

Presentation for the 25th European Regional Conference of the International Telecommunications Society, Brussels, Belgium, 22-25 June 2014

Is network sharing changing the role of mobile network operators?

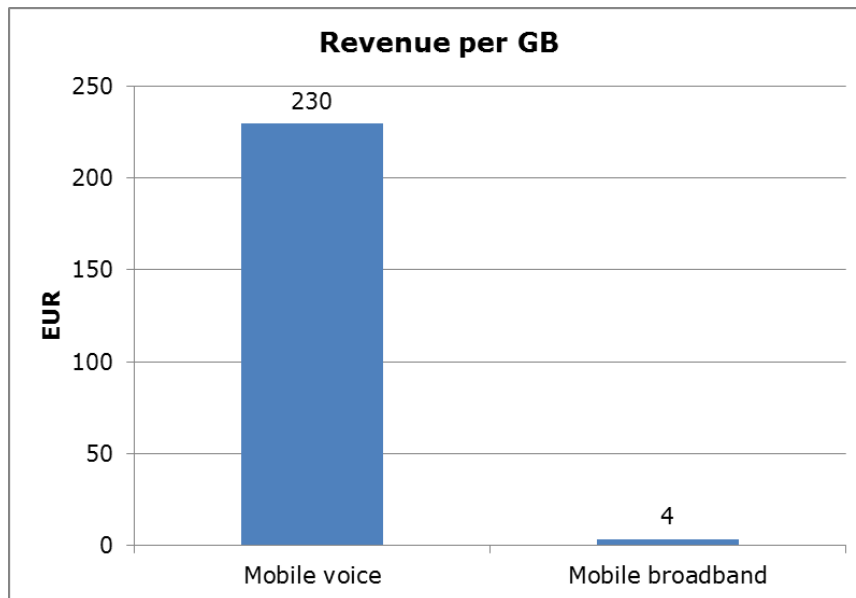
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Bengt G Mölleryd, Ph.D. PTS, bengt.molleryd@pts.se

Jan Markendahl, Ph.D. KTH

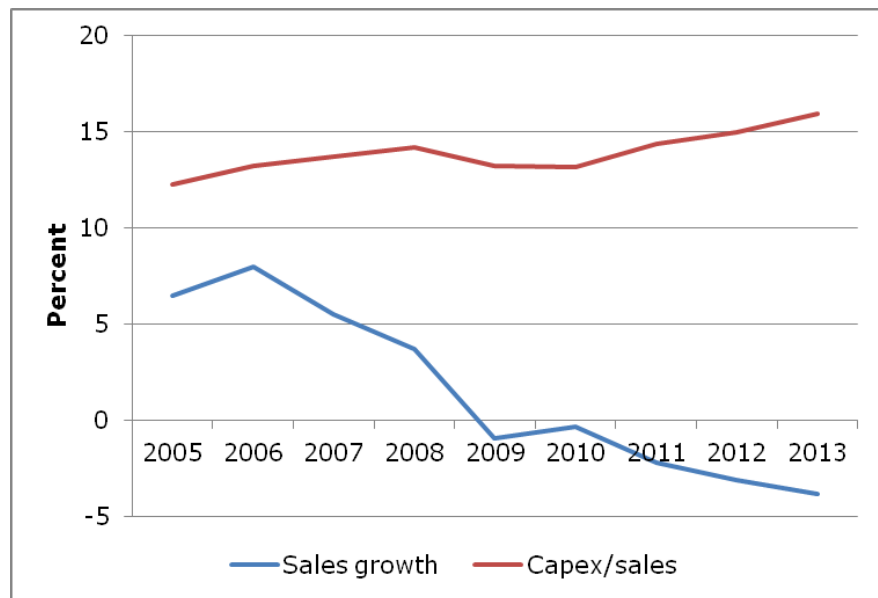
Mårten Sundquist, KTH

Revenue per GB for mobile operators in Sweden 2013



Source: PTS

Average capex-to-sales and sales growth for European operators*



* Based on an average on company ratios for: BT, DT, FT, KPN, Swisscom, Telefonica, and TeliaSonera

Source: Bloomberg

Research questions

RQ 1: How is network sharing influencing the competition on the downstream market and what is the impact of network sharing on profitability and competition?

RQ 2: What is the role of network sharing in developing and transforming the operator business?

