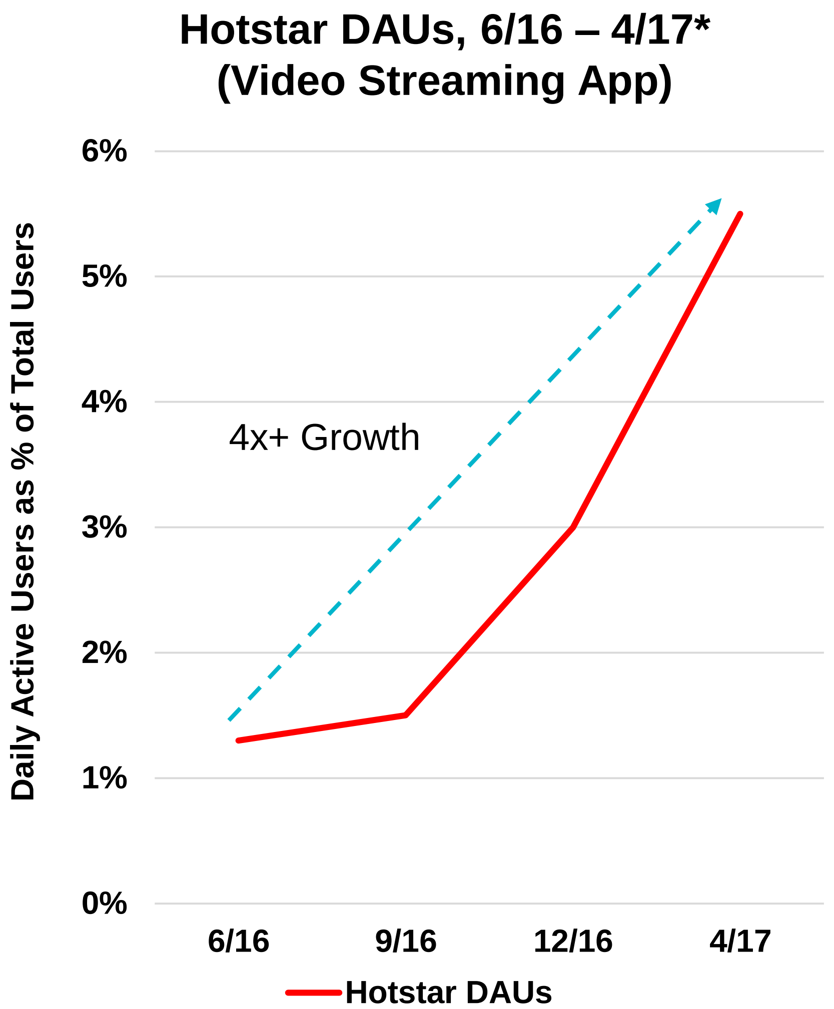
# India Wireless Internet Data Usage = Rising Dramatically as Access Costs Have Fallen…




Source: Reliance Jio, Bharti Airtel, Idea, Reliance Communications, Vodafone India.
*Note total data consumed based on publicly available data from Reliance Jio, Bharti Airtel, Idea, Reliance Communications, Vodafone and may not be collectively exhaustive.

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




Source: Gaana, SimilarWeb estimates for HotStar, 5/17
Note: DAU estimates are intended to reflect relative growth within reasonable confidence intervals using SimilarWeb's methodology.

***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

Source: Ministry of Finance, India (5/17). Rural Electrification Corporation (5/17). Reserve Bank of India (7/16). World Bank black money estimates (7/10). Ministry of Commerce, India (1/16), Ministry of Skill Development & Entrepreneurship (6/15), New York Times (11/16), Bloomberg (2/17). India Union Budget (2017-2018)

*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*

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

***Leapfrogging***

*Mobile*

*Identity*

*Bandwidth*

*Payments*

***Re-Imagining***

*Entertainment*

*Education*

*Healthcare*

*Marketplaces*

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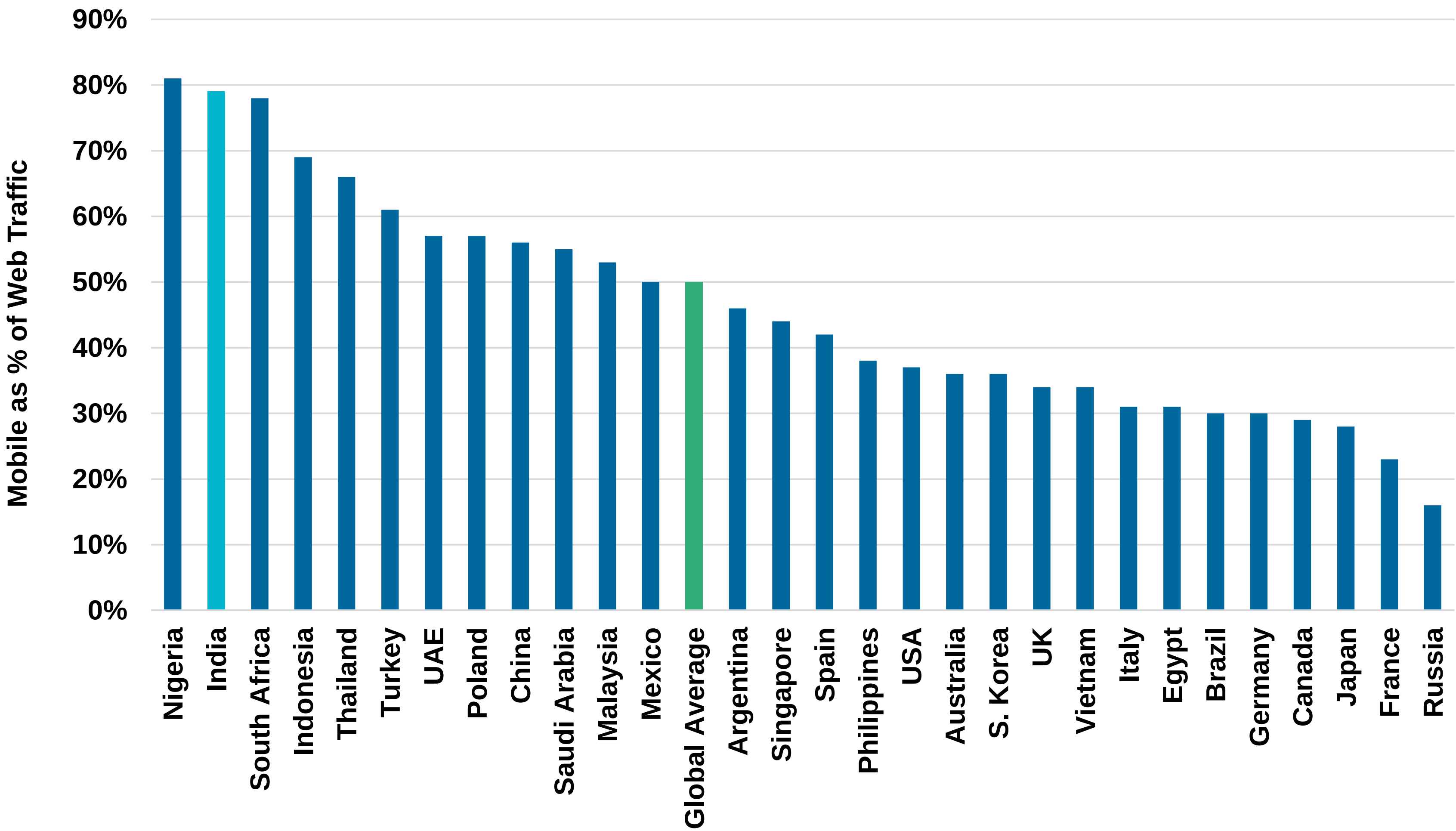
# India Mobile Usage = A Global Leader vs. Desktop Usage…
# ~80% of Internet Usage on Mobiles…

## Mobile Share of Web Traffic, 1/17

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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

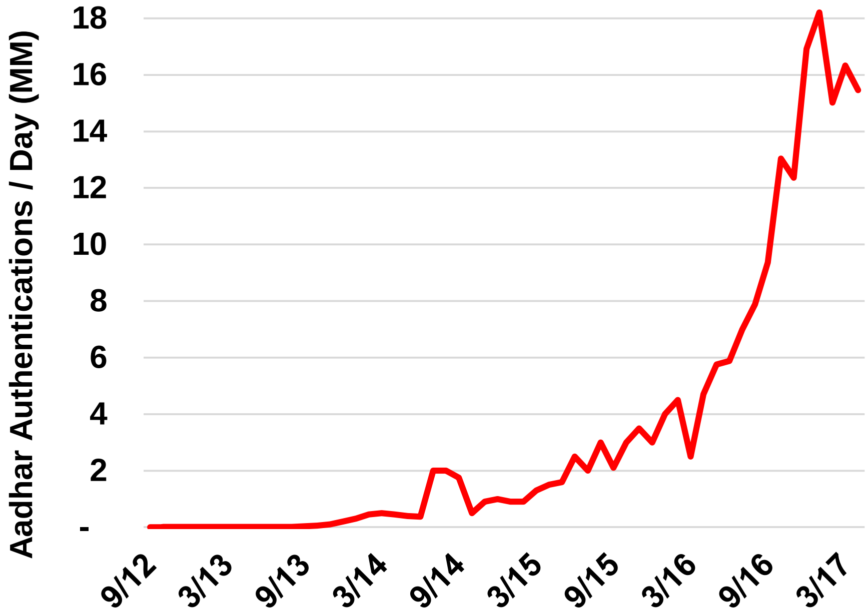
If Yes →

**eKYC Authentication**

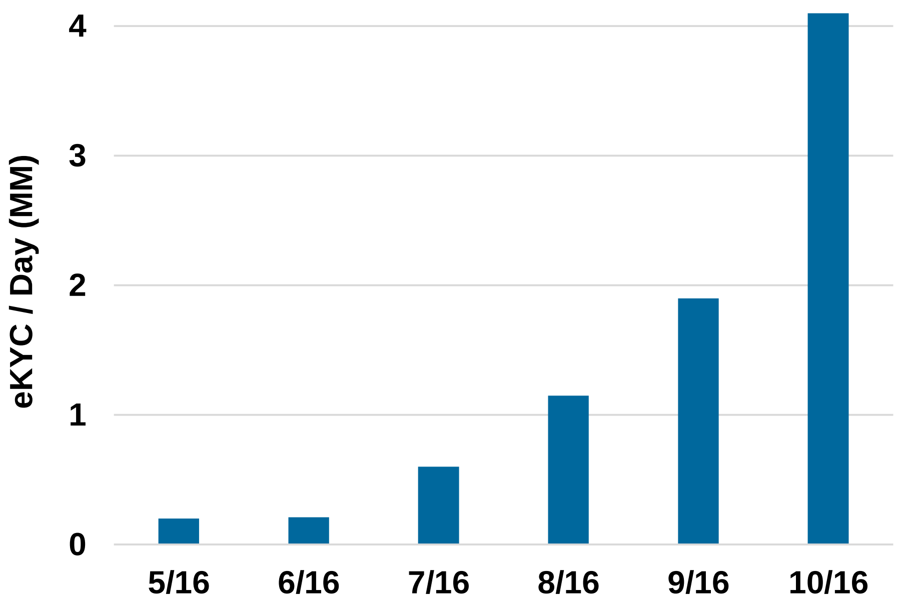
**Proof of Address / Birth / Photos…**

- 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**

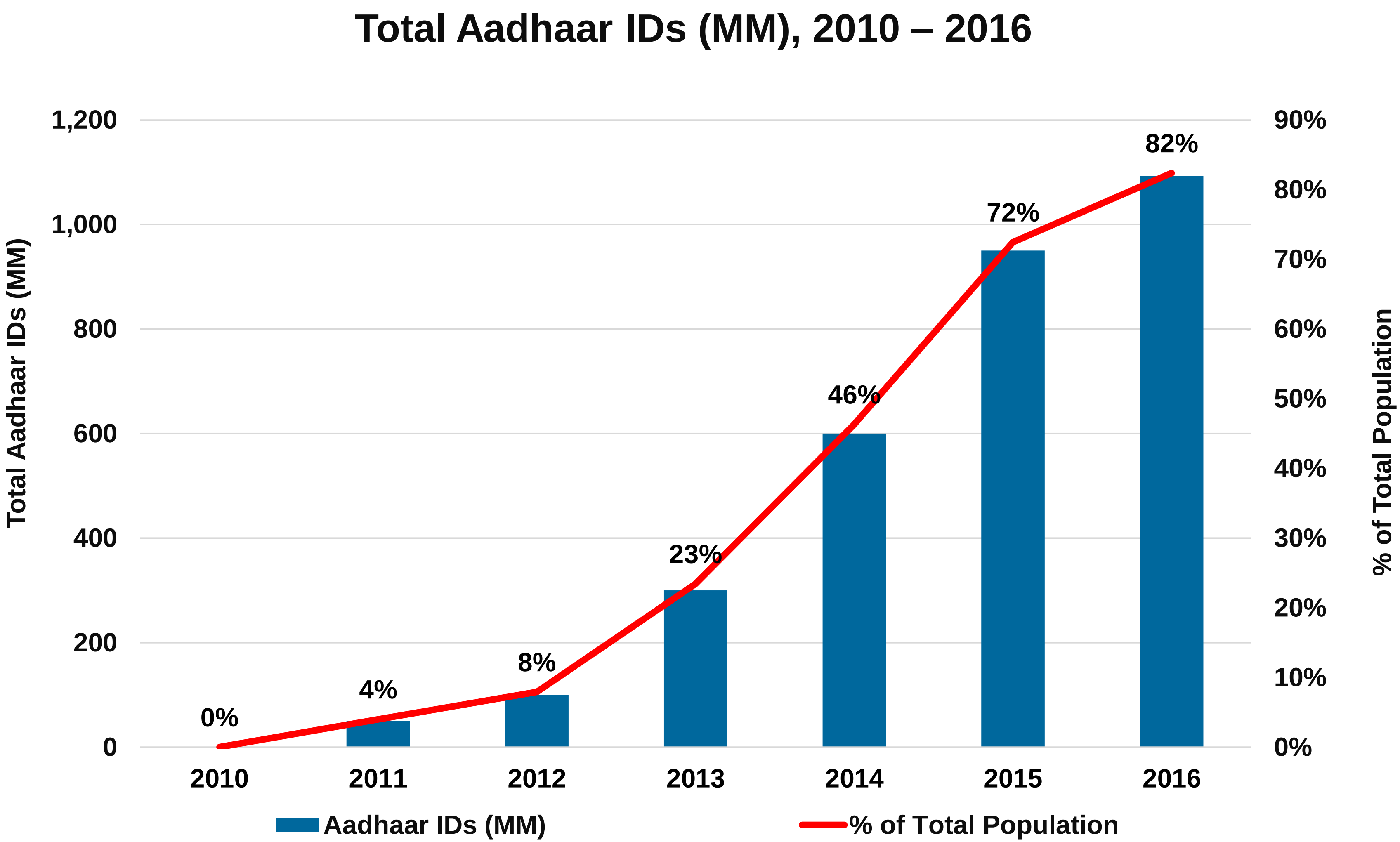



**eKYC Verifications / Day, 5/16 – 10/16**




Source: UIDAI (Indian Government), iSpirit / IndiaStack,
Note: Aadhaar authentication per day estimates provided by Prime Venture Partners, based on monthly authentication figures released by UIDAI

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




Source: UIDAI (Indian Government), iSpirit / IndiaStack, Prime Venture Partners, United Nations

# ...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

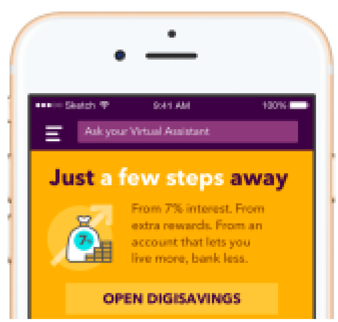

## Bank Account & Digital Wallet Opening

**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

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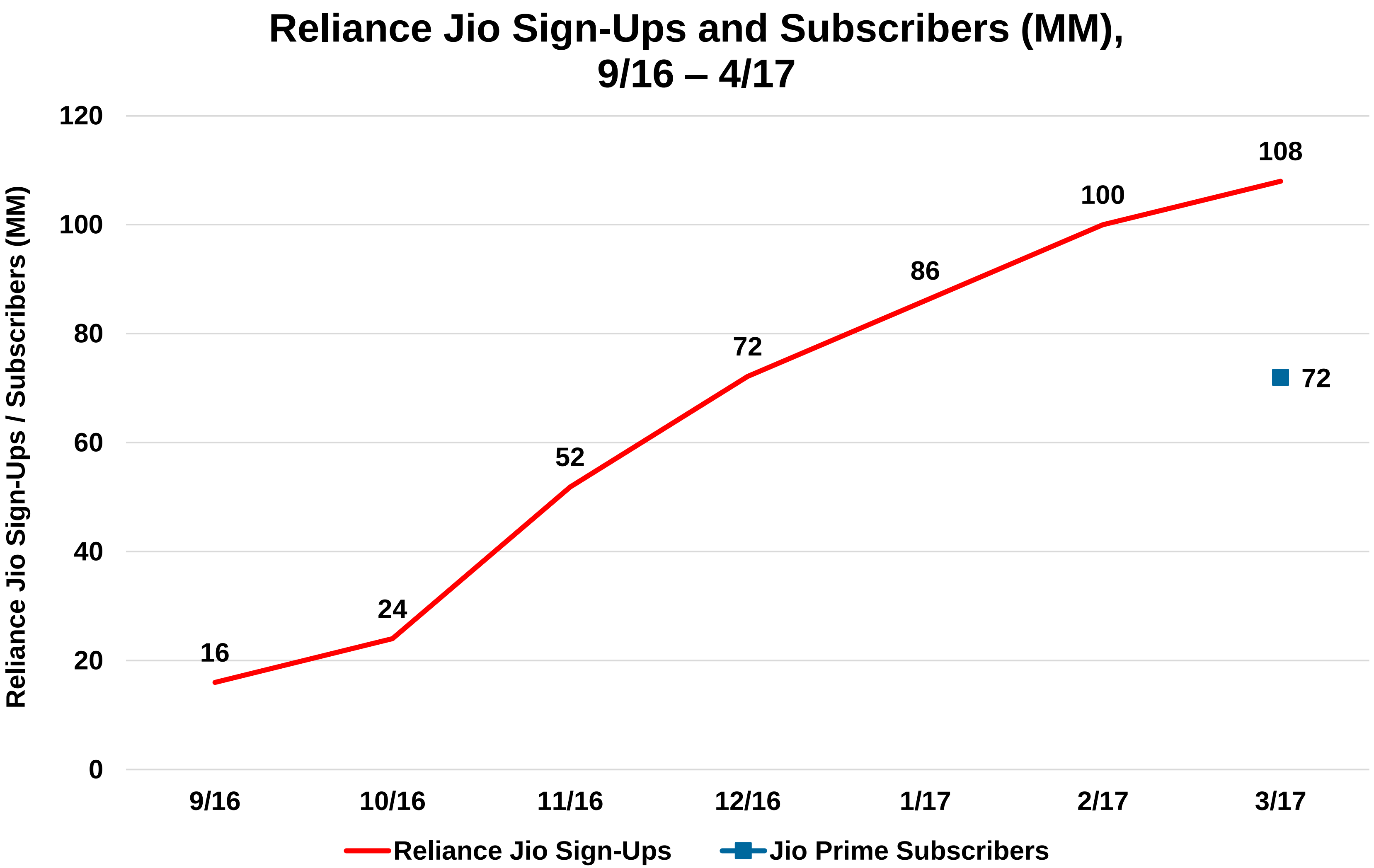
Source: UIDAI (Indian Government), iSpirit / IndiaStack, Skoch Group
Note: Image credits – Hindu Business Line, NDTV, Reliance Jio, DBS India, Livemint (2017)

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




Source: Cellular Operators Association of India (COAI), Reliance Jio, various press releases
*Sign ups represent all those who have signed up for a Jio SIM card. Subscribers are those who remained with Jio after their free trial period ended on 3/31/2017 and became Jio Prime subscribers.

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

| Phase | Project | Functionality | Results |
|---|---|---|---|
| **1) Identity** | Aadhaar (1/09) + eKYC (5/13) | Single digital ID + authentication database | • 1B+ Aadhaar cards issued since 2010<br>• ~16MM authentications/day (4/17) |
| **2) Banking** | Jan Dhan Yojana (8/14) 'Banking for All' | Bank accounts tied to Aadhaar for previously non-banked citizens | • 280MM+ accounts opened in 3 years... 50% of existing bank accounts<br>• Direct subsidies to citizen bank accounts have saved $775M owing largely to reduced corruption leakage (12/16) |
| **3) Mobile Services** | Universal Payments Interface (UPI) (7/16) | Instant money transfer between bank accounts via phone numbers | • ~$380MM monthly transaction volume (4/16)<br>• Use accelerated after demonetization (11/16) |
| | Bharat Interface for Money (BHIM) (12/16) | Government App for UPI based payments | • 17MM+ downloads within 2 months of launch (2/17) |

Source: Kalaari Capital, Prime Venture Partners, Indiastack.org, Department of Financial Services, Government of India (2016)

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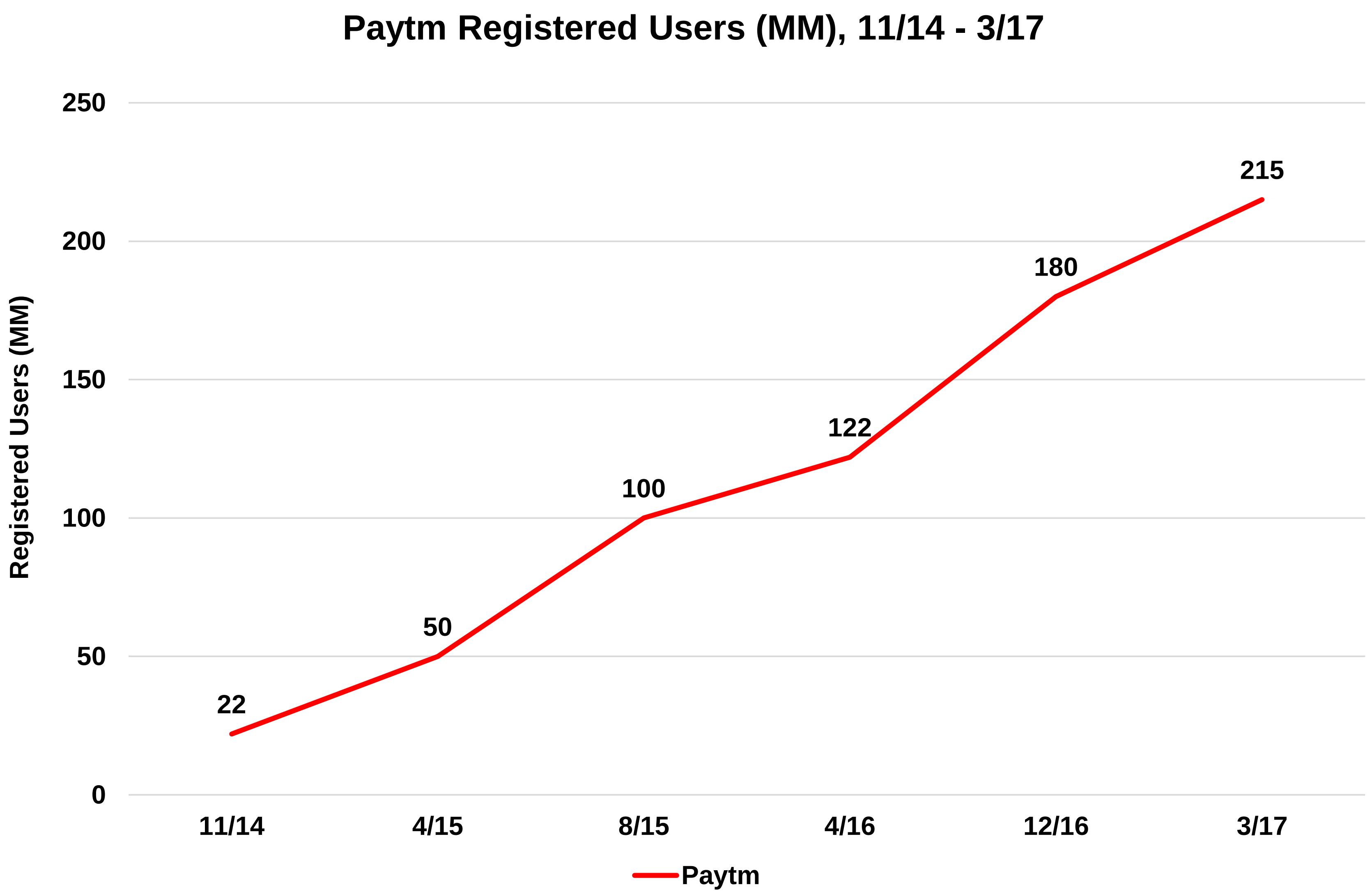
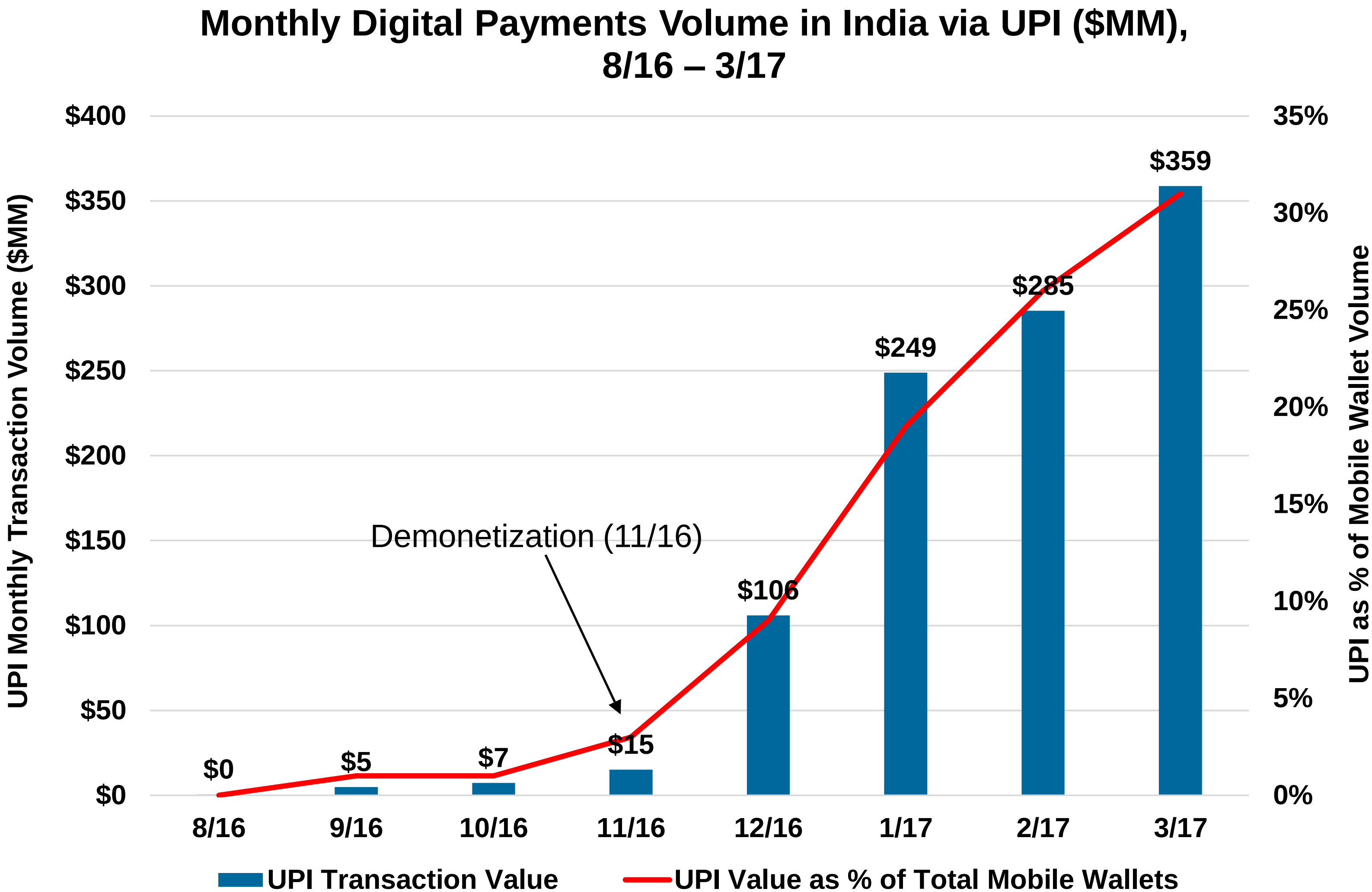
# …India Payments = Online Leader Paytm Ramping Users Rapidly… Bolstered by Uptake of Online + Offline Commerce…




Source: Paytm.

