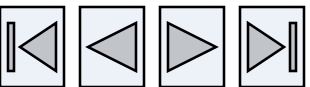


Introduction

CSCI3310

Mobile Computing & Application
Development

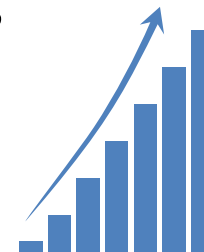
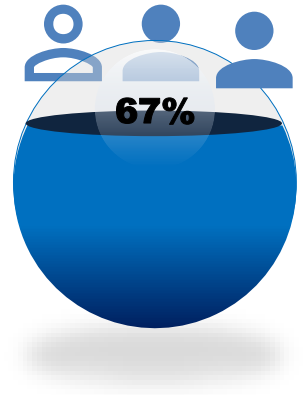


Outline

- Mobile computing platforms
 - notebook/tablet
 - smartphone
 - wearables
- Smartphone and Apps Market
 - desktop vs mobile
 - iOS vs Android

Facts

- In 2021, there are **5.27 billion** unique mobile users, or **67%** of the global population (Hootsuite).
- Global vendors shipped a total of **1.35 billion** smartphones worldwide in 2021 (IDC)
- Global direct consumer spending on apps reach **\$57.7 billion** in 2016 and grow to **\$133 billion** by 2021 (Sensor Tower)



Mobile Computing Platforms

- Can be broadly classified into:
 - Notebook/TabletPC
 - Not that abundant as smartphone now
 - Increasing acceptance for tablet PC due to iPad
 - Handheld game consoles
 - E.g. NDS, Sony PSP, Nintendo SWITCH
 - Having tough time in competing with smart phones
 - Smartphone
 - Very popular
 - We will focus our study on this in our course
 - Wearable computers
 - miniature electronic devices that are worn by the bearer



Notebook/tabletPC

- Laptop/notebook computers are useful as substitutes for desktop computers
- Notebook has problem of battery life & convenience in usage e.g. use of touchpad
- Early tablet computers are example of pen computing before the introduction of multi-touch
 - More or less targeted at eBook market initially



Apple Newton –
MessagePad



Factors affecting mobile platform

- Back in 2007, Steve Ballmer (Microsoft CEO) commented on iPhone's debut :

“ There's no chance that the iPhone is going to get any significant market share. No chance.

