

# Convergence

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# Introduction

- Introduction
- Disruptions
- Broadband
- Multiplay
- The growth of GSM
- A word on roaming
- Conclusions



# Disruptions

- New spectrum bands
- New wireless services
- New tariff plans
- Bundling of services
- Changes in fashion

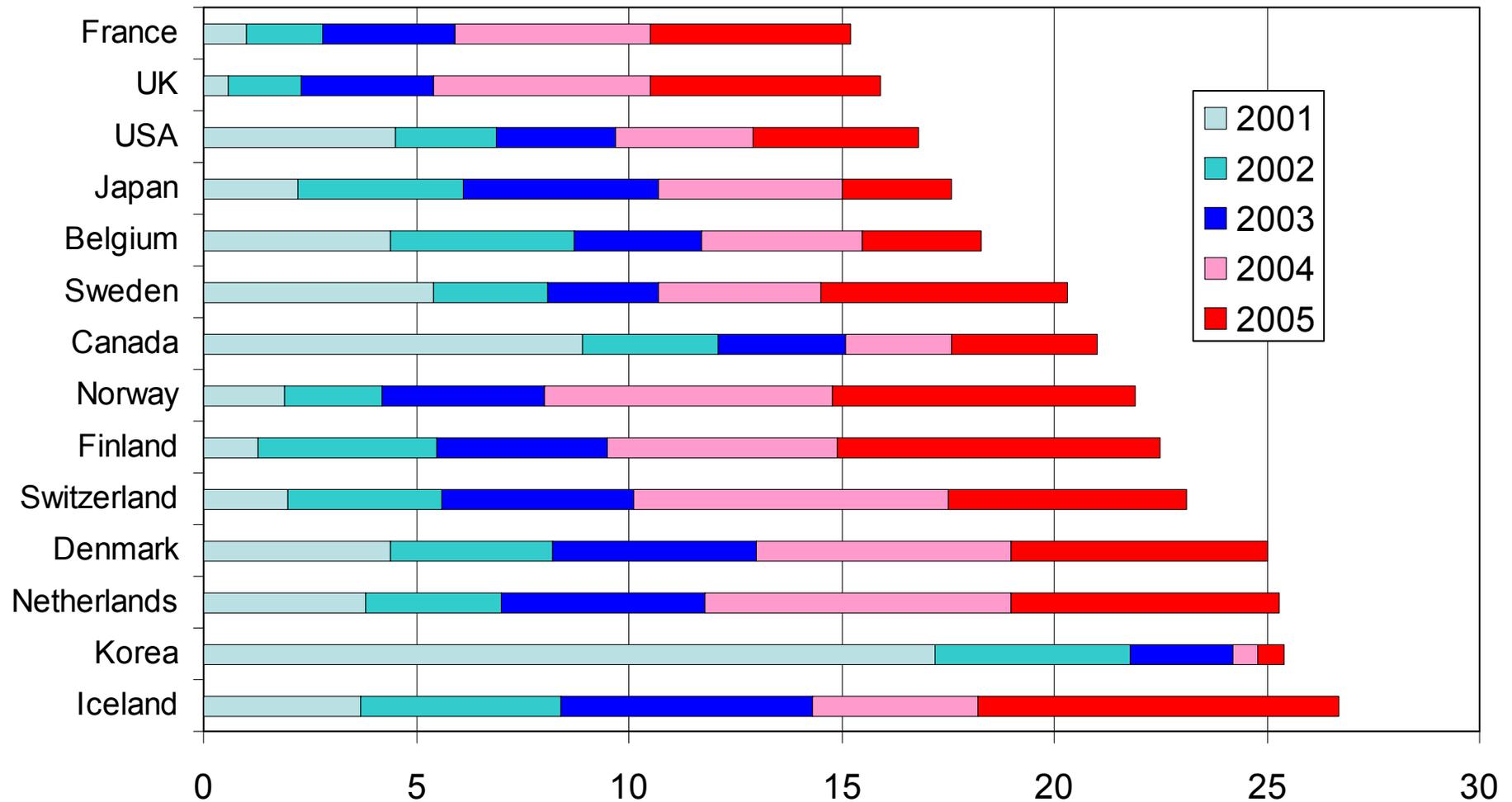


	<i>Fixed</i>	<i>Mobile</i>	<i>Internet</i>	<i>Television</i>
Egypt	13.8	11.0	5.7	95
Sudan	3.1	2.2	0.9	49
Ethiopia	0.7	0.3	0.1	2
Uganda	1.0	10.8	1.5	19
Kenya	0.3	4.5	0.6	6
Tanzania	0.4	5.1	0.7	14
Malawi	0.8	1.2	0.3	2
Mozambique	0.4	4.7	0.5	6
South Africa	10.4	47.1	8.1	54

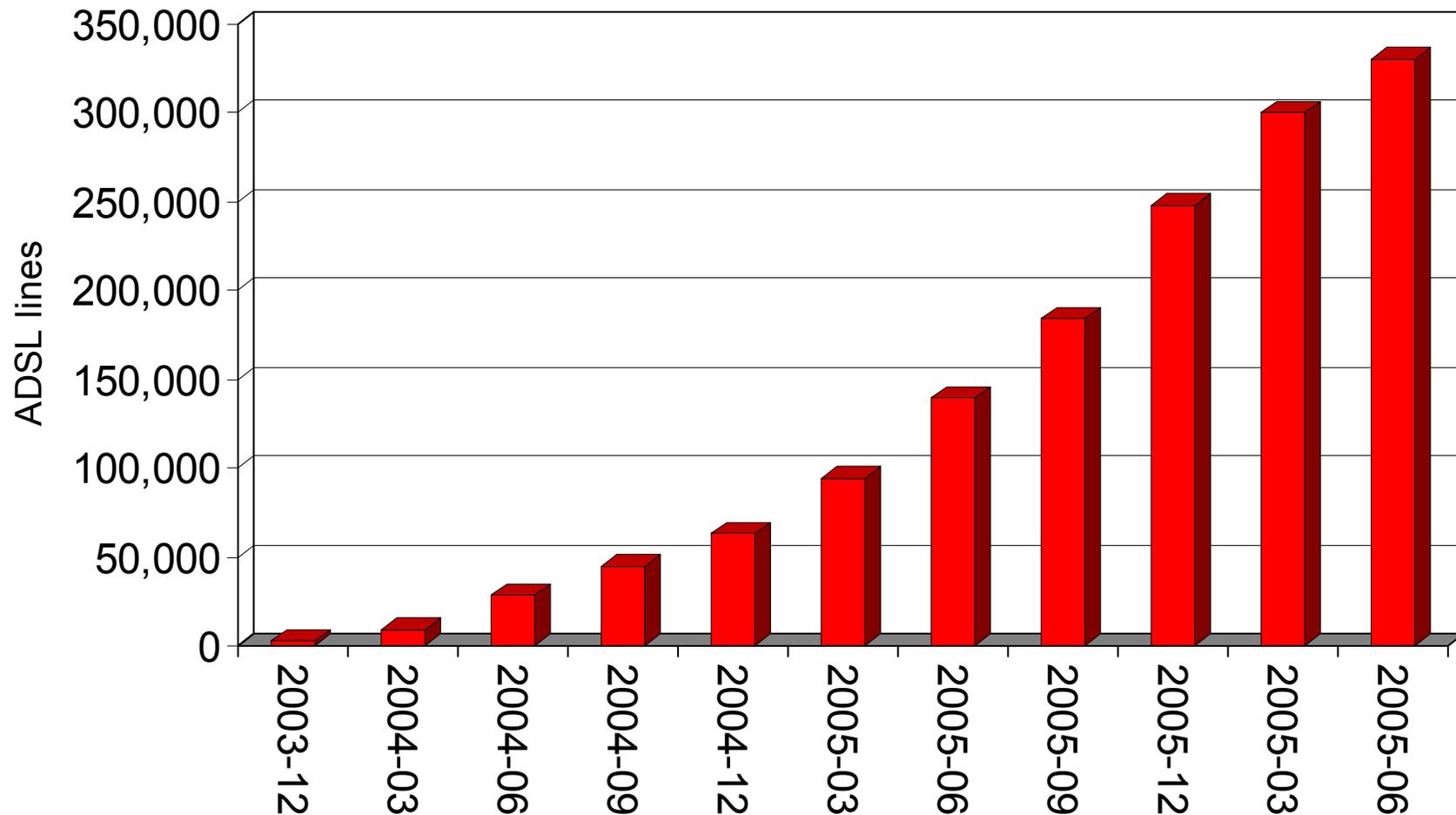
Note: televisions are per 100 households



