One SIM, Multiple Networks

Liberating mobile phone users,
Increasing mobile penetration
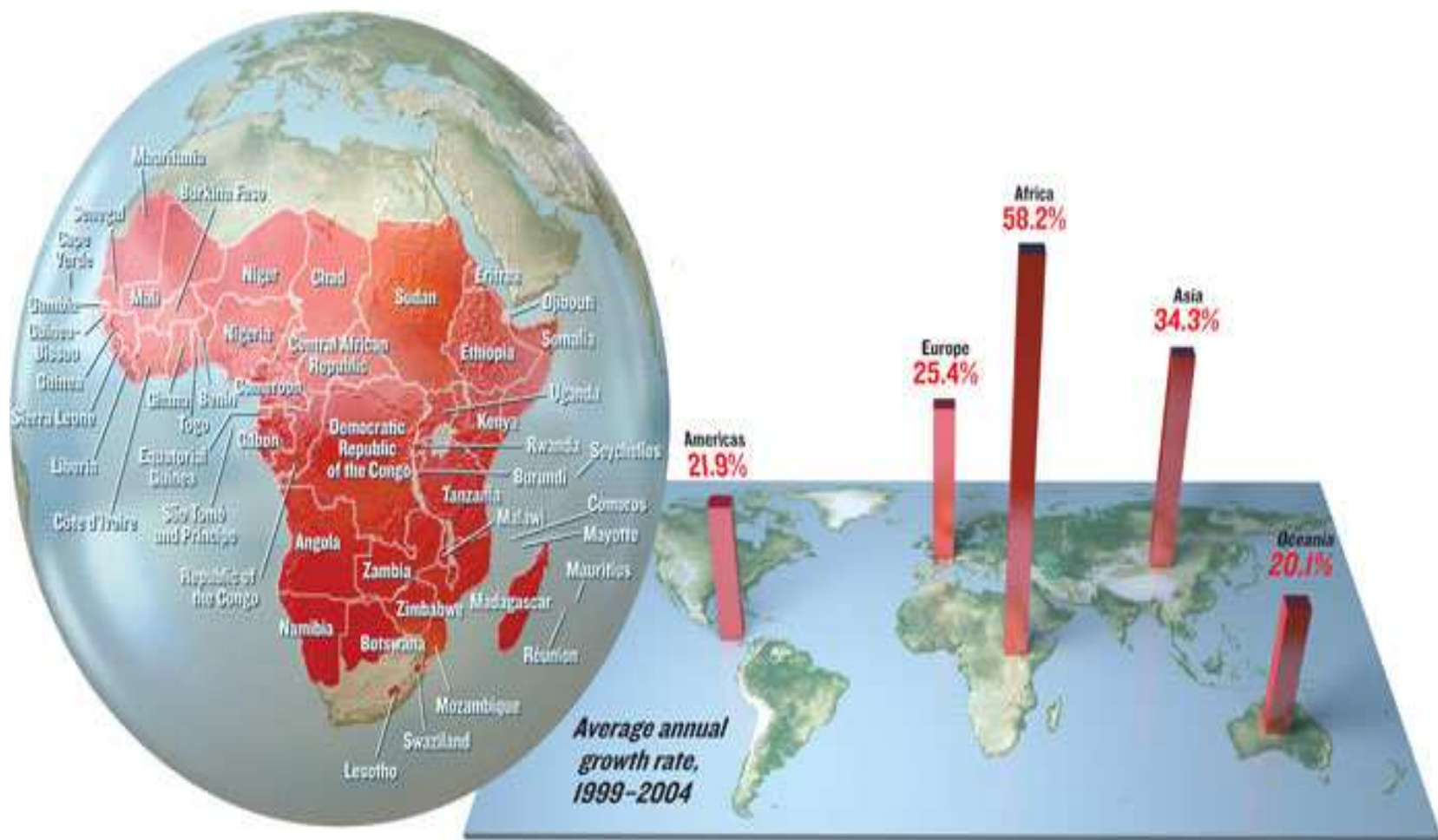
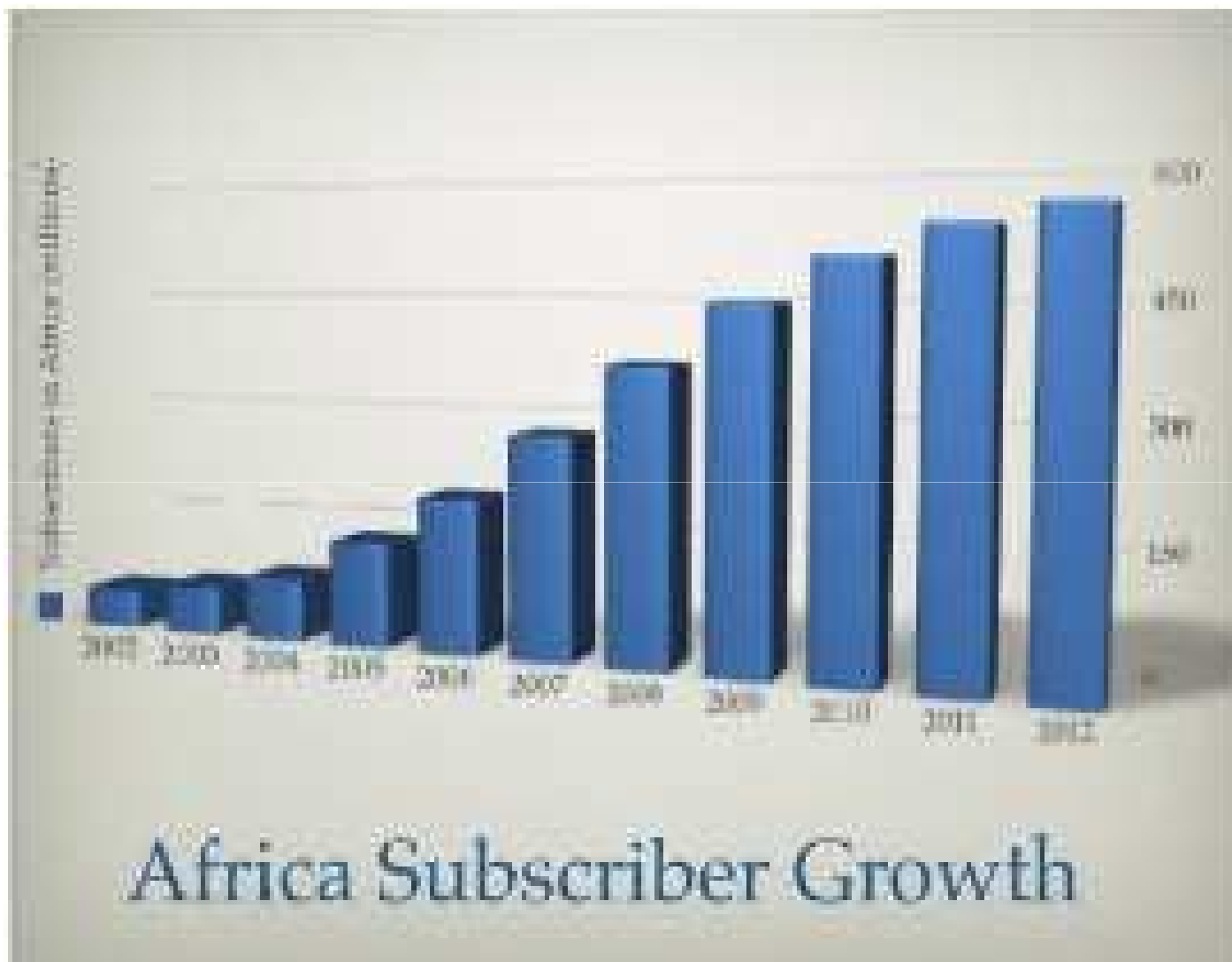Anthony Kiaria

