Internet Trends 2017

1) **Global Internet Trends** = Solid Slowing Smartphone Growth  
2) **Online Advertising (+ Commerce)** = Increasingly Measurable + Actionable  
3) **Interactive Games** = Motherlode of Tech Product Innovation + Modern Learning  
4) **Media** = Distribution Disruption @ Torrid Pace  
5) **The Cloud** = Accelerating Change Across Enterprises  
6) **China Internet** = Golden Age of Entertainment + Transportation  
   (Provided by Hillhouse Capital)  
7) **India Internet** = Competition Continues to Intensify Consumers Winning  
8) **Healthcare** @ Digital Inflection Point  
9) **Global Public / Private Internet Companies**  
10) **Some Macro Thoughts**  
11) **Closing Thoughts**
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, 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
Global Internet Trends =
Solid User Growth  Slowing Smartphone Growth

1) **Global Internet Users** = 3.4B  Flat Growth +10% vs. 10% Y/Y
   +8% vs. 8% Y/Y (ex. India)

2) **Global Smartphone Shipments** = Slowing +3% vs. +10% Y/Y

3) **Global Smartphone Installed Base** = Slowing +12% vs. +25% Y/Y

4) **USA Internet Usage (Engagement)** = Solid +4% Y/Y
Global Internet Users = 3.4B @ 46% Penetration... +10% Y/Y vs. +10%...+8% Y/Y vs. +8% (Ex-India)

Global Internet Users (MM), 2009 – 2016

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

Global Smartphone Installed Base (MM), 2009 – 2016

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

USA Internet Advertising ($B), 2009 – 2016

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

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

<table>
<thead>
<tr>
<th></th>
<th>Time Spent</th>
<th>Ad Spend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>Radio</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>TV</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>Internet</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Mobile</td>
<td>28%</td>
<td>21%</td>
</tr>
</tbody>
</table>

**Total Internet Ad** = $73B  
**Of Which Mobile Ad** = $37B  

~$16B Opportunity in USA

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

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

Source: Zenith Advertising Expenditure Forecasts (3/17)
Google + Facebook = 85% (& Rising) Share of Internet Advertising Growth, USA

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

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.
Ad Measurability = 
Can Be Triple-Edged

When Things Are Measured =
People Don’t Always Like What They See
Users Don’t Always Like Data Collected
Advertisers = Like Measurable *Engagement* Metrics But Some Find Measuring *ROI* Challenging (as with Offline)

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

<table>
<thead>
<tr>
<th>Metric</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td>56%</td>
</tr>
<tr>
<td>Conversion &amp; Revenue</td>
<td>21%</td>
</tr>
<tr>
<td>Amplification &amp; Brand Awareness</td>
<td>15%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Challenge</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring ROI</td>
<td>61%</td>
</tr>
<tr>
<td>Securing Budget &amp; Resources</td>
<td>38%</td>
</tr>
<tr>
<td>Tying Social Campaigns to Business Goals</td>
<td>34%</td>
</tr>
</tbody>
</table>

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**

- Desktop Adblocking Software Users
- Mobile Adblocking Browser Users

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Desktop</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1%</td>
<td>13%</td>
</tr>
<tr>
<td>India</td>
<td>1%</td>
<td>28%</td>
</tr>
<tr>
<td>USA</td>
<td>18%</td>
<td>1%</td>
</tr>
<tr>
<td>Brazil</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>Japan</td>
<td>3%</td>
<td>--</td>
</tr>
<tr>
<td>Russia</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Germany</td>
<td>28%</td>
<td>1%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>8%</td>
<td>58%</td>
</tr>
<tr>
<td>UK</td>
<td>16%</td>
<td>1%</td>
</tr>
<tr>
<td>France</td>
<td>11%</td>
<td>1%</td>
</tr>
<tr>
<td>Canada</td>
<td>24%</td>
<td>--</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>Date</th>
<th>PLA Share of Retail Paid Clicks on Google (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/14</td>
<td>0%</td>
</tr>
<tr>
<td>6/14</td>
<td>10%</td>
</tr>
<tr>
<td>9/14</td>
<td>20%</td>
</tr>
<tr>
<td>12/14</td>
<td>30%</td>
</tr>
<tr>
<td>3/15</td>
<td>30%</td>
</tr>
<tr>
<td>6/15</td>
<td>40%</td>
</tr>
<tr>
<td>9/15</td>
<td>50%</td>
</tr>
<tr>
<td>12/15</td>
<td>52%</td>
</tr>
<tr>
<td>3/16</td>
<td>52%</td>
</tr>
<tr>
<td>6/16</td>
<td>52%</td>
</tr>
<tr>
<td>9/16</td>
<td>52%</td>
</tr>
<tr>
<td>12/16</td>
<td>52%</td>
</tr>
<tr>
<td>3/17</td>
<td>52%</td>
</tr>
</tbody>
</table>

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?
  - Pinterest: 44%
  - Other services: 33%

- Which of these services is a great place to buy things online?
  - Pinterest: 24%
  - Other services: 12%

**Shop the Look**
Inspired Purchases, 2/17

- Shop the look: 10%

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?*

<table>
<thead>
<tr>
<th>% of Respondents</th>
<th>Made a Purchase</th>
<th>Did Not Make a Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicked on an Ad</td>
<td>74%</td>
<td>26%</td>
</tr>
<tr>
<td>Didn’t Click on Ad</td>
<td>93%</td>
<td>7%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>90%</td>
<td>10%</td>
</tr>
</tbody>
</table>

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?

<table>
<thead>
<tr>
<th>Format</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile App Reward</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>Social Click-to-Play</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Skippable Pre-Roll</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Skippable Mobile Pop-up</td>
<td>46%</td>
<td>54%</td>
</tr>
<tr>
<td>In-Banner Click-to-Play</td>
<td>45%</td>
<td>55%</td>
</tr>
<tr>
<td>Social Auto-Play</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>In-Banner Auto-Play</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
<td>Pre-Roll</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>Mobile App Pop-Up</td>
<td>19%</td>
<td>81%</td>
</tr>
</tbody>
</table>

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.
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

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)

Source: Historyofinformation.com, Google
Right Ad @ Right Place / Time
Based on *User-Typed Input (Words)* = Big Business for Google

Google = $679B Market Capitalization
+30x vs. IPO

Source: Yahoo Finance
Note: Priced as of 5/26/17 market close. Google IPO’ed @ $85 / share on 8/19/04.
User-Uploaded Input (Real-Time Images)

Linked to Relevant Ad = SnapAds (Launched 2014)

Source: Image: Adweek (10/14)
Snap = $25B Market Capitalization

Source: Snap Filings
Note: Priced as of 5/26/17 market close. Snap IPO’d @ $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
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.
Brands + Consumers = Brands Sourcing Content from Fans

