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Handset-Based Monitoring of Mobile Subscribers

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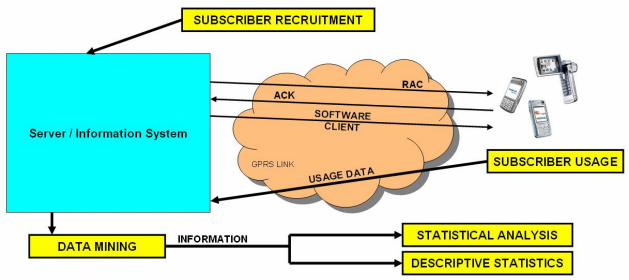
Handset-Based Monitoring –Research Method

- **A handset-based monitoring platform provides accurate and objective measurements of mobile service and device usage**
- **Records almost all user actions, excluding privacy related areas**
- **Coordinated panels in various countries, new panels launched constantly**
- **The panel process includes the collection of usage data, which is further complemented with beginning and ending questionnaires**
- **The process involves certain restrictions, mostly related to the generalization of the results**
- **All in all, the platform provides new possibilities to study emerging trends and disruptive applications in mobile communications.**

Handset-Based Monitoring – Research Method



1. Customer recruitment
2. Registration for the panel
3. Installation of the monitoring client
4. Filling in the beginning questionnaire
5. Automatic usage data retrieval (10-20 weeks)
6. Announcement of the panel ending
7. Filling in the ending questionnaire
8. Signing out from the panel

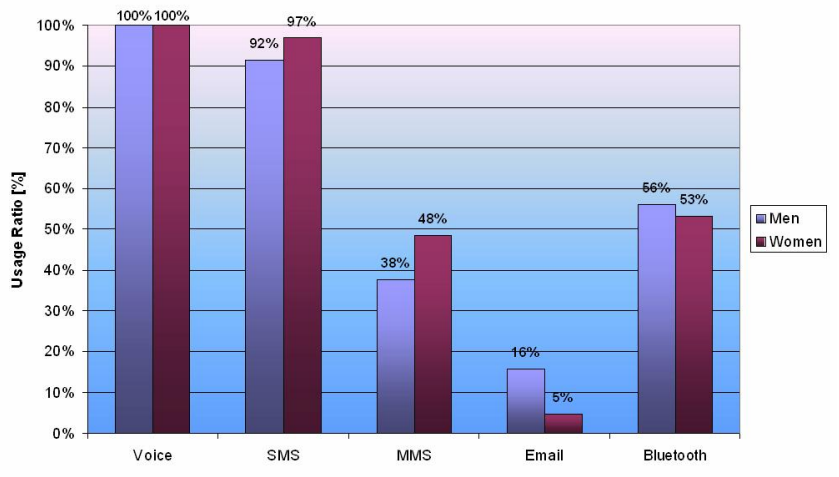
Handset-Based Monitoring – Data Sample

- **Our final dataset in this study included 562 active panelists**
- **Four countries included:**
  - **UK (39%)**
  - **Germany (35%)**
  - **USA (24%)**
  - **Singapore (2%)**
- **Male and younger people dominated in terms of demographics**
- **On average a panelist spent 15 weeks in the panel**
- **27% of the handsets were 3G devices, and 73% were 2.5G devices**
- **There is probably a strong early adopter bias in our dataset.**

Handset-Based Monitoring – Communication Usage

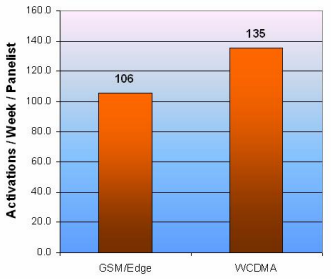
- **Communication oriented usage is still the dominant way of using smartphones, although various other functions (such as imaging, multimedia, Internet browsing) are experiencing increasing usage all the time.**
- **Our results confirm some of the earlier results:**
  - **Voice calls and SMS messages are still the dominant forms of communication**
  - **MMS messages are not that well received by the public**
  - **No significant differences exist between demographic groups in communication usage**
- **…but we also found some new, interesting results:**
  - **More people have tried Bluetooth messaging than email messaging**
  - **Voice calling contact networks are more diversified than messaging contact networks**
  - **Mobile instant messaging is making a breakthrough**
  - **Communication-oriented smartphone usage dominates in daytime only**

