SRI AKILANDESWARI WOMEN'S COLLEGE, WANDIWASH

MOBILE COMPUTING

CLASS : III BCA

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LECTURE CONTENTS

- Section-1:Mobile Computing Introduction
- Section-2:Fundamental of Mobile Computing
- Section-3:Connectivity
- Section-4:Portability
- Section-5:Conclusion

INTRODUCTION

- Mobile computing is human–computer interaction in which a computer is expected to be transported during normal usage and allow for transmission of data, which can include voice and video transmissions. Mobile computing involves mobile communication, mobile hardware, and mobile software.

EVOLUTION OF COMPUTING

Mobile Computing Functions A computing environment is defined as mobile if it supports one or more of these characteristics: User mobility: User should be able to move from one physical location to another location and use same service Network mobility: User should be able to move from one network to another network and use same service

MOBILE COMPUTING FUNCTIONS

- **Mobile Computing Functions (Cont.)** Device mobility: User should be able to move from one device to another and use same service Session mobility: A user session should be able to move from one user-agent environment to another. Service mobility: User should be able to move from one service to another Host mobility: The user should can be either a client or server
- **Mobile Computing Functions (Cont.)** Mobile computing functions can be logically divided into the major segments:1- User with device: fixed, portable2- Network: different networks: GSM, CDMA, Ethernet, Wireless LAN, …

MOBILE COMPUTING FUNCTIONS (CONT.

User with device: fixed, portable

Network: different networks: GSM, CDMA,Ethernet, Wireless LAN, …etc.

Gateway: Interfacing different transport bearers

Middleware: handling the presentation and rendering of the content on a particular device.

Content: it is the domain where the origin server and content is.

THE CONCEPT OF MOBILE COMPUTING

- Mobile communication Network
- Mobile hardware
- Mobile software

NETWORKS

- Mobile computing will use different types of networks: fixed telephone network, GSM, GPRS, ATM, …etc.
- 1- Wireline Networks: designed over wire. It is called fixed network. Copper or fiber optic cables.
- 2- Wireless Networks: mobile networks
- 3- Ad-hoc Networks: for this purpose only.
- 4- Bearers: transport bearers: TCP/IP, http, protocols for dialup connection.

WHAT ARE THE TYPES OF MOBILE COMPUTING

- Mobile computing is a combination of infrastructure, hardware and software technology. The various parts of mobile computing are as follows:
- **Mobile infrastructure.** Infrastructure refers to the technical pieces that allow devices to communicate. Mobile infrastructure includes the wireless networks, wireless protocols and data formats.

MOBILE COMPUTING HARDWARE AND SOFTWARE

- **Mobile hardware.** The physical mobile device and supporting hardware that users interact with make up the mobile hardware. This may include cell phones, laptops, tablets, wearable computers and accompanying chargers and accessories.
- **Mobile software.** This refers to the applications that run on mobile devices, including mobile operating systems (OSes) and user-facing applications, such as mobile browsers and e-commerce applications

COURSE GOALS

- Fundamentals of mobile computing
- Fundamentals of wireless networking
- Topics from closely related areas:
  - Pervasive Computing
  - Wearables
  - Internet of Things
  - Real-Time Systems
  - Embedded Systems
  - Wireless sensor networks
- Acquire and practice development skills

Report for Mobile Number Portability (MNP)

- Types of Number Portability
- Component of MNP
- MNP implementation
- MNP working
- Benefits
- Problem
- Future aspects
- Conclusion
- References

GRADING

Midterm Exam	25%
Final Exam	25%
First Progress Report	5%
Second Progress Report	5%
Starter Project Deliverables	10%
Final Project Deliverables	10%
Project Demonstration/Presentation	10%
Class Participation	10%

COURSE PROJECT

- Starter Project:
  - Purpose: Learn/improve skills
  - Individually or in teams [1-3]

- Final Project
  - Purpose: Develop innovative/unique “mobile computing solution”
  - Individually or in teams [1-3]