Brands = Leveraging UGC on Instagram

Source: SimplyMeasured (11/16)
Note: Data collected from each company’s Instagram page from 7/16-10/16. Posts were manually tagged for regrams based on mentions on ‘regram’ in the post or the camera emojis.
Brands + Influencers = Re-Distribution Driving Engagement

Influencers = Can Impact Followers

Source: Stance
Emerging Retailers + Crafty Big Brands =

Finding Ways to Make Images (+ Video) + Data + Algorithms + Voice Work for Them
Image-Based Platform *Front-Ends* = Tap + Augment Can Replace Typing

‘*Front-End*’
User-Generated Real-Time Geolocated Images

Source: Left Image: Snap, Right Image: Instagram blog (3/17)
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)
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
Voice-Based Platform *Back-Ends* = Voice Recognition Accuracy Continues to Improve

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

Word Accuracy Rate (%)

- 2013: 70%
- 2014: 80%
- 2015: 90%
- 2016: 95%
- 2017: 95%

---

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

- Easier Access to Online Support Channels: 60%
- Faster Agent Response Times: 53%
- Consistent Customer Experience Across Channels: 29%
- Faster Access to Live Support: 21%

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

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

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

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
Glossier = Skincare & Beauty Products...

Content Marketing

User Generated Content = Influencers

Glossier = Skincare & Beauty Products...

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

Accelerating Active Customer Growth

Source: Glossier
UNTUCKit = Shirts
Online-Offline Synergies in Marketing + Merchandising

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

Offline Engagement
Direct Touchpoints in Physical World

In-Store Interactions
Intimacy + Active Dialogue

Online Storefront
Digital Merchandising Insights

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

Online Sessions
Up >2.5x Y/Y

Sessions (MM)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sessions (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2.5</td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
</tr>
</tbody>
</table>
Allbirds = Shoes
Innovative Product + Simple Choice (Less Selection = More)

Two Comfortable, High Quality Styles

- Innovative Product + Simple Choice (Less Selection = More)

Growing eCommerce Sessions

- Product Changes Based on Customer Input
  - 3x adjustments to U-throat opening
  - Tongue lace loop reworked
  - Tongue reinforcement layer added
  - Alternative insole cover material developed
  - New process/material logo tabs developed
  - New internal toe reinforcement added
  - Tongue base – double row stitch implemented
  - New vamp lining wool textile introduced
  - Outsole durometer reduced
  - Insole geometry modified
  - Outsole redesigned

Source: Allbirds
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

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**

![Revenue Chart]

Source: MM.LaFleur
eCommerce A-Ha’s
If It Seems Like Package / Parcel Growth is Accelerating
It’s Because It Is, +9% Y/Y

Parcel Volume*, USA, 2010-2016

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
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
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

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

- **Lace Feature**
- **Sleeve**
- **Silhouette**
- **Print**
- **Hem Type**

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

- Neil Blumenthal, Co-CEO @ Warby Parker, 1/17
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
And Now We Have a New Kind of Store = A Subscription Store

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

Entertainment

Cloud Storage

News

Education

Professional Services

Source: Amazon
More / Faster Than Ever =

Great Products Find Customers
Customers Find Great Products

Process + Data Collection + Intermediaries =
Changing @ Torrid Pace
1) Ad Growth = Driven by Mobile

2) Ad Measurability = Can Be Triple-Edged

3) Ads Evolving Rapidly = Often Organic + Data @ Core

4) Ads = Becoming Targeted Storefronts

5) eCommerce Growth = Accelerating, Again

6) eCommerce A-Ha’s
INTERACTIVE GAMES =

MOTHERLODE OF

TECH PRODUCT INNOVATION / EVOLUTION + MODERN LEARNING

WITH THANKS TO BING GORDON FOR INSIGHT + INSPIRATION
Global Interactive Gaming = Mainstream / Evolving Rapidly / Still Early Days

2.6B Gamers* vs. 100MM in 1995


*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.

1 Player = Arcade
1 Player = Arcade
1 Player = Arcade

2 Players = Consoles
2 Players = Consoles
2+ Players = Consoles + LAN

2+ Players = Consoles + LAN

2+ Players = Consoles + LAN

45 Years

Millions of Players = Online Network

Zuckerberg’s Law* (Sharing)

Millions of Players + Spectators = eSports

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

Gen X

1970

Pong

1980

Asteroids, Space Invaders, Pac-Man

1990

Mario Bros.

Millennials

1990

Soccer

2000

Clash of Clans

2010

Candy Crush Saga

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

<table>
<thead>
<tr>
<th>Region</th>
<th>Revenue ($B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>$47</td>
</tr>
<tr>
<td>North America</td>
<td>$25</td>
</tr>
<tr>
<td>Western Europe</td>
<td>$17</td>
</tr>
<tr>
<td>Latin America</td>
<td>$4</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>$3</td>
</tr>
<tr>
<td>Middle East &amp; Africa</td>
<td>$3</td>
</tr>
</tbody>
</table>

Note: Excludes console / gaming PC hardware revenue.
Gamers = All Ages
35 Year-Old Average, USA

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

<table>
<thead>
<tr>
<th>Game Genre</th>
<th>% of Female Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match 3</td>
<td>69%</td>
</tr>
<tr>
<td>Family / Farm Sim</td>
<td>69%</td>
</tr>
<tr>
<td>Casual Puzzle</td>
<td>42%</td>
</tr>
<tr>
<td>MMOs (Fantasy)</td>
<td>36%</td>
</tr>
<tr>
<td>Action Adventure</td>
<td>18%</td>
</tr>
<tr>
<td>MMOs (Sci-Fi)</td>
<td>16%</td>
</tr>
<tr>
<td>First-Person Shooter</td>
<td>7%</td>
</tr>
<tr>
<td>Racing</td>
<td>6%</td>
</tr>
<tr>
<td>Sports</td>
<td>2%</td>
</tr>
</tbody>
</table>

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
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

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

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

- Live Streamed Gameplay
- Subscribe to Streamer
- Live Streamed Player Reactions
- Live Chat Interaction with Player

Twitch Hours Streamed vs. Unique Monthly Streamers

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

**Activision 2600 Games**
Physical Badges for In-Game Achievements

**Mainstream Internet (Now)**

**Facebook**
Give Digital Badges to Others

Source: Left image: Atari Age, Right image: Facebook
Interactive Storytelling = Deep Roots in Gaming

Early Gaming (1980)

Atari
First Role Playing Game

Mainstream Internet (Now)

Netflix + Amazon / Twitch
Experimenting with Interactive Shows

Source: Left image: mprd.se, Right images: Netflix, Amazon
Interactive Learning =
Deep Roots in Gaming

Early Gaming (1979)
Lemonade Stand
Teaching Economics 101

Mainstream Internet (Now)
Duolingo
Leveling Up in Languages

ON DAY 1, THE COST OF LEMONADE IS $.02
LEMONADE STAND 1 ASSETS $2.00
HOW MANY GLASSES OF LEMONADE DO YOU WISH TO MAKE?

