"The Age of the Terrific Deal": Information, Infrastructure, and Opportunity for All

Yaşar Tonta

Hacettepe University

Department of Information Management

06532 Beytepe, Ankara, Turkey

tonta@hacettepe.edu.tr

yunus.hacettepe.edu.tr/~tonta/tonta.html

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Overview

☞ Major Trends in ICTs

☞ Internet connectivity

☞ Digital divide

☞ How could ICTs change the world

☞ Information Society developments in SEE

☞ Conclusion

"The Age of the Terrific Deal"

"We're on the way to getting exactly what we want instantly, from anywhere, at the best value for our money."

Source: Reich, 2000, p. 15

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Industrial Society

☞ **Mass production and mass distribution**

☞ **"Make, store, sell"**

☞ **"Mechanistical organization"**

☞ **"Continuous development"**

☞ **Traditional education and training**

☞ **Rigid / hierarchical administration**

☞ **Economic models based on centralization**

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Information Society

- ☞ **Mass customization and personalization**

- ☞ **"Sell, make, deliver"**

- ☞ **"Dynamic organization"**

- ☞ **Customer focused education / continuous education**

- ☞ **Loose / horizontal administration**

- ☞ **Economic models based on customization**

Knowledge . . .

- ☞ "None of the sources that are used to create wealth is as important as knowledge."

- ☞ Knowledge → "lifeblood of development"

- ☞ Knowledge → the *sine qua non* of competition

Globalization of Human Knowledge

"The whole human memory can be, and probably in a short time will be, made accessible to every individual...This new all-human cerebrum...need not be concentrated in any one single place, it need not be vulnerable as a human head or a human heart is vulnerable. It can be reproduced exactly and fully in Peru, China, Iceland, Central Africa, or wherever else seems to afford an insurance against danger and interruption."

Source: Dyson (1997, p. 10-11)

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Major Trends

☞Increase in computing power

– processing, storage and retrieval of information

☞Decrease in costs

– information processing and transmission
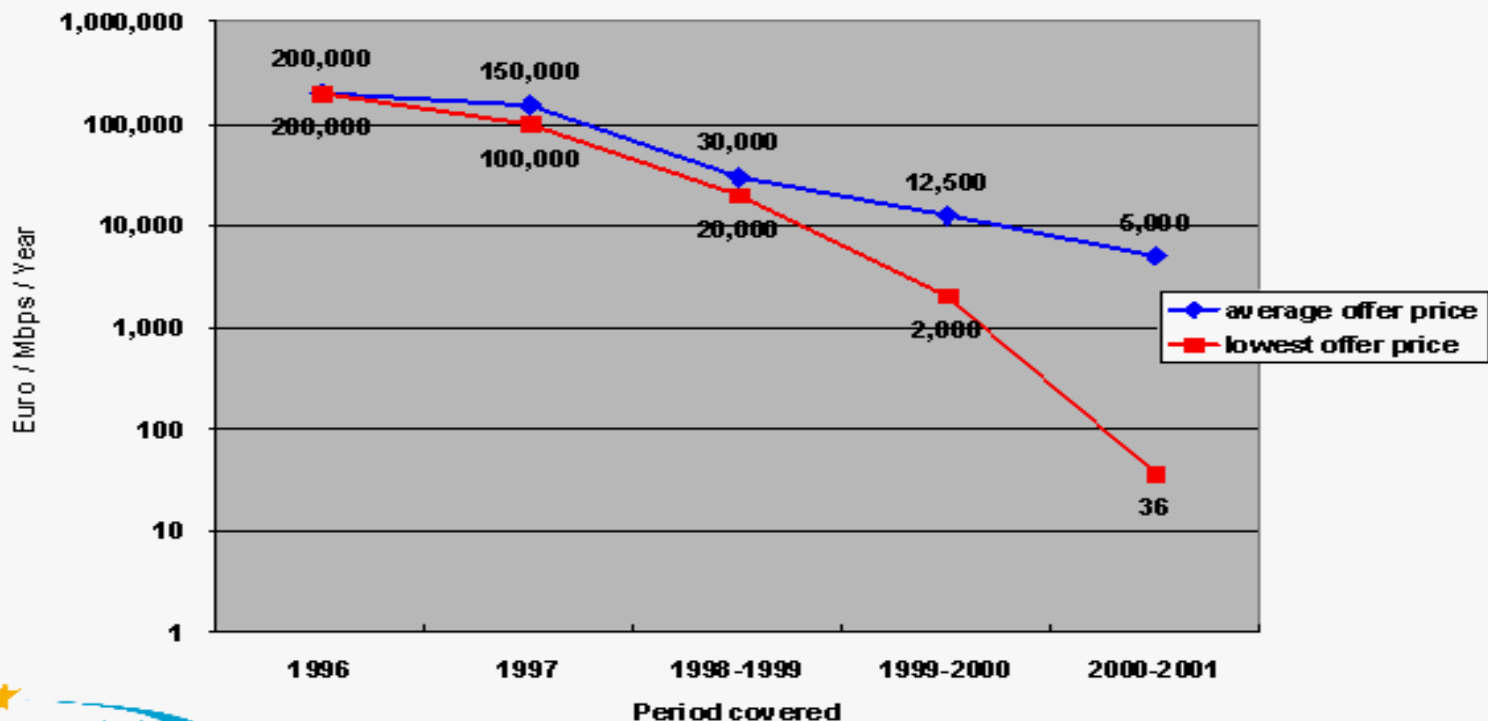
☞Information explosion