PROJECT CONTENT…

- Ideally: final project builds closely upon the starter project
- If possible (but not required): propose starter project with final project already in mind
- Use starter project period to identify final project topic and form team if desired
- Some collaboration between teams allowed/encouraged

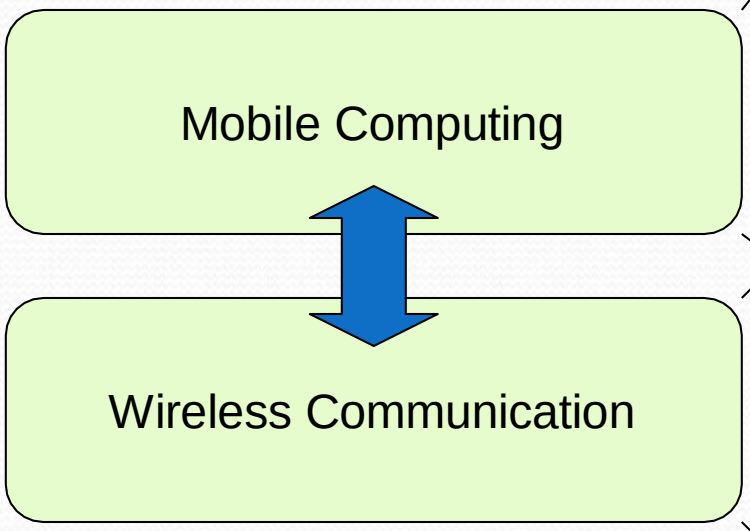
MOBILE COMPUTING

- **A simple definition could be:** Mobile Computing is using a computer (of one kind or another) while on the move
- **Another definition could be:** Mobile Computing is when a work process is moved from a normal fixed position to a more dynamic position
- **A third definition could be:** Mobile Computing is when a work process is carried out somewhere where it was not previously possible
- **Mobile Computing** is an umbrella term used to describe technologies that enable people to access services **anytime** and **anywhere**

MOBILE COMPUTING

- Many other names/overlapping computing paradigms:
  - Pervasive Computing
  - Ubiquitous Computing
  - Wireless Systems
  - Internet of Things (IoT)
  - Embedded Computing
  - Nomadic Computing
  - Wireless Sensor Networks
  - (Mobile) Ad-Hoc Networks
  - Mesh Networks
  - Vehicular Networks

MOBILE COMPUTING



- Applications
- Location-awareness
- Mobility Support
- Security
- Resource Management
- Network Protocols
- Broadcast
- Technologies
- Standards
- Wireless Medium

wired vs wireless

- **Wired Networks**
  - high bandwidth
  - low bandwidth variability
  - can listen on wire
  - high power machines
  - high resource machines
  - need physical access (security)
  - low delay
  - connected operation
- **Mobile Networks**
  - low bandwidth
  - high bandwidth variability
  - hidden terminal problem
  - low power machines
  - low resource machines
  - need proximity
  - higher delay
  - disconnected operation

WHY GO MOBILE?

- Enable anywhere/anytime connectivity
- Bring computer communications to areas without pre-existing infrastructure
- Enable mobility
- Enable new applications
- An exciting new research area

EVOLUTION

- Mobile computing can be categorized into **seven major categories of focus**
- These categories are the basis for the technology that is used today in research and design of mobile computing
- Each category or section is a different area that was focused on making mobile computing what it is today
- These seven categories are: Portability, Miniaturization, Connectivity, Convergence, Divergence, Apps, Digital Ecosystems

PORTABILITY

- Reducing the size of hardware to enable the creation of computers that could be physically moved around relatively easily

MOBILE COMMUNICATION

- Refers to the infrastructure put in place to ensure that seamless and reliable communication goes on.
- These would include devices such as protocols, services, bandwidth, and portals necessary to facilitate and support the stated services.
- Mobile communications refers to **a form of communications which does not depend** on a physical connection between the sender and receiver. It facilitates the users to move from one physical location to another during communication.

