QNX Auto Summit Japan

Nagoya

October 2011

STRATEGY ANALYTICS

Challenges Facing the Global Auto Industry

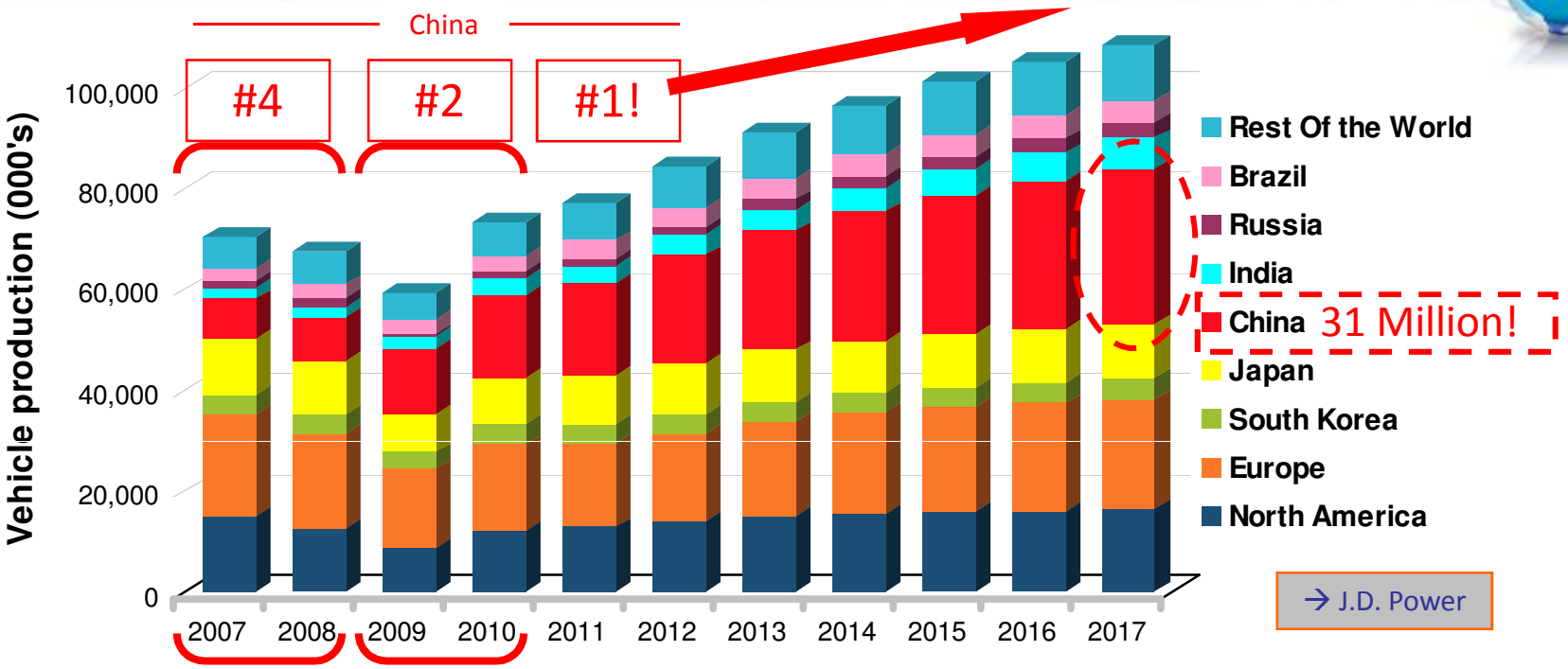
- Traffic, congestion
- Insufficient or aging infrastructure
- Pollution
- Increasing fuel prices
- Growing death toll in emerging markets from accidents
- Driver distraction from smartphone proliferation

A New "China Syndrome"

- China, Brazil, India and Russia are suddenly the most interesting automotive markets in the world:
  - Largest
  - Fastest growing
  - Increasing government spending/investments
  - Blank slate marketplace – testing ground

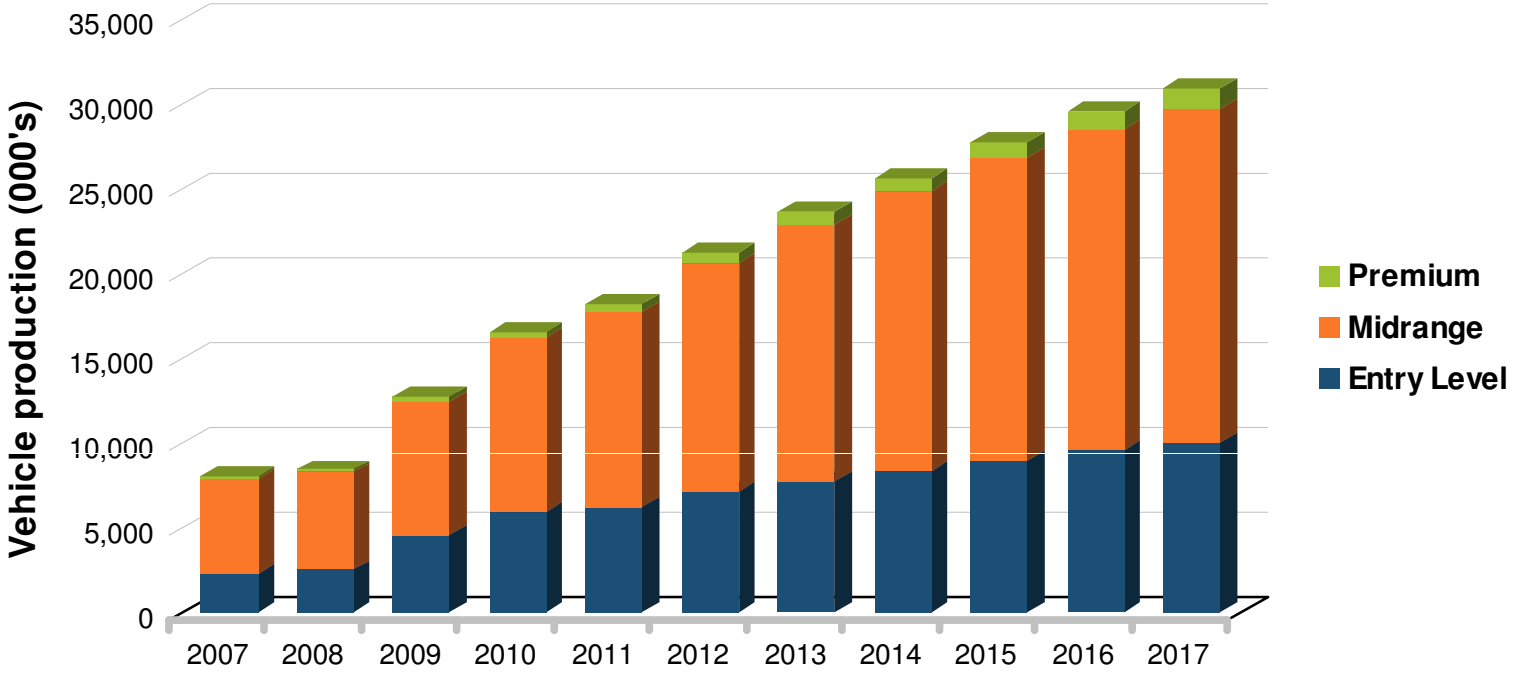
China by the Numbers

Global Vehicle Production Forecast



- Global vehicle production will grow at 5.7% CAGR (‘10 to ‘17)
- The arrival of China (in Passenger vehicle):
  - Became #4 vehicle manufacturer in 2007 (by volume)
  - Became #2 vehicle manufacturer in 2009 (by volume)
  - Will be #1 in 2011 (by volume) with production of 18.2 Mil
  - Will sustain a CAGR of 9.3% to 2017. (2017 production = 31 Million vehicles)

China Vehicle Production Forecast



- China Vehicle production will grow at 16% CAGR ('9 → '17)
- Chinese vehicle production splits by segment:
  - Premium: 220K units in 2009 → 1.1 Million in 2017
  - Midrange: 7.9 Mil. Units in 2009 → 19.7 Million in 2017
  - Entry Level: 4.6 Mil. Units in 2009 → 10 Million in 2017


东直门桥
民安街

Explosive Increase of Car Ownership

By end of 2010, registered vehicles in China reached 90.86 million, private cars 34.43 million
Beijing: registered vehicles 4.8 million, private car 2.759 million

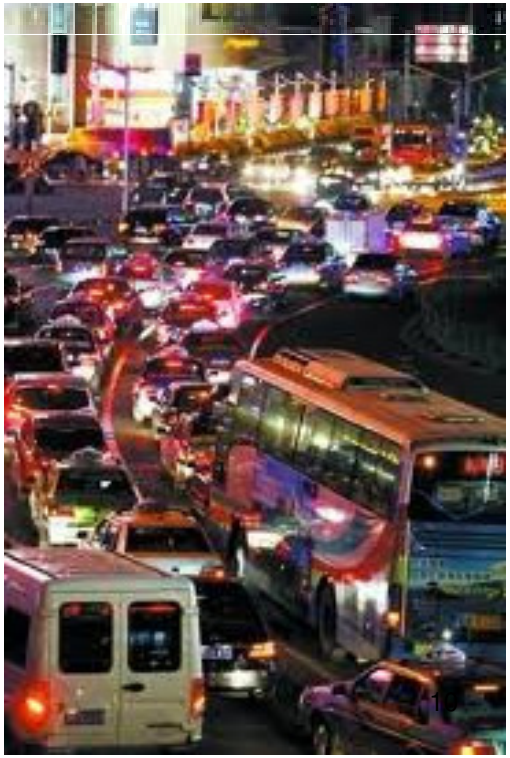
Number of congested streets in Beijing:
- **Morning peak-hour 300; Evening peak-hour 558 (Dec 2008);**
- **Morning peak-hour 576; Evening peak-hour 1081 (Dec 2009);**

Source: Beijing Transportation Research Centre

Average speed of 18km per hour (app 11 miles) at peak hours

Everyday, over 1,000 new cars hit Beijing streets; Caught in traffic jams on Beijing's main roads well after midnight is not unusual.

Other Major Cities in China



Air Pollution in China

Dark enough sky for cars to use their headlights in day time

- Pollution in the Chinese capital regularly hits levels 2 or 3 times what the WHO considers safe
- Explosive increase in car ownership contribute to the total emission.

Road Accident, Death Toll, Stolen Vehicle

According to research by WHO, in 2007, more than **600** lives are lost and more than **45,000** people are injured on China's roads every day

Unless some action is taken, WHO estimates that China will have **half a million** deaths each year by 2020.

