"The new network economy"

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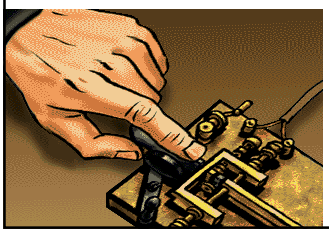
The world is moving from an industrial to an information economy

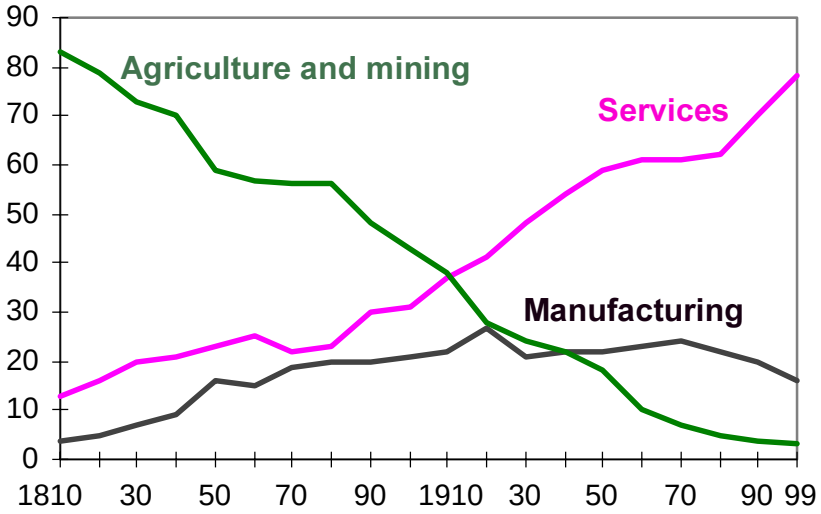
- **The evidence**
  - ⇨ **The rise of the "new economy": information-based, network-driven and global in nature**
- **The "new economy" network**
  - ⇨ **IP-based networks**
  - ⇨ **Privately-owned and operated**
  - ⇨ **"Light touch" regulation**
- **Some consequences and possible costs**
  - ⇨ **The nature of the "new economy" network**
  - ⇨ **Uneven patterns of investment in IP networks**
  - ⇨ **New gaps opening up between developed and developing countries?**

"No revolutions in technology have as visibly marked the human condition as those in transport… Yet technologies to transport ideas and information across long distances have arguably achieved even more: they have spread knowledge and are the basis for economic growth"



The Economist, Millennium edition

Towards the "new economy":
Change in percentage of US employment, 1810-1999



Source: US Bureau of Labor Statistics.

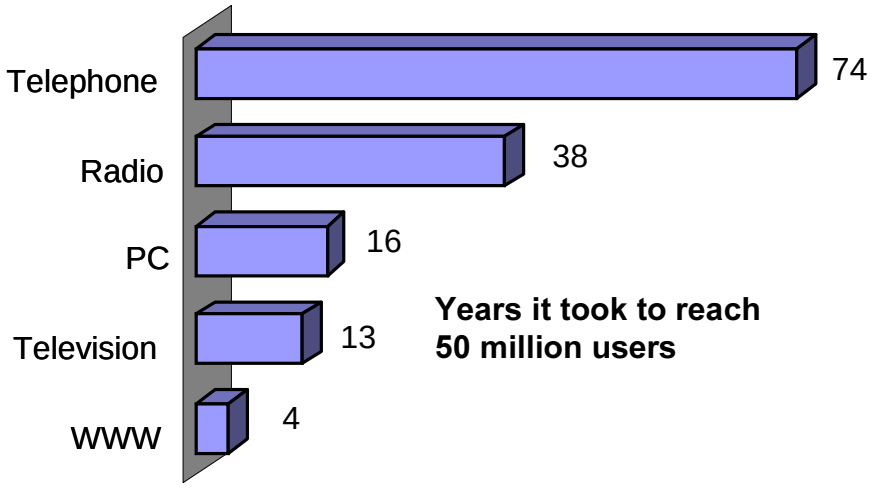
The "New Economy" is a world in which:

- people work with their brains instead of their hands;
- communications technology creates global competition;
- innovation is more important than mass production;
- investment buys new concepts or the means to create them, rather than new machines;
- rapid change is a constant.