Storage Costs

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Transmission Costs

Price Development of International Bandwidth (logarithmic scale)

DANTE

GÉANT – A Giant Step - Vincent.Berkhout@dante.org.uk (12/16)

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Information Explosion

- 5 Exabytes (5 x 10^{18} bytes)
  - The amount of new information produced in the world in 2002 (5 x 10^{18} bytes)
- 5 Exabytes of information = 37,000 new Library of Congresses!
- 10 billion documents (167 Terabytes) available on the "surface web"
- 550 billion documents (91857 Terabytes) in the "deep web"

Source: BrightPlanet & Lyman and Varian

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Growth of Information

Table 1. Worldwide production of original information, if stored digitally, in terabytes circa 2002. Upper estimates assume information is digitally scanned, lower estimates assume digital content has been compressed.

| Storage Medium	2002 Terabytes Upper Estimate	2002 Terabytes Lower Estimate	1999-2000 Upper Estimate	1999-2000 Lower Estimate	% Change Upper Estimates
Paper	1,634	327	1,200	240	36%
Film	420,254	76,69	431,690	58,209	-3%
Magnetic	5187130	3,416,230	2,779,760	2,073,760	87%
Optical	103	51	81	29	28%
TOTAL:	**5,609,121**	**3,416,281**	**3,212,731**	**2,132,238**	**74.5%**

