
Measuring the Digital Divide

A proposal for a new index

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The “Digital Divide” - a definition

“ . . . the **gap** between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to **access information and communication technologies (ICTs)** and to their **use of the internet** for a wide variety of activities.”

OECD (2001): Understanding the Digital Divide

1970: The “knowledge gap theory”

"Segments of the population with higher socio-economic status tend to acquire information at a faster rate than the lower status segments so that the **gap in knowledge between these segments **tends to increase** rather than decrease."**

Tichenor, P. J. / Olien, C. N. / Donohue, G. A. (1970). Mass media flow and differential growth in knowledge. Public Opinion Quarterly, 34: 159-170.

2000: The “digital divide”

"It is a precondition for better economic performance that we create a society with greater social cohesion and less exclusion. [...]"

The emergence of new information and communication technologies constitutes an exceptional opportunity, provided that the risk of creating an ever-widening gap between those who have access to the new knowledge and those who do not is avoided."

from: **European Council** on Employment and Social Policy, Introductory Note to the "Objectives in the fight against poverty and social exclusion", 17 October 2000

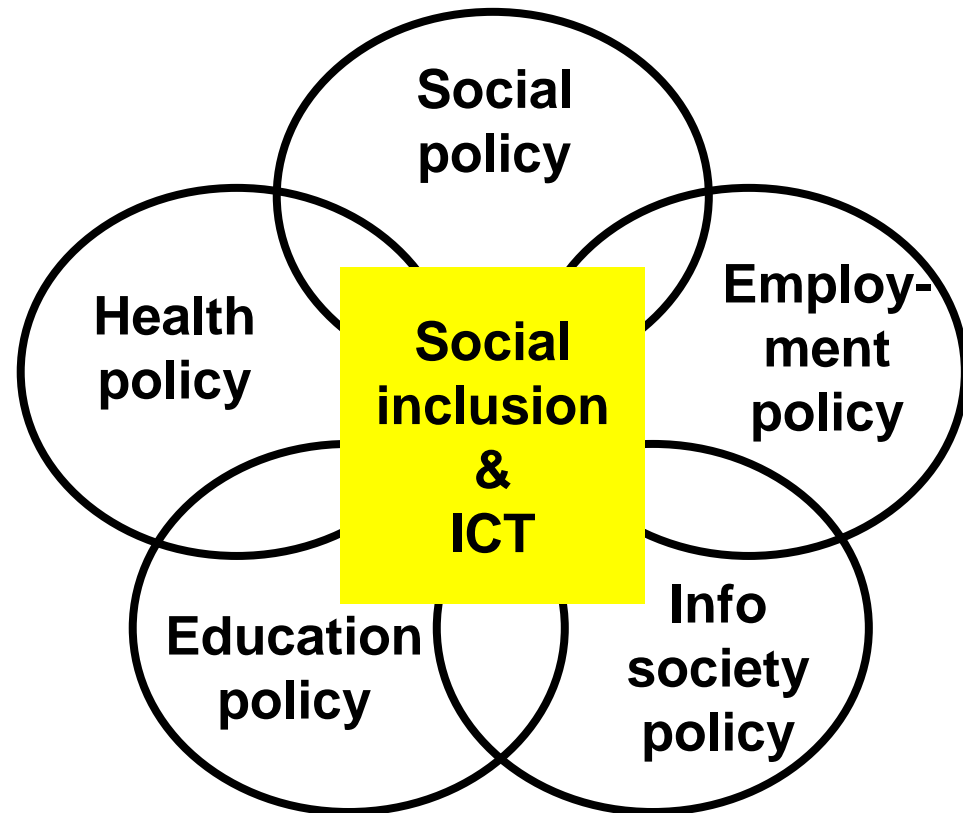
“Why bother about it?” - 3 reasons:

- **Employability**
 - Basic ICT skills are an indispensable requirement for a growing number of jobs
- **Equal participation** of citizens in the information society
 - not having ICT access or skills will increasingly be a disadvantage in day-to-day life (e.g. online banking & booking)
- **Economic reasons** (demand side economics):
 - off-liners and non ICT-literate parts of the population are likely not to be e-consumers

The digital divide and “social exclusion”

Social inclusion is a common **objective of different (EU-) policy areas.**

The important **role of ICT** has been acknowledged by these policies and is widely reflected in official policy documents.



