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# Broadband Quality Score

A global study of broadband quality  
September 2009

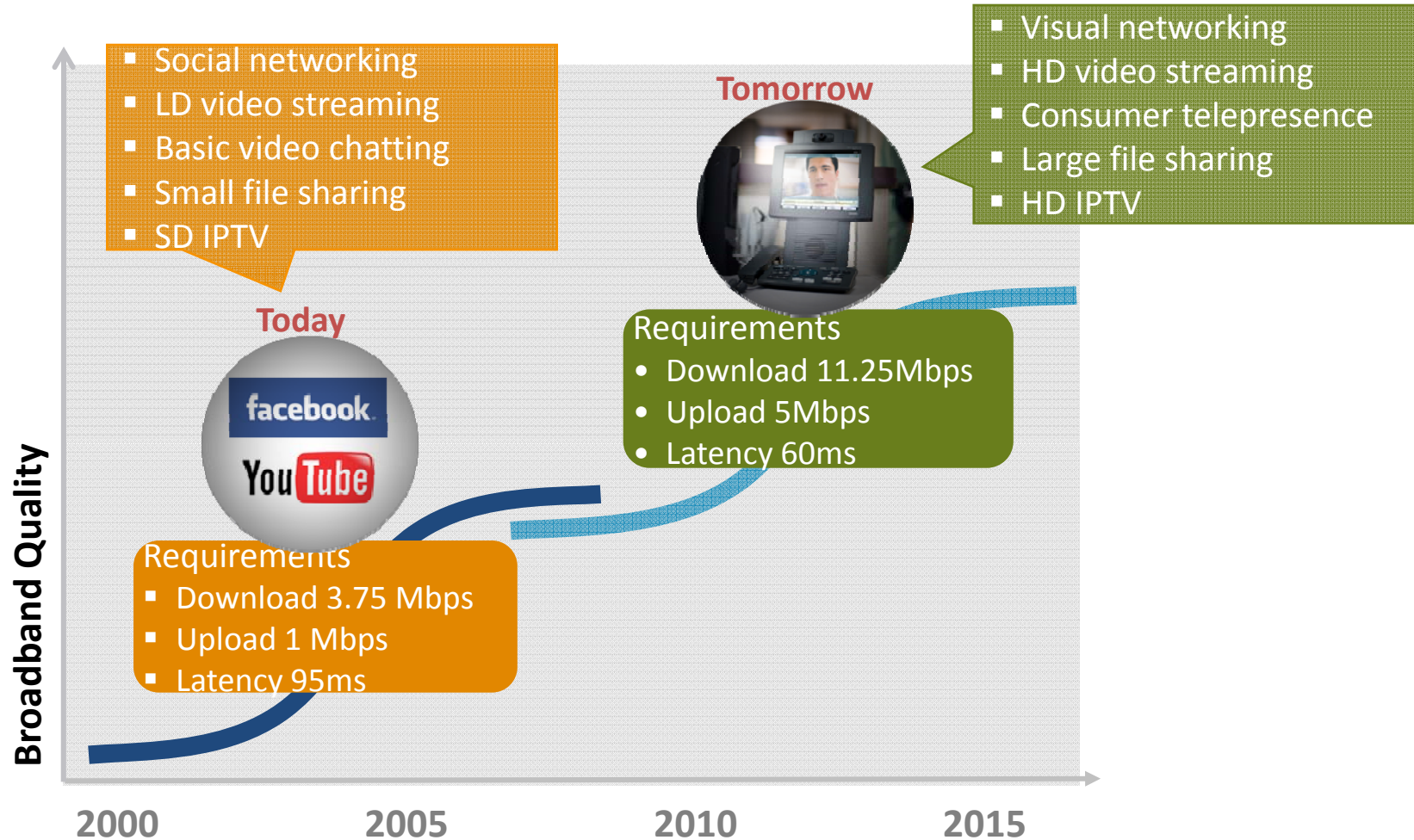
Henrik Bergqvist - teknikchef Cisco

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## What the study established in 2008

# Changing quality requirements

### TWO WAVES OF BROADBAND SERVICES



# Main broadband quality factors

## KEY FACTORS IN DETERMINING BROADBAND EXPERIENCE

Factor	Description	Example
<b>Download Throughput</b>	Net bit rate of downstream data that transverse the network and the broadband connection	Critical for streaming high quality video, sharing large files such as pictures or video
<b>Upload Throughput</b>	Net bit rate of upstream data that transverse the network and the broadband connection	Increasingly relevant for two-way high-quality video communications, uploading/sharing pictures and videos
<b>Latency</b>	Time taken for a packet of data to reach from source to destination	Very important for real-time applications such as VoIP communications and gaming
<b>Other</b>	Network oversubscription, packet loss, jitter, service continuity. Typically embedded in throughput factors	Critical for video broadcast distribution and overall end-to-end experience

# Broadband Quality Score (BQS)

## BQS THRESHOLD CALCULATION

- BQS is calculated based on normalized values of:
  - Download and Upload throughput, and Latency
- 24 million records sourced from actual tests from Speedtest.net (Ookla) during May 2008 and May - July 2009
- Weights assigned to each factor for *today's* and *tomorrow's* (3 to 5 years) applications.