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Source: Lyman and Varian

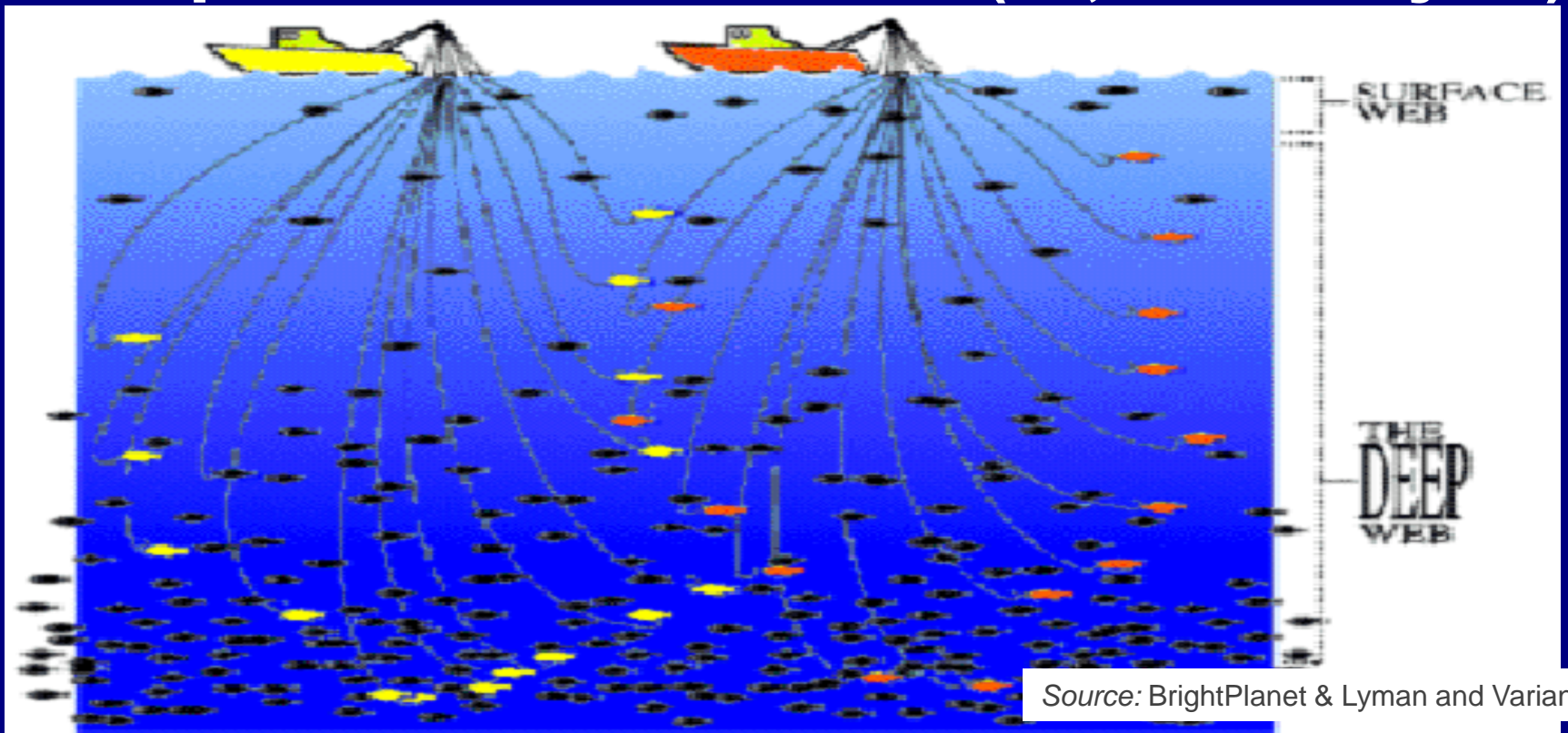Worldwide production of information in terabytes (2002)
Total: 5,609,121 terabytes
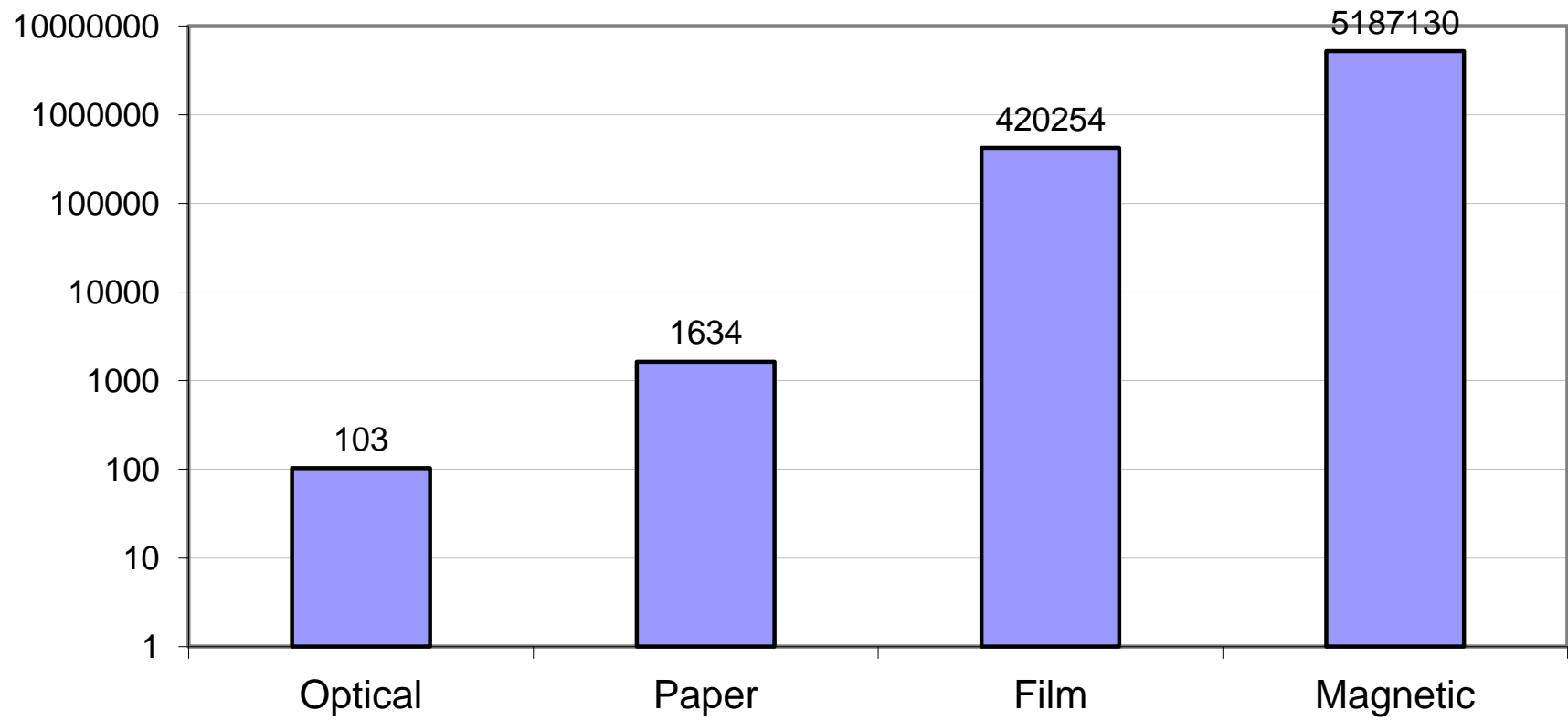