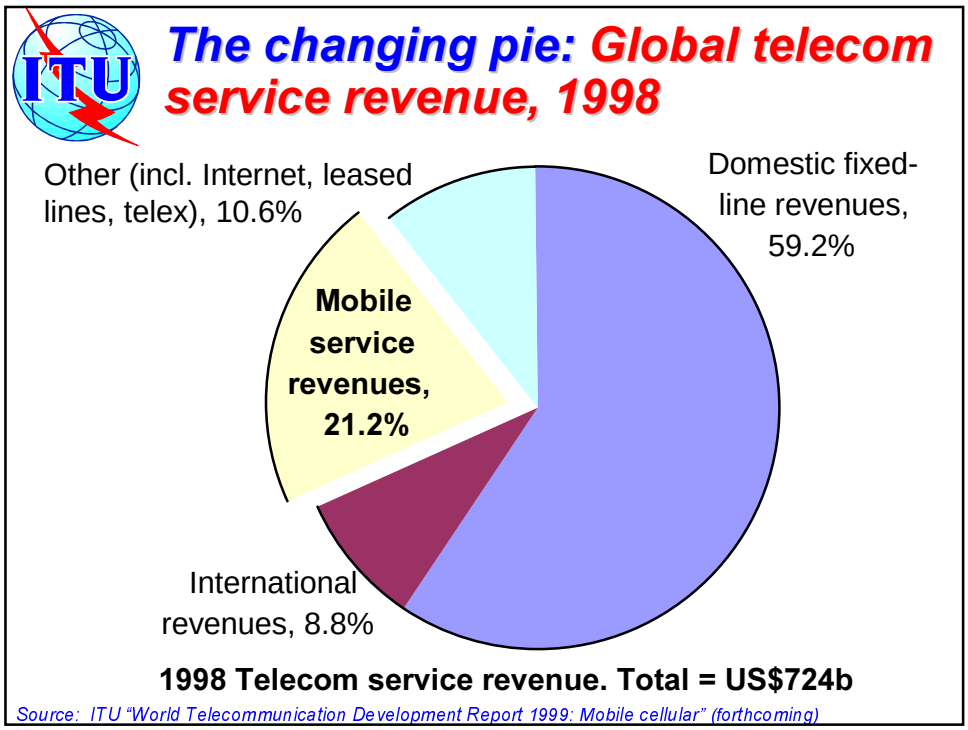
A world so different, its emergence can only be described as a revolution.

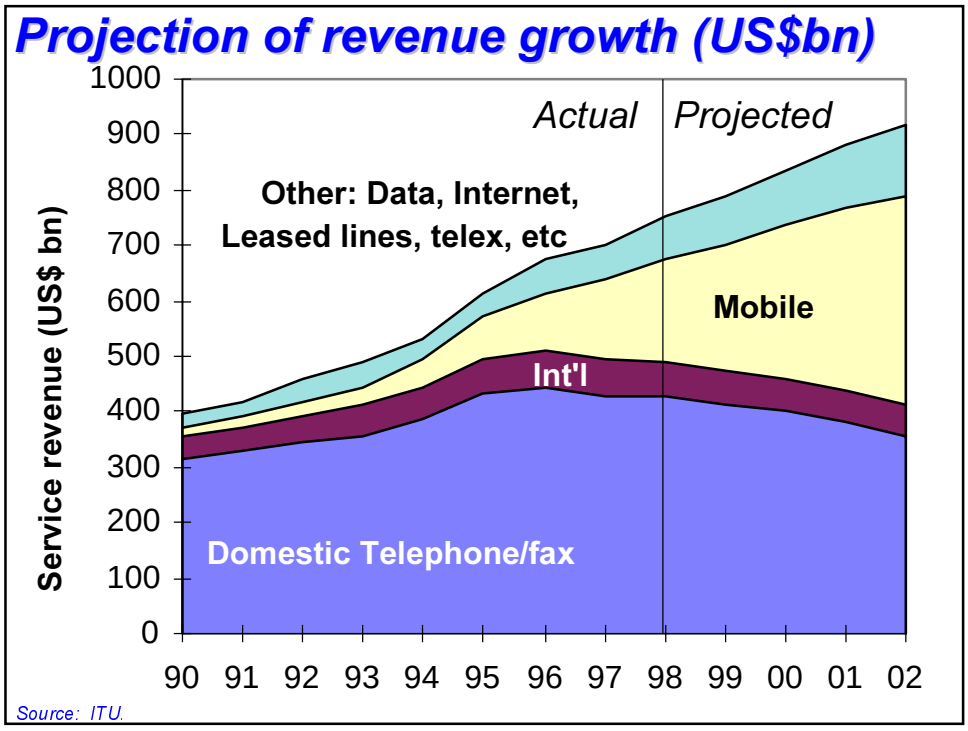
Source: Wired Magazine, "The Encyclopaedia of the New Economy", www.hotwired.com.