Social exclusion and digital exclusion - an interplay of cause and effect

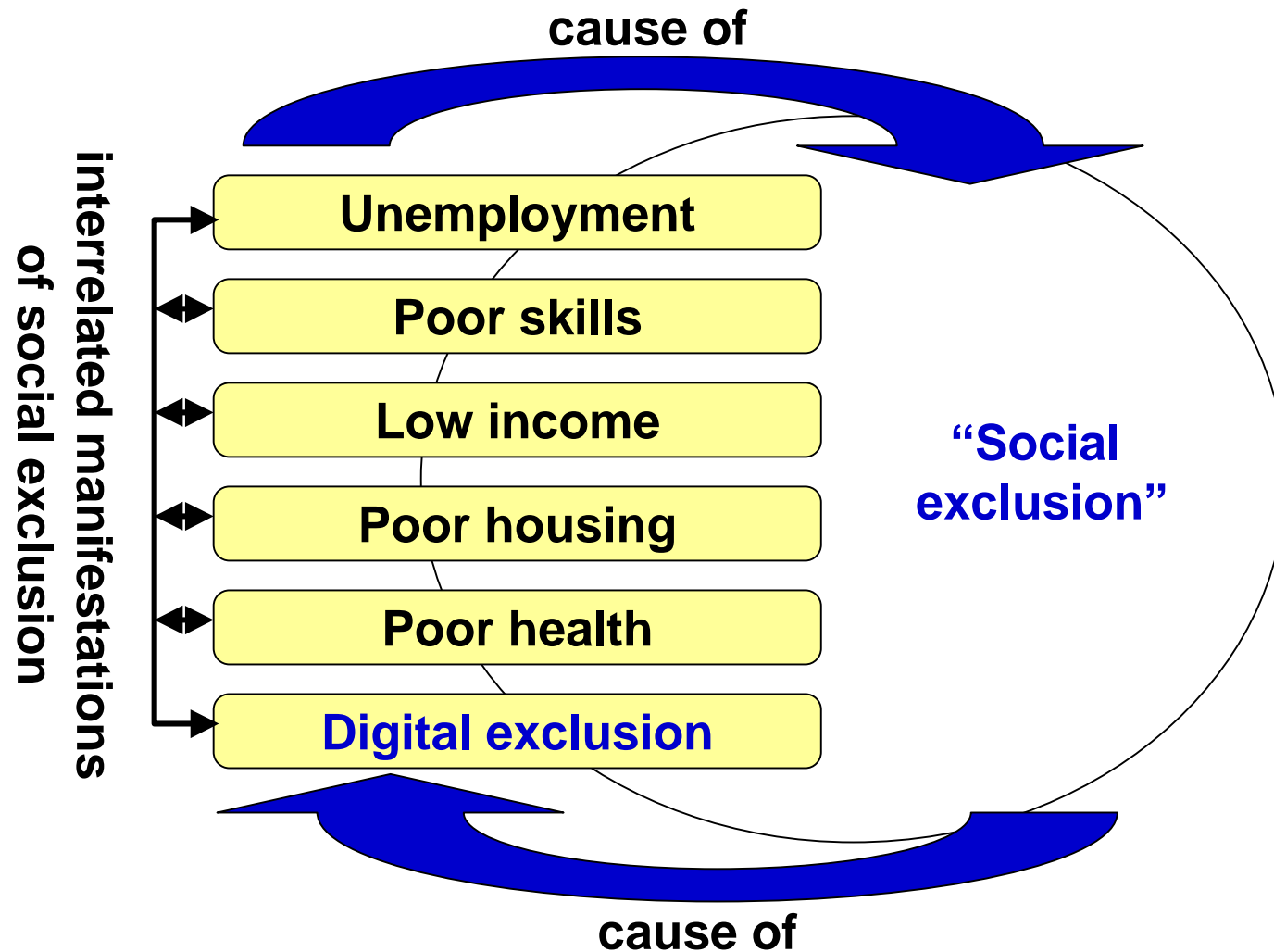


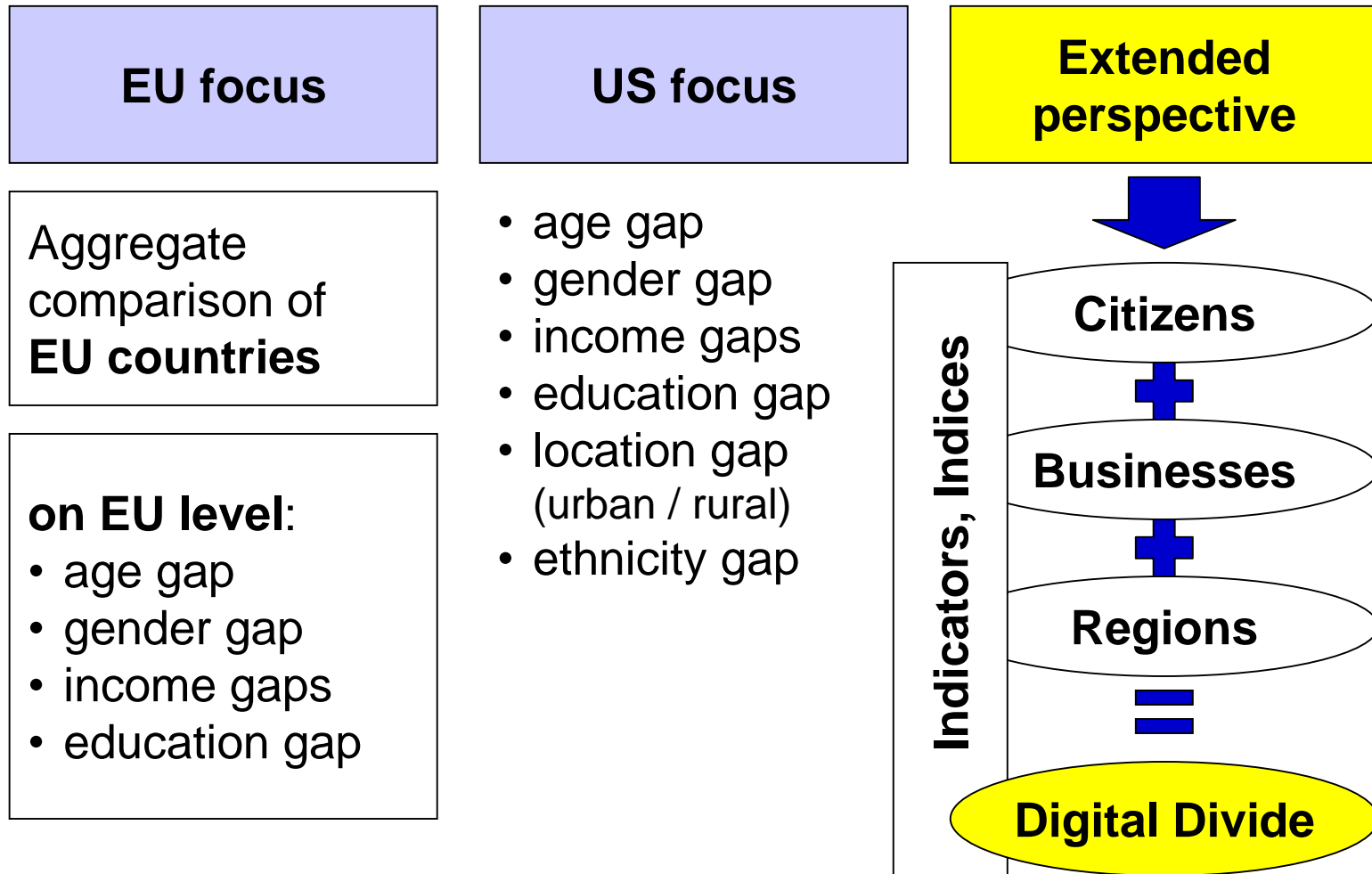
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Macro-dimensions of the digital divide