OnStar Claims 200k Users by Feb 2011

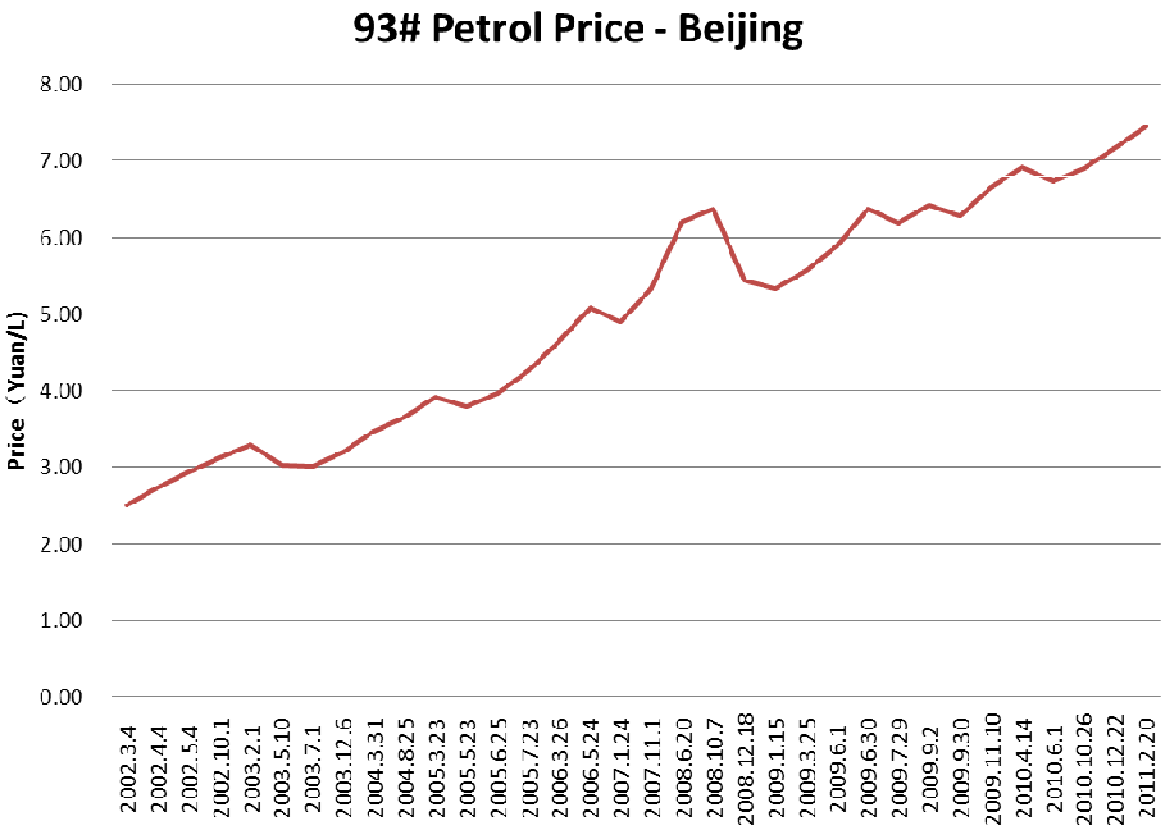
- More than 1,460 Automatic Crash Responses

- More than 50 stolen vehicle locations

Rise of Petrol Price

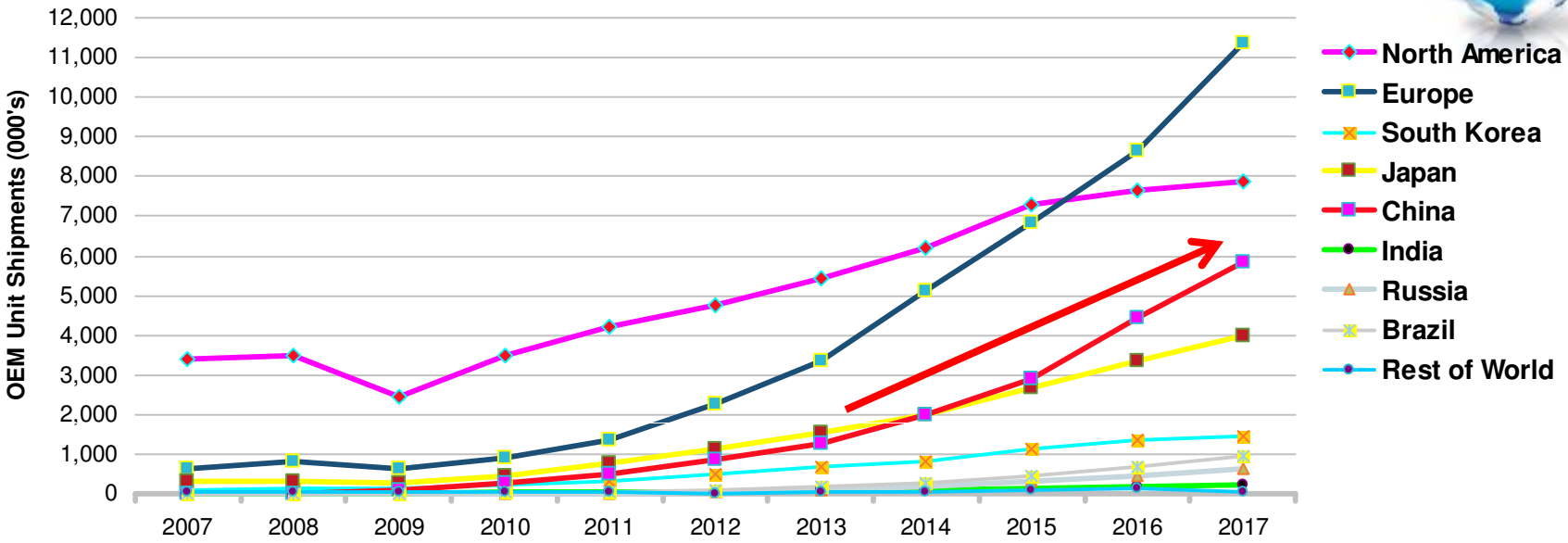
Petrol price has tripled over the past 10 years

US$1.13 per liter in China vs. US$0.84 per liter in US



Vehicle Connectivity = Solution

OEM Telematics: Regional Shipment View



North America: eCall/Telematics highly dependent on car maker strategies

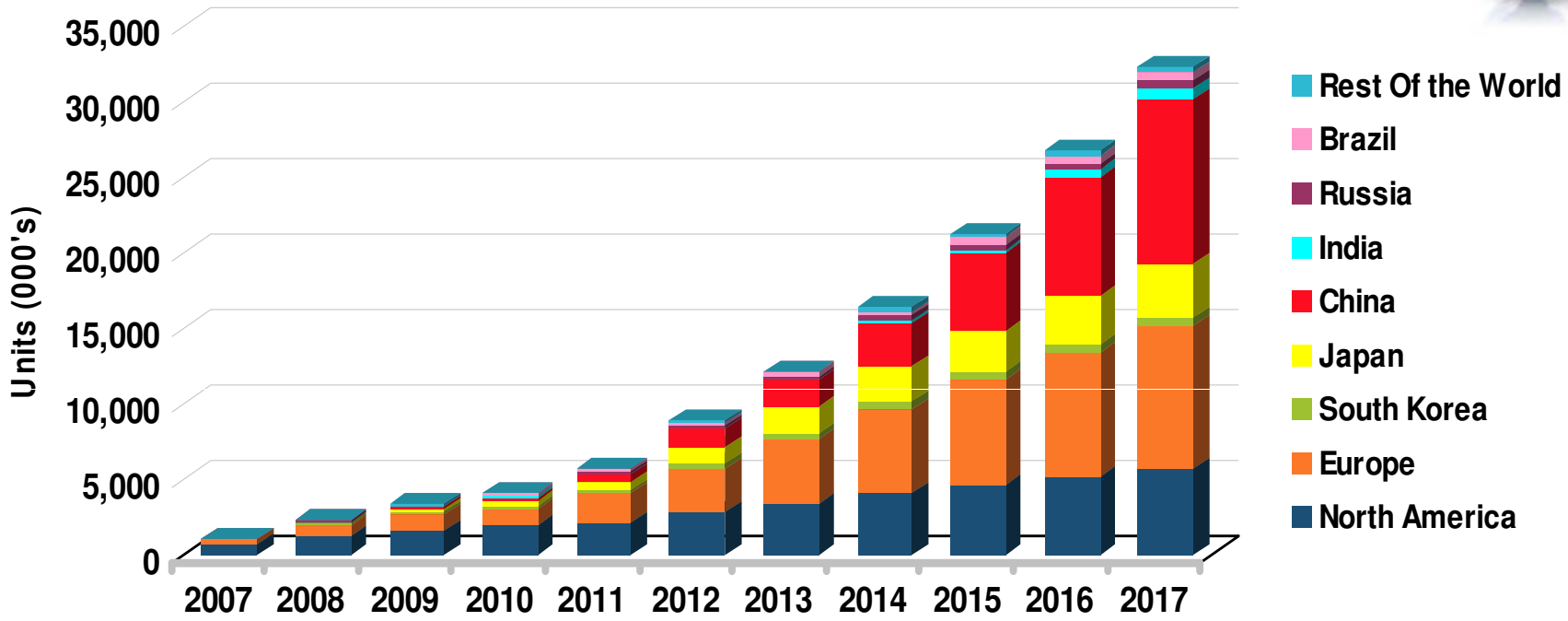
- **OnStar +5M installed base in 2008**
- **0.5M other NA car makers (mainly Mercedes Benz USA, BMW USA) in 2008, Toyota US also announced in Jan-09**

European eCall telematics highly dependent on regulatory activity and selected OEMs

Japan – Navigation is still dominant, Telematics roll-out is lead by Toyota

China – Forecast to be #3 Player in Embedded Telematics by 2015 (Globally)

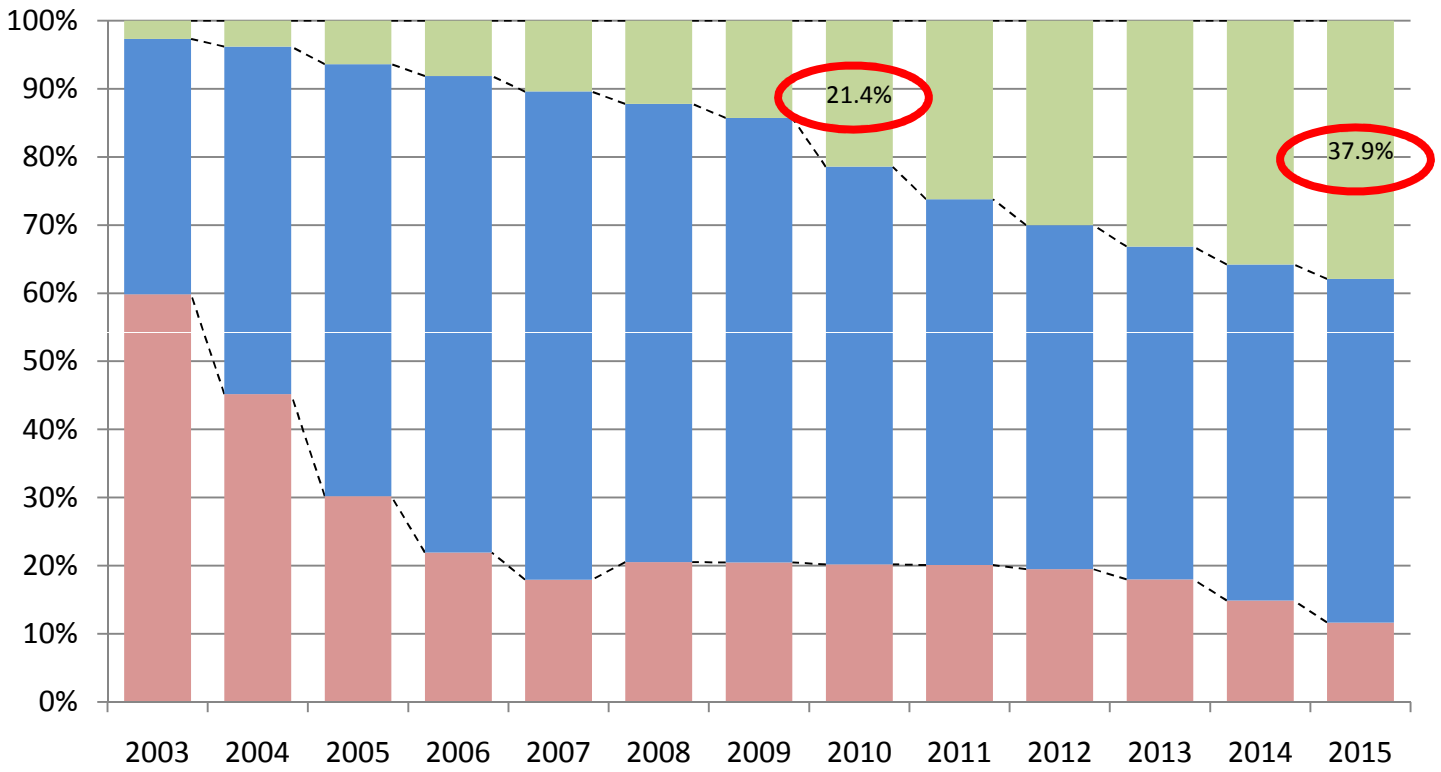
Smartphone Connectivity ECU: Regional Shipments