LEMONSVILLE WEATHER REPORT
THUNDERSTORMS!

Source: Left Image: Archive.org, Right Image: Duolingo,
Upgrades + Downloadable Content = Deep Roots in Gaming

Early Gaming (1993)

Sega
Downloadable Content via Cable

Mainstream Internet (Now)

Tesla
Over-the-Air Software Updates

Source: Left image: Gamecrate, Right image: Tesla
Secondary Markets = Deep Roots in Gaming

Early Gaming (2001)

Runescape
Secondary Markets for Items / Currency

Mainstream Internet (Now)

Apple iMessage
3rd Parties Offer Sticker Packs

Source: Left image: RPGStash, Right image: Macstories
Messaging = Deep Roots in Gaming

1999

**OICQ**

768MM DAU
12/16

2009

**Tiny Speck**

5MM DAU
1/17

2013

**Hammer GHISEL**

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)
Madden Football
Unique Game Perspectives

Mainstream Media (Now)
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)

NVIDIA
Launches GeForce 256 GPU

Mainstream Internet (Now)

Many Companies
GPUs Used for Artificial Intelligence

Source: Left Images: NVIDIA, VGA Museum, Right images: Google Deepmind, Amazon, IBM
In Era of Perceived Disengagement = ‘Engagement’ Rising
Video Gaming = Most Engaging Form of Social Media

Average Daily Minutes Spent by Active Users

- **Video Gaming (Consoles, 9/16)**: 51 minutes
- **Facebook Ecosystem (4/16)**: 50 minutes
- **King (Mobile Games, 5/17)**: 35 minutes
- **Snapchat (5/17)**: 30 minutes
- **Instagram (10/14)**: 21 minutes

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

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?
Gaming Tools =

Improving Human Performance

Virtual + Augmented Reality / Simulations / Real-Time Analytics
Immersive Gaming Tools = Improving Athlete Performance
Video + Virtual Reality = Mental Reps Can Improve Performance

**STRIVR Labs + Stanford Football**
Utilize Video + Virtual Reality to Repeatedly Run Plays / Scenarios

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**

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
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
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.

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 Batshuayi, Right Image: Hardware Zone
# Madden Football Super Bowl Predictions vs. Actual Results, 2004-2017

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

Source: Electronic Arts, ESPN, USA Today, Forbes
Immersive Gaming Tools =

Improving Performance Across Disciplines
Gamification = Influencing Multiple Consumer Services

**Education**
- Duolingo

**Personal Health**
- Mango
- Health

**Personal Finance**
- Acorns

**Energy Conservation**
- Nest

**Food**
- Starbucks

**Exercise**
- myfitnesspal

**Dating**
- Bumble

**Advertising**
- Snapchat

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

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
As Rapid Data Growth Continues =

Gaming Tools / Interfaces / Processors Will Continue to Organize + Drive Usefulness
Data Volume Growth Continues @ Rapid Clip
% Structured / Tagged (~10%) Rising Fast

Information Created Worldwide =
Expected to Continue Accelerating

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

NVIDIA Transistors, 1998-2016

- 2002 = 5 GFLOPS
  - Battlefield 1942
- 2007 = 350 GFLOPS
  - Unreal Tournament 3
- 2016 = 10K GFLOPS
  - Paragon

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

<table>
<thead>
<tr>
<th>Developers</th>
<th>Development Platforms</th>
<th>Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build Virtual Worlds / Share Ideas</td>
<td>VR / AR Platforms</td>
<td>Explore Virtual Worlds</td>
</tr>
<tr>
<td>Construct Virtual Worlds with New</td>
<td></td>
<td>Have Virtual Experiences</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build / Share Creations</td>
<td>In-Game Sandboxes</td>
<td>Build / Share / Explore</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creations</td>
</tr>
<tr>
<td>Distribute Content</td>
<td>Gaming Marketplaces</td>
<td>Discover / Buy / Share</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content</td>
</tr>
</tbody>
</table>

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*

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

2006
Justin.tv Founded = Precursor to Twitch.tv

2009
League of Legends Released = Becomes One of Most Played Strategy Games (100MM MAU, 9/16)

2012
OnGameNet Begins Broadcasting League of Legends = First Major Korean Tournament on TV

2016
League of Legends 2016 World Championship = 43MM viewers

eSports =
People Watch What They Play

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

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?

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

eSports Monthly Viewers, Global, 2012-2016

*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

Total Unique Viewers vs. Peak Concurrent Viewers

Source: Engadget, Polygon, The Verge, eSports Marketing, LoLeSports
eSports Monthly Viewers = 79% <35 Years Old  29% Female

Monthly eSports Viewers by Age / Gender, Global, 2016

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

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

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

<table>
<thead>
<tr>
<th>German Soccer Club, FC Schalke 04 = Acquires eSports Team, Elements, 5/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philadelphia 76ers = Acquire eSports Teams, Dignitas &amp; Apex, 9/16</td>
</tr>
<tr>
<td>Riot Games + BAMTech = $300MM 6yr LoL Streaming Rights, 12/16</td>
</tr>
<tr>
<td>Miami Heat = Invests in eSports Team, Misfits, 1/17</td>
</tr>
</tbody>
</table>

Expanding Connections with Sports / Media Platforms

<table>
<thead>
<tr>
<th>Italian Soccer Club AS Roma = Partners with eSports Team, Fnatic, 2/17</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBA + Up with Take Two = 2K eSports League, 2/17</td>
</tr>
<tr>
<td>Facebook = Expands eSports Relationships with ESL Streaming Deal, 5/17</td>
</tr>
</tbody>
</table>

Source: ESPN, Engadget, Yahoo Sports, Live Production, Dot eSports, Forbes
Gaming Experience =>

Technology
Leadership + Innovation?
If you want to see what business leadership may look like in three to five years, look at what’s happening in online games.