<i>Unit of observation</i>	Citizens individuals / households	Businesses and organisations	Regional units e.g. countries
<i>Independent variables (examples)</i>	<ul style="list-style-type: none"> • age • gender • income • education • location • ethnicity 	<ul style="list-style-type: none"> • sector • number of employees • turnover • location 	<ul style="list-style-type: none"> • location • GDP/capita • size • population • language
<i>Indicators (examples)</i>	<ul style="list-style-type: none"> • Access to and/or usage of ICT & internet • Skills in using ICT • ICT infrastructure (e.g. of businesses / regions) 		

Focus of current statistics about the digital divide



Measuring the digital divide in the society: the 4 micro-dimensions

- The **Gender** dimension
 - Disadvantaged group: **women**
- The **Age** dimension
 - Disadvantaged group: **elderly people** (in this study defined as “**55+ years old**”)
- The **Education** dimension
 - Disadvantaged group: **low education** (= **terminal education age ≤ 15 years**)
- The **Income** dimension
 - Disadvantaged group: **low income** (= **lowest quartile**)

Selected indicators

For this pilot study, four indicators were selected to build the composite index. Data were available from the Eurobarometer surveys (1997, 1998, 2000). The decision was to pilot the Index with a few very basic indicators only rather than building a complex index.

<u>Indicators</u>	<u>Weight</u>
1: Percentage of computer users	30%
2: Percentage of people who use a computer at home	20%
3: Percentage of internet users	30%
4: Percentage of people who use internet at home	20%

Calculation principles

Indicators were used to measure the difference between the “**disadvantaged group**” and the population average in each of the 15 EU Member States. The difference was measured in two ways:

a) The “**Gap**”:

- **difference** in percentage points between the disadvantaged group and the total population

b) The “**Digital Divide Index**”:

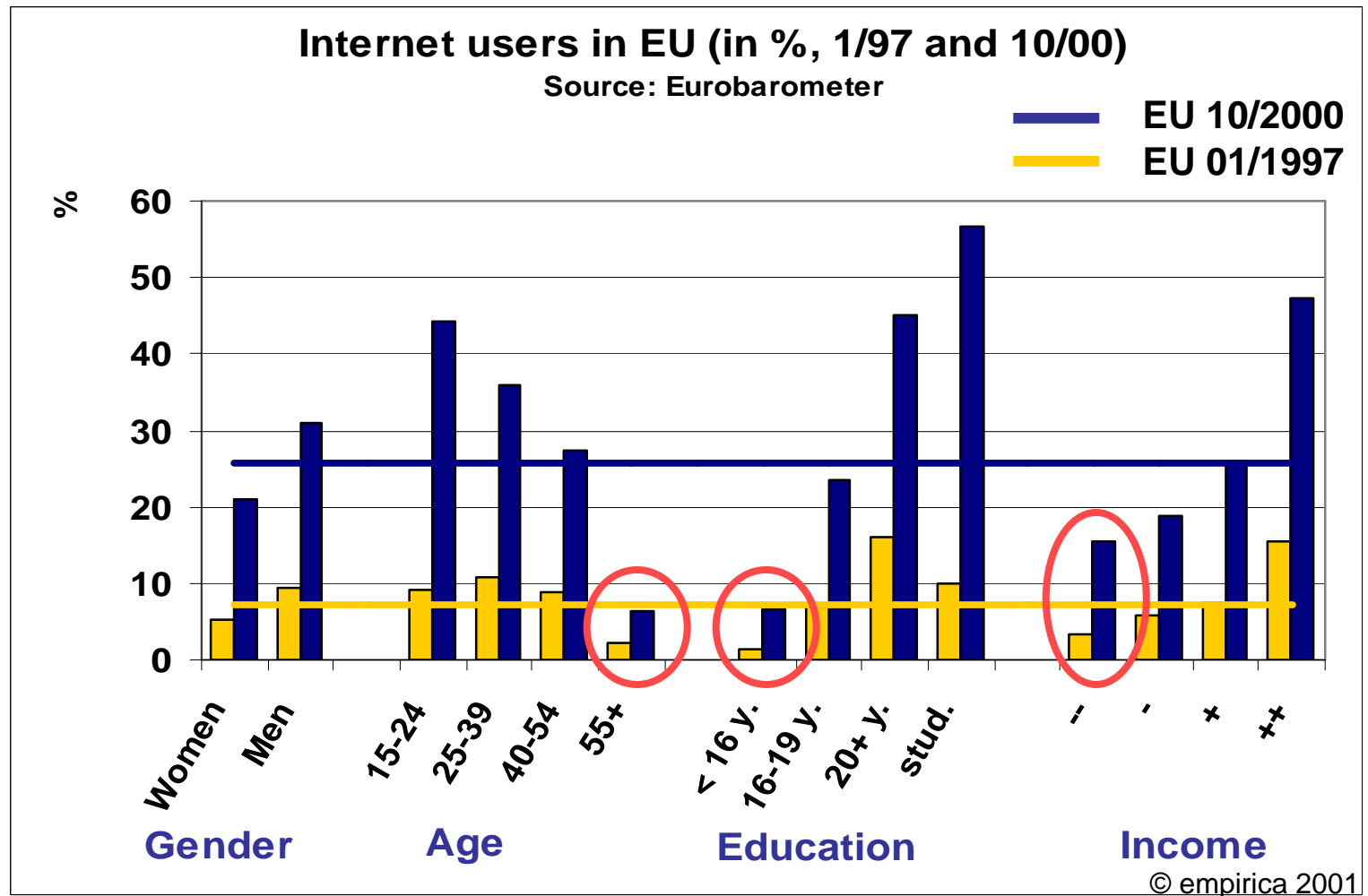
- **ratio** between percentage of users in total population and percentage of users among disadvantaged group (**Equality = Index of 100**)

The gaps and indices for different Member States were then compared.

