

# *Strategy of New Networks in the Republic of Serbia*

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## *Talk overview*

- ICT Indicators
- Technologies for future:
  - ✓ Cloud computing
  - ✓ IoT
  - ✓ 5G
- Spectrum needs
- FTTH needs

# Serbia

*Serbia has some of the highest penetration rates for mobile services in the Balkans and a competitive market with three competing operators. The fixed market was liberalized relatively late in 2010 and fixed-broadband penetration remains low compared to the European average.*

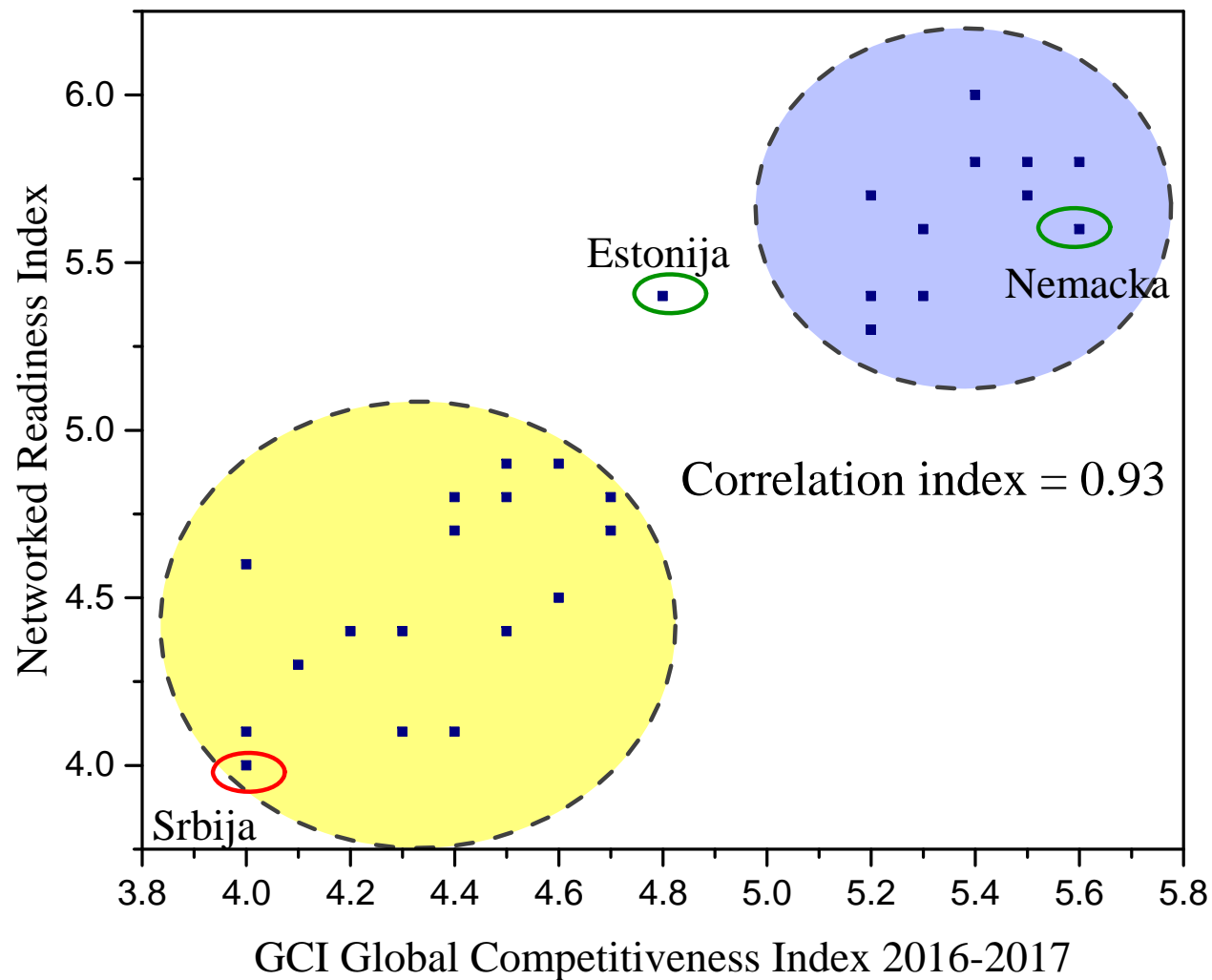
Economy: SERBIA				
	Key indicators for 2016		Europe	World
1	Fixed telephone sub.per 100 inhab.	36.07	37.7	13.6
2	Mobile-cellular sub. per 100 inhab.	128.52	118.0	101.5
3	Fixed-broadband sub. per 100 inhab.	24.29	30.2	12.4
4	Active mobile-cellular sub. per 100 inhab.	67.4	80.1	52.2
5	3G coverage (% of population)	99	98.5	85.0
6	LTE/WiMAX coverage (% of population)	95	92.2	66.5
7	Mobile-cellular prices (% GNI pc)	3.3	1.0	5.2
8	Fixed broadband prices (% GNI pc)	3.3	1.2	13.9
9	Mobile-broadband prices 500MB (% GNI pc)	1	0.6	3.7
10	Mobile-broadband prices 1 GB (% GNI pc)	1.2	0.6	6.8
11	Percentage of household with computer	74	79.6	46.6
12	Percentage of household with internet access	66.82	82.5	51.5
13	Percentage of individuals using the Internet	67.1	77.9	45.9
14	Int. Internet bandwidth per Internet user (kbps)	26.3	178.0	74.5