BQS (today) = 55% Download + 23% Upload + 22%Latency

### BQS threshold: 30

- Download 3.75 Mbps
- Upload 1 Mbps
- Latency 95ms

BQS (tmrw) = 45% Download + 32% Upload + 23%Latency

### BQS threshold: 50

- Download 11.25Mbps
- Upload 5Mbps
- Latency 60ms



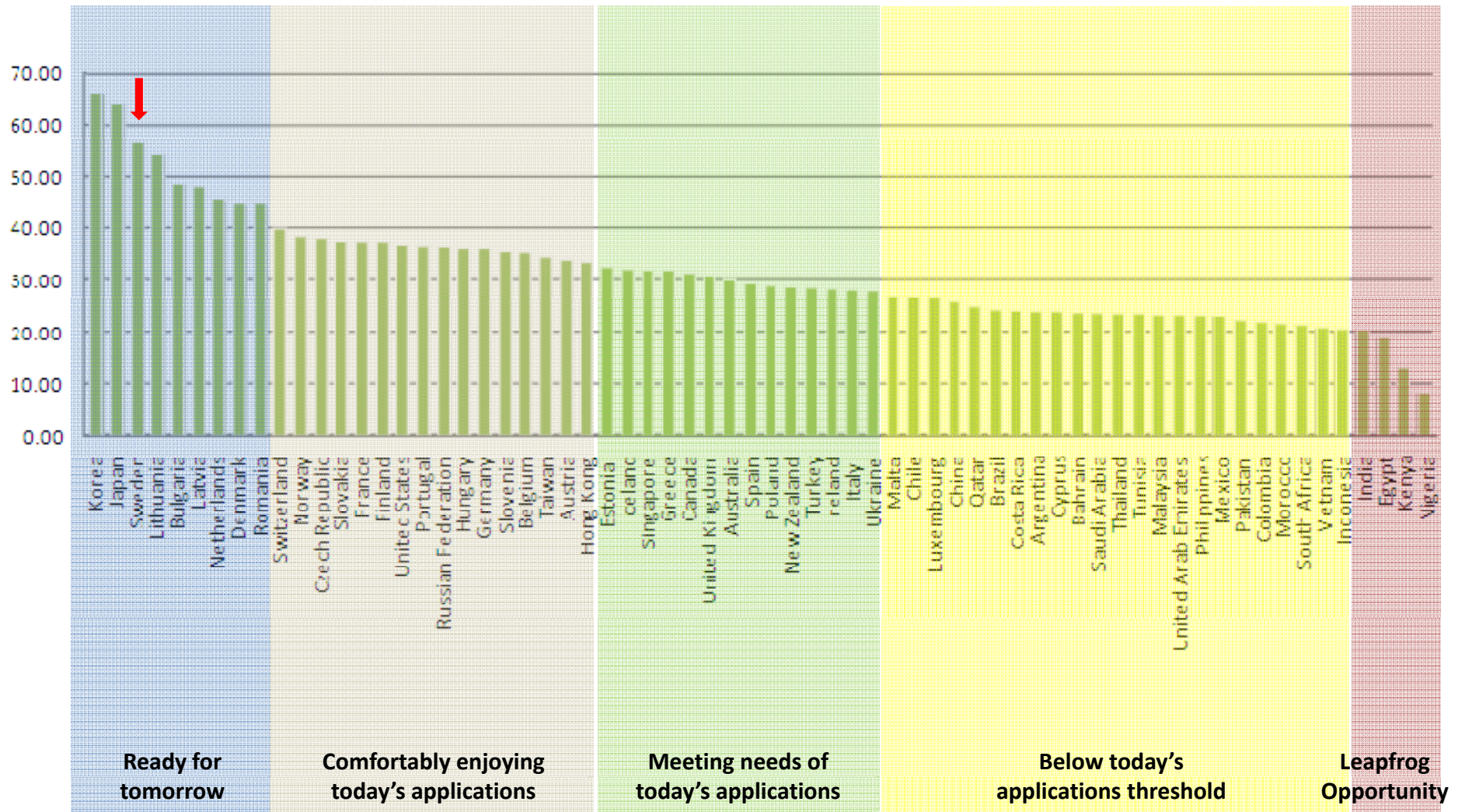
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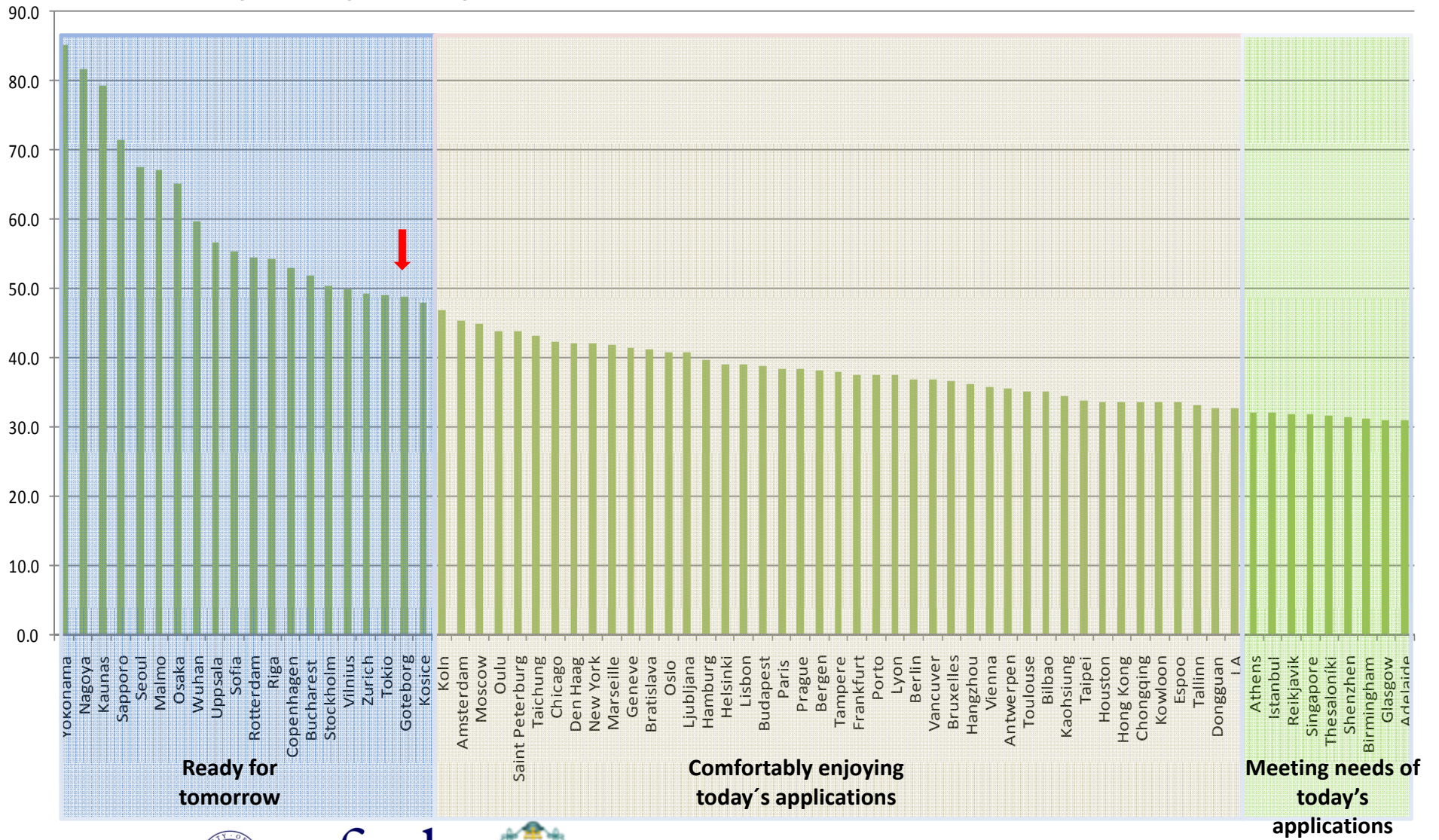
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# BQS by countries 2009