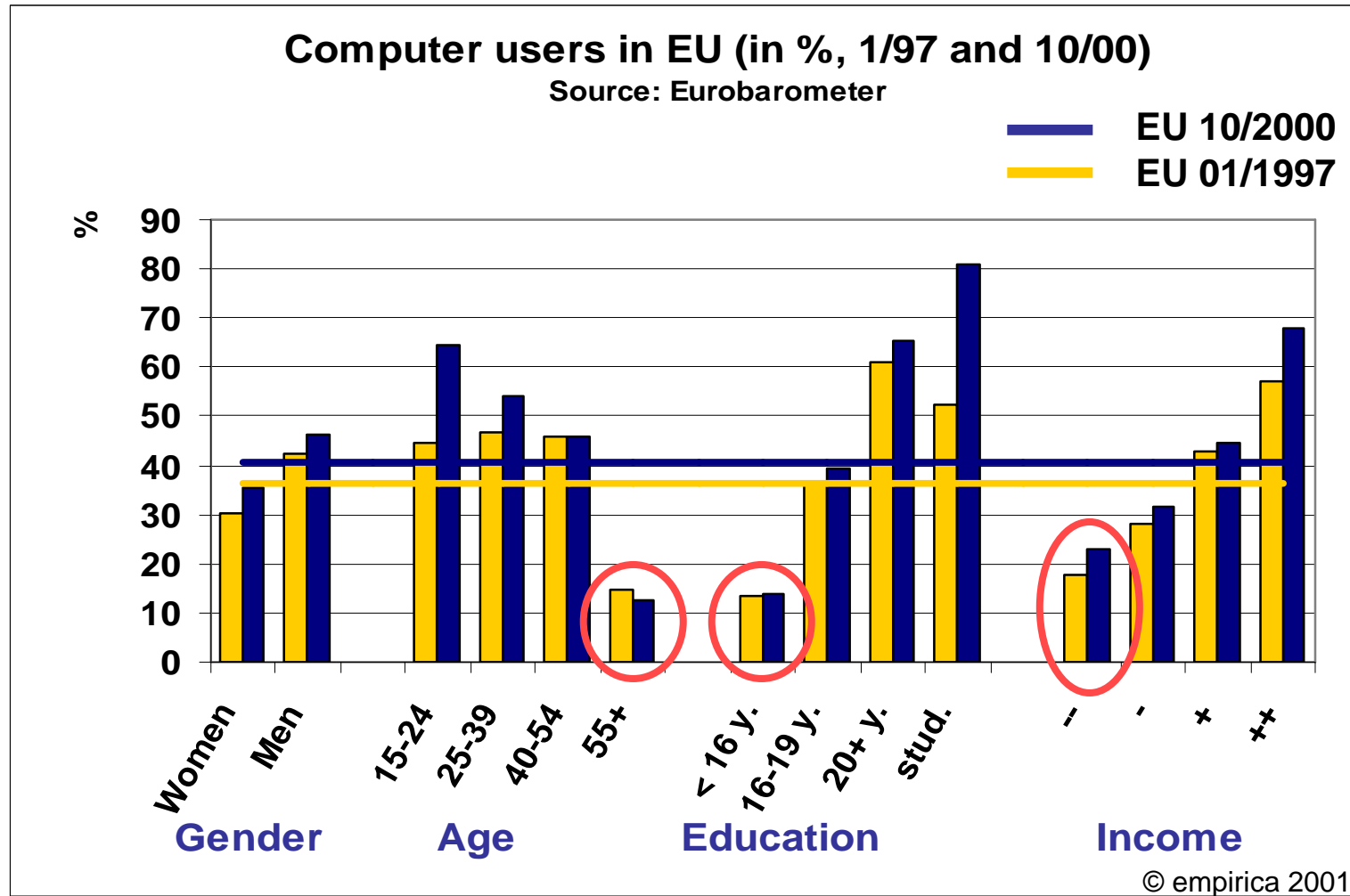
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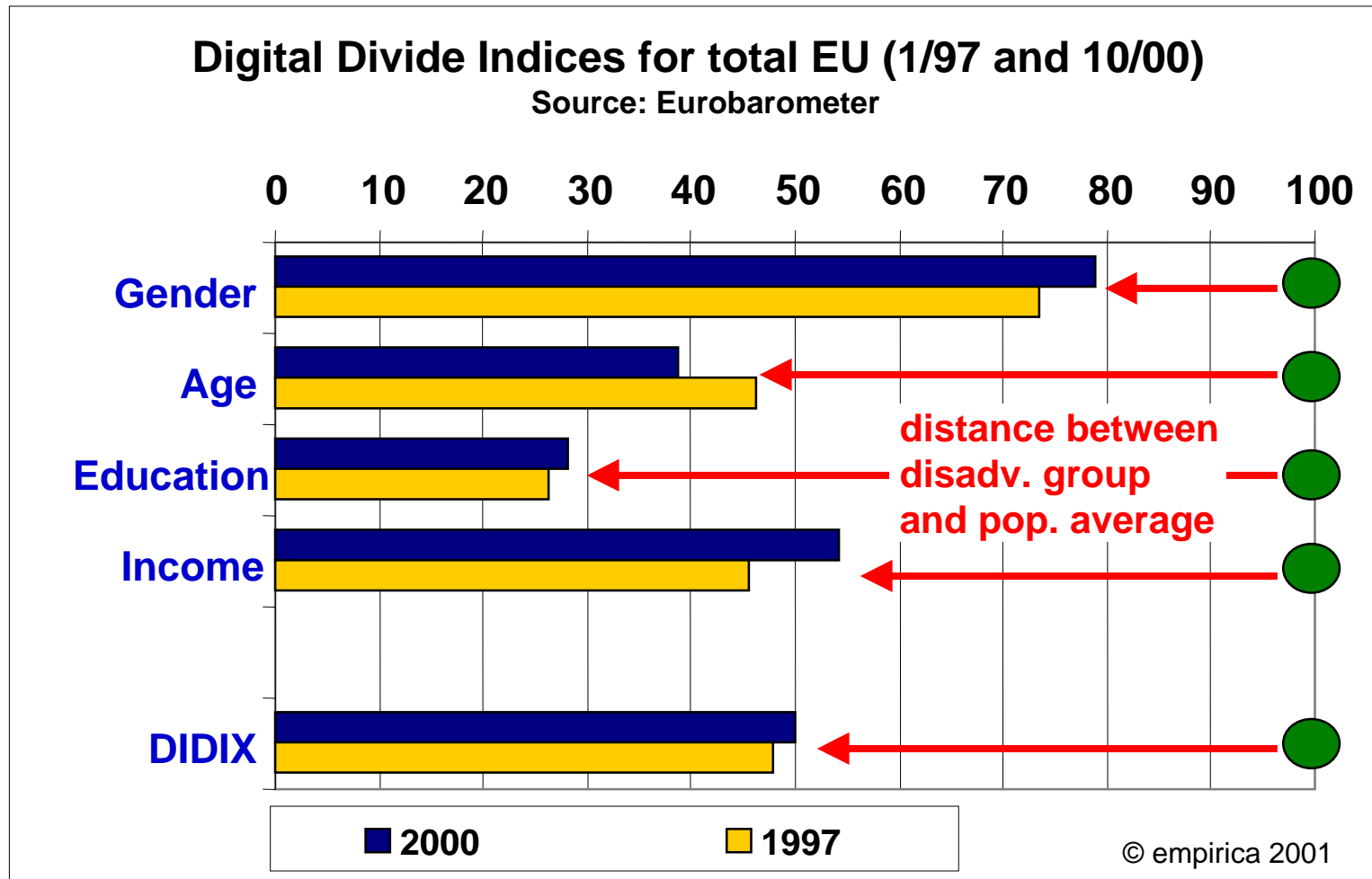
Internet users (total EU)