MINIATURIZATION

- Creating new and significantly smaller mobile form factors that allowed the use of personal mobile devices while on the move

50mm x 50mm

35mm x 35mm

15mm x 15mm

CONNECTIVITY

- Developing devices and applications that allowed users to be online and communicate via wireless data networks while on the move

Wi Fi

Bluetooth®

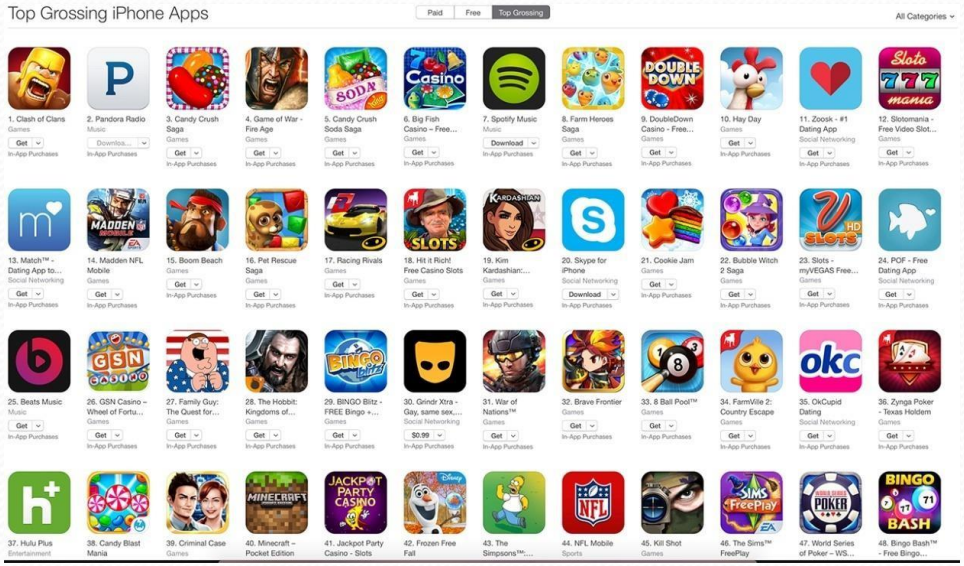
4G LTE

CONVERGENCE

- Integrating emerging types of digital mobile devices, such as Personal Digital Assistants (PDAs), mobile phones, music players, cameras, games, etc., into hybrid devices

APPLICATIONS (APPS)

- The latest wave of applications (*apps*) is about developing matter and substance for use and consumption on mobile devices, and making access to this fun or functional interactive application content easy and enjoyable



DIGITAL ECOSYSTEMS

- The emerging wave of *digital ecosystems* is about the larger wholes of pervasive and interrelated technologies that interactive mobile systems are increasingly becoming a part of

EXAMPLE: SMARTPHONE

- Portability: carry it anywhere you want
- Miniaturization: make it possible to build device to fit in your pocket
- Connectivity: Wi-Fi, LTE/4G, cellular, Bluetooth
- Convergence: phone, camera, gaming device, movie streaming, music player, …
- Divergence: ?
- Applications: “Rise of the Apps”
- Digital Ecosystem: social networks, distributed gaming, video streaming, work apps, …

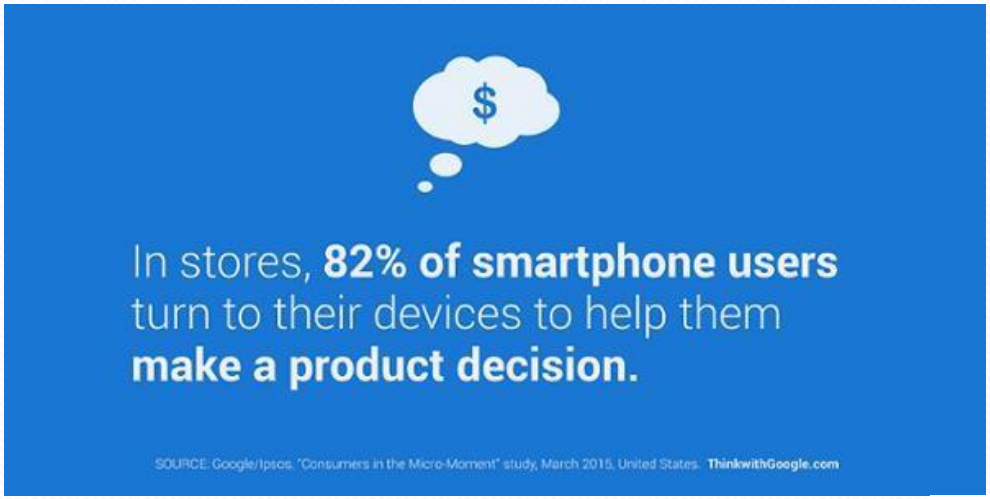
APP STORE (IOS)