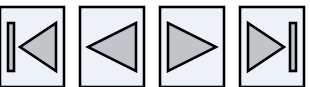
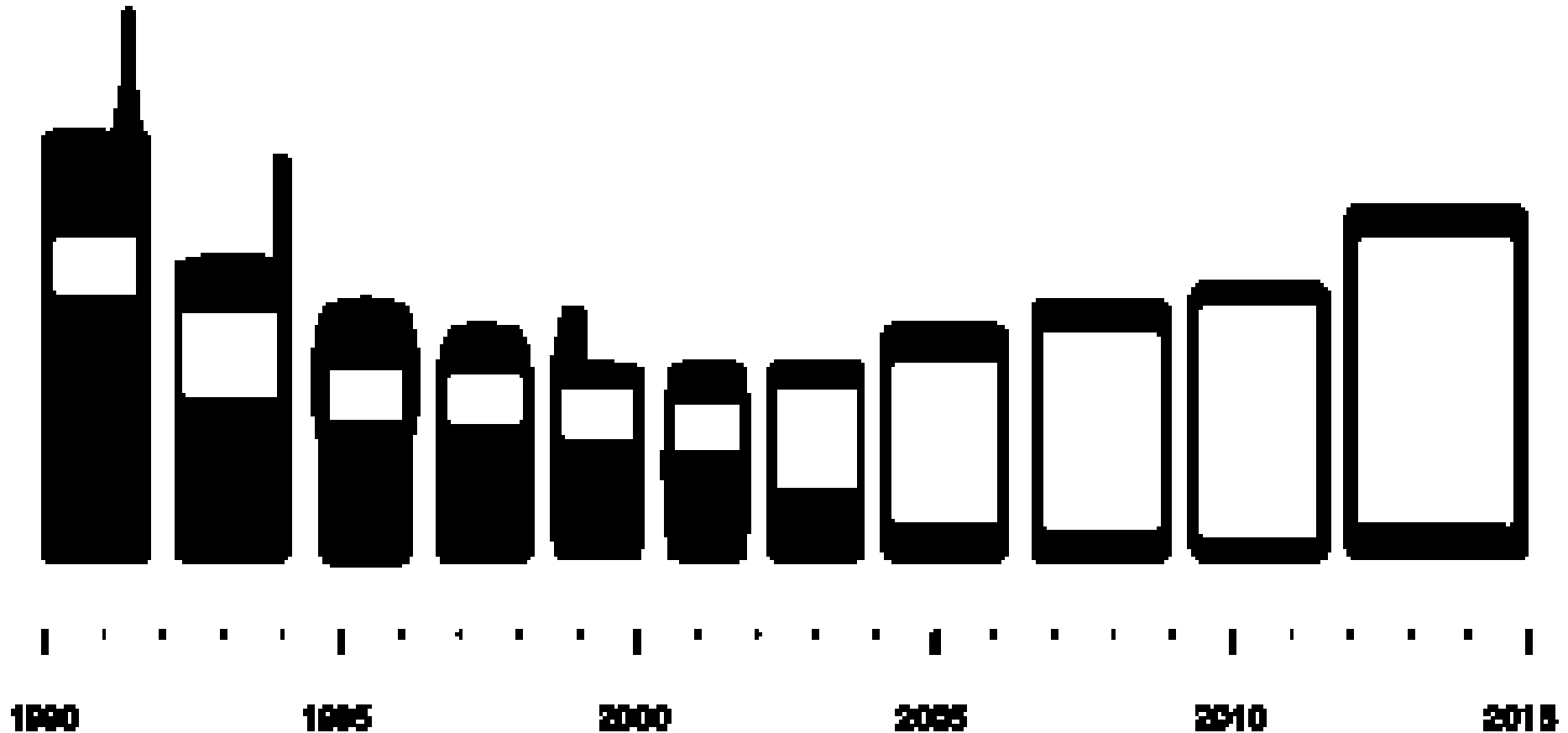
- Now everyone knows the result
- iPhone marked the start of the era of mobile computing

Smartphones

- Better think of as handheld computers nowadays
- Evolved into system with smartphone operating system e.g. iOS, Android, Windows Phone etc.
- People are moving all daily matters on to smartphone
- To discuss more soon



Smartphones (History)



Tablet PC Revived

- The tablet computer market was refreshed by Apple through the introduction of the iPad device in 2010.

Hardware for iPad Air 2

Retinal touchscreen display of 2048 x 1536 pixels diagonal 9.7 inch (over 50% more than HDTV)

Dual core A8X processor with M8 motion coprocessor
WiFi (802.11a/b/g/n/ac), LTE / CDMA EV-DO, Bluetooth

Assisted GPS & GLONASS

Environmental sensor

- Accelerometer
- ambient light sensor
- barometer
- gyroscope
- iBeacon microlocation
- Digital compass

8MP iSight camera & FaceTime HD Camera



Wearable Computers

- New generation of mobile computing
- Emphasize its contact with our skins or attachment to clothes
- Currently focus on wrist or eye attachment
- Health monitoring wearable will be the major direction besides reading notifications from the wearable
- Currently seems to be more nice-to-have than must-have