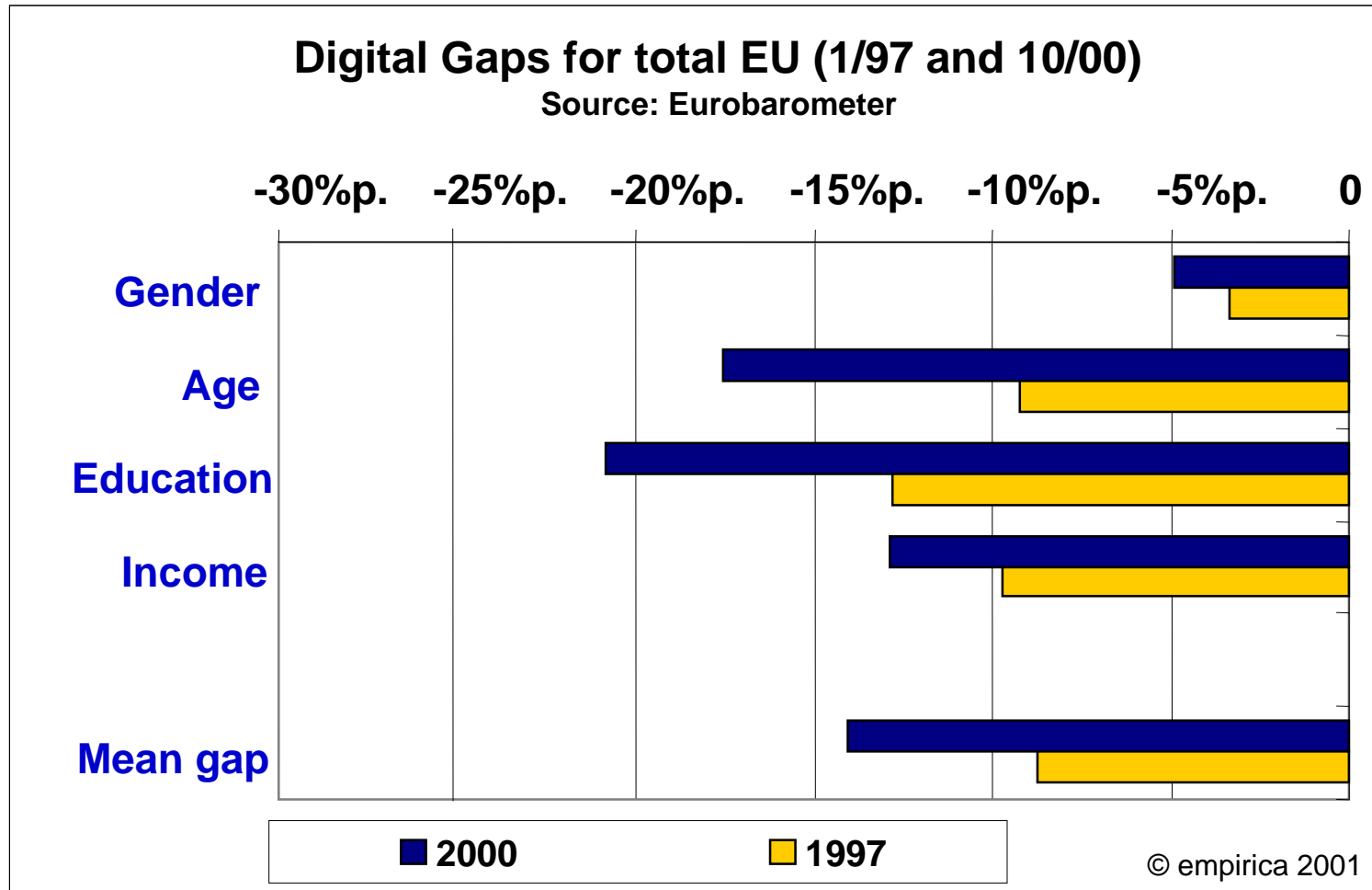
Computer users (total EU)



The compound Digital Divide Indices on EU Level (1997 / 2000)



The “Gaps” on EU level (1997 / 2000)



Comparison of the 4 selected indicators

EU Digital Divide Indices by indicator (2000)

	Gender	Age	Educ.	Income	Mean
Computer	87	44	34	57	55
Comp. home	83	43	31	56	53
Internet	81	37	26	60	51
Internet home	59	29	21	40	37
Compound (weighted)	79	39	28	54	50

