The Effects of New Mobile Services on UMTS Network Structures

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Content

- Research problem
- Research methods
- Background information about UMTS network and licenses in Finland
- Implementation of UMTS network services
- Results
- Conclusions and topics for future studies

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Research problem

- The implementation phase of UMTS network has been delayed, so time to market is becoming a critical factor
- UMTS network is a modular structure that allows different network combinations to be implemented
- Due to the high capital expenditures (CAPEX) and operational expenditures (OPEX) of UMTS network, it's important to make correct decisions about network services to be implemented
- Network services to be implemented depend on real requirements of the services used by the subscribers

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Research methods

- Literature research:
  - UMTS network specifications maintained by 3GPP consortium
  - Researches and studies from different academic and commercial sources (UMTS Forum etc.)
- Presentations and consultation of mobile communication professionals
- Valuation tables for required network services and expected traffic characteristics

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UMTS licenses in Finland

Suomen 3 G *(Tele2)* (former Finnet Group license)	Pearl Oy *(Finnet-verkot)* (former Telia Mobile Finland)
Elisa Mobile	TeliaSonera (former Sonera)

- In spring 2003 nearly all licenses in Finland changed their owners due to the acquisition of Telia and Sonera
- Current license holders are
  - Suomen 3 G Oy (owned by Tele2 Ltd)
  - Pearl Oy (owned by Finnet verkot)
  - TeliaSonera
  - Elisa Mobile / Radiolinja

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UMTS network operator business

- Due to the new technology, a lot of network investments has to be made in access network and core network components
- Existing GSM/GPRS network offers significant synergism when the UMTS network is implemented
- UMTS network operator has to co-operate with multiple service operators, which creates challenges at early stages of the network implementation

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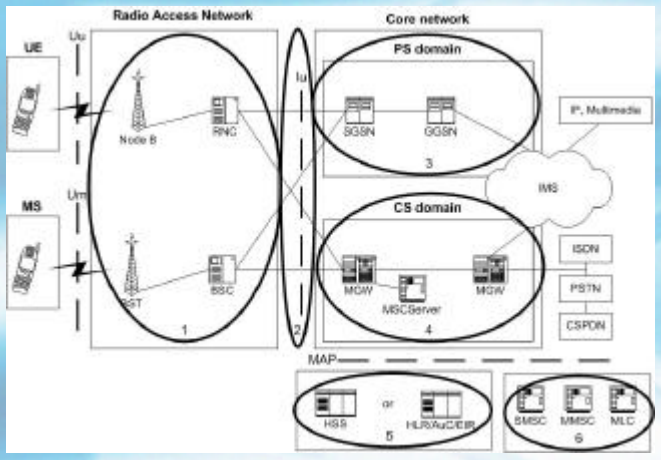
Network cost component for network operator



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Components for UMTS customer services

Service operator

Subscriber service

Network operator

Service domain

O&M

Circuit domain bearers

Packet domain bearers

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3G subscriber services

Services like:

- Voice call
- Rich call
- Video call
- Mobile messaging (SMS, MMS, IMPS)
- IMS services (PoC, multicast, broadcast)
- Location based services
- Internet services (access services)
- Streaming services

are compared in terms of requirements like:

- Bandwidth requirements (32 – 384 kbps)
- Delay requirements (< 150 ms)
- Jitter (delay variation)
- Supporting network services (e.g. service platform)

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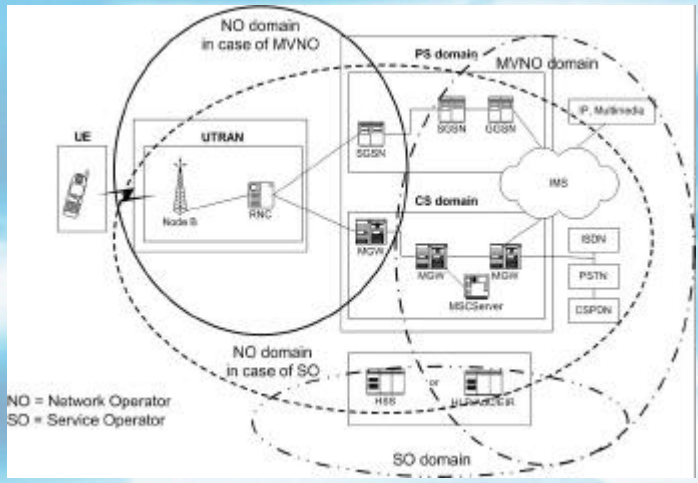
Compared UMTS operator business models 1/2



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Compared UMTS operator business models 2/2

1. Bit-pipe operators offering services only for MVNOs
2. Network operator that offers basic network services and maintains own service infrastructures
3. Network operator that offers basic network services and actively participates in customers' service creation procedures

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The result of comparison

- The result of optimal network design is heavily dependent on network operator's general strategy
- Vertical integration of operator business increases remarkably the complexity of the business
- Modularity of the network is important in every case (quick reaction to the market needs)
- A very large customer base is needed to enable profitable business (business users vs. VAS users)

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Main points of the thesis

- It's very difficult to identify the different requirements of 3G subscriber services due to large variety of services
- To offer competent UMTS network operator services, the RAN business must be separated from service platform business and customer functionalities
- A lot of users are required to be able to offer affordable cost per bit transfer services in UMTS network

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Conclusions

- In Finland the customer base isn't large enough to support four different nationwide UMTS network
  - In this situation only the largest players are able to put up the network business
- To ensure the competition in 3G mobile communication markets in Finland the joint ventures should be allowed in UMTS network operations (RAN sharing or something similar)

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Issues for future studies

- Three main paths for future studies:
  - The detailed cost analysis of network services and synergies of different combinations
  - The feasible models to share radio access network in Finland (the amount of networks)
  - Network externalities between service producer and mobile network service platform provider

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Q & A

Thank you for your attention!

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