

Application Development on Mobile Platforms

Jaroslav Skrabalek

27/2/2019, Brno

symbian
OS



maemo.ORG



BlackBerry

Windows phone palm webOS

About me

1998, 2004

3 commercial mobile divisions
1st academic mobile lab in Czech

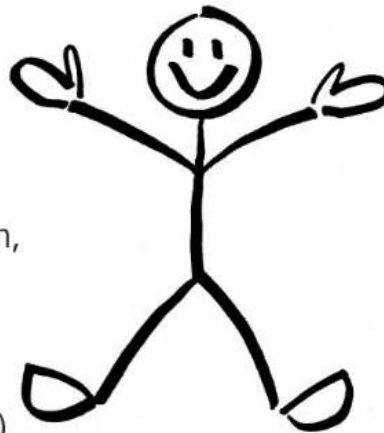


Editor (past)

- mobilmania.cz, Mobility, gsmarena.com,
- zive.cz, Computer

Project Manager & Division leader
responsible for mobile development (past)

- JavaME, iOS
- Sazka, Tipos
- iCRM, Play.cz



Mobile development division as a key part
of several companies

- Entrepreneur

Modern Mobile Platforms Group
Leader@LaSARIS

- Mobera conference chief-organizer
- Project manager (EU projects)
- Ministry of Education/ Interior consultant
- Lecturer (PV206, VAMP, XV004, ...)



Masarykova univerzita se zaměří na smartphony



[Vytisknout](#)  | [textová verze](#) | [velikost písma](#)  

Autor: [Filip Kůžel](#)

Chcete studovat smartphony a vývoj mobilních aplikací na vysoké škole? Brněnská Masarykova univerzita vám to umožní.

Why ?



Parahub case study

52.3 % smartphone users
10.8 % tablet users
36.9 % PC
34.4 % Android
44.4 % iOS
1.2 % other

10 Billion mobile phone users in 2014

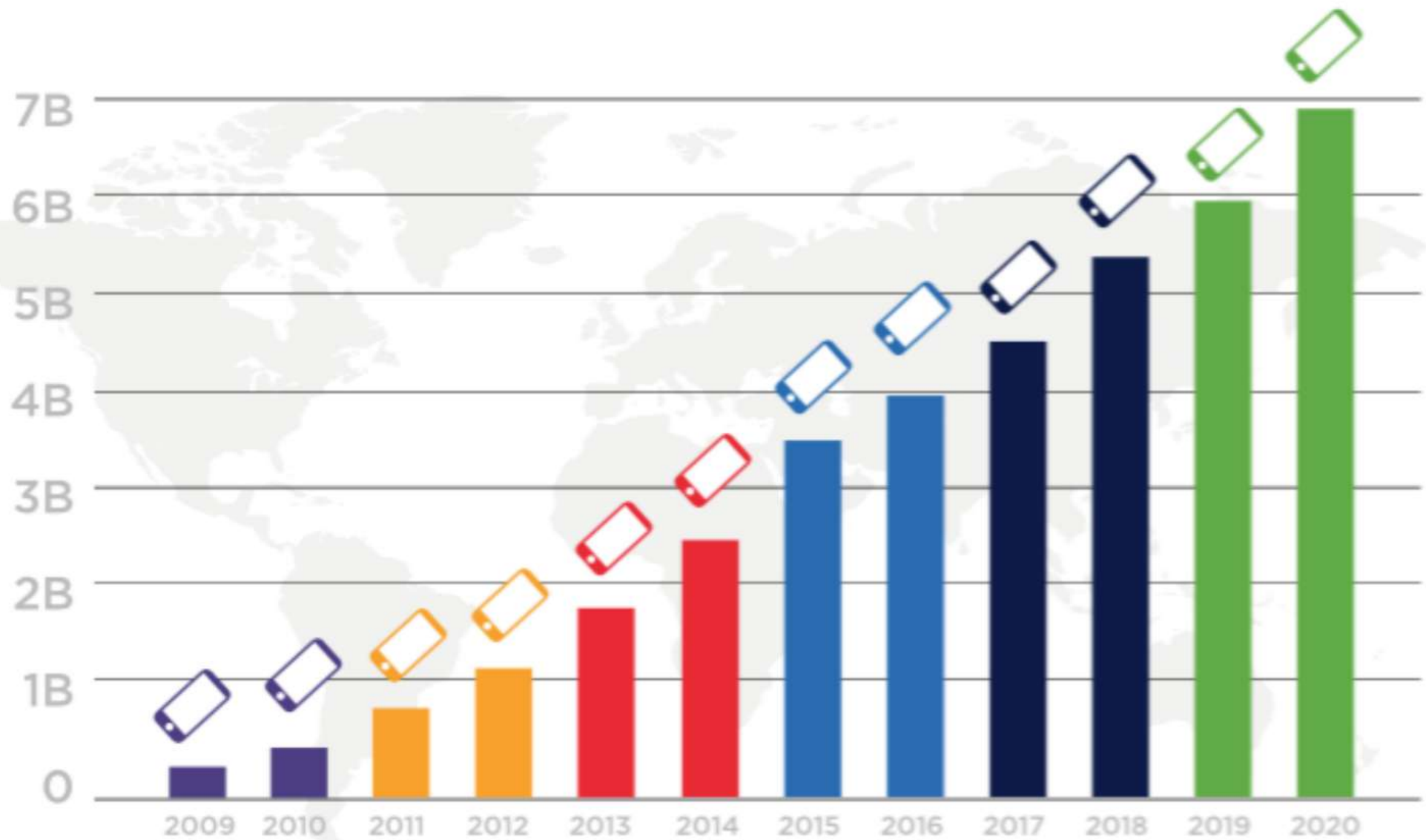
- Earth population seven billion people

9 Billion+ phones with high speed data

More mobile connection than desktop
connection to Internet in 2011

International Telecommunication Union

SMARTPHONE USERS: UP 800M



TUNE

PornHub case study

52,9 % smartphone users

10,8 % tablet users

36,3 % PC

54,4 % Android

44,4 % iOS

1,2 % other

Why ?

Change of computers' usage

- Everywhere
- Everyone
- Simply



Why ?

Old way



New way



In her 100th year,
Virginia buys her first
computer -- an iPad

Why ?

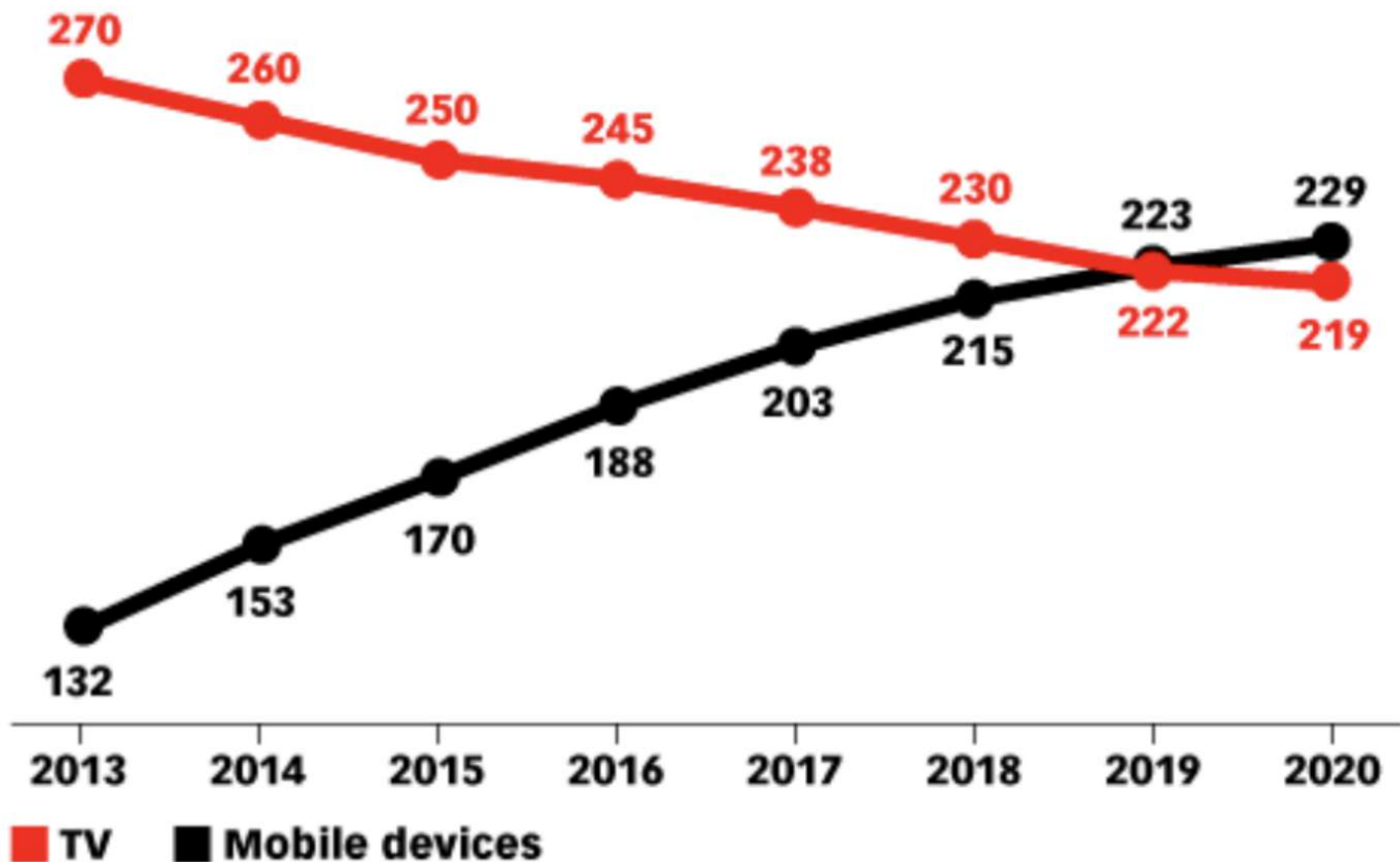
„Within five years, 70 % of collaboration and communications applications designed on PCs will be modeled after user experience lessons from smartphone collaboration applications.“