Accelerating pace of diffusion



Source: ITU 1999 "Challenges to the Network: Internet for Development"

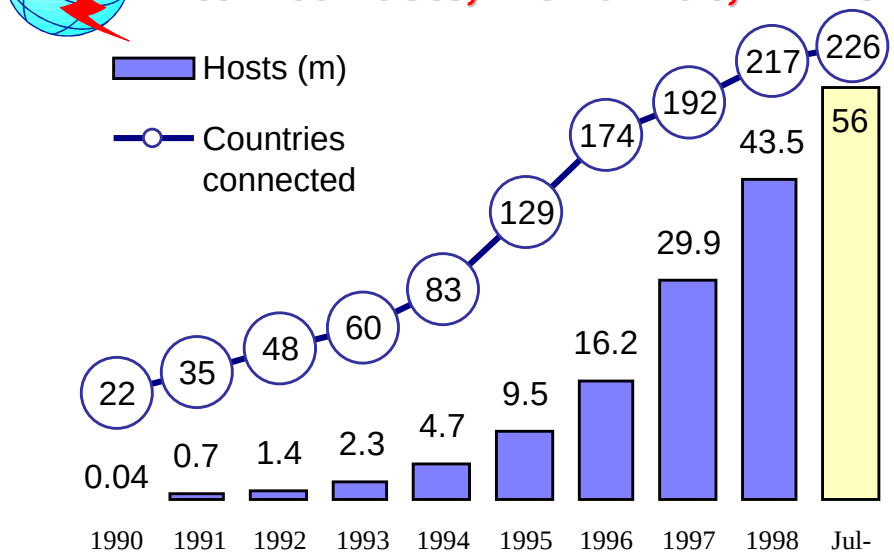

The changing pie: Global telecom service revenue, 1998
Other (incl. Internet, leased lines, telex), 10.6%
Domestic fixed-line revenues, 59.2%
Mobile service revenues, 21.2%
International revenues, 8.8%
1998 Telecom service revenue. Total = US$724b
Source: ITU "World Telecommunication Development Report 1999: Mobile cellular" (forthcoming)


Projection of revenue growth (US$bn)
Service revenue (US$ bn)
1000
900
800
700
600
500
400
300
200
100
0
Actual
Projected
Other: Data, Internet, Leased lines, telex, etc
Mobile
Int'l
Domestic Telephone/fax
90 91 92 93 94 95 96 97 98 99 00 01 02
Source: ITU.

Selected "new economy" corporations, ranked by market capitalisation, Jan 2000

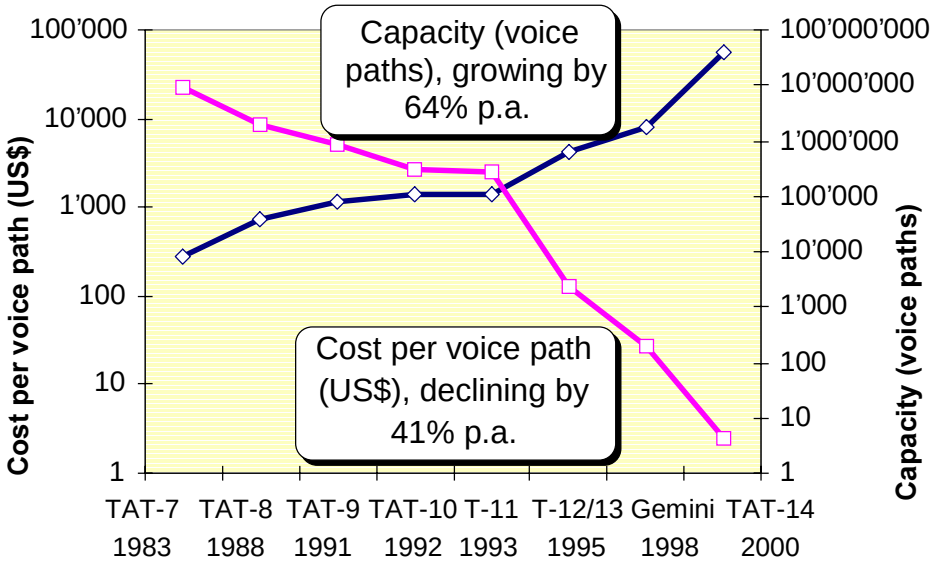
Company	Market capitalisation	Equivalent country (in terms of GDP)
Microsoft	US$564 bn	Spain
GE	US$497 bn	India
Cisco	US$348 bn	Netherlands
NTT DoCoMo	US$312 bn	Switzerland
AOL-Time Warner	US$254 bn	Belgium