Surface web – 10 billion doc's (167 terabytes)
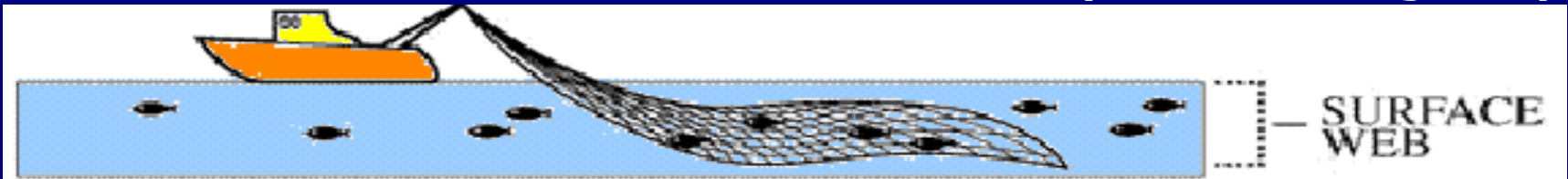
Deep web – 550 billion doc's (91,857 terabytes)
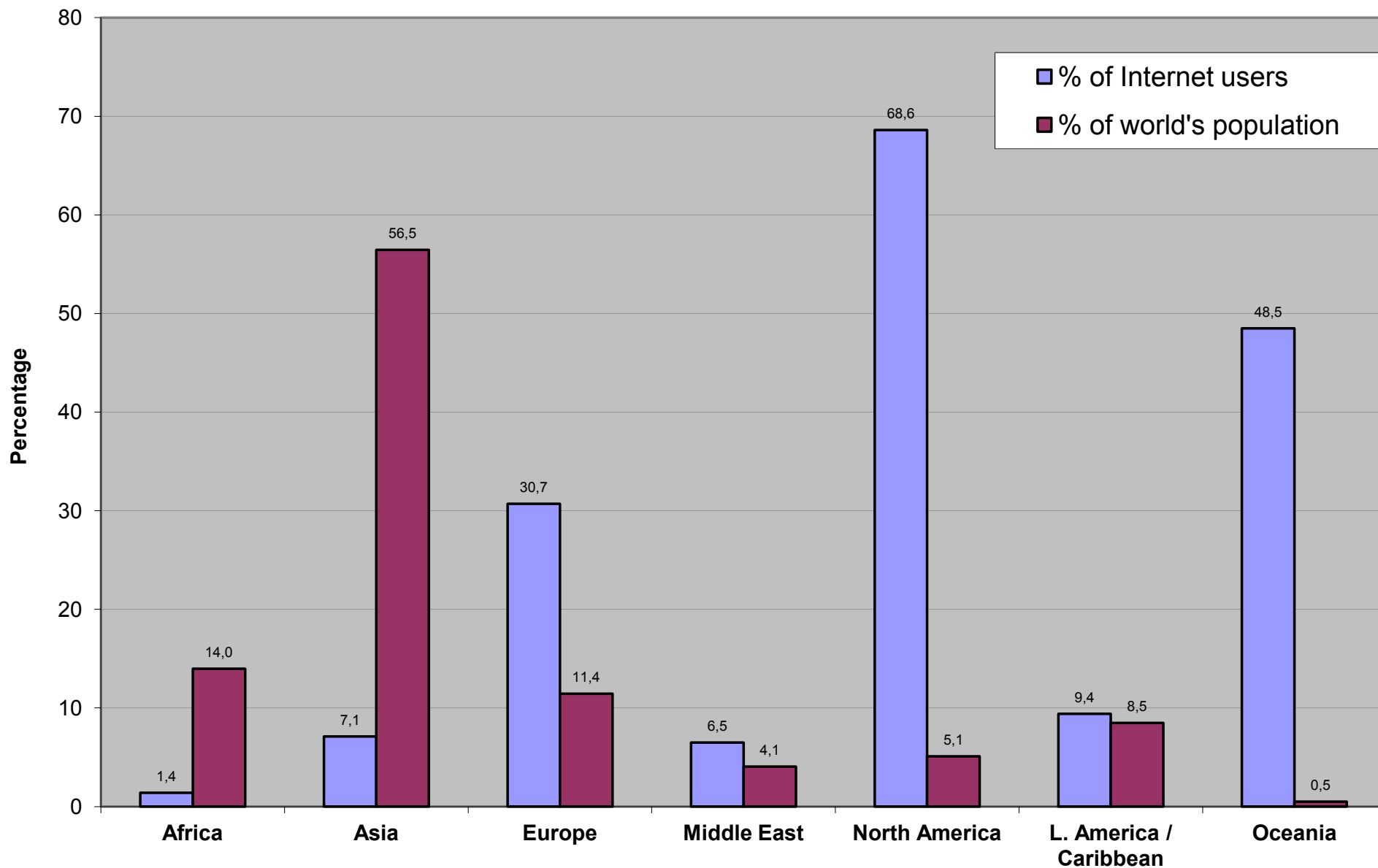
Source: BrightPlanet & Lyman and Varian