- Connectivity ECU growth opportunity 2010 vs. 2018:
  - ECU Shipments: 3.3 mil units to 32.4 million units (CAGR 33%).
  - ECU Revenues: $341 mil in 2010 to $2.9 Billion in 2018 (CAGR 31%).
  - Average Selling Price:
    - $103/unit in 2010 → $89/unit in 2018

Device Types: Global

Global Handset Sales by Type
Percent of Total Handset Sales



Smartphones

Feature Phones

Basic Phones

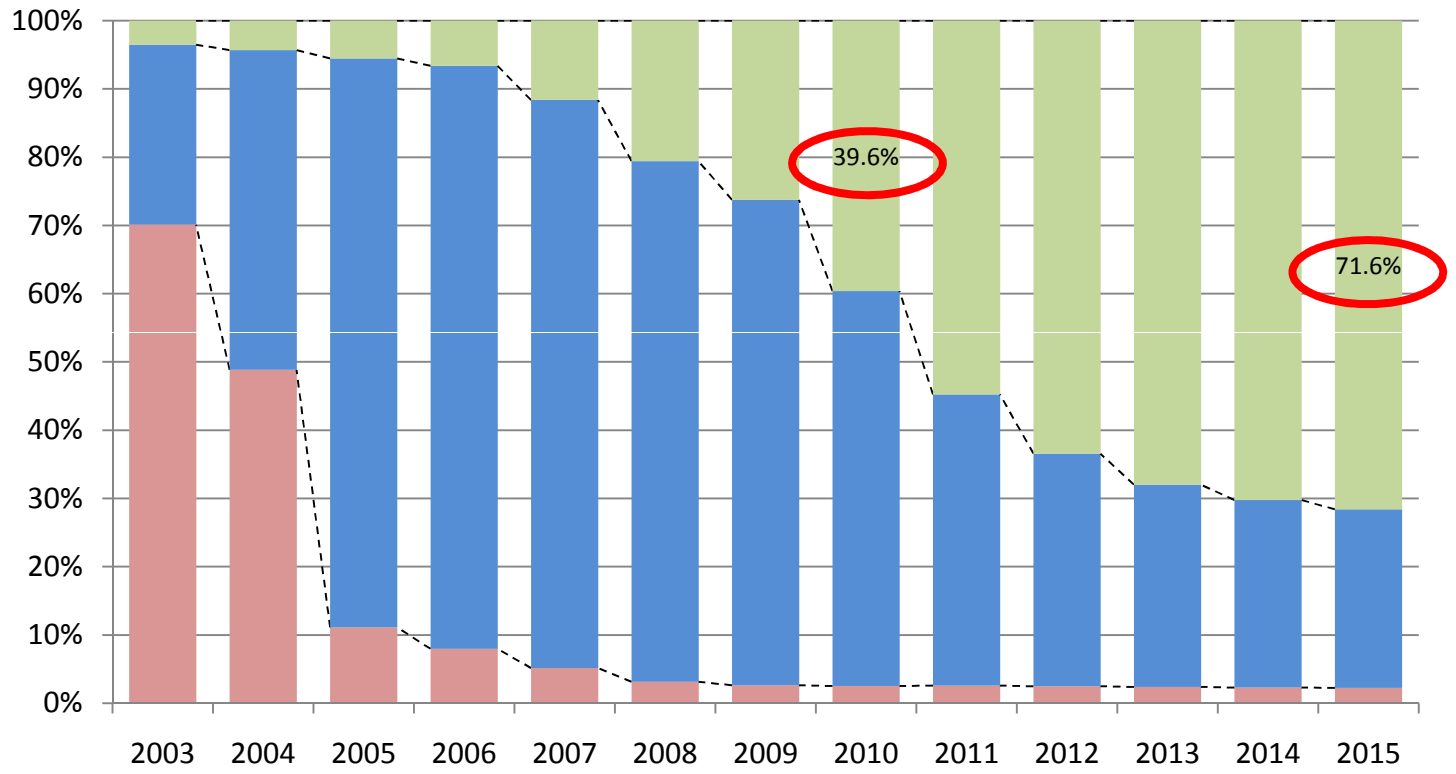
- Smartphone proportion steadily increasing, while feature phones set to replace basic phones in low tiers.

Source: Strategy Analytics – Wireless Device Strategies (WDS)

Device Types: North America

STRATEGY ANALYTICS

North America Handset Sales by Type
Percent of Total Handset Sales



Smartphones

Feature Phones

Basic Phones

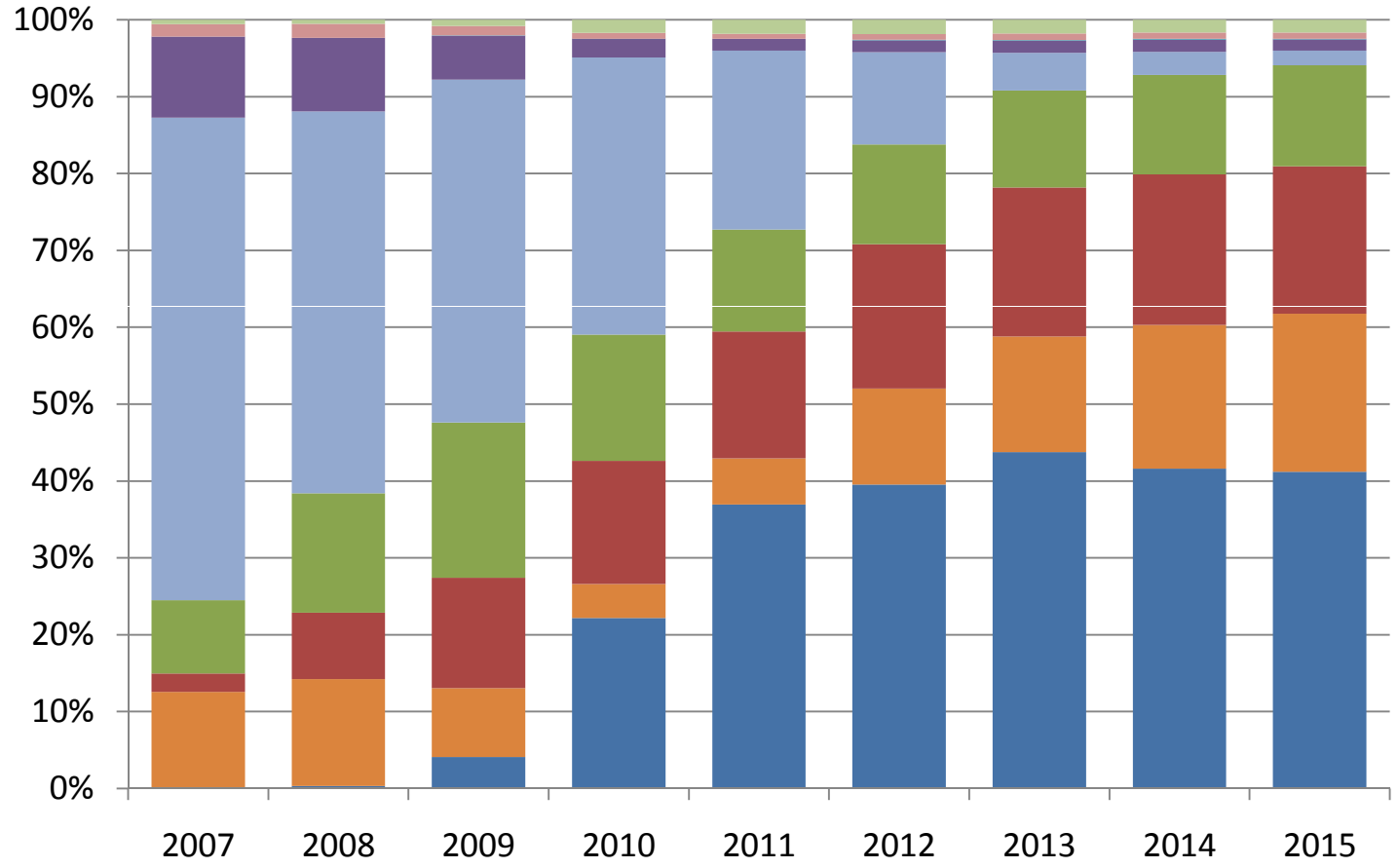
- Android superphone popularity leading huge growth in North American smartphone volumes.