The "new economy" network Internet hosts, worldwide, millions



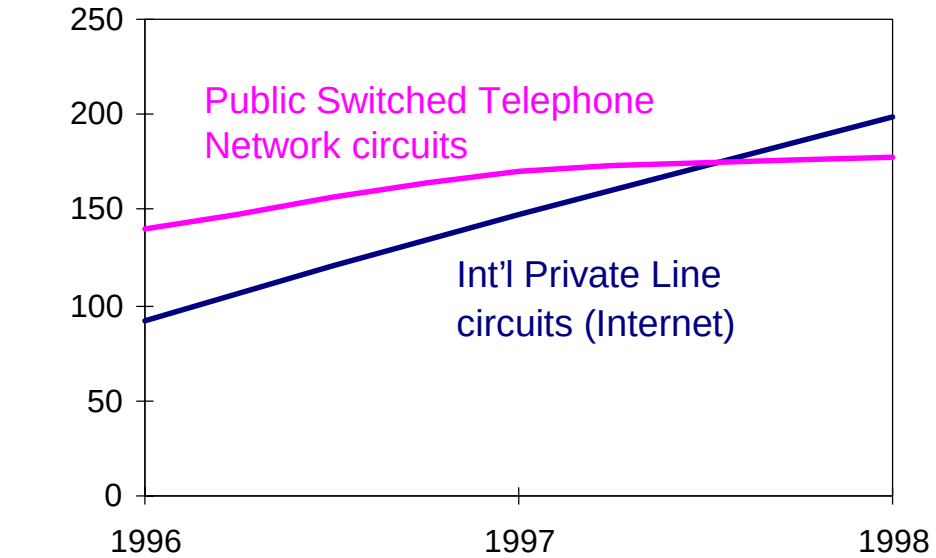
Source: ITU, partially based on data from Internet Software Consortium (www.isc.org) and RIPE (www.ripe.net).

Infrastructure capacity and costs, TransAtlantic cables, 1983-2000



Source: ITU, TeleGeography Inc., FCC.
Note: Voice-path numbers assume a compression ratio of 5:1 to number of circuits.

Out with the old; in with the new: Usage of International circuits, in thousands



Note: Based on usage of circuits between the US and the rest of the world. *Source:* FCC.

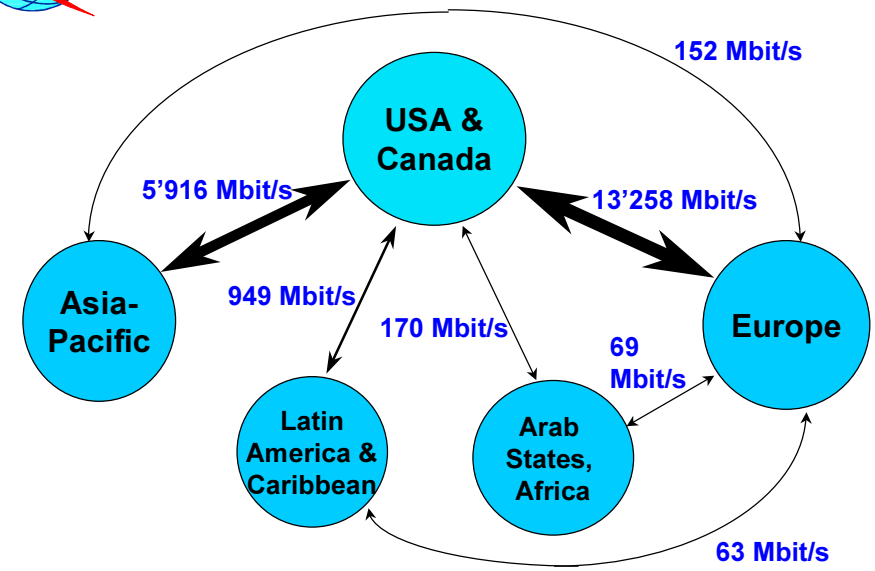
"Old economy" and "new economy" networks: What's the difference?

