



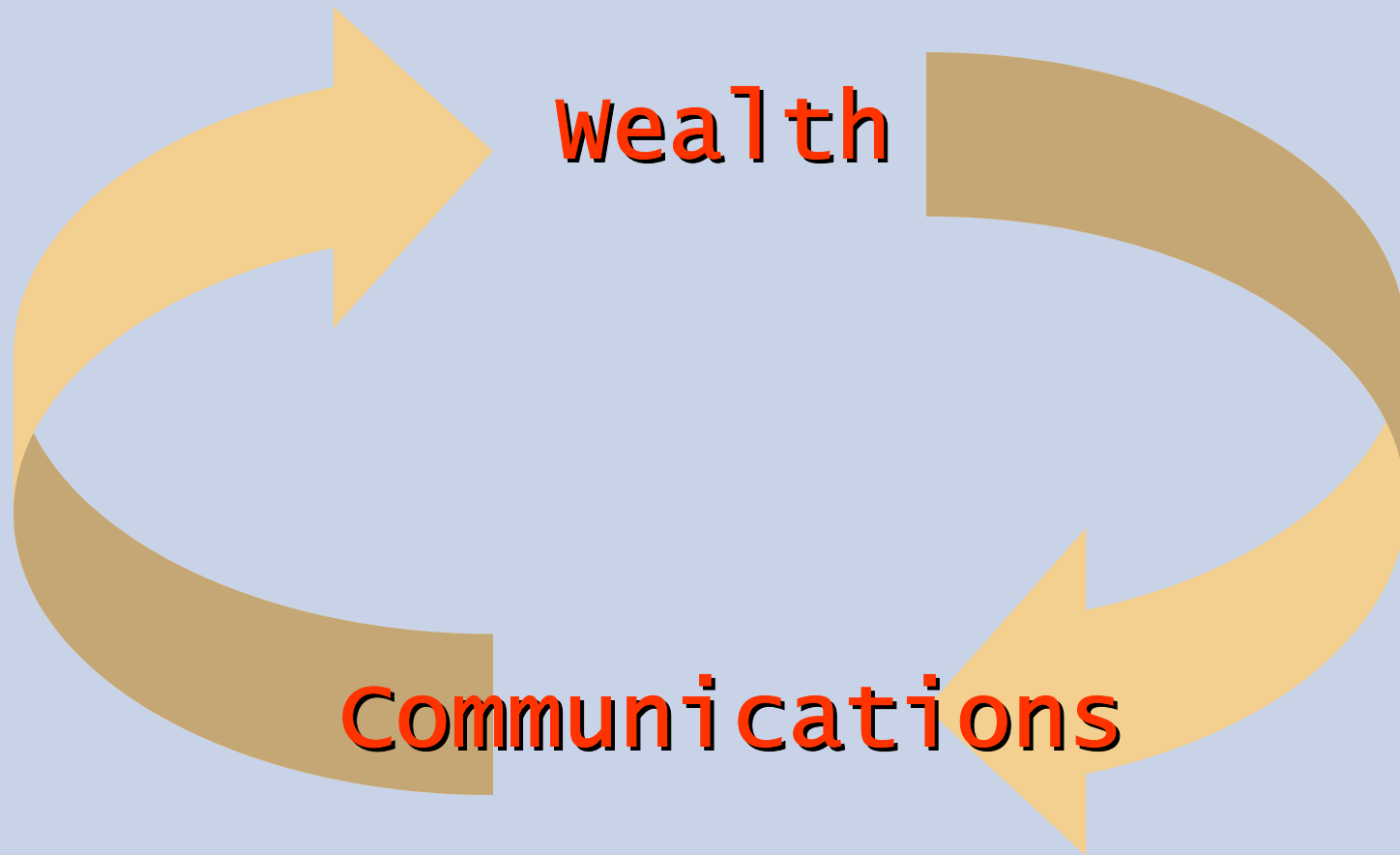
Advising the world's leading telecom co

Accelerating Telecom in Emerging Nations

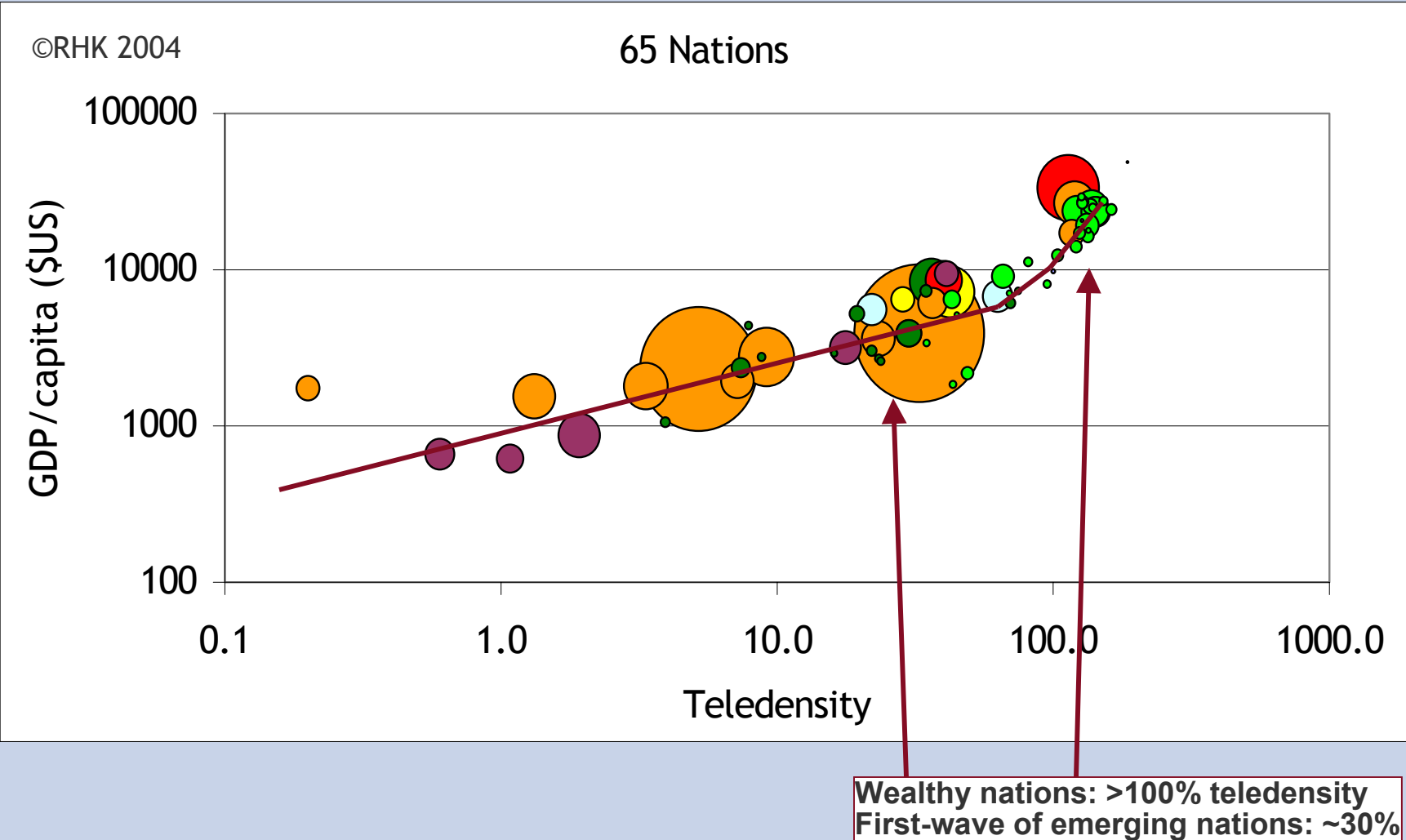
Dr. John Ryan
5/14/2004

- This presentation ... reviews quantitative metrics of network access
- ... for telephony (incl. mobile) and for Internet access
- ... and asks about