- Byron Reeves, Professor of Communication, Stanford University, 6/07
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?
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
Digital Leaders =

Transforming Media With

Better User Experiences +
Lower Prices    Data + Scale
Music = Why Streaming?  
Access / Choice / Discovery / Personalization / Mobile / Fewer Ads

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

- **Free Trial Convert**: 42%
- **Get Rid of Ads**: 29%
- **Mobile Access**: 27%
- **Listening Choice**: 24%
- **Recs from Friends / Family**: 22%
- **Bundled**: 21%
- **Offline Listening**: 19%
- **Viewed Ad**: 9%

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

- **Size of Catalog**
- **New Music Discovery**
- **Multi-Device Listening**
- **Support Artists**
- **Keep Up with Hits**
- **Curation / Recs**
- **Simultaneous Music Videos**
- **Build Playlists**
- **Share Playlists**

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

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too Expensive</td>
<td>80%</td>
</tr>
<tr>
<td>Use an Internet Streaming Service</td>
<td>48%</td>
</tr>
<tr>
<td>Use Antenna to Get Basic Channels</td>
<td>27%</td>
</tr>
<tr>
<td>Like to Binge Entire Seasons via Streaming</td>
<td>19%</td>
</tr>
<tr>
<td>Dropped Cable Upon Moving / Relocating</td>
<td>13%</td>
</tr>
<tr>
<td>Bulk of Viewing is Streaming Service Original Content</td>
<td>11%</td>
</tr>
</tbody>
</table>

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

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

Subscription & Streaming
Download & Synchronization
Physical

Source: Recording Industry Association of America
Note: “Subscription and Streaming” 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)
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 Spotifyys

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


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
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

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

Source: Sandvine Global Internet Phenomena Report (2H 2012 and 2016)
Facebook (Facebook / WhatsApp / Messenger / Instagram) = Video Ramping Across Platform

Facebook Platform MAUs, Global, Months Since Launch

Source: Facebook, Instagram, Whatsapp, Financial Times, TechCrunch
Snap = Ramping Original Short-Form Content

Snap ‘Original Shows’

**Phone Swap**
10MM+ Views for 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
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, 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

<table>
<thead>
<tr>
<th>Age Bracket</th>
<th>Analog</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>4:35</td>
<td>4:27</td>
</tr>
<tr>
<td>25-34</td>
<td>5:42</td>
<td>4:42</td>
</tr>
<tr>
<td>35-49</td>
<td>7:17</td>
<td>5:19</td>
</tr>
<tr>
<td>50-64</td>
<td>9:09</td>
<td>4:41</td>
</tr>
<tr>
<td>65+</td>
<td>9:49</td>
<td>1:30</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>Platform</th>
<th>ARPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>DirecTV</td>
<td>$1,439</td>
</tr>
<tr>
<td>Charter</td>
<td>$1,131</td>
</tr>
<tr>
<td>Dish</td>
<td>$1,064</td>
</tr>
<tr>
<td>Comcast</td>
<td>$997</td>
</tr>
<tr>
<td>Netflix</td>
<td>$103</td>
</tr>
</tbody>
</table>

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...

**Network Era**
1950s-1980s
Cater to All / High Viewership / No Personalization

**Cable Era**
1980s-2010s
Broad Genres / Focus on Programming / Limited Bundle Choices

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

Digital Distributors
- crunchyroll
- SHUDDER
- FANDOR
- SSEE

Digital Studios
- YouTube Red
- 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...)

KP INTERNET TRENDS 2017 | PAGE 177
THE CLOUD =

ACCELERATING CHANGE ACROSS ENTERPRISES

ALEX KURLAND @ KLEINER PERKINS
1) **Cloud Adoption** = Reaching New Heights + Creating New Opportunities

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

3) **Security** = More Applications → More Vulnerabilities
Cloud Adoption =

Reaching New Heights +

Creating New Opportunities
Public + Private Clouds = Approaching Traditional Data Center Spend +37% to $36B vs. 2014

IT Infrastructure Spend, Global, 2014-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Traditional Data Center</th>
<th>Public Cloud</th>
<th>Private Cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>76%</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>2014</td>
<td>72%</td>
<td>17%</td>
<td>11%</td>
</tr>
<tr>
<td>2015</td>
<td>67%</td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td>2016</td>
<td>63%</td>
<td>22%</td>
<td>15%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Cloud Provider</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS</td>
<td>57%</td>
<td>57%</td>
</tr>
<tr>
<td>Azure</td>
<td>20%</td>
<td>34%</td>
</tr>
<tr>
<td>Google Cloud</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>IBM</td>
<td>7%</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Source:** Rightscale 2017 State of the Cloud Report

Note: Based on survey of IT Professionals, n=1,002.

### Public Cloud Adoption, 2017

% of Respondents Running, Experimenting, or Planning to Use Applications

<table>
<thead>
<tr>
<th>Cloud Provider</th>
<th>Running Apps</th>
<th>Experimenting</th>
<th>Planning to Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS</td>
<td>17%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Azure</td>
<td>21%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>Google Cloud</td>
<td>15%</td>
<td>17%</td>
<td>8%</td>
</tr>
<tr>
<td>IBM</td>
<td>13%</td>
<td>8%</td>
<td>8%</td>
</tr>
</tbody>
</table>
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

- **Data Security**: 42% (2012), 35% (2015)
- **Uncertainty of Costs and Savings**: 38% (2012), 21% (2015)
- **Loss of Control (Upgrades, Timing of Backups)**: 33% (2012), 19% (2015)
- **Compliance / Governance**: 27% (2012), 21% (2015)
- **Reliability (SLA Requirements)**: 21% (2012), 14% (2015)
- **Data Portability and Ownership**: 20% (2015), 18% (2012)
- **Software Compatibility**: 18% (2012), 14% (2015)
- **Lock-In (ability to change vendors)**: 7% (2015), 22% (2012)

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

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery Method</td>
<td>On-Prem</td>
<td>Cloud-based</td>
</tr>
<tr>
<td>Pricing</td>
<td>Perpetual License</td>
<td>Subscription</td>
</tr>
<tr>
<td>UX</td>
<td>Generic</td>
<td>Personalized</td>
</tr>
<tr>
<td>Intelligence</td>
<td>Constrained</td>
<td>Unlimited (AI / ML)</td>
</tr>
<tr>
<td>Growth Engine</td>
<td>Sales</td>
<td>Product</td>
</tr>
<tr>
<td>Purchase Decision</td>
<td>Top-Down</td>
<td>Bottoms-Up</td>
</tr>
<tr>
<td>Measure of Engagement &amp; Customer Satisfaction</td>
<td>N/A</td>
<td>DAUs / MAUs / NPS</td>
</tr>
</tbody>
</table>
Design = Increasingly Core to Enterprise R&D
End-Users Demanding Consumer-Quality Product Experiences

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2012</td>
<td>1 designer: 25 developers</td>
</tr>
<tr>
<td>2017</td>
<td>1 designer: 9 developers</td>
</tr>
<tr>
<td><strong>Atlassian</strong></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>N/A</td>
</tr>
<tr>
<td>2017</td>
<td>1 designer: 6 developers</td>
</tr>
<tr>
<td><strong>Dropbox</strong></td>
<td></td>
</tr>
<tr>
<td>2010-2012</td>
<td>1 designer: 72 developers</td>
</tr>
<tr>
<td>2017</td>
<td>1 designer: 8 developers</td>
</tr>
<tr>
<td><strong>IBM</strong></td>
<td></td>
</tr>
<tr>
<td>2010-2012</td>
<td>1 designer: 11 developers</td>
</tr>
<tr>
<td>2017</td>
<td>1 designer: 8 developers</td>
</tr>
<tr>
<td><strong>Intercom</strong></td>
<td></td>
</tr>
<tr>
<td>2010-2012</td>
<td>N/A</td>
</tr>
<tr>
<td>2017</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>LinkedIn</strong></td>
<td></td>
</tr>
</tbody>
</table>

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

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.
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

![Graph showing the percentage of internet traffic by source for humans and bots from 2012 to 2016.]