Gartner, also PWC, 2010



Average Time Spent per Day with TV and Mobile Devices by US Adults, 2013-2020

minutes



Hype Cycle for Emerging Technologies, 2018

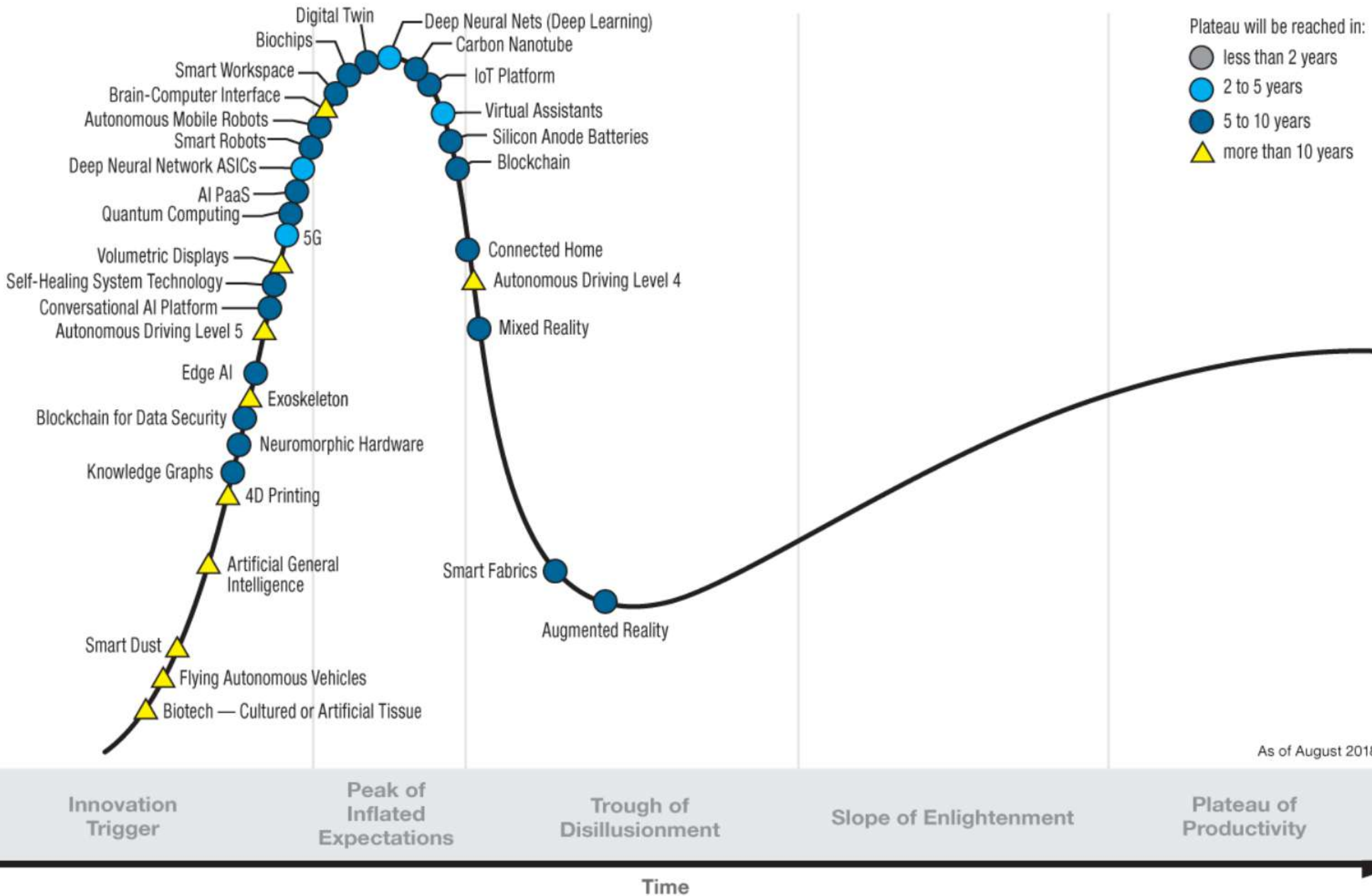
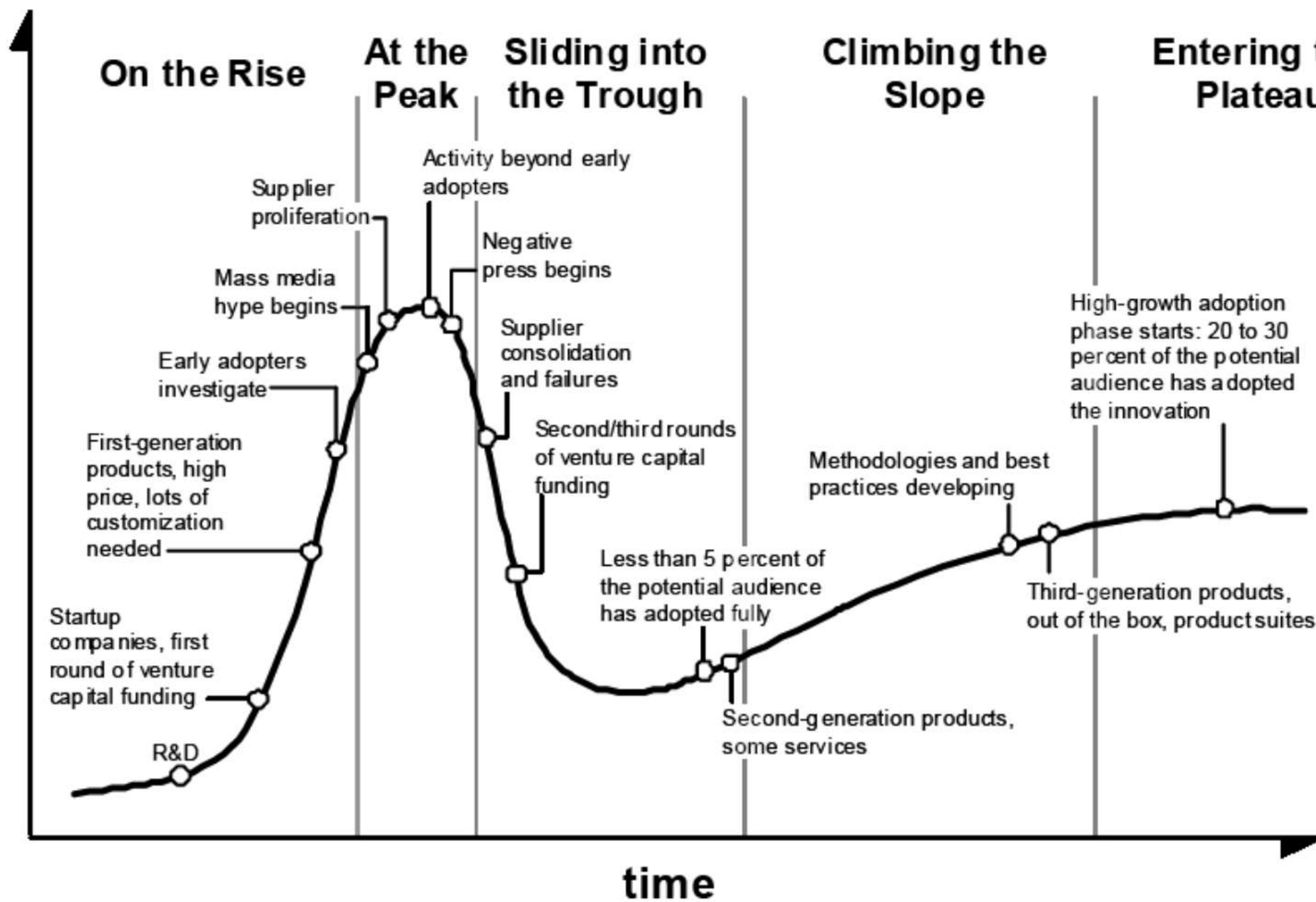


Figure 1. Gartner's Hype Cycle

Why

expectations



Why ?

NFC

- Mobile payments instead of cards
- Localization (profiles, alarm, night mode, automode)

Augmented reality

- navigation
- health
- handicapped

Sources of energy

- New technologies (fuel cells)
- Alternative energy sources (solar energy)
- "eternal" endurance

Why ?

Third Dimension

- 3D Displays
- 3D cameras
- 3D multitouch

Materials

- Liquid metals
- biochips

Performance

- parallelism - the X-core CPUs and frequency of gigahertz
- miniaturization



History

Modern is essential

R.I.P.

- EPOC
- Windows Mobile <6.5
- Palm OS
- Symbian
- BB10

- Meego
- WebOS



















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Milestones

EPOC -> Symbian

- Nokia 7650 (2002)



Touch (2007)

- Apple iPhone
- Simplicity (!)



AppStore (2008)

Siri (2011)

Watch (2014-2015)

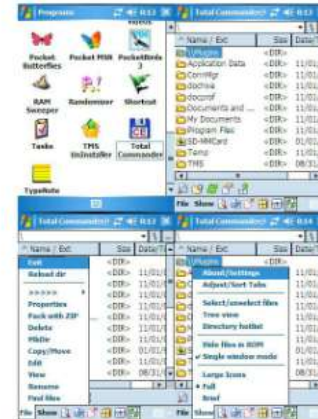


Approaches

Full IBM/PC in your pocket

VS.

Simple mobile oriented solution



Programs 0:13 Total Commander/ 0:13

videos

Pocket Butterflies
 Pocket MSN
 PocketBirds 3
 RAM Sweeper
 Randomizer
 Shortcut
 Tasks
 TMS UnInstaller
 Total Commander
 TypeNote

Name / Ext	Size	Date/Ti
\\Plugins	<DIR>	
Application Data	<DIR>	11/01/0
ConnMgr	<DIR>	11/01/0
dochive	<DIR>	11/01/0
docprof	<DIR>	11/01/0
Documents and ...	<DIR>	11/01/0
My Documents	<DIR>	11/01/0
Program Files	<DIR>	11/01/0
SD-MMCard	<DIR>	01/01/9
Temp	<DIR>	11/01/0
TMS	<DIR>	08/31/0

File Show [Icons]

Total Commander/ 0:13 Total Commander/ 0:14

Name / Ext	Size	Date/Ti	Name / Ext	Size	Date/Ti
Exit	<DIR>		\\Plugins	<DIR>	
Reload dir	<DIR>	11/01/0	Application Data	<DIR>	11/01/0
>>>>>	<DIR>	11/01/0	ConnMgr	<DIR>	11/01/0
Properties	<DIR>	11/01/0	dochive	<DIR>	11/01/0
Pack with ZIP	<DIR>	11/01/0	docprof	<DIR>	11/01/0
Delete	<DIR>	11/01/0	Documents and ...	<DIR>	11/01/0
MkDir	<DIR>	11/01/0	My Documents	<DIR>	11/01/0
Copy/Move	<DIR>	01/01/9	Program Files	<DIR>	11/01/0
Edit	<DIR>	11/01/0	SD-MMCard	<DIR>	01/01/9
View	<DIR>	08/31/0	Temp	<DIR>	11/01/0
Rename			TMS	<DIR>	08/31/0
Find files					

About/Settings
 Adjust/Sort Tabs
 Select/unselect files
 Tree view
 Directory hotlist
 Hide files in ROM
 Single window mode
 Large Icons
 Full
 Brief

File Show [Icons] File Show [Icons]



Quick Tour



Calc



Calendar



Card Info



CMDBar



Contacts



Dialer



Documents



Expense



abc



123

Approaches

Connectivity, Media, Content

Rich yet Simple Functionality

- Hundreds of functions
vs. tens but well-controllable

Touch



Cross-field area



Why ?

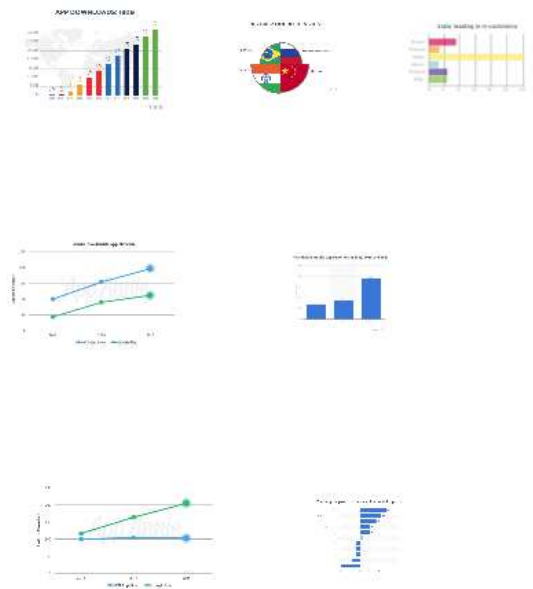
Business is there

Apple **AppStore** (3/2018)