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




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*

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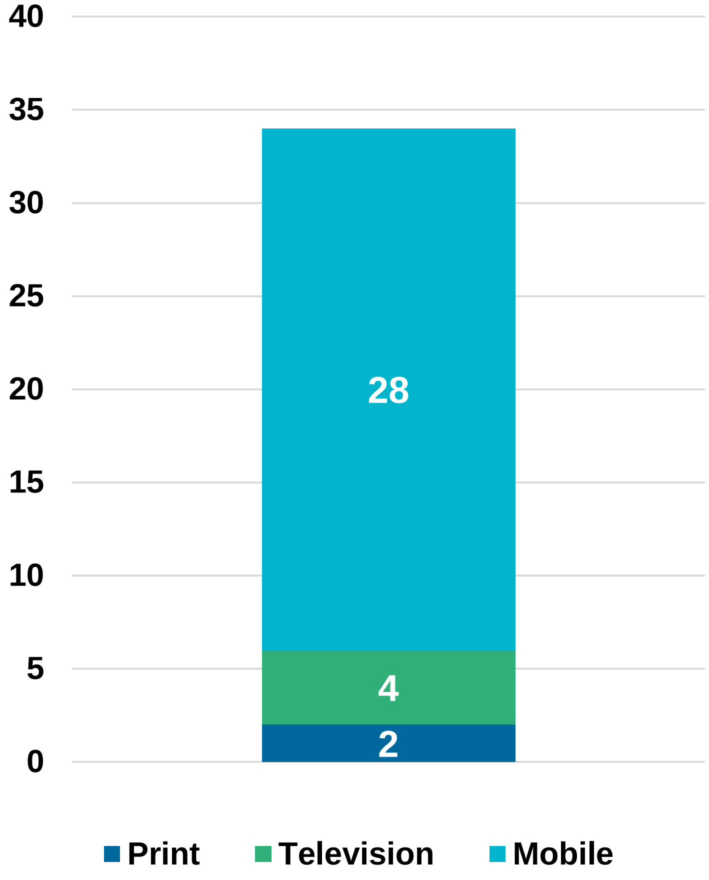
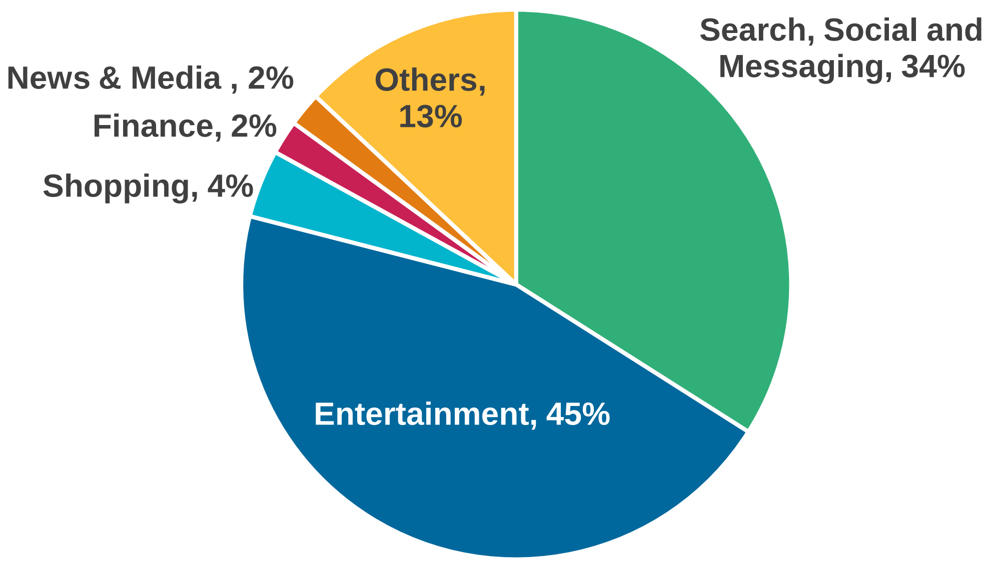
# India Entertainment = Weekly Mobile Time Spent @ 7x TV…
45% Mobile Time = Entertainment…

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




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




Source: MMA Kantar India Mobile Usage Report, 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*

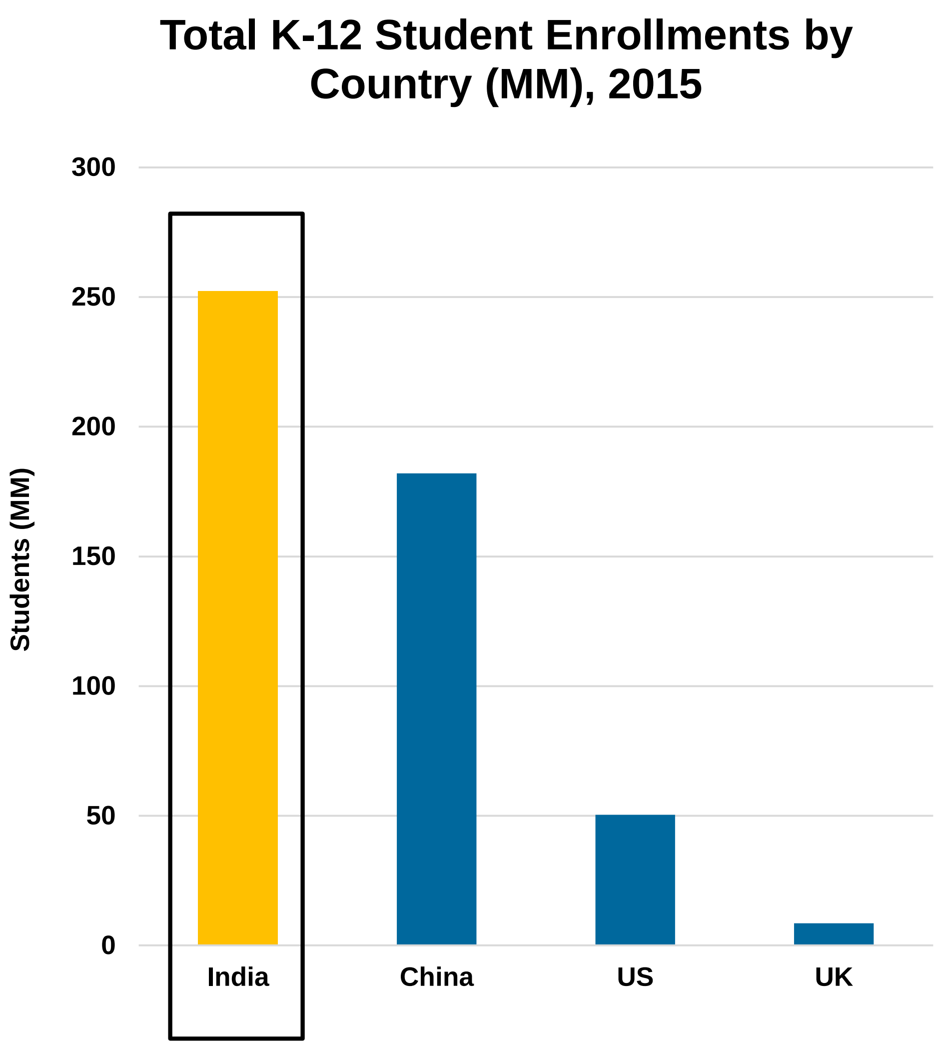
## On-Demand Web-Video Shows

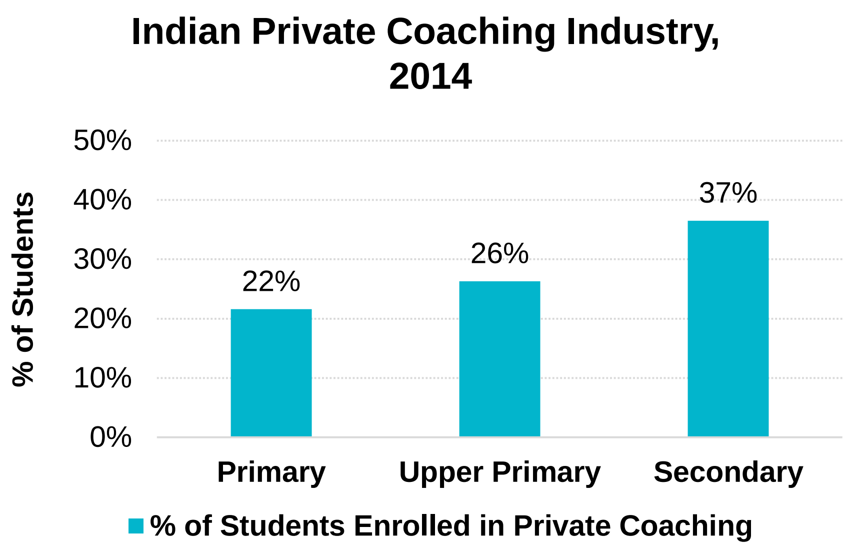
ex. AIB Roasts, Hotstar

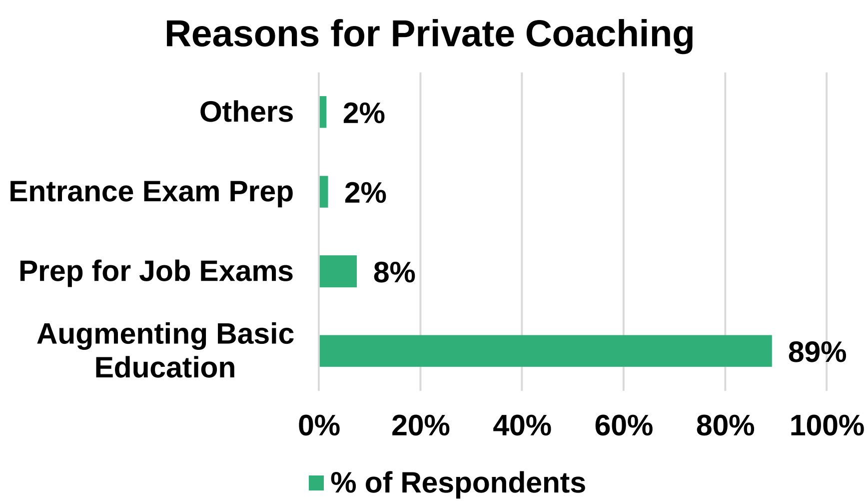
- Millennial focused / short-form content such as 'Hinglish' standup comedy
- Made for mobile / shared via messaging channels (Whatsapp, FB, etc)
- Instant user data + feedback (Views, Geos, Replays etc.)
- Dramatic growth assisted by 4G rollout of Jio…AIB Channel @ 100MM+ views


Source: Google Play, Reliance Jio Annual Report
Image: Wikipedia, Hotstar, JioTV

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

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Source: Nielsel 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

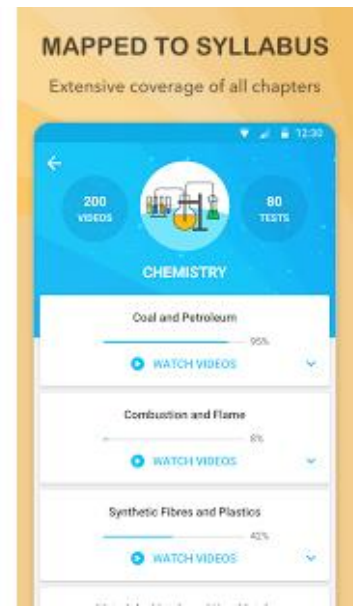
- Offline lectures + in-person testing
- Directly based on income & geography
- 1:35+ student-teacher ratio
- One-size-fits-all approach
- Extreme focus on test taking

*NOW*

## Mobile Self-Paced Learning

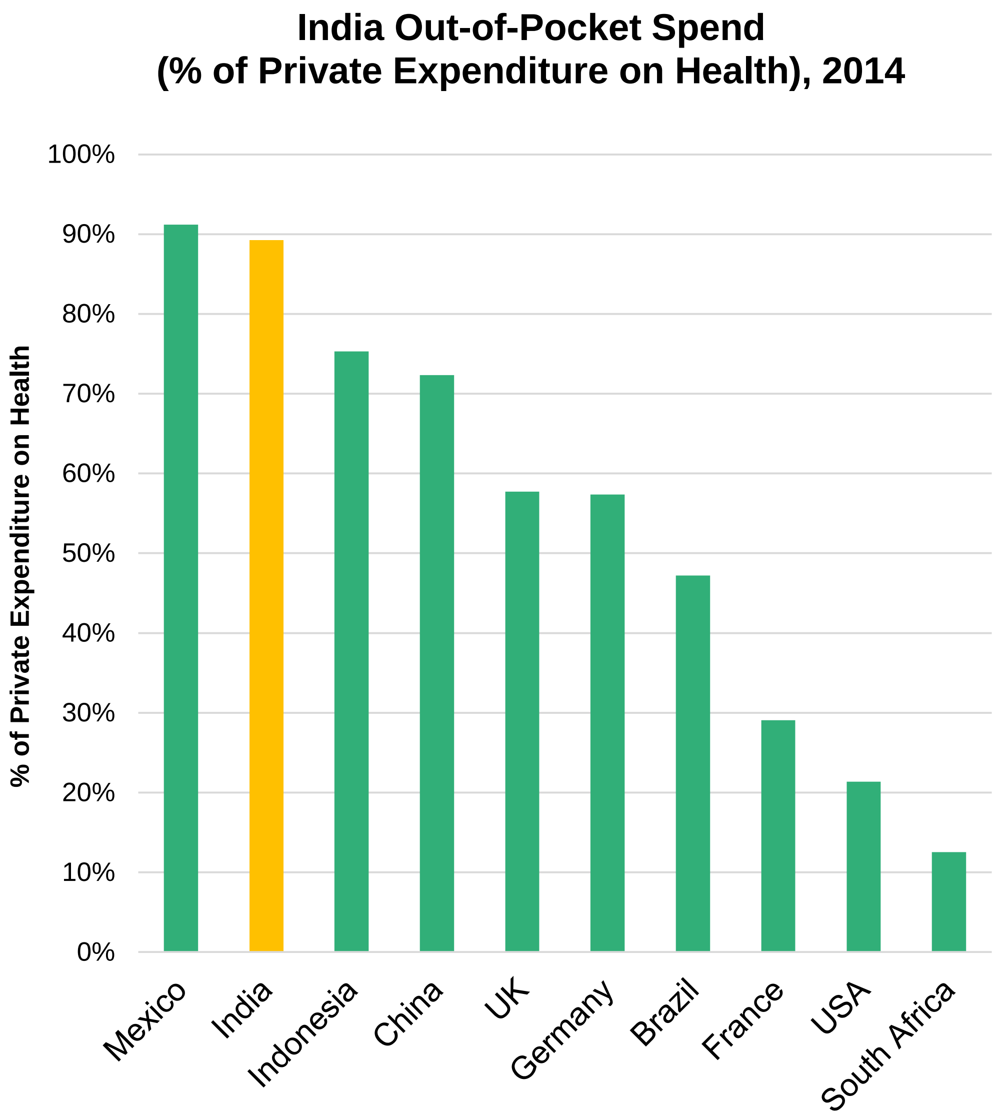
ex. Byju’s

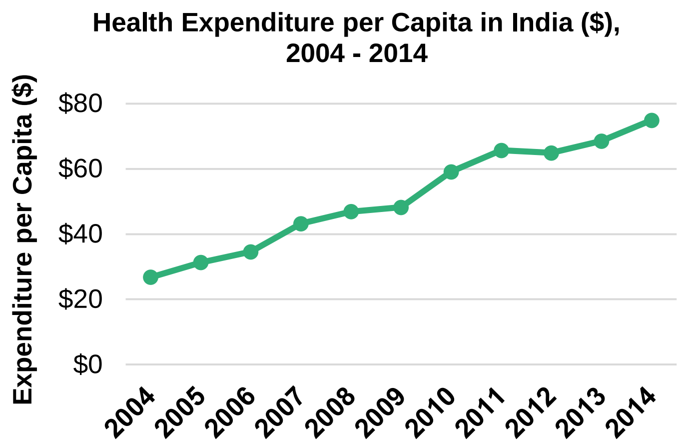
- Math + science with games + videos
- Anyone / anywhere with smartphone
  40+ minutes average daily usage
- Personalized
- Learning outcomes* improved 15%+

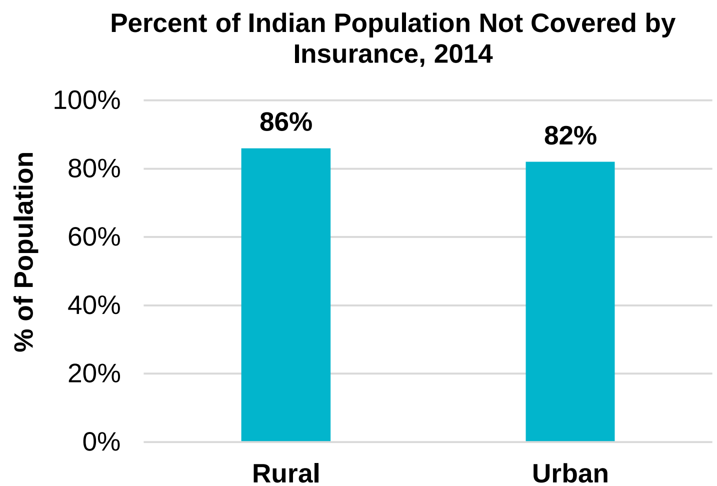




Source: Byju’s, *data refers to improvements among students who took a test, watched the video and then took another tes
Image: DailyMail

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




Source: World Bank 2014 Census.

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# …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


Source: 1Mg, Portea, CDSCO Report 2016

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

*THEN*

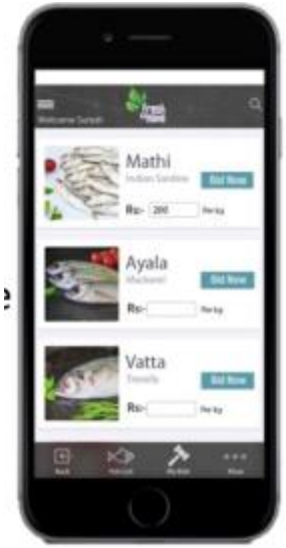
**Hyperlocal Offline Markets**
ex. Fish Mandis

- 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





Source: FreshtoHome
Image: TheIndianIris

***India Internet Challenges =***

***Fundraising Environment + Language***

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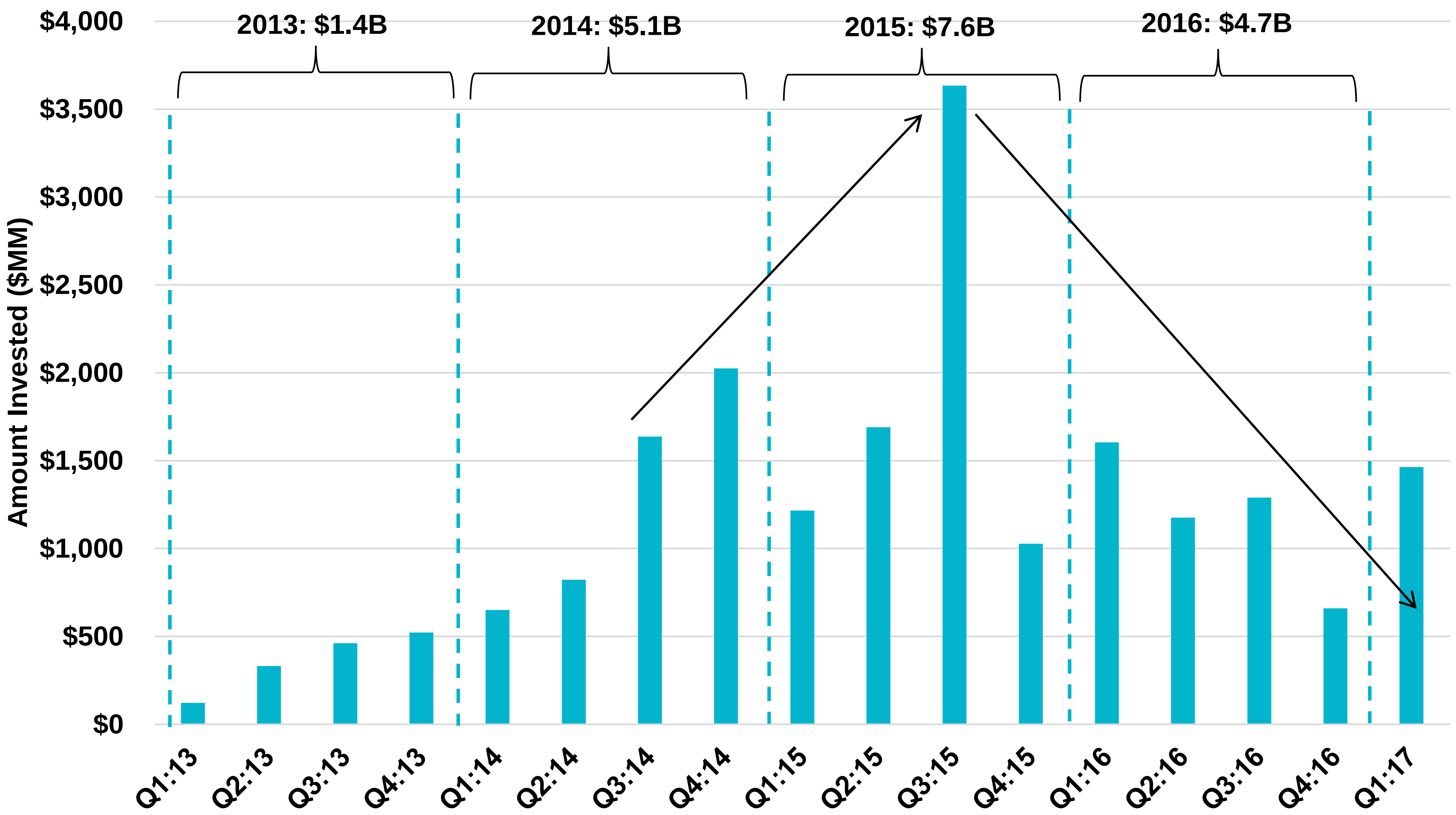
# India = Especially High Venture Capital Funding in H2:14 – 2015…
# Helped Drive Aggressive Start Up Valuations + Spending + Competition

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




Source: Tracxn, Inc42

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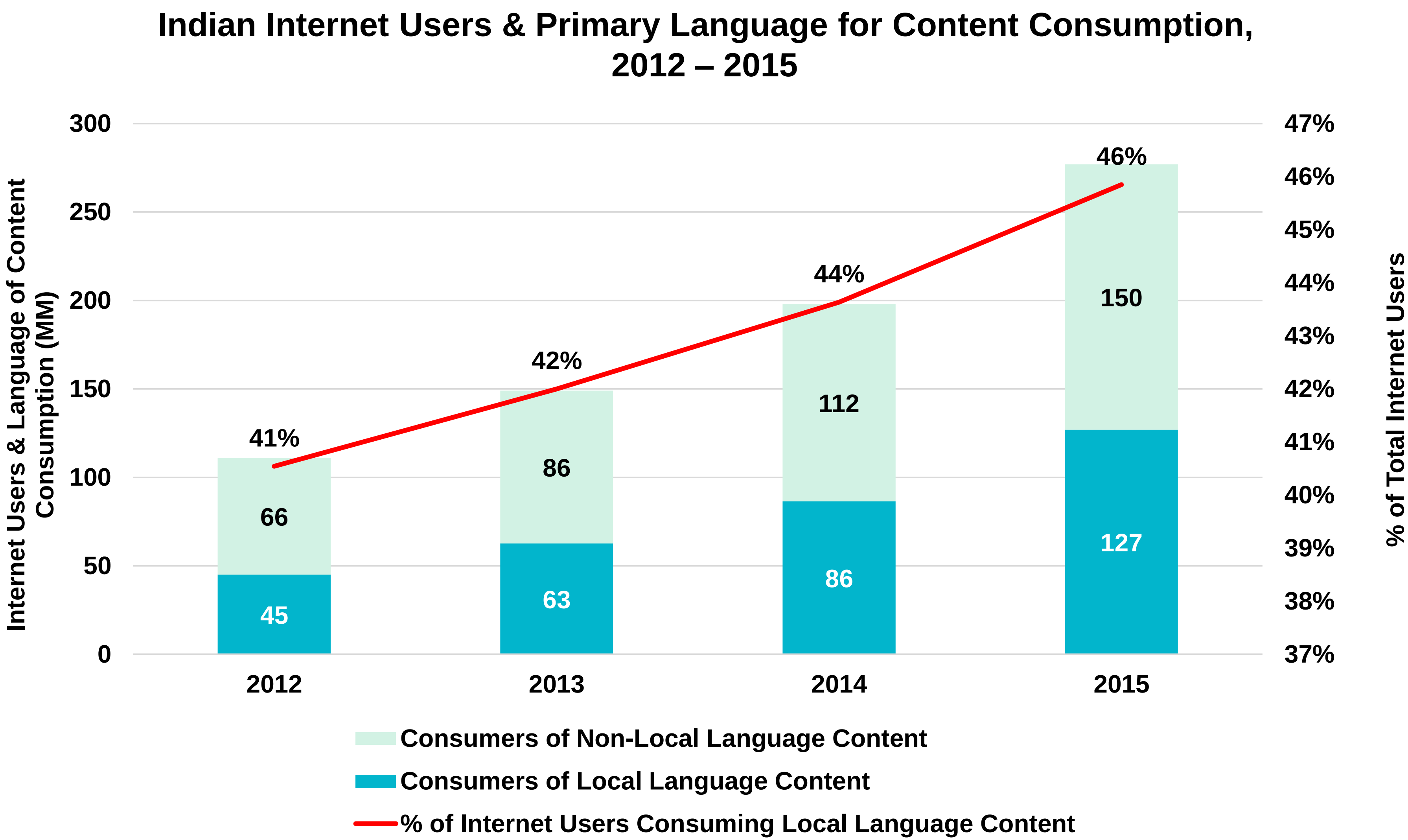
# India = 29 Languages Spoken by >1MM People…6 >50MM (ex-English)…
# 46% of Internet Users Primarily Consume Local Language Content




Source: IDC New Media Market Model 3/17, Nation Master 2009, Indian Census 2001, CRDDP Survey, (Shariff, 2014), IAMAI 2/16, IAMAI Reports 2012-2016.