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Internet

☞Removal of temporal and spatial barriers

☞Remote access to information sources and services on a 24X7 basis

☞"Instant gratification"

WORLD INTERNET USAGE AND POPULATION STATISTICS

World Regions	Population (2004 Est.)	Internet Usage, (Year 2000)	Internet Usage, Latest Data	User Growth (2000-2004)	Penetration (% Population)	% of World
Africa	893,197,200	4,514,400	**12,786,100**	183.2 %	1.4 %	1.5 %
Asia	3,607,499,800	114,303,000	**256,454,536**	124.4 %	7.1 %	32.1 %
Europe	730,894,078	103,096,093	**224,462,968**	117.7 %	30.7 %	28.1 %
Middle East	258,993,600	5,284,800	**16,843,900**	218.7 %	6.5 %	2.1 %
North America	325,246,100	108,096,800	**222,956,690**	106.3 %	68.6 %	27.9 %
Latin America/Caribbean	541,775,800	18,068,919	**50,749,374**	180.9 %	9.4 %	6.3 %
Oceania	32,540,909	7,619,500	**15,786,930**	107.2 %	48.5 %	2.0 %
WORLD TOTAL	6,390,147,487	360,971,012	**800,040,498**	121.6 %	12.5 %	100.0 %

The proportion of Internet users from different geographic regions as compared to the proportion of world population in these regions

Legend:
- ☐ % of Internet users
- ■ % of world's population

Region	% of Internet users	% of world's population
Africa	1,4	14,0
Asia	7,1	56,5
Europe	30,7	11,4
Middle East	6,5	4,1
North America	68,6	5,1
L. America / Caribbean	9,4	8,5
Oceania	48,5	0,5

Y-axis: Percentage

Internet Usage in Europe

EUROPE	Population (2004 Est.)	Internet Users, Latest Data	Use Growth (2000-2004)	% Population (Penetration)	% of World
European Union	456,791,700	204,050,785	119.0 %	44.6 %	25.5 %
Rest of Europe	274,102,378	20,412,183	105.5 %	7.4 %	2.6 %
TOTAL EUROPE	730,894,078	224,462,968	117.7 %	30.7 %	28.1 %
Rest of World	5,659,253,409	575,577,530	123.2 %	10.2 %	71.9 %
TOTAL WORLD	6,390,147,487	800,040,498	121.6 %	12.5 %	100.0 %

Network Readiness Index

☞ Network Use
- – Internet users per 100 inhabitants
- – Cellular subscribers per 100 inhabitants
- – Internet users per host
- – % of computers connected to the Internet
- – Availability of public access to the Internet

☞ Enabling Factors
- – Network access variables (infrastructure, h/w, s/w and support)
- – Network policy variables (ICT policy, business and economic environment)
- – Networked society variables (networked learning, ICT opportunities, social capital)
- – Networked economy (e-commerce, e-government, general infrastructure)

Table 1. The Networked Readiness Index Rankings

COUNTRY	SCORE	NRI RANK
United States	5.50	1
Singapore	5.40	2
Finland	5.23	3
Sweden	5.20	4
Denmark	5.19	5
Canada	5.07	6
Switzerland	5.06	7
Norway	5.03	8
Australia	4.88	9
Iceland	4.88	10
Germany	4.85	11
Japan	4.80	12
Netherlands	4.79	13
Luxembourg	4.76	14
United Kingdom	4.68	15
Israel	4.64	16
Taiwan	4.62	17
Hong Kong SAR	4.61	18
France	4.60	19
Korea	4.60	20
Austria	4.56	21
Ireland	4.55	22
New Zealand	4.48	23
Belgium	4.43	24
Estonia	4.25	25
Malaysia	4.19	26
Malta	4.15	27
Italy	4.07	28
Spain	4.01	29
Slovenia	3.99	30
Portugal	3.94	31
Chile	3.94	32
Czech Republic	3.80	33
Greece	3.76	34

COUNTRY	SCORE	NRI RANK
Latvia	3.74	35
Hungary	3.74	36
South Africa	3.72	37
Thailand	3.72	38
Brazil	3.67	39
Tunisia	3.67	40
Slovak Republic	3.66	41
Lithuania	3.63	42
Mauritius	3.62	43
Mexico	3.57	44
India	3.54	45
Jordan	3.53	46
Poland	3.51	47
Croatia	3.48	48
Costa Rica	3.46	49
Argentina	3.45	50
China	3.38	51
Trinidad and Tobago	3.37	52
Jamaica	3.36	53
Uruguay	3.35	54
Botswana	3.34	55
Turkey	3.32	56
Dominican Republic	3.32	57
Panama	3.31	58
Namibia	3.28	59
Colombia	3.28	60
Romania	3.26	61
El Salvador	3.22	62
Russian Federation	3.19	63
Morocco	3.19	64
Egypt	3.19	65
Sri Lanka	3.15	66
Bulgaria	3.15	67
Vietnam	3.13	68