Source ITU (data for 2015),  
RATEL (data for 2016)

## *ICT index – IDI for WB6 countries*

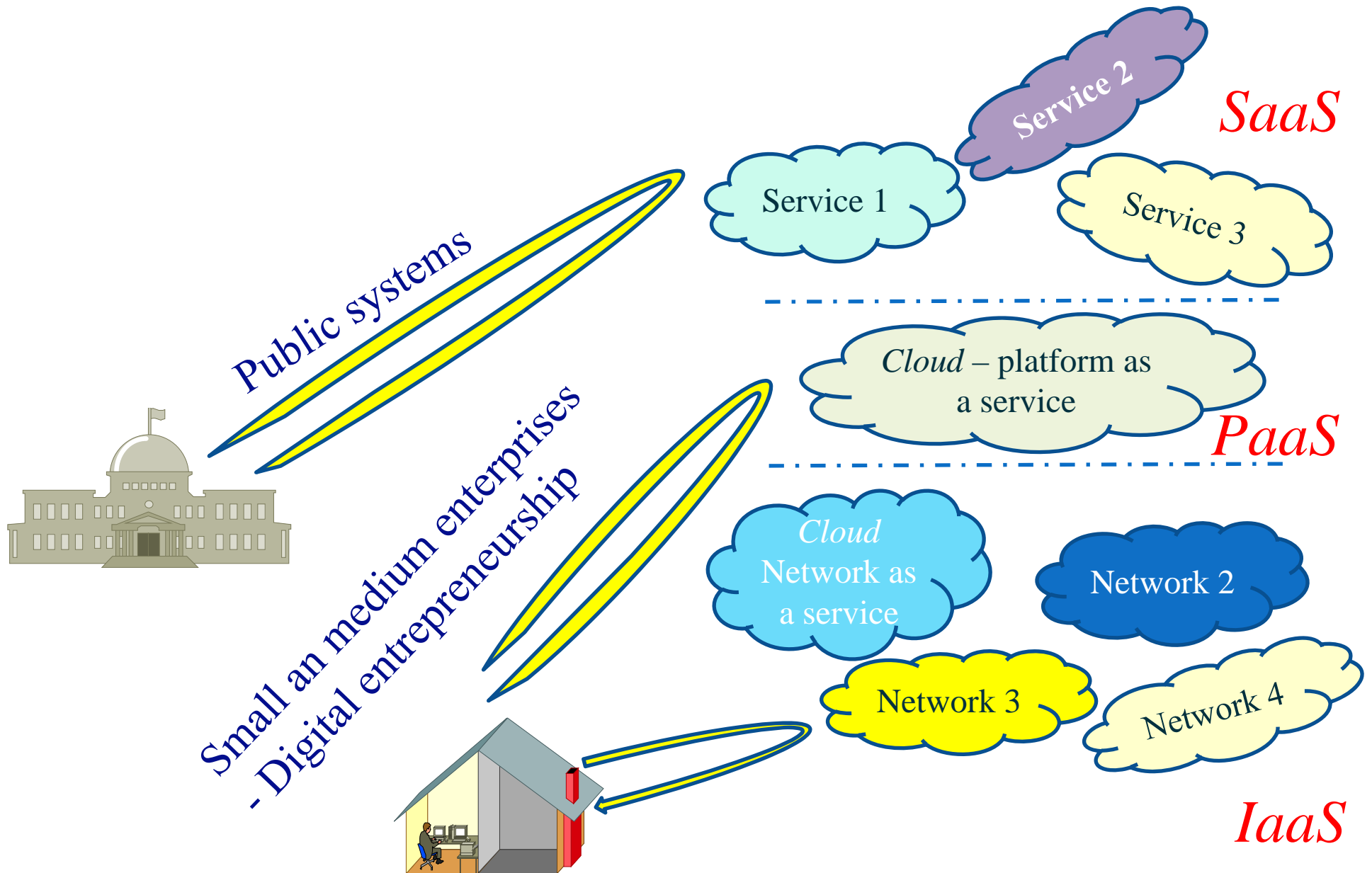
IDI index in the region	ICT index IDI Source ITU	Rank in 2017
Albania	4.90	89
Bosnia and Herzegovina	5.23	83
Croatia	7.24	36
The Former Yugoslav Republic of Macedonia	5.88	68
Montenegro	6.30	61
Serbia	6.51	55
Slovenia	7.20	33