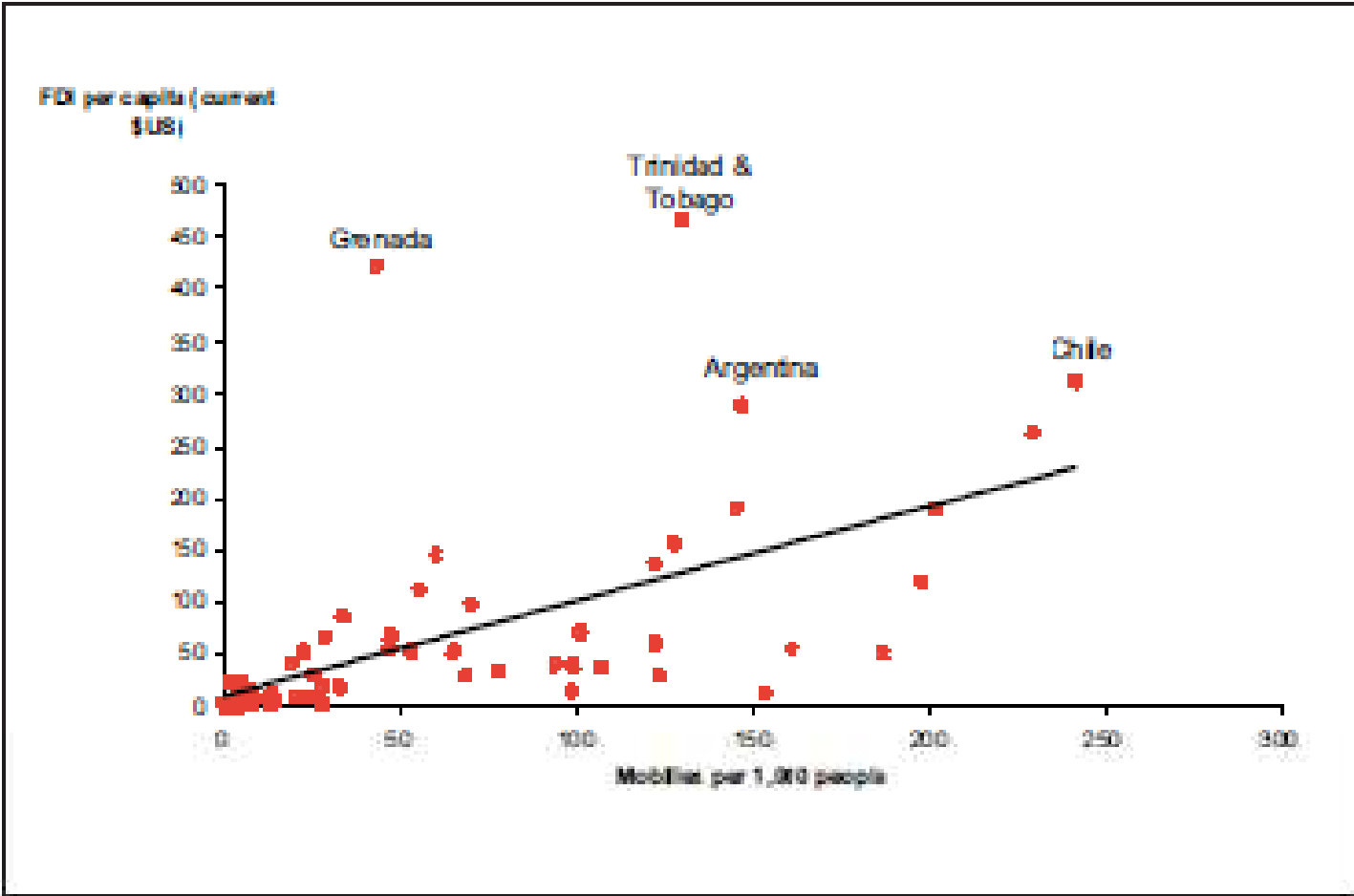Kirimi Achieng

Mworia Wilfred Mutua

How remarkable the mobile has been for Africa…

Mauritania
Burkina Faso
Senegal
Cape Verde
Niger
Chad
Eritrea
Gambia
Mali
Sudan
Djibouti
Guinea-Bissau
Nigeria
Central African Republic
Somalia
Guinea
Ethiopia
Ghana Benin
Cameroon
Uganda
Sierra Leone
Togo
Gabon
Kenya
Liberia
Equatorial Guinea
Democratic Republic of the Congo
Rwanda
Seychelles
Burundi
Côte d'Ivoire
São Tomé and Príncipe
Tanzania
Comoros
Malawi
Mayotte
Angola
Zambia
Mauritius
Republic of the Congo
Zimbabwe
Madagascar
Namibia
Botswana
Réunion
Mozambique
Swaziland
Lesotho

Americas
21.9%
Europe
25.4%
Africa
58.2%
Asia
34.3%
Oceania
20.1%

Average annual growth rate, 1999–2004

Africa Subscriber Growth

Source: WDI (2004), Frontier Economics

The Barriers

- Each has specific benefits to pull in subscribers...

- And lock them in!

A Probable Solution will…

- Lower the barrier to entry for mobile service consumers regardless of the provider

- Solve lock in and associated costs of e.g. cross network charges.

Hence!

- Wider mobile coverage

- Increase in number of mobile subscribers

- Lower and more competitive costs

- Better customer service and increased products

More importantly... Economic Inclusion

Consequently...

- Enjoy a mix of different subscriber offers... off-peak rates, free SMS/text etc...

- How many **SIM cards** do you maintain...?

- How many **phones** do you maintain...?

For *m* providers you have *m* SIMs (m:m)

This is quite <u>inefficient</u>, isn't it? But what if...

Prior Solutions

- Own many phones (not really a solution)

- One phone and switch SIMs

- Multi-SIM phone
  - Dual SIM???
  - Triple-SIM???
  - Quad-SIM???

Our Solution

- Fix this –
  - Increase the amount of communication going on
  - Number of people communicating!

- Increase the rate at which people and even states achieve more of the benefits of mobile!

How is our solution any different?

A **Virtualized** SIM

i.e.

Multiple 'SIM's on a single Smart Card (1:m)

1 SIM　　　　　　　**Multiple SIM's**

=

- Borrowing from concept of Operating Systems virtualization

- VMware, Open Kernel Labs have all managed to virtualize on mobile devices
    - One mobile phone running multiple OSs

- Take it a notch 'lower', bring the same capability on a SIM

Can it be done?

Scientists dared to think otherwise

Options

- Overhaul the smart card OS and many GSM standards in the process

- Create an application level solution based on existing GSM standards (11.11, 11.14, 02.19, 03.19)

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Proof it can be done...

- Web server on a SIM card? HTTP Request/Response on a SIM card???...

  - *How to Turn a GSM SIM into a Web Server: Projecting mobile trust to the World Wide Web; Scott Guthery, Roger Kehr, Joachim Posegga (2000) - WebSIM*

  - *Webcard: a Java Card web server; Jim Rees, Peter Honeyman (1999)*

- The smart card has limited memory…

  WebSIM implemented in less than 7Kb!

- Testing the prototype

- 'Upset' service providers