Network sharing

Type of network sharing	Characteristics
Passive network sharing	Sharing of passive elements of network like towers, mast, sites, cabinet, power, conditioning.
Active RAN network sharing	Sharing of active equipment in the access network, like antenna, node, radio network controller elements, sharing of the radio access network (RAN), backhaul segment to the RNC (radio network controller).
Core network sharing	Sharing of core networks relate to active equipment with switches (SGSN, MSC, HLR, and GGSN).
Spectrum sharing	Sharing of spectrum could be in the form of pooling of spectrum
National roaming and MVNO	Such agreements are a sort of network sharing as network operators open their network for other operators

Issues

- Network sharing – a way to lower cost and improve coverage
- Co-opetition – co-operation and competition at the same time
- Network sharing and regulation

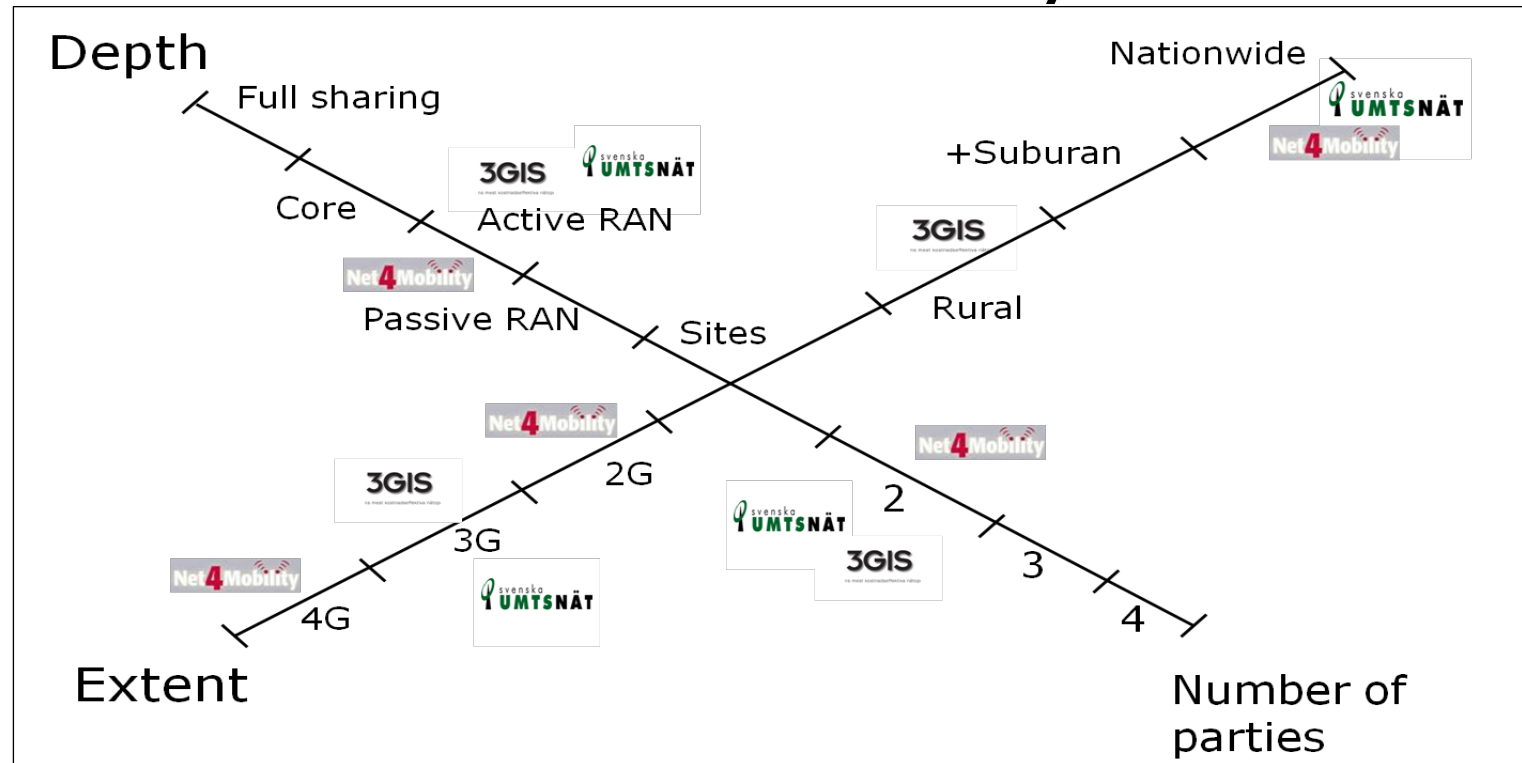


Mobile network sharing in Sweden



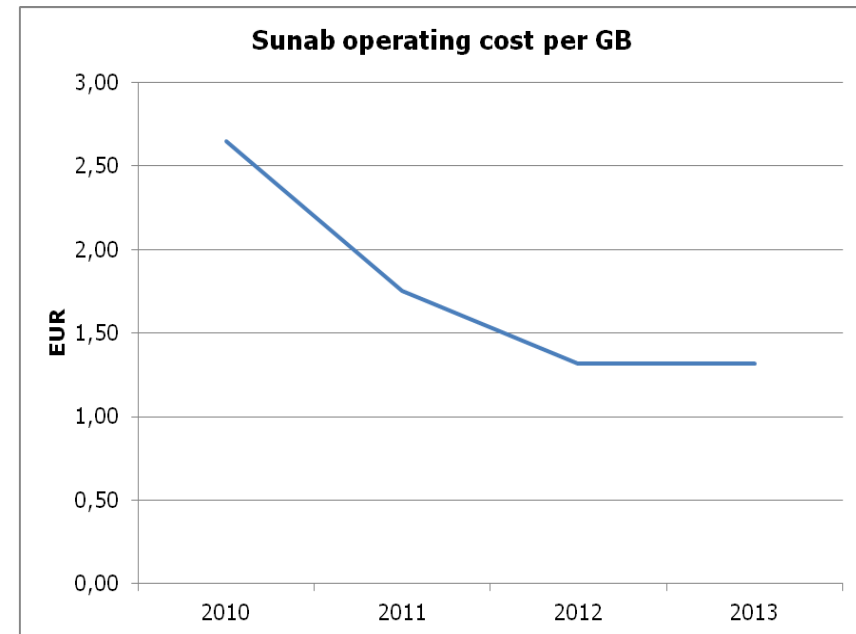
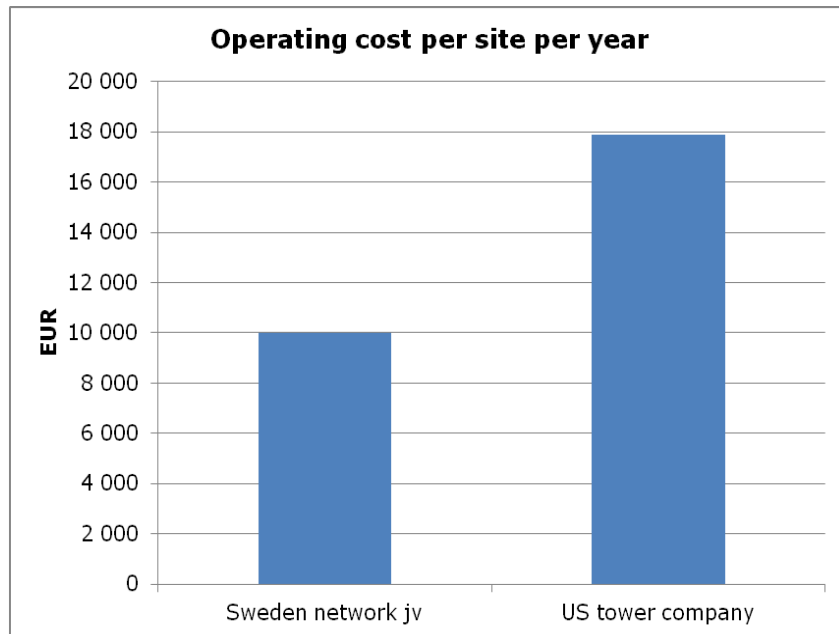


The taxonomy



Based on Frisanco et al. (2008)