## *Network Readiness Index vs. Global Competitiveness index*



*Cloud services*

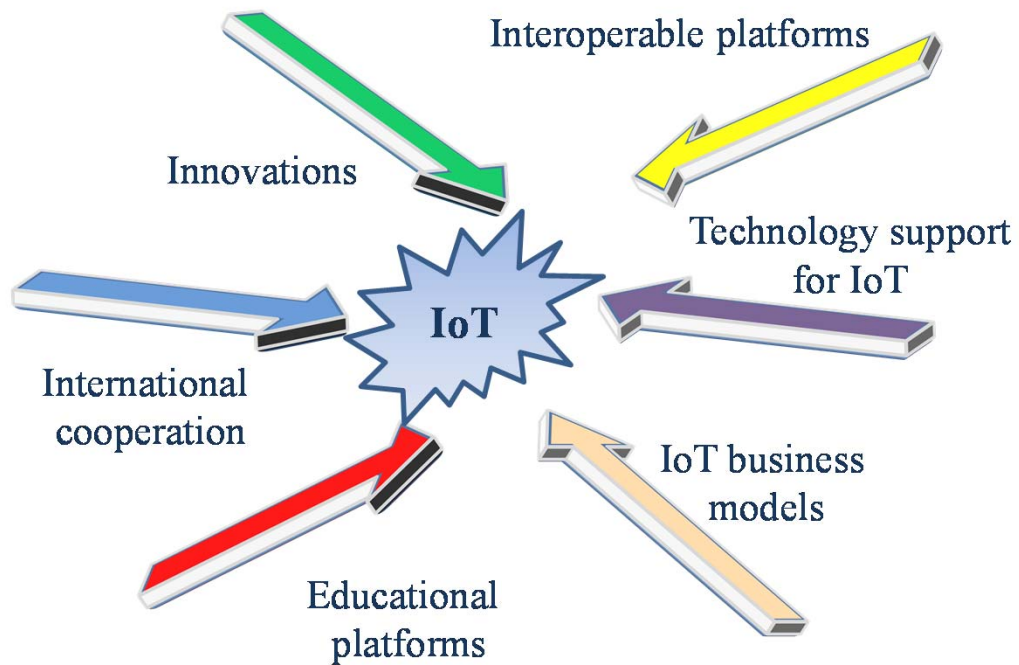
# Cloud computing



*Internet of Things (IoT)*

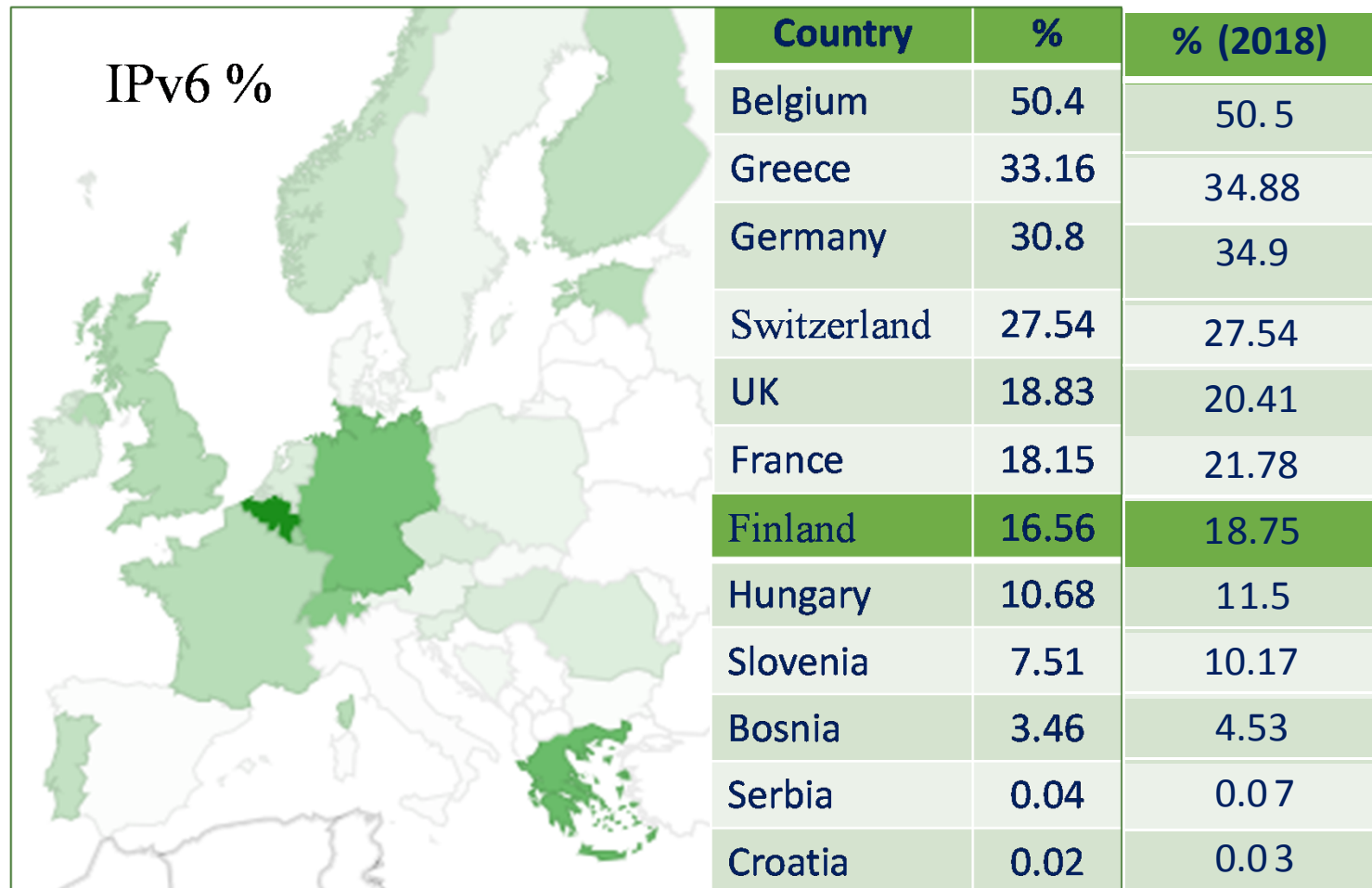


## *How to develop IoT?*



**This is the field for cooperation!**

## *Lack of IT addresses is serious obstacle for IPv6 implementation*



Source:  
<https://www.google.com/intl/en/ipv6/statistics.html#tab=per-country-ipv6-adoption>

