Aalto University
School of Electrical
Engineering

# Mobile Handset Population in Finland 2005 – 2012

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*MoMIE project report*
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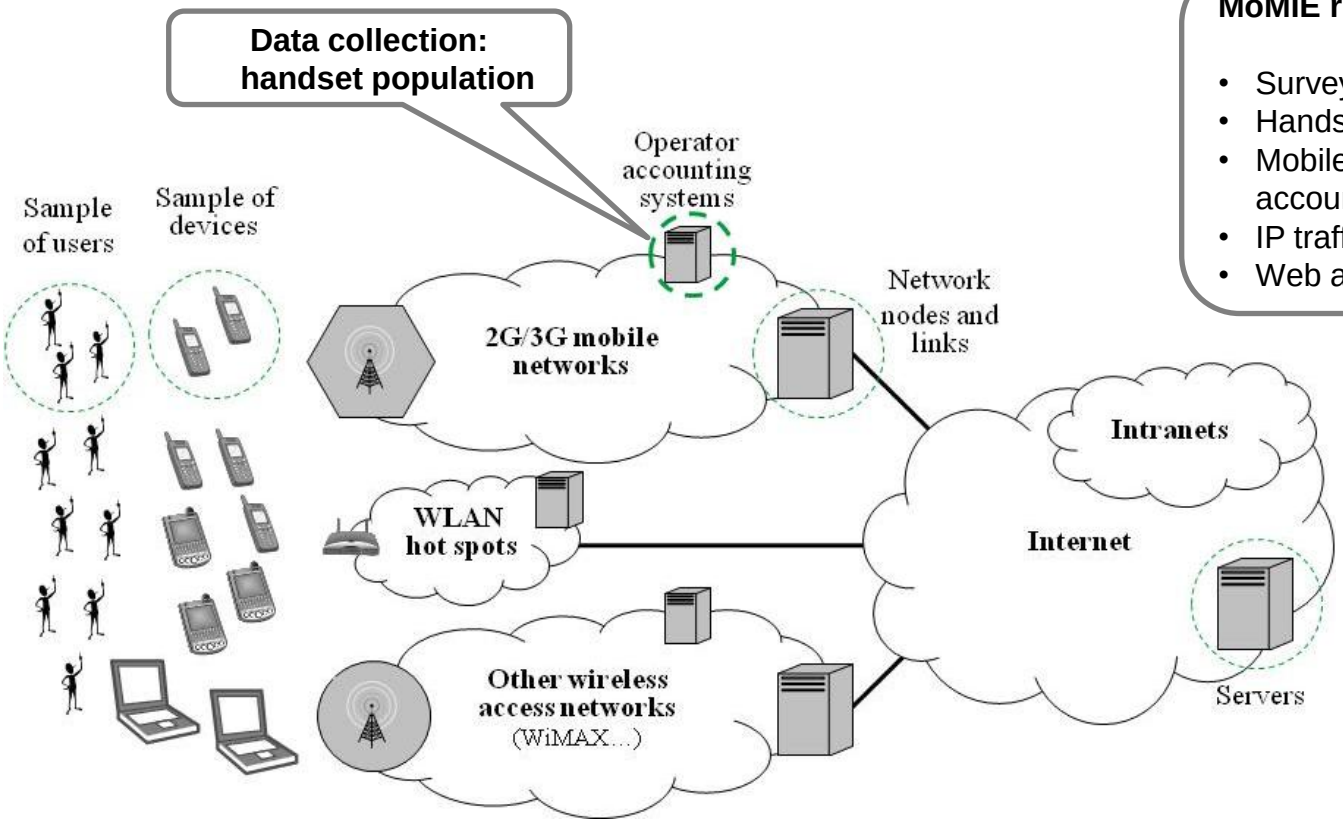
# MoMIE project: Comprehensive view on mobile service usage




**MoMIE research:**

- Surveys on handset panel
- Handset monitoring
- Mobile operator accounting systems
- IP traffic measurements
- Web analytics

Source: Modified from Kivi, 2009

http://momie.comnet.aalto.fi

# Data collection: handset population

**Data collected from mobile operators' accounting systems**

- Data from DNA, Elisa, and TeliaSonera
- Collected in the end of September, annually 2005–2012
- Feature information from GfK and public sources

**Data represents 80-99% of devices in use in Finnish mobile networks (~99% in 2012)**

- Includes devices observed at operators' network
- Some error due to
  - *No data on Apple iPhone between 2005 and 2010*
  - *Mobile subscriber churn during observation period*
  - *Differences in operator-specific data sets*
  - *Unidentified devices and missing feature-data of handset models*