***India Macro…***

***Demographics = Bad & Good***

***Other Challenges =***

***1) Job Creation***

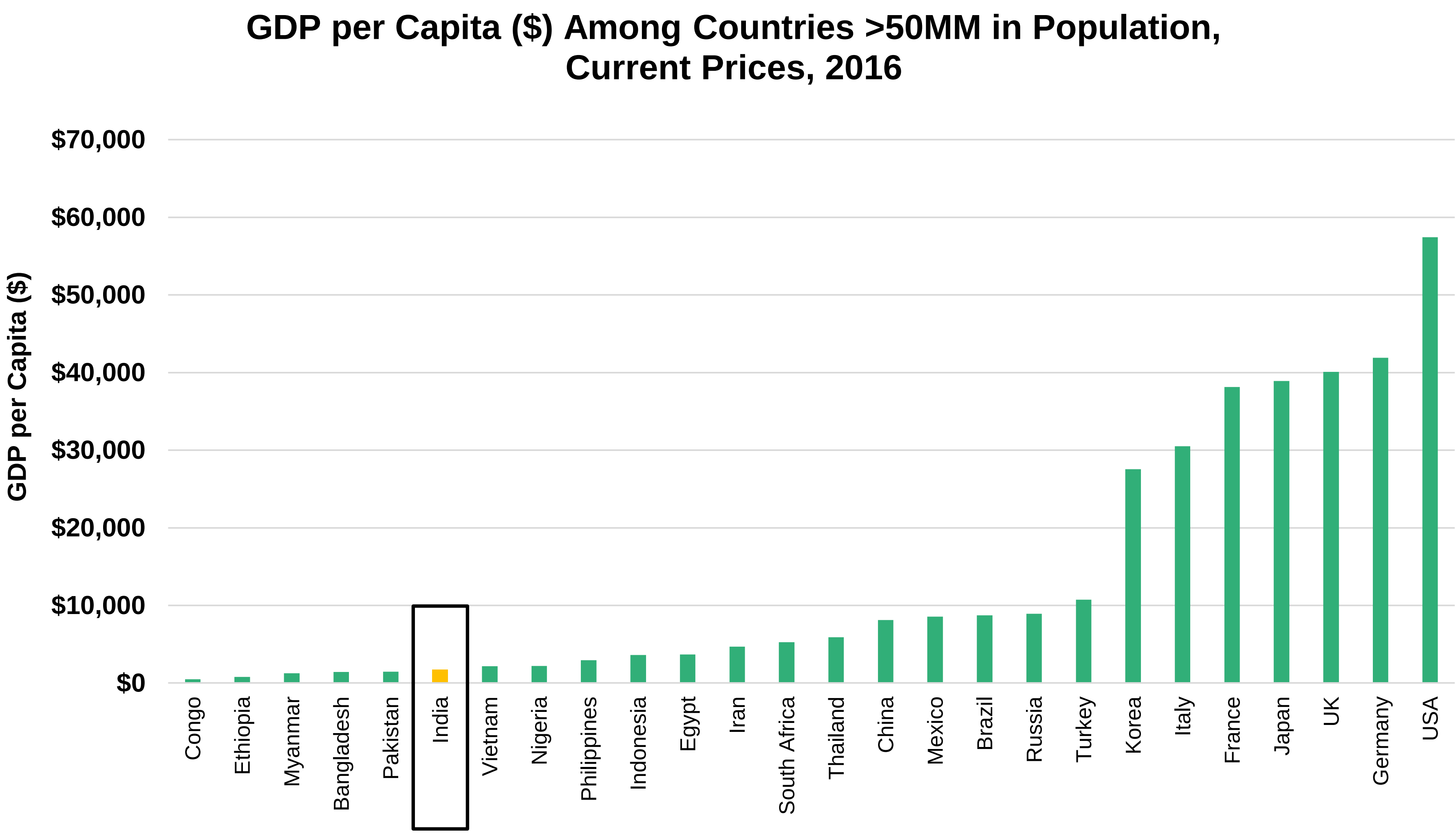
***2) Business Basics***

***3) Education***

***4) Logistics***

***5) Gender Disparity***

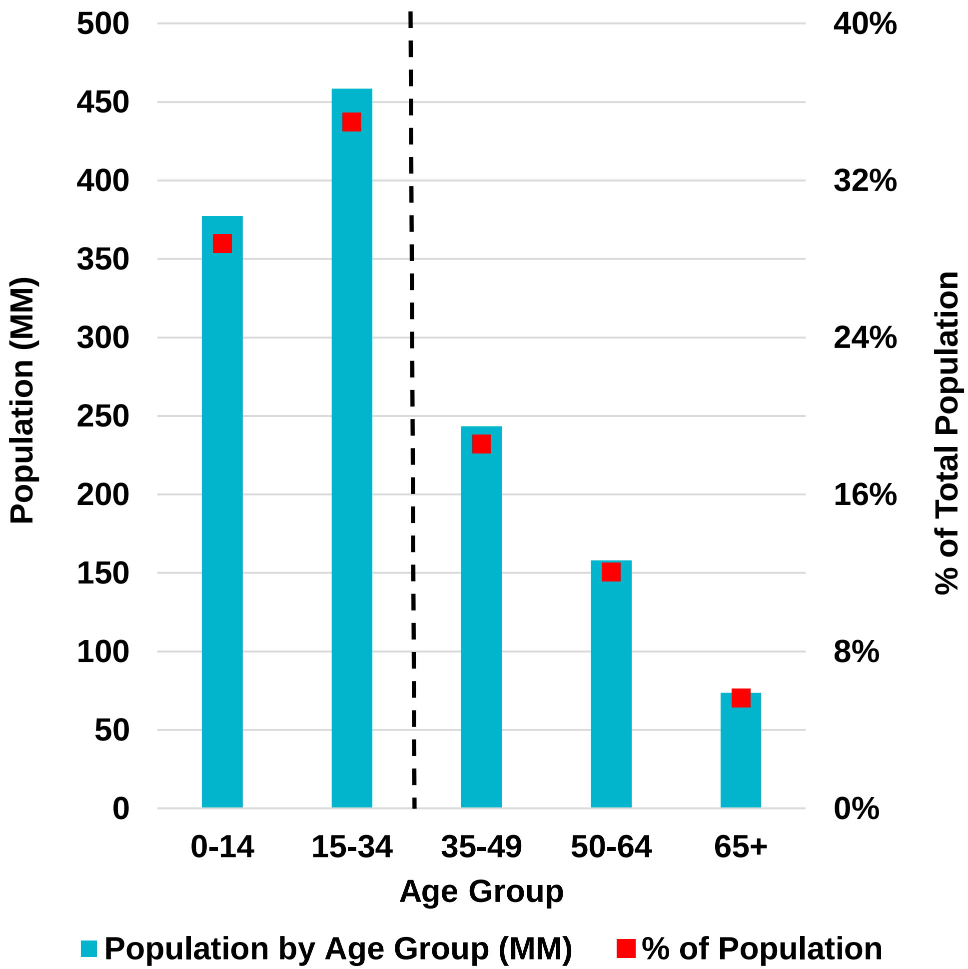
# India = Low Relative GDP per Capita…Poverty Levels… While Improving…Remain High



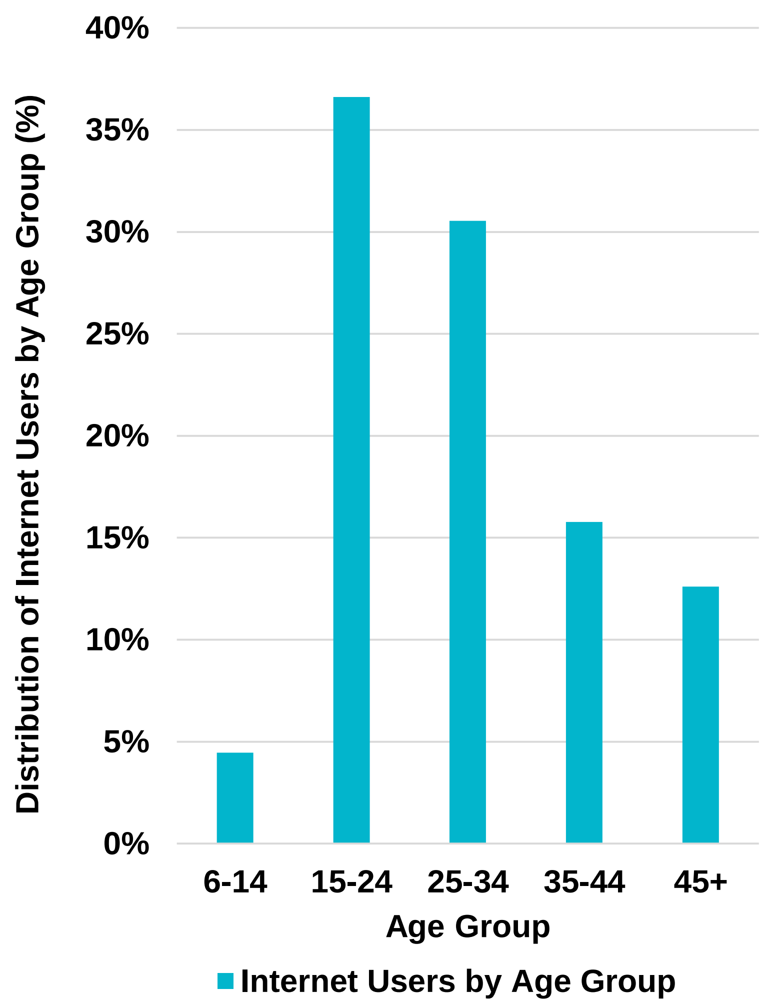

Source: IMF, 4/17.
GDP per Capita data based on current prices. Selected for countries with population >50MM.

# 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

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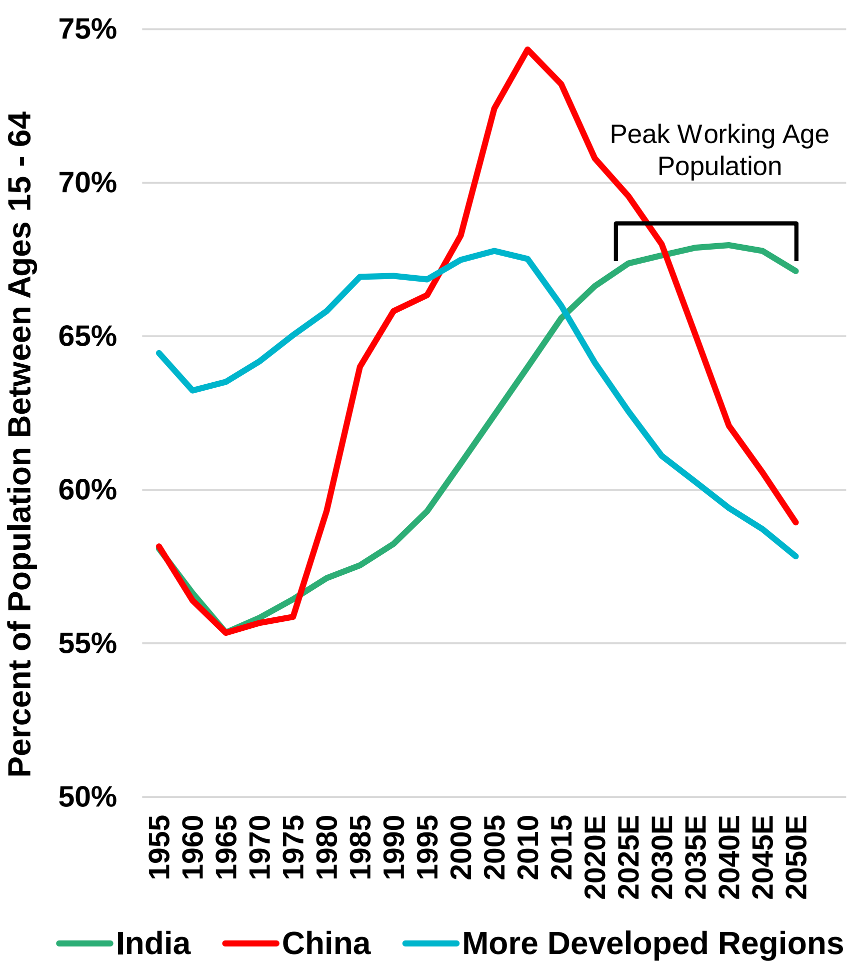
Source: UN Population Division., ComScore, 3/17.
ComScore data based on panel and census and only includes Android.

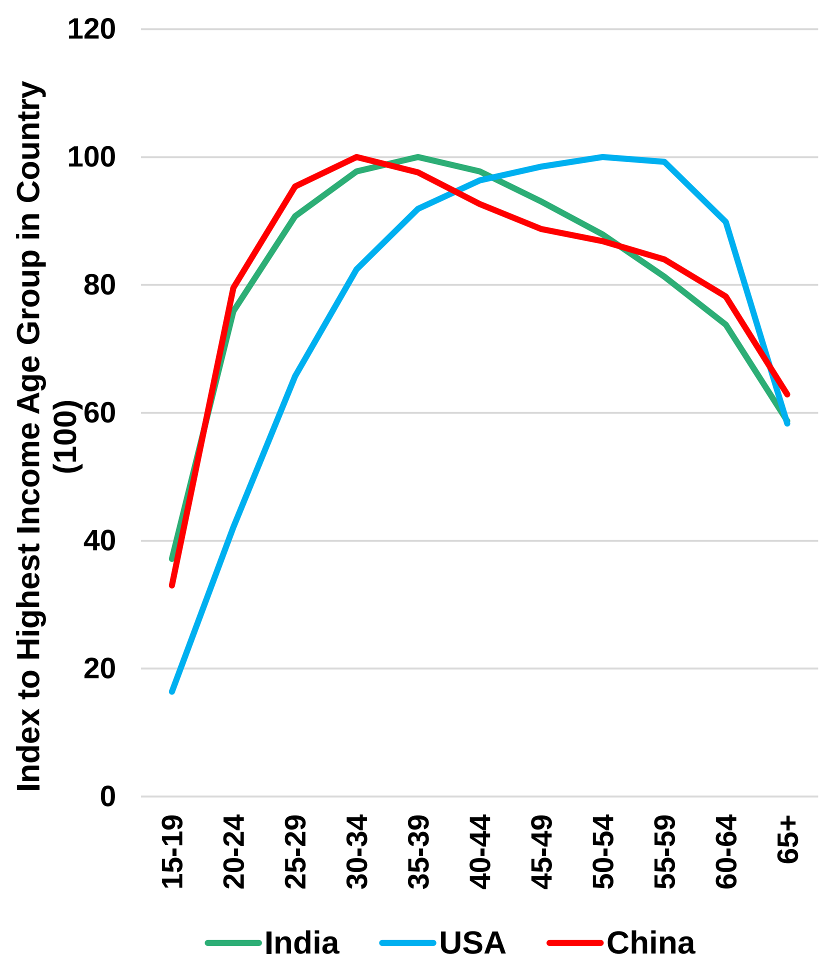
# India = Working Age Population Growth + Millennial Per Capita Income… Compare Favorably with Other Countries

**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)*

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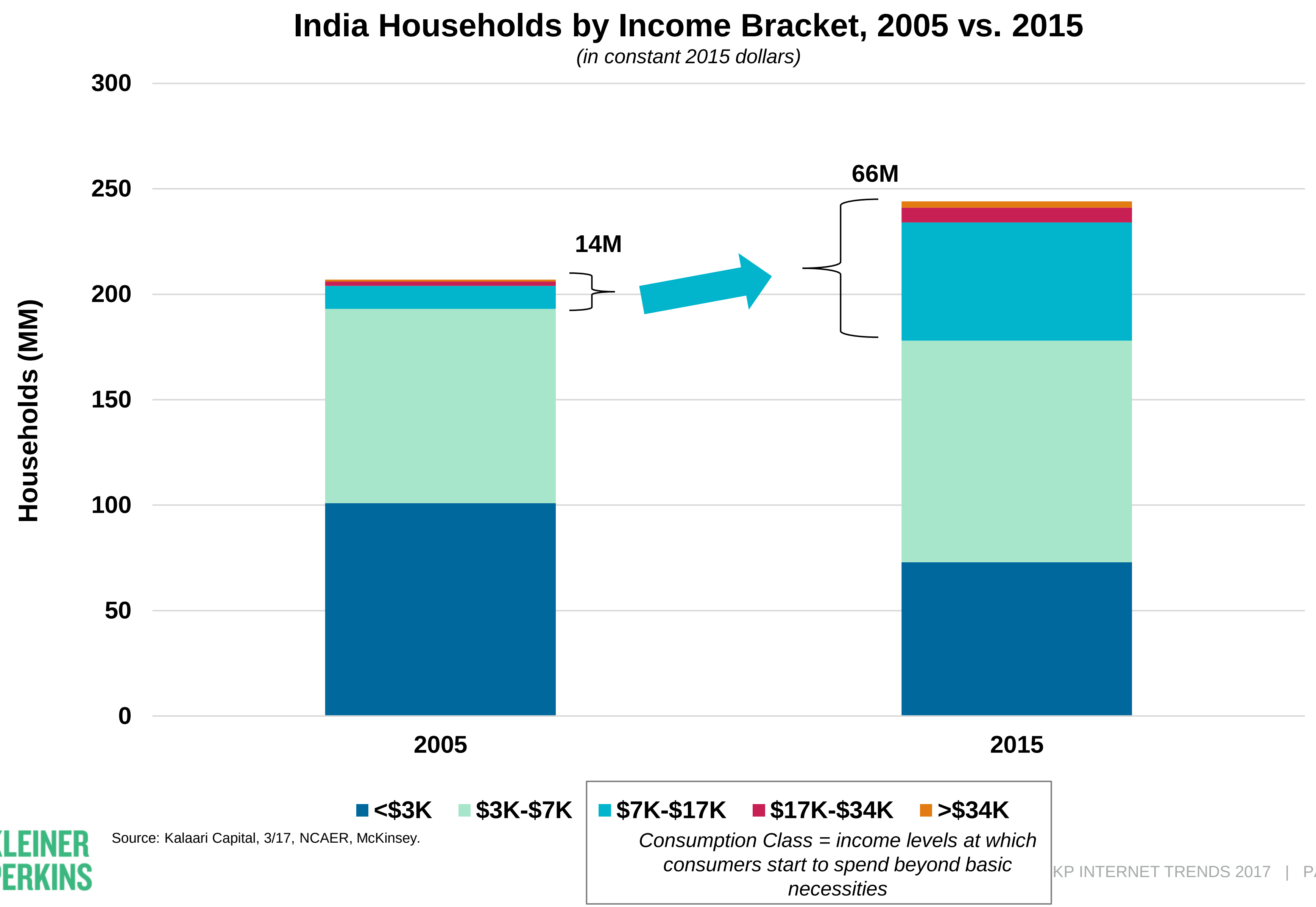
Source: UN Population Division, Euromonitor, Morgan Stanley.
Projections data based on medium variant estimates. "More Developed Regions" comprised of N. America, Europe, Japan, Australia, New Zealand. Projections begin after 2015. UN provides projections on a 5-year time frame.

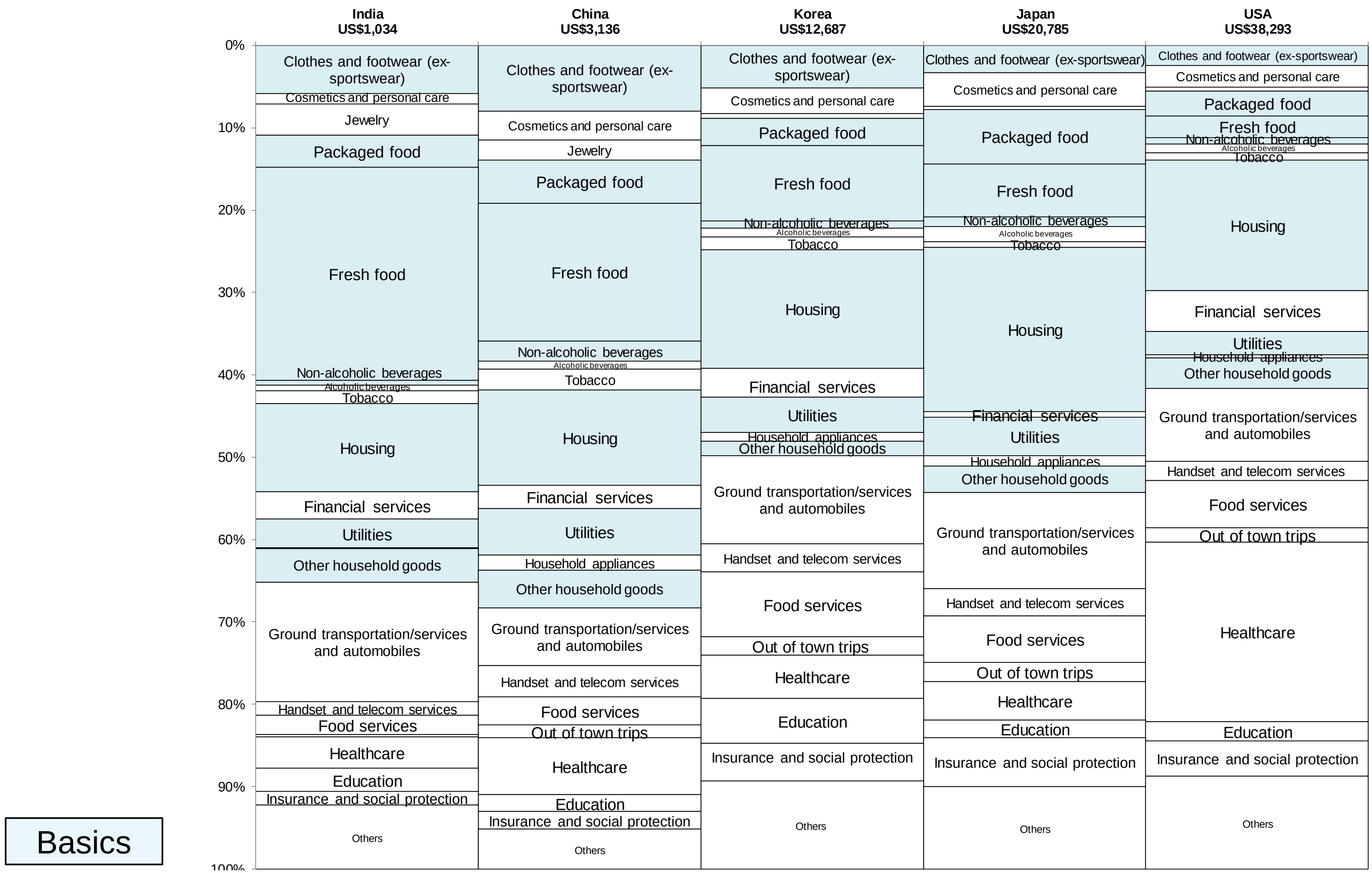
# India = 'Consumption Class' Growing Rapidly…
# @ 27% of Households (66MM) vs. 7% Ten Years Ago




Source: Kalaari Capital, 3/17, NCAER, McKinsey.

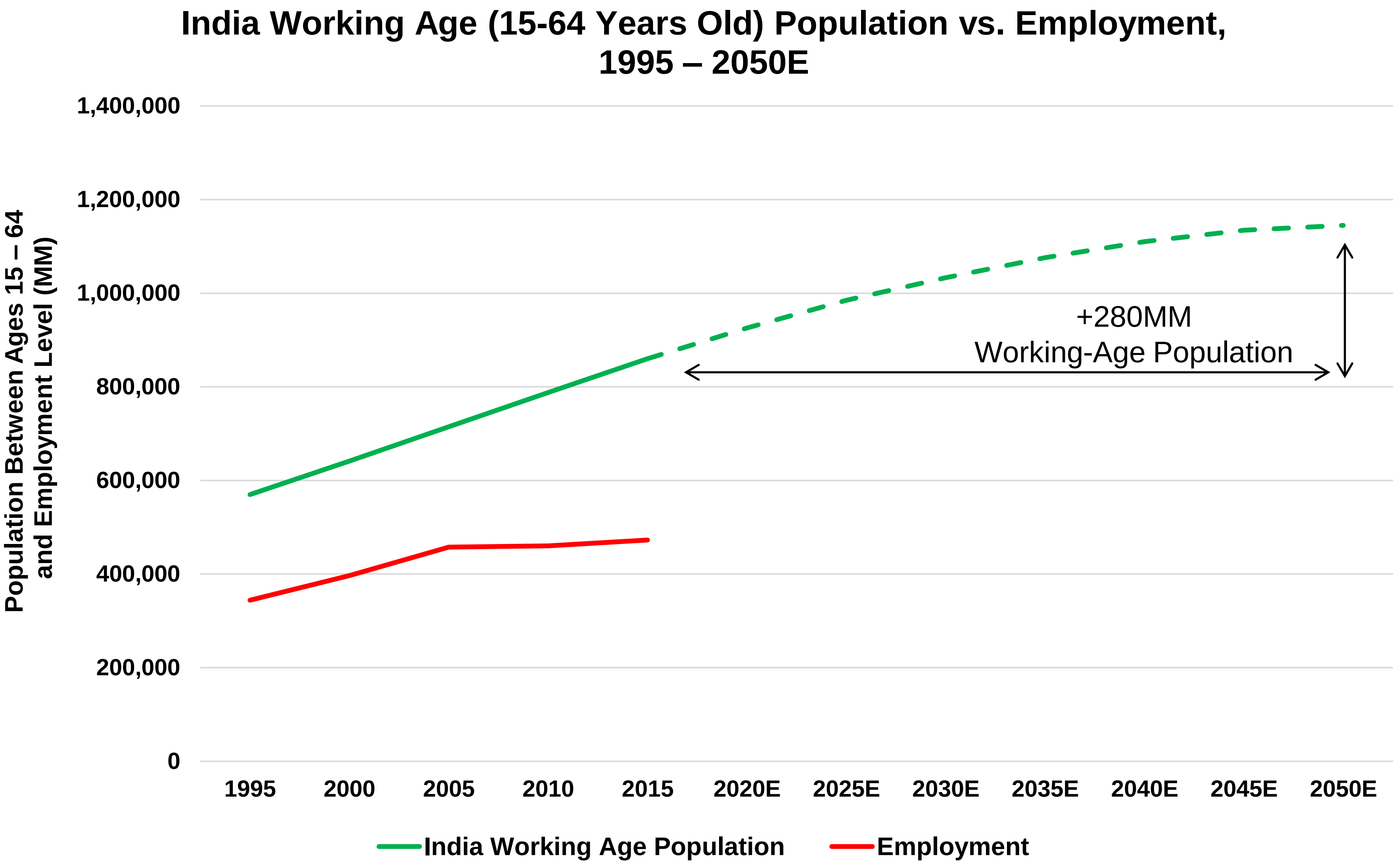
# India Consumption = Mostly Focused on Basics…"Roti, Kapda Aur Makaan"… @ 54% of Personal Consumption Expenditure

## Personal Consumption Expenditure by Category, 2016




Source: Euromonitor, Goldman Sachs Investment Research.