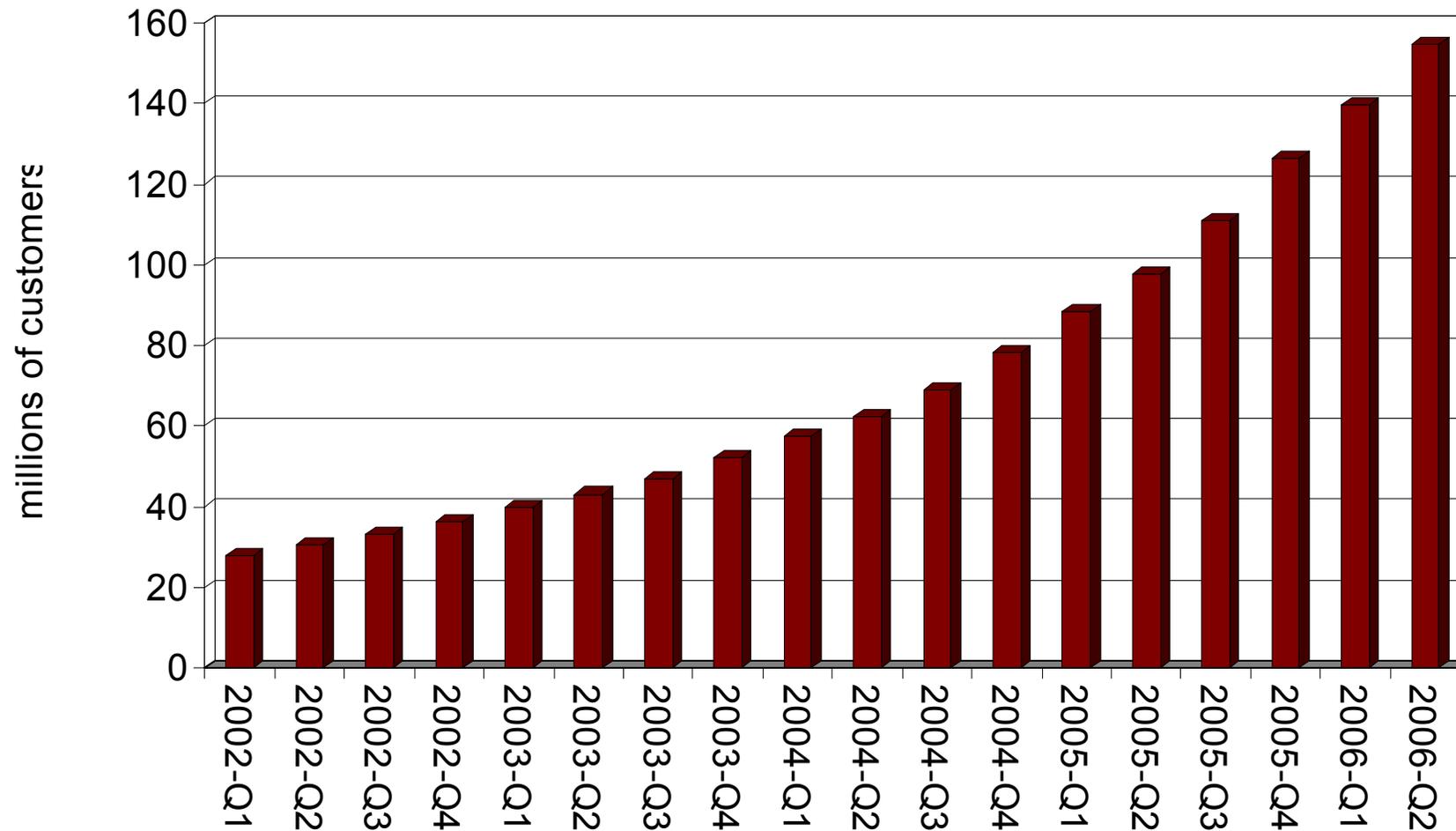
# Broadband in the OECD

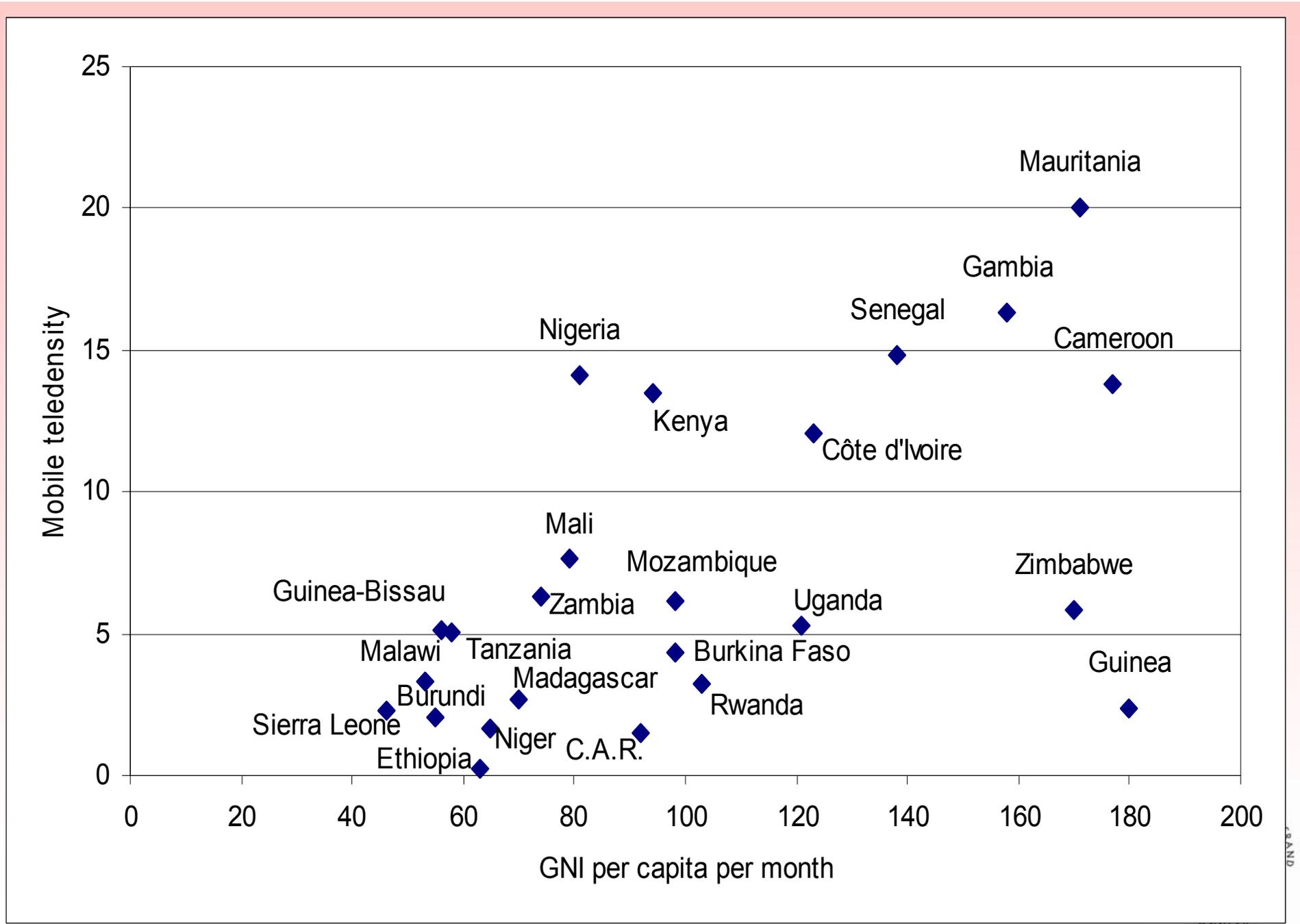


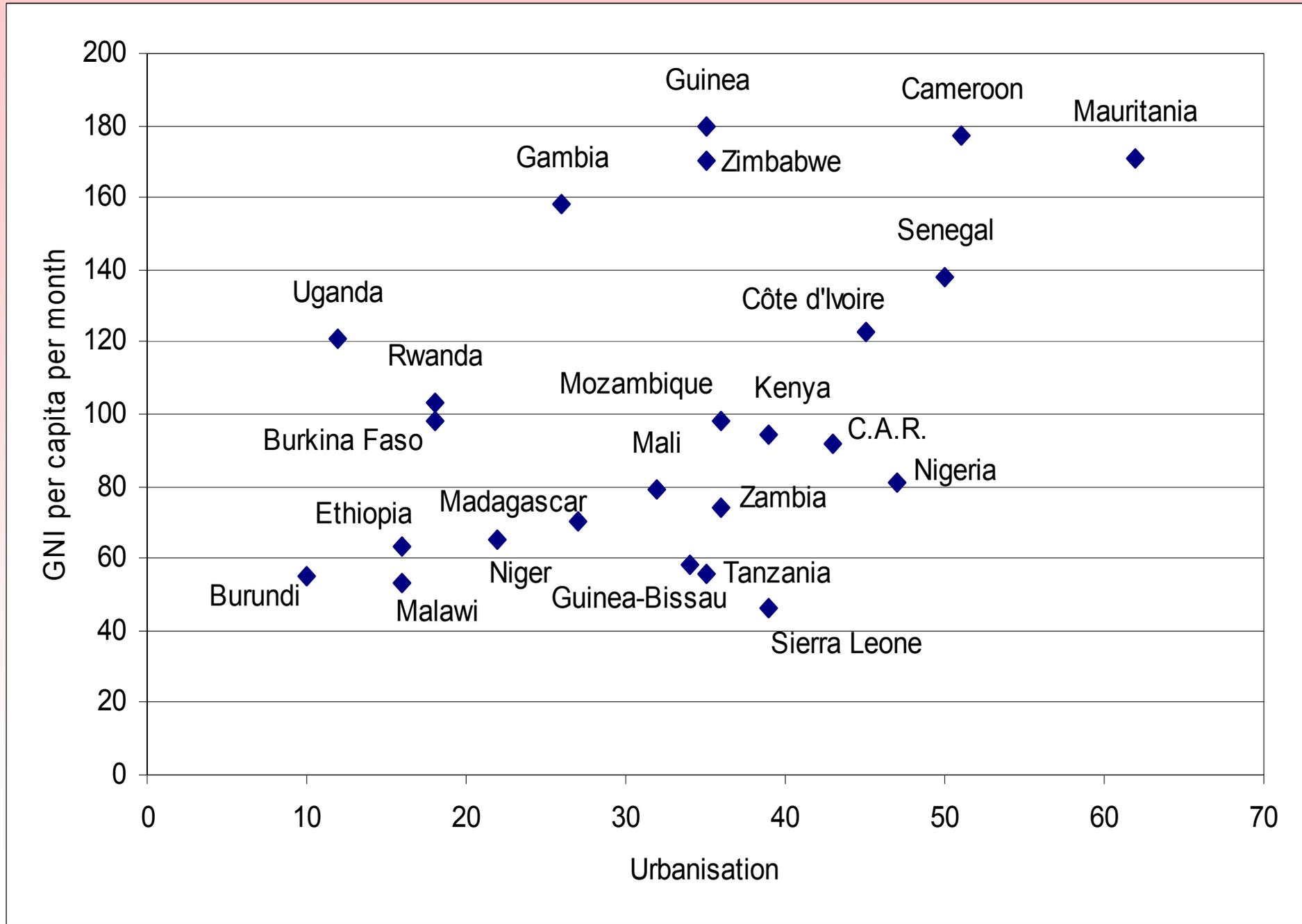
# Kingdom of Morocco - ADSL



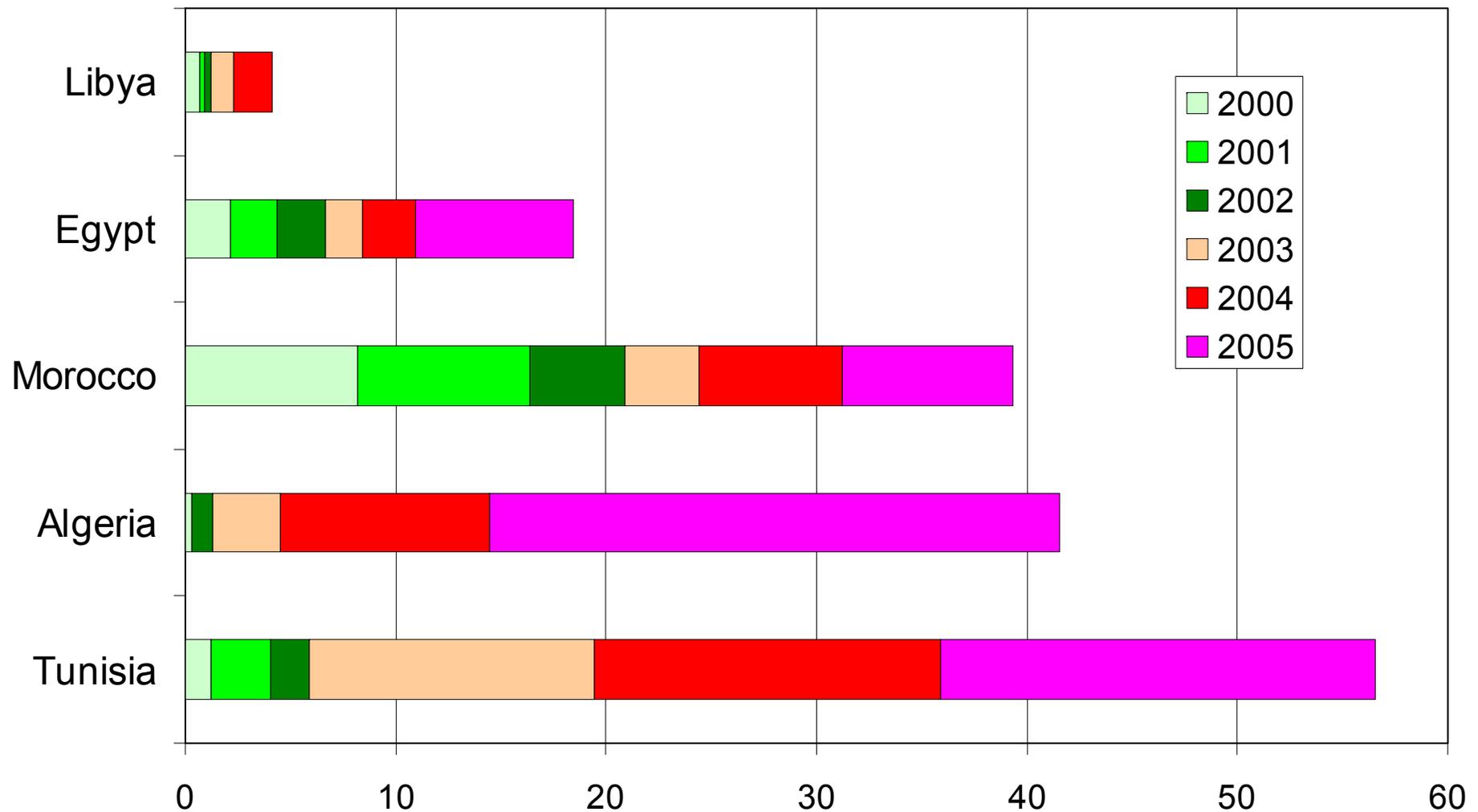
# Growth of GSM in Africa



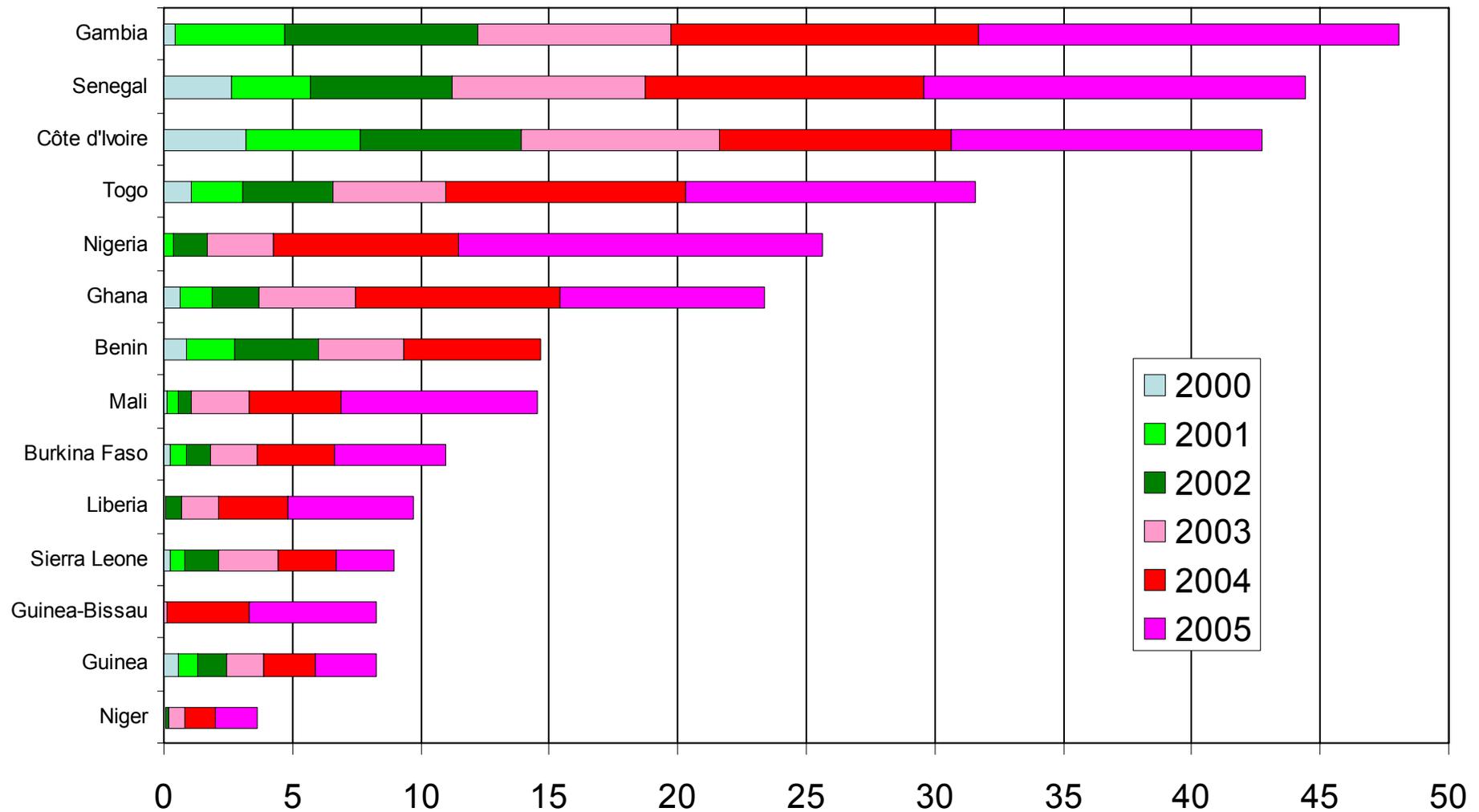




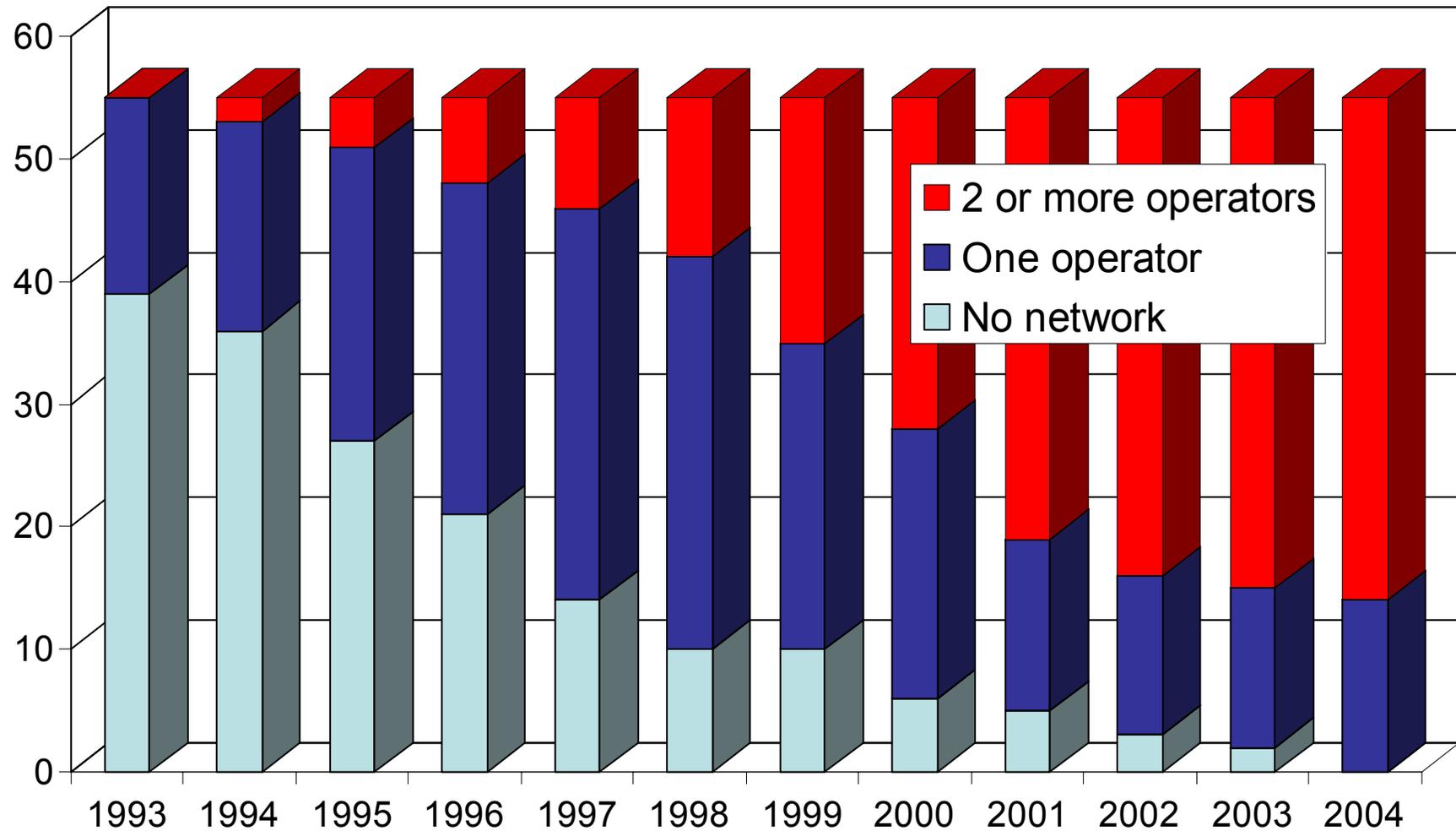
# North Africa



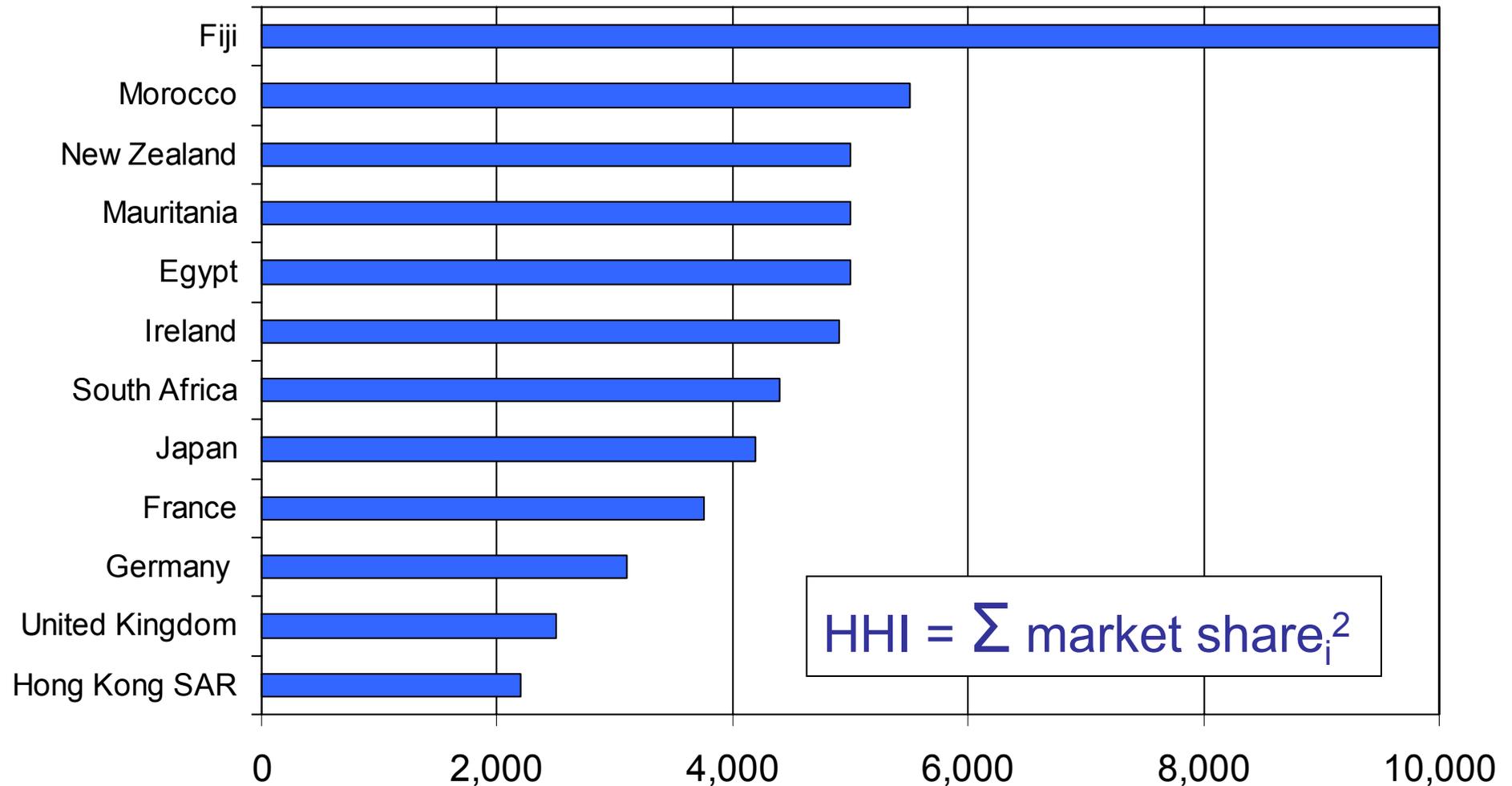