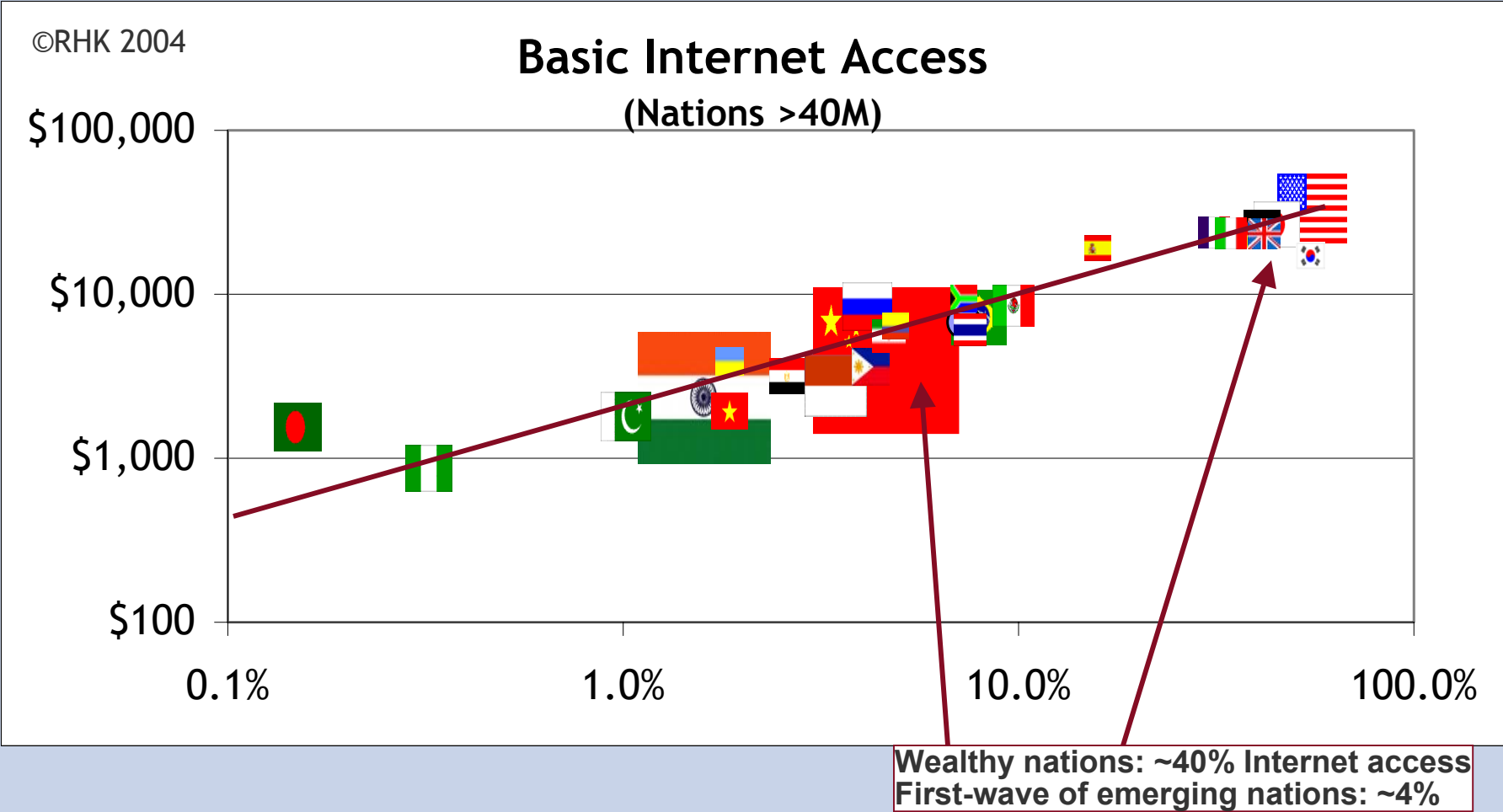
Where to begin?