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




Source: UN Population Division, Planning Commission of India, National Sample Survey, International Labor Organization. Population projections based on medium variant estimates. Projections begin after 2015. Working age population defined as ages 15-64.

# 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% |

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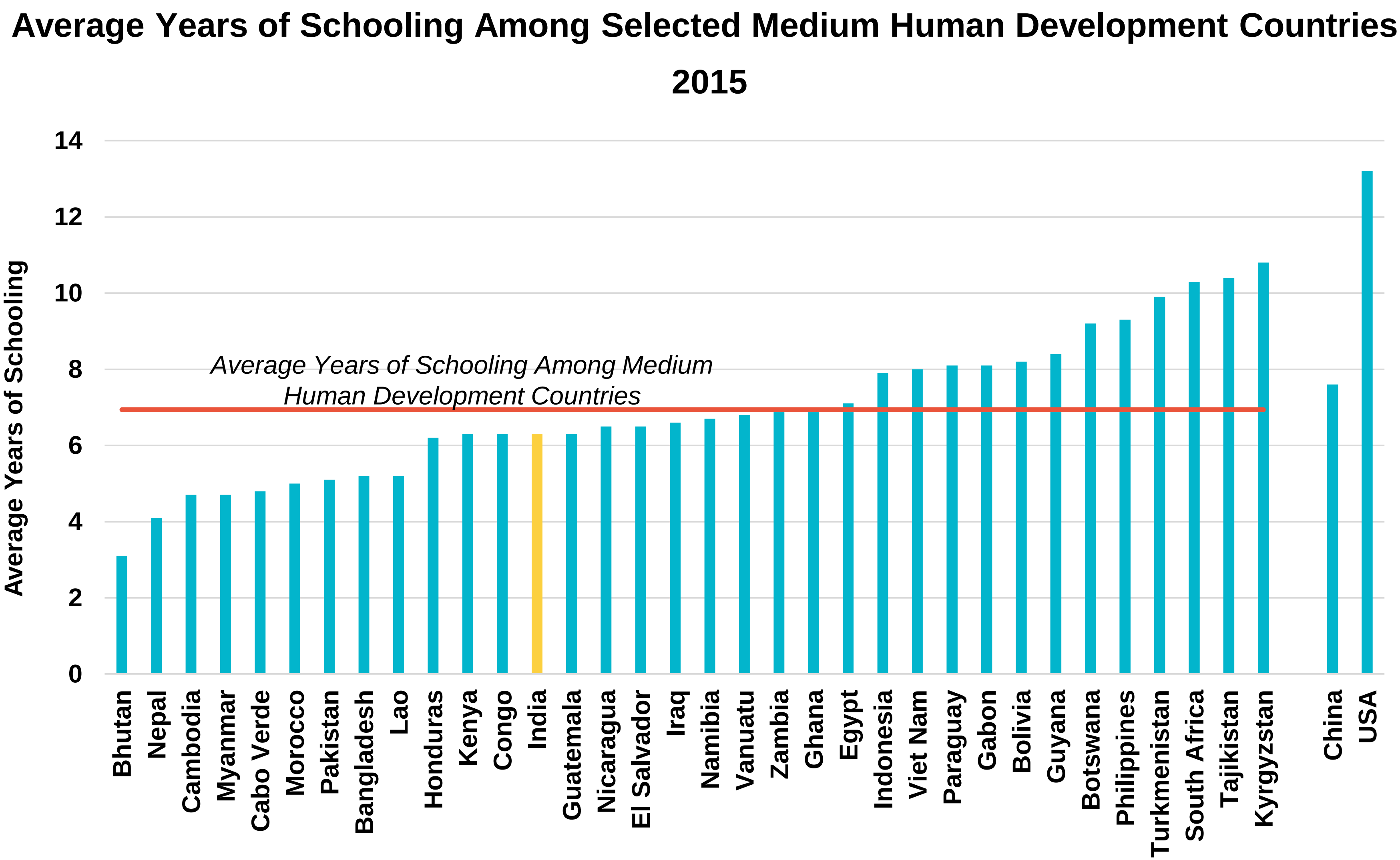
Source: The World Bank, 2017 (http://www.doingbusiness.org/rankings). Rankings apply to 190 countries.
Number of procedures, time to register, and cost as % of income per capita reported here based on statistics that apply to men.

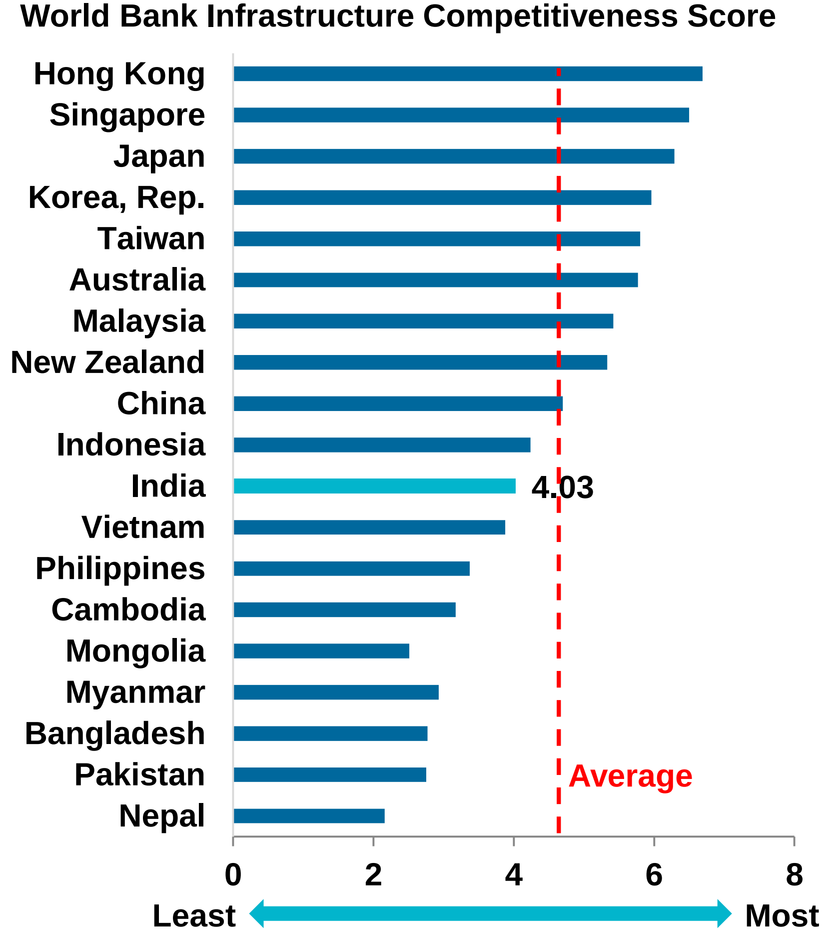
# India Education =
# Average Years of Schooling Lags Peers




Source: Human Development Report, 2016
Mean years of schooling defined as average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level.

# India Logistics =
# Low Infrastructure Competitiveness

## Infrastructure Rankings Across Asia, 2016

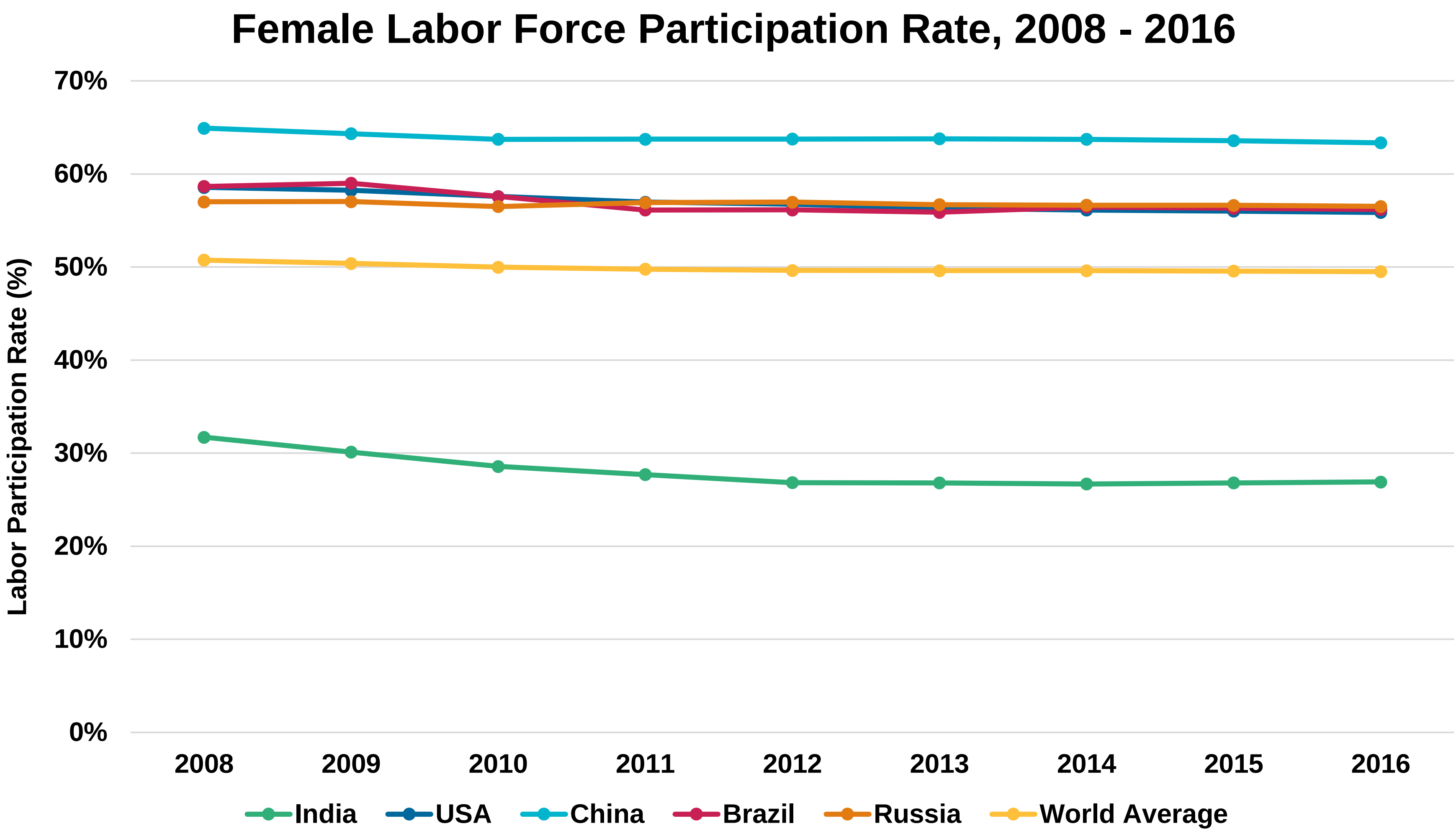



## Top 10 Most Congested Cities Globally, 2016*

| 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 |

Source: The World Bank Global Competitiveness Index, 2016-2017. Population data per CIA World Factbook. Numbeo Traffic Estimates.
*The World Bank Global Competitiveness Report (GCR) is a yearly report published by the World Economic Forum. Since 2004, the Global Competitiveness Report ranks countries based on the Global Competitiveness Index, developed by Xavier Sala-i-Martin and Elsa V. Artadi.

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




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** =<br>***Leapfrogging*** = Mobile…Identity…Bandwidth…Payments<br>***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


Source: History of Nephrology, Welch Allyn, Medisave, Kinsa

# 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

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# *Digital Inputs =*

# *Rapid Growth in Sources of Digital Health Data*

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

**2000's** | **2017**

**X-Ray**

**2D / Analog**

**3D / Digital**

**ECG**

**Paper-Based / Analog**

**Wearable / Digital**

**2000's** | **2017**

**Blood Pressure**

**Manual / Analog**

**Automatic / Digital**


**Hospital Monitoring**

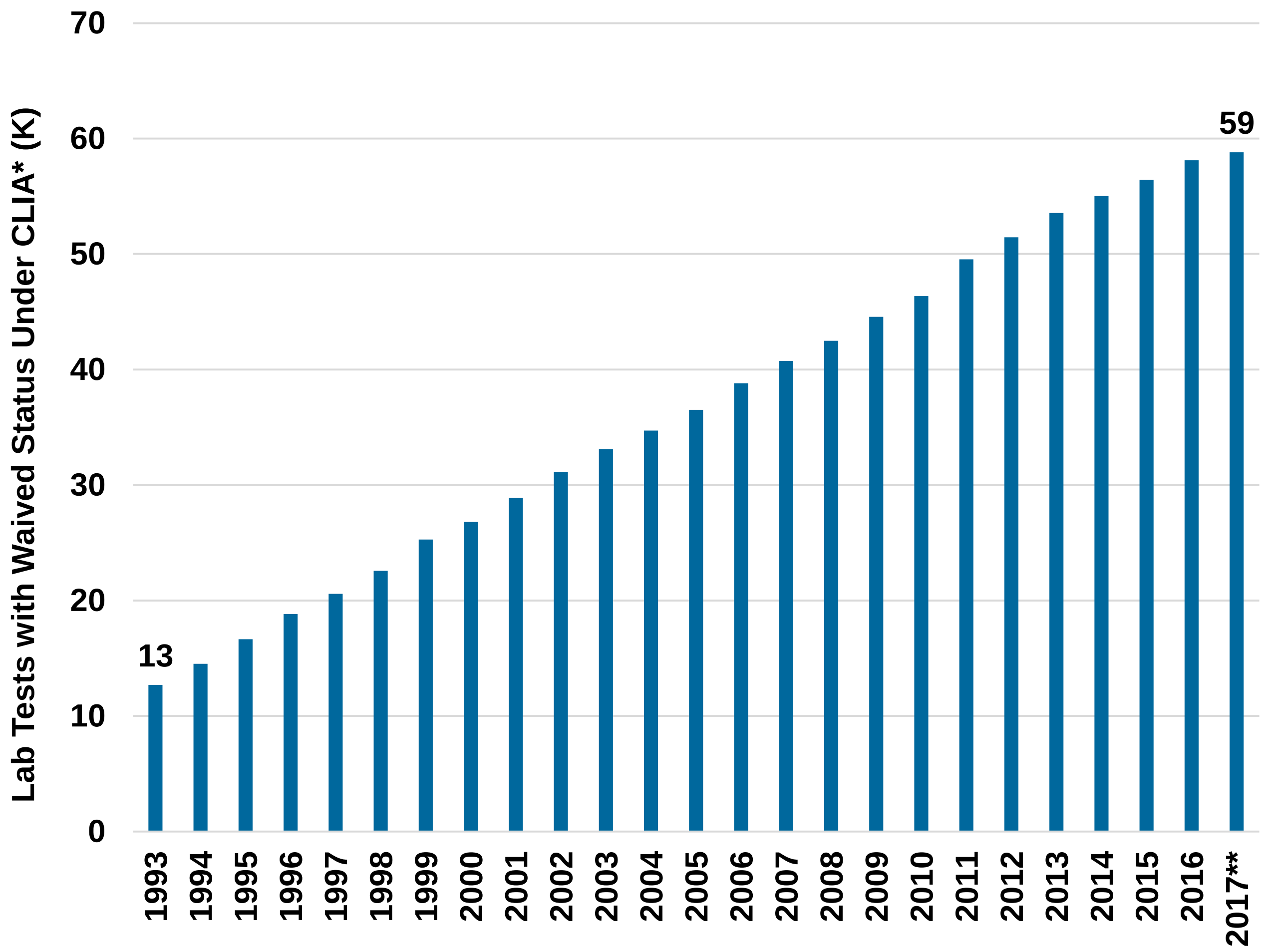
**In-Room / Analog**


**Remote / Digital**

Source: Medisave, GE Healthcare, iRhythm Technologies, Welch Allyn

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

## Commercially Available Lab Tests, 1993-2017




**A**mylase

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**988 Distinct Analytes**

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**Z**inc

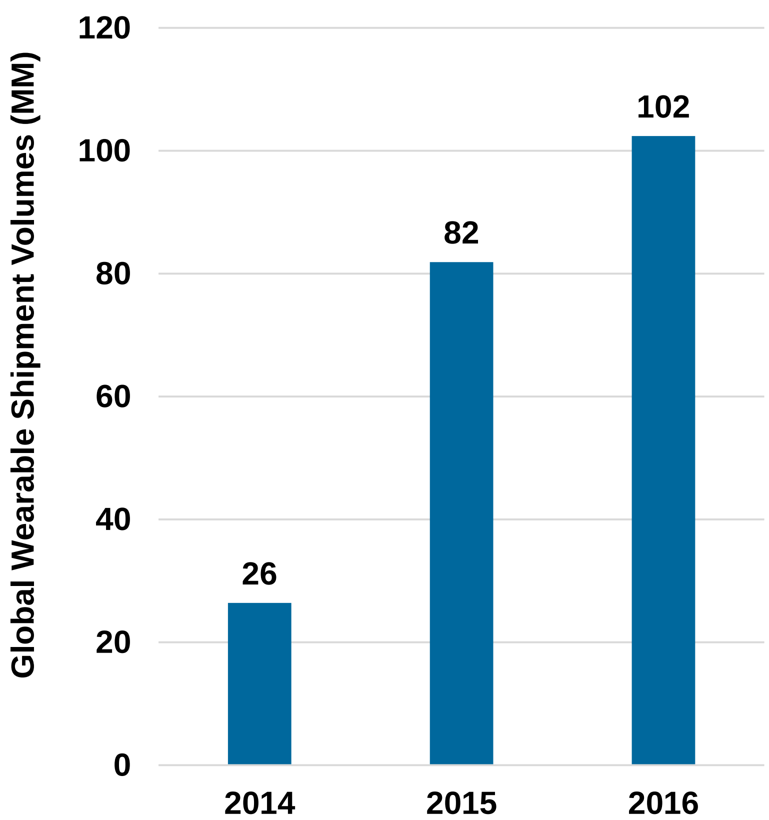
Source: CLIA/FDA Database of Waived Tests and Database of Analytes (5/17)
* Lab Tests are considered to be CLIA waived if the test is simple and accurate enough that it is impossible to product incorrect results conducting them and does not do any harm to the human body. Tests become CLIA waived automatically if the FDA approves it for at-home use
** 2017 as of 5/17.

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

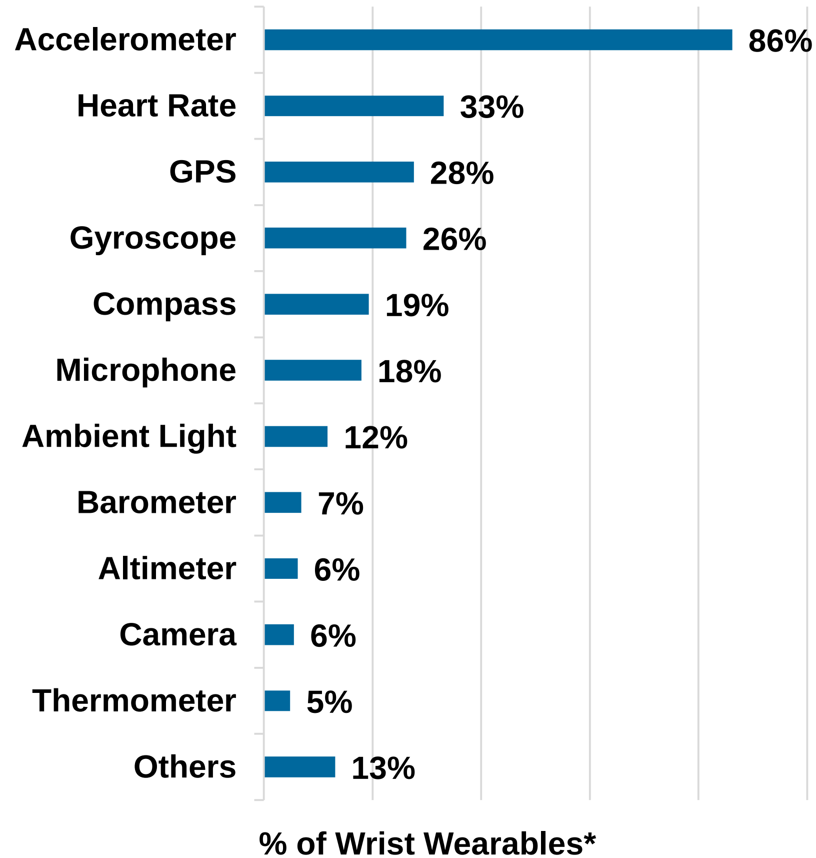
## Wearables = Gaining Adoption

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

### Global Wearable Shipments



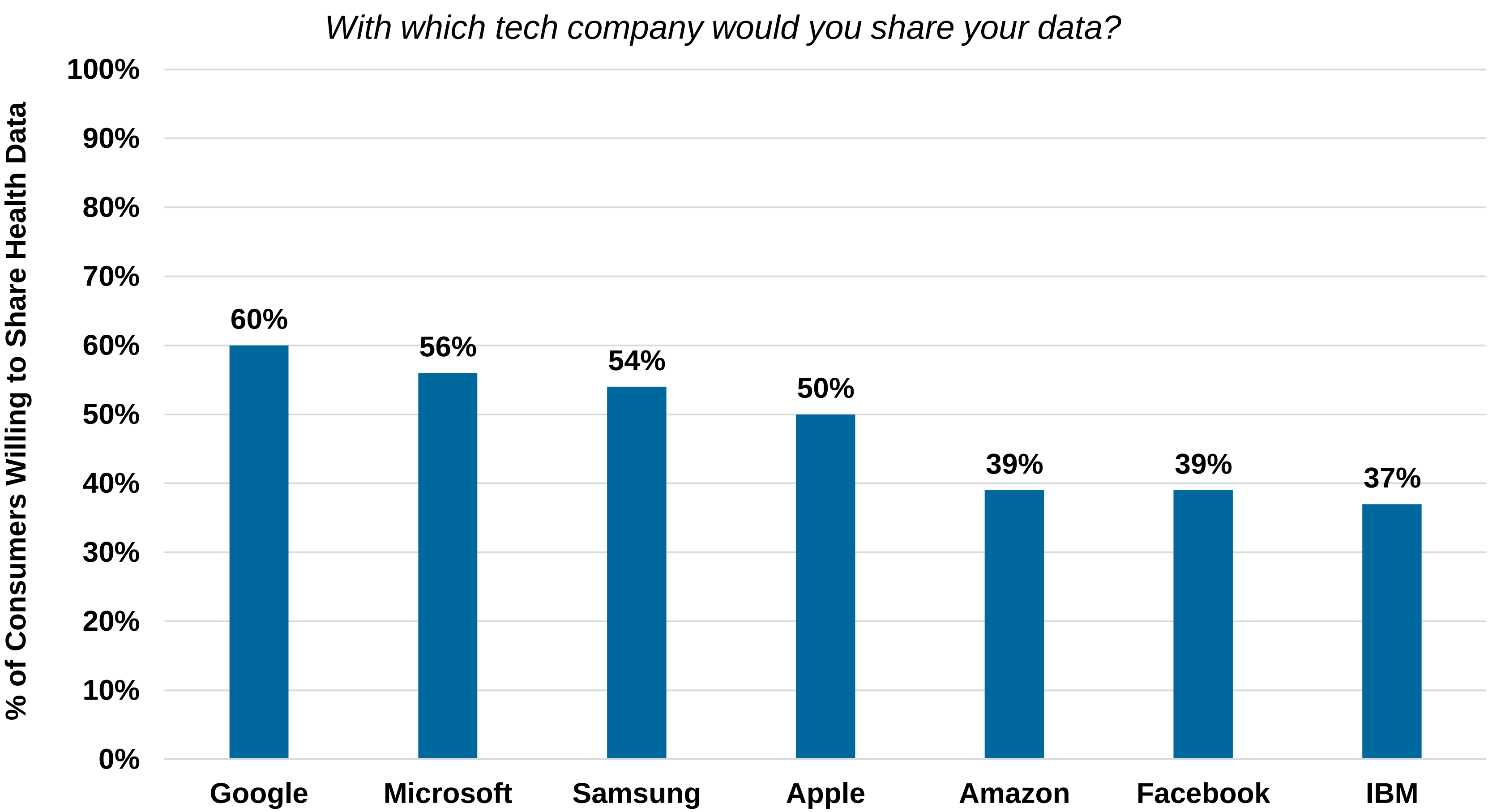

### Sensors in Wrist Wearables, 9/16




Source: Rock Health 2016 Consumer Survey (12/16), IDC, Collection and Processing of Data from Wrist Wearable Devices in Heterogeneous and Multiple-User Scenarios (9/16)
* Based on analysis of 140 different wrist wearable devices

# …Consumers = Willing to Share Health Data

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



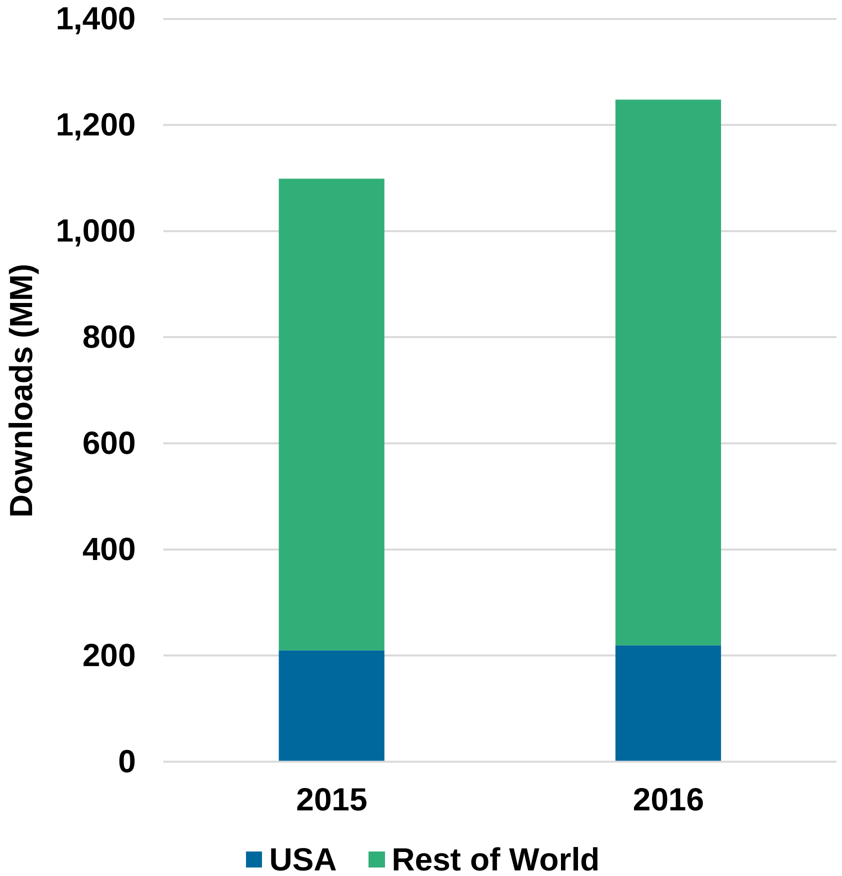

Source: Rock Health 2016 Consumer Survey
Note: Based on consumer survey with 4,015 participants; as % of respondents willing to share their health data with tech company at all.