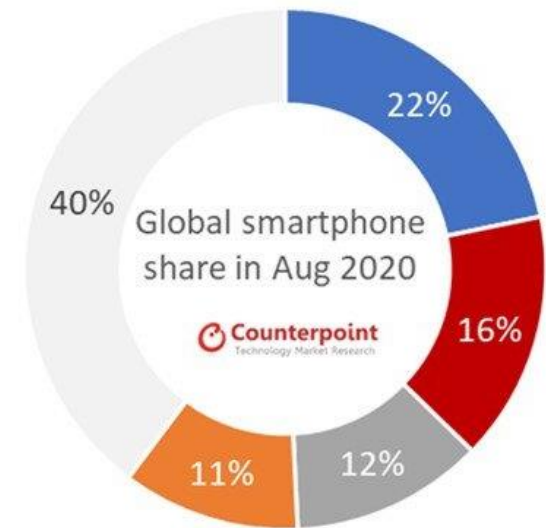


Samsung Galaxy S20+ 5G

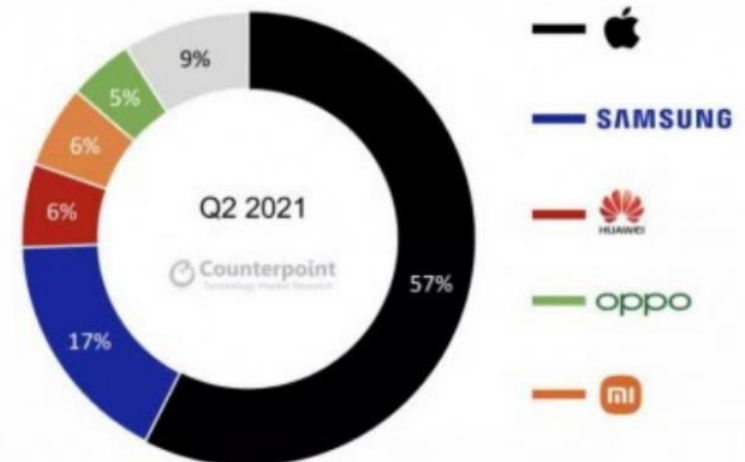
- Hardware Specification
 - 6.7” inch with 1440x3200 resolution touchscreen with multi-touch sensing
 - Processor –Octa-core (2x2.73 GHz Mongoose M5 & 2x2.50 GHz Cortex-A76 & 4x2.0 GHz Cortex-A55) Qualcomm Snapdragon
 - Memory 8GB RAM
 - Storage – Up to 512 GB
 - Fingerprint Sensing
 - Camera (Main and Selfie: 12M & 10M Pixels)
 - Assisted GPS, Glonass, BDS, GALILEO (location based service)
 - Built-in 3G, 4G, 5G, Bluetooth & WiFi 802.11 a/b/g/n/ac/6
- From features point of view, it is even more advance than desktop PC!

Smartphone Market

- Samsung crushing Apple in terms of volume
- But Apple's premium market share is still in lead
- And Apple is always honored as innovator



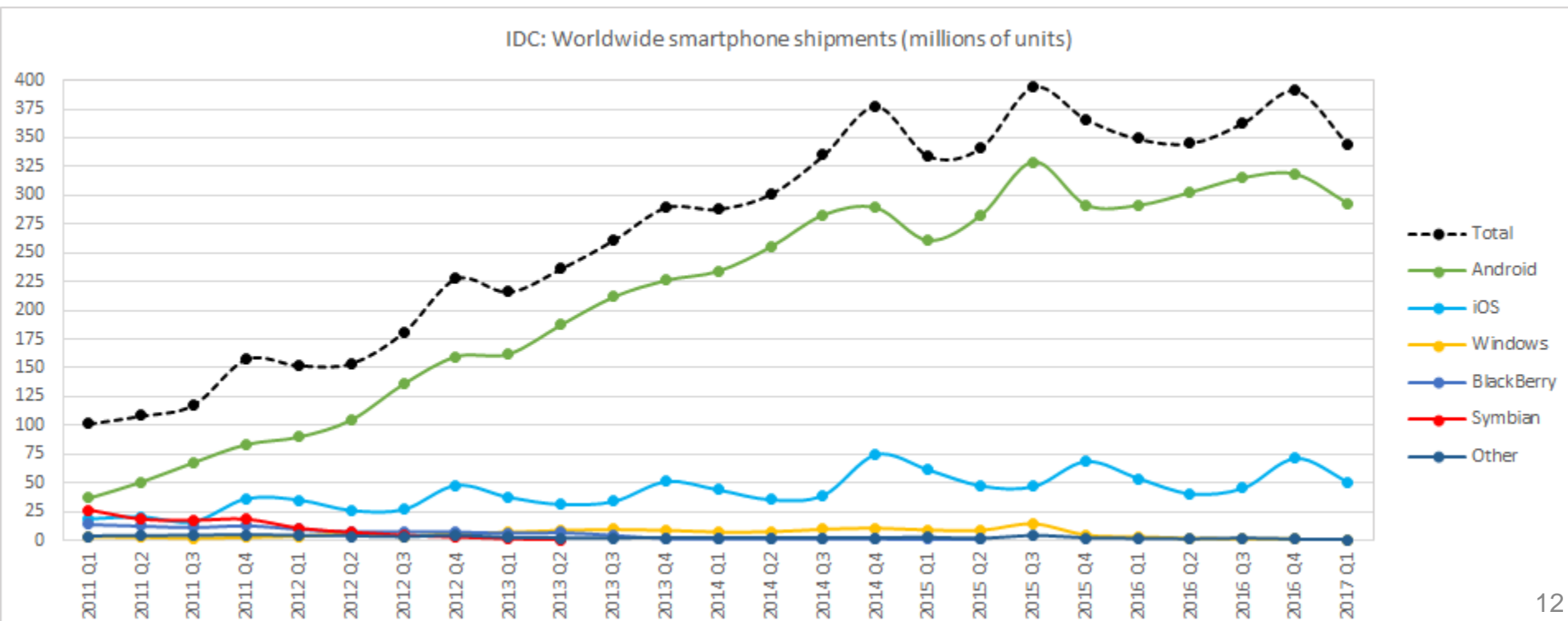
■ Samsung ■ Huawei ■ Apple ■ Xiaomi ■ Others