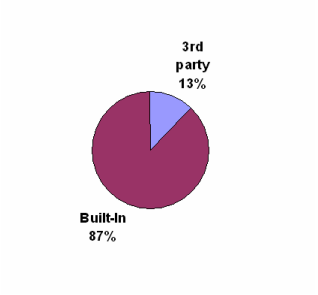
Handset-Based Monitoring – Service Usage



Handset-Based Monitoring – Application Usage

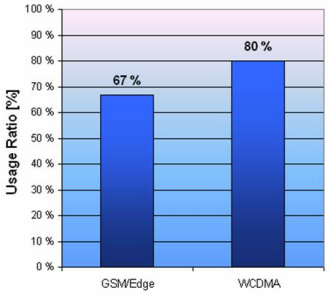
- **Handset capability seems to drive application usage.**
- **It is promising that 3rd party applications already make up 13% of all application launches.**
  - **Some 3rd party applications are preinstalled in the handset by the handset vendor or operator**
  - **Some 3rd party application are installed by the customer himself**
- **The results suggest that people perceive the open software platform as an important attribute in customizing the handset and accessing new services.**

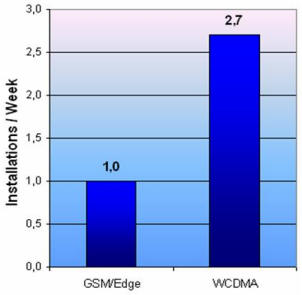




Handset-Based Monitoring – Application Usage

- **Quite a high share of people have installed applications.**
- **On average people install more than 1 application / week.**





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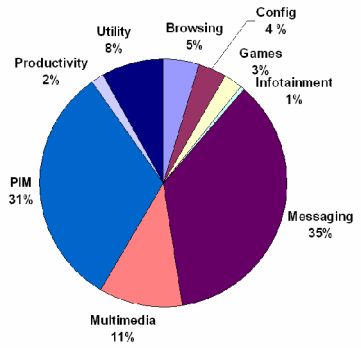
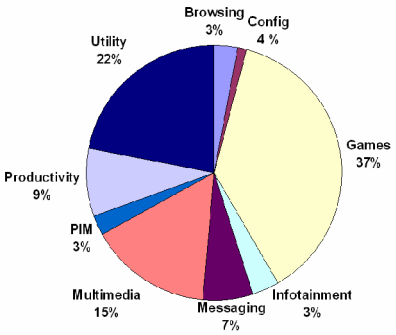
Handset-Based Monitoring – Application Usage

Functional Distribution of Usage

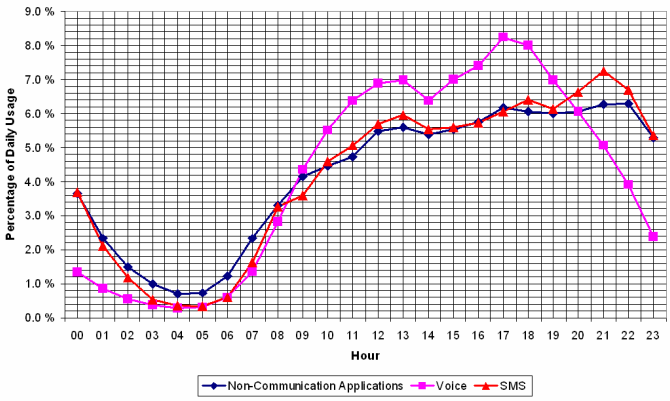


Functional Distribution of Installations



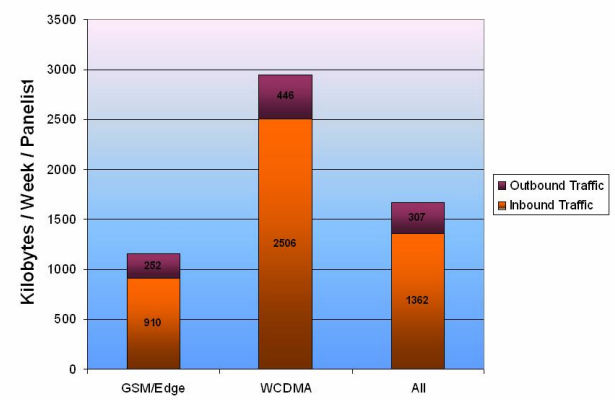
Handset-Based Monitoring – Daily Usage

- **Non-communication-oriented application usage increases towards the night.**
- **People use messaging very actively in the evening.**
- **Voice calls dominate in daytime.**