# Device types

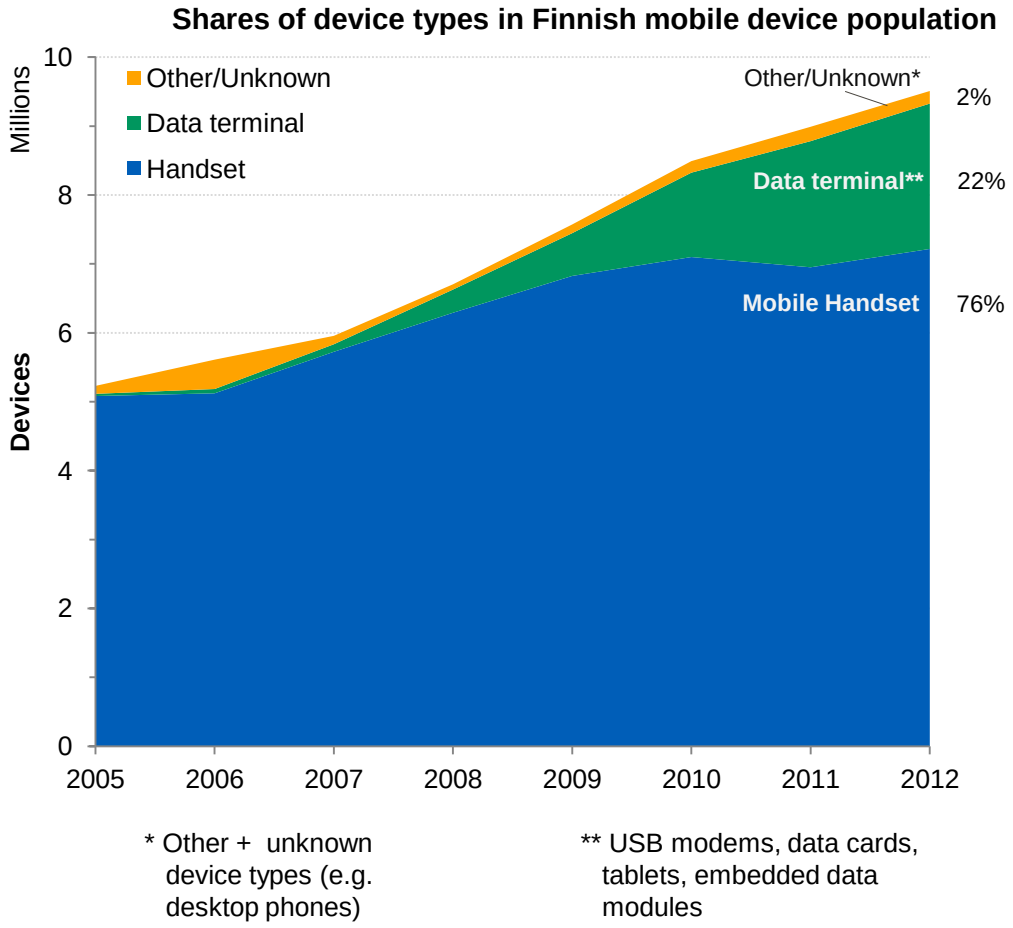
**Share of data terminals growing slowly**

- USB modems as the major category
- Tablets roughly 1.5% out of all devices (does not include WLAN-only tablets)

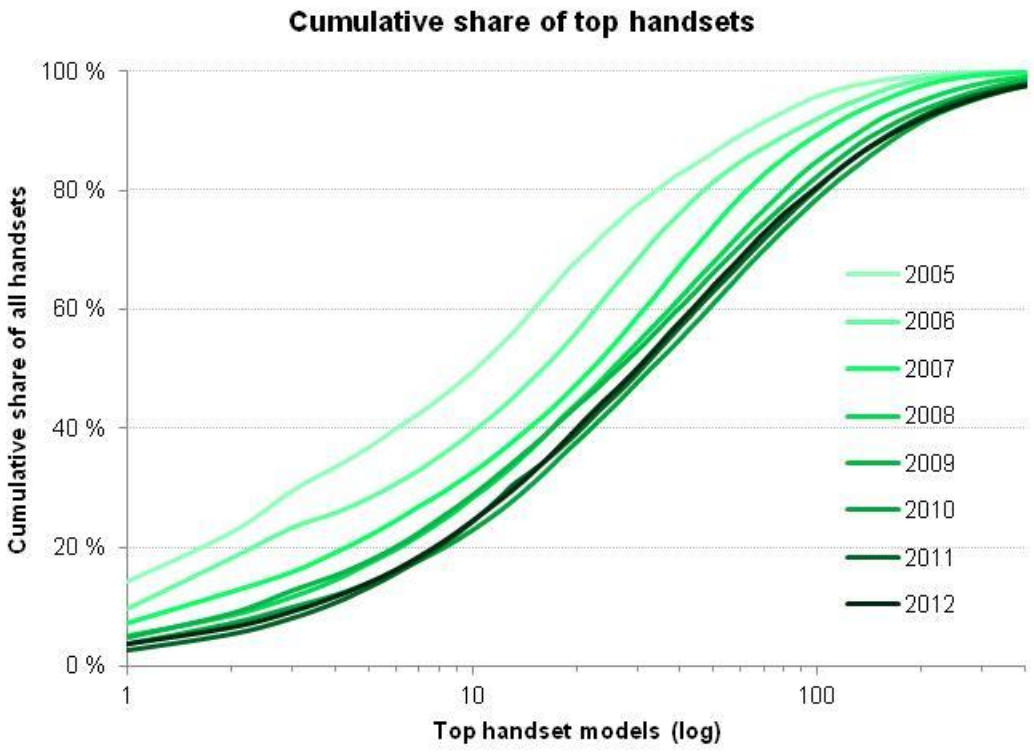
**Size of the active device population growing**