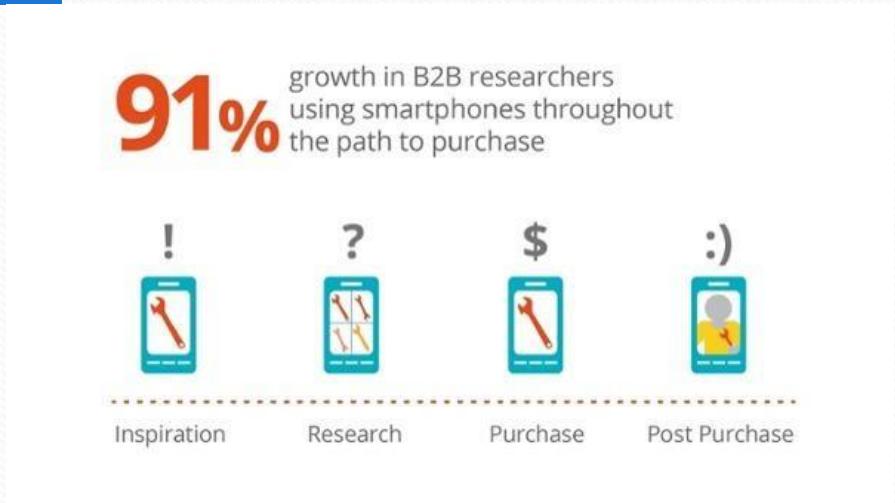
- 2003: iTunes Music Store
- 2008: iPhone App Store (iPhone 3G with App Store support)
- 2015: > 100 billion app downloads
- 2016: > 2 million apps
- 2016: China biggest App Store market
- 2016: App developers earned $20 billions
- Most downloaded app: Minecraft Pocket Edition (paid) and Pokemon GO (free)