Global Premium Smartphone (>\$400) Sales Market Share,

Smartphone Market

- Rapid rise of Android from 4% in 2009 to more than 70% in 2021, while iOS share 29% in 2021
- Symbian, RIM are fading drastically
- Windows Phone, Bada never come into play



Factors affecting mobile platform

- Success in iPhone can be attributed to
 - Great UI
 - multi-touch interface enable complex input with fingers intuitively
 - Uniform, consistent user experience across the series
 - App Store
 - huge supply of apps for any purposes
 - Most important feature!

App Store

A digital application distribution platform for iOS devices by Apple (2008)



Users can browse and download applications from iTunes Store either for free or at a relatively low cost i.e. US\$ 1 - 50.

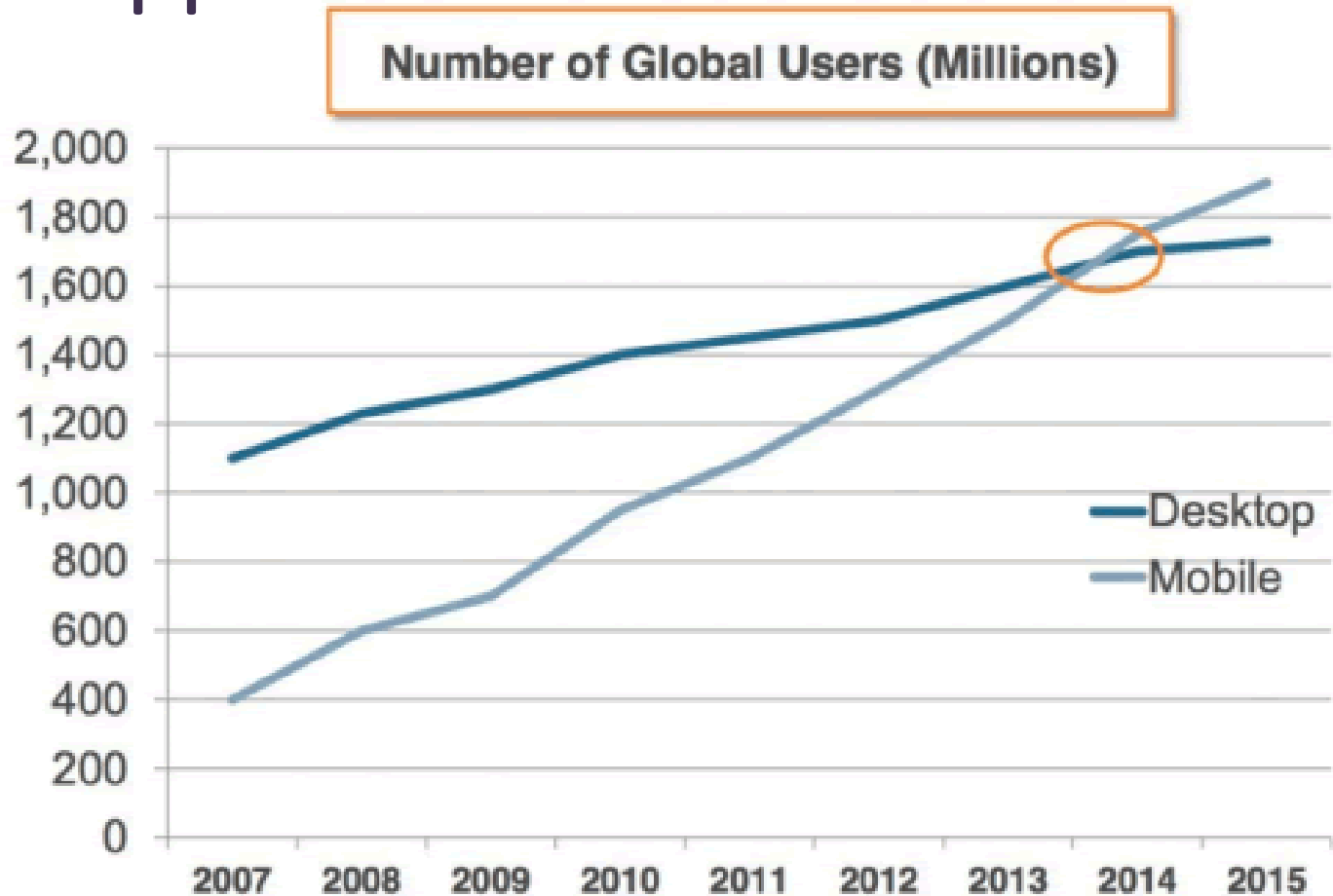
30% of revenues go to Apple & **70%** go to producer of the app