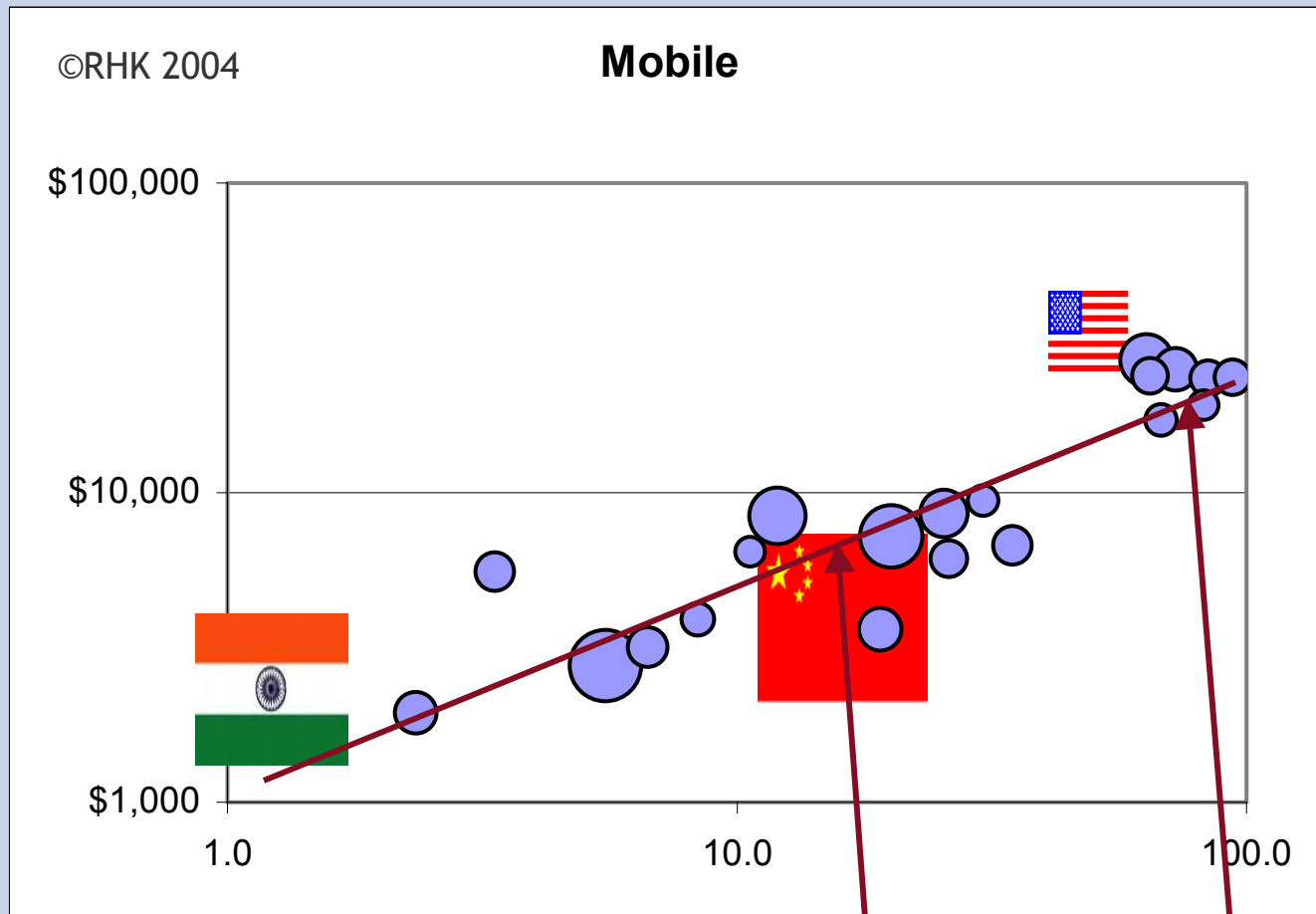
Correlation between GDP/capita and telecom spans 3 orders of magnitude



The Digital Divide: Access to Internet ~10x as in First-Wave Emerging Nations



Slightly different data for mobile ...