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*5G*

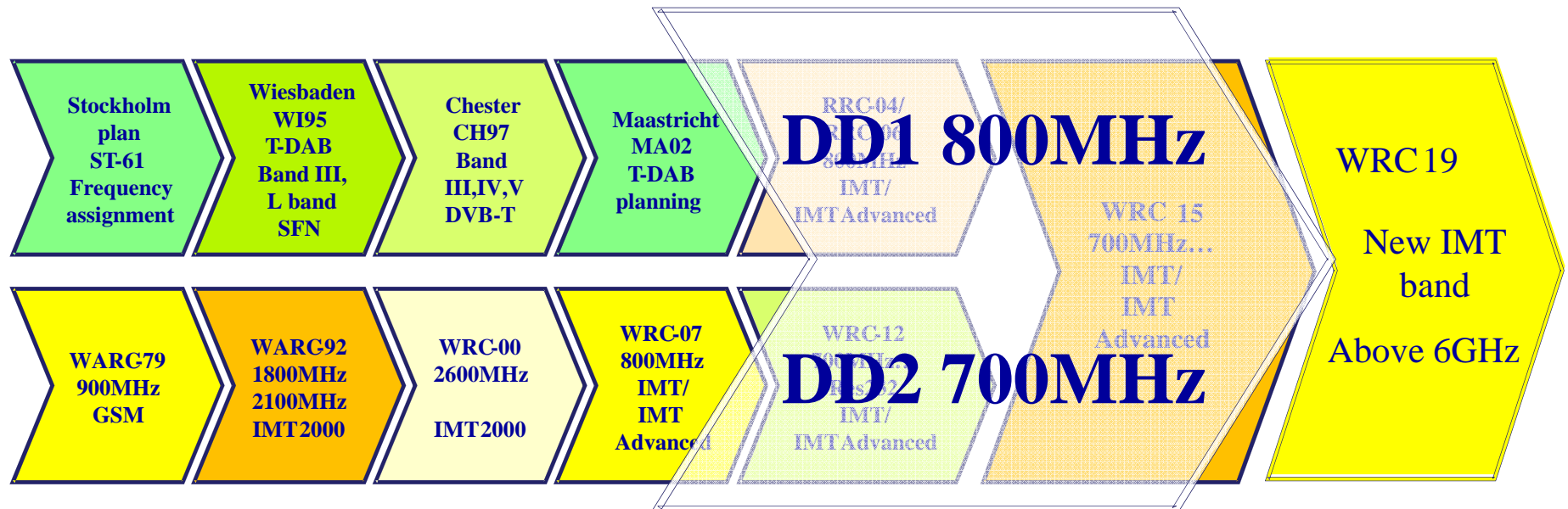
## *5G – requirements*

- The spectrum requirement for 5G networks is seen today in two directions:
  - the frequencies under 1GHz
  - the frequencies above 6GHz.
- The spectrum bandwidth estimated per operator could be:
  - ~500MHz below 20GHz,
  - ~1GHz between 20-40GHz and
  - ~2 GHz above 40GHz.
- The harmonization of spectrum policies for 5G is a challenge.
- There is lack of global spectrum harmonization on LTE deployment.