MOBILE COMPUTING APPLICATIONS

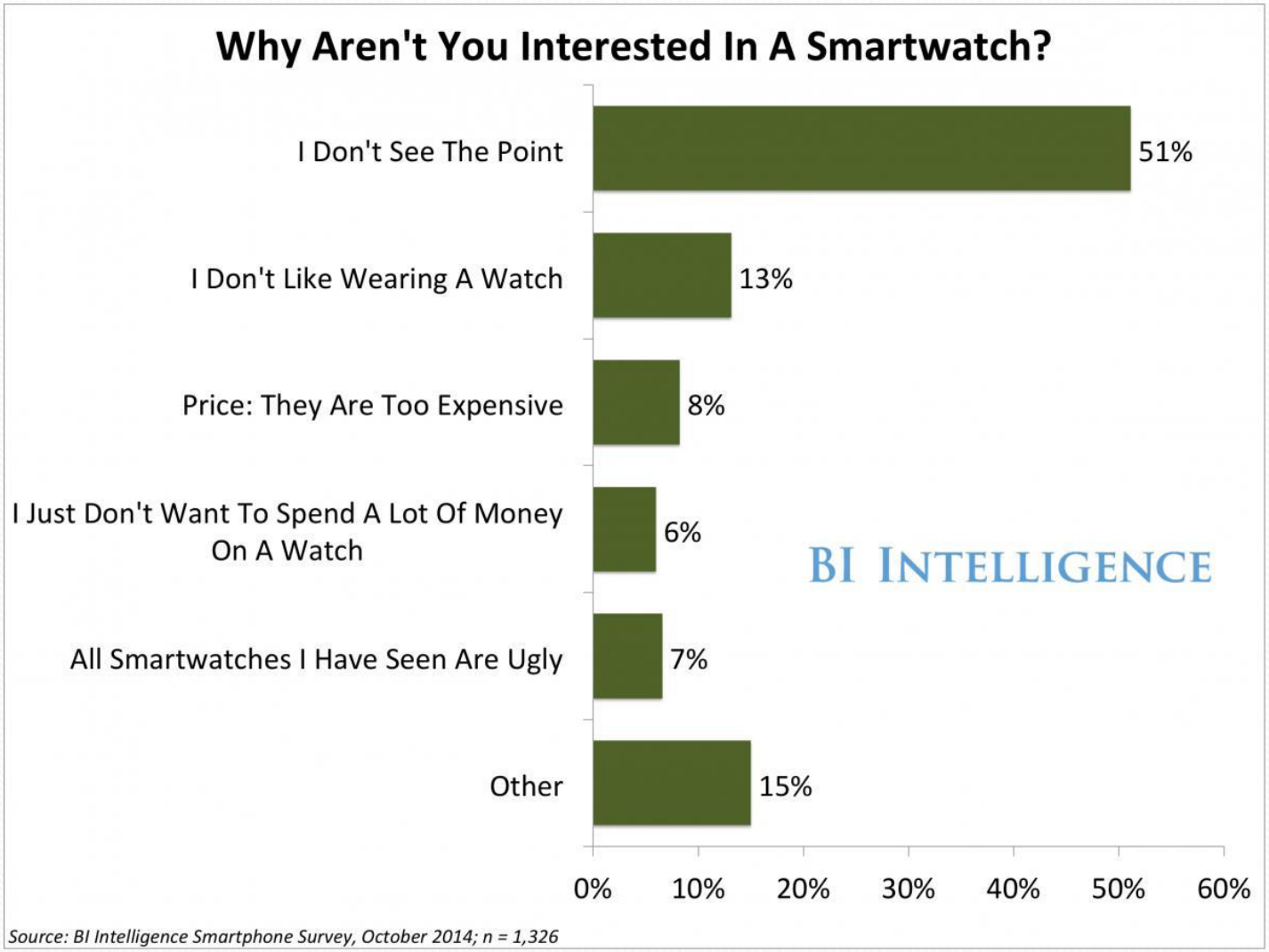
Enable the business initiatives by supporting mobility of Customers Suppliers and Businesses Employees Mobile computing applications Wireless messaging (e.g., SMS)Mobile ecommerce (M-Commerce) and its variants Positional commerce (p-commerce) .Voice commerce (v-commerce).Television commerce (T- Commerce)Mobile business applications (MEBAs), e.g., M-CRM, M-portal Specialized applications Location sensitive apps

TRENDS IN MOBILE: SHOPPING





TRENDS IN MOBILE: SMARTWATCHES



ADDED DIMENSIONS OF MOBILE COMPUTING

1. Location awareness,
2. Network connectivity quality of service (QOS),
3. Limited device capabilities

(particularly storage and CPU),

4. Limited power supply,
5. Support for a wide variety of user interfaces,
6. Platform proliferation, and
7. Active transactions