# West Africa



# The rise of rivalry



# Herfindahl-Hirschman Index



# 2.5 G

- Adding data to voice and SMS
- IP interface
- Requires upgrading of:
  - network infrastructure
  - handsets
- Requires development of new business models:
  - raw IP access
  - value-added services
- Extending the value chain to include:
  - service providers
  - content aggregators
  - Mobile Virtual Network Operators (MVNOs)



# GSM Association

- m-commerce has particular benefits in emerging economies
- Capturing the unofficial cash float
- Eliminating the need to carry cash
- Reducing exposure to robbery
- Enabling the advancement of micro-loans
- Facilitating loan repayments
- Enabling the payment of utility bills
- Minimizing money-laundering opportunities

[http://www.gsmworld.com/documents/services/micro\\_payment.pdf](http://www.gsmworld.com/documents/services/micro_payment.pdf)



# Mobile payments

- Payment:
  - add to monthly bill
  - deduct from stored credit
  - link to a credit card
- By means of:
  - RFID tag
  - SMS
- The alternative is to use Internet payment systems
- India
  - Tata and ICICI
- Japan
  - DoCoMo and Sony
- South Korea
  - Moneta
- Malaysia
  - Nokia and Visa
- USA and UK
  - PayPal



# Mobile content

- Sport
- Games
- Betting
- News
- Music (downloads and streaming)
- Television (broadcasts and “mobisodes”)
- The content that nobody talks about