9.1 billion downloads in Q2 2020 (ref. App Annie)

popular apps such as Facebook, Whatsapp etc.

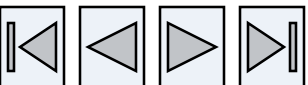
Era of Apps



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Source: Morgan Stanley Research



Apps

- Short for “*application software*”, but usually means mobile app
- Different from desktop apps in:
 - available through a vendor-provided distribution platform such as Google Play, App Store, etc.
 - (can) Provide **context-aware** services e.g. location-based
 - Power awareness

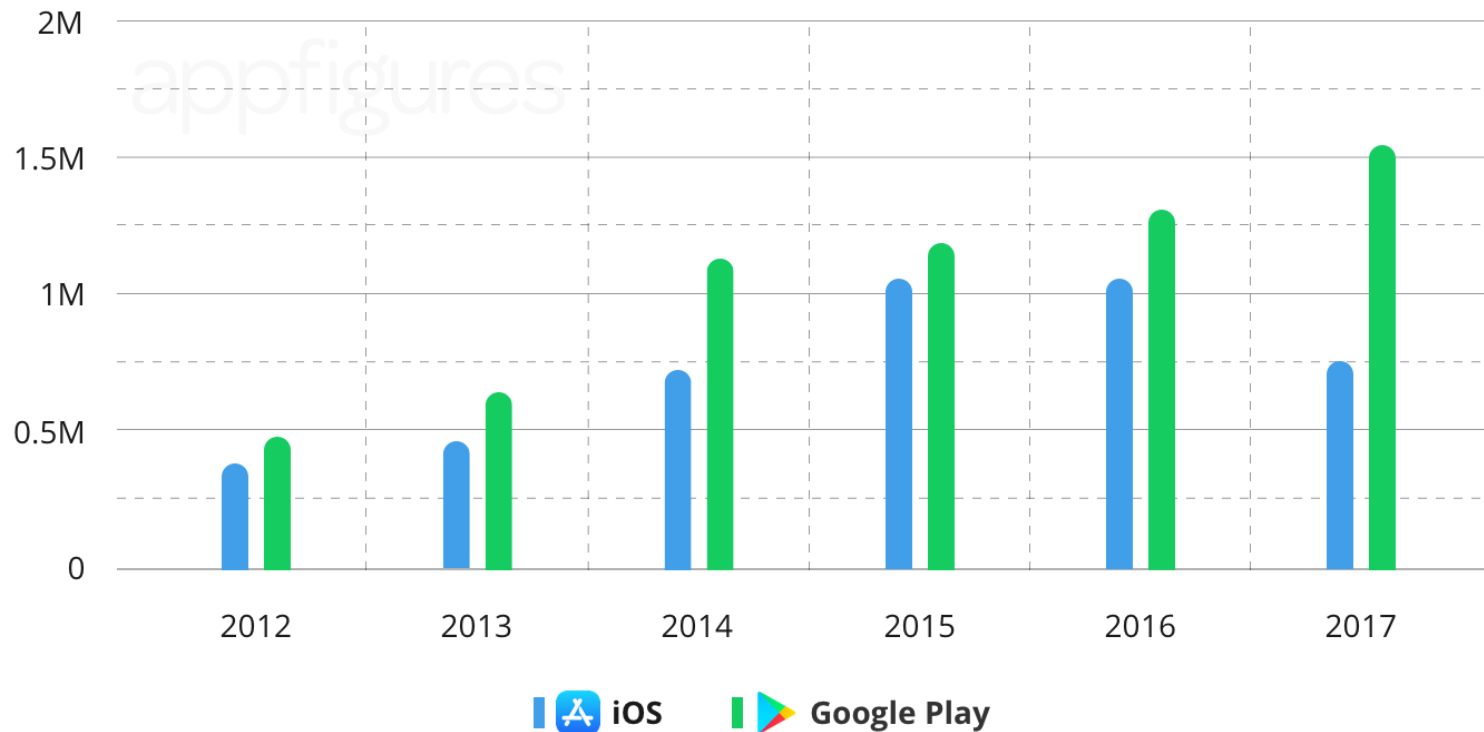
Go Mobile!