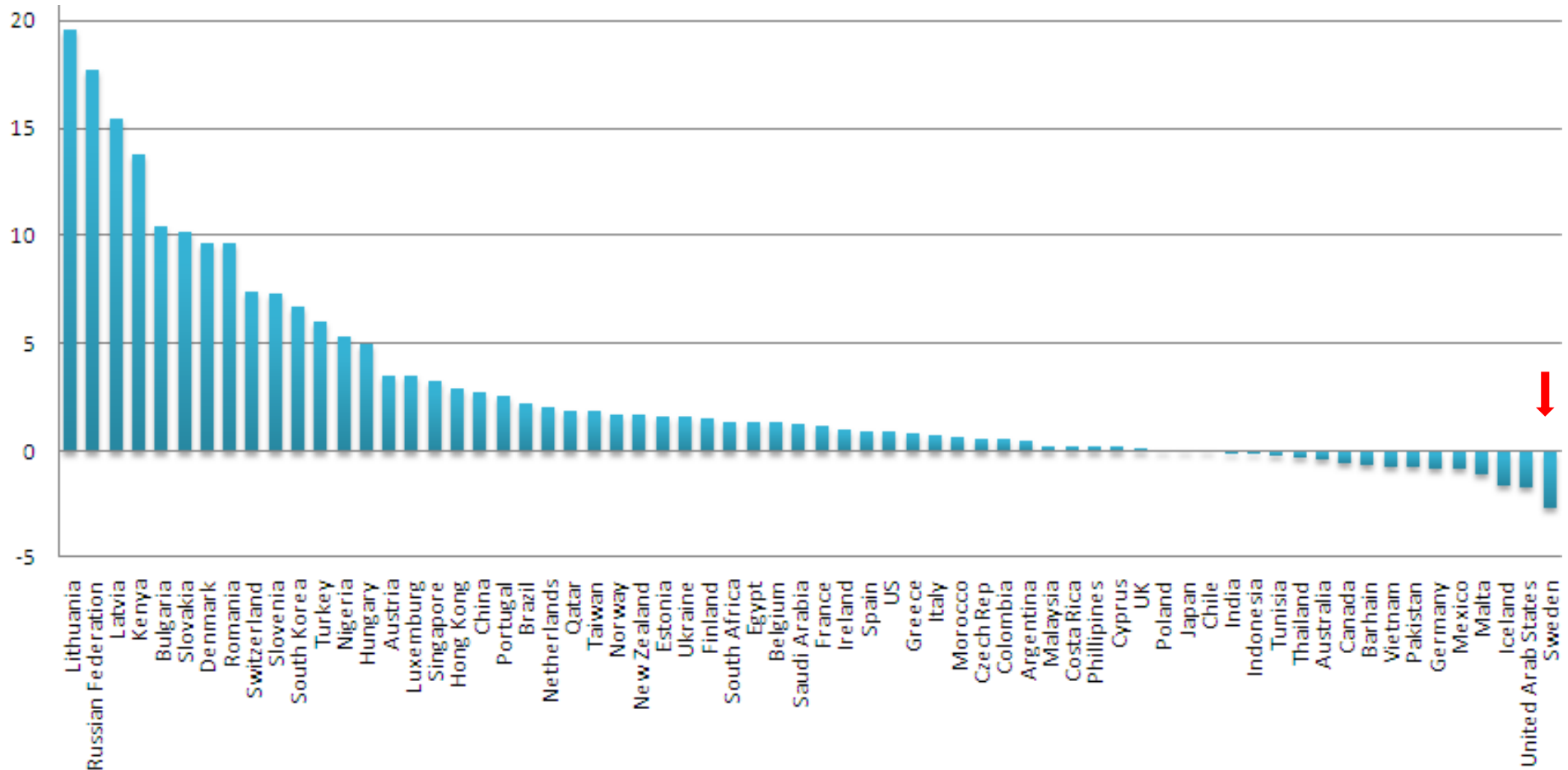
# BQS by city (top 100)



# Svenska städer

city	download	upload	latency	BQS
<b>Malmö</b>	18404	7428	34	67
<b>Uppsala</b>	15586	4363	71	57
<b>Stockholm</b>	11665	5123	88	51
<b>Göteborg</b>	11980	3464	68	49

# Digital Broadband Quality Divide



# Mobile Broadband Quality Divide

Technology	Download	Upload	BQS
GPRS	43	41	-30
EDGE	244	116	-3
3G	753	180	5
HSDPA	1223	189	9
HSDPA+	1984	198	11
<b>Today's Threshold</b>	<b>1300</b>	<b>1300</b>	<b>26</b>
WIFI	2814	779	22

# Svenska statens åsikt

- Näringsdepartementet
  - vill höja minimi internet till mellan 0,5 och 2 Mbit/s.
  - År 2020 90 procent av alla hushåll och företag bör ha tillgång till bredband om minst 100 Mbit/s i Bredbandsstrategi för Sverige
- PTS jobbar med en Bredbandskartläggning...

# Reflektioner

- Sverige ligger bra till på grund av infrastrukturkonkurrens
- Fast och trådlöst bredband kommer komplettera varandra eftersom 4G/LTE inte klarar inte morgondagens krav fullt ut