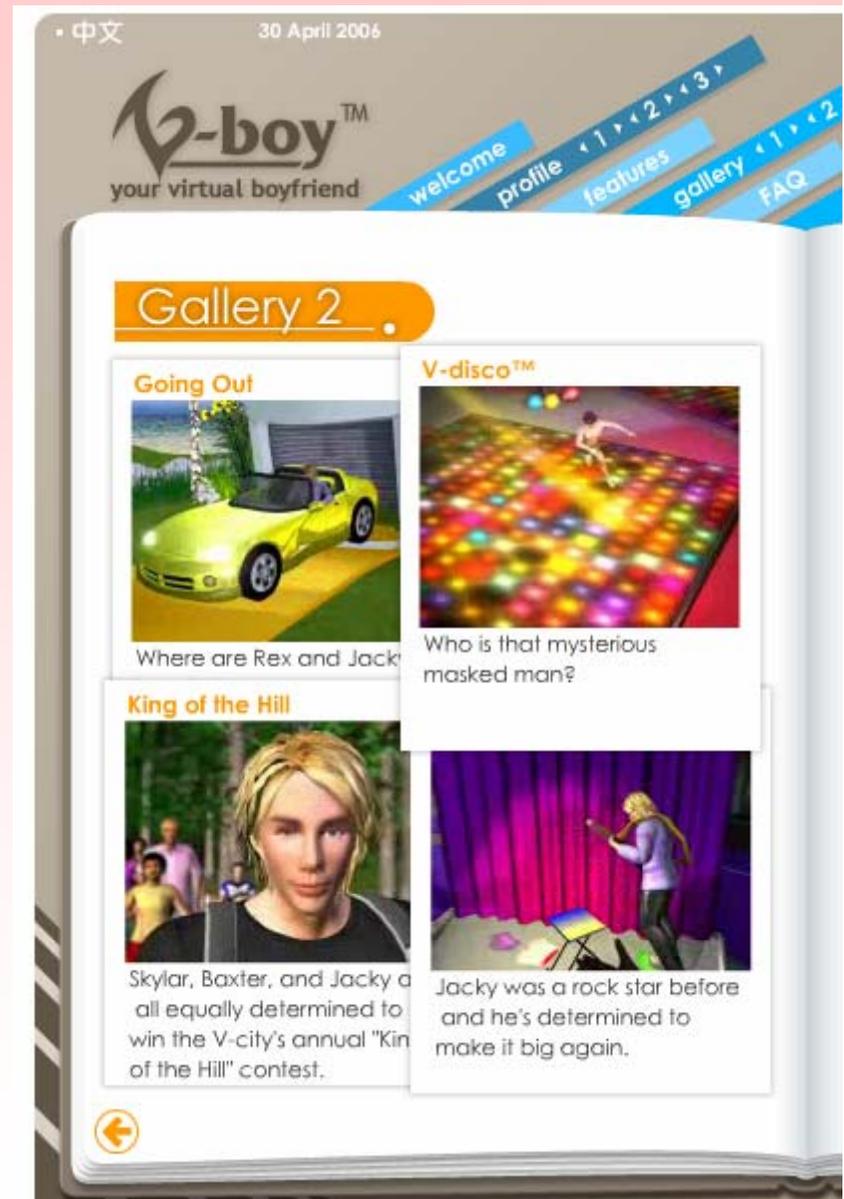
Is it one device or many? iPod or cellphone?



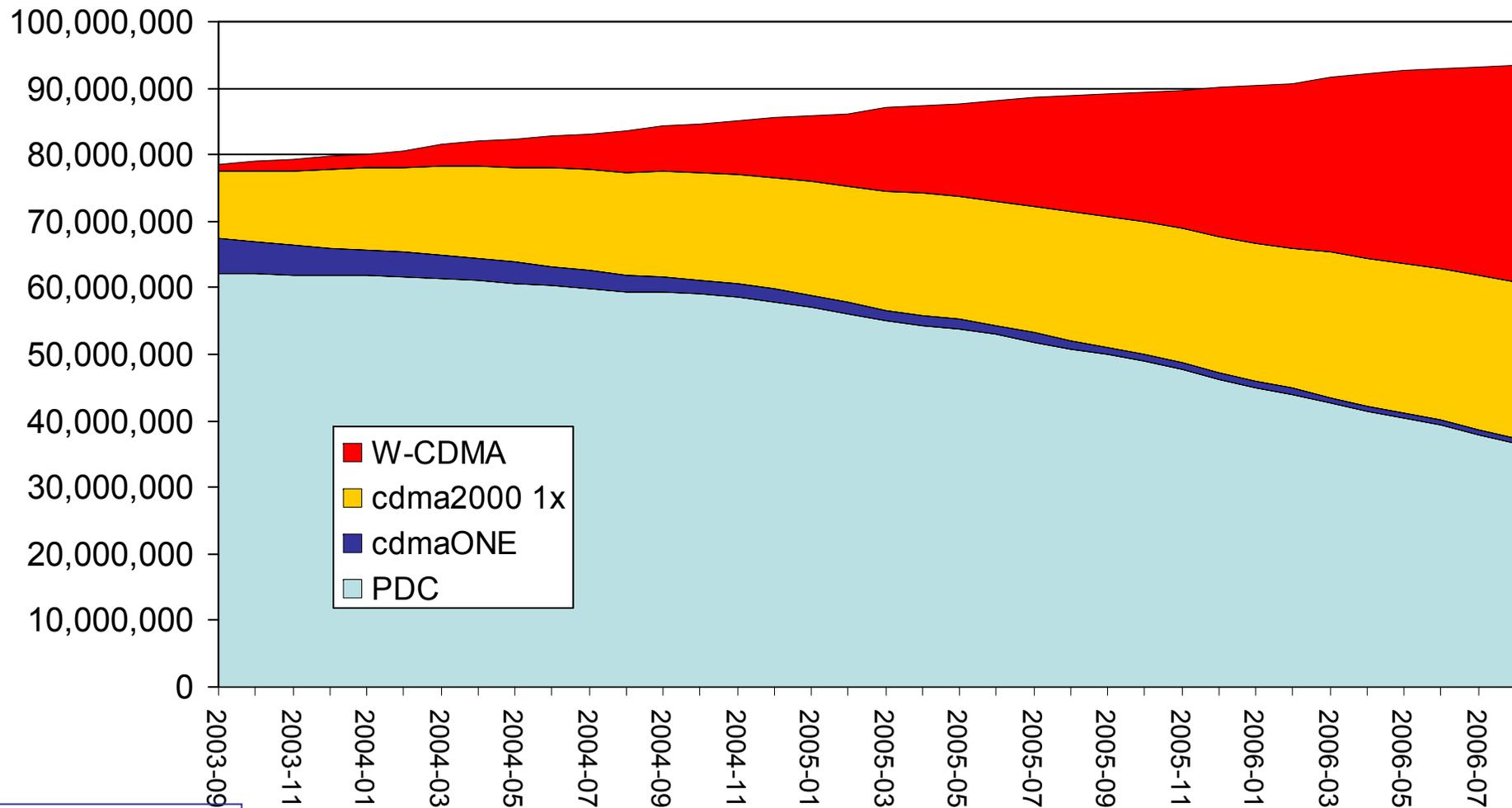
# Artificial Life

- Developer of games:
  - standalone
  - multi-user games
- Games within games
- Examples:
  - Virtual Girlfriend
  - Virtual Boyfriend
  - Virtual Emperor Penguin
- Launched with MNOs in:
  - Brunei
  - China
  - Hong Kong, SAR
  - Malaysia
  - Singapore
  - Taiwan

<http://www.artificial-life.com/>  
<http://mobileindustry.biz/>



# Japan switches to 3G



<http://www.tca.or.jp/>

# China

- Beijing Olympics opening on 08/08/08 will be a showcase for 3G
- Everyone is waiting for the licences
- Ministry of Information Industries (MII) seems undecided between:
  - technology neutrality
  - support for TD-SCDMA
- A lot of foreign and domestic lobbying
- Forecasts of 50 to 100 million customers by 2010
- Will drive the export market
- Many emerging and developing markets will copy



# 3G

- Games, Gambling and Girls
- Greed, Gullibility and Grief
  
- Location Based Services (LBS)
- Entertainment:
  - streamed audio
  - streamed video

Competition with mobile television?