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

![Bar chart showing the number of breaches with 10MM+ identities exposed from 2014 to 2016.]

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

GOLDEN AGE OF ENTERTAINMENT + TRANSPORTATION
China Macro = Positive Trends
China Macro = Confidence Improving Since CH2:16

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

Source: China National Bureau of Statistics, Bernstein Research
China Macro = Service Sector @ 52% GDP Share vs. 23% Thirty-Five Years Ago

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

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

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

- Information Technology
- Health Care
- Consumer Discretionary
- Financials
- Overall MSCI China
- Materials
- Consumer Staples
- Industrials
- Utilities
- Energy
- Telecommunication Services

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

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

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)

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

Source: Zenith Optimedia
China Entertainment = Key Driver of Mobile Time Spent

eCommerce + Games = Monetize Best Per Time Spent

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

Average Daily Hours (MM)

Source: QuestMobile

Note: Only top 100 apps by time spent are categorized by company affiliation. Tencent, Alibaba and Baidu affiliates include strategically invested companies.
China Online Entertainment = Consumers Increasingly Willing to Pay
Led by Games + Livestreaming + Video

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Online Game</th>
<th>Online Video</th>
<th>Online Literature</th>
<th>Livestreaming</th>
<th>Digital Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Game industry data 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).
Global Interactive Game Revenue =
China #1 Market in World* > USA (2016)

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

Video Game (excl. Hardware) Revenue ($B)

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

Source: Tencent, NetEase
China Online Gaming = Tencent + NetEase Driving Mobile Innovation + Revenue

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

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

Source: Tencent, NetEase, Goldman Sachs Investment Research
Note: Assuming 1USD = 6.9RMB.
Diverse Live Content Type
- Singing / Dancing / Talk Show / Game Play

Interactive / Social / Gamified
- Like / Chat with Hosts & Audience / Buy Virtual Gifts to Support Performers

Local / Social
- Nearby Livestreams / Chat & Add Friends

20+ Virtual Gift Categories
- Priced from Rmb0.01

Source: Hillhouse research
China Livestreaming = Compelling Monetization

Estimated Revenue per Hour, China, 2016

- Livestreaming
- Online Games
- TV
- Online Video
- Radio
- Online Music

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

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

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

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.
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

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

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

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

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

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=16,546.92
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

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

~$0.15 for On-Demand Bike

$0.50+ for Street Food

$0.01+ for Article / Author Tipping

$0.01+ for Livestreaming Tipping

Source: Hillhouse estimates
China Mobile Payments = Low Relative Cost Helped by Regulated Interchange Rates

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

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

<table>
<thead>
<tr>
<th>Payment</th>
<th>Wealth Management</th>
<th>Financing</th>
<th>Insurance</th>
<th>Credit Rating / History</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ant Financial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>支</td>
<td>支付宝</td>
<td>ALIPAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>付</td>
<td>余额宝</td>
<td>YUE BAO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>货</td>
<td>蚂蚁借呗</td>
<td>ANT CASH NOW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>蚂蚁花呗</td>
<td>ANT CREDIT PAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>蚂蚁小贷</td>
<td>ANT MICRO LOAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;100MM Cumulative Consumer Finance Users³, &gt;5MM Cumulative SME Borrowers⁴</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>380MM Cumulative Users⁵</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>130MM Cumulative Users⁶</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tencent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>¥</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
China eCommerce + Advertising = Innovation + Growth
China eCommerce = Strong Growth
+24% Y/Y @ $681B GMV  71% Mobile

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

Source: iResearch
Note: Assuming constant FX 1USD = 6.9RMB
China B2C eCommerce @ 15% of Retail Sales Penetration Ramping Faster Than Peers

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

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.
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. 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.
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
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

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP ($B)</th>
<th>Y/Y Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>$18,569</td>
<td>1.6%</td>
</tr>
<tr>
<td>China</td>
<td>$11,218</td>
<td>6.7%</td>
</tr>
<tr>
<td>Japan</td>
<td>$4,939</td>
<td>1.0%</td>
</tr>
<tr>
<td>Germany</td>
<td>$3,467</td>
<td>1.8%</td>
</tr>
<tr>
<td>UK</td>
<td>$2,629</td>
<td>1.8%</td>
</tr>
<tr>
<td>France</td>
<td>$2,463</td>
<td>1.2%</td>
</tr>
<tr>
<td>India</td>
<td>$2,256</td>
<td>6.8%</td>
</tr>
<tr>
<td>Italy</td>
<td>$1,851</td>
<td>0.9%</td>
</tr>
<tr>
<td>Brazil</td>
<td>$1,799</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Korea</td>
<td>$1,411</td>
<td>2.8%</td>
</tr>
<tr>
<td>Russia</td>
<td>$1,281</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Spain</td>
<td>$1,233</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

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

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

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

Source: Morgan Stanley, IDC
India Smartphone + Data Costs =

Declining But Still High for Majority of India’s 1.3B Citizens
India Smartphone Cost (excluding Data) = Unaffordable for Many @ 8% of Annual Average GDP per Capita

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

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


*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)
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...

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)

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

*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

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%...

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

Source: Statcounter 2017
Note: Data reflects usage share across calendar year quarters. As Q2 is in progress, data for Q2 2017 reflects current share as of 5/30/17
## India Software – Top Downloaded Android Apps

**USA @ 4 of 10**  
**China @ 2 of 10**  
**India @ 2 of 10**

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

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.
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

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

Amazon India Fulfillment Centers, 2012 – 2016

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

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

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

Source: Reliance Jio, Bharti Airtel, Idea, Reliance Communications, Vodafone India.
India Wireless Internet Data Usage = Bandwidth Intensive App Usage Growing Dramatically

