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International Telecommunication Academy Method of Measuring the Digital Divide in the Information Society

(ITA-GIS Recommendation A.6)



Geneva, February 2005



Digital Divide Measuring

Determined in World Summit on Information Society Documents, 1 Geneva Phase, December 2003:

1. **Declaration of Principles** – chapters 10 and 17
2. **Plan of Action** – chapters 27, 28, 29



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Guidelines

1. Fundamental documents "Declaration of Principles" and "Plan of Action", adopted in December 2003 in Geneva on the World Summit on the Information Society (WSIS)
2. The value of these documents was mentioned by ITU Secretary General Mr. Y. Utsumi according to which "in the Declaration of Principles and Plan of Action first of the ICT prospects and not the problems arisen thereupon are under consideration"
3. An active and multiscaled work of the UN structure organizations (ITU, ECOSOC, UN ICT Task Force, UNDP, UNIDO, UNESCO, International banking group) in this field



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Main Goals:

- The significance of the harmonization of the infocommunication and social-economic relation development in the civil society,
- A profound impact of information, knowledge, infocommunication technologies and services on a political, economic and social life;
- Considerably uneven distribution of incomes, technologies and services between world countries, between the rich and poor;
- Necessary measures for further decreasing the digital and economic divide for harmonization of social-economic relations.



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Known Methods of Development Indexes Determination

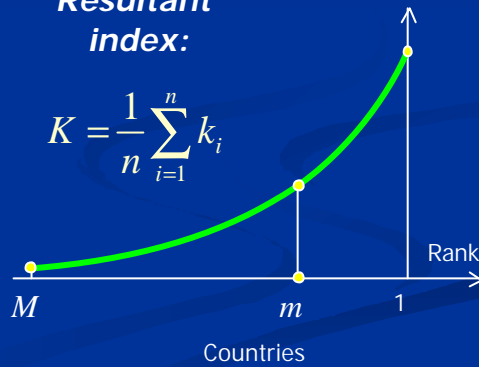
UNDP Method – Human Development Index HDI

Particular index:

$$k_j = \frac{N_{real\ i} - N_{min\ i}}{N_{max\ i} - N_{min\ i}}$$

Resultant index:

$$K = \frac{1}{n} \sum_{i=1}^n k_i$$

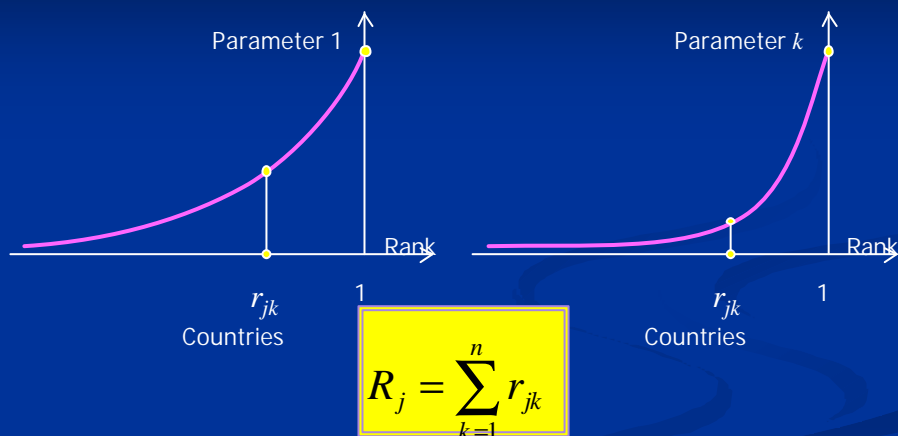


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ITU Method Sum of Ranks



1 place ? $R_j = R_{min}$ (Sum of Ranks, Sum of Places)

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ITA Method of Measuring the Digital Divide, I

Is recited in:

1. The Book by L.E. Varakin "*Distribution of Incomes, Technologies and Services*", 2002
2. ITA-GIS Recommendation A.1, 2002
3. The book by L.E. Varakin "*Digital Divide in the Global Information Society*", 2004
4. ITA-GIS Recommendation A.6, 2005