# Location Based Services

- Originally the big hope for 3G revenues
- Adoption has been painfully slow
- Now there are many alternatives:
  - Global Positioning System (GPS)
  - Bluetooth
  - Ultra Wide Band (UWB)
  - Radio Frequency Identification (RFID) tags
  - Wi-Fi
  - identification of the mobile cell
  - embedded systems in cars

<http://www.oecd.org/dataoecd/19/7/34884388.pdf>



# Audio and video streaming

- Some material is:
  - on-demand
  - interactive
- Broadcasting for news, sports and music:
  - satellite
  - terrestrial
- Wi-Fi and WiMAX where demand is not immediate:
  - residential
  - public hot-spot



# Digital broadcasting

- Competing standards:
  - Digital Audio Broadcast (DAB)
  - Digital Multimedia Broadcast (DMB)
  - Digital Video Broadcast (DVB)
- Satellite and terrestrial
- Can carry vast amounts of entertainment and other services
- Very much cheaper than cellular for delivery to customers



# Wireless VoIP

- Multiple possible devices:
  - lap-top computer
  - Personal Digital Assistant (PDA)
  - Skype phone
- Wi-Fi chips are cheap and easily added to consumer electronic devices (n.b., games consoles)
- New multimode handsets
- Dedicated Wi-Fi phones



# Wireless VoIP

## Nokia E-Series handsets

- Wi-Fi when in:
  - corporate offices worldwide
  - Home
  - Hotels, etc.
- SIP client
- Otherwise GSM
- Being combined with iPASS, a global Wi-Fi supplier

## France Iliad “free.fr”

- Any Wi-Fi hotspot with “freebox”:
  - your home
  - your neighbours
  - people in the next street, village or town
- Free calls to fixed networks in France and 14 countries
- €29.99 per month

<http://adsl.free.fr/>



# VoIP over 3G

- Theoretically possible, but questions of:
  - pricing
  - download limits
  - operators filtering out VoIP
- Some deals for Skype over 3G:
  - Hutchison Whampoa (a.k.a. Three)
  - E-Plus (KPN)
- Enormous reluctance of 3GSM operators:
  - but how long can they resist the pressure?
- For the present, roaming charges make VoIP very expensive to use over 3G



# WiMAX

- Unlicensed bands:
  - often still not opened for use
  - 2.4 GHz and 5.8 GHz
- Licensed bands (e.g., 3.5 GHz):
  - very few issued so far
- Economies of scale not yet achieved
- A big push from Intel “World Ahead”

<http://www.intel.com/go/worldahead>



# Not cellular mobile alone

- Fixed Network Operators told by financial markets to:
  - spin-off MNOs
  - re-absorb MNOs
- Quadruple play (telephony, television, Internet, mobile)
- Comcast Cable (USA) now offers a bundle with cellular voice and data
- Vodafone is looking to add broadband, using wholesale offers from TOs and ISPs



# Multiple networks

- Personal Area Networks (PANs)
- Car networks
- Residential networks
- Cellular
- Other wireless networks
- Fibre optic cables for high bandwidth



# Ubiquitous Network Society

- The view from Japan and Korea
- Industry and government
- A focus on economic development
- A big push for manufacturing and services
- Multiple networks
- NGN plus RFID plus Ubiquitous Sensor Network (USN)



# Recent handset features

- Camera  
(create video clips for YouTube and MySpace)
- Stored music and video
- Receiver for digital mobile radio and television
  - satellite and terrestrial
- RFID for identification:
  - access controls
  - payments

**These can, but often do not, generate network traffic.**



# Devices

- Sony Mylo (my life online)
  - Wi-Fi, Keyboard, memory (music and video)
  - web browser, instant messaging and Skype
- Moneta:
  - stored credit
  - credit card
  - with RFID
  - all on a mobile phone
- Slingbox:
  - bridges your cable or satellite TV to Internet
  - remote access for fixed or mobile device
  - can be linked to Personal Video Recorder (PVR)



# Classes of convergence

- Packets
- Devices
- Services:
  - servers
  - programming
- Offers to customers
- Companies