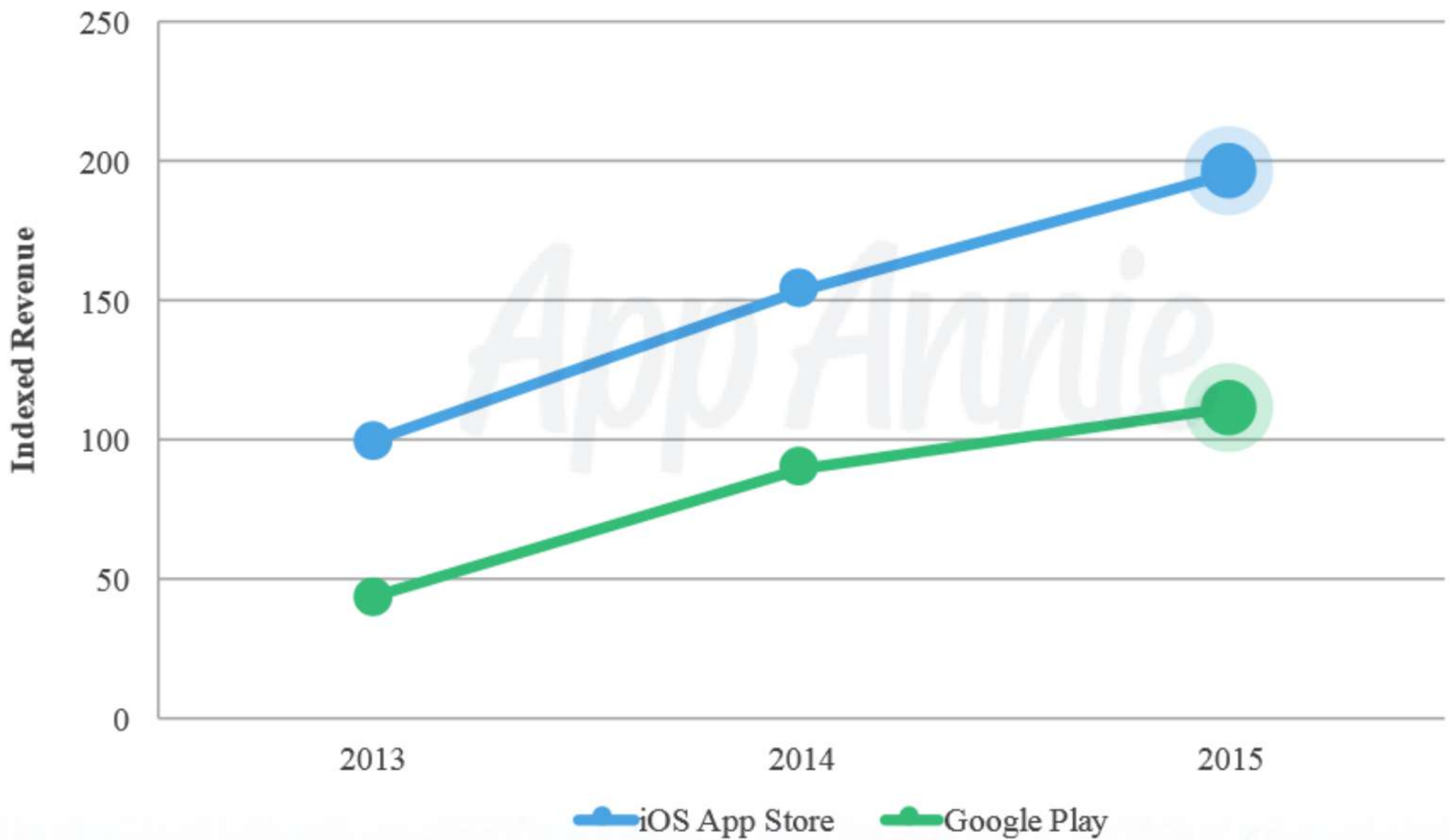
- 2,1M+ apps, 275apps/day
- Revenue \$50 000+ not unusual
- 75 % revenue

Google **Android Market** (12/2018)

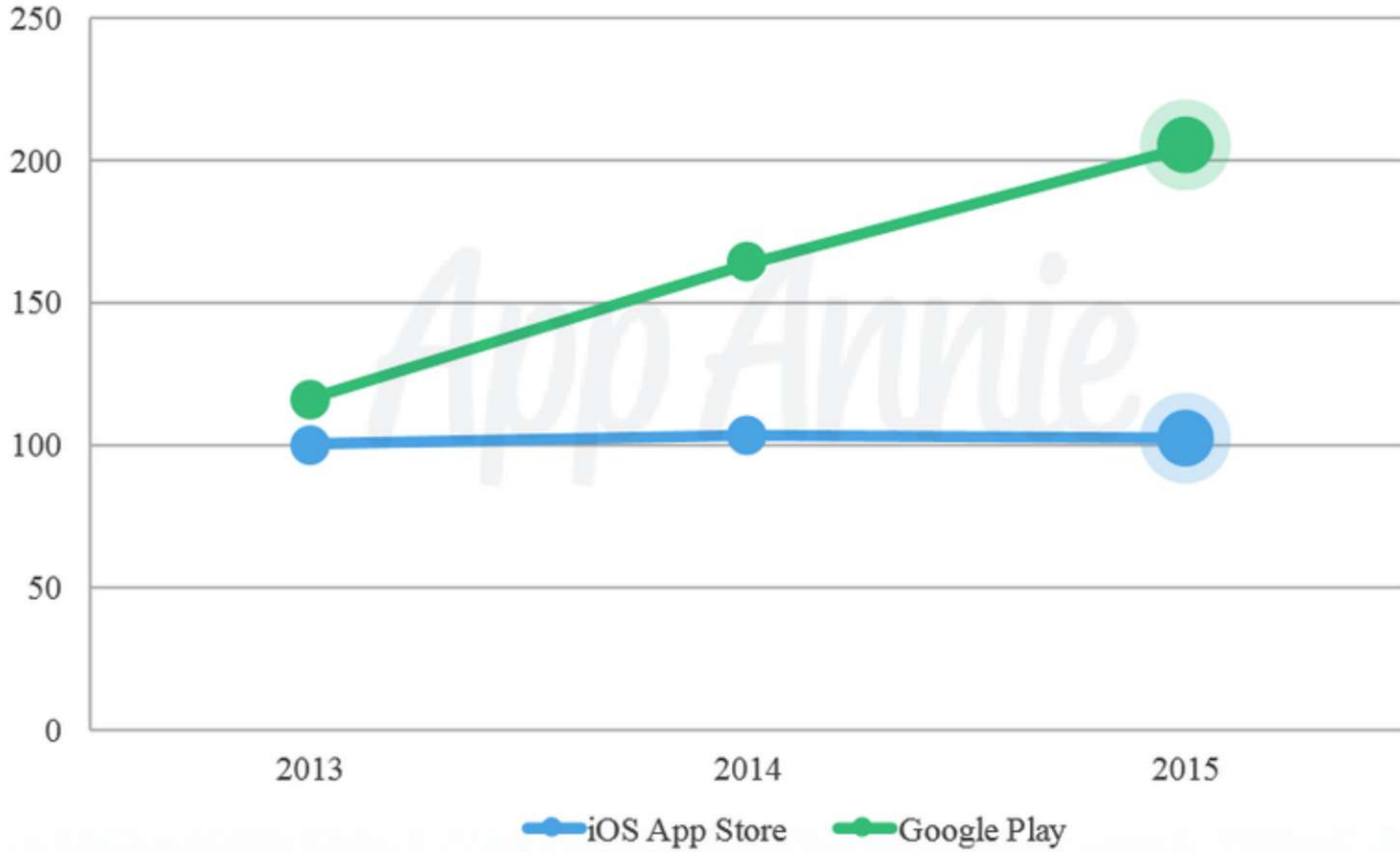
- 2,6M+ apps (3,8M in 3/2018)
- Revenue ~ poor, insecure