- When **Android start**, the project is claimed as:

“ *tremendous potential in developing smarter mobile devices that are more aware of its owner's **location** and **preferences*** ”

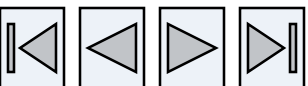
New Apps Released By Year

iOS App Store and Google Play • Worldwide



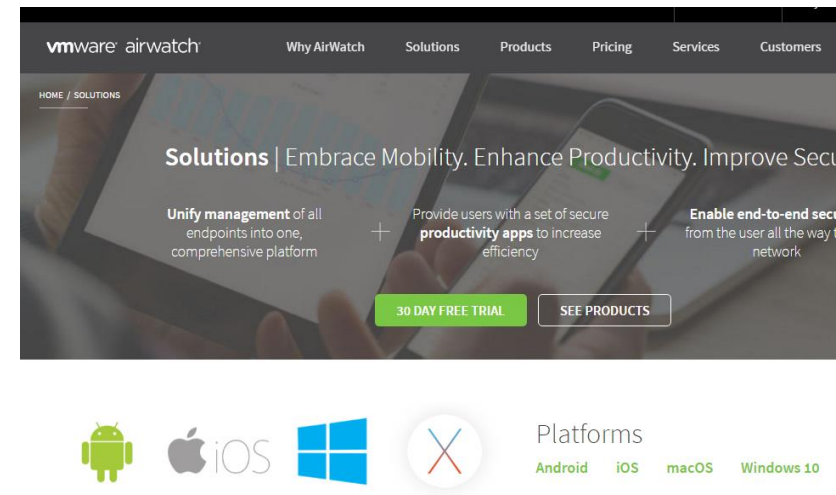
appfigures insights

Mobile Trends for 2018



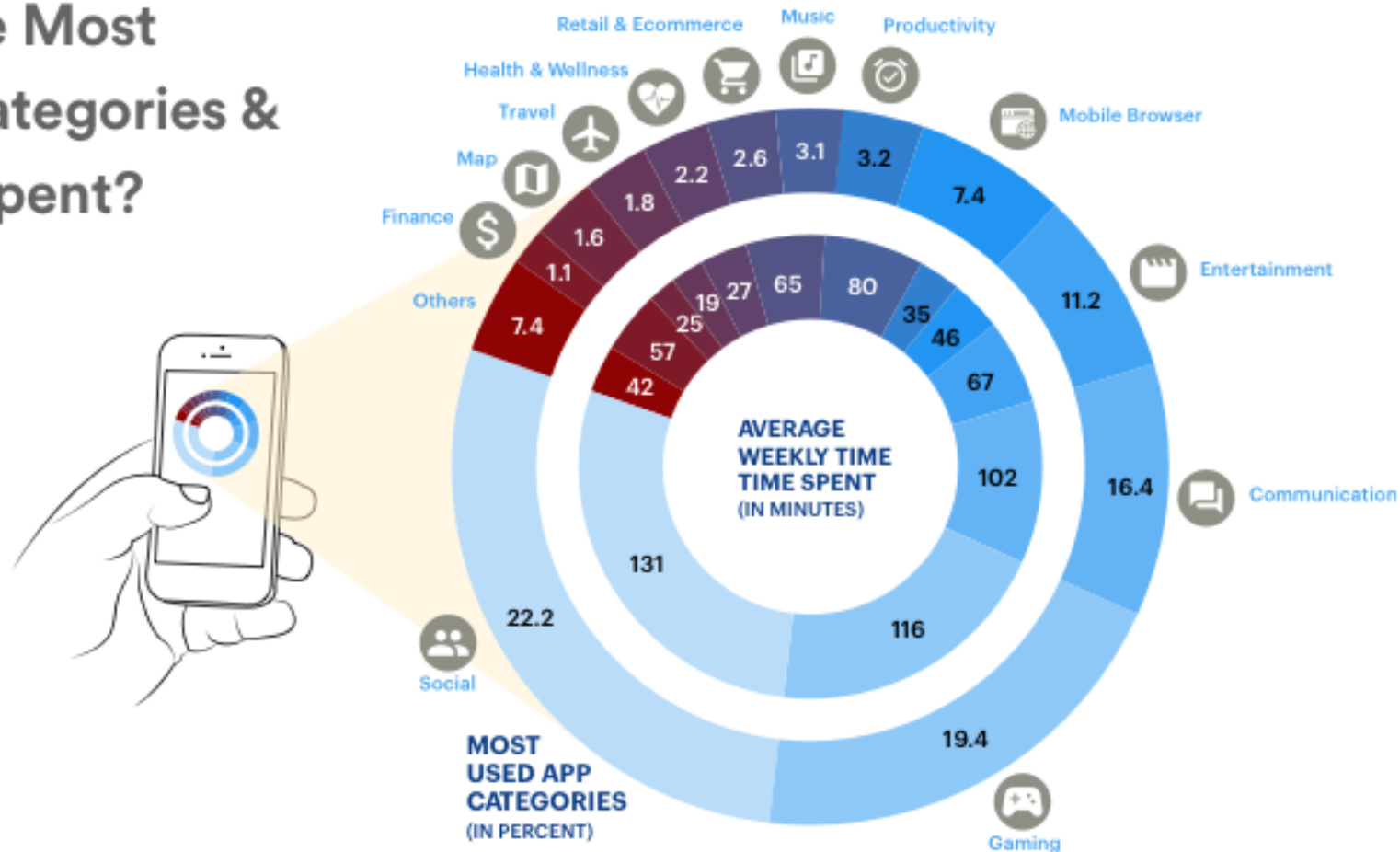
Apps

- Originally offered games and information retrieval for personal usage
- Huge public demand rapidly expanded into all categories
- Now enterprise adoption leads to more business applications



Apps Usage

What are the Most Used App Categories & Total Time Spent?







Mobile Apps

- What difference(s) does it make between normal desktop app & mobile app?
- What are the reasons behind app's popularity?
- What issues need be addressed when developing a mobile app?

Reflection

- So what are the differences between mobile computing devices and traditional computers?

	Desktop PC	Mobile devices
Computational power	Much better 	Limited
User	Multi-users	Strictly personalized 
Usage	Fixed location	Anywhere 
Energy Awareness	Practically no 	Severe

Reflection

- What directions it affect developers?
 - Limited processing power ->
 - early apps focus on simple application such as information display, games etc.
 - Recent development tends to be **more server-based** to explore more possibilities
 - Highly **personalized** devices ->
more tighter coupling to users, apps focus on aspects in daily life
e.g. social platform, shopping, authenticated actions
 - Usage can be **anywhere** ->
broaden the application horizon e.g. location-based apps
GoGoVan, Uber etc. & [misc](#)

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- **Ubiquitous computing** -computing made anytime, anywhere
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- **Smartphone market share**
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