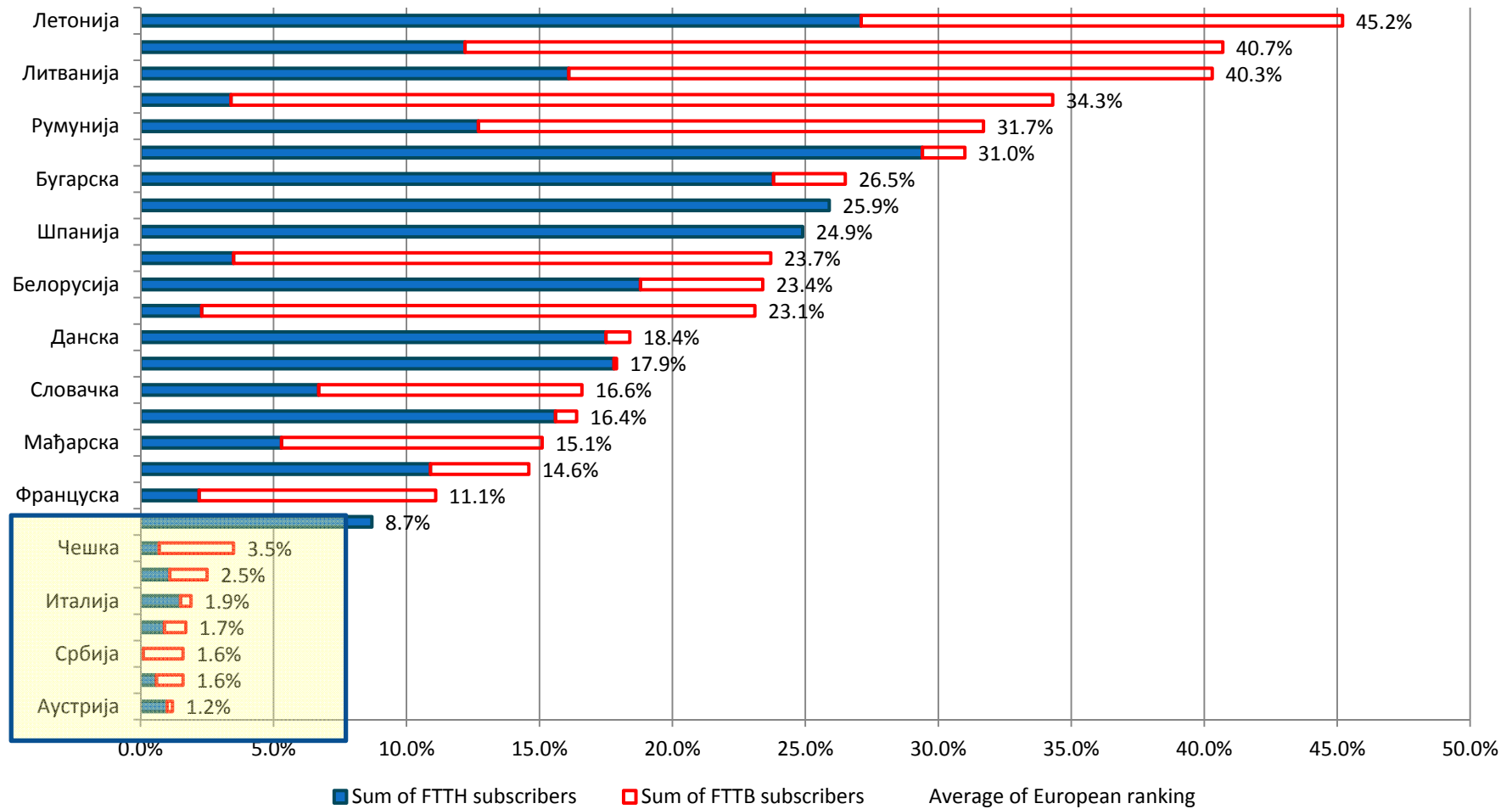


Share of LTE deployments by frequency band, by region (January 2015); *Source: GSMA Intelligence Report*

# *From 5% of radio frequency spectrum - towards 5G*



# FTTH European Council



*Common for development of Cloud computing,  
IoT and 5G is the necessity for the  
**Broadband Infrastructure Availability***



# *Data,... Data,... Data,... Data*

- Data analysis,
- Feature extraction:  
image, video, audio  
applications,...,  
other data.
- Processes control.



Thank you for the attention!

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