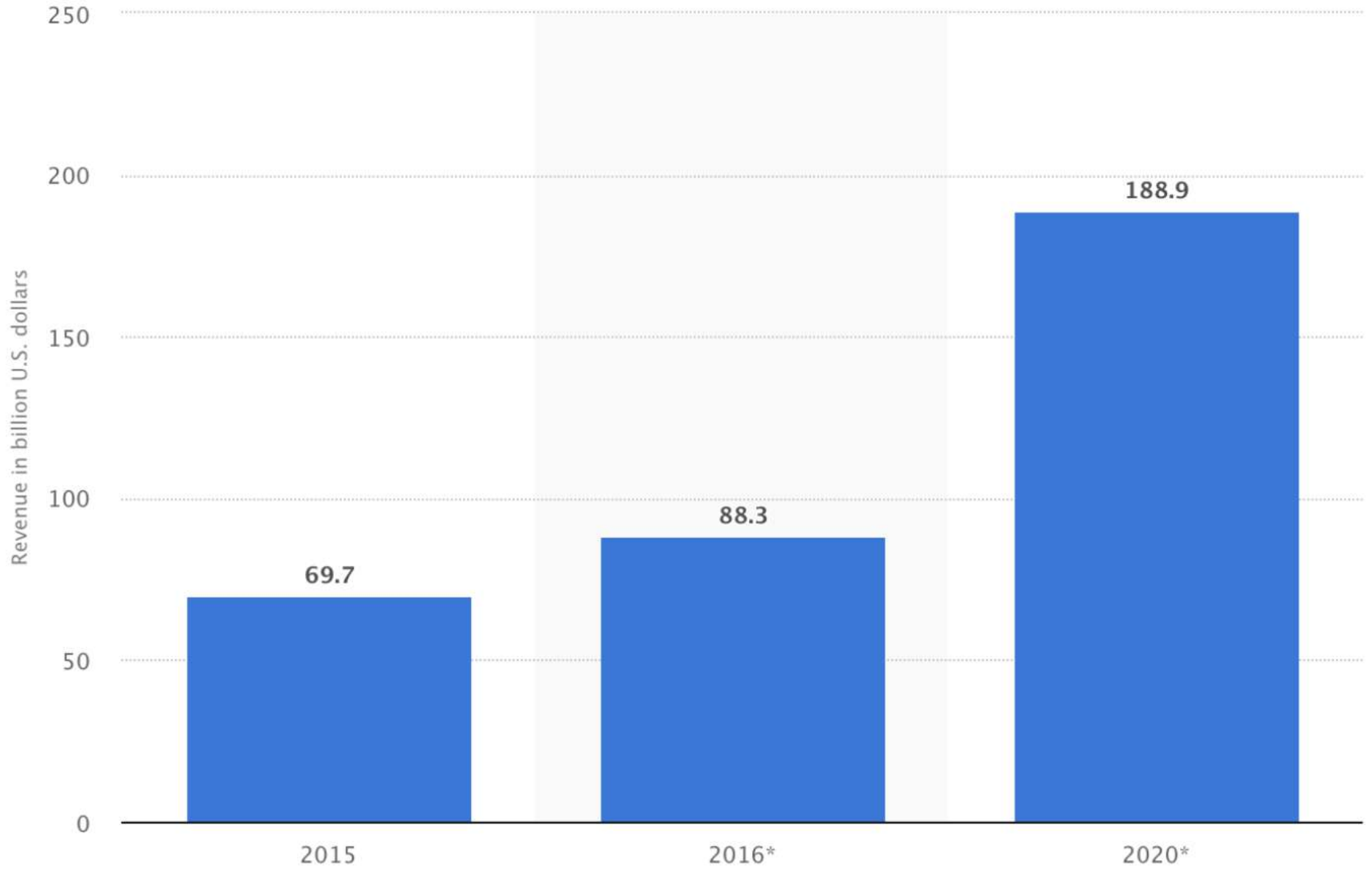
Annual Worldwide App Revenue



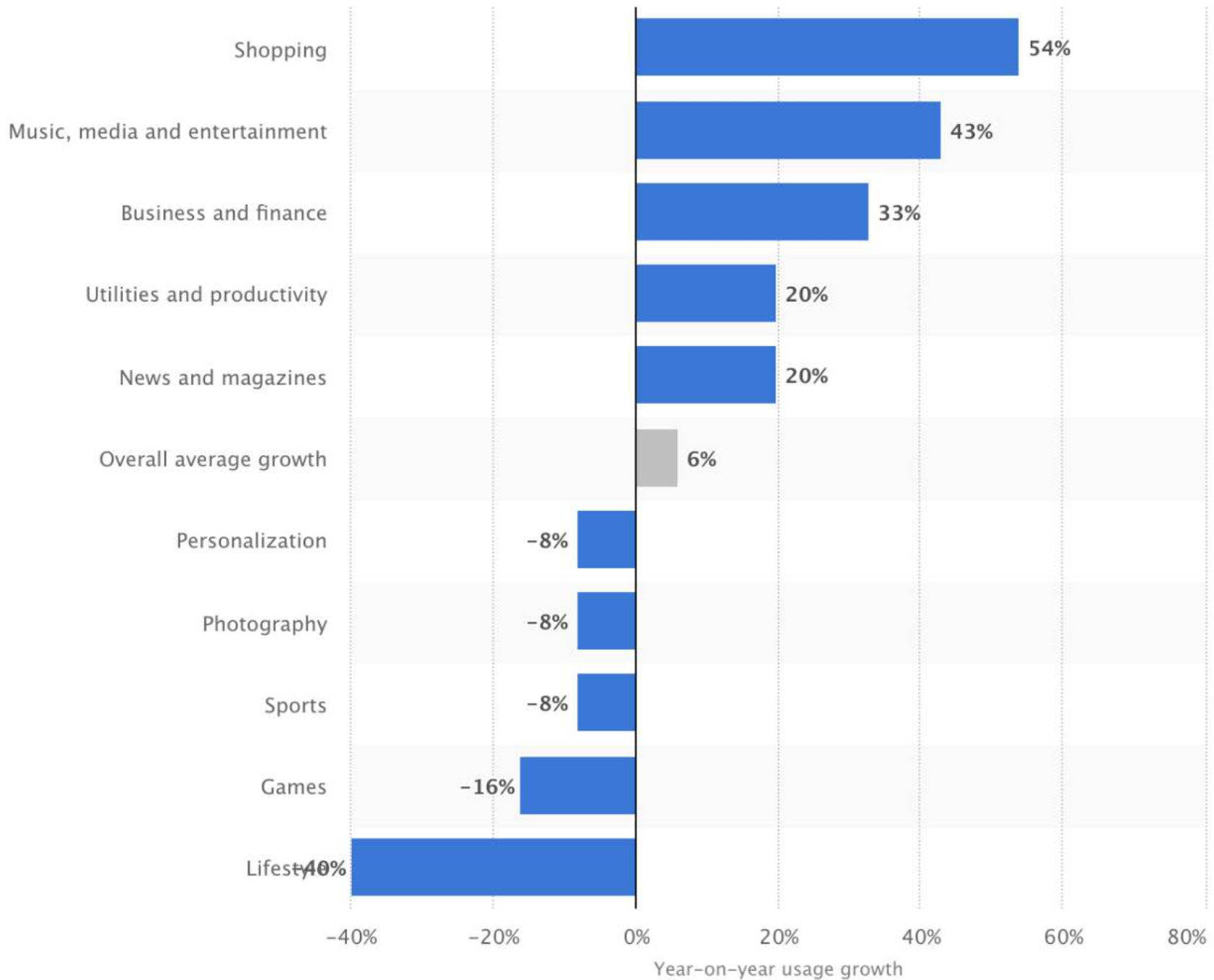
Indexed Downloads



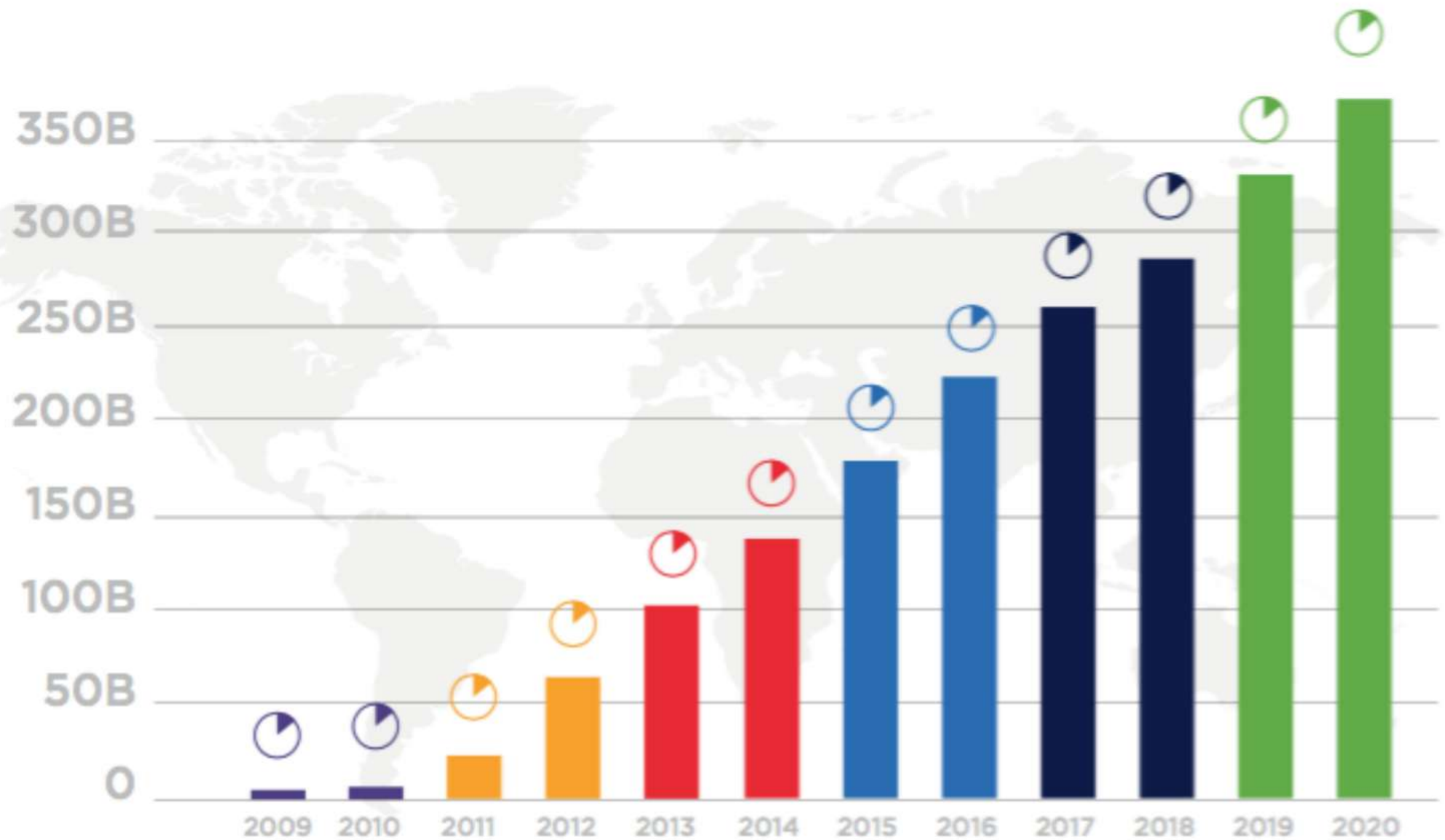
Worldwide mobile app revenues in 2015, 2016 and 2020



Year-on-year growth in time spent per mobile app cat



APP DOWNLOADS: 180B

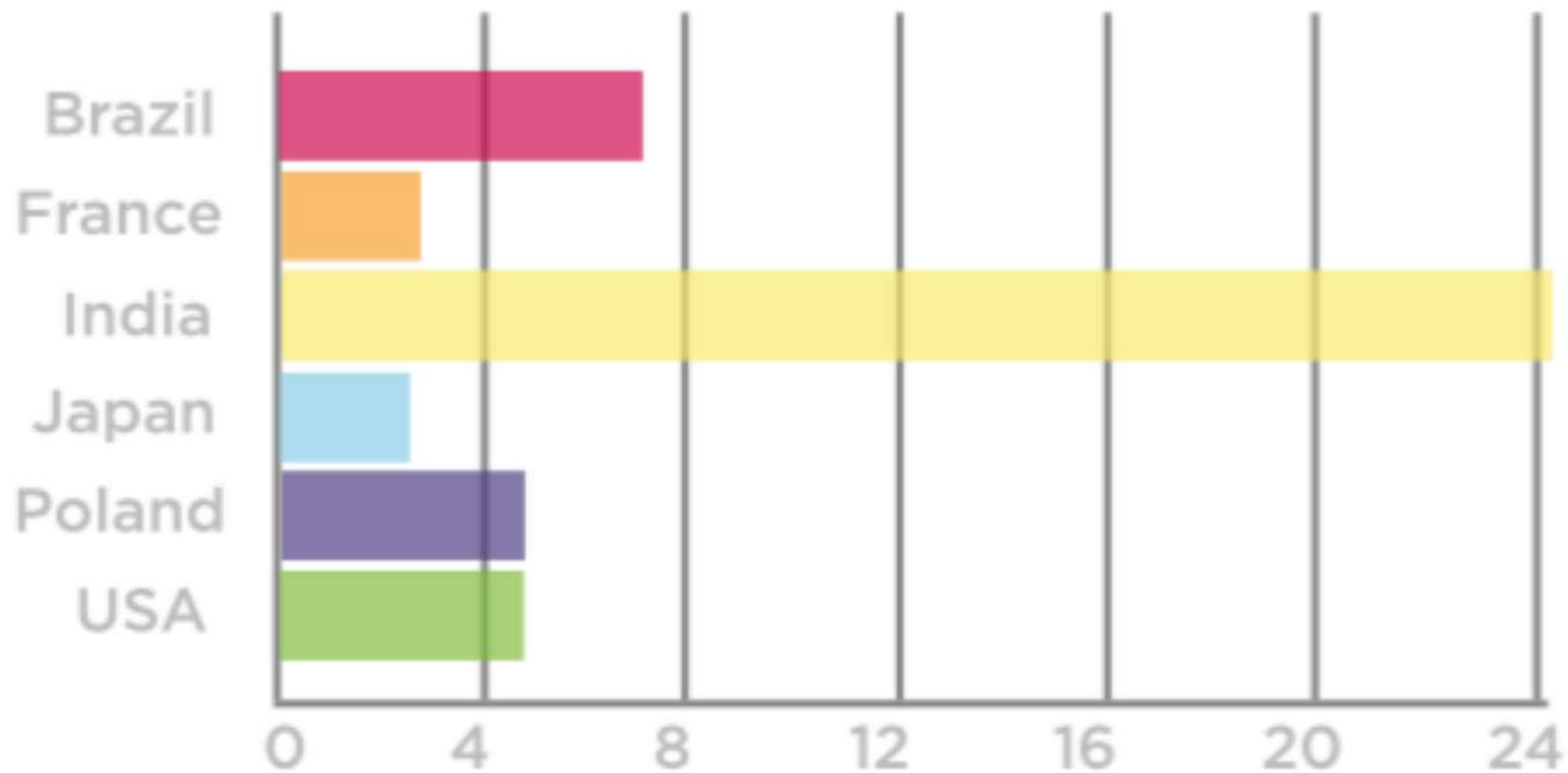


BIG BRIC: DOUBLED IN 2015



TUNE

India: leading in m-commerce



APPS ORANGES

UNCOMMON COMPARISONS OF THE **APP STORE** VS. **GOOGLE PLAY**

PEOPLE LOVE TO COMPARE THE APP STORE TO GOOGLE PLAY, BUT IT SEEMS THESE COMPARISONS ALWAYS FOCUS ON THE SAME METRICS—NUMBER OF APPS, RATE OF GROWTH, SALES. IN OTHER WORDS, IMPORTANT BUT PREDICTABLE METRICS. SO WE DECIDED TO HAVE A LITTLE FUN AND VISUALIZE UNCONVENTIONAL COMPARISONS OF THE TWO MOST DOMINANT MOBILE MARKETPLACES.