Source: Strategy Analytics – Wireless Device Strategies (WDS)

Four Platforms to Control 94% of Global Smartphone Market by 2015

STRATEGYANALYTICS

Global Smartphone Operating System Share
Percent of Total Smartphone Sales



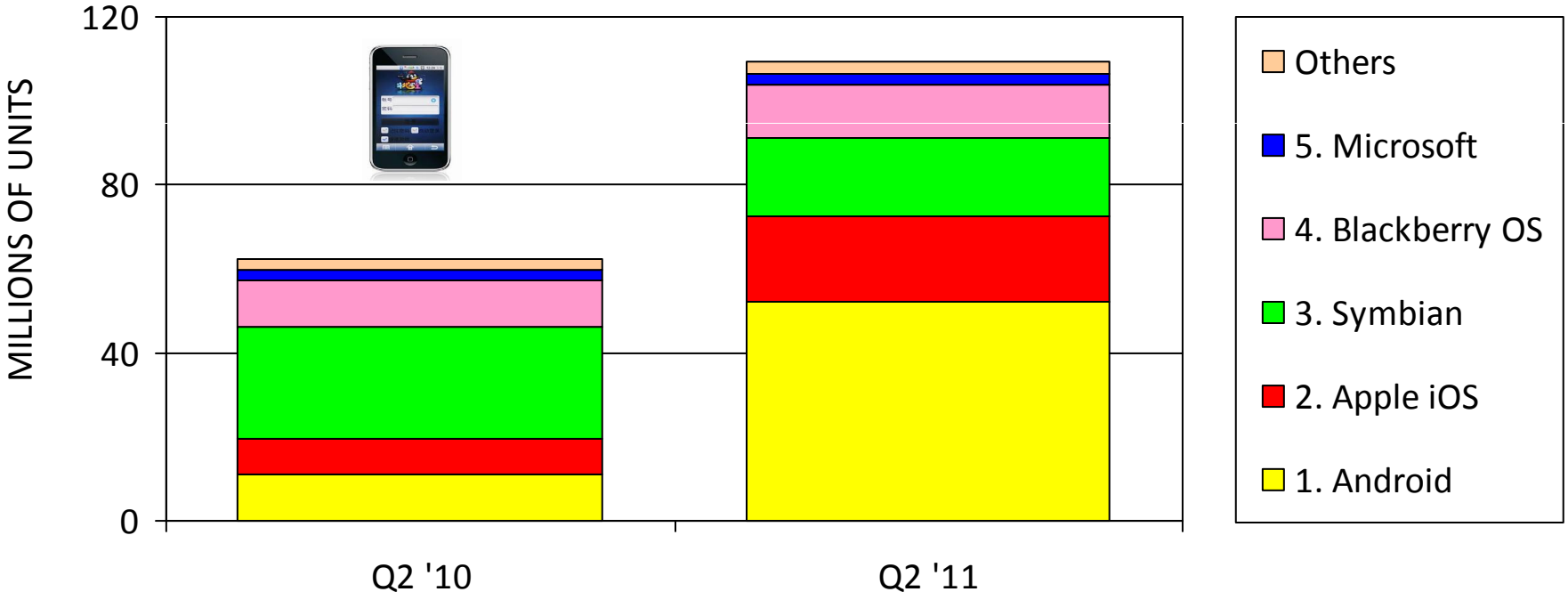
Others
symbian
BlackBerry

Service: Wireless Smartphone Strategies (WSS)

GLOBAL SMARTPHONE SHIPMENTS BY OS

STRATEGY ANALYTICS

1. Android has surged to half the global smartphone market, due to a combination of perceived low-cost software, a touchscreen-friendly user-experience, and low-cost supporting Google services (e.g. maps);



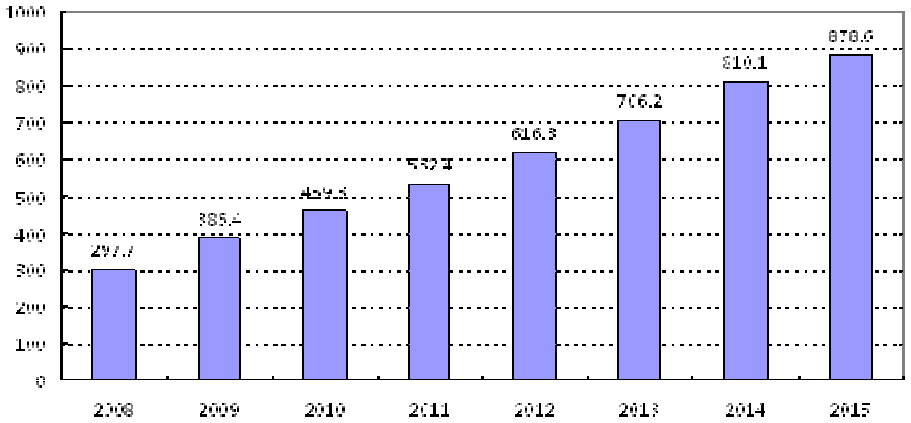
Source: Wireless Smartphone Strategies (WSS) service, Strategy Analytics, October 2011

Consumer Use of Connected Devices in the Car

Application Priorities among Chinese Mobile Phone Users

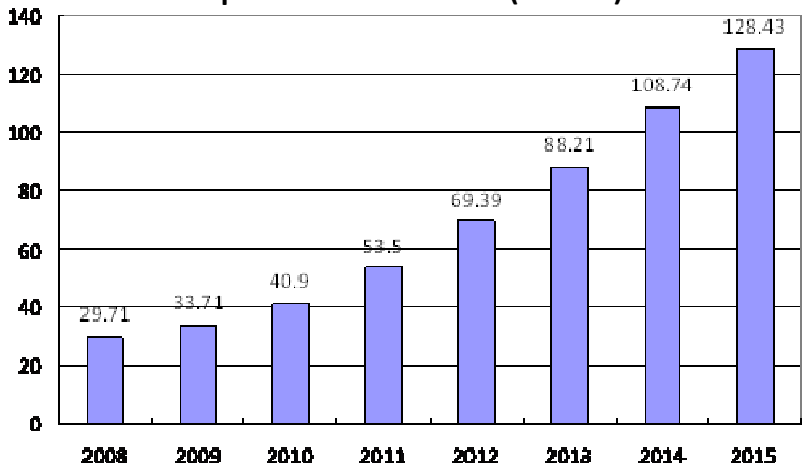
STRATEGY ANALYTICS

Internet Users in China (Million)



Source: Strategy Analytics "Digital Media Strategies" Service

Smartphone Users in China (Million)

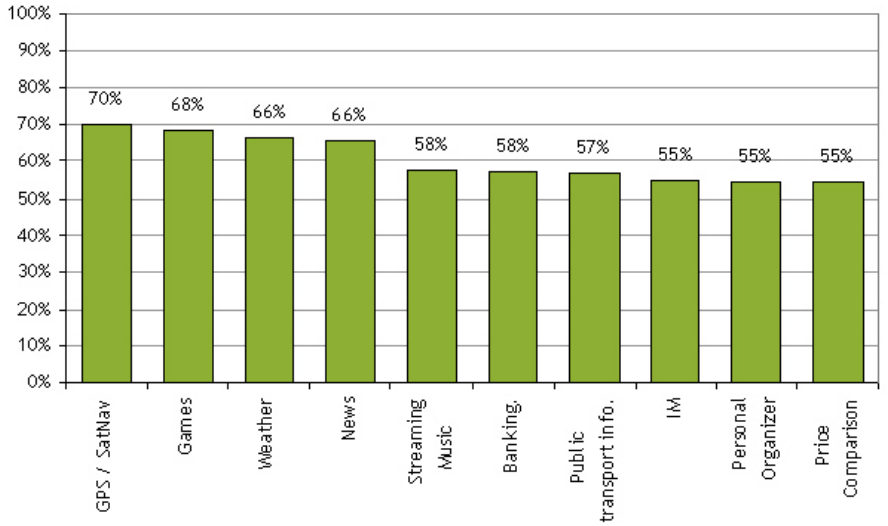


Source: Strategy Analytics "Wireless Smartphone Strategies" Service

Chinese respondents were most interested in applications that allowed them to navigate, play games and access news/weather.

- Most respondents in China (70%) would be interested in having a GPS/Sat Navigation application.
- Games (68%), Weather (66%), and News (66%) were also highly popular and were only marginally less popular than a GPS/SatNav application.

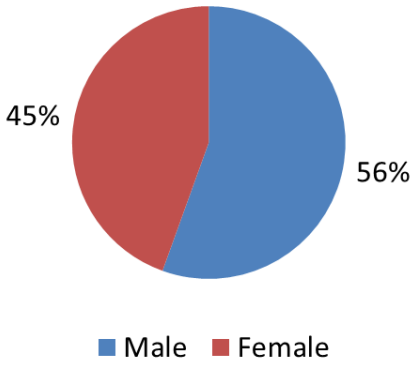
Top 10 Applications of Interest in China

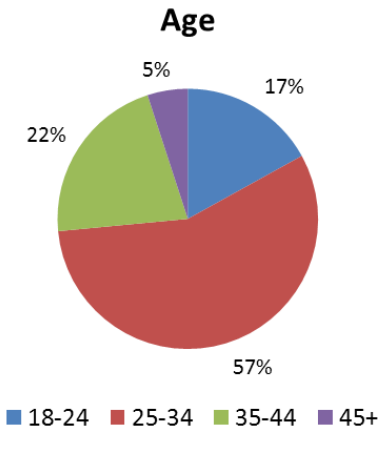


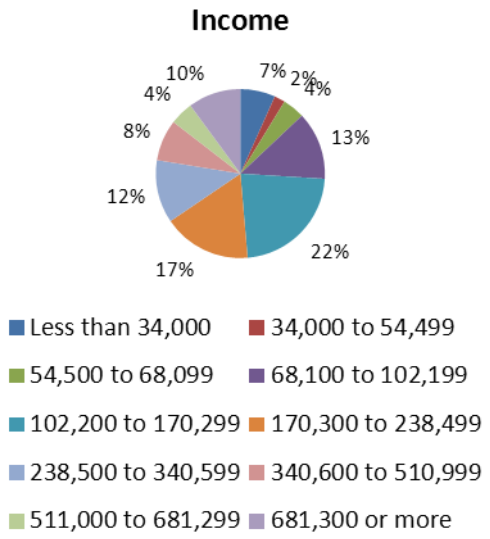
Source: China Wireless Consumer Survey, Aug 2010
Strategy Analytics "Wireless Media Lab" Service

Methodology

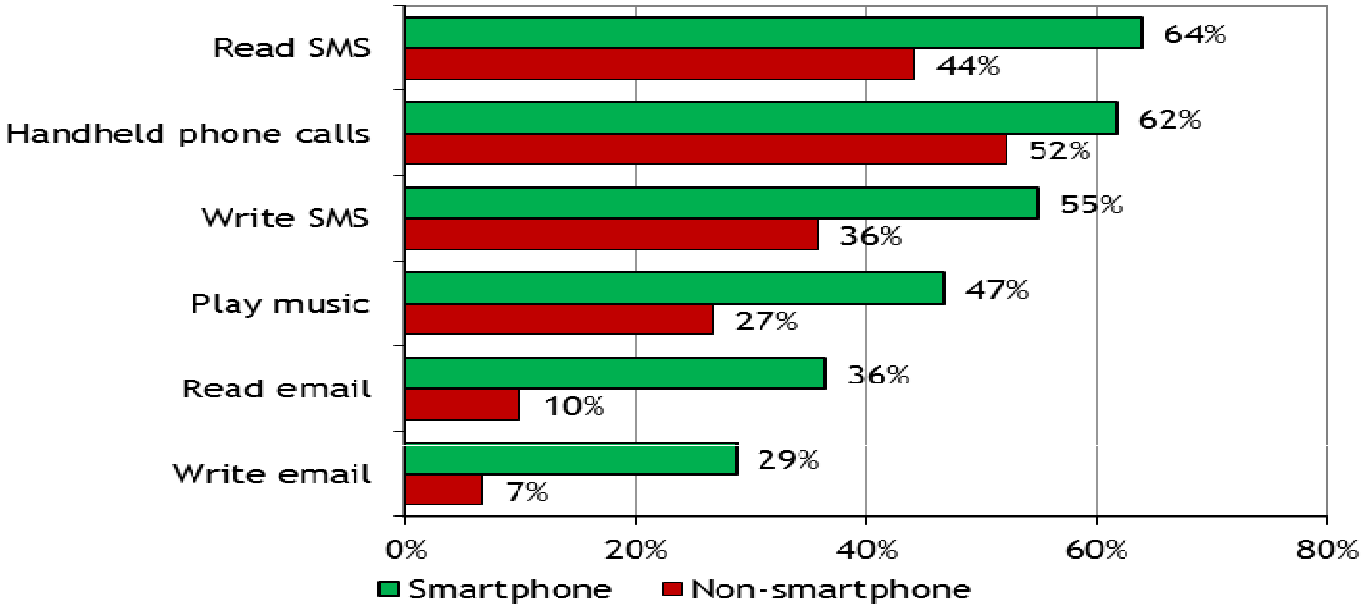
- Online survey, March 2011
- 2000 respondents
  - 1000 from Tier One cities
  - 1000 from Tier Two cities
- Must own and use vehicle
- Focus on
  - In-vehicle phone use