HISTORY OF MOBILE COMPUTING

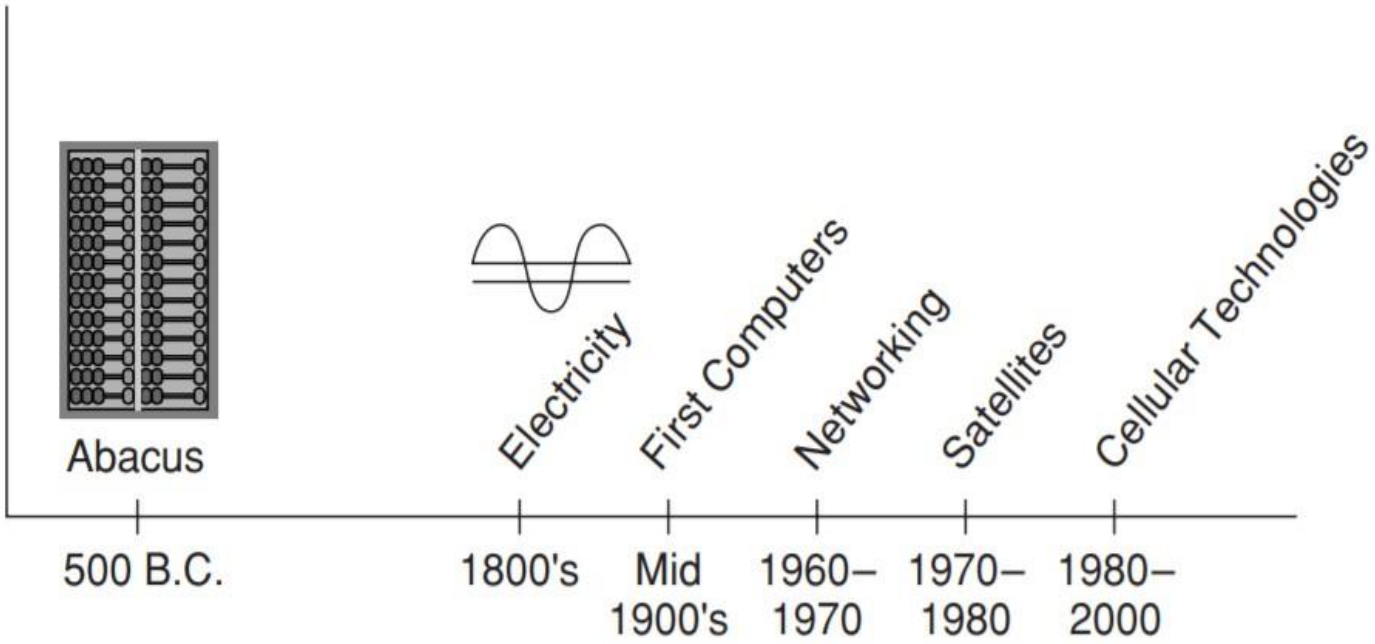