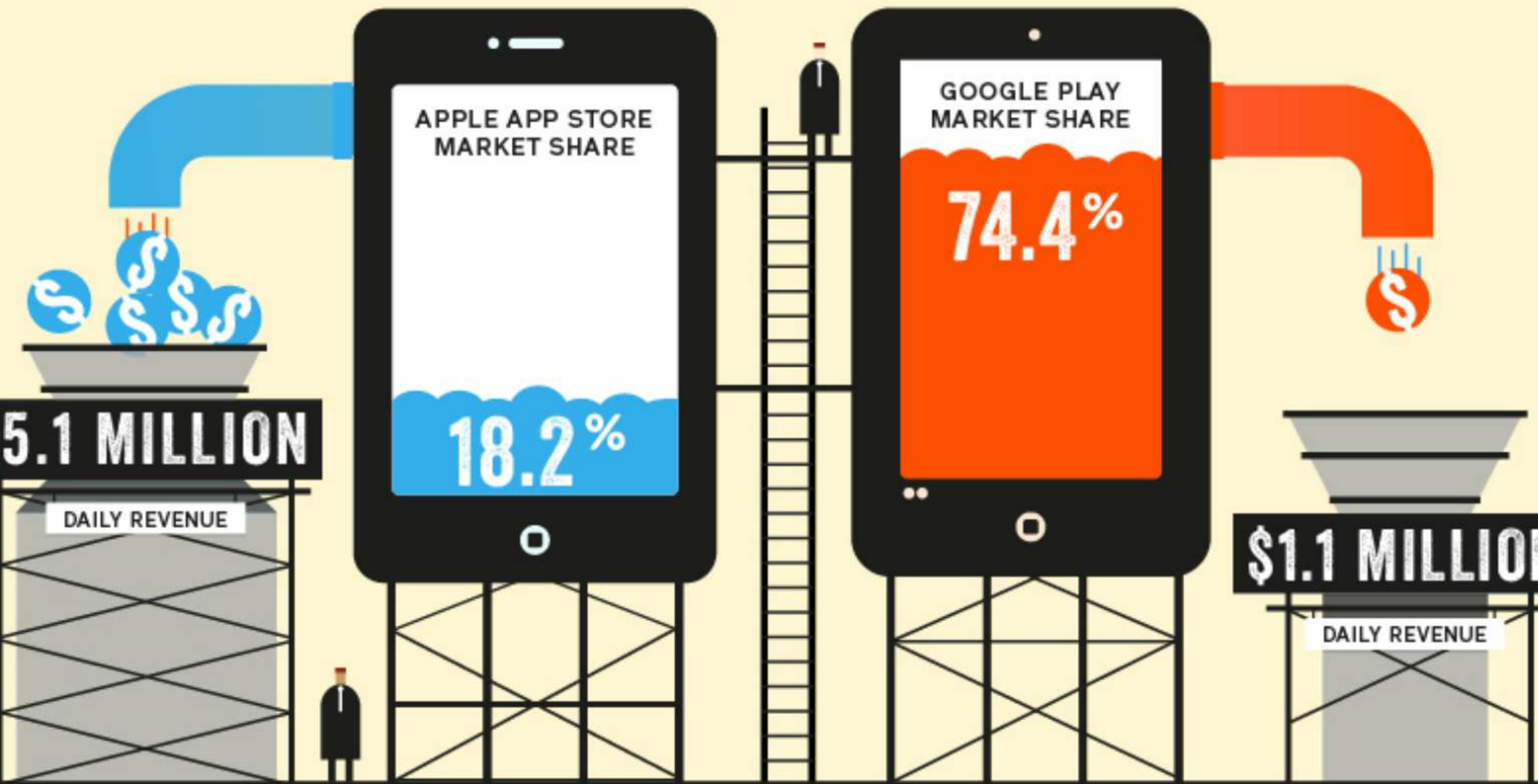
THE BIG PICTURE

DESPITE A SIGNIFICANTLY LARGER MARKET SHARE, GOOGLE PLAY LAGS IN GENERATING REVENUE FOR DEVELOPERS.



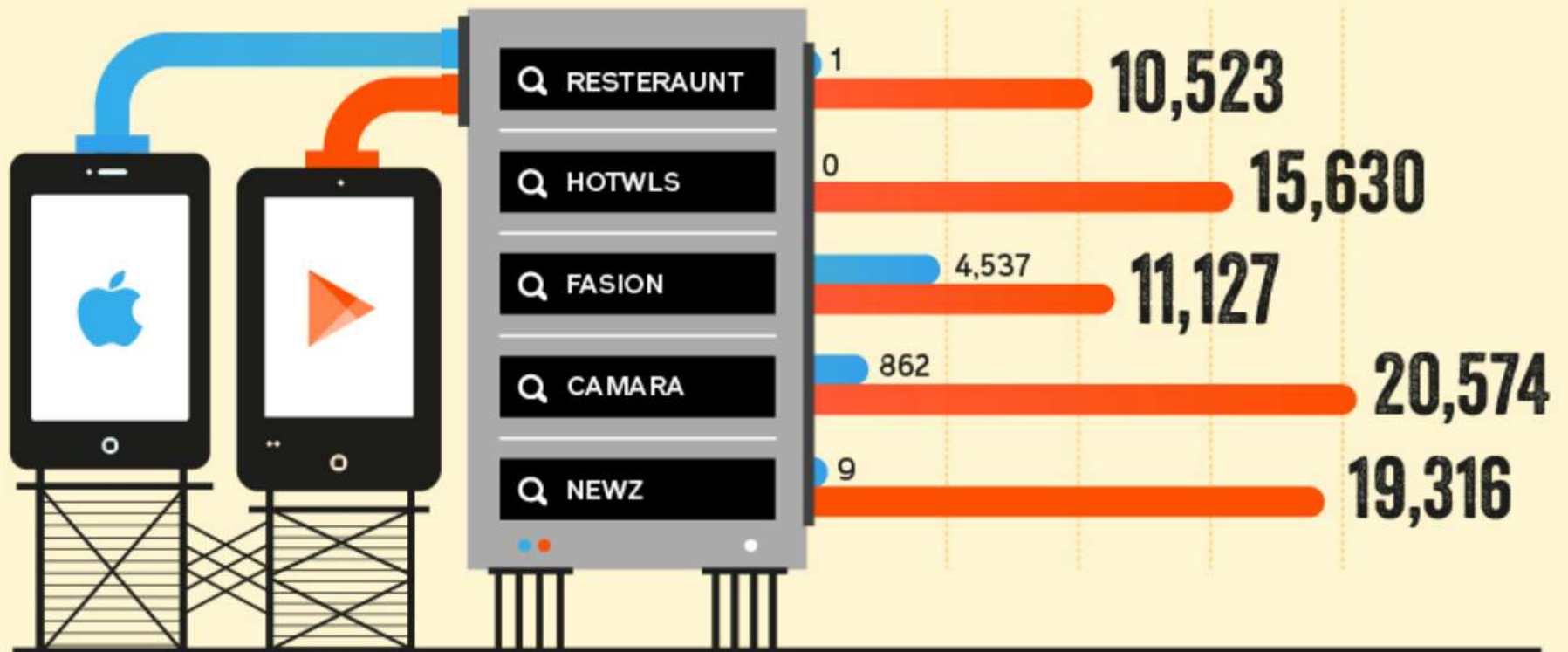
THE BIG PICTURE

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APP DISCOVERY

GOOGLE PLAY'S SUPERIOR SEARCH FUNCTION MAKES IT EASIER TO FIND APPS — EVEN WITH A KEYWORD MISPELLED.

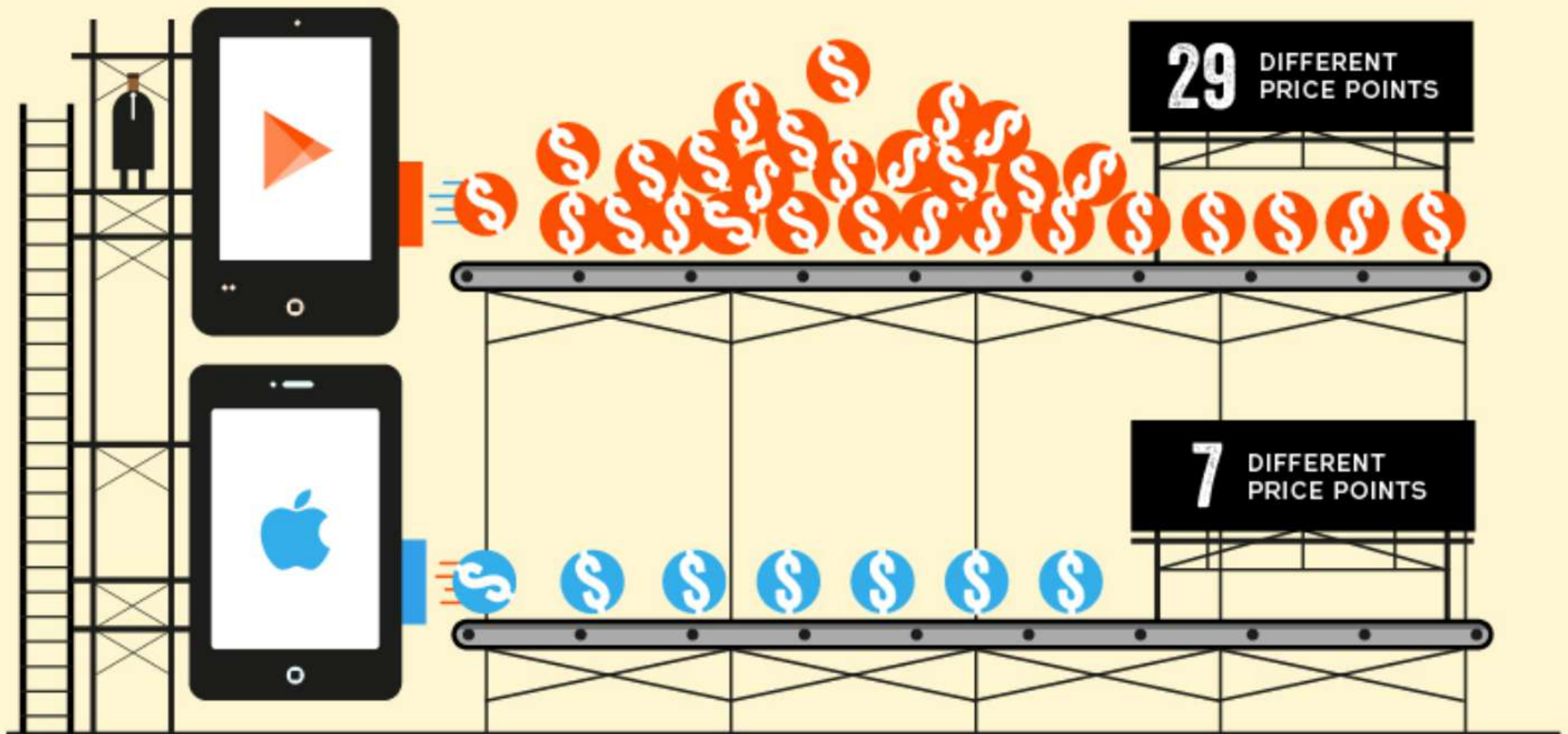


PRICE POINT DISTRIBUTION

GOOGLE PLAY'S PRICING MODEL ALLOWS FOR A LARGER NUMBER OF PRICE POINTS (FROM TOP 100 APPS AS OF 7/9/2013).