% Reporting Daily Usage of Mobile Phone Features While Driving



Source: Strategy Analytics Automotive Consumer Insights May 2011

The majority of smartphone owners in China read and write text messages daily in their vehicle

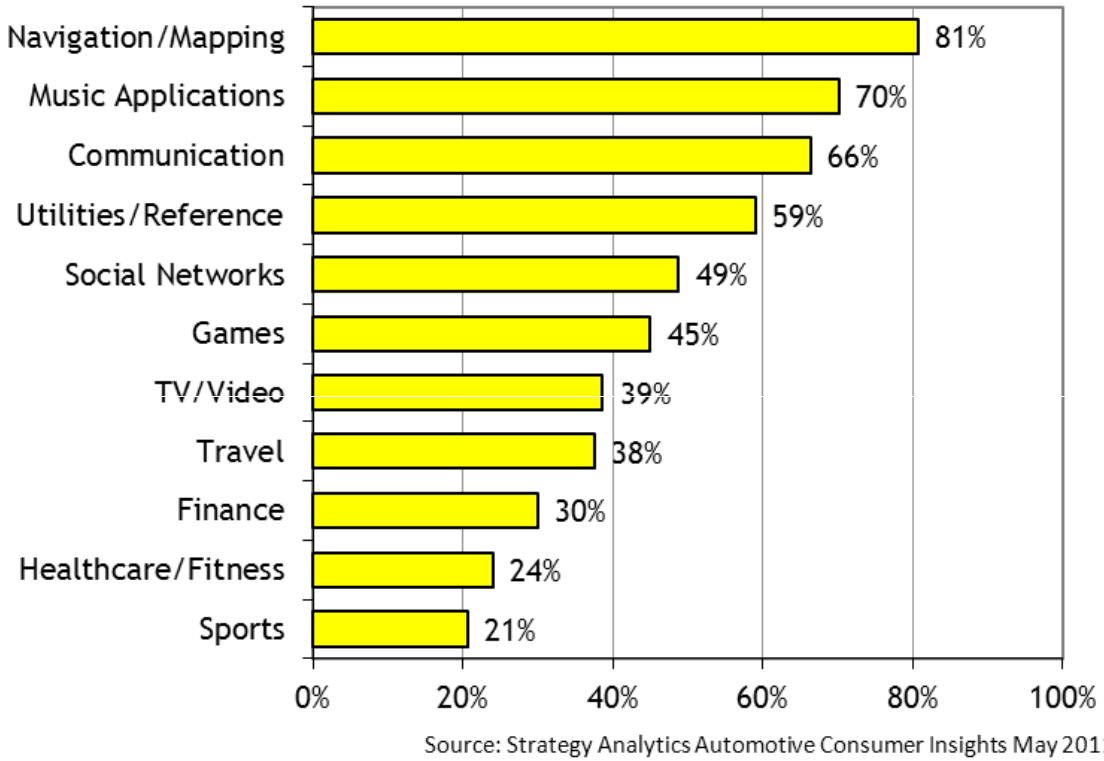
- 64% of smartphone owners and 44% of non-smartphone owners read at least one SMS daily while driving
- 55% of smartphone owners and 36% of non-smartphone owners report writing at least one text message each day while driving.

For smartphone owners, SMS use is about equivalent to handheld voice calls, while for non-smartphone owners, handheld voice calls are still the primary method of communication.

- 52% of non-smartphone owners place and/or receive at least one phone call per day while driving.

47% of smartphone owners accessing music from their smartphone daily while driving

% Reporting Daily Usage of Smartphone Applications While Driving

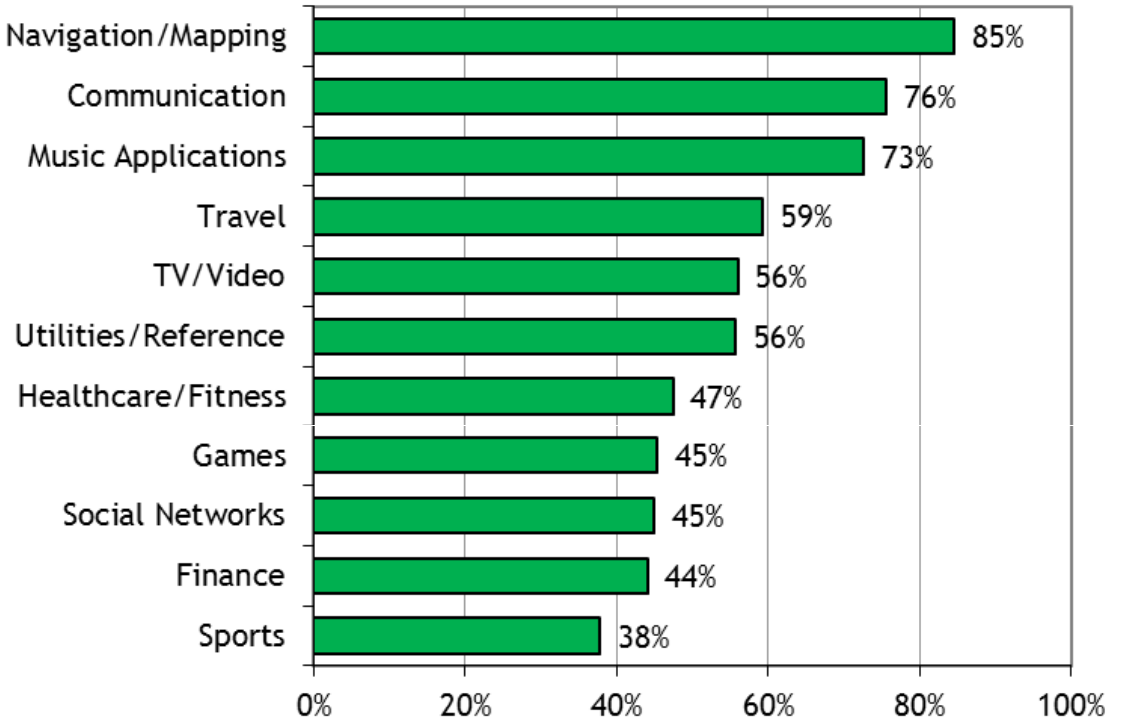


Source: Strategy Analytics Automotive Consumer Insights May 2011

Smartphone owners in China frequently access smartphone applications while on the road

- 81% report accessing mapping and navigation applications while driving, most likely driven in part by real-time traffic services.
- 70% also report accessing music applications.
- Chinese smartphone owners also show high usage for communication apps (66%), utilities/reference apps such as local search (59%), and social network apps (49%).

% Interested or Very Interested in Accessing Applications While Driving



Source: Strategy Analytics Automotive Consumer Insights May 2011

Both smartphone and non-smartphone owners are interested in accessing these apps in their vehicle

- Navigation and mapping applications are on the top the list, with 85% of all respondents interested in accessing these applications in the car

Handwriting recognition, apps

Handwriting recognition in Chang'An sedan; BYD i-System – Shanghai Auto Show 2011

Source: Strategy Analytics

Apps, apps and more apps

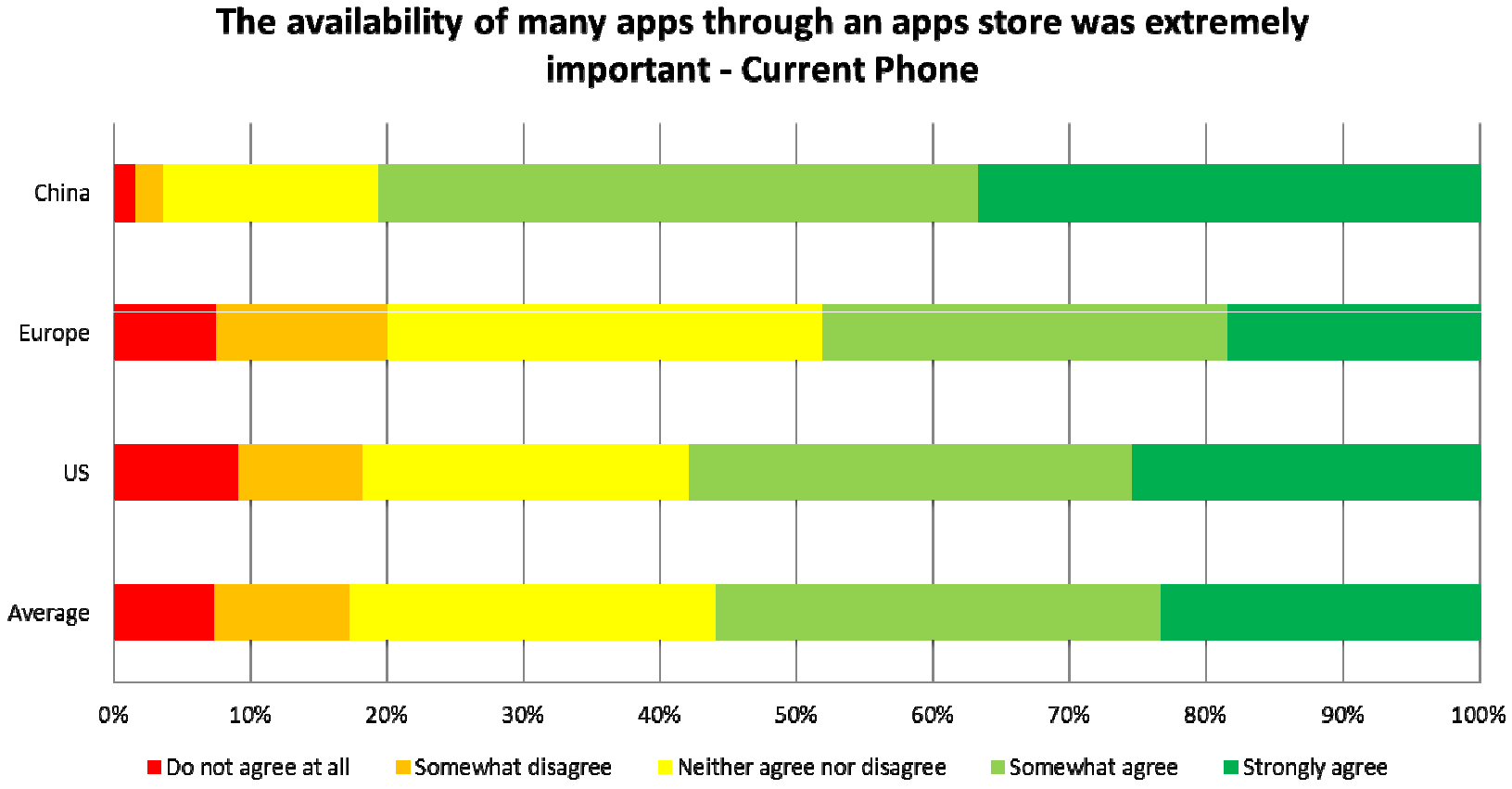
Hawtai B11 TIVI head unit – Shanghai Auto Show 2011

Source: Strategy Analytics

Look familiar?