Wealthy nations: >60% mobile
First-wave of emerging nations: ~20%

Some Ratios: "Us": "Them"

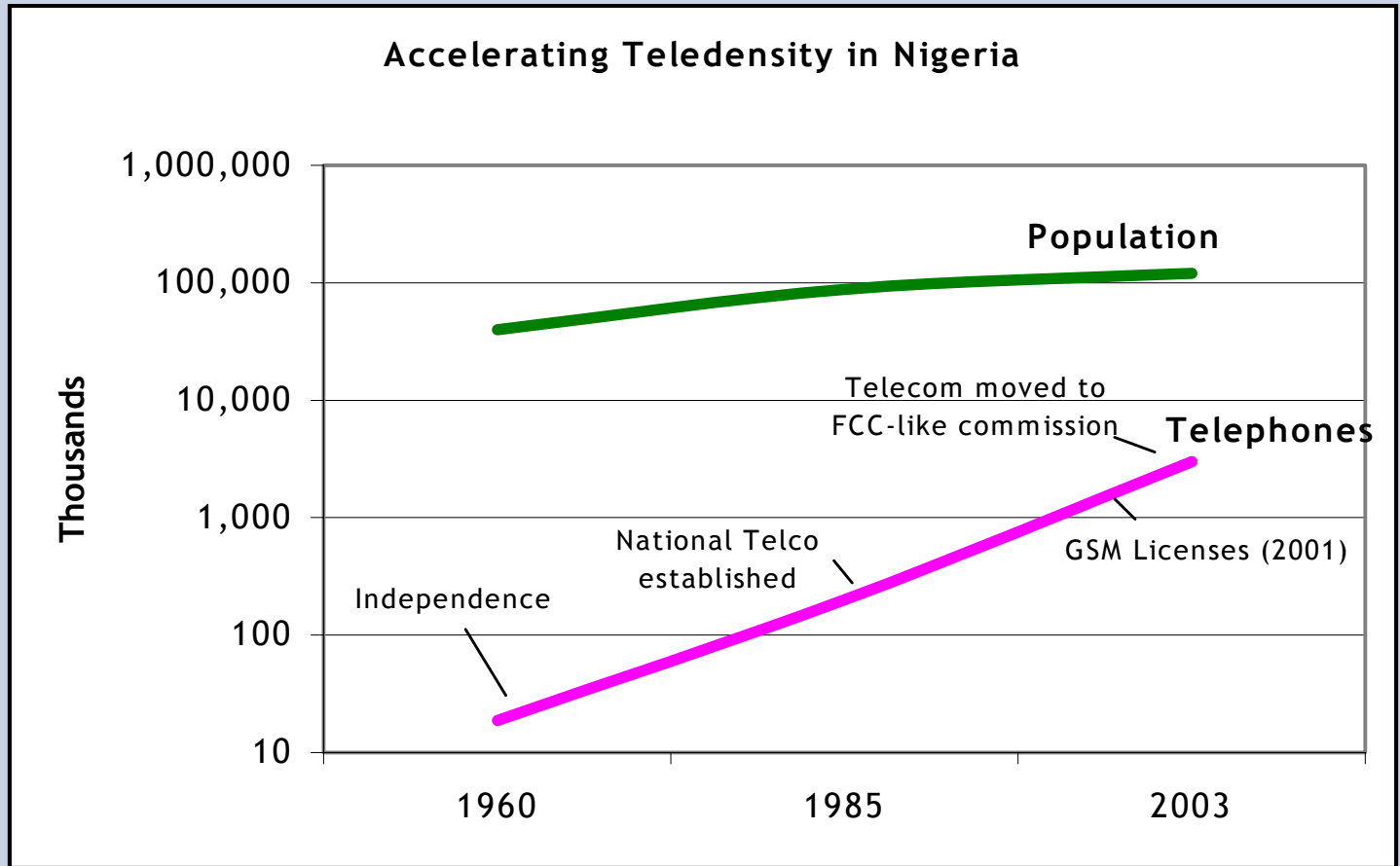
(ratios of penetration % averages)

| | Total telephony | Mobile Telephony | Internet | Broadband |
|--|-----------------|------------------|----------|-----------|
| Western nations: 1 st wave of emerging (China, Ukraine, ...) | 3:1 | 3:1 | 10:1 | 10:1 |
| Western nations: 2 nd wave of emerging (India, Indonesia ...) | 30:1 | 20:1 | 20:1 | 40:1 |
| Western nations: 3 rd wave of emerging (Nigeria, Myanmar ...) | 100:1 | 50:1 | 100:1 | N/A |