"Old economy" network	"New economy" network
Hybrid analogue/digital	All digital
Circuit-switched	IP (packet-switched)
Highly regulated	Largely unregulated
Priced per minute	Priced per megabyte
Distance-sensitive pricing	Distance-insensitive pricing
Generally state-owned and operated	Generally privately-owned and operated
Accounting rate system means cash flows from net traffic generating to net traffic receiving countries	Peering and transit system means cash flows from net traffic receiving to net traffic generating countries

Some features of the "new economy" network

- >95 per cent of global IP capacity passes through United States
- 96 out of top 100 websites in the United States
- Developing countries wanting to hook up to US IP backbone must pay both half-circuits of the leased line
- Smaller ISPs must pay bigger ones for transit
- Accelerating returns to scale
  - ⇨ high volume routes have lowest unit costs
  - ⇨ big hubs get bigger
  - ⇨ resources go to the strong

Inter-regional Internet backbone



Source: TeleGeography Inc., Global Backbone Database. Data valid for Sept. 1999.

Top Internet cities,
Ranked by Int'l IP bandwidth (Mbit/s) available per 1'000 inhabitants

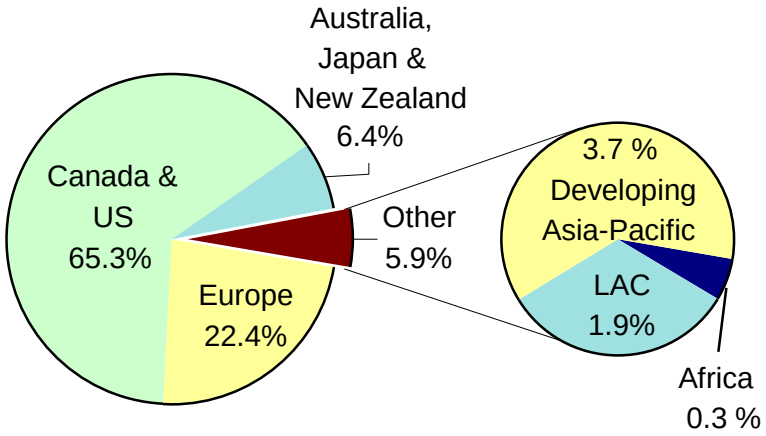
World		*Asia-Pacific*	
Geneva	15.06	Tokyo	0.31
Amsterdam	9.81	Sydney	0.19
Washington DC	7.36	Auckland	0.16
Brussels	5.54	Kuala Lumpur	0.15
Toronto	5.38	Singapore	0.15
San Francisco	5.37	Taipei	0.12
Seattle	4.98	Osaka	0.10
Frankfurt	3.00	Seoul	0.10
Stockholm	2.84	Hongkong	0.08

Source: ITU, adapted from TeleGeography Inc. Global Backbone Database. Data valid for Sept. 1999.

Global distribution of IP hosts is uneven

Developed:
94 % of hosts
16 % population

Developing:
6 % of hosts
84 % population



Source: ITU 1999 "Challenges to the Network: Internet for Development"

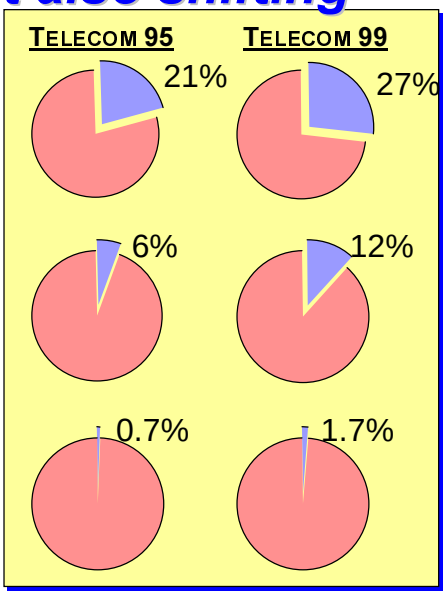
The development gap is shrinking, but also shifting