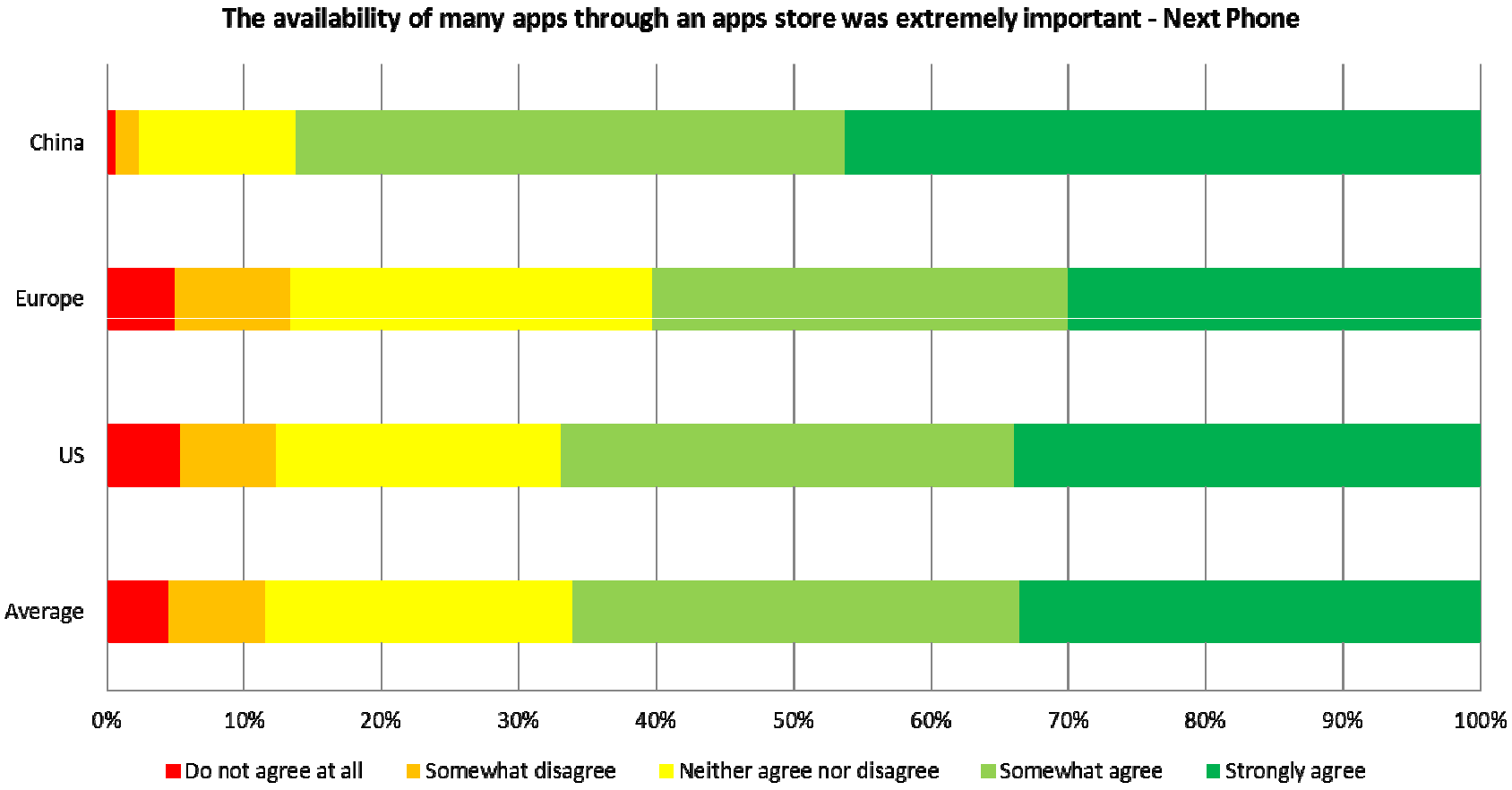
GM's MyLink Interface MY2013 Malibu

Importance of Apps – Current Phone



2011 GWP Survey of smartphone owners

Importance of Apps – Next Phone



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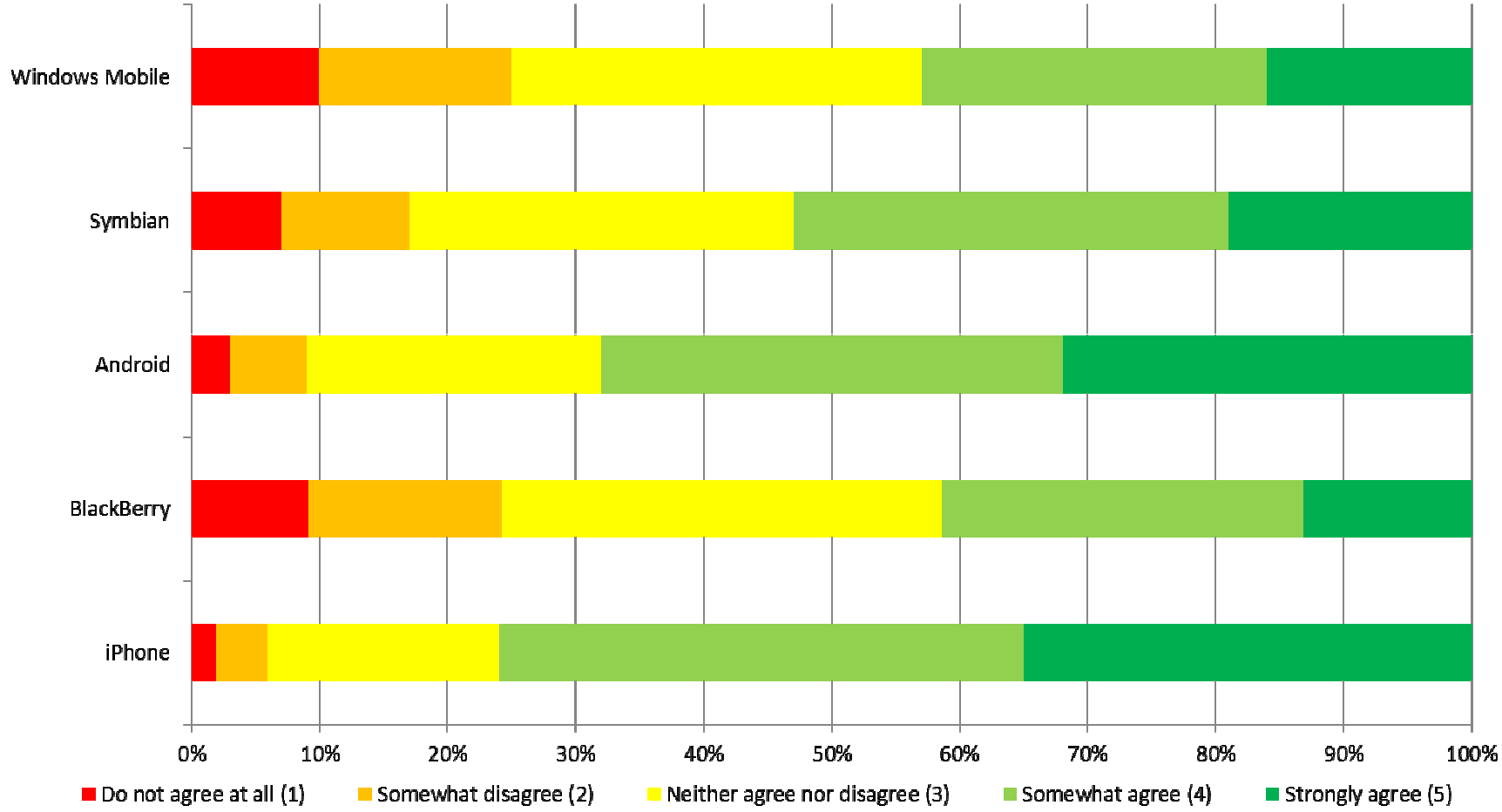