Network sharing and opex



Source: PTS, Company reports, authors calculations

Case: model assumptions

Subscribers and site sizes	
Rural site max site radius	6,0 km
Max rural area	113 km ²
Urban site max site radius	1,0 km
Max urban area:	3,1 km ²
Capacity per subscriber / BH /	15 kb/s/BH
Subscribers/km ² in Scenario 1 rural area	2 subs/km ²
Subscribers/km ² in Scenario 2 dense urban area	600 subs/km ²
Capex passive equipment	
Passive equipment cost for rural site	400 000 EUR
Passive equipment cost for urban site	80 000 EUR
Depreciation passive equipment	20 years
Cost of capital	7,80%
Annuity cost rural site	40 136 EUR/year
Annuity cost urban site	8 027 EUR/year
Capex active equipment	
Capacity expansion step	10 Mbit/s
Basic equipment cost including first expansion step	10 000 EUR
Cost additional expansion step	2 000 EUR
Depreciation active equipment	4 years
Cost of capital	7,80%
Depreciated cost active equipment base configuration	3 006 EUR/year
Ditto expansion step	601 EUR/year
Opex assumptions	
Opex per year per rural site	12 000 EUR/year
Opex per year per urban site	8 000 EUR/year
Co-operation/administration cost per shared site(per operator)	500 EUR/year

Two scenarios

Rural

Input	
Subscribers per km ² in the dense urban scenario:	2 subs/km ²
Data traffic per subscriber/BH	15 kbit/s/sub
Single operator	
Resulting data load per area	30 kbit/s/km ²
A rural site with base configuration supports	10 Mbit/s
The covered area is	113 km ²
Average supported load is	88 kbit/s/km ²
Cost per year per operator per site	55 142 EUR
Cost per per km ²	488 EUR
Shared network	
Assume that the two operators have the same traffic load.	
A site with minimum capacity can handle the traffic from both networks without capacity expansion	
Cost for two operators sharing the same equipment:	56 142 EUR
Cost per operator for shared network:	28 071 EUR
Benchmark	
The saving per operator is therefore:	49%

Urban

Input	
Subscribers per km ²	600 subs/km ²
Data traffic per subscriber/BH	15 kbit/s/sub
Single operator	
Resulting average data load per km ²	9 000 kbit/s/km ²
Assuming a site using the throughput:	30 Mbit/s
The site coverage area	3,33 km ²
The annual site cost	20 235 EUR/site
The cost per km ² for a single operator running its network	6 071 EUR/km ² /year
Shared network	
Assume that the two operators have the same traffic load.	
The capacity increased is achieved by doubling the capacity of each cell. The combined shared network use twice the number of frequencies.	
The cost of a shared network site	23 039 EUR
The cost per km ² for a shared network	6 912 EUR/km ² /year
Benchmark	
The saving per operator is therefore:	43%

Indoor sharing

- How to combine spectrum resources into a common pool, i.e. both aggregating licensed spectrum of different operators and combination of licensed and unlicensed spectrum bands.
- Local spectrum licenses, e.g. for buildings or blocks
- Control of the traffic of own customers in the shared network
- How to resolve conflicts when it comes to prioritizations of traffic and sharing of costs
- Impact on competition with one common indoor infrastructure

Indoor sharing (2)

- To be pro-active in getting agreements with facility owners
- To acquire new spectrum or make use of unlicensed spectrum for indoor use
- To invite other operators and partners to join ventures and to organize the co-operation
- The deploy and operate indoor infrastructure

Impact of network sharing

- Network sharing has a great savings potential for MNOs, both in the rural and dense urban areas.
- In the rural scenario, the traffic is so limited, that the equipment used by one operator can support both operators' capacity needs without upgrades.
- The only reason why the gain is 49 percent and not 50 percent is the factor for co-operation/administration cost per shared site.
- For the densely urban case, the saving is estimated to be 43 percent. The cost of the capacity expansion of a shared site is considerable lower than the cost of a site.

Financial impact of network sharing

- Network opex is ~30% of opex
- Lower operational cost facilitate a push on the EBITDA margin