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

- +3x Growth

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

- 4x+ Growth

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

<table>
<thead>
<tr>
<th>Policy</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Banking for All’ ‘Jan Dhan Yojana’ = 8/14</td>
<td>~280MM+ new bank accounts opened to deliver financial services directly to underbanked in effort to bypass corruption</td>
</tr>
<tr>
<td>‘Power for All’ Rural Electrification = 7/15</td>
<td>Program to electrify 100% of villages by 2019, with 133MM rural households electrified to date ~45MM remaining</td>
</tr>
<tr>
<td>Demonetization = 11/16</td>
<td>~85% of paper currency in circulation replaced overnight to clean ‘black’ money (estimated at 22%+ of total GDP) &amp; boost digital payment adoption</td>
</tr>
<tr>
<td>Nationwide Tax (GST) Reform = 3/17</td>
<td>Single indirect tax replacing 17 different state &amp; central taxes, turning India into single national market &amp; eliminating double taxation for consumers</td>
</tr>
<tr>
<td>Digital India = 7/15</td>
<td>National rollout of high speed broadband access &amp; digital delivery of land records, income tax filings &amp; other government services</td>
</tr>
<tr>
<td>Skills &amp; Entrepreneurship = 6/15</td>
<td>Dedicated ministry to upgrade youth skills goal to train 10MM new workforce entrants per year</td>
</tr>
<tr>
<td>Startup India = 1/16</td>
<td>High level support of Indian startups via funding &amp; fast tracking of regulatory support for new companies</td>
</tr>
<tr>
<td>Infrastructure Enhancements = 2/17</td>
<td>$59B targeted to upgrade railways / airports / roads</td>
</tr>
</tbody>
</table>

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

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

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

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

Consumers Benefitting from Competition & Government Policies
India Internet Innovation =
Leapfrogging + Re-Imagining

Leapfrogging
  Mobile
  Identity
  Bandwidth
  Payments

Re-Imagining
  Entertainment
  Education
  Healthcare
  Marketplaces
India Mobile Usage = A Global Leader vs. Desktop Usage
~80% of Internet Usage on Mobiles

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

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

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
...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

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

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

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)...

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

Source: Kalaari Capital, Prime Venture Partners, Indiastack.org, Department of Financial Services, Government of India (2016)
India Payments = Online Leader Paytm Ramping Users Rapidly Bolstered by Uptake of Online + Offline Commerce

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

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

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

Source: Reserve Bank of India, Monthly Bulletin (Payments and Settlement Systems)
India Internet Innovation = Leapfrogging + Re-Imagining

Leapfrogging
Mobile
Identity
Bandwidth
Payments

Re-Imagining
Entertainment
Education
Healthcare
Marketplaces
India Entertainment = Weekly Mobile Time Spent @ 7x TV
45% Mobile Time = Entertainment

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

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

- India: 250MM
- China: 150MM
- US: 50MM
- UK: 10MM

Indian Private Coaching Industry, 2014

- Primary: 22%
- Upper Primary: 26%
- Secondary: 37%

Reasons for Private Coaching

- Augmenting Basic Education: 89%
- Prep for Job Exams: 8%
- Entrance Exam Prep: 2%
- Others: 2%

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 test
Image: DailyMail
India Healthcare = High (& Rising) Out-of-Pocket Spend
<20% Insurance Penetration

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

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

### THEN

**Offline Labs & Pharmacies**

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

### NOW

**Online Health Hubs**

ex. 1Mg, Portea

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

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

Source: Tracxn, Inc42
India = 29 Languages Spoken by >1MM People  6 >50MM (ex-English)  
46% of Internet Users Primarily Consume Local Language Content

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

India Macro

Demographics = Bad & Good

Other Challenges =

1) Job Creation
2) Business Basics
3) Education
4) Logistics
5) Gender Disparity
India = Low Relative GDP per Capita Poverty Levels While Improving Remain High

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

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

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)

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

<table>
<thead>
<tr>
<th>Category</th>
<th>India US$1,034</th>
<th>China US$3,136</th>
<th>Korea US$12,687</th>
<th>Japan US$20,785</th>
<th>USA US$38,293</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothes and footwear (ex-sportswear)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosmetics and personal care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jewelry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaged food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-alcoholic beverages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other household goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground transportation/services and automobiles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handset and telecom services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthcare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance and social protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Euromonitor, Goldman Sachs Investment Research.
India Job Creation = Employment Levels @ 55% of Working Age Population...
Employment Trending Slower than Population Growth

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

Population Between Ages 15 – 64 and Employment Level (MM)

Working age population defined as ages 15-64.
India Business Basics = Ease-of-Doing Business Lags Behind Many Countries

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

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

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

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

World Bank Infrastructure Competitiveness Score

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

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

**Female Labor Force Participation Rate, 2008 - 2016**

Source: International Labor Organization, 2016

Note: ILO defines female labor force participation rate as the proportion of the female population of age 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.
1) **Economy** = Strong Growth
2) **Internet Users** = Solid Growth
3) **Mobiles** = Choppy Growth Recent Acceleration
4) **Internet** = Fierce Global Battleground (Hardware / Carriers / Software / Commerce)
5) **Internet Usage** = Rising Owing to Cheaper / Faster Access
6) **Leadership** = Focused Pro-Digital Policies
7) **Internet Innovation** =
   - *Leapfrogging* = Mobile Identity Bandwidth Payments
   - *Re-Imagining* = Entertainment Education Healthcare Marketplaces
8) **Internet Challenges** = Financing Environment Language Diversity
9) **India Macro** = Demographics = Bad & Good Challenges = Job Creation Business Basics Education Logistics Gender Disparity
HEALTHCARE @ DIGITAL INFLECTION POINT

NOAH KNAUF @ KLEINER PERKINS
Healthcare @ Digital Inflection Point

100 Years Ago
Human Touch

25 Years Ago
Machine Assisted / Analog

Today
Technology Enabled / Digital

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
Digital Inputs =

Rapid Growth in Sources of Digital Health Data
Measurement =
Most Widely Used Medical Technology Now Digital / Connected

2000’s | 2017
---|---
2D / Analog | 3D / Digital
X-Ray

2000’s | 2017
---|---
Manual / Analog | Automatic / Digital
Blood Pressure

2000’s | 2017
---|---
Paper-Based / Analog | Wearable / Digital
In-Room / Analog | Remote / Digital
ECG

Hospital Monitoring

Source: Medisave, GE Healthcare, iRhythm Technologies, Welch Allyn
Diagnostic Technology = Measured / Monitored Data Attributes Rising Rapidly

**Commercially Available Lab Tests, 1993-2017**

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 produce 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 = Gaining Adoption
~25% of Americans own a Wearable, +12% Y/Y, 2016

Global Wearable Shipments

<table>
<thead>
<tr>
<th>Year</th>
<th>Shipments (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>26</td>
</tr>
<tr>
<td>2015</td>
<td>82</td>
</tr>
<tr>
<td>2016</td>
<td>102</td>
</tr>
</tbody>
</table>

Sensors in Wrist Wearables, 9/16

- Accelerometer: 86%
- Heart Rate: 33%
- GPS: 28%
- Gyroscope: 26%
- Compass: 19%
- Microphone: 18%
- Ambient Light: 12%
- Barometer: 7%
- Altimeter: 6%
- Camera: 6%
- Thermometer: 5%
- Others: 13%

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


With which tech company would you share your data?