***Data Accumulation =***

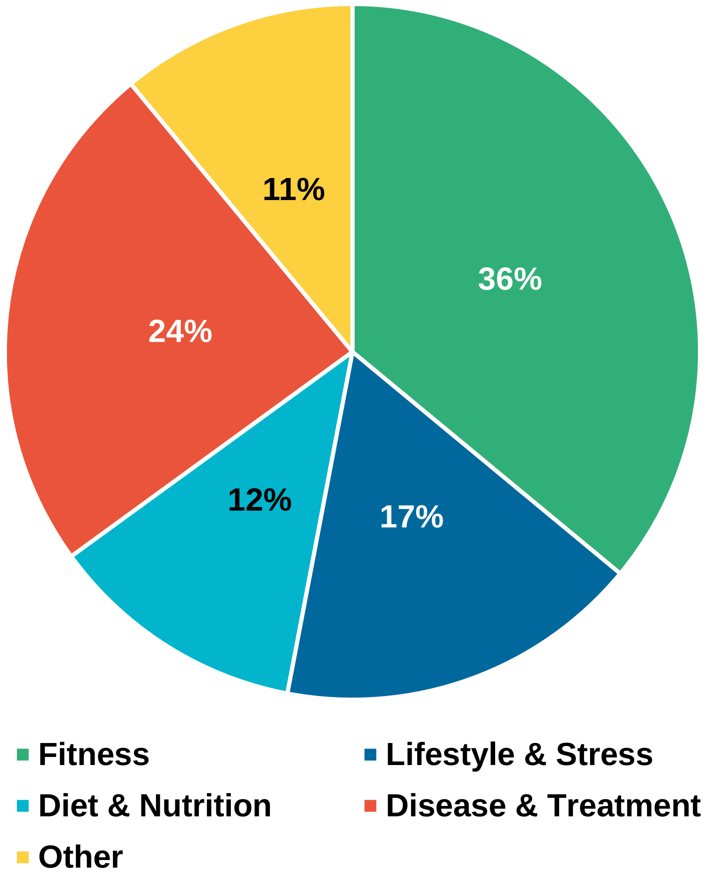
***Proliferation of Digitally-Native Health-Related Data Sets***

# 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**

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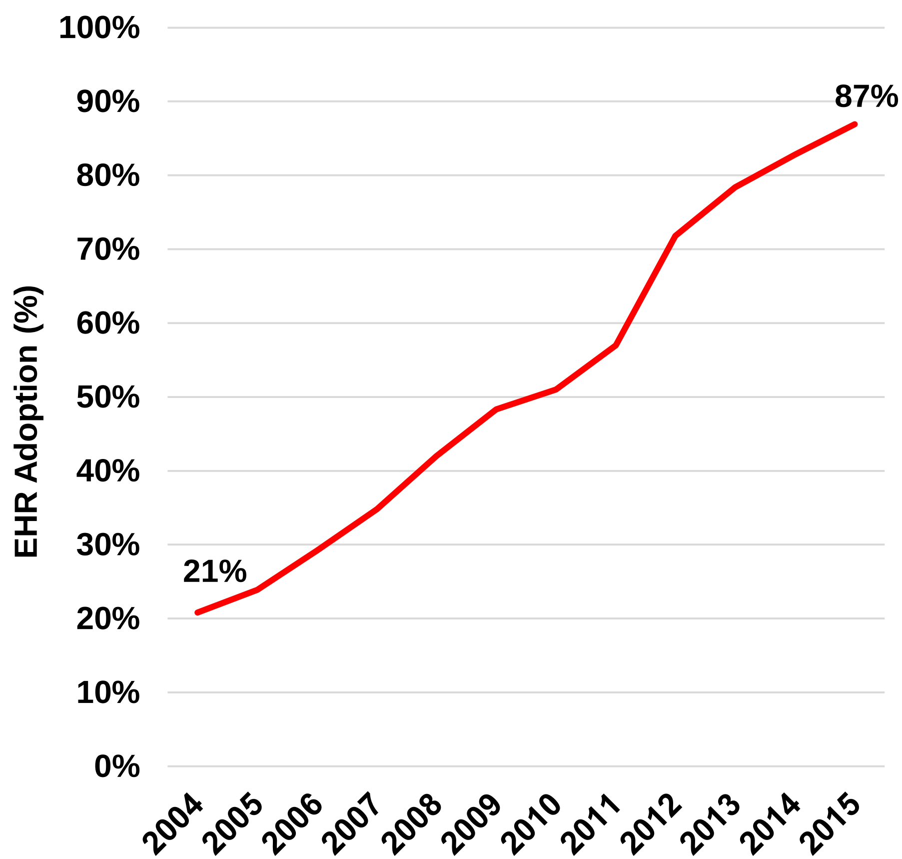
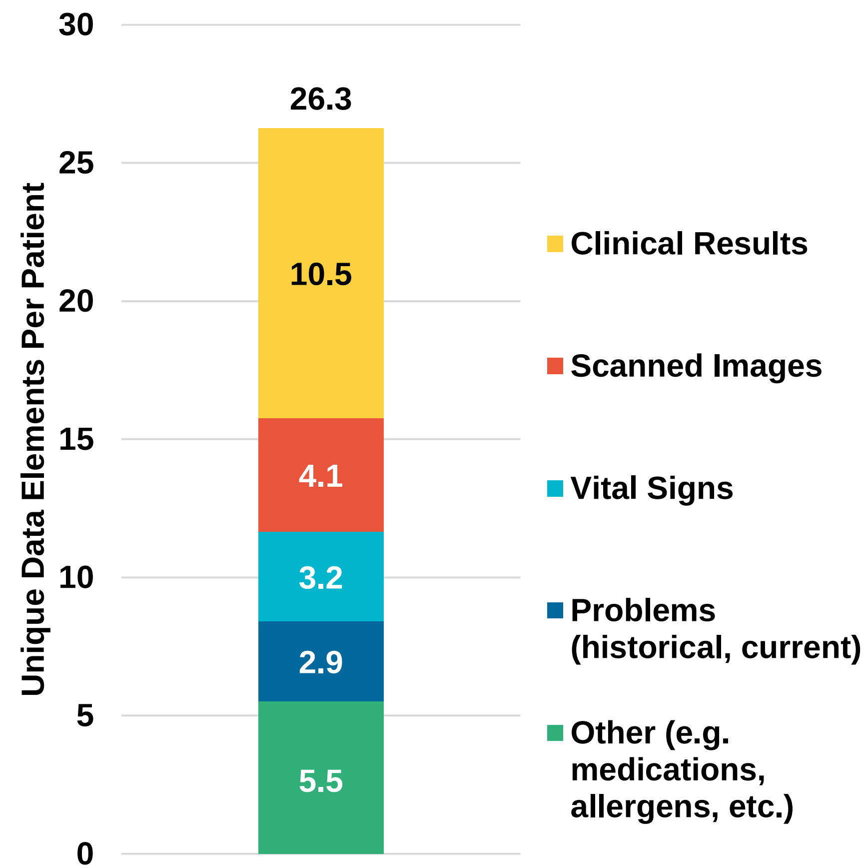
Source: App Annie, IMS Health (6/15)
Note: Due to focus on iOS App Store and Google Play, Rest of World in the App Annie chart does not capture China's downloads on other app stores. The IMS chart includes iOS App Store and Google Play as of 6/15.
* App downloads captures iOS App Store and Google Play

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

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



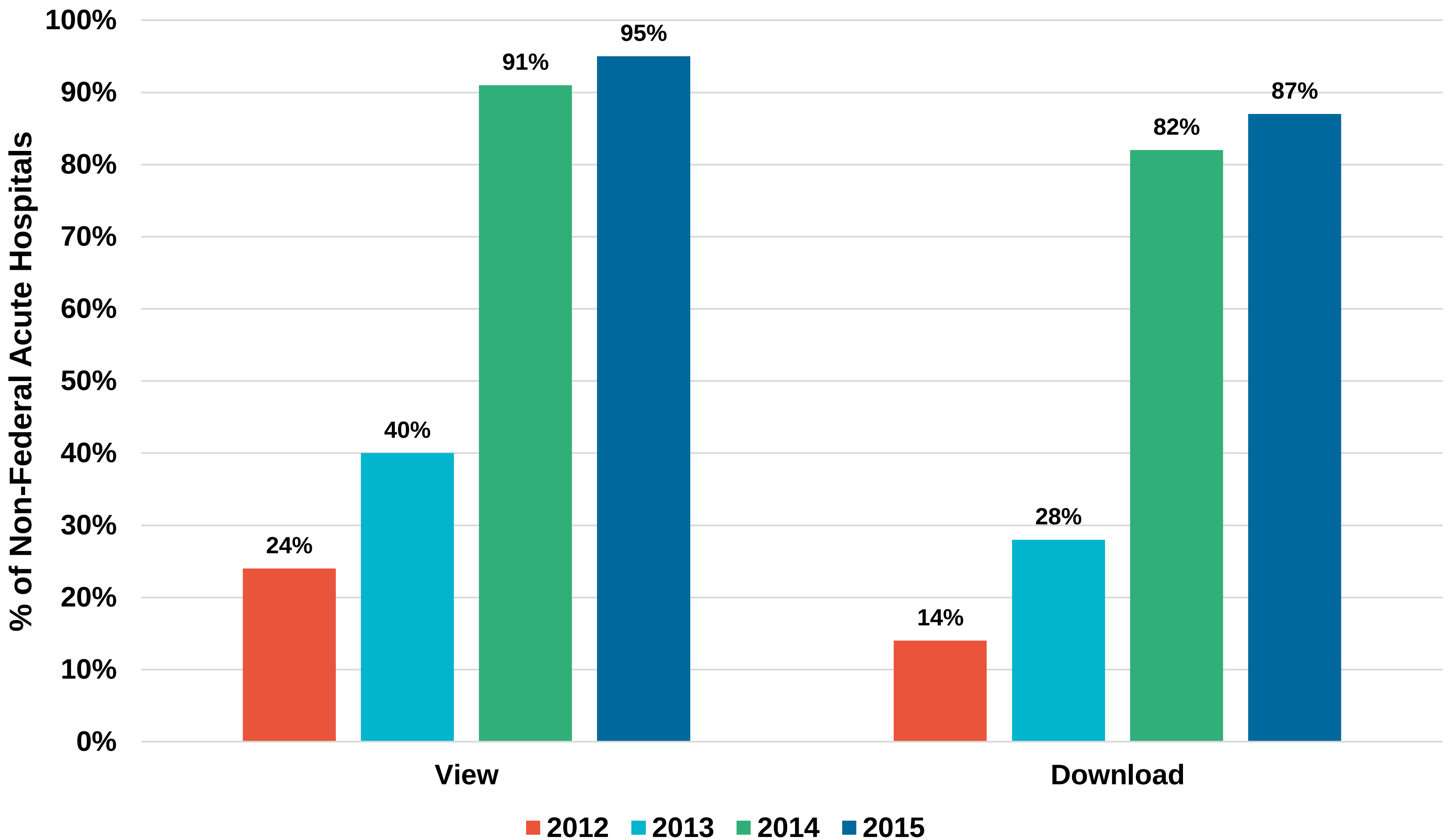

## Average Amount of Clinical Data Elements per Patient per Year*, 8/16




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…

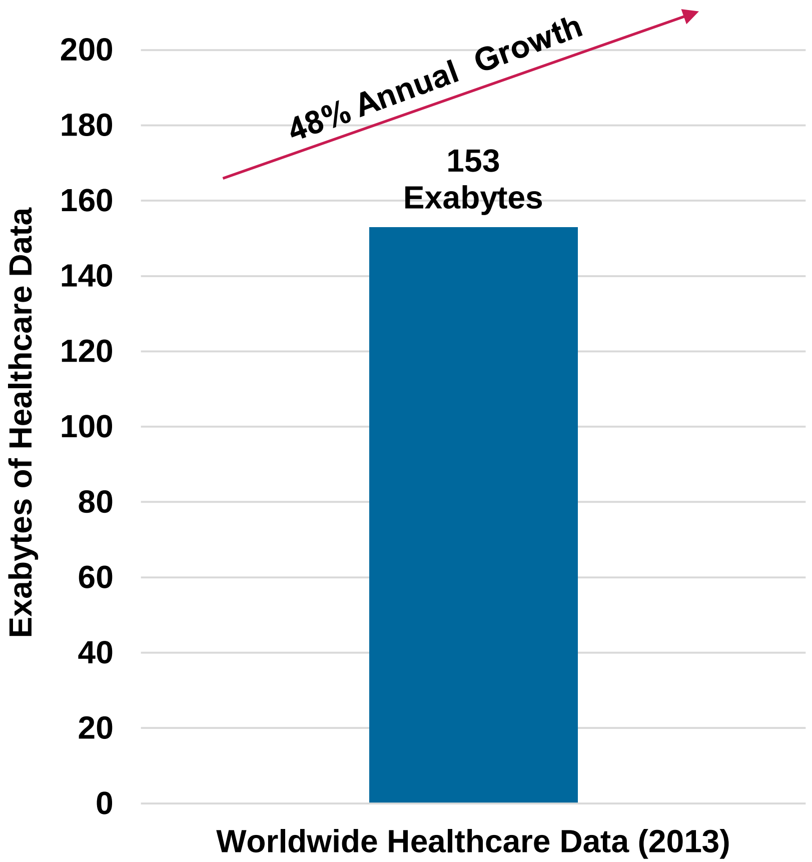
## Hospitals that Enable Patient Digital Data Access, 2012 - 2015




Source: ONC/AHA Annual Survey Information Technology Supplement: 2012-2015 (9/16)
Note: Percentage of non-federal acute care hospitals that provide patients with the capability to electronically view, download, and transmit their health information

# …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**

Source: IDC & EMC (12/13)
Note: 1 Exabyte = 1B Gigabytes, 1 Petabyte = 1M Gigabytes

## ***Data Insight + Translation =***

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

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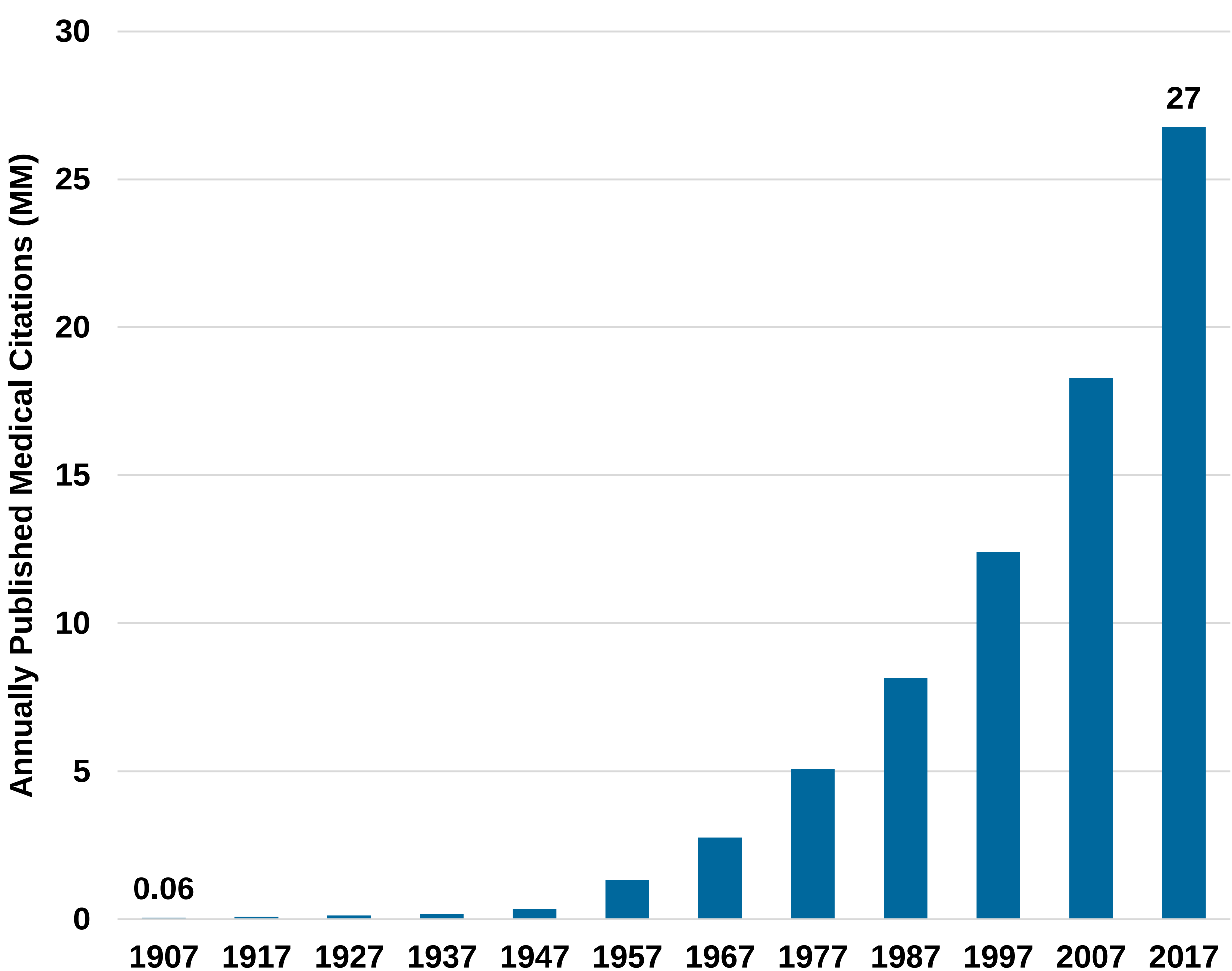
# Rise in Inputs + Data = Medical Research / Knowledge Doubling Every 3.5 Years…

## Cumulative PubMed Scientific Article Citations*




## Years to Double Medical Knowledge**

**1950**
50 years

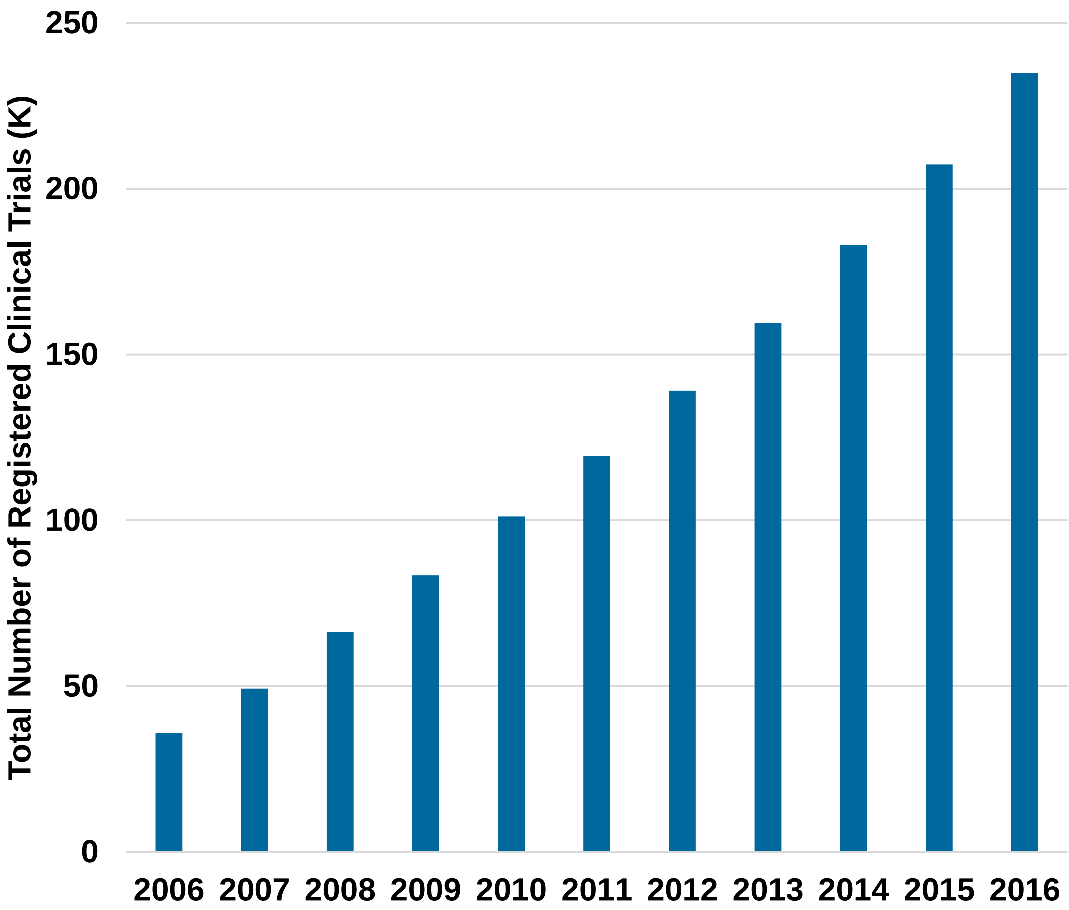
**1980**
7 years

**2010**
3.5 years

Source: National Institutes of Health, U.S. National Library of Medicine (4/17), "Challenges and Opportunities Facing Medical Education" (Densen, Peter) Transactions of the American Clinical and Climatological Association (1/10)
*Based on cumulative number of published medical citations on PubMed, **Based on peer-reviewed article on challenges in medical education

# …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**

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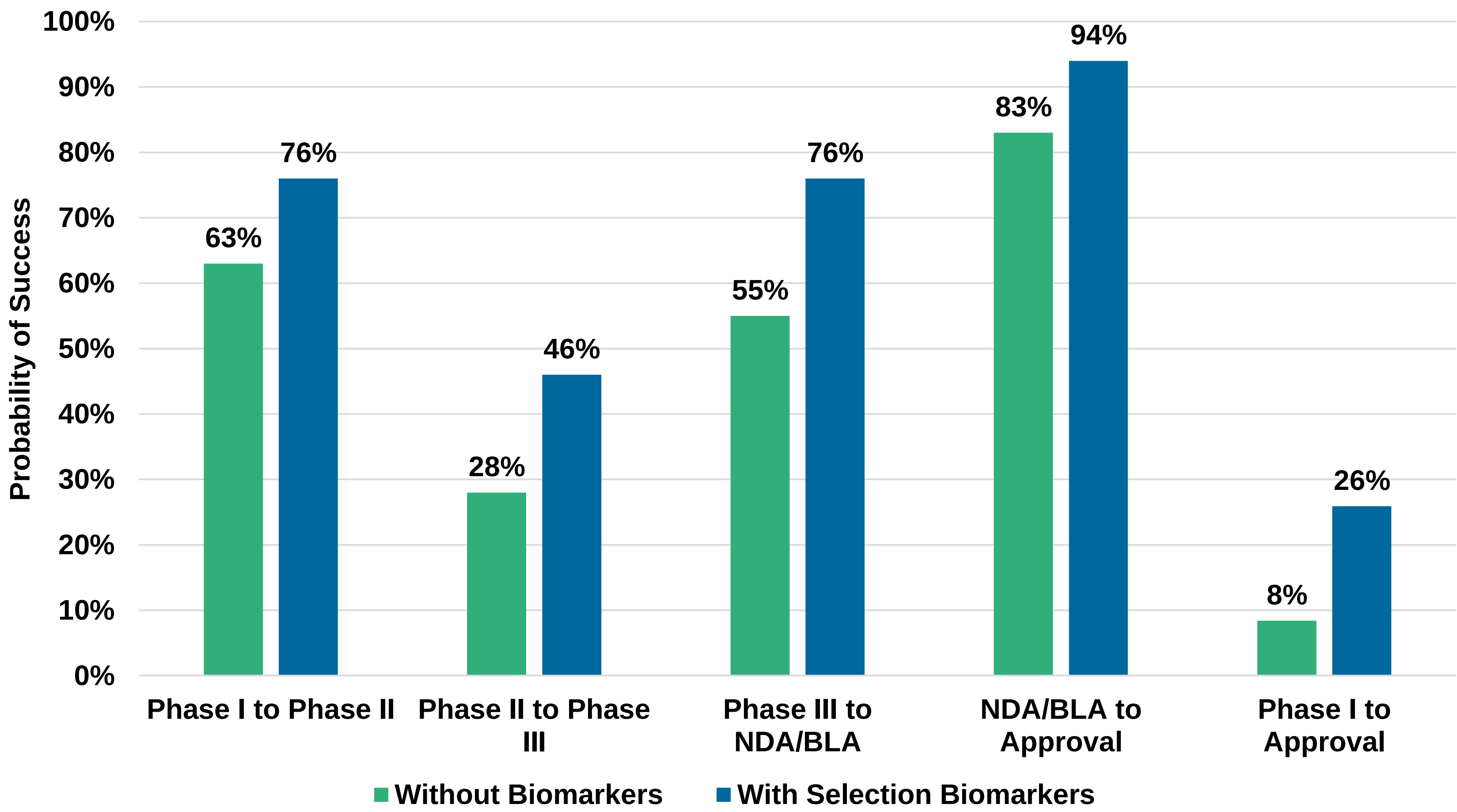
Source: ClinicalTrials.gov database (5/17), FDAReview.org (2016)
Number of Registered Clinical Trials posted on ClinicalTrails.gov.

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

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




Source: Biotechnology Innovation Group, Biomedtracker, Amplion (5/16)
Note: Based on 9,985 phase transitions of trials between 2006 – 2015. 512 phase transitions incorporated selection biomarkers for patient stratification; phase transitions identified by mapping NCT numbers from ClinicalTrials.gov with Amplion's BiomarkerBase and Biomedtracker's transition database.