- Exact size depends on definition
- Here, size of the population assumed to equal the total number of mobile subscriptions
- Relative shares of handsets and data terminals based on MoMIE measurements

**Other/Unknown and Data terminals excluded from the rest of the analyses**



# Fragmentation of handset population has stopped




**Top models' share of all handsets has stopped decreasing**

- Top 1 model
  - *14% (2005) → 4% (2012)*
- Top 10 models
  - *50% (2005) → 25% (2012)*

**Between 2005 – 2008, the number of available models increased, increasing fragmentation**

- Since 2008, the amount of available models has remained rather stable

# Top handset models in use in Finland
## September 2012

| Rank | Model name | Intro year | Share | Change from '11 | Packet data |
|---|---|---|---|---|---|
| 1 | Nokia C2-01 | 2010 | 3.9% | ↑ | Yes (3G) |
| 2 | Nokia C5-00 | 2010 | 2.8% | ↑ | Yes (3G) |
| 3 | Apple iPhone 4 | 2010 | 2.7% | ↑ | Yes (3G) |
| 4 | Apple iPhone 4S | 2011 | 2.5% | ↑ | Yes (3G) |
| 5 | Nokia 3720 Classic | 2009 | 2.3% | ↓ | Yes (2G) |
| 6 | Nokia 7230 | 2009 | 2.2% | ↓ | Yes (3G) |
| 7 | Nokia E7-00 | 2010 | 2.2% | ↑ | Yes (3G) |
| 8 | Nokia Lumia 800 | 2011 | 2.1% | ↑ | Yes (3G) |
| 9 | Nokia C1-01 / C1-03 | 2010 | 2.0% | ↑ | Yes (2G) |
| 10 | Nokia 2760 | 2007 | 1.9% | ↓ | Yes (2G) |
| 11 | Nokia 2730 Classic | 2009 | 1.8% | ↓ | Yes (3G) |
| 12 | Nokia 5230 | 2009 | 1.6% | ↓ | Yes (3G) |
| 13 | Samsung Galaxy S II | 2011 | 1.6% | ↑ | Yes (3G) |
| 14 | Nokia 1100 | 2003 | 1.6% | ↓ | No |
| 15 | Nokia 2330 Classic | 2008 | 1.6% | ↓ | Yes (2G) |

**More smartphones included in top models**

### Top 3

- Models introduced in 2010
- All equipped with 3G connectivity

### Top 15

- 7 smartphone models
- Only one model (Nokia 1100) not capable of Internet access

# Majority of people using Nokia handsets

**Nokia's share is very high, but decreasing**

- 81% (2011) → 72% (2012)