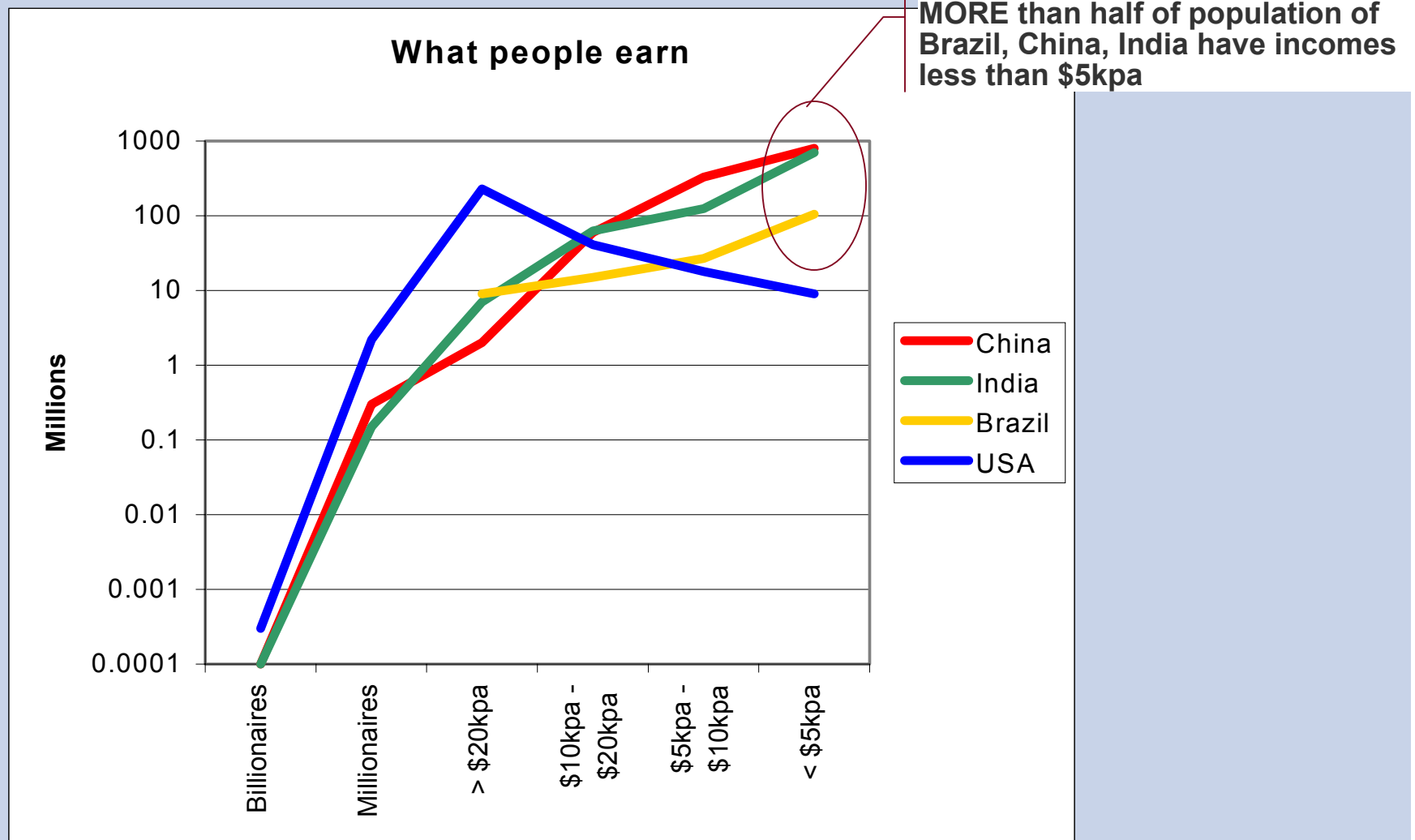
The relative utility of mobile phones and Internet access