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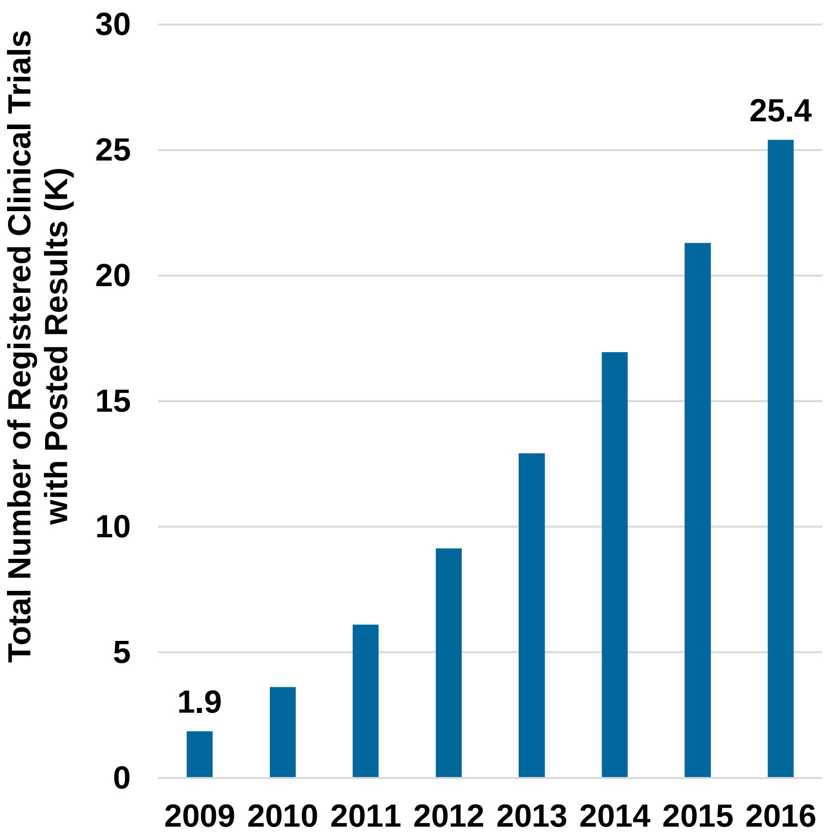
# …Data Silos = Breaking Down Owing to Broad Efforts to… Share Data Among Scientific Community…

## 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 |

Source: ClinicalTrials.gov database (5/17), Nature (7/14)
Number of Registered Studies with Public Results posted on ClinicalTrials.gov. ClinicalTrials.gov launched results database in September 2008 so earliest available full year is 2009.

# …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** |
| **Number of Patients** | 2,838 | 50,000 |
| **Years of Data** | 7 Years | 30 Years |
| **Length of Study** | 7 Years | 2 Months |
| **Conclusion** | 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.

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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***

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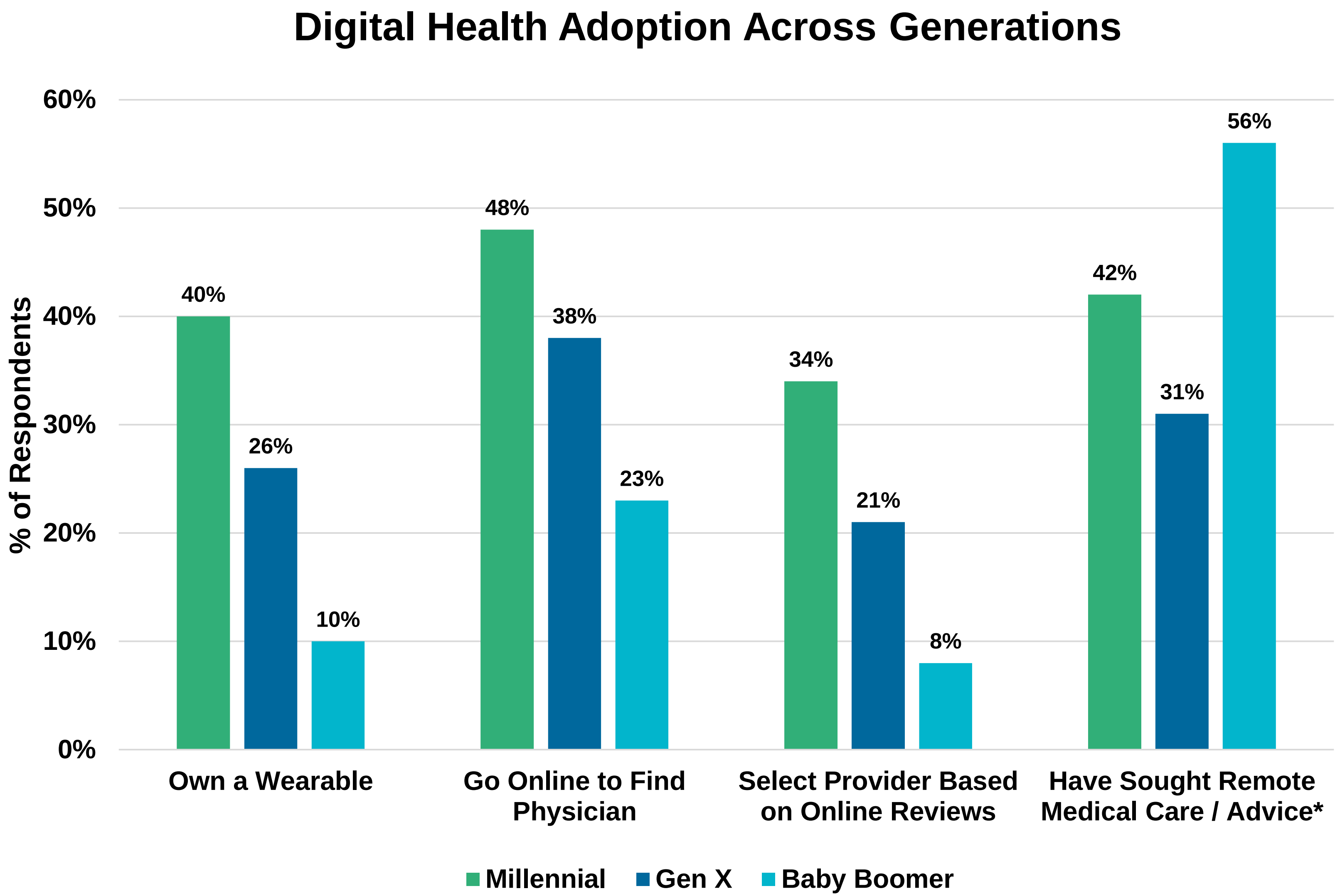
# Consumers = Increasingly Expect Digital Health Services… Especially Millennials…




Source: Rock Health Digital Health Consumer Adoption (12/16)
*Represents % of Millennials that have sought medical care/advice over live video, % of Gen X that have over text message, and % of Baby Boomers who have over phone
Millennials include 18-34 year olds; Gen X include 35-54 year olds; Baby Boomers include 55+ year olds

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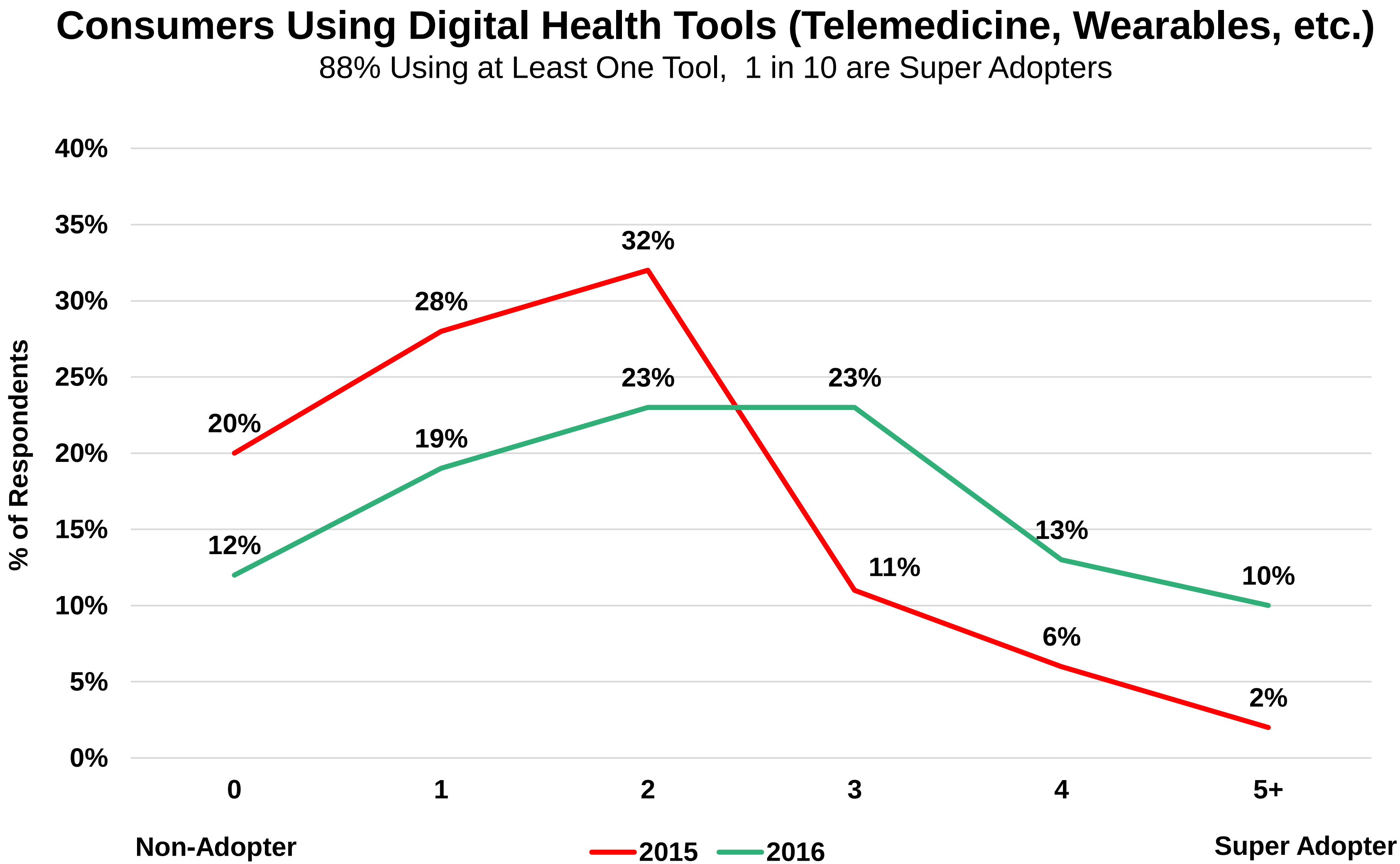
# …Consumers = Increasingly Use Digital Health Tools




Source: Rock Health Digital Health Consumer Adoption (12/16)
Based on consumer survey of n=4,015; number of digital health categories used by respondent

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

## Patient Empowerment & Health Management

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

Propeller

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

Livongo

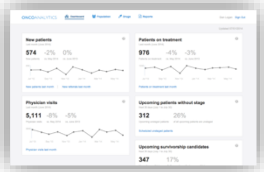
## Improvements to Clinical Pathways / Protocol

**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**

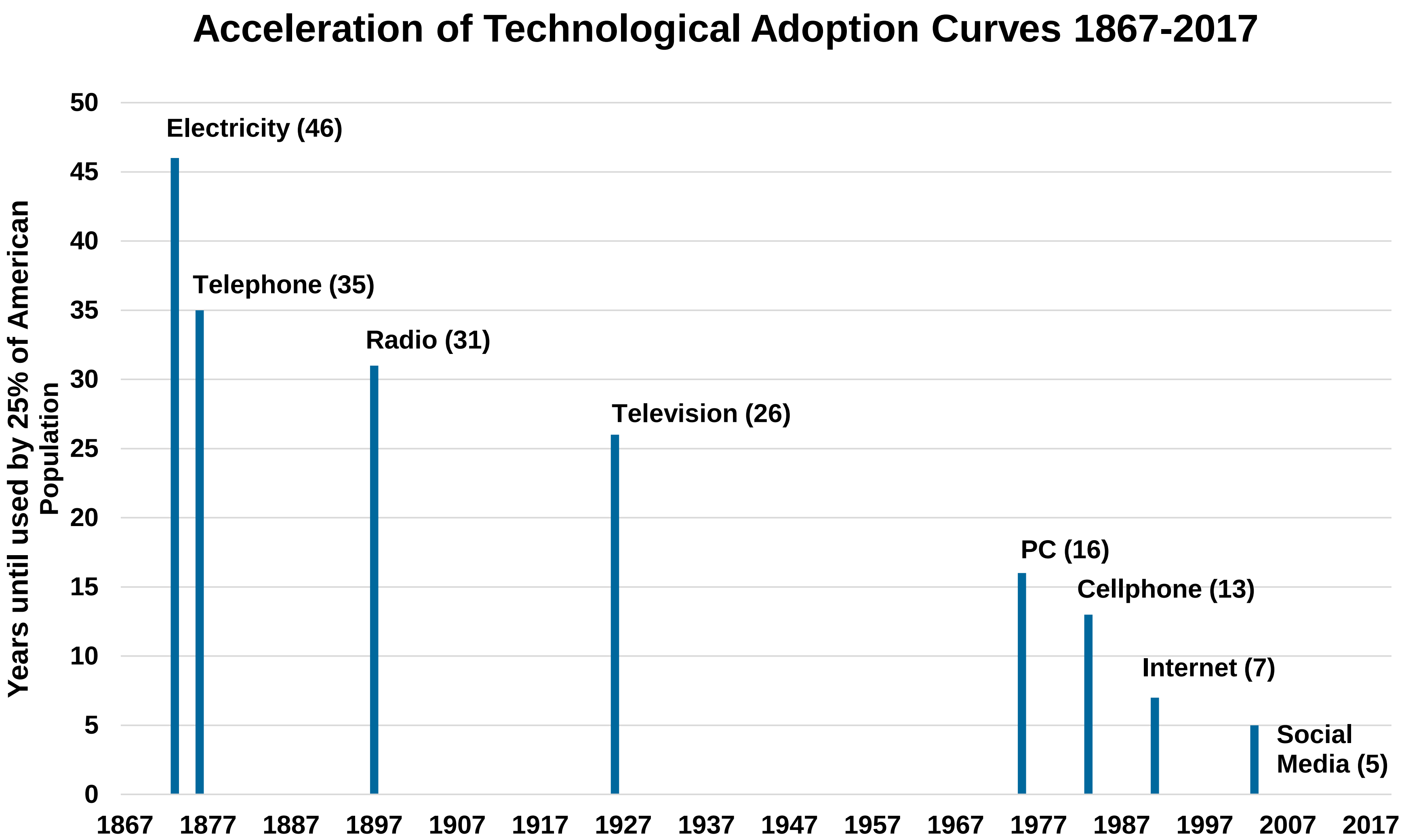
kinsa

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

omada

Source: PBS, Propeller Health, TechCrunch, Livongo, Ayasdi, Flatiron, Xconomy, Kinsa, Omada

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




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…***

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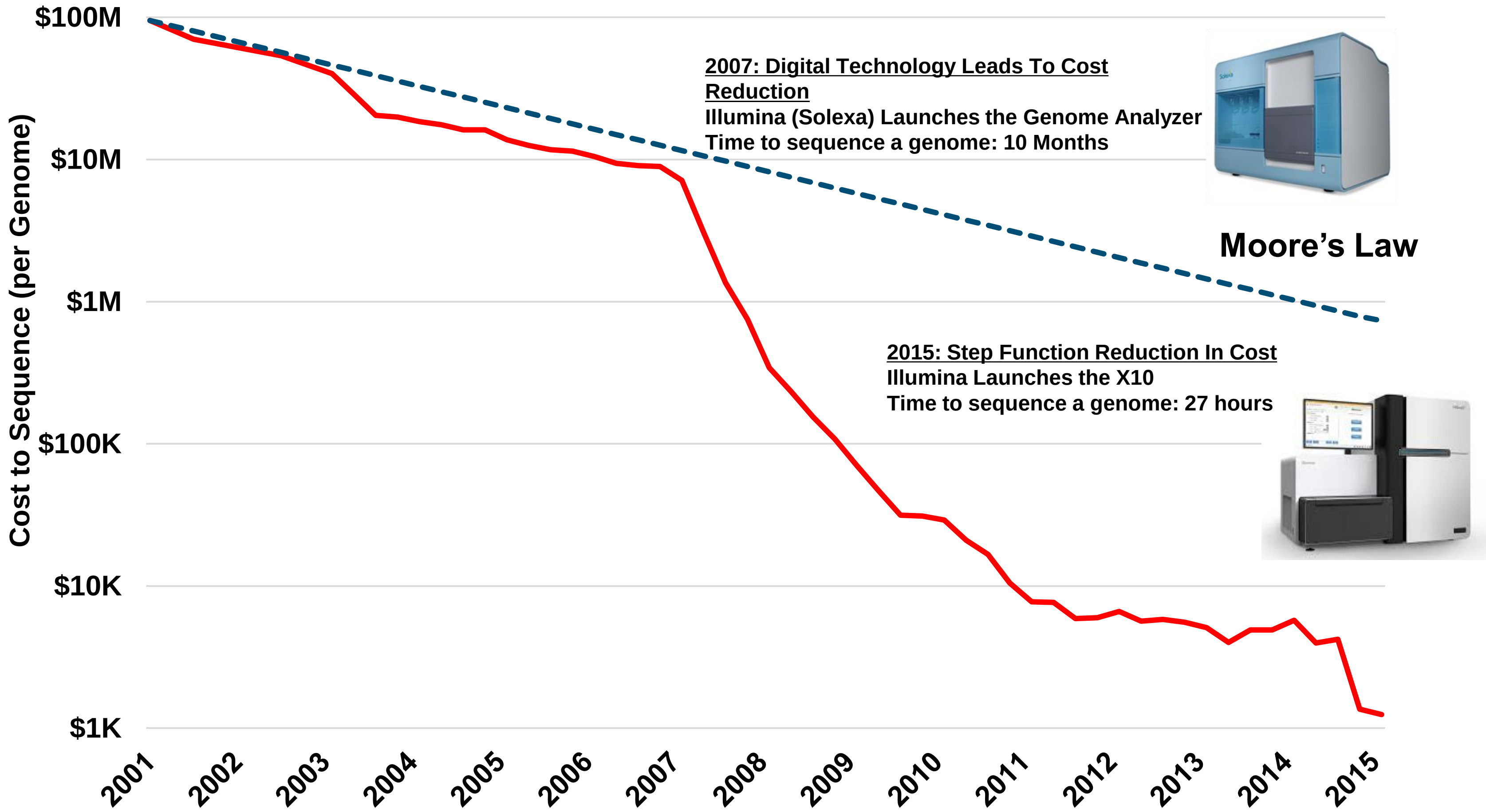
# Genomics Digitizes = Gets Faster / Better / Cheaper…

## 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

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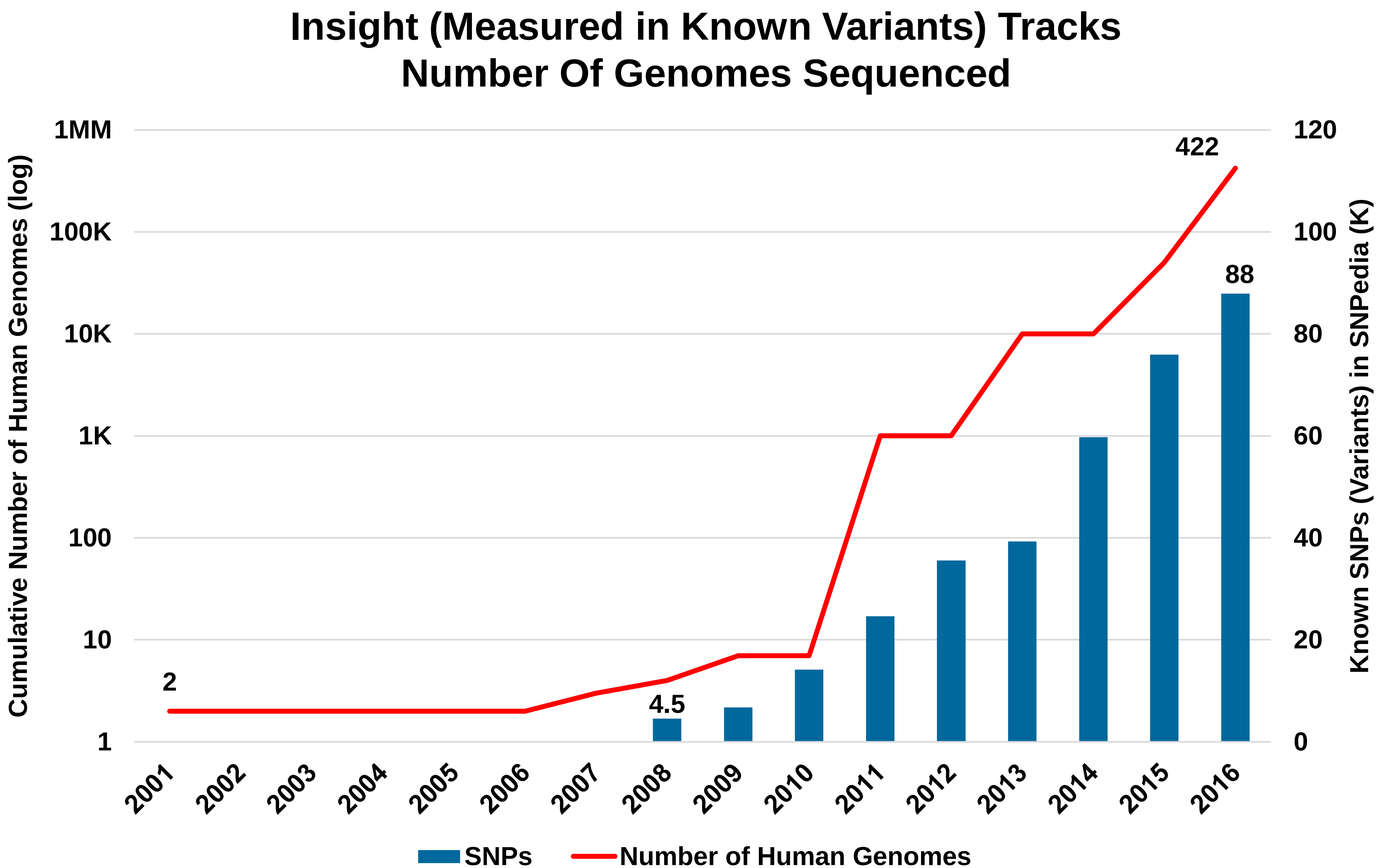
# …Accumulation of Genomic Data Leads to…
# 19x Increase in Genomic Knowledge…

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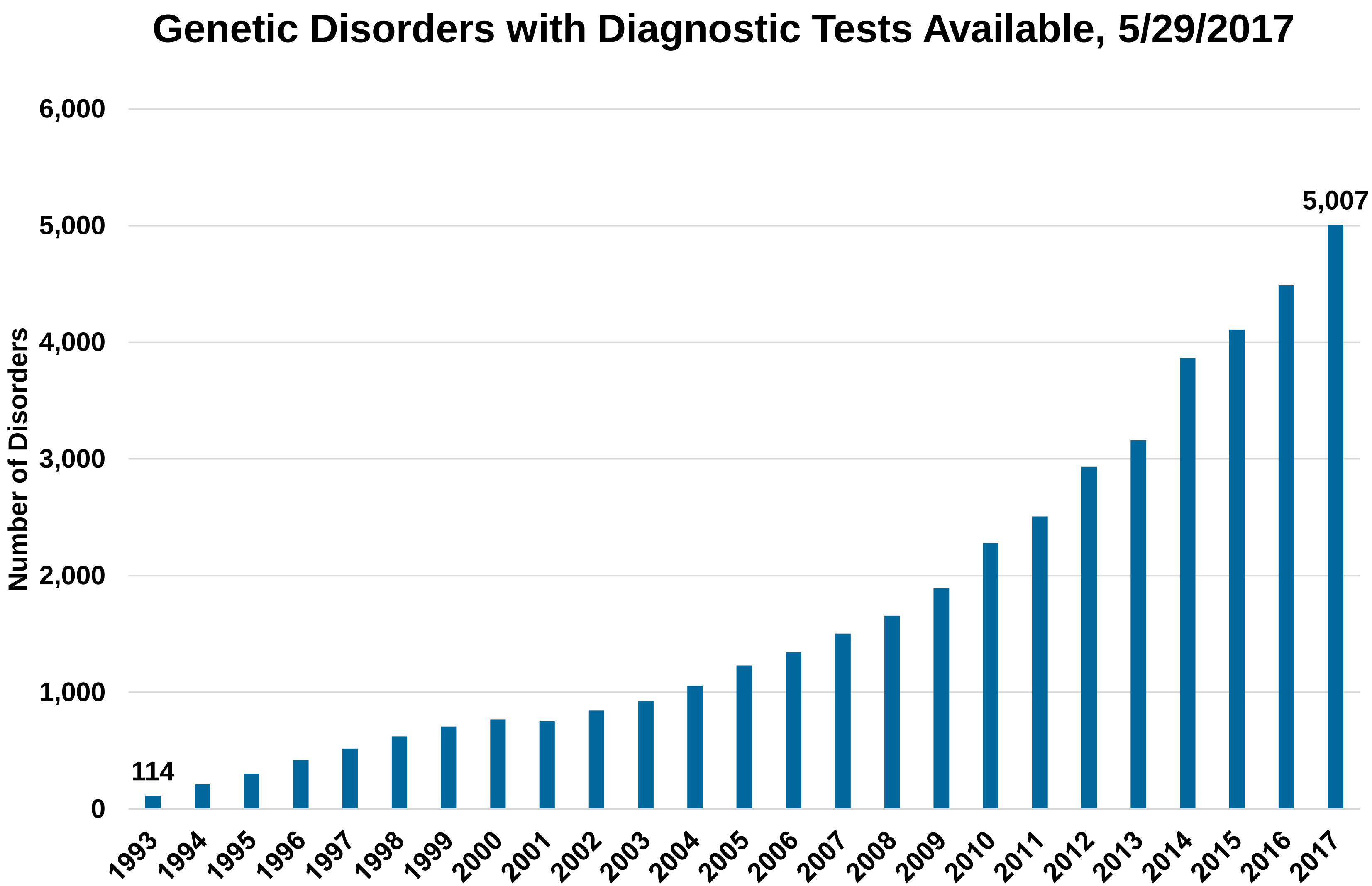
Source: PloS Biology (7/15), SNPedia (5/17)
SNPs (Single Nucleotide Polymorphisms) represent nucleotides where the DNA of different people vary; variants can be predictive of disease risk, drug efficacy, and phenotypic differences