PRICE POINT DISTRIBUTION

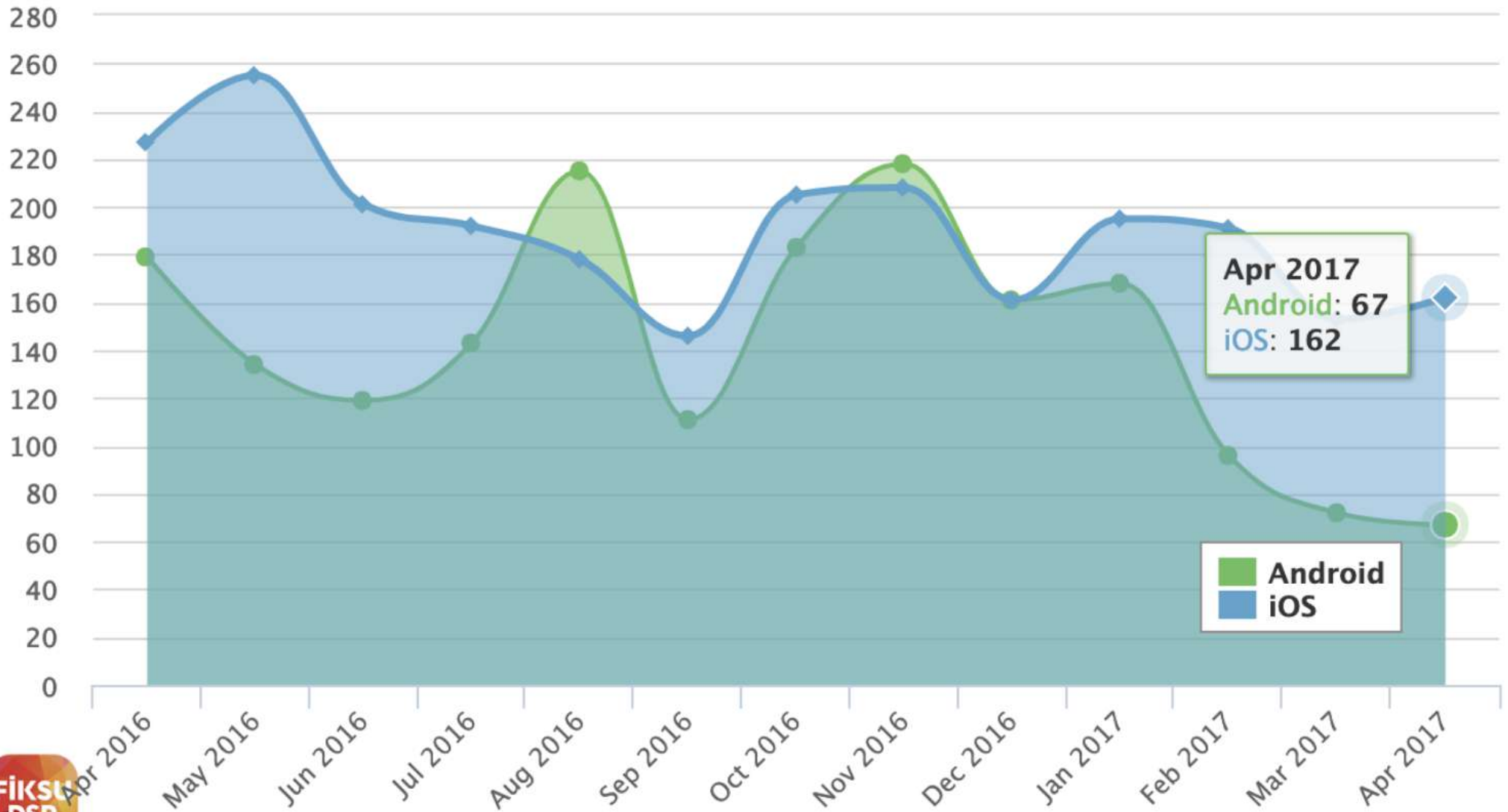
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MOST EXPENSIVE APPS

FEW APPS APPROACH THE MAX PRICE POINT SET BY EACH MARKETPLACE (AND EVEN IF YOU PAY \$999 FOR VIP BLACK ON IOS, YOU CAN'T ACTIVATE THE SERVICE UNTIL YOU VERIFY THAT YOU HAVE "ASSETS AND/OR INCOME IN EXCESS OF \$1 MILLION").

Fiksu DSP Cost Per Purchaser Index



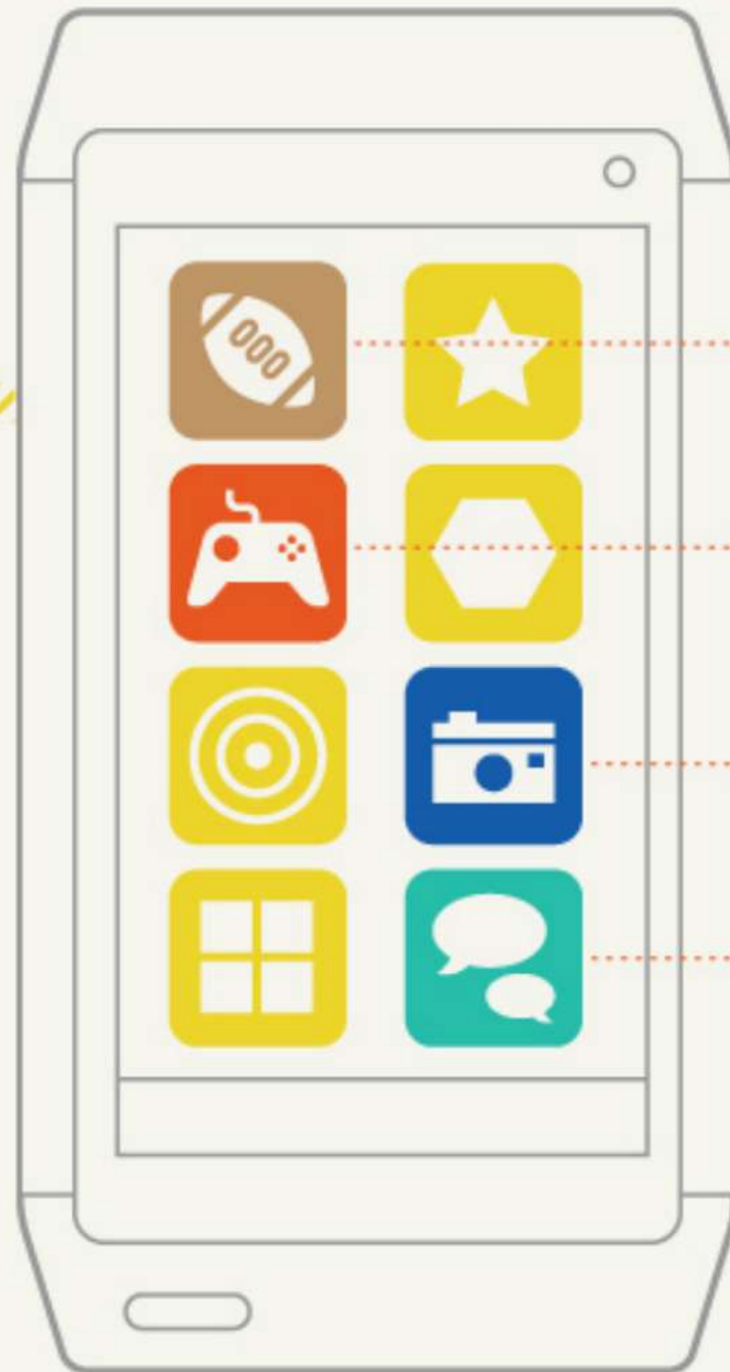
ONE TIME USE

PERCENTAGE OF APPS
ONLY USED ONCE
(BY APP CATEGORY)



20%

of all mobile apps
downloaded once are
never used again



THE APPSTORE IS STUFFED

5,257 iPhone Apps for Workout

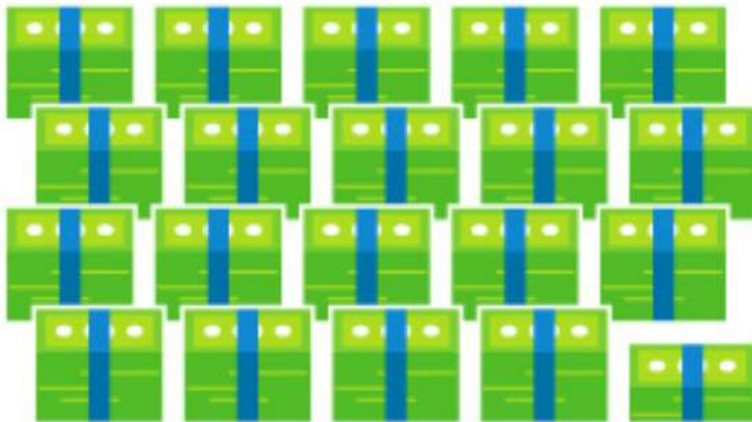


5,200 Android Apps for Workout

..... THE CONSEQUENCE: ONLY A FEW DEVELOPERS EARN WELL

While Clash of Clans makes

\$1,221,606 /DAY



THE AVERAGE APP MAKES:

\$625
\$2,222 /developer



\$1,125
\$6,000 /developer



\$4,000
\$21,276 /developer





NATIVE MOBILE APPS

25%

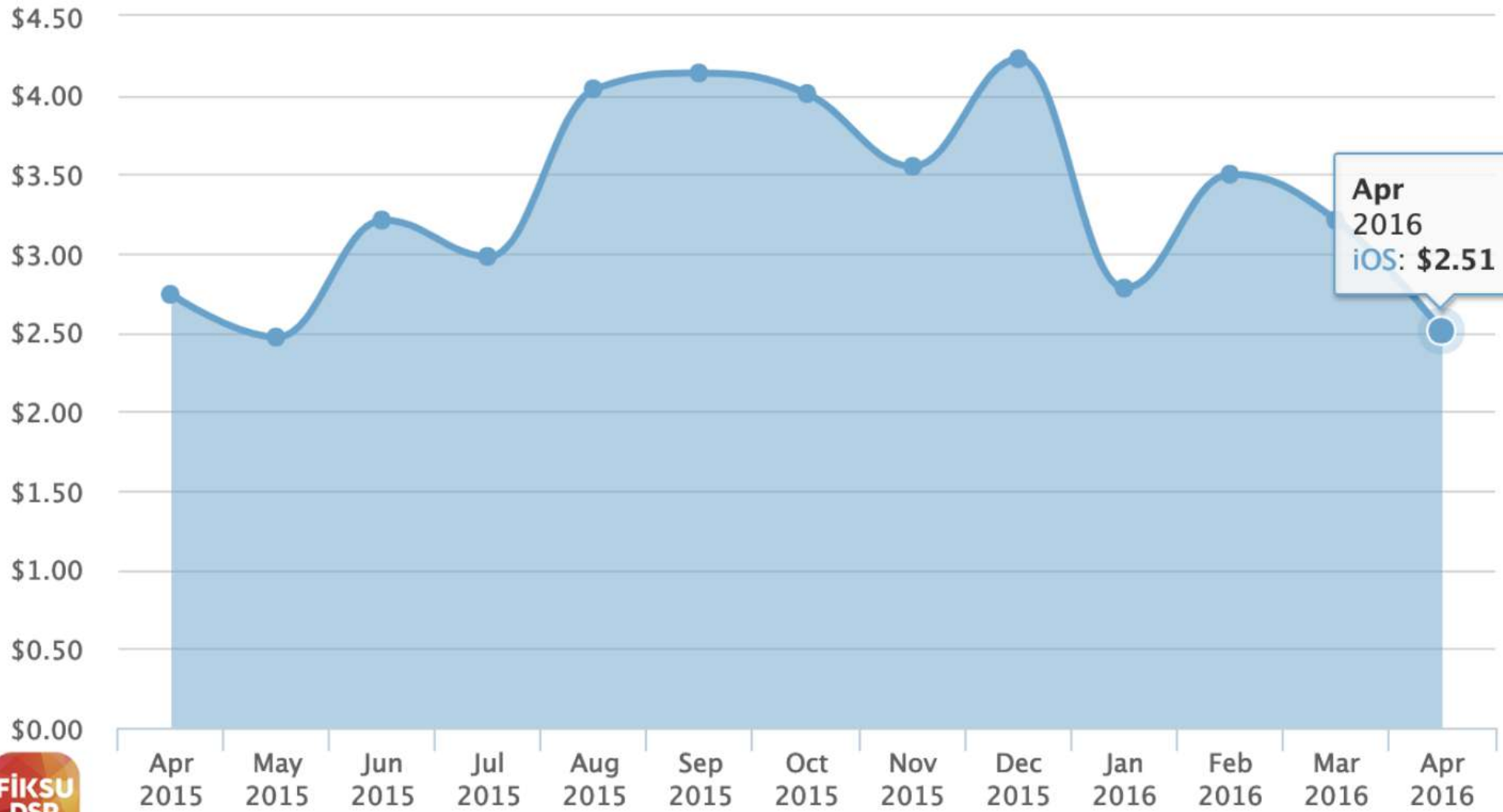
ARE ABANDONED
AFTER FIRST TIME USE

-77%

AVG. DAILY ACTIVE USER
LOSS IN 1ST 3 DAYS OF
INSTALL

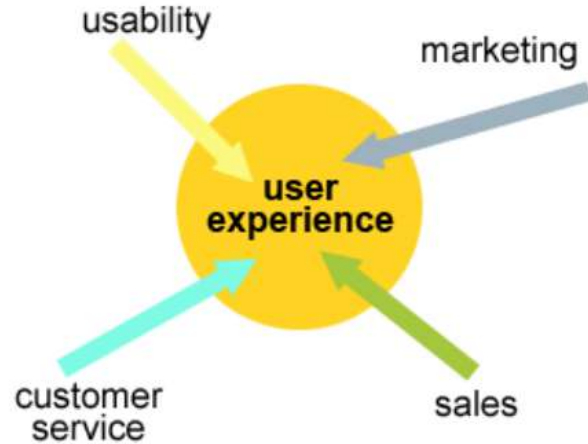
Cost Per Loyal User Index

■ iOS





User first



Any idea, but...