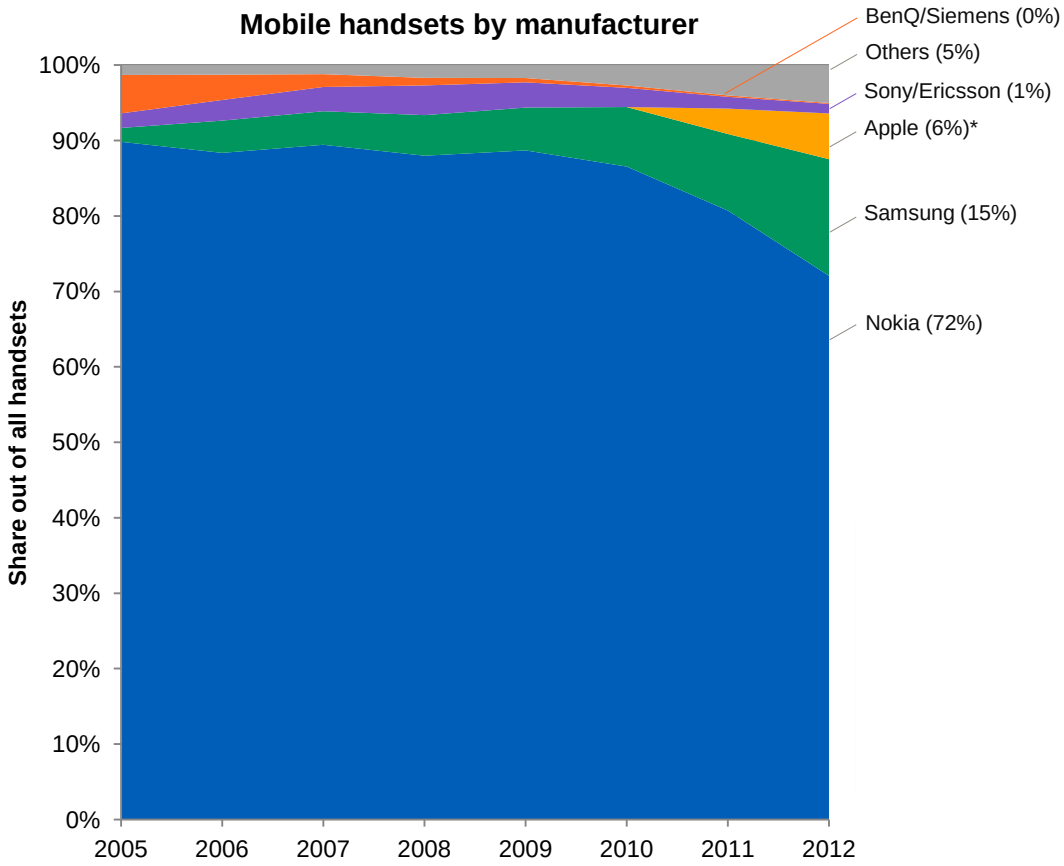
**Shares of Samsung and Apple growing**

- Samsung 10 → 15%
- Apple 3% → 6%

**Others with 5% share**

- HTC (>1%) and ZTE (<1%) with highest shares in *Others*

* No data on Apple iPhone from 2007-2010



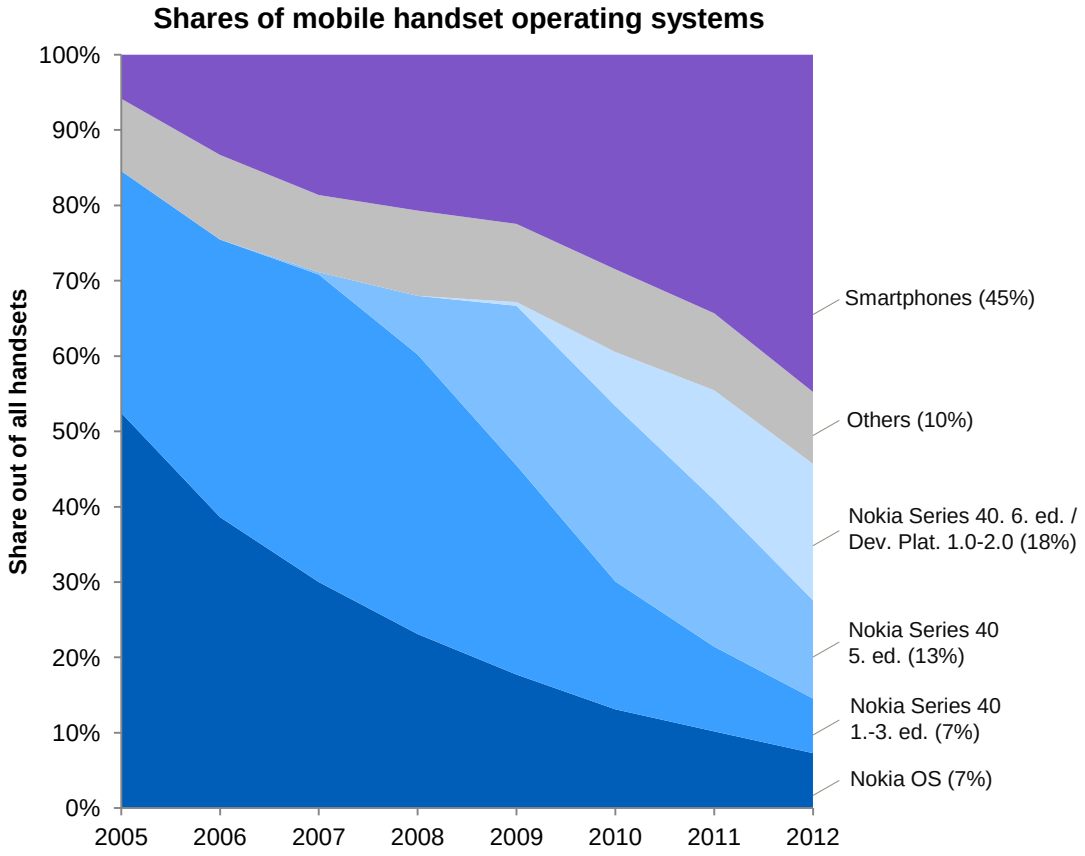
# Operating systems: mobile phones vs. smartphones

## Share of smartphones increasing

- 34% (2011) → 45% (2012)
- Smartphone definition: Possibility to install native applications. For example, Android, iOS, Symbian, Windows Phone, MeeGo

## Mobile phones mainly Nokia Series 40

- Single largest development platform
- Share decreasing 45% (2011) → 38% (2012)