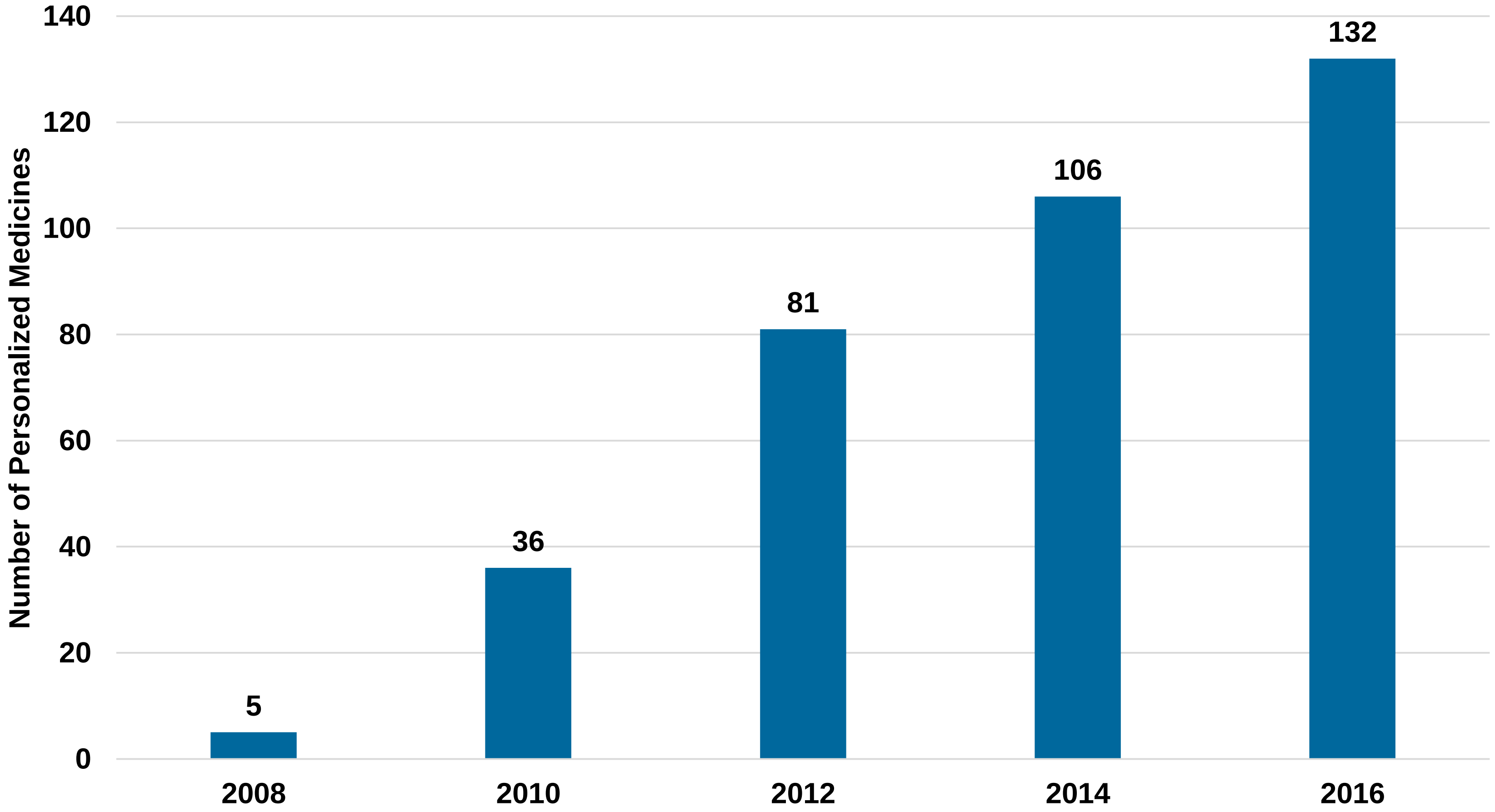
# …Genomics Research & Insights Lead to Rapid Increase in… Available Genetic Tests…




Source: Genetests (5/17)

# …Genomics Insight Translates to Therapeutics…

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



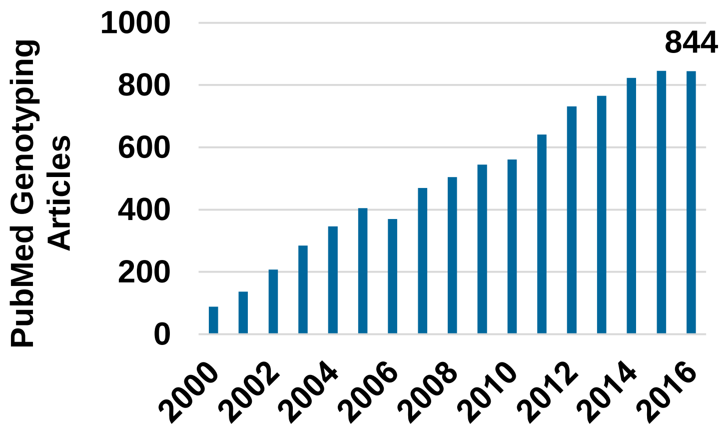

Source: Personalized Medicine Coalition (2017)
*Number of personalized medicines calculated based on PMC's Case for Personalized Medicine and the FDA's Table of Pharmacogenomic Biomarkers in Drug Labeling

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

## Research

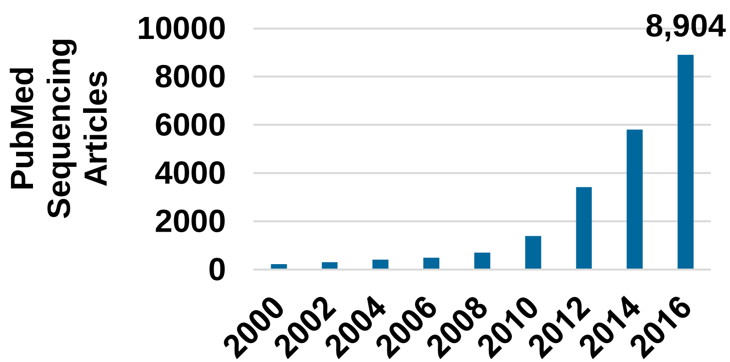
**SNP Arrays and Genotyping (v1.0)**

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




**Next Generation Sequencing (v2.0)**

**Looks for variations throughout the entire gene**




## Consumer

23andMe

ancestry.com

Helix

color

Source: PubMed, Helix
Based on PubMed queries for peer-reviewed articles on genotyping and sequencing

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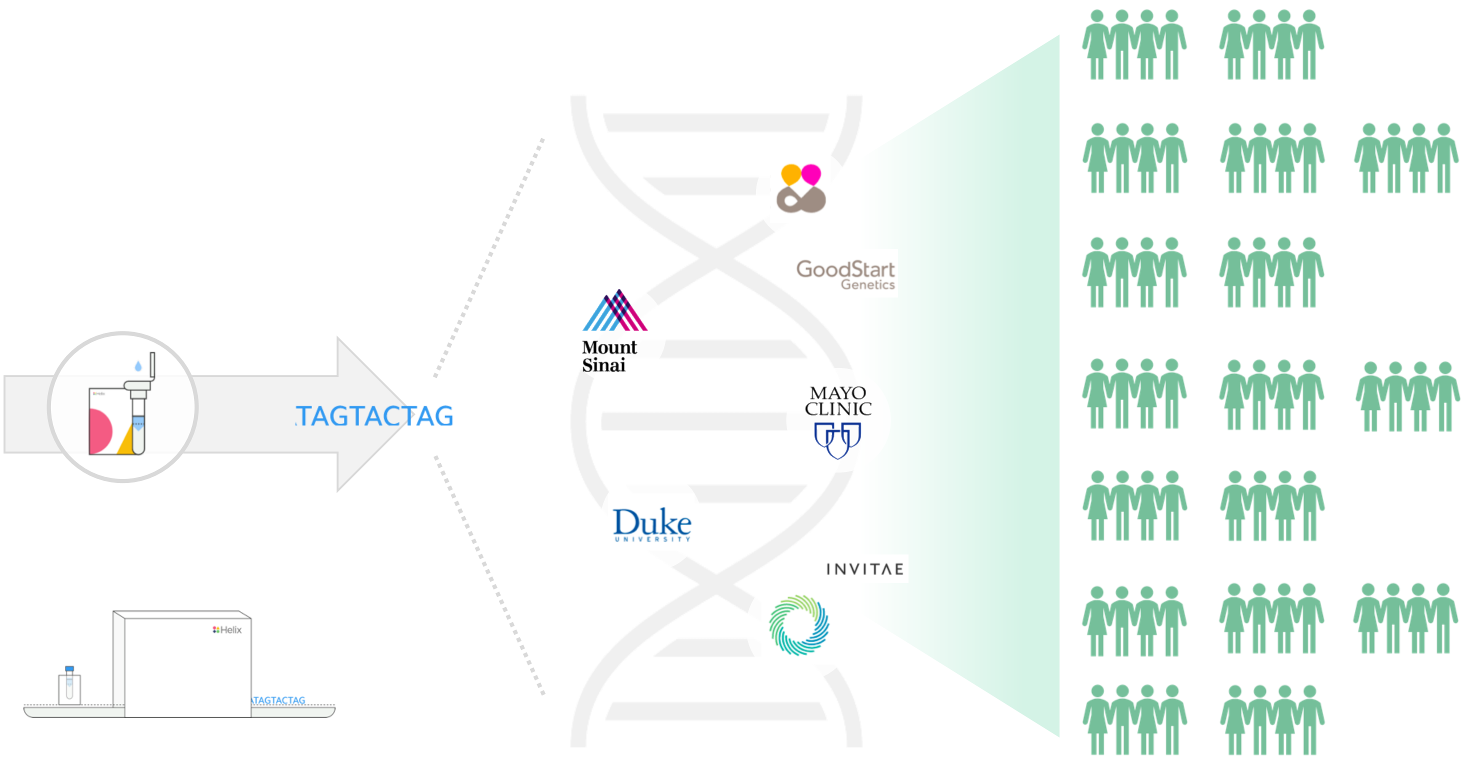
## Digitization = Enabling New Business Models in Genomics




**DNA Sequenced Once**

**Query Often: Ecosystem of Products from Partner Organizations**

**More Empowered + Informed Consumers**

Source: Helix (5/17)

# Healthcare @ Digital Inflection Point

## 100 Years Ago
Human Touch

## 25 Years Ago
Machine Assisted / Analog

## Today
Technology Enabled / Digital


Source: History of Nephrology, Welch Allyn, Medisave, Kinsa

# GLOBAL PUBLIC / PRIVATE INTERNET COMPANIES =

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

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*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 |
| Total | | | $3,827 |

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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 |
| Total | | | | $7,207 | $2,497 |

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 |
| Total | | | | $4,512 | $3,257 |

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.

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

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

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

| Company | Founding Year | Original Business | Current Businesses |
|---|---|---|---|
| **Apple** | 1976 | **Personal Computer Maker** | Smartphone / Computer / Tablet Maker…Content / Media Marketplace…Cloud Services |
| **Google - Alphabet** | 1998 | **Online Search Engine** | 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 |
| **Amazon** | 1994 | **Online Bookseller (USA)** | Global B2B B2C / C2C Commerce…Content Ecosystem…Digital Video / Music Platform…eReader / Tablet / IoT / OTT Device Maker…Cloud Services…Logistics…Ad Ecosystem |
| **Facebook** | 2004 | **Social Network (USA)** | Global Social Network…Instant Messaging Platform…Image Sharing Platform…AR / VR Software / Hardware…Ad Ecosystem |
| **Tencent** | 1998 | **Instant Messaging Platform (China)** | Instant Messaging Platform…Gaming…Content Ecosystem…Social Network…Ad Ecosystem…Payments…Digital Video / Music Platform…Cloud Services |
| **Alibaba** | 1999 | **B2B Commerce Platform (China)** | 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 |

Source: Company filings

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*Global Technology Financings =*

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

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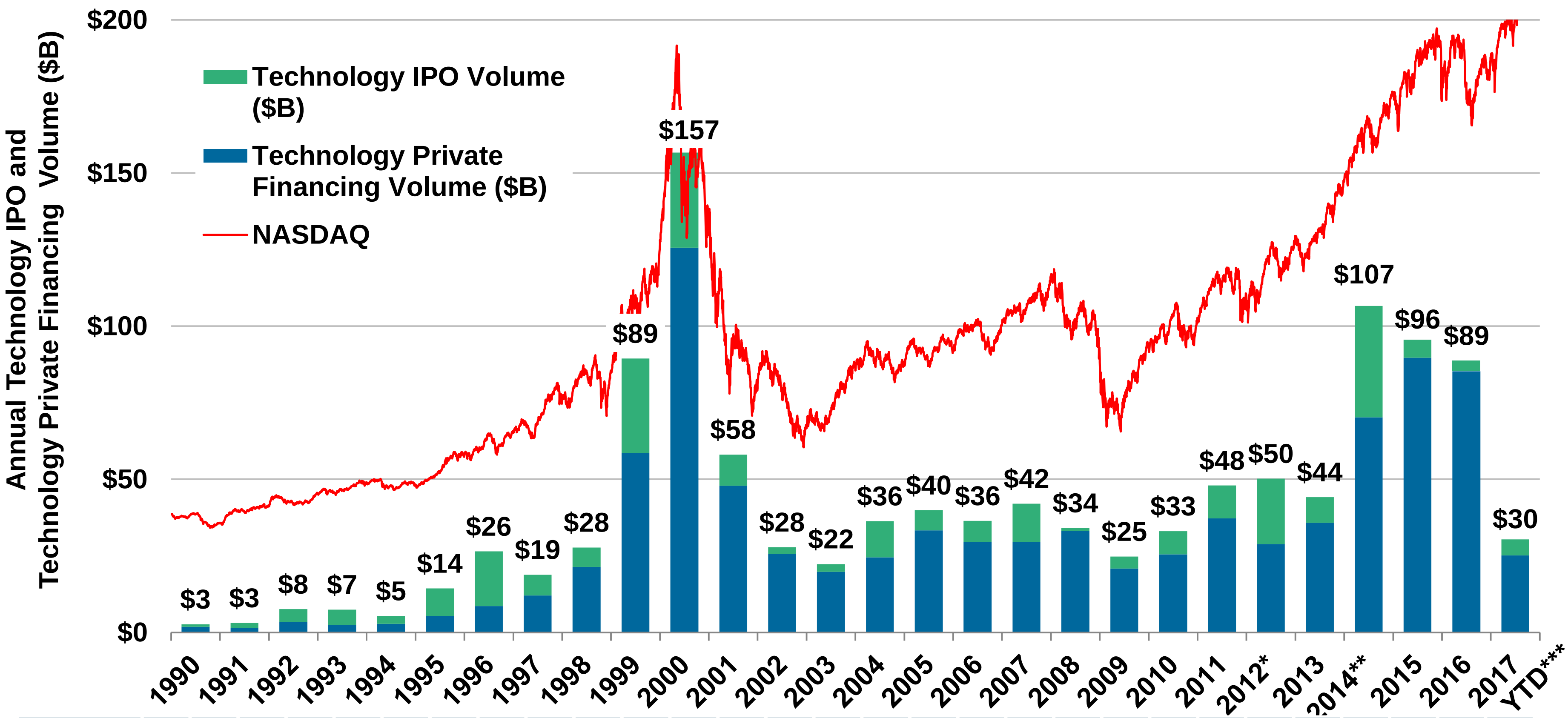
# Global Technology Financings =
# Strong Relative to History…Slowing @ Margin

## 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* |

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*

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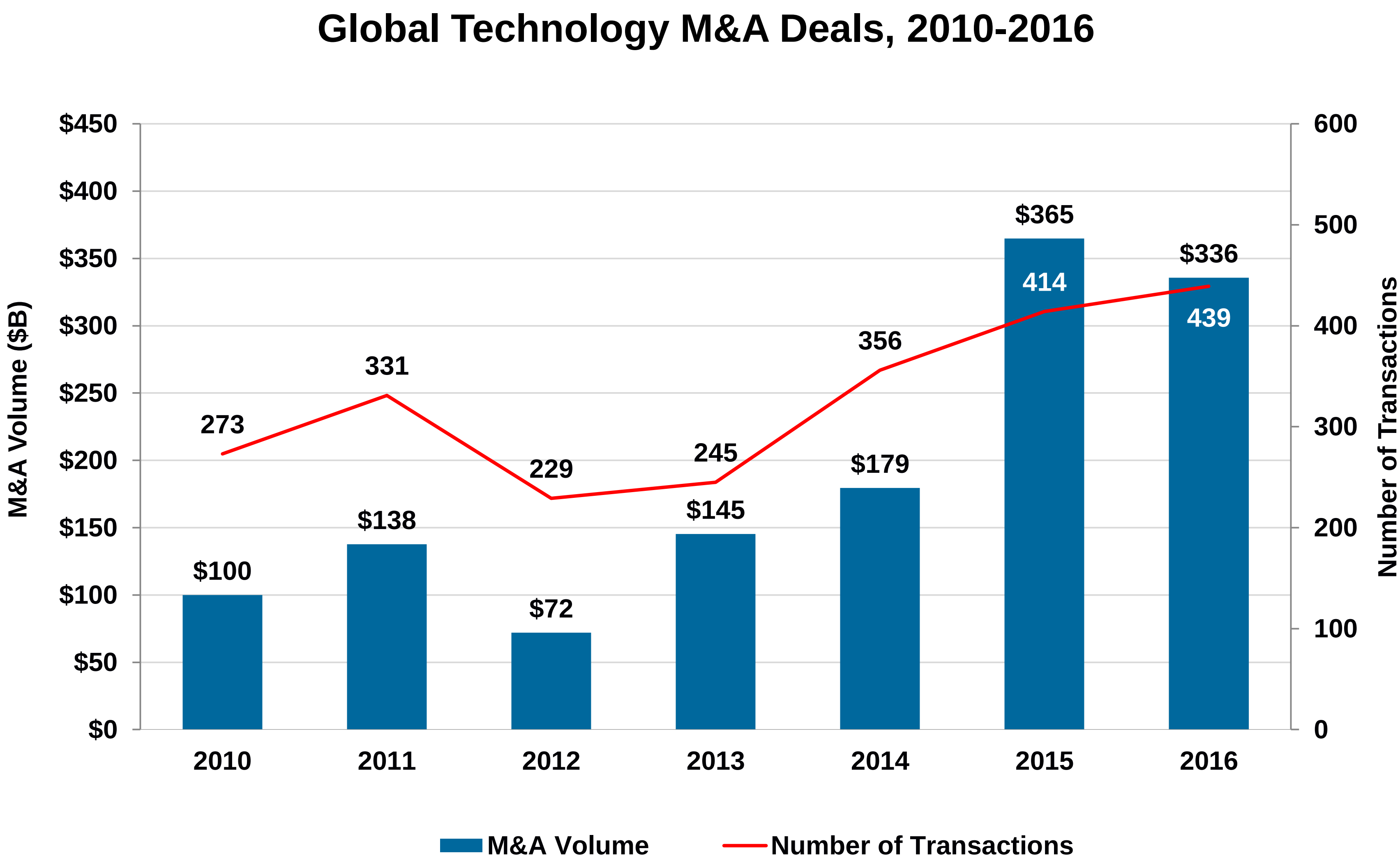
# Global Technology Merger & Acquisition Volume = Robust Relative to History




Source: Morgan Stanley, Thomson Research

# Value of a Business…

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

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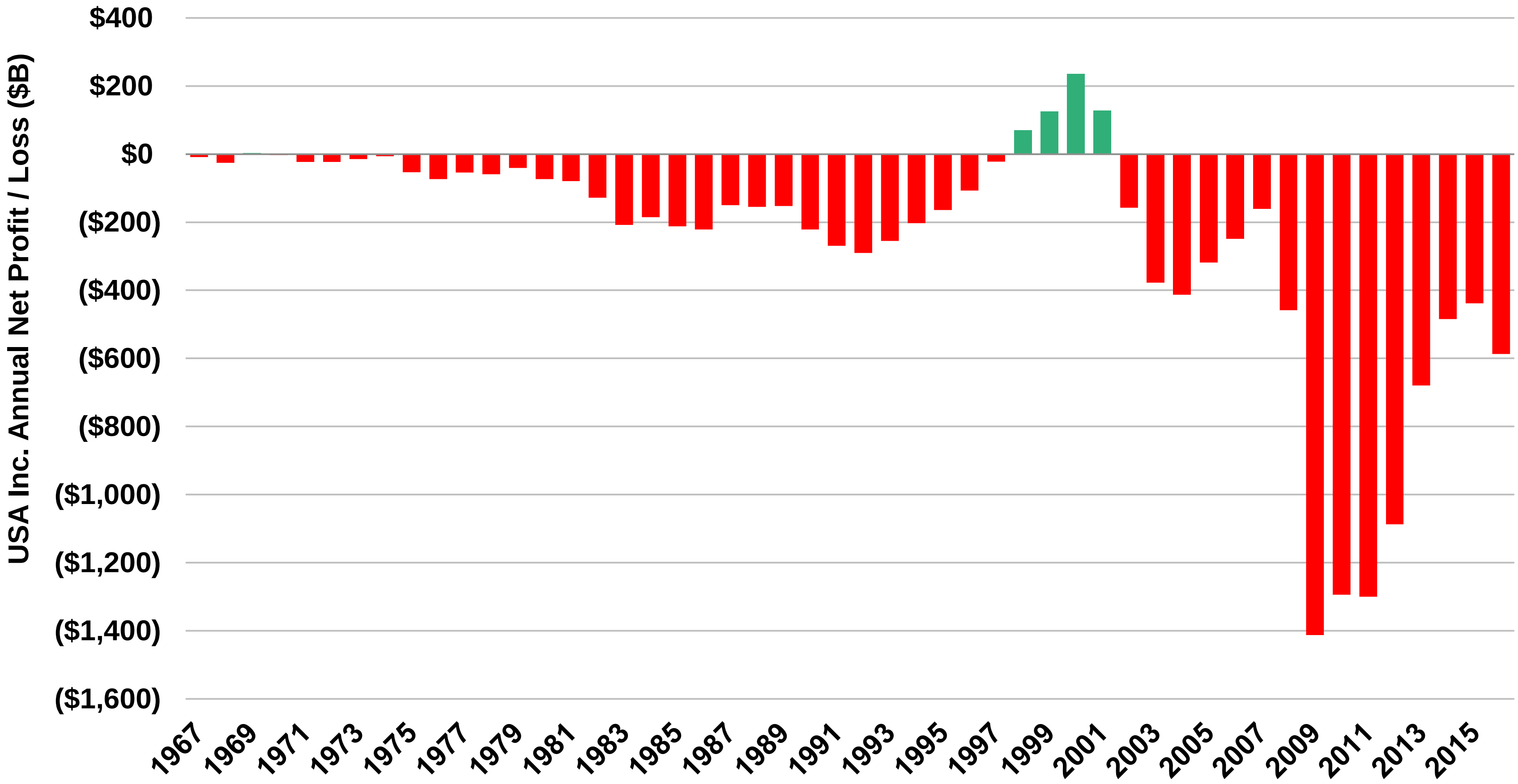
Source: Congressional Budget Office, White House Office of Management and Budget
Note: USA federal fiscal year ends in September. Non-defense discretionary includes federal spending on education, infrastructure, law enforcement, judiciary functions.
* Individual & corporate income taxes include capital gains taxes.

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

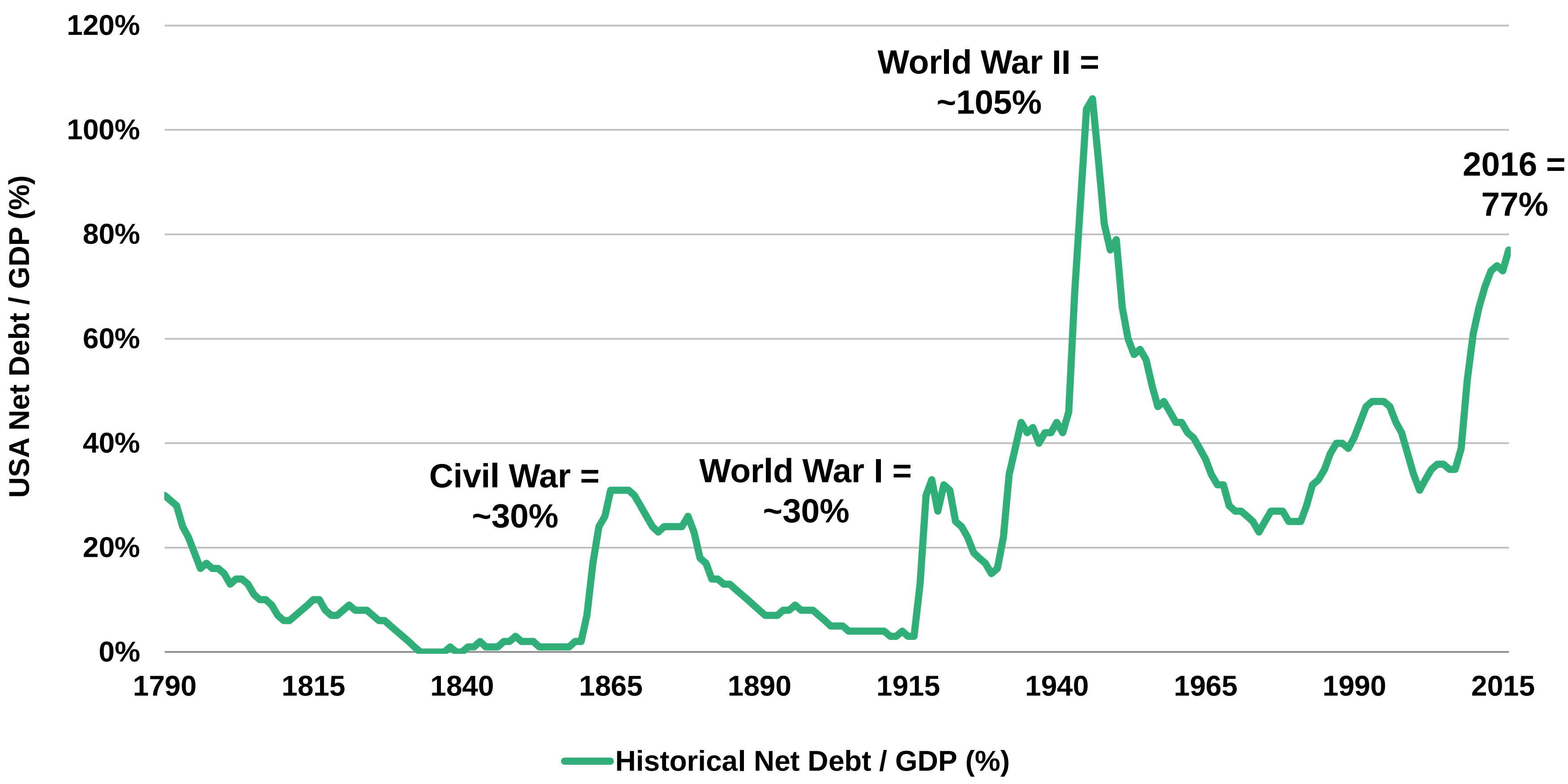
## USA Annual Profits & Losses, 1967 – 2016




Source: Congressional Budget Office, White House Office of Management and Budget
Note: USA federal fiscal year ends in September.
* Individual & corporate income taxes include capital gains taxes. Non-defense discretionary includes federal spending on education, infrastructure, law enforcement, judiciary functions.