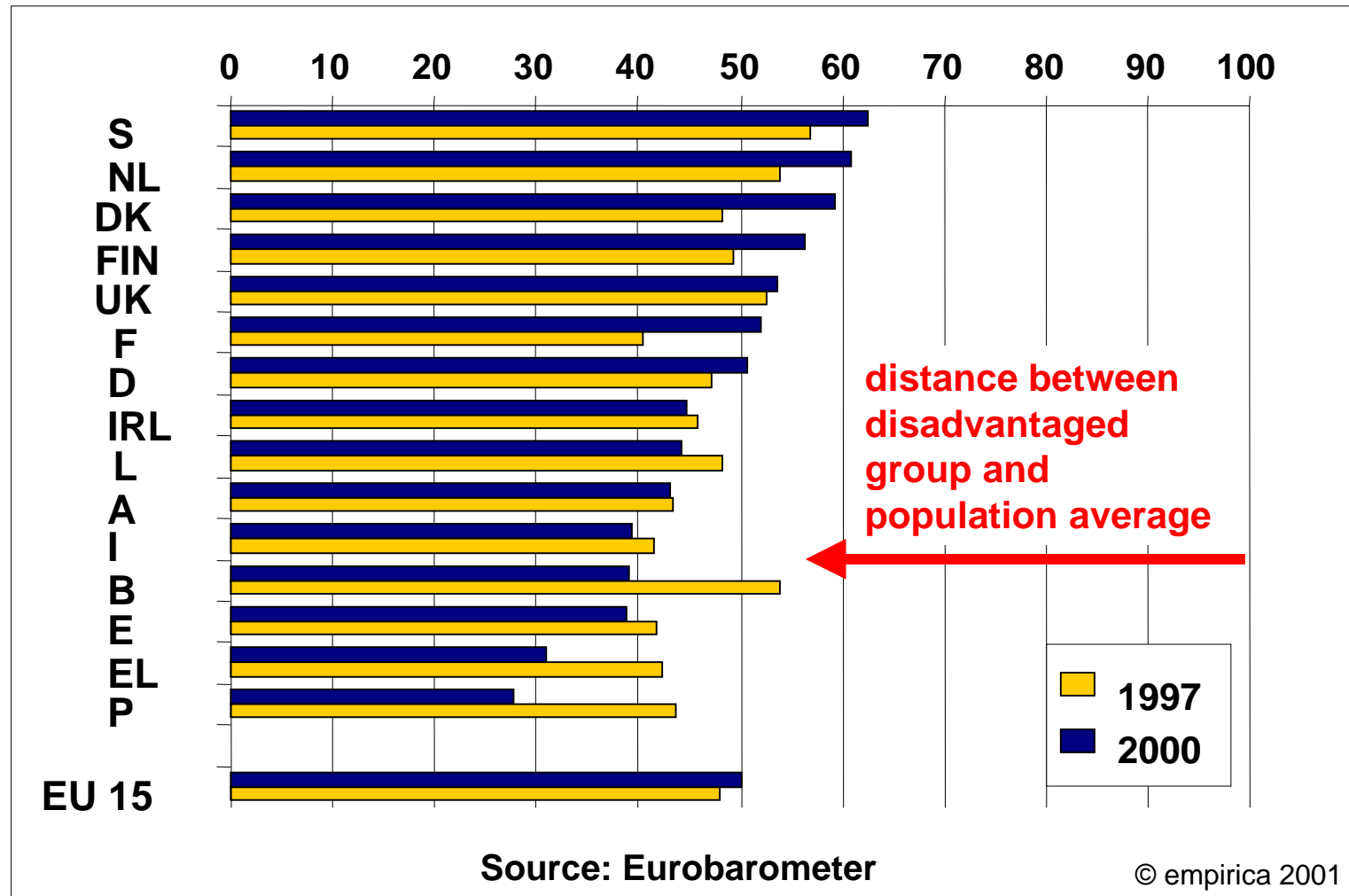
© empirica 2001

Example: Older people (55+) are only 29% as likely as the population average to use the internet at home.

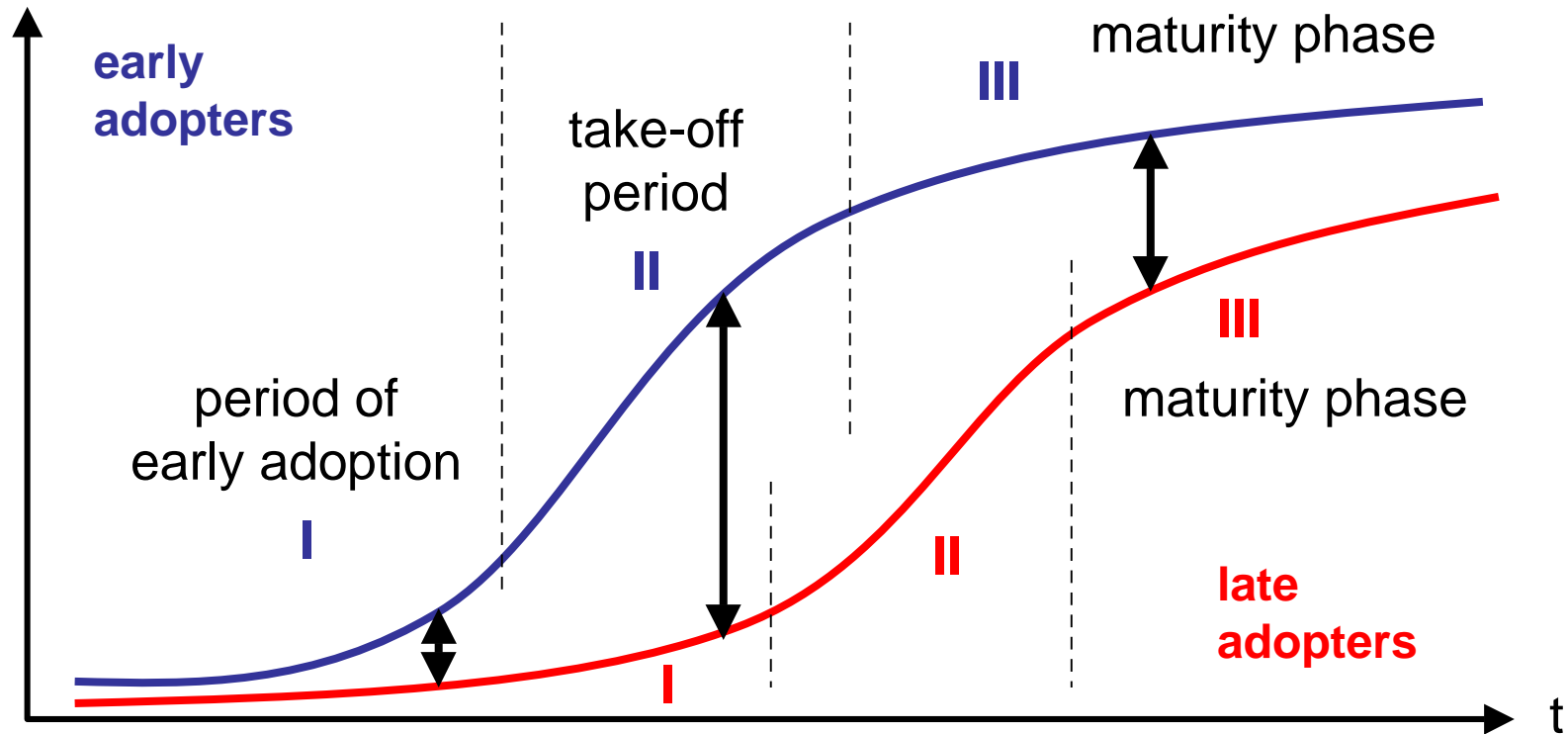
The Member State Digital Divide Indices and the overall Index (2000) ○ = <70% of EU15