% of Consumers Willing to Share Health Data

- Google: 60%
- Microsoft: 56%
- Samsung: 54%
- Apple: 50%
- Amazon: 39%
- Facebook: 39%
- IBM: 37%

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

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

- 2004: 21%
- 2015: 87%

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

- Clinical Results: 26.3
- Scanned Images: 10.5
- Vital Signs: 4.1
- Problems (historical, current): 3.2
- Other (e.g. medications, allergens, etc.): 5.5

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

- **View**
  - 2012: 24%
  - 2013: 40%
  - 2014: 91%
  - 2015: 95%

- **Download**
  - 2012: 14%
  - 2013: 28%
  - 2014: 82%
  - 2015: 87%

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
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of Registered Clinical Trials (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>10,000</td>
</tr>
<tr>
<td>2007</td>
<td>11,000</td>
</tr>
<tr>
<td>2008</td>
<td>12,000</td>
</tr>
<tr>
<td>2009</td>
<td>13,000</td>
</tr>
<tr>
<td>2010</td>
<td>14,000</td>
</tr>
<tr>
<td>2011</td>
<td>15,000</td>
</tr>
<tr>
<td>2012</td>
<td>16,000</td>
</tr>
<tr>
<td>2013</td>
<td>17,000</td>
</tr>
<tr>
<td>2014</td>
<td>18,000</td>
</tr>
<tr>
<td>2015</td>
<td>19,000</td>
</tr>
<tr>
<td>2016</td>
<td>20,000</td>
</tr>
</tbody>
</table>

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

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

Probability of Success

- Phase I to Phase II: 63% without, 76% with selection biomarkers
- Phase II to Phase III: 28% without, 46% with selection biomarkers
- Phase III to NDA/BLA: 55% without, 76% with selection biomarkers
- NDA/BLA to Approval: 83% without, 94% with selection biomarkers
- Phase I to Approval: 8% without, 26% with selection biomarkers

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

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:

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

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.
Growing Evidence That Data = Cheaper + Faster Clinical Trials

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

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.

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

Healthcare Delivery Could Change Faster With Consumer Engagement & Faster Innovation Cycles
Consumers = Increasingly Expect Digital Health Services Especially Millennials

Digital Health Adoption Across Generations

- **Own a Wearable**
  - Millennials: 40%
  - Gen X: 26%
  - Baby Boomers: 10%

- **Go Online to Find Physician**
  - Millennials: 48%
  - Gen X: 38%
  - Baby Boomers: 23%

- **Select Provider Based on Online Reviews**
  - Millennials: 34%
  - Gen X: 21%
  - Baby Boomers: 8%

- **Have Sought Remote Medical Care / Advice**
  - Millennials: 56%
  - Gen X: 31%
  - Baby Boomers: 31%

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
Consumers = Increasingly Use Digital Health Tools

Consumers Using Digital Health Tools (Telemedicine, Wearables, etc.)
88% Using at Least One Tool, 1 in 10 are Super Adopters

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

**Improvements to Clinical Pathways / Protocol**
- Ayasdi AI + Mercy Health System Patient Data = Clinical Anomaly Detection + Improved Clinical Pathway Development
- Flatiron + Foundation Med (FMI) = 20,000 Liked Cancer Patients Records + Personalized Medicine

**Preventative Health**
- Kinsa + Crowdsourced Temperature Data = Local Flu Predictions + Proactive Treatments for Populations
- Omada + Preventative Program = 4-5% Body Weight Reduction + Reduced Risk for Stroke and Heart Disease

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
Genomics Digitizes = Gets Faster / Better / Cheaper

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

Cost to Sequence (per Genome)

- $100M
- $10M
- $1M
- $100K
- $10K
- $1K

2007: Digital Technology Leads To Cost Reduction
Illumina ( Solexa) Launches the Genome Analyzer
Time to sequence a genome: 10 Months

2015: Step Function Reduction In Cost
Illumina Launches the X10
Time to sequence a genome: 27 hours

Source: National Institute of Health, National Human Genome Research Institute (7/17), Biology Reference, Illumina
Accumulation of Genomic Data Leads to 19x Increase in Genomic Knowledge

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.

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

- Known SNPs (Variants) in SNPedia (K)
- Cumulative Number of Human Genomes (log)

Graph showing the increase in insight measured in known variants tracks the number of genomes sequenced from 2001 to 2016.
Genomics Research & Insights Lead to Rapid Increase in Available Genetic Tests

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

Source: Genetests (5/17)
Genomics Insight Translates to Therapeutics

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

Source: Personalized Medicine Coalition (2017)

*Number of personalized medicines calculated based on PMC’s Case for Personalized Medicine and the FDA’s Table of Pharmacogenomic Biomarkers in Drug Labeling
Evolution of Genomics Technologies Enable Deeper Research

Consumer Genomics Evolving Similarly

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

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

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
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

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

Total $3,827

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**

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

**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

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

Source: CapIQ. Market value data as of 5/31/12.
Note: For public companies, colors denote current market value relative to Y/Y market value. Green = higher, red = lower.
Big Get Bigger =
& Go After Other Bigs

Often Led by Founder-Driven
Innovation / Seeing Around Corners
## Internet Bigs Expansion / Growth = A Long Way from Where They Started

<table>
<thead>
<tr>
<th>Company</th>
<th>Founding Year</th>
<th>Original Business</th>
<th>Current Businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>1976</td>
<td>Personal Computer Maker</td>
<td>Smartphone / Computer / Tablet Maker</td>
</tr>
<tr>
<td>Facebook</td>
<td>2004</td>
<td>Social Network (USA)</td>
<td>Global Social Network Instant Messaging Platform Image Sharing Platform AR / VR Software / Hardware Ad Ecosystem</td>
</tr>
<tr>
<td>Tencent</td>
<td>1998</td>
<td>Instant Messaging Platform (China)</td>
<td>Instant Messaging Platform Gaming Content Ecosystem Social Network Ad Ecosystem Payments Digital Video / Music Platform Cloud Services</td>
</tr>
</tbody>
</table>

Source: Company filings
Global Technology Financings =

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

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Technology IPO Volume ($B)</th>
<th>Technology Private Financing Volume ($B)</th>
<th>NASDAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$3</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>$3</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>$8</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>$7</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>$14</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>$19</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>$26</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>$28</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>$89</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>$157</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>$58</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>$28</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>$22</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>$36</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>$40</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>$36</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>$42</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>$34</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>$33</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>$25</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>$33</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>$48</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>$50</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>$44</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>$107</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>$96</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>$89</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>2017 YTD</td>
<td>$30</td>
<td>$0</td>
<td></td>
</tr>
</tbody>
</table>

VC Funding per Company ($MM)