Problem → Solution

Three kinds

- Must-to-have
- Nice-to-have
- ehm, next one

Feasible

APP ROADMAP HOW TO GO FROM APP IDEA TO APP STORE

1 IT ALL STARTS WITH AN IDEA

Ensure your idea

1. Is unique



2. Solves a problem or provides entertainment



3. Has been evaluated by an expert for areas of improvement and technical limitations



Most frequently used apps

1 IT ALL STARTS WITH AN IDEA

Ensure your idea

1. Is unique



2. Solves a problem or provides entertainment



3. Has been evaluated by an expert for areas of improvement and technical limitations



Most frequently used apps:



Weather



Social
Networking



Maps/
Navigation



Games

2 DEVELOP A MONETIZATION PLAN

On average, developers make:



\$1125 revenue/app
in the Google Play Store



\$4000 revenue/app
in the Apple App Store

Ways to monetize your app include:



in the Google Play store

in the Apple App Store

Ways to monetize your app include:



1. Charge a one-time fee to download your app



2. One-time fee + in-app purchase (i.e. for extra features)



3. Offer a free version + a paid version (which has extra features)



4. Include advertising



5. Charge subscription fee



6. Free for a limited time, then charge a fee

However, **80%** of app developers are not generating enough revenue to support a stand alone business.



3 DEVELOP A MARKETING PLAN

This starts early! Why?

2/3 of all apps have never been downloaded



Build Buzz Through:



4 HIRE YOUR TEAM

Who you'll need:

A developer

A designer

A marketer



Sign Up For A Developer Account



Sign Up For A Developer Account



\$\$\$99/YEAR
iOS Developer



\$\$\$25 ONE TIME FEE
Google Play Developer



This is so you can establish your business and
distribute your product through these app stores.



5 SKETCH YOUR APP

Sketch each screen of your app and the flow from start to finish.

Keep in mind:

How each screen will look



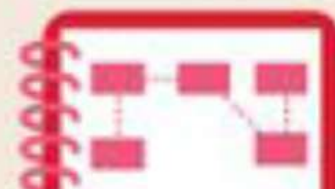
Size and shape of various elements



Actions users can take from each screen.



Then take this sketch to your design and development team.



To avoid having your app rejected from the app store, ensure it doesn't do any of these things:

Improperly uses files and file systems



Links to outside payment schemes



Mentions supported platforms



Uses the word "beta"



Has a long load time



Has localization glitches



404 ERROR

Crashes for users + denies permissions



OPEN PAGE

Improperly uses icons or buttons



7 LAUNCH IT!

— Sit back, relax, and watch as people download your app. →



— Then start working on the next, improved version! →



Programming languages

- Java
- Kotlin
- Obj-C
- Swift
- C++

```
if (gidsetsize <= NGROUPS_SMALL)
    group_info->blocks[0] = group_info->small_block;
else {
    for (i = 0; i < nblocks; i++) {
        gid_t *b;

        b = (void *)__get_free_page(GFP_USER);
        if (!b)
```

Cloud

Mobile device is not enough

Necessity of backend

- Amazon Web Services
- Google AppEngine
- Microsoft Azure



App as a Web

Write once, run many times

Cross-Platform Mobile Application Development

(+) fast, looks like native, all major platforms

(-) slow, energy consuming, not native user experience

WebView

-> Phonegap, Titanium, Xamarin

DROID vs. IOS

BATTLE OF THE OPS

The following is one of 5000 "Tech Hunt At

20.04.2015, 23:01

Androidák dobodal iPhonistu. Muži sa pohádali kvôli telefónom

HN

Autor: dpi

 Komentáre (0)

 Zdieľaní (0)



f



g+

Obyčajná hádka o iPhone a Samsungu skončila príchodom policajnej jednotky, lekárov a nasadzovaním pút.



32%

APPLE iOS

21%

ANDROID

8%

NOT SURE / DON'T HAVE A CELLPHONE

23%

16%

Hunch crossed those responses with answers from dozens of other "Teach Hunch About You" questions, totaling 80 million+ responses.

ANDROID

IPHONE / iOS

DIFFERENCES BETWEEN ANDROID AND IPHONE/iOS USERS:



- 10% more likely to be men
- 17% more likely to live in the suburbs
- 86% more likely to live in the country
- Skew 18-34



- 18% more likely to be women
- 27% more likely to live in a city
- 29% more likely to be 35+
- 37% more likely to have a graduate degree
- 17% more likely to be politically liberal



CORE DEMOGRAPHICS



80% more likely to have only a high school diploma

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24% more likely to have an
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between \$50k and \$100k

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67% more likely to have an annual household
income of \$200k or more

60% more likely to be
American Express cardholders



Slightly more likely to be pessimists

12% more likely to be introverts

29% more likely to prefer
saving their money



Slightly more likely to be optimists

14% more likely to be extroverts

26% more likely to prefer spending their money

39% more likely to say they're high-maintenance



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The American Express logo, featuring the word 'AMEX' in white capital letters on a green rectangular background.



PERSONALITY

Slightly more likely to be pessimists

12% more likely to be introverts

29% more likely to prefer saving their money



18% more likely to have equally strong mathematical and verbal aptitude

71% more likely to say they tend to follow

Slightly more likely to be optimists

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39% more likely to say they're high-maintenance

11% more likely to have a stronger verbal aptitude

27% more likely to say they tend to lead



LIFE EXPERIENCES

71% more likely to have never traveled outside their native country

36% more likely to not remember their last vacation

12% more likely to have pets



50% more likely to have visited more than five countries

13% more likely to play a musical instrument

15% more likely to have vacationed in the last six months





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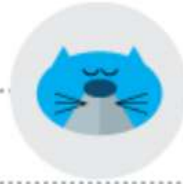
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15% more likely to have vacationed in the last six months

55% more likely to have taken several free flights this year using frequent flyer miles

31% more likely to be later adopters



57% more likely to prefer an ugly device that's full-featured

35% more likely to have just one email address

47% more likely to have first used the Internet after 2000

2000 ▶

50% more likely to be early adopters

122% more likely to prefer a sleek device that does just a few things

22% more likely to have three or more email addresses

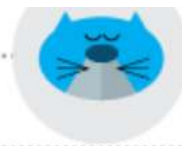
50% more likely to have first used the Internet before 1992



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33% more likely to never back up their computer

More than 100% more likely to be PC users

50% more likely to use Yahoo! Mail



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22% more likely to have three or more email addresses

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67% more likely to back up their computer constantly



More than 100% more likely to be Mac users

38% more likely to own an email domain associated with work, school, or their website

Slightly more likely to briefly listen to the pitch when reached by a telemarketer

35% more likely to pass the time waiting in a long line by texting



Slightly more likely to immediately hang up on telemarketers

50% more likely to text while driving



54% more likely to pass the time waiting

TECHNOLOGY



BREAKING OF



TECHNOLOGY

the Internet after 2000

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before 1992

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SPEAKING OF THE PHONE



Slightly more likely to briefly listen to the pitch when reached by a telemarketer

35% more likely to pass the time waiting in a long line by texting

24% more likely to have a song (rather than beeps or tones) for a ringtone

33% more likely to answer an unknown phone call with "Hi, this is..."



Slightly more likely to immediately hang up on telemarketers

50% more likely to text while driving

54% more likely to pass the time waiting in a long line by checking email

17% more likely to have digital tones or beeps (rather than songs) for a ringtone



TV SHOWS

Louie | How I Met Your Mother | The Walking Dead



Planet Earth | Portlandia | The Killing



CABLE TV NETWORKS

Comedy Central | ESPN | Discovery Channel

Bravo | BBC | HBO



MOVIES

X-Men: First Class | The Tree of Life |

Midnight in Paris | Inception | Another Earth

STATS OF THE PHONE

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CABLE TV NETWORKS

Comedy Central | ESPN | Discovery Channel

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MOVIES

X-Men: First Class | The Tree of Life | Harry Potter and the Deathly Hallows: Part 2

Midnight in Paris | Beginners | Another Earth

BOOKS

The Lord of the Rings | 1984 | The Gunslinger



A Visit from the Goon Squad | Switch | Freedom

MUSIC

Radiohead | Janelle Monàe | Girl Talk

The Antlers | Belle and Sebastian | Best Coast



BREAKFAST CEREAL



Corn Pops | Honey Nut Cheerios | Cinnamon Toast Crunch

Rice Krispies | Kashi GOLEAN Crunch! | Crispix

SNACKS



MUSIC

Radiohead | Janelle Monàe | Girl Talk

The Antlers | Belle and Sebastian |
Best Coast



BREAKFAST CEREAL



Corn Pops | Honey Nut Cheerios |
Cinnamon Toast Crunch

Rice Crispies | Kashi GOLEAN Crunch! |
Crispix

SNACKS

Mini-pizzas | Popcorn | Chocolate

Mixed Nuts | Ginger Snaps | Yogurt



MAIN COURSE

Sirloin Steak | General Tso's Chicken |
Cheesesteak

Sushi | Pad Thai | Tapas



FRUIT

Orange | Pineapple | Grape



Strawberry | Clementine | Raspberry

ICE CREAM

Chocolate Chip Cookie Dough | Vanilla |
Cookies and Cream

Salted Caramel | Mint Chip |
Lemon Sorbet



ALCOHOL

Shiraz | Moscato | Beck's



Malbec | Chianti | Magic Hat

FASHION DESIGNER

Brooks Brothers | Salvatore Ferragamo |
Ralph Lauren

Tom Ford | Marc Jacobs |
Proenza Schouler



FOOD & DRINK

ICE CREAM

Chocolate Chip Cookie Dough | Vanilla |
Cookies and Cream

Salted Caramel | Mint Chip |
Lemon Sorbet



ALCOHOL

Shiraz | Moscato | Beck's



Malbec | Chianti | Magic Hat

FASHION DESIGNER

Brooks Brothers | Salvatore Ferragamo |
Ralph Lauren

Tom Ford | Marc Jacobs |
Proenza Schouler



ART MOVEMENT

Gothic | Street Art | Surrealism

Minimalism | Abstract Expressionism | Bauhaus



TREE

Bamboo | Oak | Maple

Walnut | Cherry | Fir



LIVE THEATRE

Shakespeare | Cirque du Soleil |
Contemporary Play



Broadway Musical | Classical Play | Dance

FASHION, TASTE, & AESTHETICS



 People with Windows-based
operating systems tend to be:

Women

Suburbanites

Self-described middle of the road



 People with other operating systems
(BlackBerry and Palm) tend to be:

Equally likely to be men or women

City-dwellers

Self-described liberal



WHAT ABOUT



FASHION, TASTE, & AESTHETICS

Gothic | Street Art | Surrealism

Minimalism | Abstract Expressionism | Bauhaus

TREE

Bamboo | Oak | Maple

Walnut | Cherry | Fir

LIVE THEATRE

Shakespeare | Cirque du Soleil | Contemporary Play



Broadway Musical | Classical Play | Dance



WHAT ABOUT OTHER OPS?