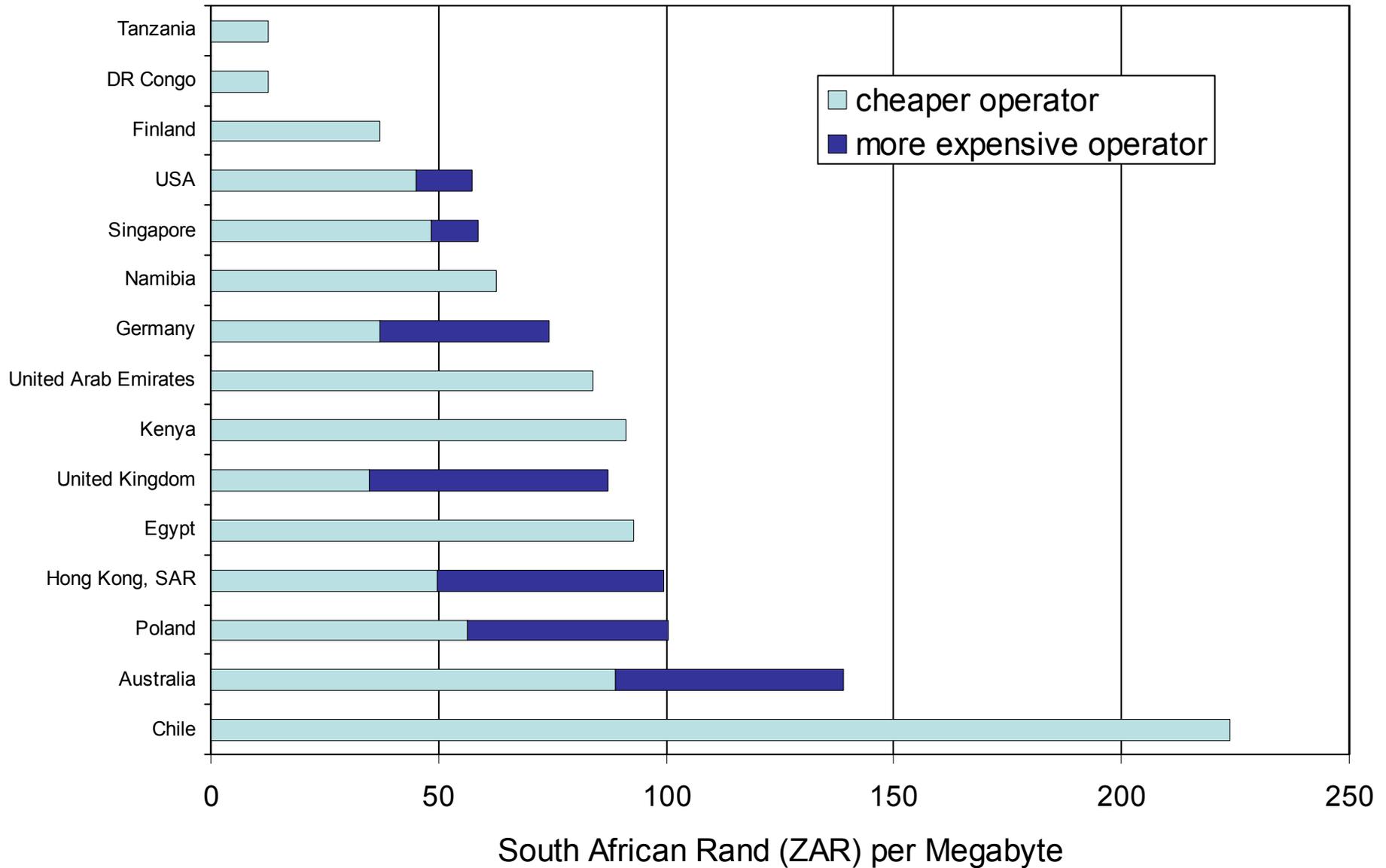


# An American roaming from Cape to Cairo

	Cingular standard	Cingular World Traveler	Sprint	T-Mobile USA	Verizon Global Phone
South Africa	\$2.49	\$1.69	\$1.50	\$1.49	\$2.49
Mozambique	\$3.49	\$3.49	\$1.50	\$1.99	\$1.29
Malawi	\$4.99	\$4.99	-	\$1.99	\$1.29
Tanzania	\$3.99	\$3.99	\$1.50	\$4.99	\$1.29
Kenya	\$3.49	\$3.49	\$1.50	\$4.99	\$4.99
Ethiopia	\$3.49	\$3.49	-	-	-
Sudan	\$3.49	\$3.49	-	-	-
Egypt	\$2.49	\$2.49	\$1.50	\$1.99	-

# South African data roamers

US\$ 1 = ZAR 7.76



# Hong Kong, SAR

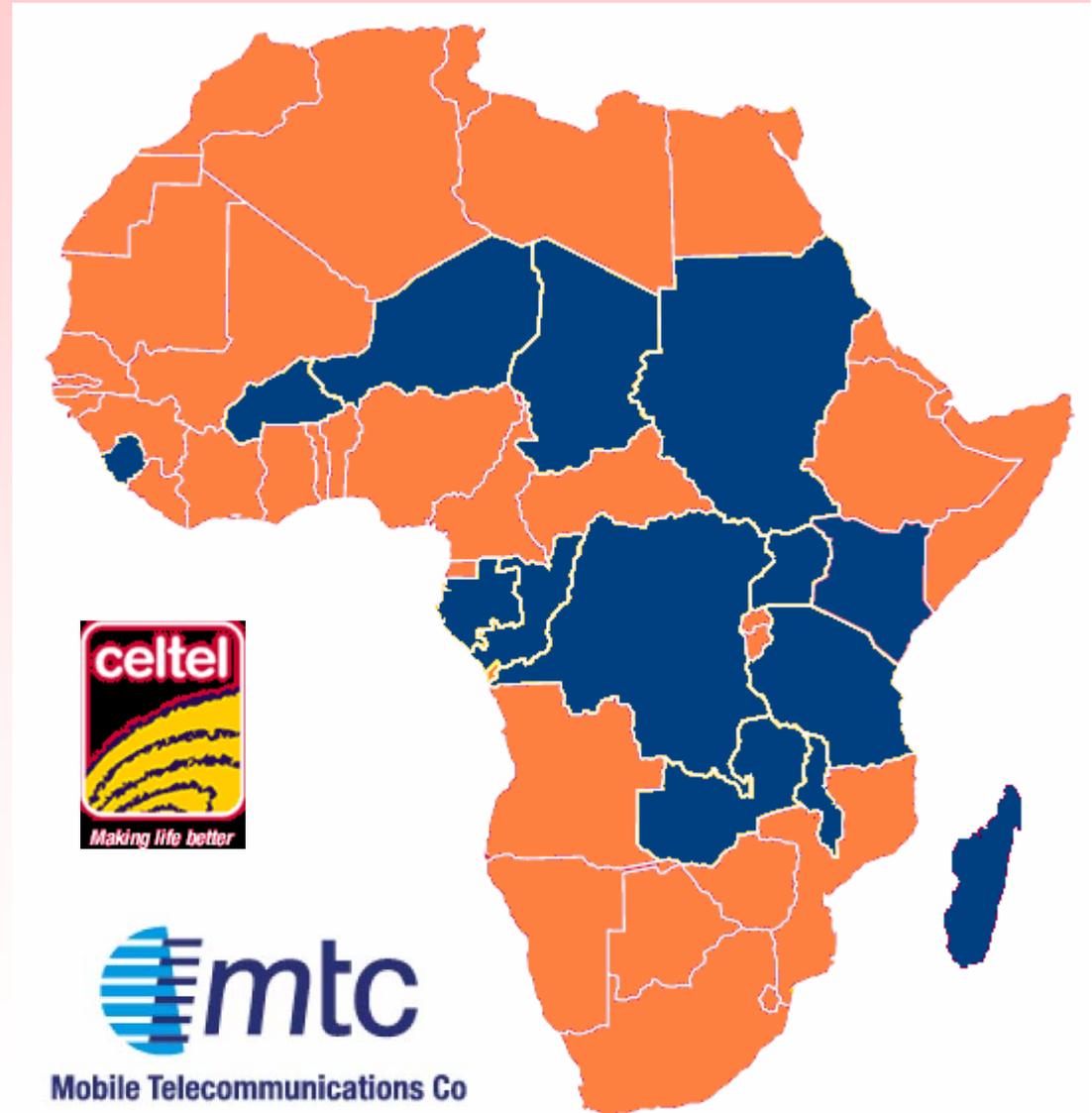
- One country, two systems
- One SIM card, two numbers:
  - Hong Kong, SAR
  - China
- Calls handled on the intelligent network
- Can be called on either number at any time
- Can make calls at national rates in both countries



# Celtel

- 14 countries
- 8.5 M users
- 270 M citizens (lots of growth)
- Owned by MTC of Kuwait

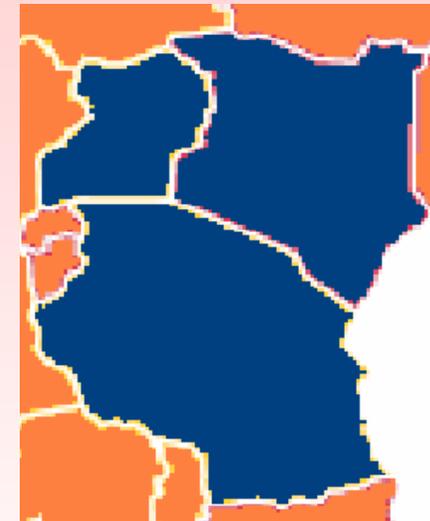
<http://www.celtel.com/>



# Celtel – One network



- Elimination of roaming charges:
  - Kenya
  - Tanzania
  - Uganda
- One network:
  - local rates while abroad
  - no charge for incoming calls
  - can top-up with locally purchased cards
- Will be further expanded



# Conclusions

- Enormous uncertainty about demand for:
  - data services
  - value added services
- Enormous uncertainty about access to networks by value-added service providers
- There are non-cellular routes to markets
- The pre-paid business model worked well for voice, but does not look plausible for value-added services



# Thank you

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