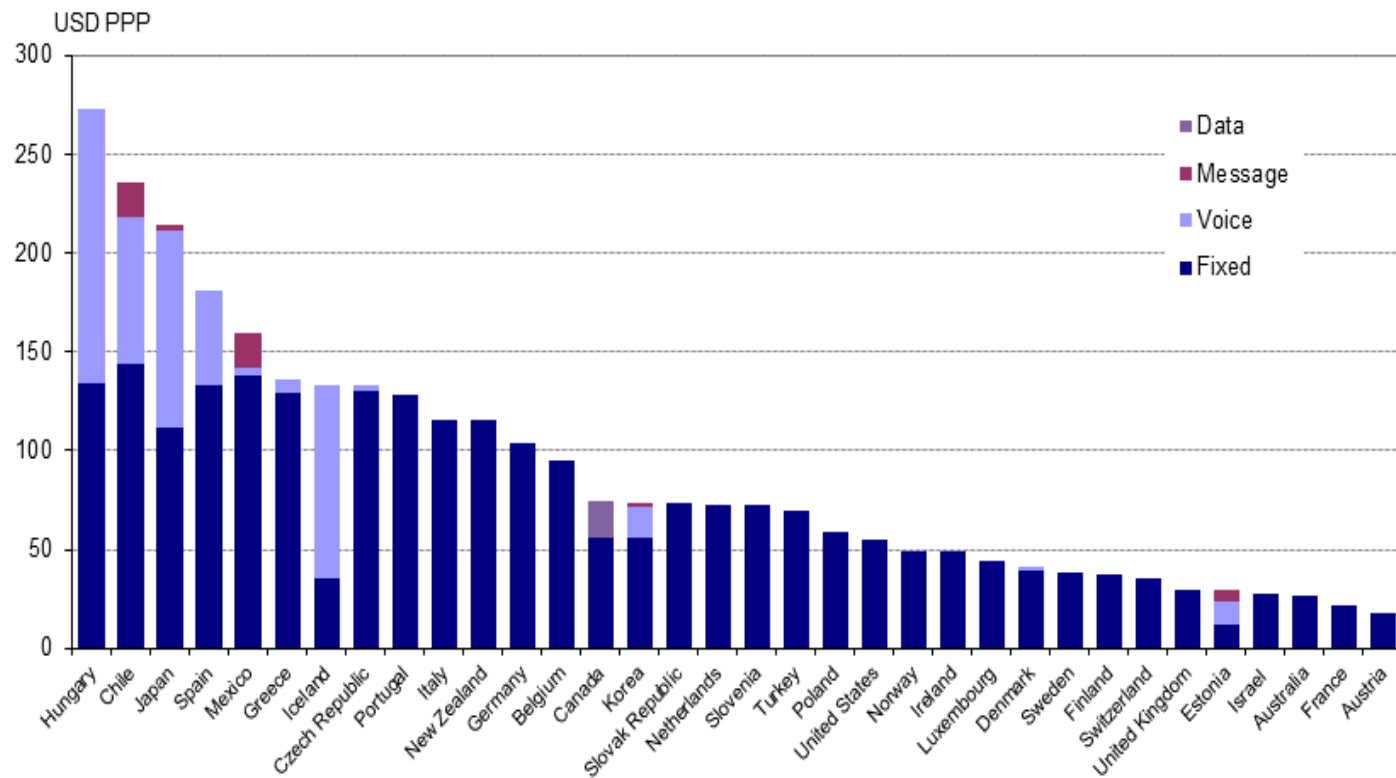
	Site sharing	RAN-sharing
Population million	50,0	50,0
Penetration	90%	90%
Operator		
ARPU EUR	20	20
Market share	25%	25%
Subs million	12,5	12,5
Revenues MEUR	3 000	3 000
EBITDA margin	30,0%	30,0%
EBITDA MEUR	900	900
Opex MEUR	2 100	2 100
Reduction of opex	2,4%	6,9%
Lower opex MEUR	50	145
Revised opex MEUR	2 050	1 955
Modified EBITDA MEUR	950	1 045
Modified EBITDA margin	31,7%	34,8%

$2.4\% = 30\% * 8\%$ (saving with site sharing according to Frisanco et al. (2008))