# Operating systems: smartphones

**Share of Google's Android increasing**

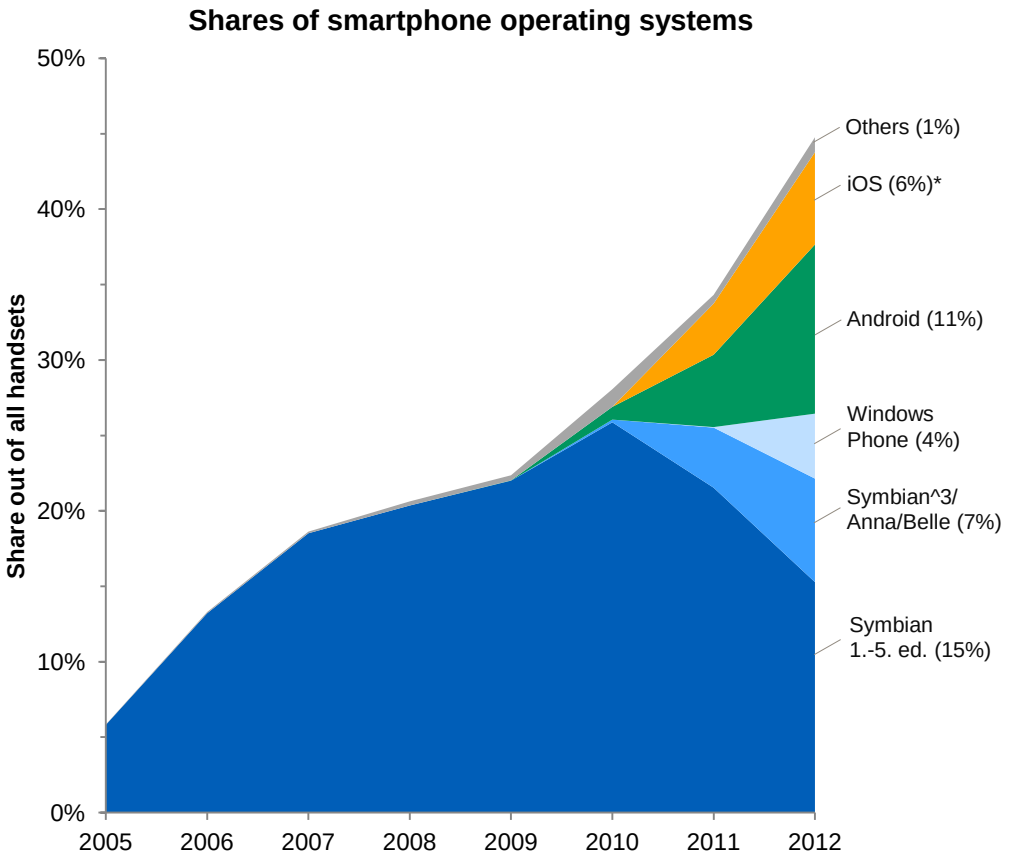
- Android handsets manufactured mainly by Samsung (73% out of all Android handsets)

**Apple iOS also gaining market share**

- Two models (4/4S) generate majority of Apple's share

**Share of Nokia's handsets rather stable from 2011**

- Windows Phone and new versions of Symbian substitute older Symbian models

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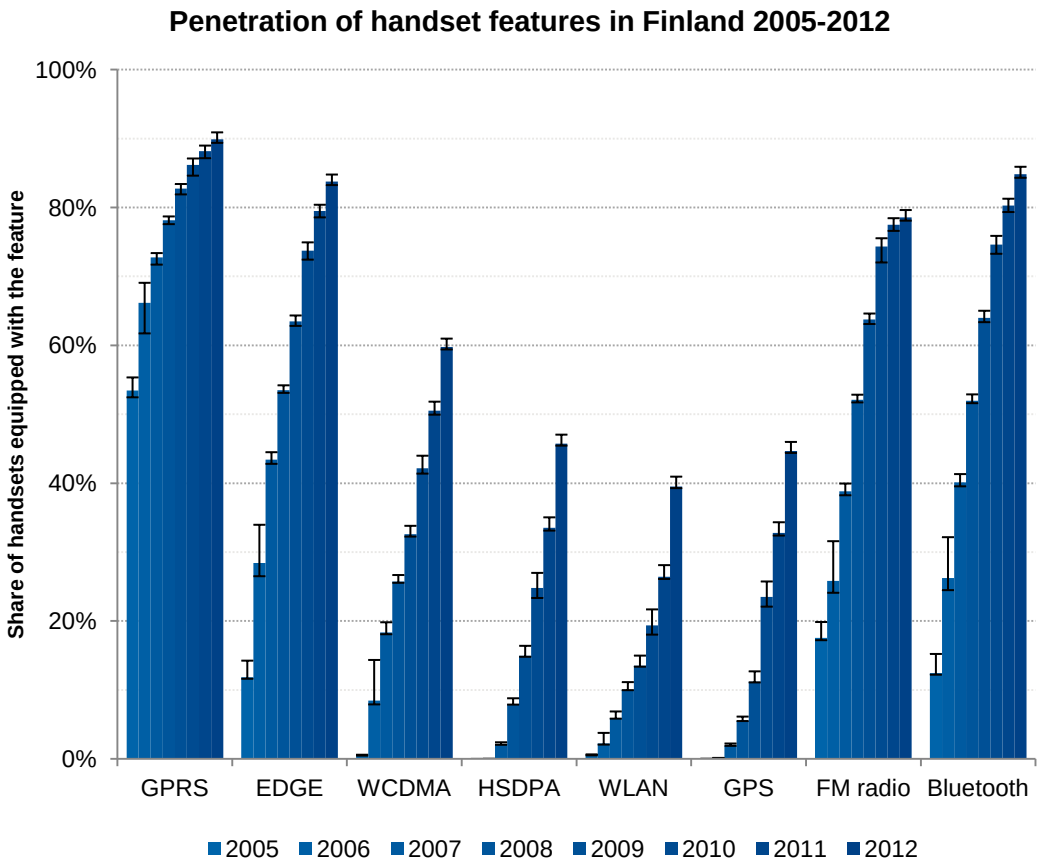
# Diffusion of radio interfaces




## Older features closing saturation

- Penetration of FM radio saturating near 80%?