<table>
<thead>
<tr>
<th>Year</th>
<th>VC Funding per Company ($MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$3</td>
</tr>
<tr>
<td>1991</td>
<td>$3</td>
</tr>
<tr>
<td>1992</td>
<td>$2</td>
</tr>
<tr>
<td>1993</td>
<td>$5</td>
</tr>
<tr>
<td>1994</td>
<td>$4</td>
</tr>
<tr>
<td>1995</td>
<td>$4</td>
</tr>
<tr>
<td>1996</td>
<td>$5</td>
</tr>
<tr>
<td>1997</td>
<td>$5</td>
</tr>
<tr>
<td>1998</td>
<td>$6</td>
</tr>
<tr>
<td>1999</td>
<td>$8</td>
</tr>
<tr>
<td>2000</td>
<td>$14</td>
</tr>
<tr>
<td>2001</td>
<td>$18</td>
</tr>
<tr>
<td>2002</td>
<td>$11</td>
</tr>
<tr>
<td>2003</td>
<td>$8</td>
</tr>
<tr>
<td>2004</td>
<td>$8</td>
</tr>
<tr>
<td>2005</td>
<td>$9</td>
</tr>
<tr>
<td>2006</td>
<td>$9</td>
</tr>
<tr>
<td>2007</td>
<td>$8</td>
</tr>
<tr>
<td>2008</td>
<td>$9</td>
</tr>
<tr>
<td>2009</td>
<td>$7</td>
</tr>
<tr>
<td>2010</td>
<td>$7</td>
</tr>
<tr>
<td>2011</td>
<td>$10</td>
</tr>
<tr>
<td>2012</td>
<td>$8</td>
</tr>
<tr>
<td>2013</td>
<td>$9</td>
</tr>
<tr>
<td>2014</td>
<td>$13</td>
</tr>
<tr>
<td>2015</td>
<td>$15</td>
</tr>
<tr>
<td>2016</td>
<td>$18</td>
</tr>
<tr>
<td>2017 YTD</td>
<td>$19</td>
</tr>
</tbody>
</table>

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, data per Dealogic, Bloomberg, & Capital IQ. VC Funding per Company ($MM) calculated as total venture financing per year divided by number of companies receiving venture financing.

*Facebook ($16B IPO) = 75% of 2012 IPO $ value. **Alibaba ($25B IPO) = 69% of 2014 IPO $ value. ***Snap ($4B IPO) = 74% of 2017 YTD $ value.
Global Technology Mergers & Acquisitions = Robust Relative to History
Global Technology Merger & Acquisition Volume = Robust Relative to History

Global Technology M&A Deals, 2010-2016

Source: Morgan Stanley, Thomson Research
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**
SOME MACRO THOUGHTS
USA, Inc.* =

Understanding Where Your Tax Dollars Go


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

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


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
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

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

Source: IMF
Note: Ranking excludes countries with public debt less than $10B in 2015. Public debt includes federal, state and local government debt but exclude unfunded pension liabilities from government defined-benefit pension plans and debt from public enterprises and central banks.
USA Entitlements = 63% of Spending vs. 45% 25 Years Ago
Interest Expense Down as % Owing to Interest Rate Declines

USA Expenses by Category, 1991-2016

Change by Category, 1991-2016

Debt: +$11T / +427%
Entitlements: +$1.8T / +307%
Non-Defense Discretionary: +$387B / +181%
Defense: +$264B / +83%
Net Interest Cost: +$46B / +24%

Source: Congressional Budget Office, White House Office of Management and Budget, US Treasury
Note: Yellow line represents yield on 10-year US Treasury bill from 12/31/91 to 12/31/16.
USA Entitlements = +$1.8 Trillion Over 25 Years Paced by Medicare + Medicaid Growth

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

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

Entitlements = 20% of median household income

Entitlements = 32% of median household income

1990

$6K

$23K

2016

$18K

$38K

% of Median Household Income

% of Median Household Income

0%

100%

20%

40%

60%

80%

100%

Remaining Household Median Income

Entitlements / Household

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.
USA Rising
Debt Commitments =

Non-Trivial Challenges that Need to Be Addressed
Immigration =

Important for USA
Technology Job Creation

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

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


*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.

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

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

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

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

- Extreme Poverty
- Not in Extreme Poverty

Child Mortality Rates, Global, 1800-2015

- Mortality Rate by Age 5
- Survival Rate by Age 5

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

- No Democracy
- Democracy

Literacy Rate, Global, 1800-2014

- Illiterate Population
- Literate Population

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

---


CLOSING THOUGHTS
<table>
<thead>
<tr>
<th>Century</th>
<th>Economic Growth Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-18\textsuperscript{th}</td>
<td>Cultivation &amp; Extraction</td>
</tr>
<tr>
<td>19\textsuperscript{th}-20\textsuperscript{th}</td>
<td>Manufacturing &amp; Industry</td>
</tr>
<tr>
<td>21\textsuperscript{st}</td>
<td>Compute Power + Human Potential</td>
</tr>
</tbody>
</table>
1) **Global Internet Trends** = Solid Slowing Smartphone Growth 4-9
2) **Online Advertising (+ Commerce)** = Increasingly Measurable + Actionable 10-80
3) **Interactive Games** = Motherlode of Tech Product Innovation + Modern Learning 80-150
4) **Media** = Distribution Disruption @ Torrid Pace 151-177
5) **The Cloud** = Accelerating Change Across Enterprises 178-192
6) **China Internet** = Golden Age of Entertainment + Transportation 193-231
   (Provided by Hillhouse Capital)
7) **India Internet** = Competition Continues to Intensify Consumers Winning 232-287
8) **Healthcare** @ Digital Inflection Point 288-319
9) **Global Public / Private Internet Companies** 320-333
10) **Some Macro Thoughts** 334-351
11) **Closing Thoughts** 352-353
Disclaimer

This presentation has been compiled for informational purposes only and should not be construed as a solicitation or an offer to buy or sell securities in any entity, or to invest in any KPCB entity or affiliated fund.

The presentation relies on data and insights from a wide range of sources, including public and private companies, market research firms and government agencies. We cite specific sources where data are public; the presentation is also informed by non-public information and insights. We disclaim any and all warranties, express or implied, with respect to the presentation. No presentation content should be construed as professional advice of any kind (including legal or investment advice).

We publish the Internet Trends report on an annual basis, but on occasion will highlight new insights. We may post updates, revisions, or clarifications on the KPCB website.

KPCB is a venture capital firm that owns significant equity positions in certain of the companies referenced in this presentation, including those at www.kpcb.com/companies.

Any trademarks or service marks used in this report are the marks of their respective owners, who are not participating partners or sponsors of the presentation or of KPCB or its affiliated funds, and such owners do not endorse the presentation or any statements made herein. All rights in such marks are reserved by their respective owners.