COUNTRY	SCORE	NRI RANK
Philippines	3.10	69
Peru	3.09	70
Tanzania	3.09	71
Venezuela	3.09	72
Indonesia	3.06	73
Ghana	3.06	74
Macedonia, FYR	3.05	75
Pakistan	3.03	76
Serbia	2.98	77
Ukraine	2.96	78
Nigeria	2.92	79
Uganda	2.90	80
Senegal	2.90	81
Gambia	2.85	82
Cameroon	2.82	83
Kenya	2.81	84
Zambia	2.80	85
Guatemala	2.76	86
Algeria	2.75	87
Malawi	2.71	88
Ecuador	2.68	89
Bolivia	2.66	90
Paraguay	2.62	91
Madagascar	2.60	92
Bangladesh	2.57	93
Nicaragua	2.56	94
Zimbabwe	2.53	95
Mali	2.52	96
Mozambique	2.51	97
Honduras	2.41	98
Angola	2.32	99
Haiti	2.27	100
Ethiopia	2.13	101
Chad	2.09	102

Figure 3. **Networked Readiness 2003–2004 vs Gross Domestic Product per Capita, Partial Log Regression**
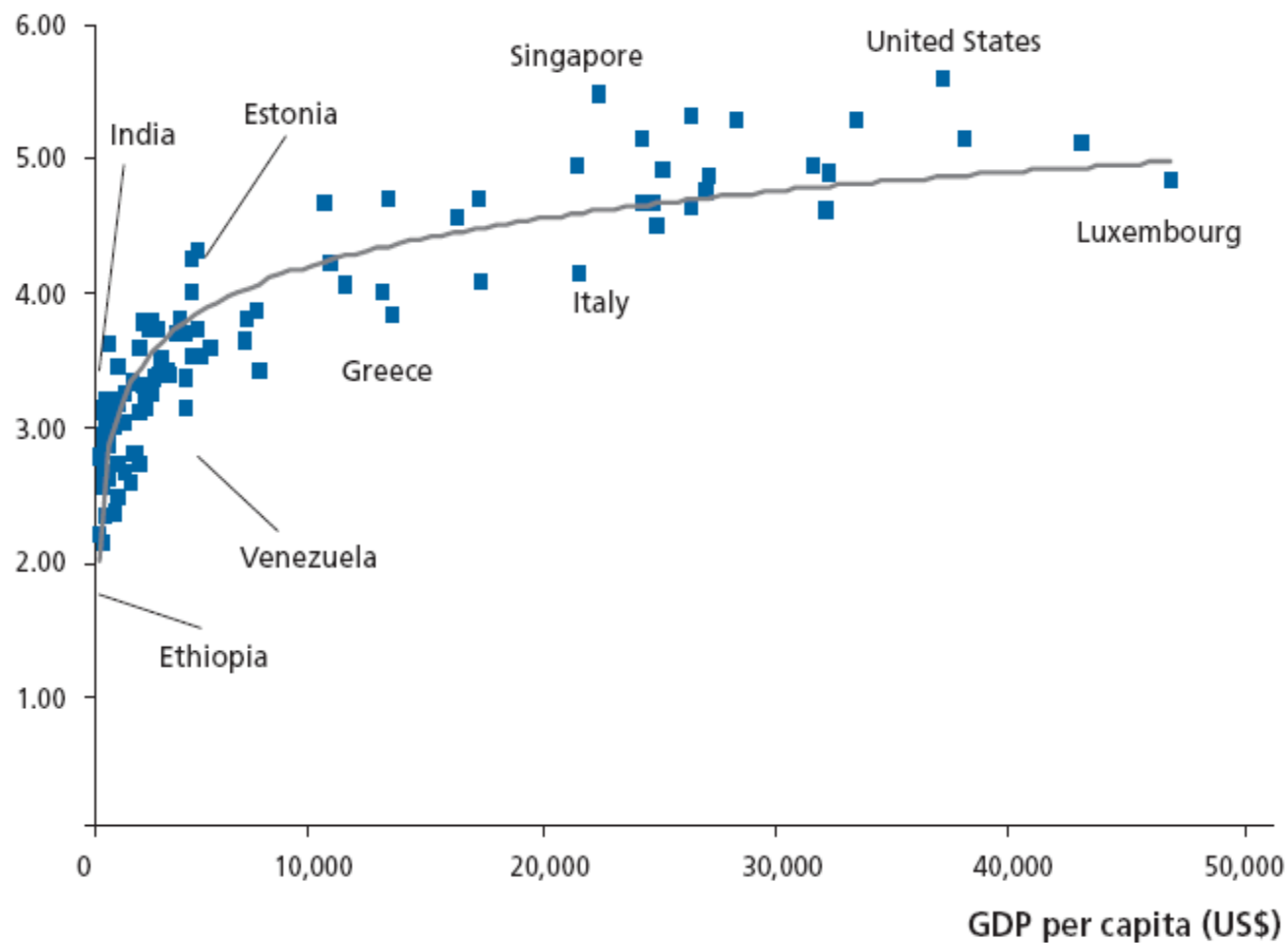
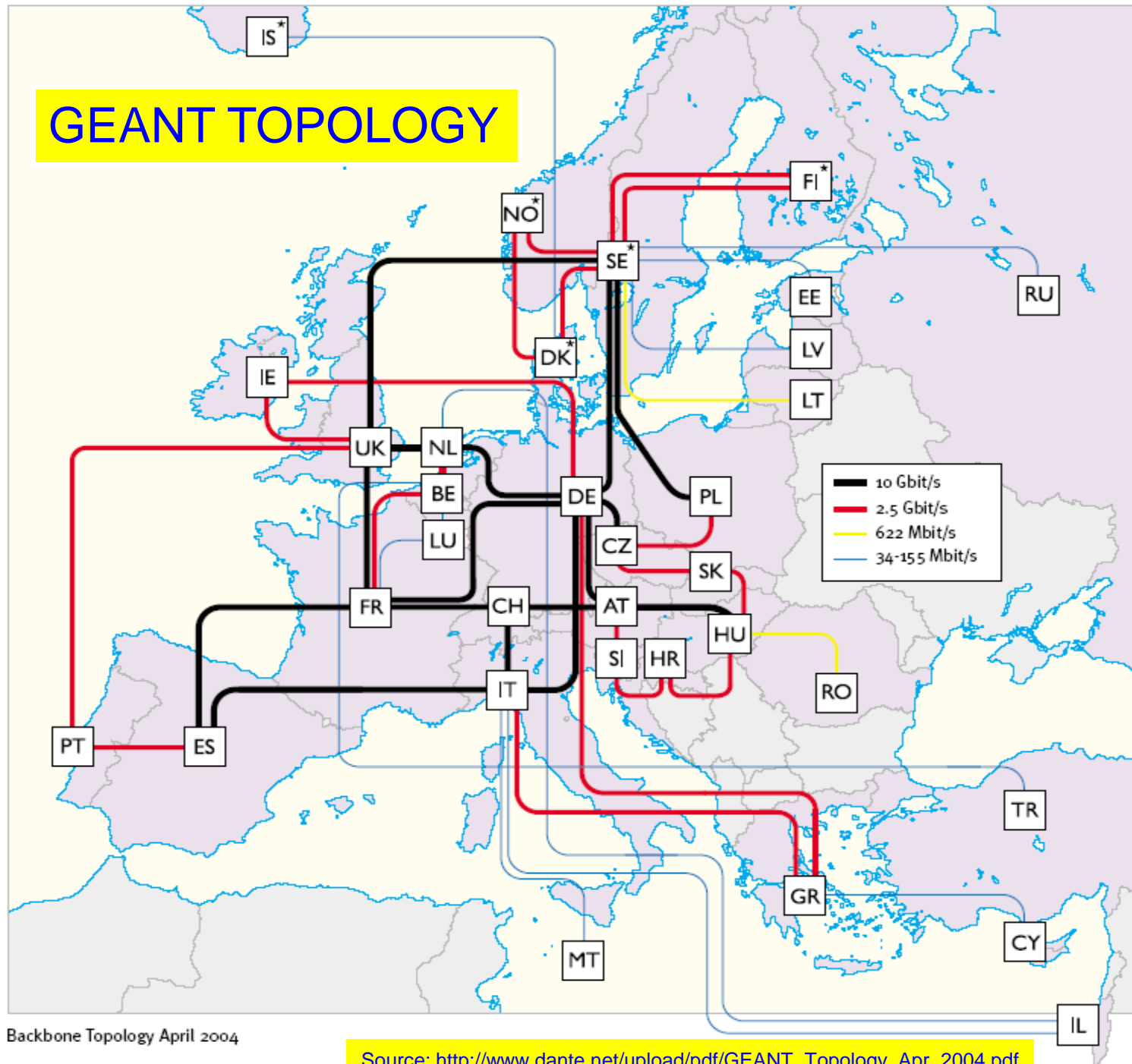Source: Authors' analysis of data from the World Bank