## HSDPA, WLAN, and GPS spreading increasingly fast

- Diffusion of WCDMA still fast linear

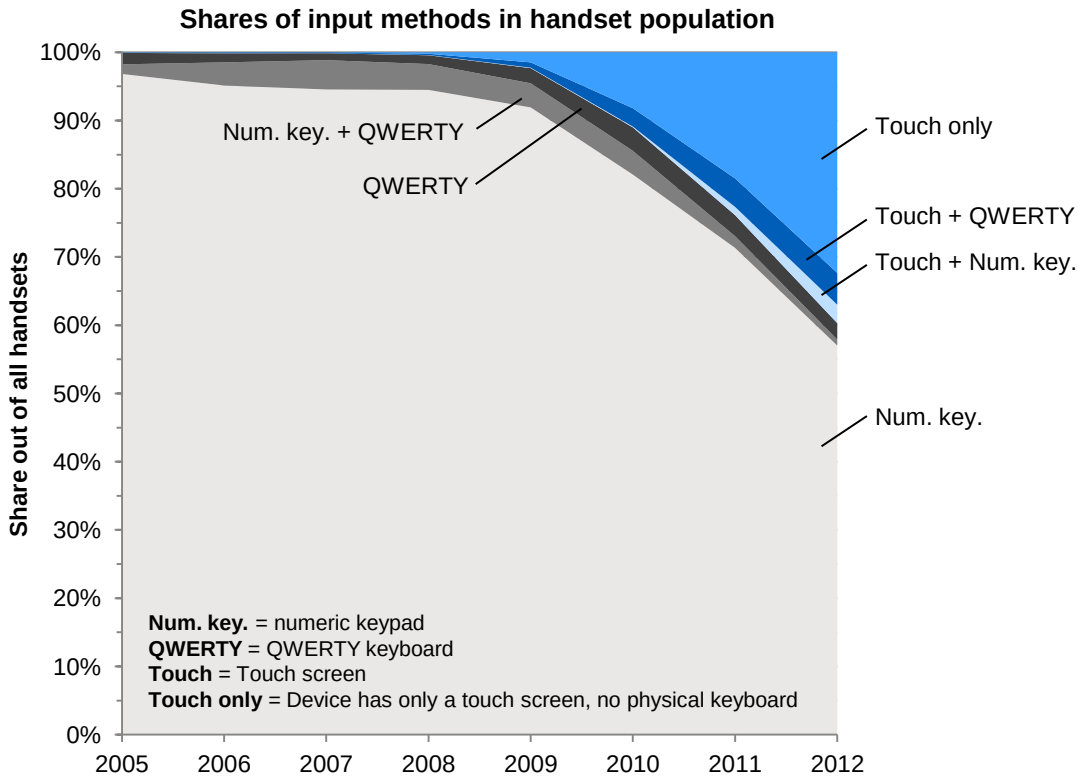
# Input methods for mobile handsets

## Touch screen handsets spreading fast

- Touch only:
  18% (2011) → 32% (2012)
- Substitutes numeric keypad:
  71% → 57%

## Share of handsets with two input methods small, but slightly increasing

- Mainly Touch + QWERTY and Touch + Numeric keypad
- Total share of combinations and QWERTY ~11% (2012)



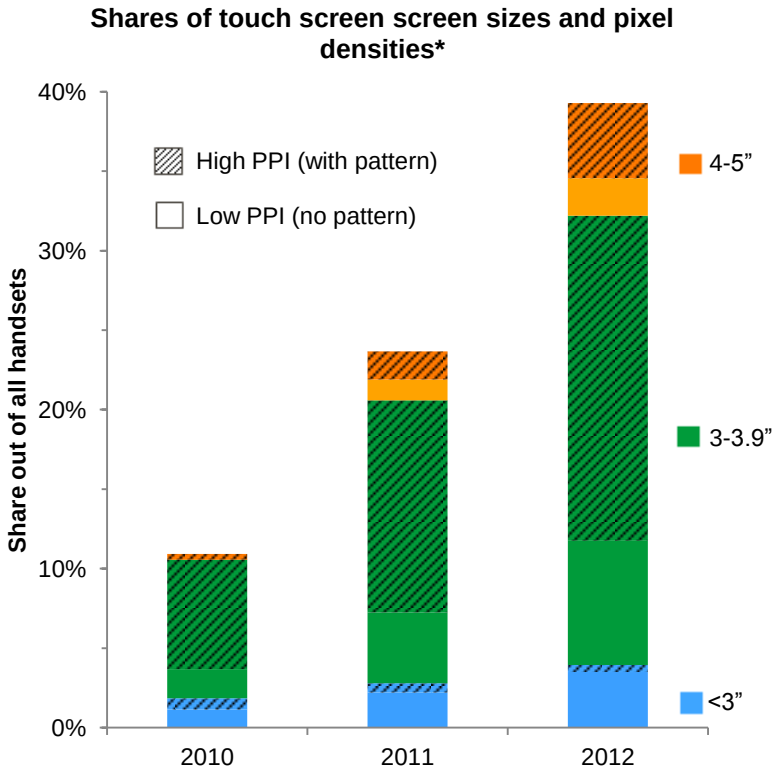
# Touch screen handsets: Screen sizes and pixel densities