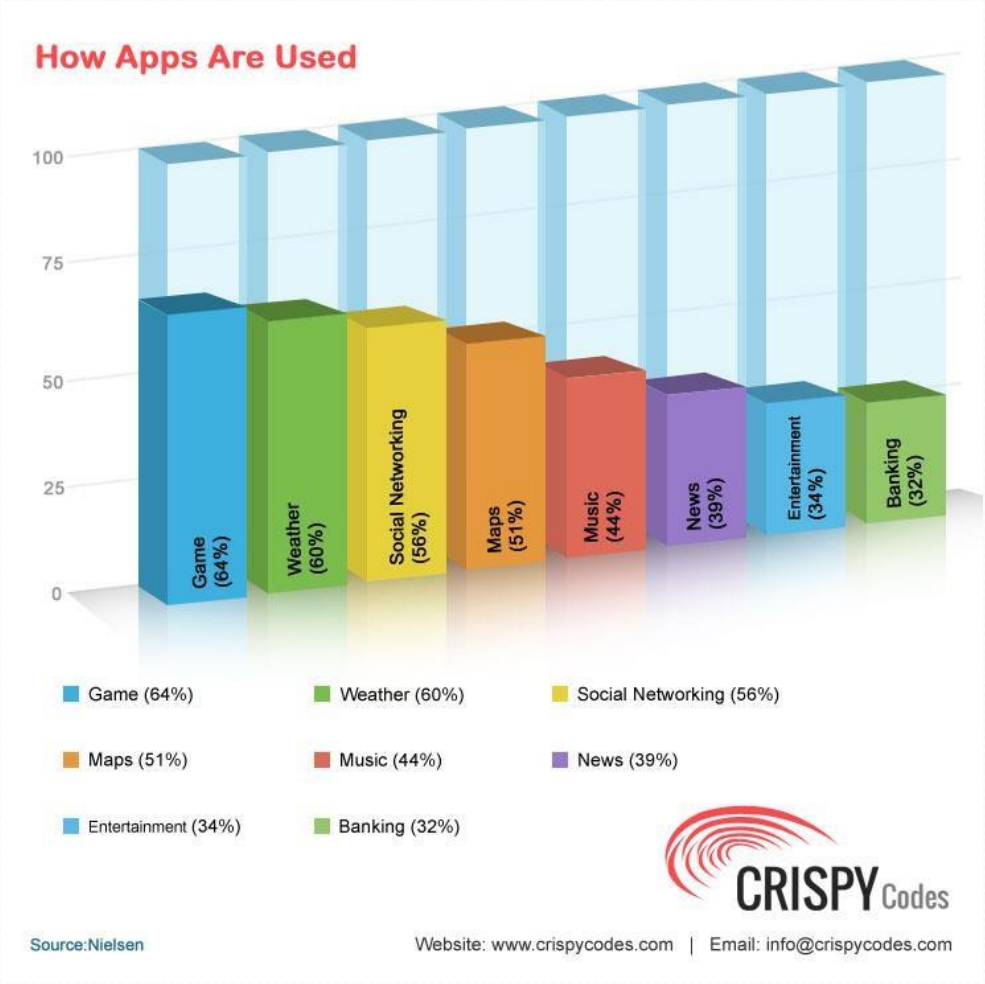
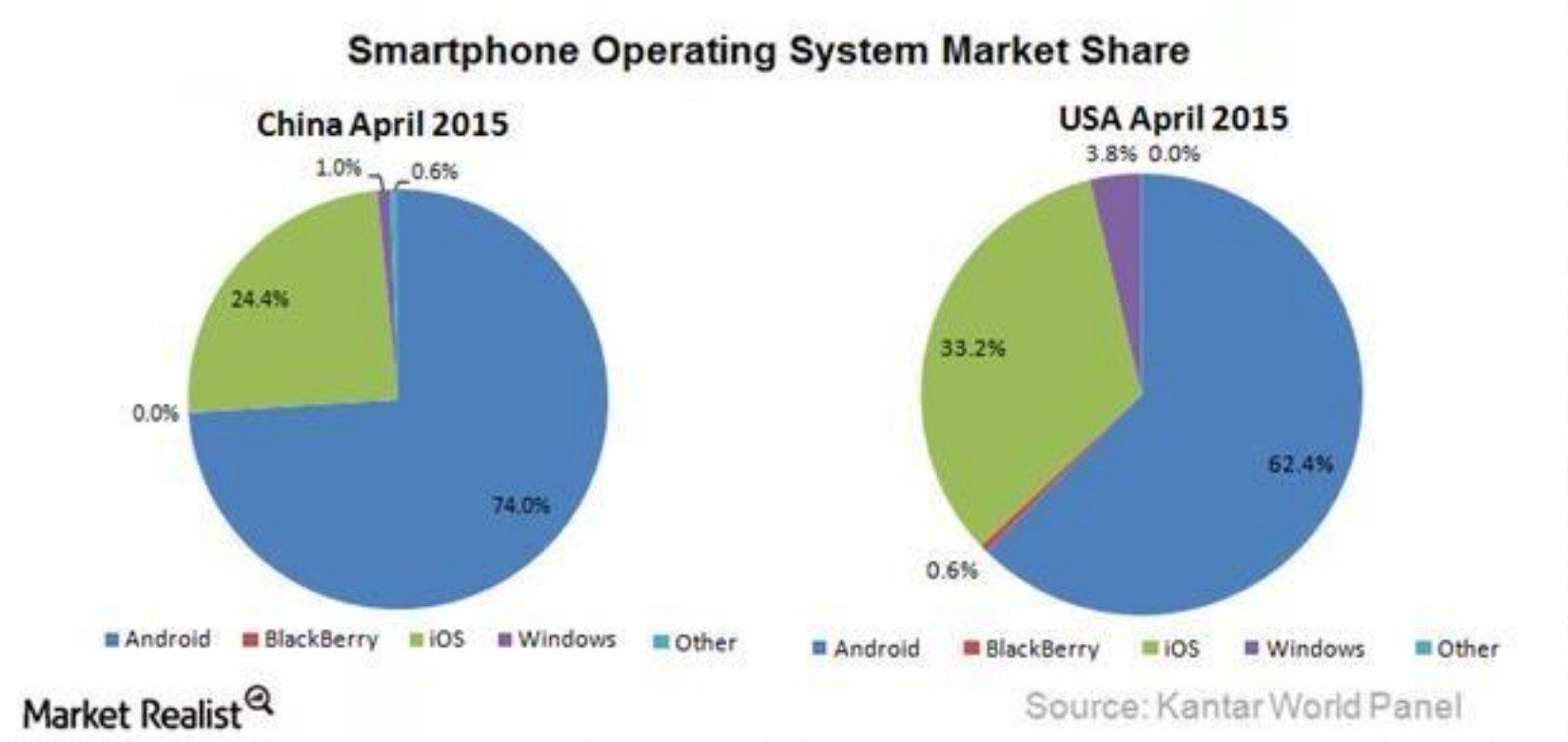