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ITA Method of Measuring the Digital Divide, II

Based on:

1. Official data on infocommunication terminals and their density (ITU, World Bank)
2. Determination of the Infocommunication Vector (ICV), based on exact and strict mathematical methods of n-dimensional vector space
3. Comparison of countries' ICV level
4. Determination of the Digital Divide Index

Infocommunications = *Informatization* + *Telecommunication*



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ITA Method of Measuring the Digital Divide, III

1. Official data on FD, MD, FMD, PCD, IHD, BD parameters density is used (ITU, World Bank)

2. Parameter density is normalized

$$a_i = FD_i / FD_{\max}$$

3. ICV length is determined (Normalized Vector Area)

$$A_j = \sqrt{\frac{1}{n} \sum_{i=1}^n a_{ji}^2}$$



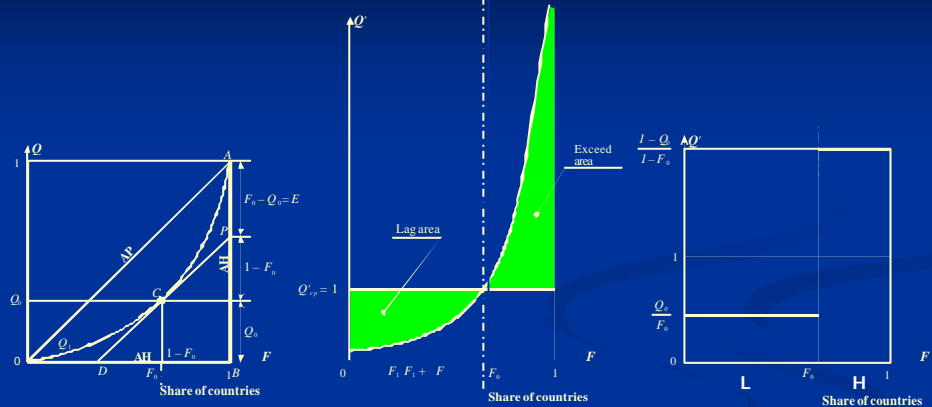
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ITA Method, IV

4. The Dispersion Curve is Calculated (Lorenz Curve in the Economics)



$$\Delta_1 = \frac{Q'_1}{Q'_2}$$

$$Q = \sum_{j=1}^M A_j$$

$$1 \leq M \leq N$$

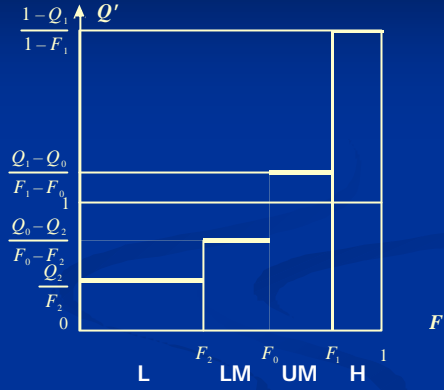
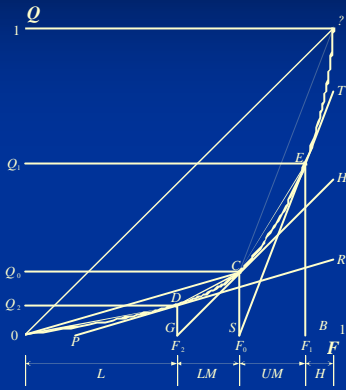