Share of low and lower-middle income countries in:

Telephone main lines

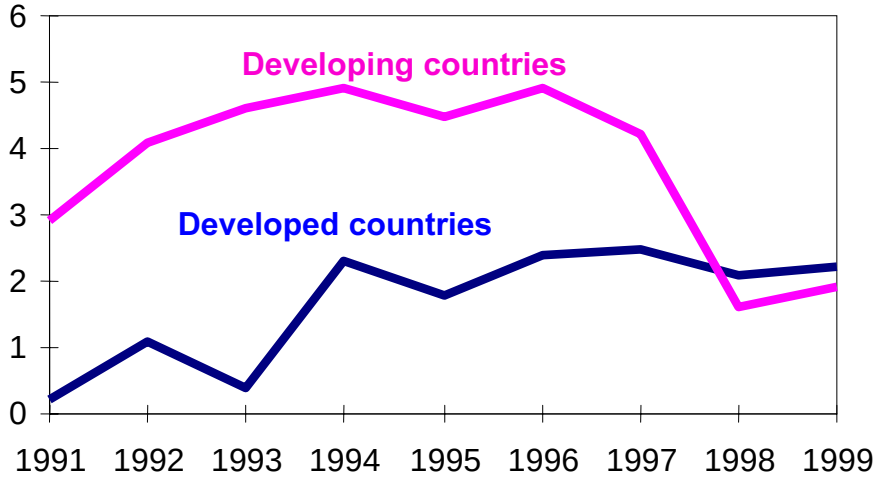
Mobile subscribers

Internet host computers



Source: ITU World Telecommunication Indicators Database.

Is the "new economy" changing the nature of the development gap?
GDP growth per capita, 1991-1999



Source: IMF

Forecasting
Projecting forward current trends

- **By 2005, there could be:**
  - ⇨ **1.4 billion telephone lines**
  - ⇨ **1.3 billion cellular telephone subscribers**
  - ⇨ **500-750 million Internet users**
- **These could account for:**
  - ⇨ **250 billion minutes of int'l voice/fax traffic**
  - ⇨ **2.5 trillion minutes of total voice/fax traffic**
  - ⇨ **1'000'000 Gigabits (1 Petabit) per second of Internet traffic**
  - ⇨ **Services market of around US$1.1 trillion**
  - ⇨ **Equipment market of around US$400 billion**

Forecasting
Identifying discontinuities

- By 2001, less than 10% of int'l traffic will use accounting rate system
  - ⇨ Domestic interconnect fees will be dominant mode
- Major price cuts in international calls early in decade
  - ⇨ Availability of new infrastructures
  - ⇨ Impact of Internet pricing model (distance and duration independent)
- Mobiles exceed fixed-line phones worldwide by 2006/07
  - ⇨ Introduction of "third generation" mobiles after 2001
  - ⇨ Generational shift, as new users reject fixed-lines

The int'l telecoms market in 2005: Some educated guesses

- The premium of an international call over a domestic call (currently >300%) will be <20%
  - ⇨ Internet-like pricing structure
- Traffic flows will be dictated by a small number of hubs connected to multiple fat pipes
  - ⇨ Major hubs in New York, London and Hong Kong?
- Major alliances will own a smaller share of the market as infrastructure owners resell capacity
  - ⇨ Market significantly bigger by volume, but only slightly bigger by revenue
- Telecom development gap will shift
  - ⇨ Gap between middle income countries and LDCs

Conclusions:
Towards the new economy

- **Long-term trends (post-war period)**
  - ⇨ **Rise of services employment**
  - ⇨ **Development of info-communication networks**
  - ⇨ **Information as a means for creating wealth**
  - ⇨ **Gap between rich and poor narrowing**
- **Short-term trends (latter half of 1990s)**
  - ⇨ **Development of information-based economy**
  - ⇨ **IP-based networks eclipsing voice-based networks**
  - ⇨ **Elevated stock market valuations for "dot.com" companies**
  - ⇨ **Gap between rich and poor widening**