**Some important characteristics:**

- Screen size (Inches)
- Resolution (width x height)
- Aspect ratio (res. width / res. height)
- Pixel density (PPI, Points Per Inch)
  - *Low <= 200 (e.g. 3.5" screen with 320 x 480 resolution)*
  - *High > 200 (e.g. 3.5" screen with 640 x 960 resolution)*

**Share of touch screen handsets with high pixel densities and larger screens increasing**

- Data includes *Touch only*, *Touch + QWERTY*, and *Touch + Num. Keypad* -handsets




* Share of other/unknown screen sizes and PPIs out of identified touch screen handsets (< 0.6%) not included in figure

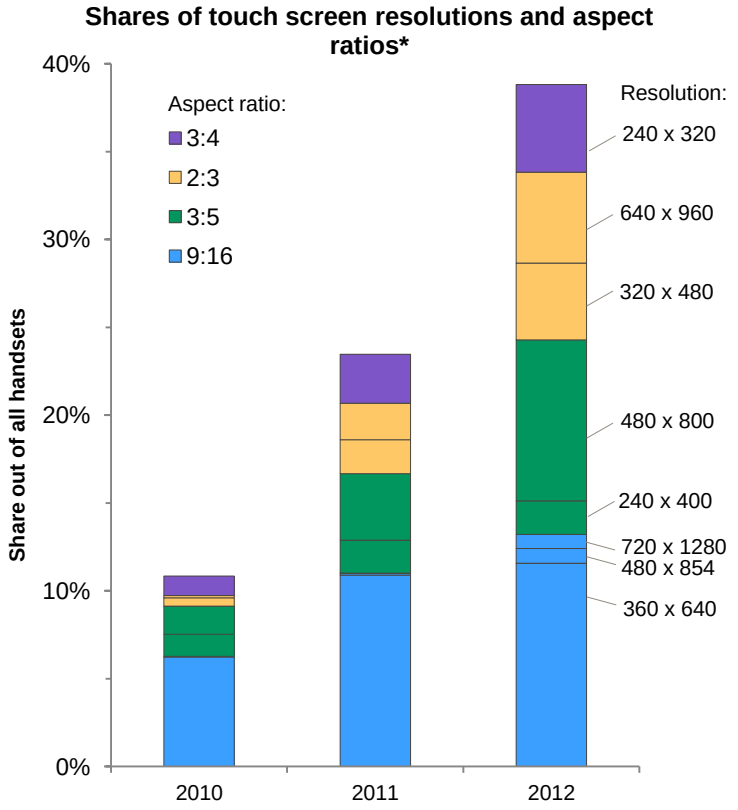
# Touch screen handsets: Screen aspect ratio and resolution

**Four main aspect ratios in mobile handset touch screens (2012):**

- 3:4 ratio: 13% (out of all touch screen handsets)
- 2:3 ratio: 24%
- 3:5 ratio: 29%
- 9:16 ratio: 34%


**Most popular models of the categories**

- 2:3 ratio: Apple iPhone 4 & 4S (640x960)
- 9:16 ratio: Nokia E7 & 5230 (360x640)
- 3:5 ratio: Nokia Lumia 800 & Samsung Galaxy S II (480x800)




* Share of other/unknown aspect ratios and resolutions out of identified touch screen handsets (< 0.6%) not included in figure

# Feature diffusion forecast: Logic

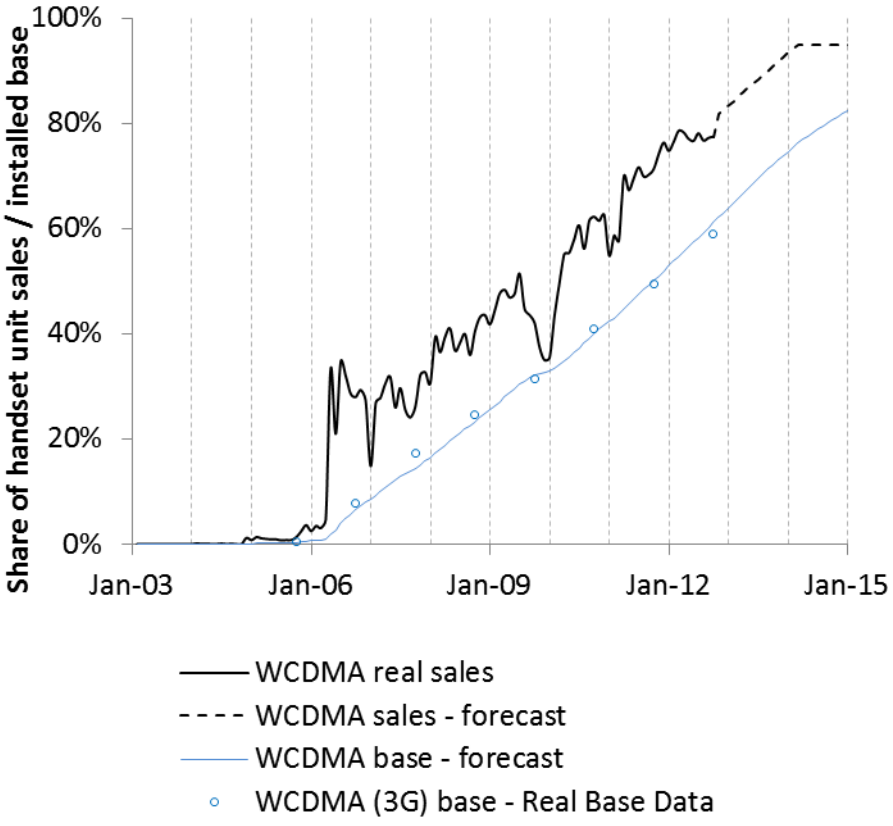
## Combination of handset sales and installed base data