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

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




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

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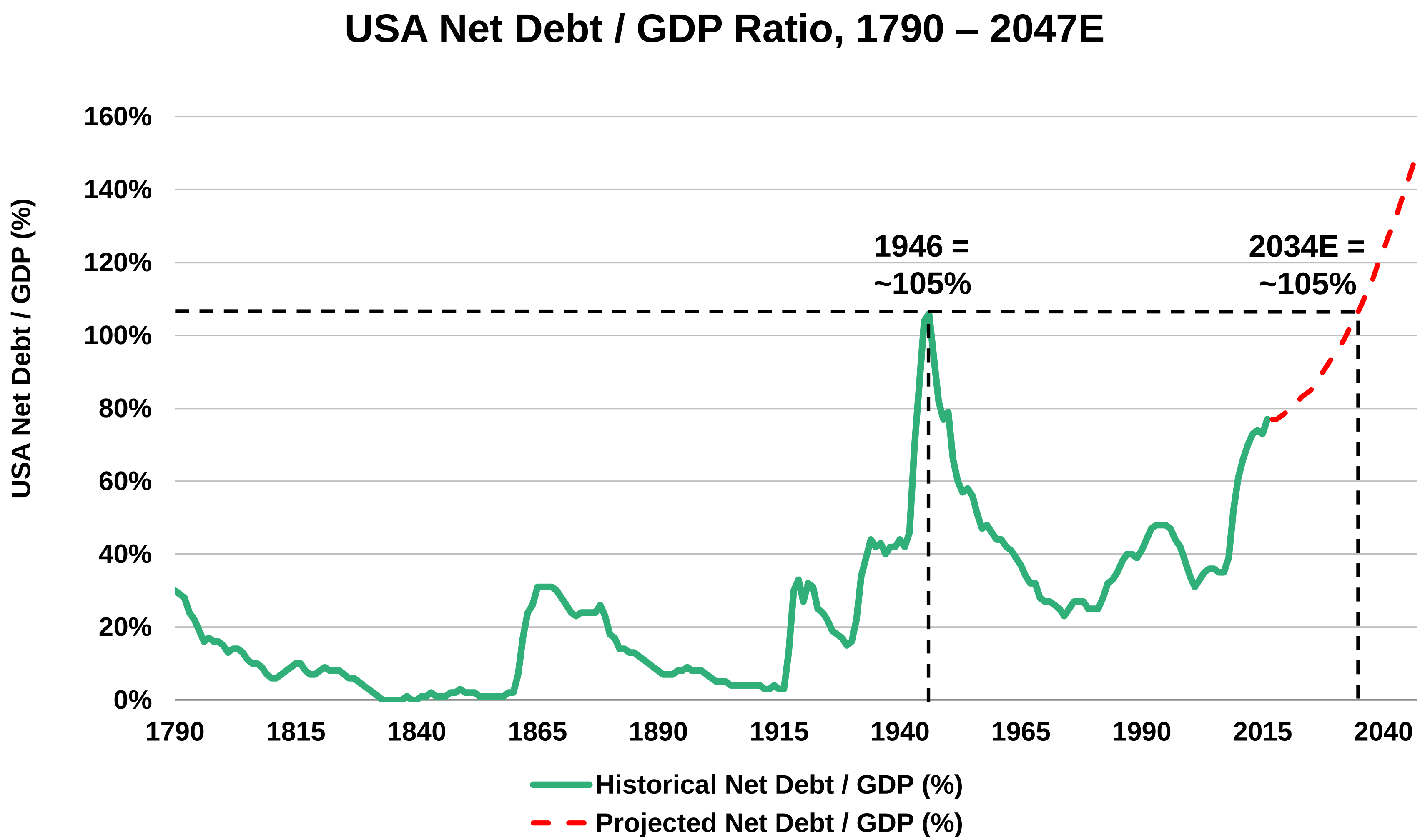
# …@ Current Course / Speed (& If Government Projections are Correct)… USA *Net* Debt / GDP Ratio Will Break WWII Record by 2035…




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 | **United States** | **105** | 18,870 |
| 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 |

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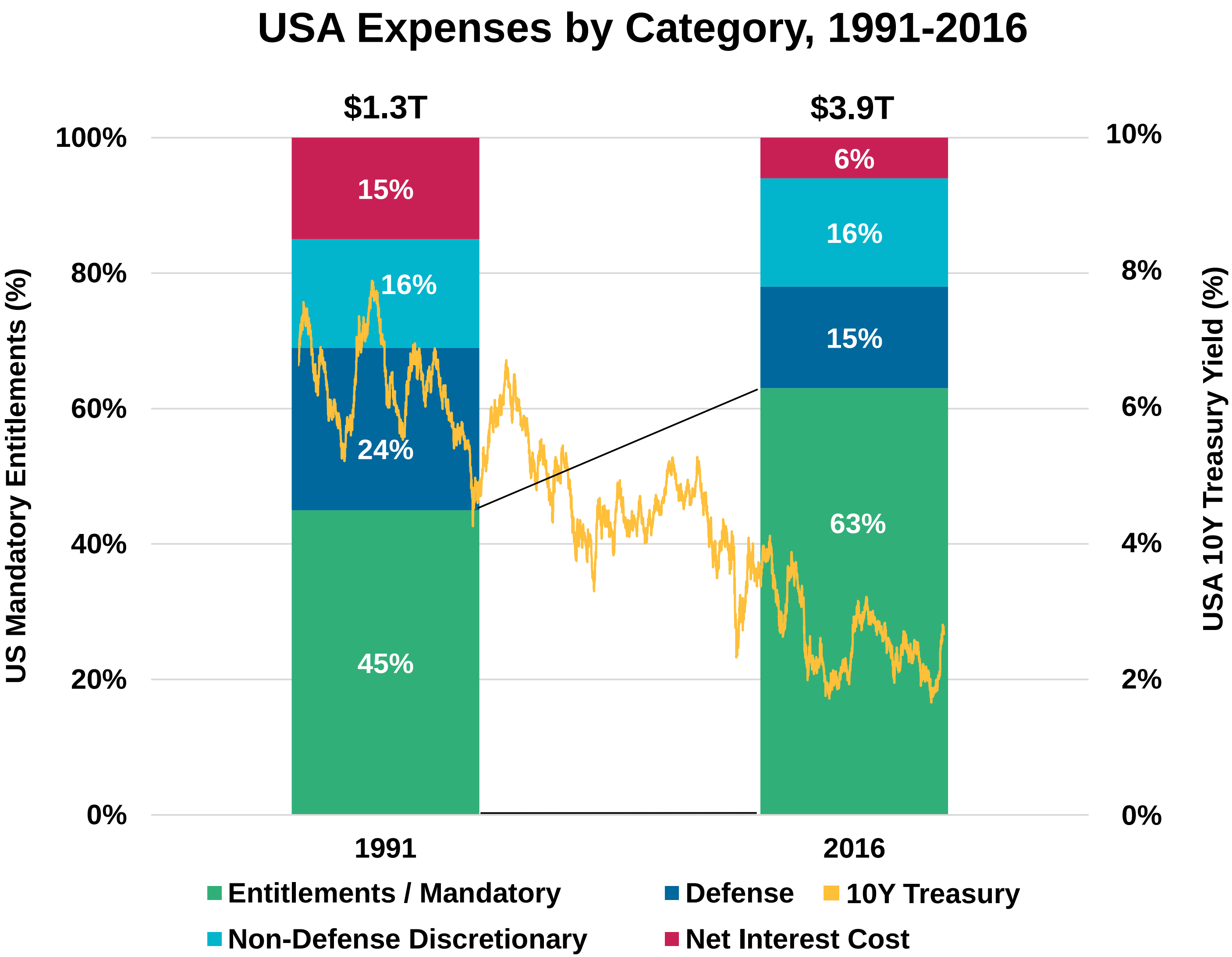
Source: IMF
Note: Ranking excludes countries with public debt less than $10B in 2015. Public debt includes federal, state and local government debt but exclude unfunded pension liabilities from government defined-benefit pension plans and debt from public enterprises and central banks.

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




**Change by Category, 1991-2016**

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

Entitlements:
+$1.8T / +307%

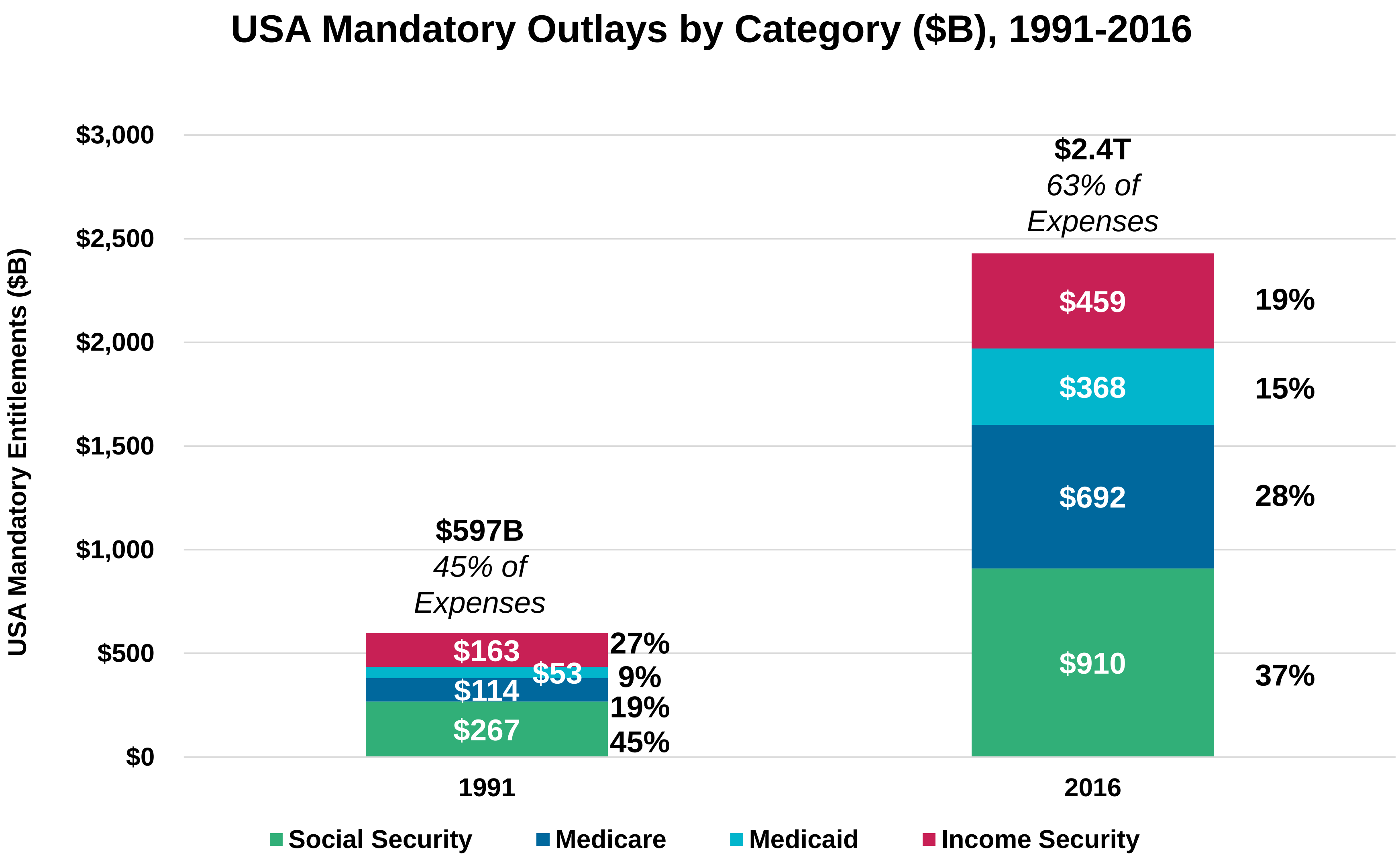
Non-Defense Discretionary:
+$387B / +181%

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.

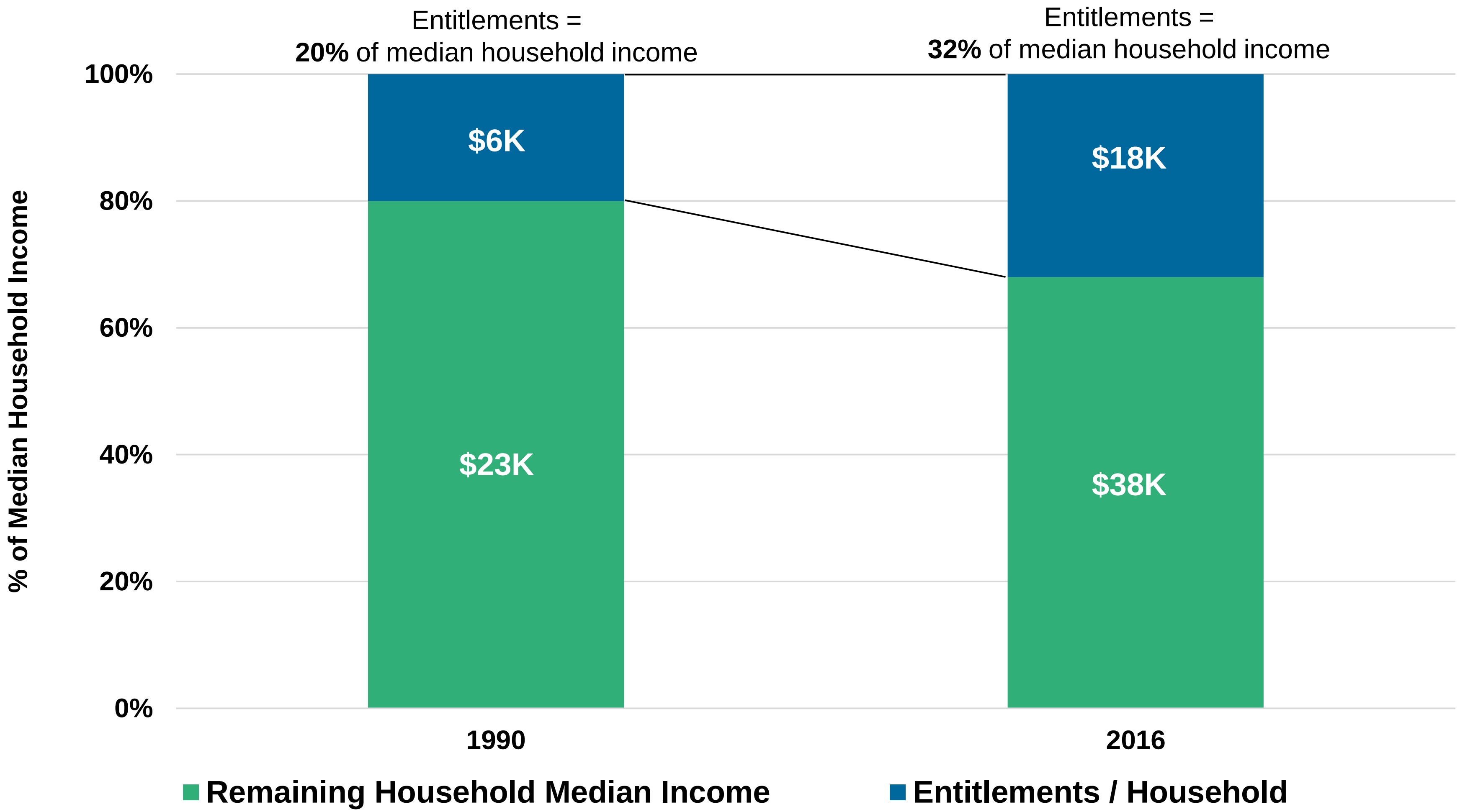
# …USA Entitlements = +$1.8 Trillion Over 25 Years… Paced by Medicare + Medicaid Growth…




Source: Congressional Budget Office, White House Office of Management and Budget
Note: Numbers may not sum due to rounding.

# …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

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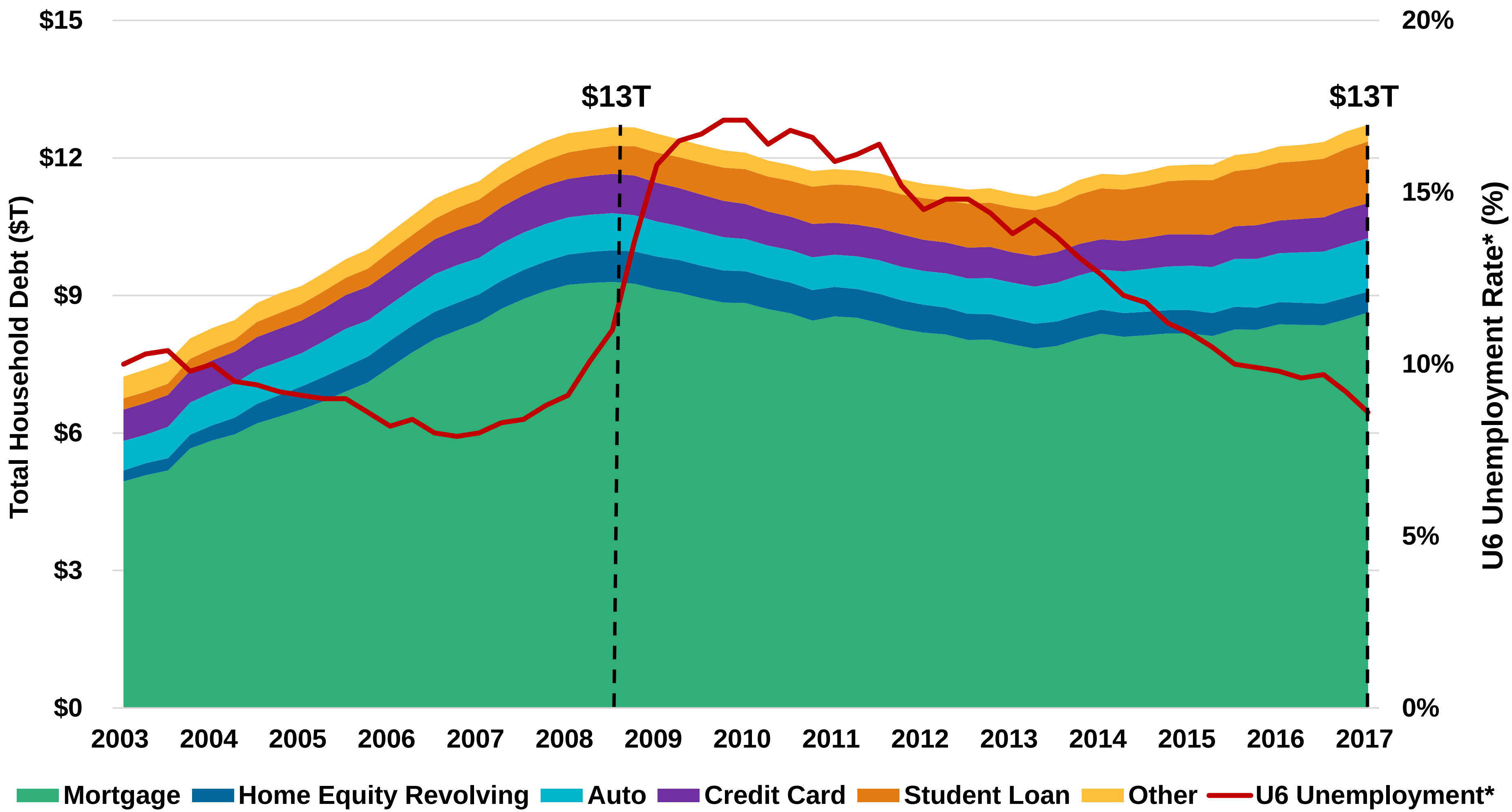
Source: Congressional Budget Office, US Census Bureau
Note: Based on median income math. Median income in current $ as of year specified. Effective entitlement dollars per household represents total entitlements over total US households (current $ as of year specified).

Household Debt = Back @ Peak (Q3:08) Level & Rising…
Now vs. Q3:08 = Mortgage Debt (-7%) / Student Loans (+120%) / Auto Loans (+44%)

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




Source: Federal Reserve Bank of New York Consumer Credit Panel / Equifax, Quarterly Household Debt and Credit Report, Q1:17; St. Louis Federal Reserve FRED Database
* U6 Unemployment Rate defined as total unemployed persons plus all marginally attached workers plus persons employed part time for economic reasons.

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*USA Rising*
*Debt Commitments =*

*Non-Trivial Challenges that*
*Need to Be Addressed*

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***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

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# 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 | -- | -- |

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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… 1st Generation Immigrants...>48K Jobs, 5/17

| Company | Immigrant Founder / Co-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 Tatarko, 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 / Co-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 |

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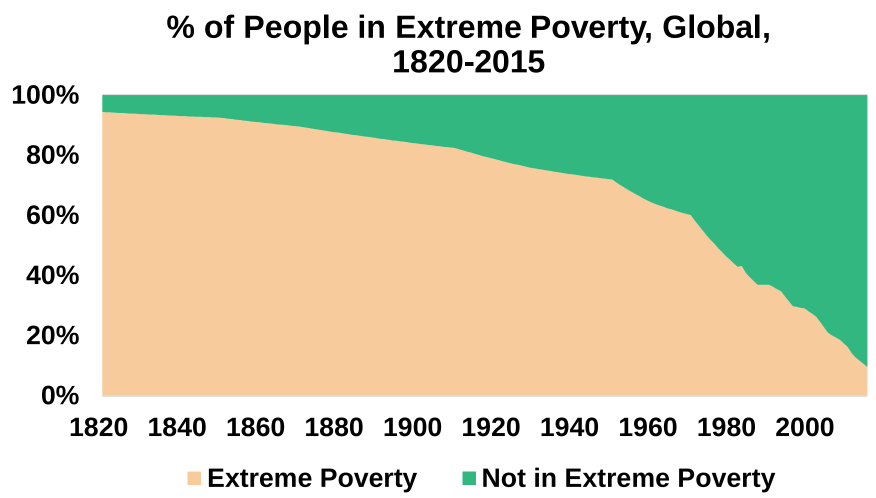
Source: Based on analysis by National Foundation For American Policy, “Immigrants and Billion Dollar Startups”, Stuart Anderson, 2016, subsequently updated by Aimee Groth, Quartz, 4/17. Valuation data from Wall Street Journal, CB Insights, headcount from LinkedIn (5/17).
Note: Due to varying definitions of unicorns, may not align with various unicorn lists. As of 5/17 there are 100 US-based, venture-backed unicorns (including rumored valuations), 50 of which have at least one first-generation immigrant founder.

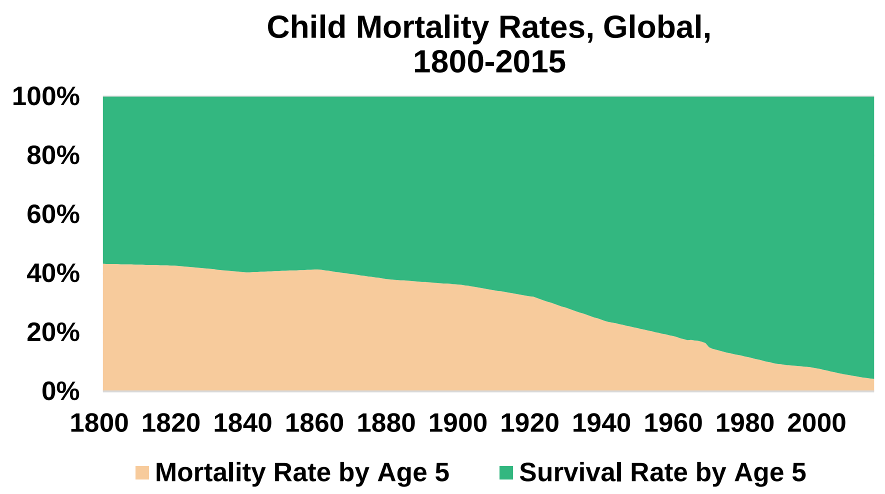
***High Level,***

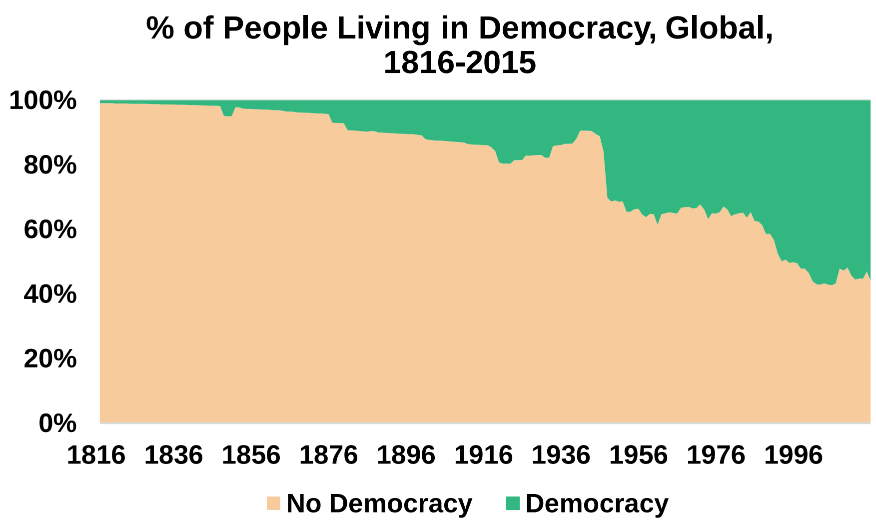
***For All the Angst,***

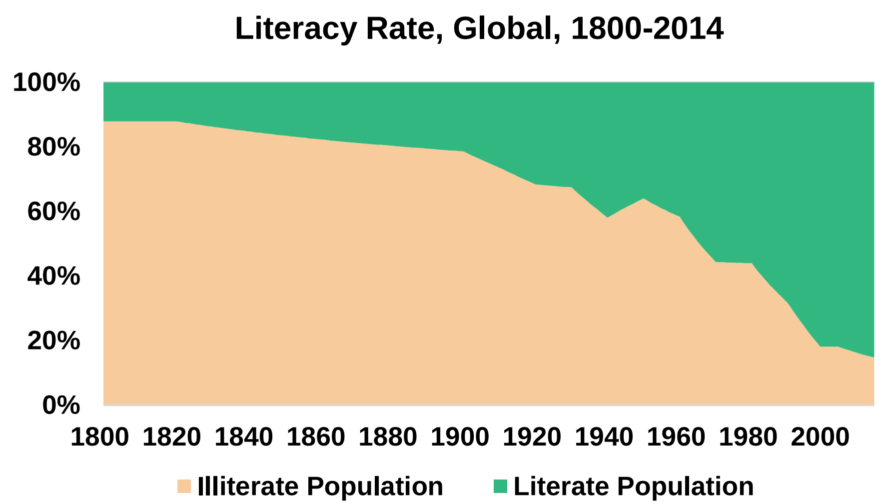
***Consider This…***

# World = Getting Better in Many Ways…
# Down = Poverty + Child Mortality…Up = Democracy + Literacy




Source: Max Roser, Our World in Data; World Bank; Bourguignon and Morrison, “Inequality Among World Citizens”, American Economic Review 92.4, 2002; Gapminder; Polity IV; UN Population Division; Wimmer and Min, “From empire to nation-state: Explaining war in the modern world, 1816-2001,” American Sociological Review 71.6, 2006; OECD; UNESCO
Note: Extreme poverty defined as income level below $1.90 (int’l dollars) / day. Child mortality rates measured before and after 5 years old. Democracy based on Polity IV database. Literacy rate based on ages 15+ globally.

# Some Macro Thoughts

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…

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# Economic Growth Drivers = Evolve Over Time

| Century | Economic Growth Drivers |
|---|---|
| Pre-18$^{th}$ | **Cultivation & Extraction** |
| 19$^{th}$-20$^{th}$ | **Manufacturing & Industry** |
| 21$^{st}$ | **Compute Power + Human Potential** |

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