People with Windows-based operating systems tend to be:

- Women
- Suburbanites
- Politically middle of the road
- Extroverted
- Not particularly well-traveled



People with other operating systems (BlackBerry and Palm) tend to be:

- Equally likely to be men or women
- City-dwellers
- Politically liberal
- Introverted
- Well-traveled



Stats are based on more than 80 million aggregated and anonymized responses to "Teach Hunch About You" questions answered between March 2009 and July 2011 by about 700,000 users of Hunch.com. The base cellphone operating system question was asked between March 2011 and July 2011. Yes, Poindexter, we know that correlation does not necessarily imply causation. Legalese: There are lots of brands listed above that belong to their respective owners, not to Hunch. Find more cool data stuff at hunch.com/info/reports.

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Any

Tablets

Nice-to-have?

7", 9", 10", 11", 13"?

Keep BI, design UI

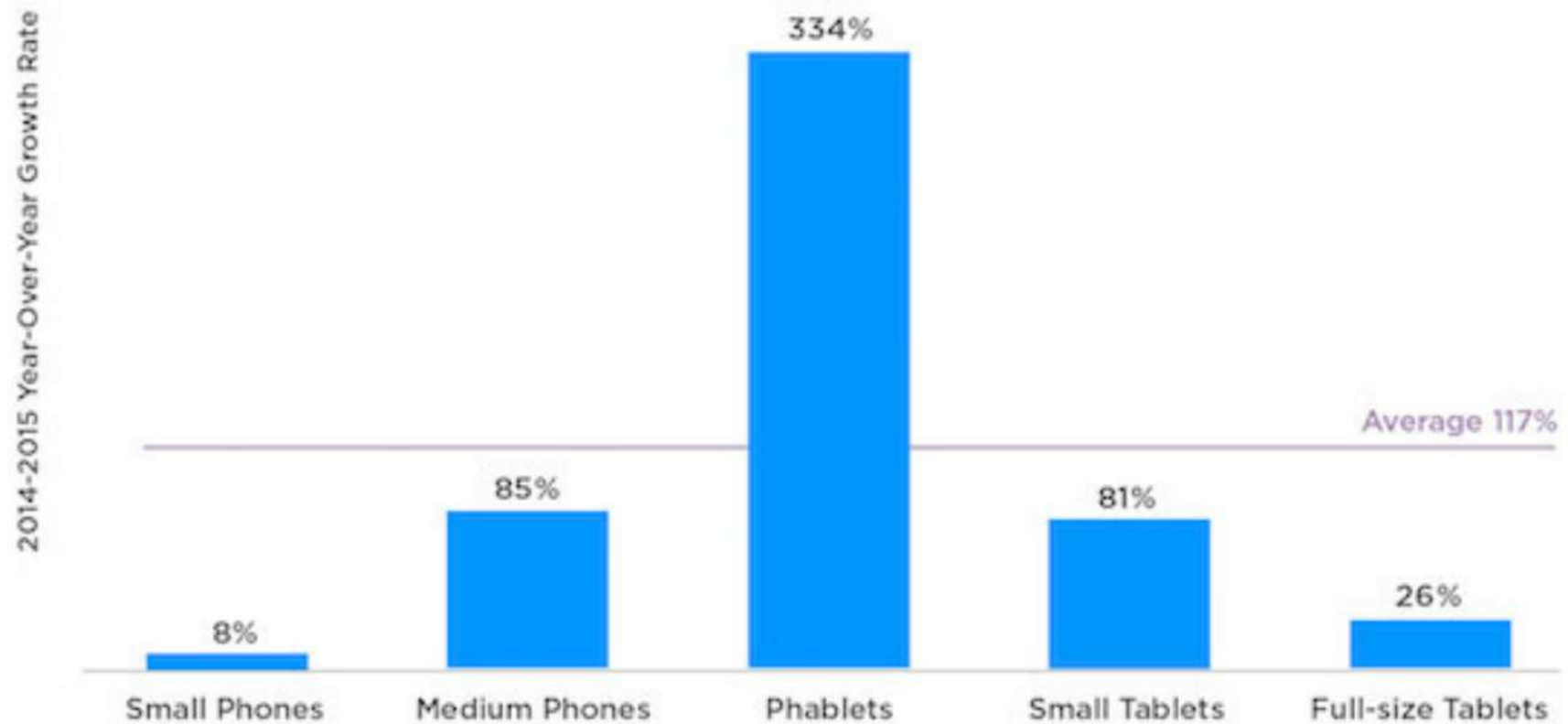
Apple iPad dominance

Future



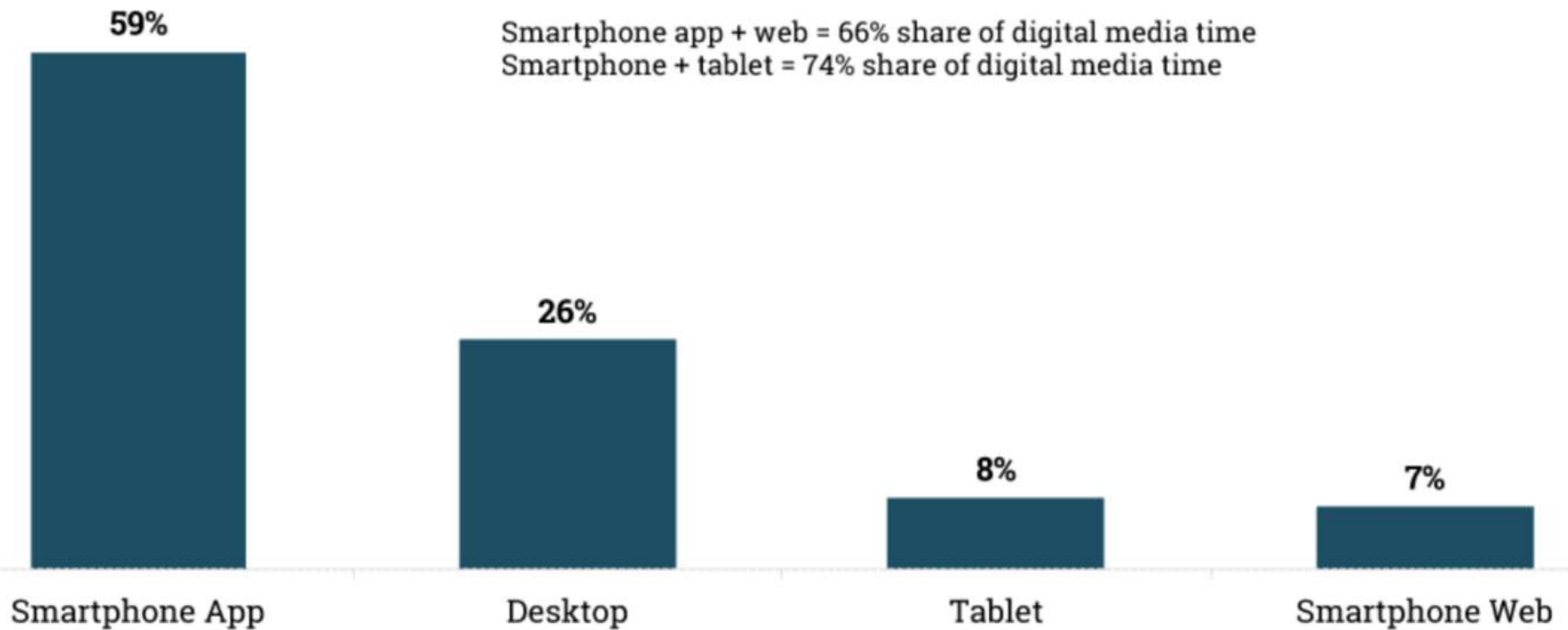
Time Spent on Mobile Grows 117% Year Over Year

(By Form Factor)



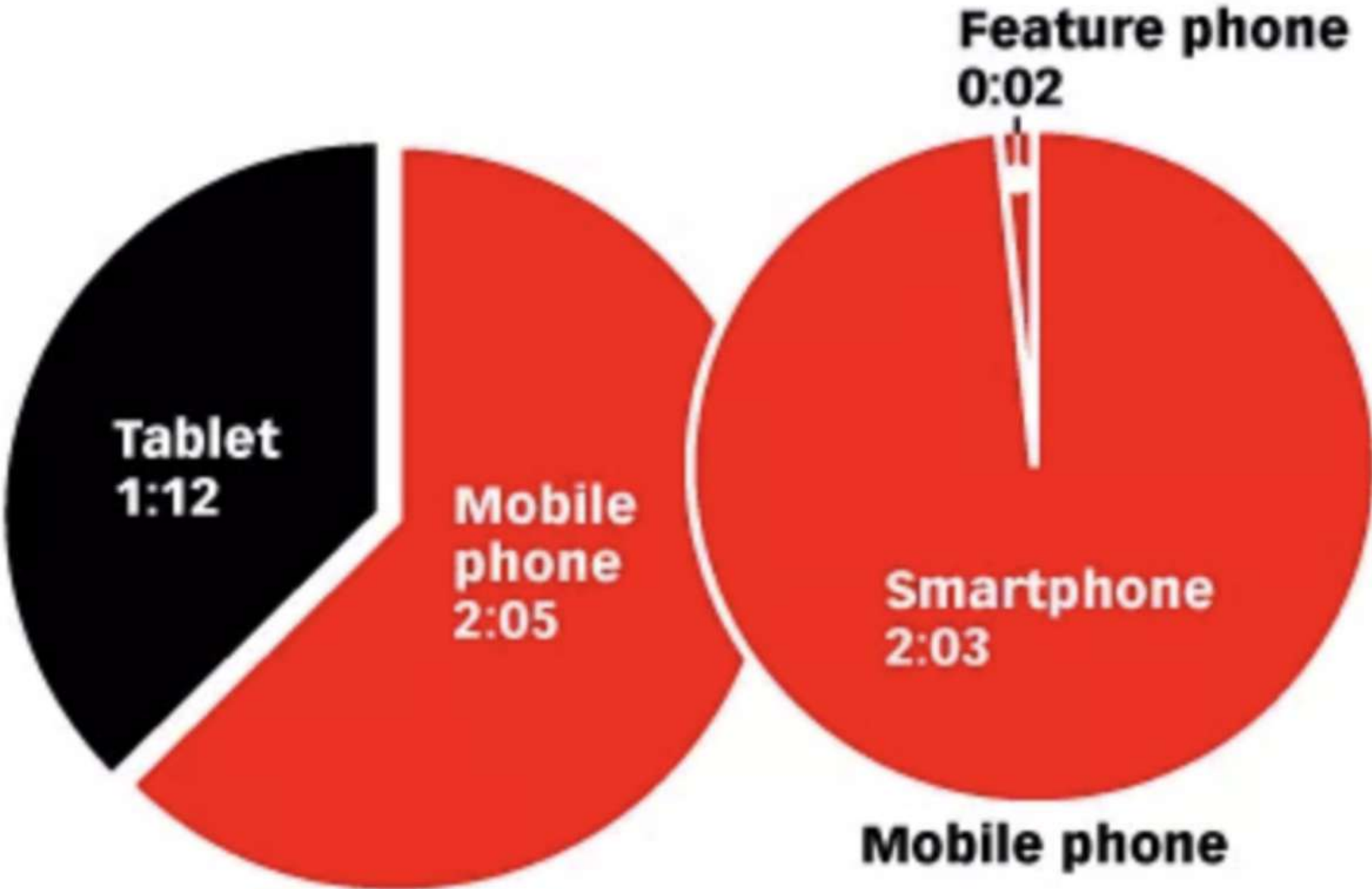
Device Share of US Digital Media Time Spent

In April 2018



Average Time Spent per Day with Nonvoice Mobile Activities by US Adults, 2017

hrs:mins



Total per day=
3 hours 17 minutes

THANK YOU FOR ATTENTION !

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