Source: Pohjola, 2000, p.9

GEANT TOPOLOGY

Legend:
- ■ 10 Gbit/s
- ■ 2.5 Gbit/s
- ■ 622 Mbit/s
- ■ 34-155 Mbit/s
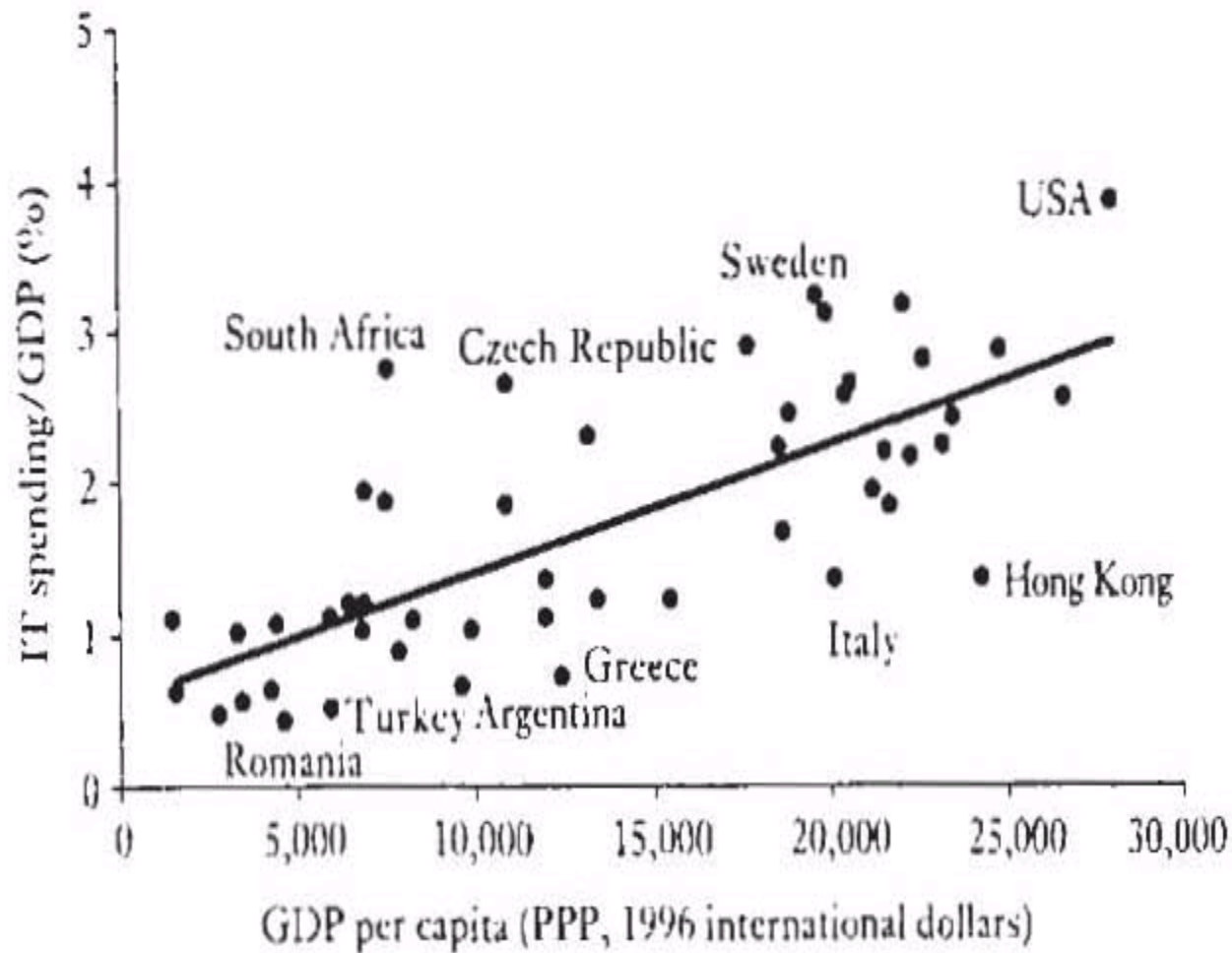
Backbone Topology April 2004

Internet is not Telephone

☞Internet: A potential equalizing tool

☞Connectivity

☞Content production and distribution

- Effective and efficient use of the Web
- Coverage of web
- Lack of search skills
- Language and literacy barriers

☞Available vs. accessible

Digital Divide

☞ Global divide

– differences among industrialized and lesser developed nations

☞ Social divide

– inequalities among the population of one nation

☞ Democratic divide

– differences among those who do and do not use digital technologies to engage and participate in public life

Source: Hargittai, p. 828

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Digital Inequity

☞ Mere connectivity is not enough for effective Internet use

☞ More nuanced measures are needed
  – Technical means
  – Autonomy of use
  – Social support network
  – Experience
  – Skill

☞ Equality vs. equity

Millennium Development Goals

☞ Child malnutrition

☞ Primary school completion

☞ Gender equality in school

☞ Child mortality

☞ Maternal mortality

☞ HIV/AIDS prevalence

☞ Access to water

☞ Global participation and partnerships

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How ICTs Could Really Change the World

☞ Peer-to-peer or device-to-device networks

☞ Precise local spatial data embedded in every device and application

☞ Sensor fusion – integration of devices that measure temperature, movement, pressure, acceleration, flow, electrical use, radioactivity, chemical composition

☞ Unique identity systems

Source: Gage, 2002

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Information Society Developments in SEE

☞ SEEREN

☞ SEE - Grid Proposal

☞ Varna Workshop (2003): Policy Issues for National Research & Education Networks (NRENs) in SEE

☞ National Information Society Policies: eSEEurope Initiative

☞ *e*Europe benchmark indicators of Information Society

☞ Challenges and Opportunities

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