| | Mobile Phone | Internet Access |
|-----------------------------------|--------------|-----------------|
| Communicate with outside world | ✓✓✓ | ✓✓ |
| Can find lots of information | | ✓✓✓ |
| Cheap client device | ✓✓ | |
| ~ independent from A/C power | ✓✓✓ | |
| Reliable client device | ✓✓✓ | |
| Free from government intervention | | |
| Works without literacy | ✓✓✓ | |
| Don't need a manual | ✓✓✓ | |
| Other apps: games, entertainment | | ✓✓ |

Trajectory in Nigeria ...



Who can AFFORD communications?



ARPU vs. Income ...

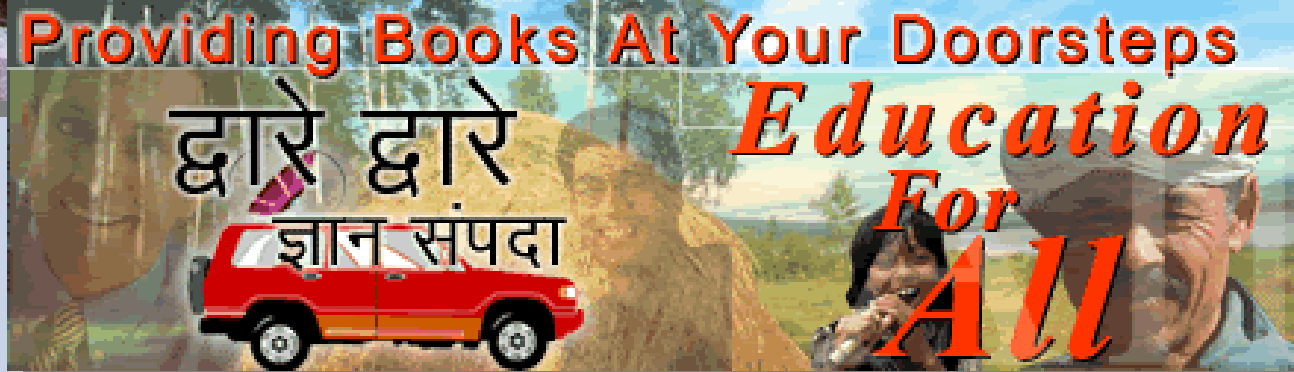
- US: ~2%
- China: 14%
 - \$1,000/- GDP
 - Penetration is about 20% (mobile/vs. total population)
- India: 30%
 - \$500/- GDP
 - Blended ARPU of ~\$12/mo, similar to China, with GDP-PPP about 50% of that in PRC
 - BUT penetration rate remains tiny - about 30M subs on ~1Bn
 - Bharti describes India's telecom adoption as like China +5 years

All figures are national average ARPU vs. GDP/capita

Broadly shared access

- Looking at the developing world is like looking at our own history.
- Telephony started with shared access
 - Payphones
 - Party lines
 - In parts of the developing world ... the mobile payphone: a pre-paid mobile phone & a bicycle
- Internet shared-access models seem most likely as a first-step
 - Potential resolution of high CPE cost, IT complexity
 - Commercial internet cafés
 - Other examples?

Solving the Cost & A/C Power Problem



Bottom Line?

- Mobile telephony
 - Selected by emerging economies as the preferred means to build a communications infrastructure
 - PHS as a low-cost entry point drives UTSI sales past \$1Bn
 - Probably could benefit from increased funding of local uses
- Internet access
 - Likely path starts with shared access - such as Internet cafes, rather than with individual PC ownership
 - Surely could benefit from greater access, especially at schools, other centralized facilities
 - But will also need training (perhaps the most important intervention)



Thanks ...