	Gender	Age	Education	Income	DIDIX
B	77	37	10	32	39
DK	84	57	35	60	59
D	80	36	34	53	51
EL	71	15	9	29	31
E	77	19	15	44	39
F	82	32	17	76	52
IRL	84	30	29	35	45
I	68	28	20	42	39
L	81	34	24	38	44
NL	81	53	32	78	61
A	73	21	28	51	43
P	68	8	7	28	28
FIN	83	52	36	54	56
S	86	60	37	67	63
UK	82	50	49	34	54
EU 15	79	39	28	54	50
MS Mean	79	36	25	48	47

The “DIDIX” 2000: Comparison of Member States



Explanation based on diffusion theory



The gap between early and late adopters will increase during the early adopters' market take-off stage and decrease once late adopters have entered this stage.

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Summary (1/3): Basic results

- Usage of computers and internet is still very uneven across different socio-demographic groups.
- The most threatened groups considerably lagging behind are:
 - People with **low education** are only **28%** as likely as the average to use a computer and the internet.
 - **Elderly** people are only **39%** as likely.
 - People with **low income** are only **54%** as likely.
- The “**gender divide**” in using computers and the internet is closing in nearly all Member States.

Summary (2/3): Dynamic perspective

- **The (compound) digital divide was about the same in 2000 (Index: 50) as in early 1997 (Index: 48)**
 - It has slightly decreased by 4.2 %
- **But the dynamic was a different one in the four dimensions analysed in this pilot study:**

	Index 97	Index 00	Change %
Gender	73	79	+ 8.2 %
Age	46	39	- 15.2 %
Education	26	28	+ 7.7 %
Income	45	54	+ 20.0 %

Note: perfect equality = Index of 100

Summary (3/3): Member States

- **Results suggest that the digital divide is wider in less advanced than in the leading countries (in terms of using ICT).**
 - The compound Index is **lowest in Portugal and Greece** (i.e. there are the highest relative levels of social inequality in using computers and internet).
 - The Index is **highest in Sweden, NL and Denmark.**
- **Note: The results are very different if the absolute distance (in percentage points) is measured.**
 - **But: We argue that - for most purposes - the ratio should be used as the standard measure.**

Conclusions / recommendations (1/2)

- In spite of all the hype about it: The “digital divide” should still be regarded as an **important issue**.
- **Computer skills** are critical
 - Those who are able to use and have access to a computer will sooner or later be internet users as well. As of today, the percentage of computer users indicates the potential of internet users.
 - It does not help to raise awareness for the internet, if basic computer skills are lacking.
- Affirmative action should particularly **focus on the low education group**.
 - There is an acute threat that the digital divide will aggravate and reinforce their disadvantaged position in the labour market and in society.

Conclusions / recommendations (2/2)

- **Future surveys and research on social inclusion and on the digital divide will also have to take into account **qualitative aspects** of computer and internet usage.**
 - What do people do with these technologies?
 - How does it impact on their personal life?
- **This will require **new indicators** that go beyond mere “access” and “usage”:**
 - Value driven ICT indicators
 - Indicators about ICT skills

Selected IST projects dealing with aspects of the digital divide



- **[SIBIS \(www.sibis-eu.org\)](http://www.sibis-eu.org)**
 - Innovative statistical indicators for benchmarking the information society. One of the topics deals with “social inclusion”. 1/2001 - 6/2003
- **[BISER \(www.beep-eu.org\)](http://www.beep-eu.org)**
 - Statistical information society indicators for European regions (NUTS II). 12/2001 - 12/2003
- **[SeniorWatch \(www.seniorwatch.de\)](http://www.seniorwatch.de)**
 - Study on the use of new technologies by seniors (50+)
- **[BEEP \(www.beep-eu.org\)](http://www.beep-eu.org)**
 - collects “best eEurope practices” in four domains (e.g. “social inclusion”). 2/2001 - 7/2003

Final remark

- This presentation is based on “**research in progress**”. The methodology underlying the Digital Divide Index may be revised, e.g.
 - the definition of disadvantaged groups
 - selection of new indicators.
- We would appreciate your **feed-back and critical comments** - please mail to

[**werner.korte@empirica.com**](mailto:werner.korte@empirica.com)



Thank you!