### Three datasets utilized:

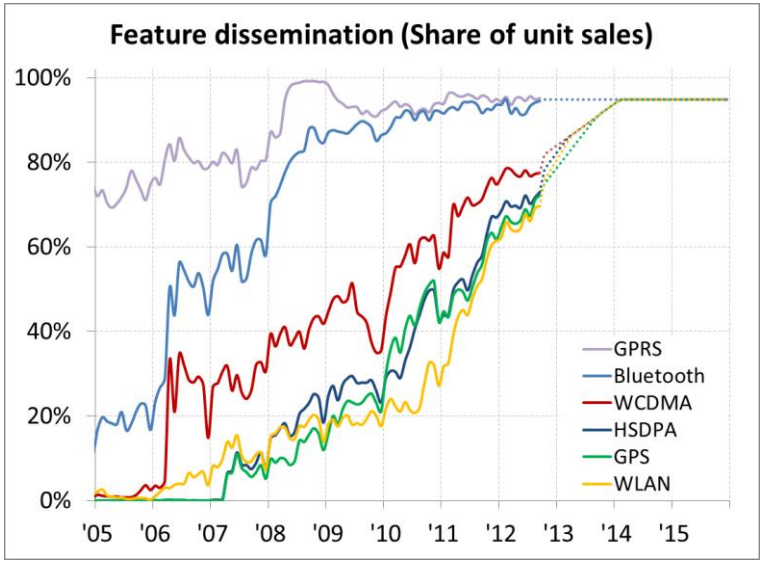
- Mobile handset population (from operators)
- Mobile handset sales (from GfK)
- Database of handset features (from GfK and public sources)

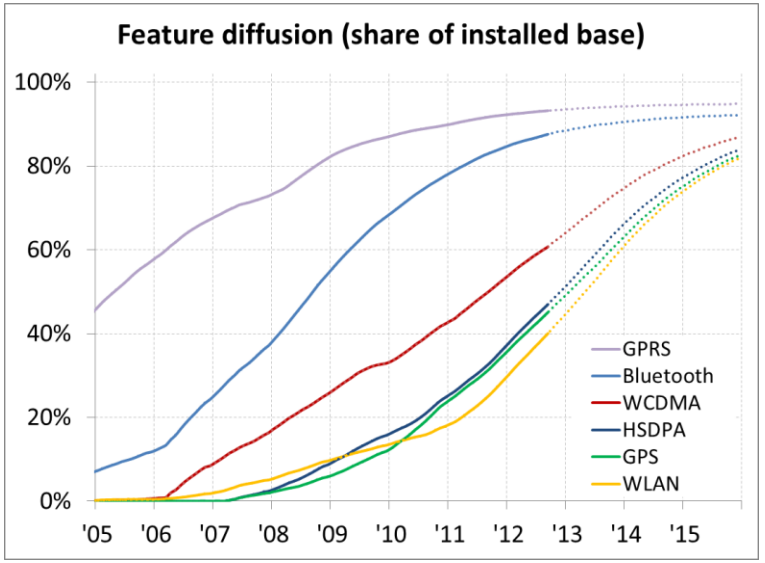
### Forecasting process:

1. Handset unit lifetimes estimated using sales and installed base data
2. Shares of features in handset sales calculated and predicted
3. Diffusion of features (shares in handset population) calculated based on 1) and 2)



# Forecasts for diffusion of selected features




**Steady growth in feature diffusion**

- WCDMA predicted to reach 80% penetration in two years, WLAN in three years

**Features diffuse in bundles**

- Certain features found together in feature phones, other features in smartphones

# Summary

**Data of the Finnish mobile device population collected annually 2005-2012 from all Finnish mobile network operators**

**Typical handset manufactured by Nokia (72%) and has a Nokia Series 40 (38%) operating system**

- Shares of Samsung and Apple increasing

**Smartphones (45%) and advanced features spreading fast**

- Especially technologies providing higher data transfer speeds
- Touch screen substituting numeric keypad
- Fragmentation of touch screen sizes and resolutions visible

**Forecasts predict stable growth of key features**

# Further information

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MoMIE project:

Modeling of Mobile Internet Ecosystem
http://momie.comnet.aalto.fi/

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