FIGURE 1.1. A Timeline of Mobile Computing.

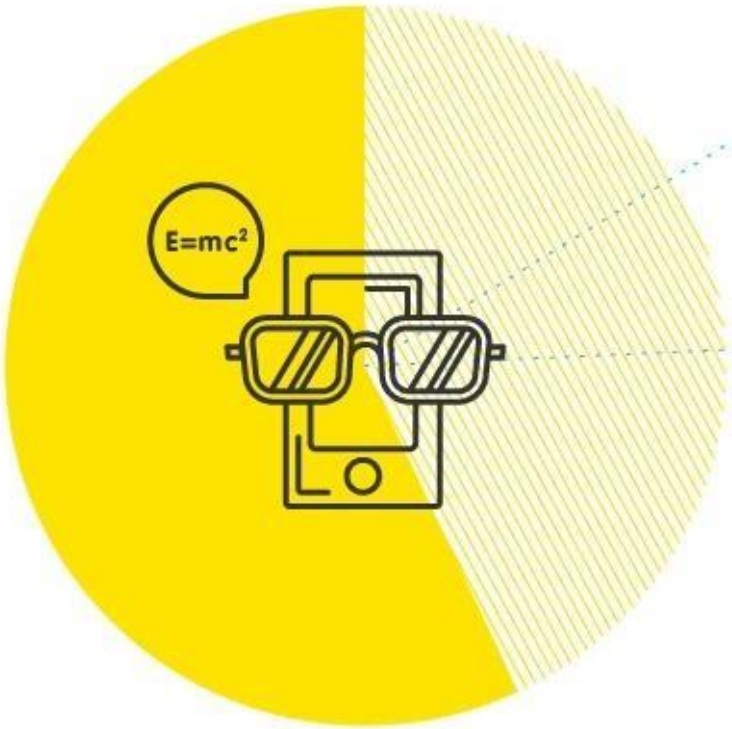
Trends in Mobile: Apps



TRENDS IN MOBILE: SMARTPHONE OS



Trends in Mobile: Students



A MAJORITY OF STUDENTS IN OUR SURVEY USE SMARTPHONES.

SMARTPHONE: 57% BASIC: 43%

IPHONE AND ANDROID ARE NECK-AND-NECK FOR THE TOP SPOT

IPHONE	42%
ANDROID	43%
BLACKBERRY	12%
WINDOWS 7	02%

NEARLY ALL SMARTPHONE OWNERS USE THEM FOR SOCIAL NETWORKING...

Use phone for social networking

YES 97% NO 03%

BUT LUCKILY, CHEATING ON A PHONE IS RARE

Has cheated on test with phone

YES 13% NO 87%

THANK YOU