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ITA Method, V



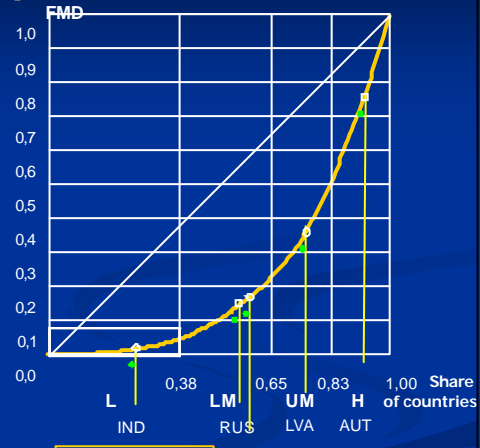
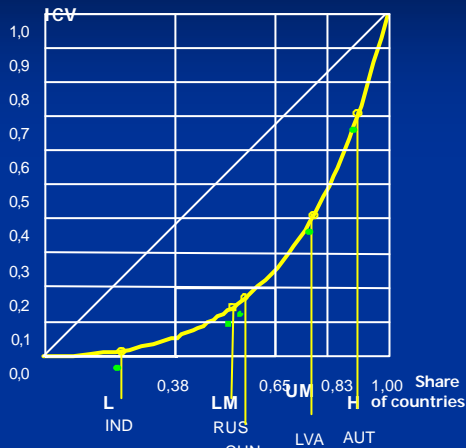
$$\Delta_2 = \frac{Q'_1}{Q'_4}$$



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ITA Method, VI Examples



$$\begin{aligned} ?_1 &= 6,391 \\ ?_2 &= 22,768 \end{aligned}$$

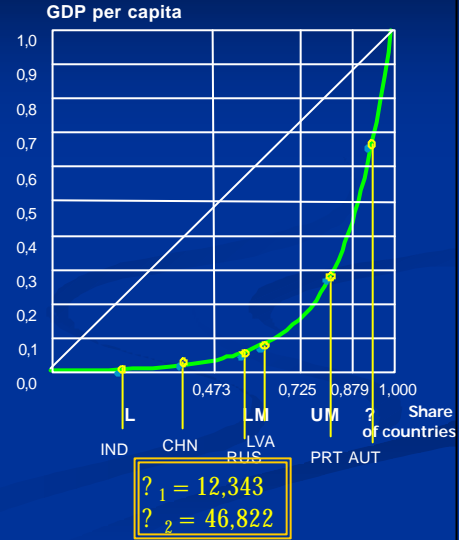
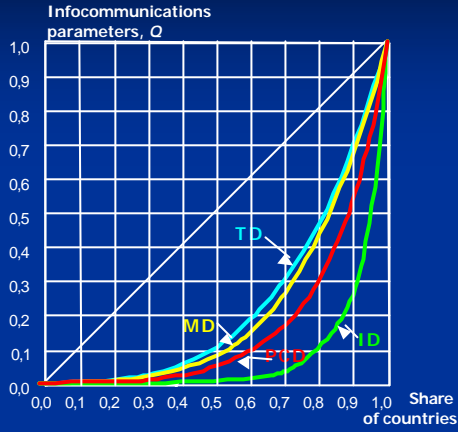
$$\begin{aligned} ?_1 &= 6,433 \\ ?_2 &= 24,710 \end{aligned}$$

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ITA Method, VII

Examples



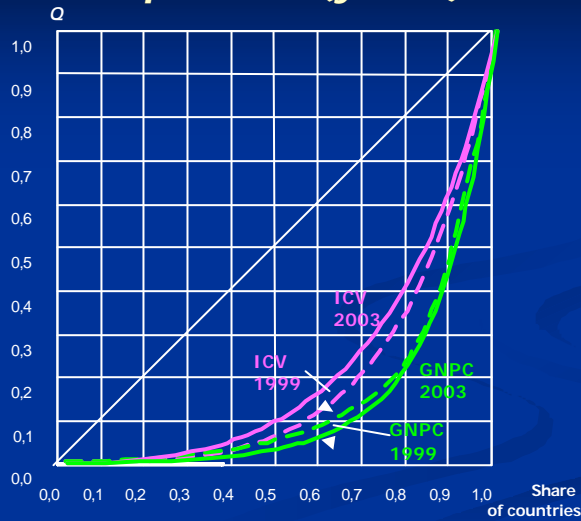
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ITA Method, VIII

Comparison (years)



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Represented methodology of measuring the Digital Divide based on applying dispersion curves made it possible to determine the Digital as well as Economic Divide and is practically **multi-purpose!**



ITA Measure Method is intended for:

- *International Organizations*
- *Governments of Countries*
- *Banking Groups*
- *Scientists*
- *Equipment Manufacturers*
- *Telecom Operators*



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Thank you!