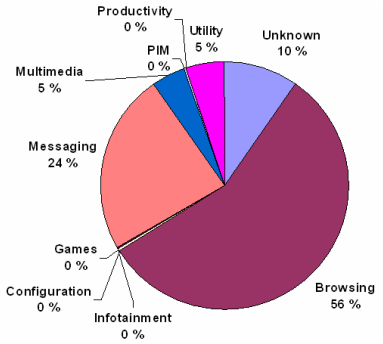
Handset-Based Monitoring – Packet Data Usage

- **Handset capability drives packet data usage.**
- **88% of panelists have tried packet data services.**



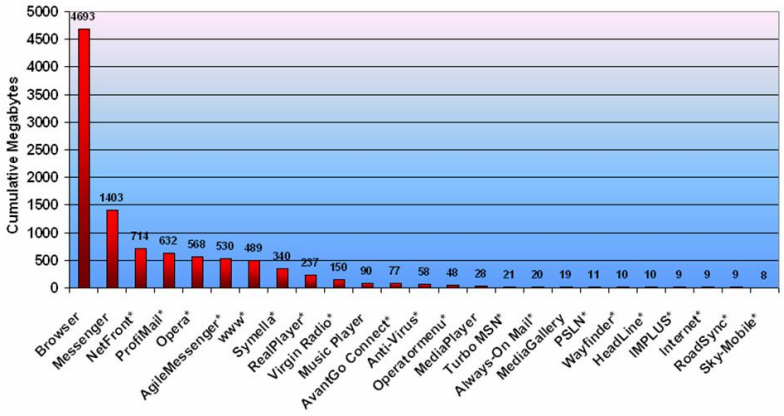
Handset-Based Monitoring – Packet Data Usage

- **Mobile Internet browsing dominates packet data usage.**
- **Also many 3rd party applications generating packet data were identified.**
- **Most popular applications:**
  - **Browsing:**
    - **Web (built-in browser)**
    - **Opera**
    - **Netfront…**
  - **Messaging:**
    - **Messaging (built-in messenger)**
    - **Profimail**
    - **AgileMessenger…**
  - **Other:**
    - **Symella (P2P)**
    - **RealPlayer (streaming media)**
    - **Virgin Radio (streaming media)**



Handset-Based Monitoring – Packet Data Usage

- Browsing dominates in terms of total amount of traffic generated
- Instant messaging and P2P are making their mobile breakthrough!
- Streaming applications are not that popular yet.
- In the future it is interesting to follow the role of WLAN and Bluetooth in mobile content distribution.



Handset-Based Monitoring – Conclusions

- Handset-based monitoring provides an efficient, objective and accurate way of studying mobile end-customers.
- 3rd party application usage is promising, meaning that the Symbian-based software platform drives 3rd party software and service innovations.
- Packet data transmission levels are already significant, reflecting the fact that smartphones are bringing data networking into a mobile age. In addition, it is interesting to see that WCDMA subscribers transfer about three times more data than GSM/Edge subscribers.
- In terms of daily usage patterns, voice calls dominate in daytime, messaging being more important a communication tool in the evening. Application and data usage dominate in the late-evening and nighttime usage.
- Conventional service usage can be largely explained by earlier handset usage patterns, but the step towards new advanced services such as imaging and the mobile Internet is better explained by (male) gender and (younger) age, which might serve as proxies of technological orientation.