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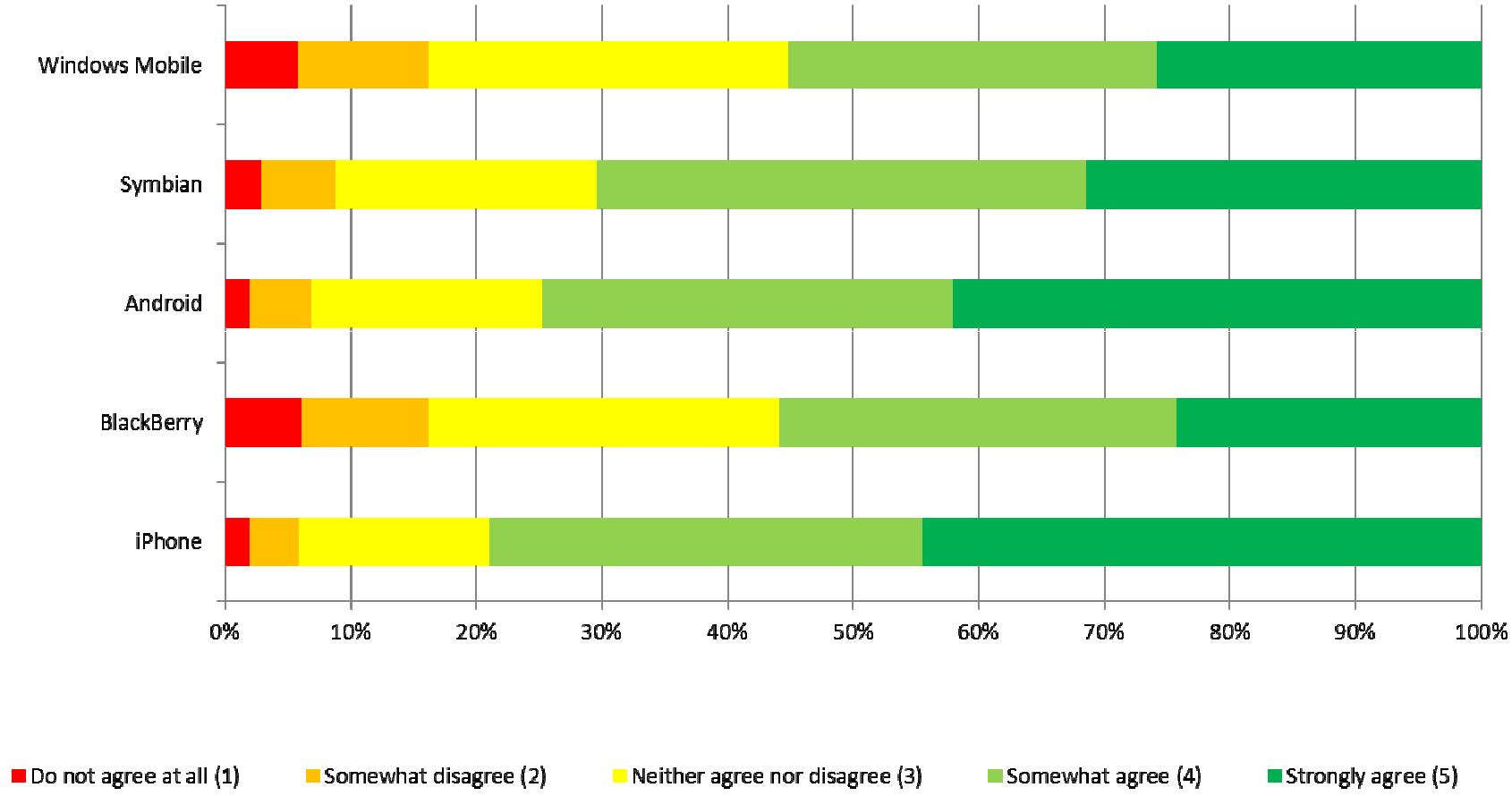
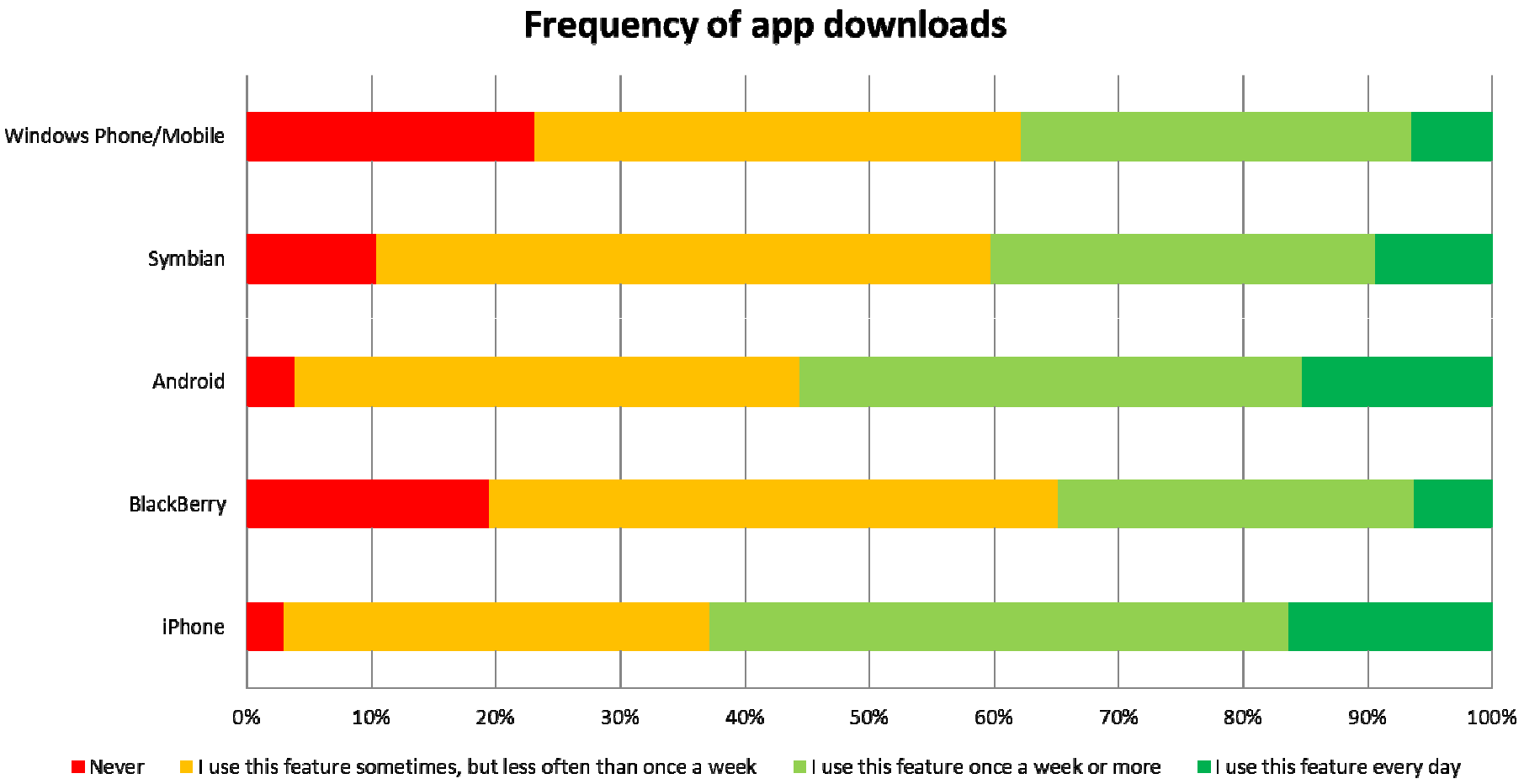
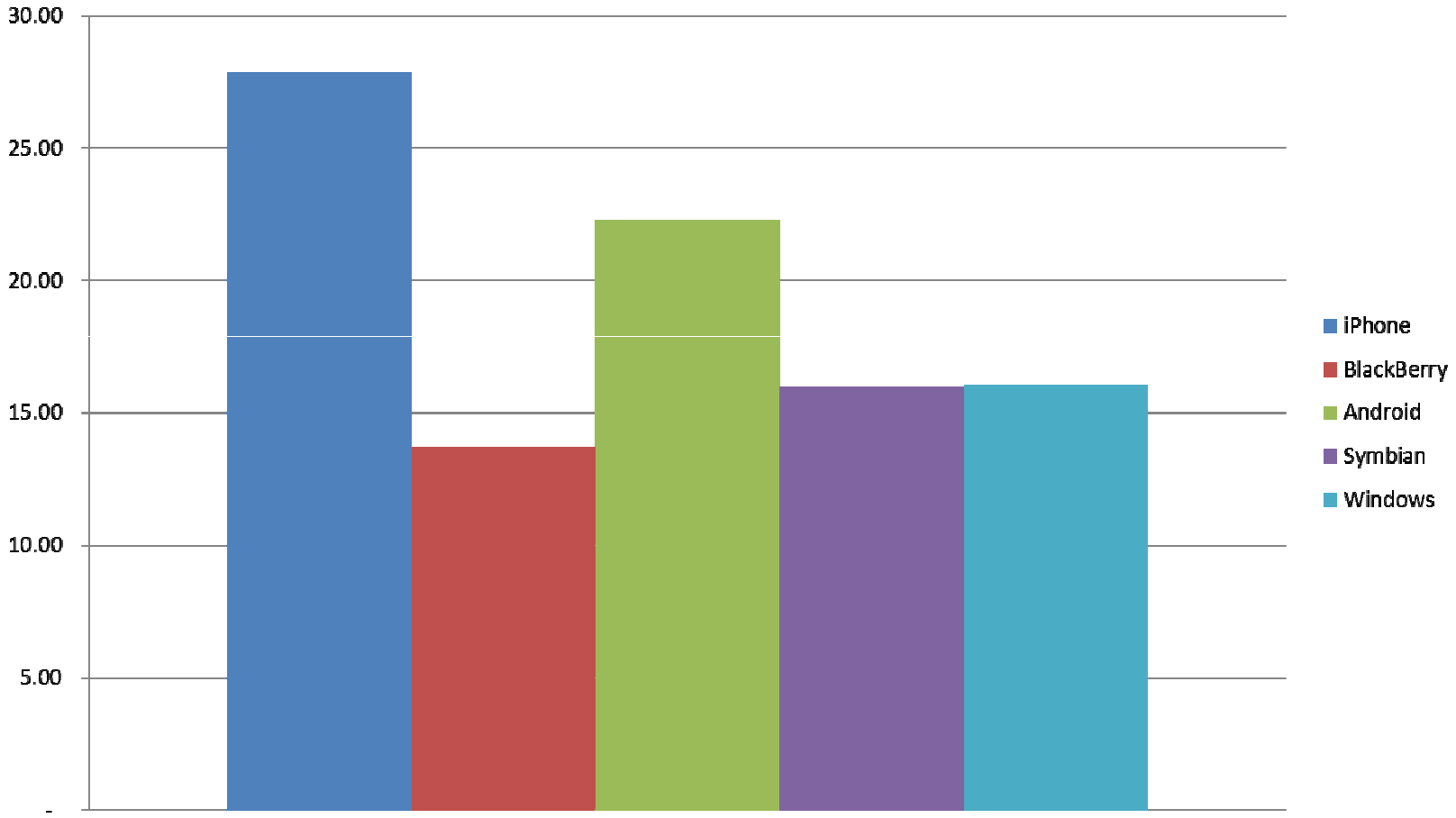