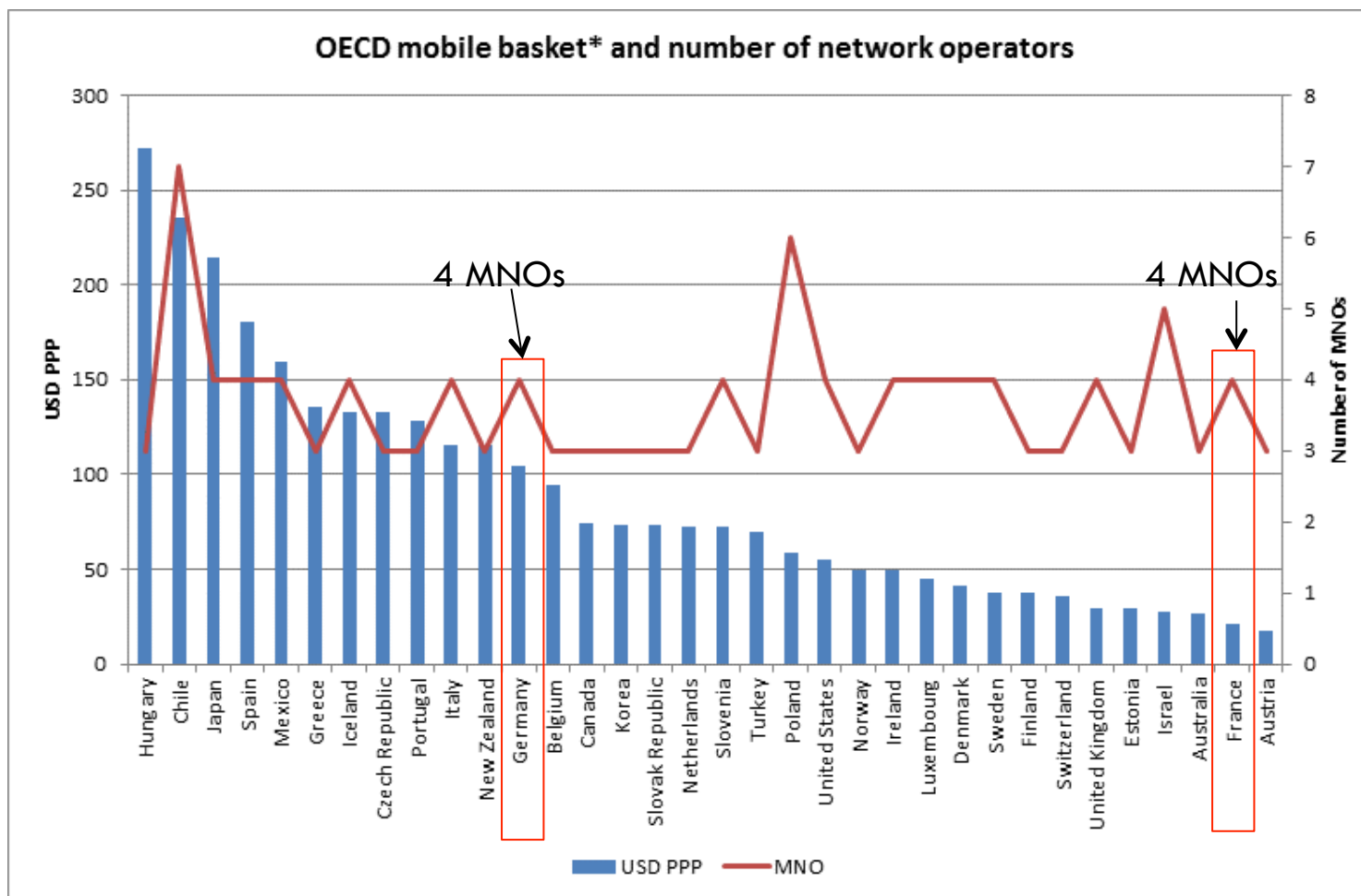
$6.9\% = 30\% * 23\%$ (saving with site sharing according to Frisanco et al. (2008))

Mobile basket 900 calls + 2 GB mobile basket, 2012

- Countries with network sharing...
- Number of network operators...



Source: OECD, Communications Outlook 2013



Source: Communications Outlook 2013. *OECD 900 calls + 2 GB mobile basket, August 2012, VAT included

Conclusions

- Network sharing enables operators to lower network operation cost which could push up profitability levels, but competitive dynamics as well as industry development is going in the other direction.
- Network sharing and outsourcing have propelled a development of dedicated tower and infrastructure companies
- The social benefit with larger coverage and improved capacity has so far given extensive support for network sharing..
- Operators' inability to balance the focus on macro networks with small cell and indoor networks creates an opportunity for other players to challenge the MNOs with indoor/small cell solutions

Future research

- Industrial change, vertical disintegration and a new potential new industry structure.
- For indoor networks a common approach for network sharing including network deployment and operation can be expected since facility owners do not allow multiple indoor single-operator networks.
- The combination of spectrum and network sharing should be investigated more both from a system performance as well as a competition perspective, like spectrum aggregation.

OECD Wireless Broadband basket, OECD Laptop 5 GB, September 2012