Handset-Based Monitoring – Future Potential

- It is possible to develop the client further and obtain even more information in the future.
- Subscriber privacy is guaranteed, and the whole panel process is further tailored to the academic research usage.
- Future avenues of research:
  - Regulatory issues
    - Use of unlicensed radio bands (e.g. WLAN and Bluetooth)
    - 3rd party application usage (e.g. P2P data traffic)
    - Role of bundling or subscription type in usage (e.g. handset-capability)
    - Role of operator-specific portals, bookmarks and services
  - Adoption studies
    - Adoption of new mobile services (e.g. drivers and process)
    - Identification of new trends and service diffusion
  - Marketing studies
    - Segmentation studies
    - User behavior and social network analysis

Contact Information

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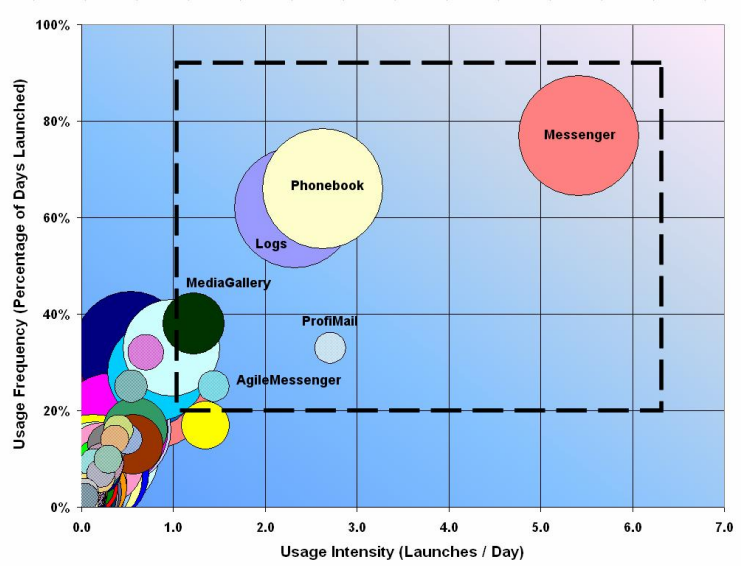
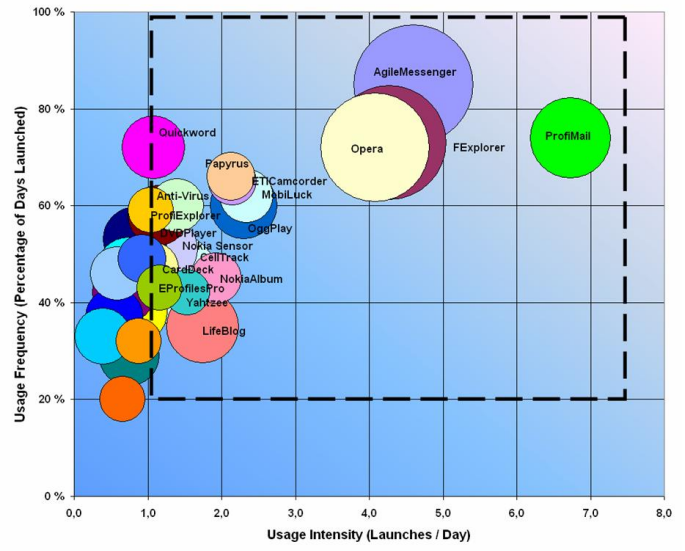
http://www.netlab.tkk.fi/tutkimus/coin/

Appendices



Appendices



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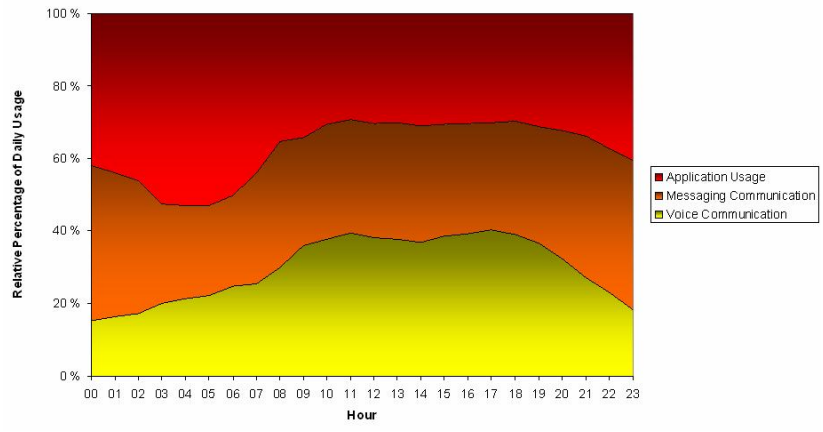
100 %
80 %
60 %
40 %
20 %
0 %
Relative Percentage of Daily Usage
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour
Application Usage
Messaging Communication
Voice Communication