2011 GWP Survey of smartphone owners

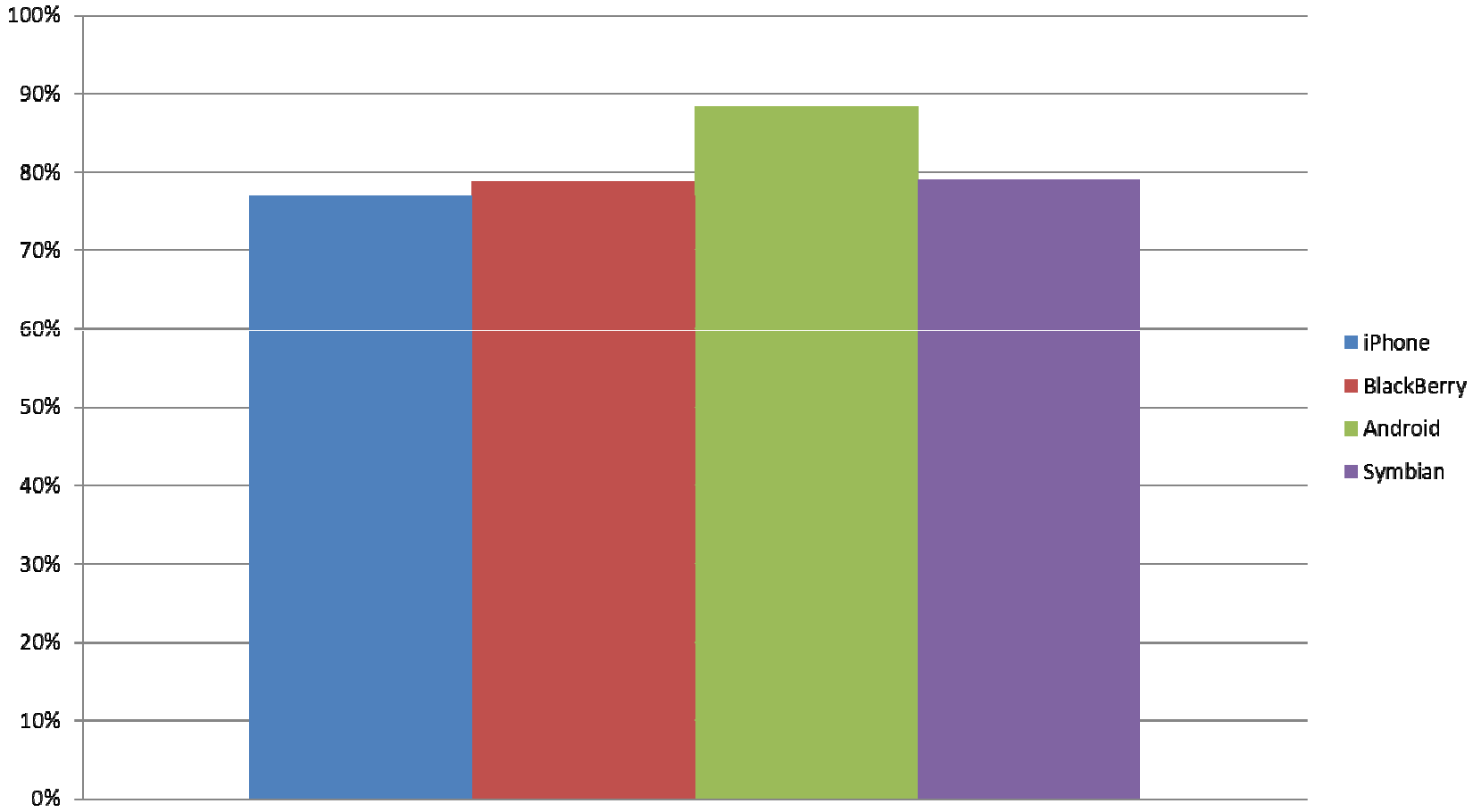
Frequency of app downloads



Apps downloaded per platform by users

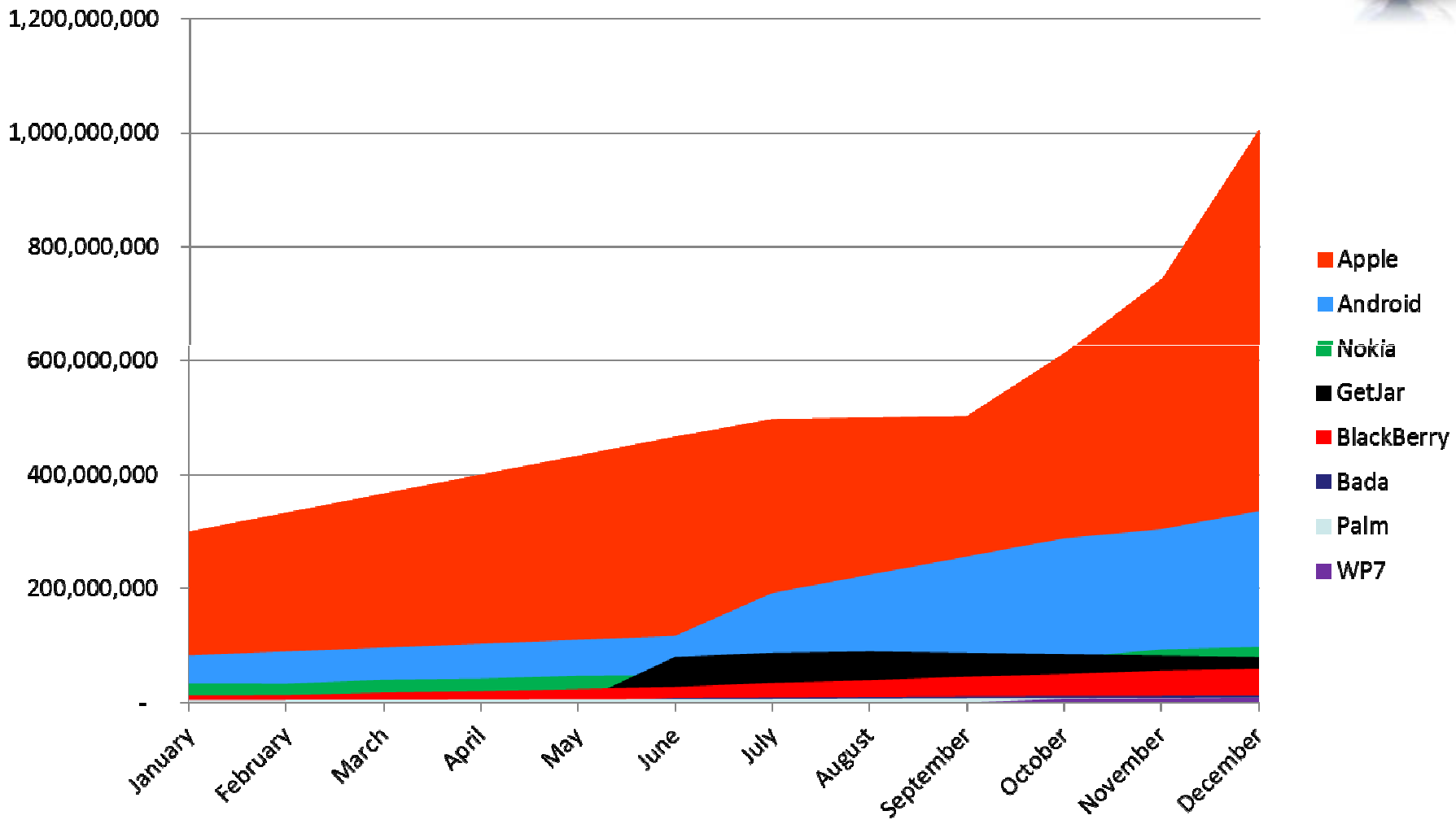


% of apps downloaded that were free

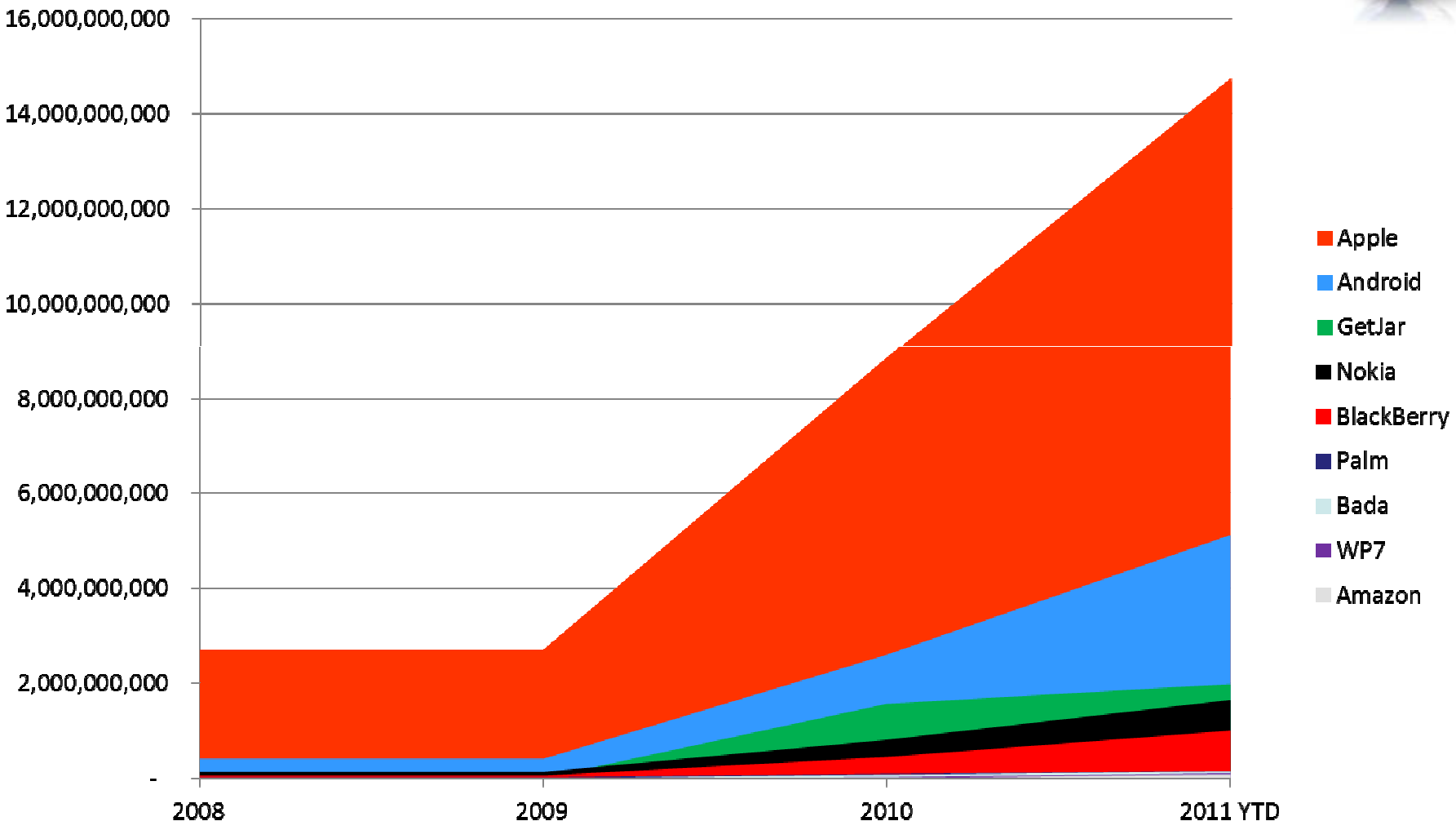


2011 GWP Survey of smartphone owners

App Downloads per Platform - 2010



App downloads cumulative



Tier Ones Making Their Choices (cont.)

Tier 1 Supplier	OS Supported
Awtec	µITRON and VxWorks
Alpine	µITRON, Microsoft Embedded
Bosch	T-engine, Linux, MontaVista
Clarion	Microsoft Embedded, VxWorks, µITRON and Linux
Continental	Android (AutoLinQ), Microsoft Embedded and Linux, GenIVI
Delphi	GenIVI, Android/Linux, QNX, Microsoft Embedded
Denso	QNX-based Blue Harmony, µITRON and T-Engine, willing to support Microsoft Embedded

Tier Ones Making Their Choices

Tier 1 Supplier	OS Supported
Harman	QNX, VxWorks, GenIVI, Linux
Johnson Controls	QNX
Magneti Marelli	Microsoft Embedded, VxWorks, and MeeGo
Mitsubishi Electric	Microsoft Embedded, µITRON and Linux
Panasonic	Microsoft Embedded, QNX
Pioneer	VxWorks, Microsoft Embedded and µITRON
Visteon	Android, GenIVI, MeeGo, Microsoft Embedded, QNX, Linux, Ubuntu

Auto OS Outlook

OS	Outlook	Support
Linux – Ubuntu, MG-Nucleus, MeeGo, etc.		Volkswagen, GM, Nissan
Android		Roewe, Saab, Geely, Nissan?
GenIVI		GM, PSA, BMW, Hyundai, Jaguar-Land Rover, SAIC, Renault
QNX		GM, PSA, BMW, Hyundai, Jaguar-Land Rover, Volkswagen, Porsche, Audi, Chrysler, Toyota
Microsoft Embedded		Kia, Ford, Mercedes, Honda, Fiat, Nissan, Hyundai
µITRON, T-Engine, VxWorks		Toyota, Volkswagen, Renault, Nissan(MeeGo)?

Auto OS Outlook Questions

- GM shifting from QNX to Linux?
- Toyota shifting to QNX?
- BMW dividing its commitments between QNX and GenIVI?
- Volkswagen/QNX? Nissan – Android/MeeGo? Tizen?
- TomTom shift to Android
- Continental, Parrot support for Android
- China syndrome -> Can MS transition Win CE users to Win Emb?
- Will QNX embrace/support for Android create an advantage?
- Harman experimenting with Android (!) <- not in automotive

Connectivity Options

- MirrorLink
- RealVNC
- Aha Radio (Harman)
- Choreo (Airbiquity)
- Zypr (Pioneer)
- AudiConnect
- BMW ConnectedDrive
- MyFord Touch
- Entune/Touch&Go (Toyota)
- MyLink (GM)
- Uconnect (Chrysler)

Conclusions

- Traffic information is the single most important application in the car
- China is the largest and fastest growing automobile market and the fastest growing telematics market
- Automotive user interfaces are converging toward mobile device configurations
- If the industry – our eco-system – does not find a way to solve the societal and technological challenges resulting from the growing number of cars on the road, governments will
- **Vehicle connectivity is the key to mitigating most of these issues**

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