

CHALLENGES IN MEASURING THE DIGITAL DIVIDE

Prof. Richard Taylor
Institute for Information Policy
The Pennsylvania State University
Beijing University of Posts and Telecommunications
Beijing, China
December 8, 2008



Outline of Talk

- The Challenge: The Digital Divide
- Background: Information Measurement
- Status of Information Metrics Studies
- Limitations of Information Metrics Studies
- The Opportunity: Time for a New Approach?
- Exploration of New Models
- Conclusion

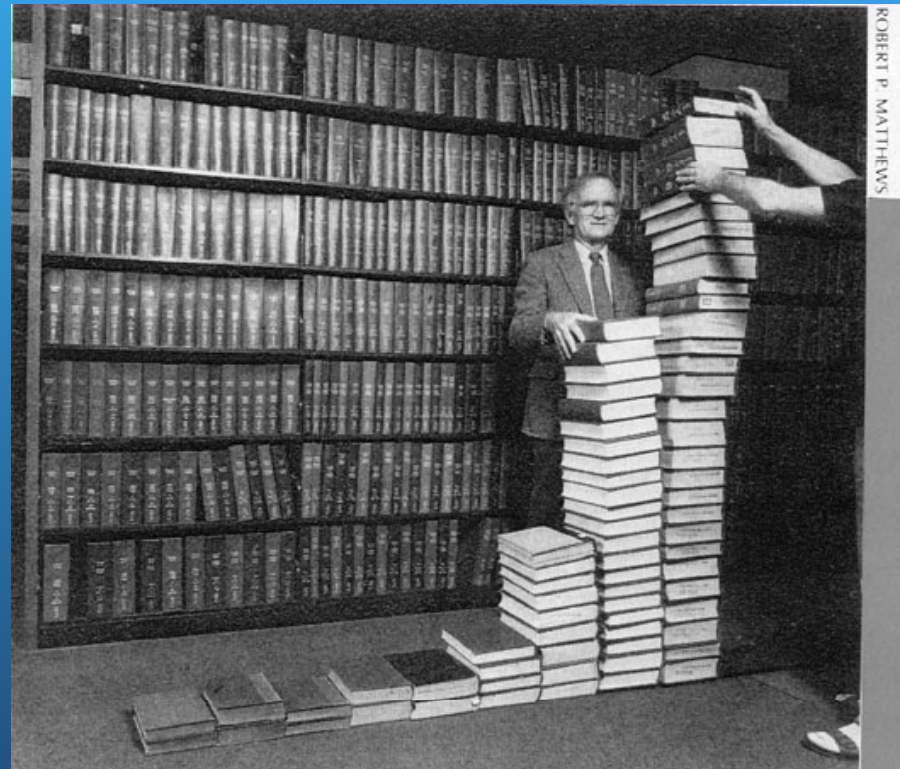
The Challenge: The Digital Divide

- In the Information Society, everyone should prosper
- To achieve this, the “digital divide” needs to be addressed
- Effective policy needs to be based on empirical data
- There are significant challenges in modeling the Information Society
- Progress has been made, but an integrated approach has yet to be developed

Background: Information Measurement

- Information inequality precedes the “digital divide”
- History of measuring information by “counting things” (proxies or “indicators”)
- Much data, little theory
- Information metrics is not economics
- However, it is complementary to current economic theories, e.g., “emergence economics,” “network economics,” “innovation economics,” “general purpose technology”

INFORMATION



CONCEPTUAL CHALLENGES

- INFORMATION IS IMMATERIAL
- INFORMATION IS HETEROGENEOUS
- NO SINGLE DEFINITION OF "INFORMATION"
- SO WHAT DO WE DO?
- WE COUNT "THINGS" - PROXIES FOR INFORMATION ("INDICATORS")
- WHAT CAN WE LEARN FROM COUNTING "THINGS"?



THE IRRESISTABLE URGE TO QUANTIFY “INFORMATION”

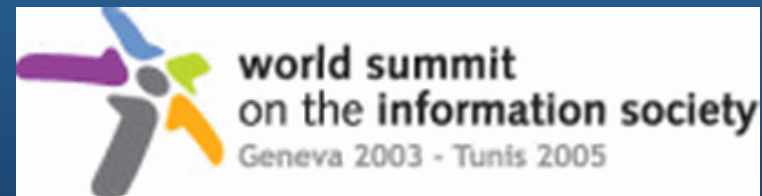
- JAPAN: THE JOHOKA SHAKAI
- U.S.: POST-INDUSTRIAL SOCIETY
- JOHOKA INDEX
- THE “INFORMATION SOCIETY”
- WHAT DID THE MEASURES MEASURE?



Status of Information Metrics Studies - 1

- Two models: E-readiness (“e-economy”) and digital divide (“e-society”)
- OECD/ITU digital divide model and EIU/WEF model
- Underlying similarity: focus on compound indicators
- ITU’s ICT Opportunity Index and Digital Opportunity Index leading digital divide models

- ITU
- UNCTAD
- UNDP
- UNESCO
- OECD
- WSIS
- WEF
- EIU



EXAMPLES

- ITU'S 2007 ICT-OPPORTUNITY INDEX (MERGES ITU'S DIGITAL ACCESS INDEX AND ORBICOM'S DIGITAL DIVIDE INDEX
 - MODEL DESCRIBES THE DEGREE OF A COUNTRIES "ICT-IZATION" OR (PREVIOUSLY) "INFOSTATE"
 - COMBINES TEN INDICATORS IN FOUR CATEGORIES TO PRODUCE A SINGLE COMPOSITE INDEX FOR 139 ECONOMIES
- ECONOMIST INTELLIGENCE UNIT'S (EIU) E-READINESS REPORT
 - USES SIX WEIGHTED CATEGORIES, OVER 100 CRITERIA, TO PRODUCE SINGLE-DIGIT COMPOSITE INDEX
 - GOVERNMENTS CAN COMPARE ICT SUCCESS TO OTHER COUNTRIES
 - COMPANIES CAN IDENTIFY MOST PROMISING INVESTMENT LOCATIONS

Status of Information Metrics Studies - 2

- WSIS Indicators Working Group
- OECD 2007 Istanbul Declaration
- OECD “Global Project in the Measurement of Information Societies”
- “Partnership on Measuring ICT for Development”
- OECD Ministerial on the “Future of the Internet Economy”
- “Gross National Realisation” Approach

Limitations of Information Metrics Studies

- Compound indicators of questionable analytic value
 - Comparative and descriptive vs. explanatory and predictive
 - General lack of theory
 - Subjectivity, lack of comparability across time, place or studies
- Freudenberg, Michael (2003). Composite Indicators of Country Performance: A Critical Assessment. OECD, STI Working Paper, DSTI/DOC(2003)16. Paris: OECD. Available at [http://www.oilis.oecd.org/oilis/2003doc.nsf/LinkTo/NT0000607A/\\$FILE/JT00153477.PDF/](http://www.oilis.oecd.org/oilis/2003doc.nsf/LinkTo/NT0000607A/$FILE/JT00153477.PDF/), accessed Nov. 20, 2008.

Limitations of Information Metrics Studies - 2

- Some problems with compound indicators:
 - Conceptual imprecision
 - Choice of indicators and weights subjective
 - Data/indicators often not comparable
 - Computation ad hoc
 - Lack of concurrent validity
 - Built on different values
 - Sensitivity to different weighting and aggregation techniques
 - Problem of subjective indicators (e.g., sense of well-being)
 - Problem of handling missing data

The Opportunity: Time for A New Approach?

- Need better: theory, models, indicators, data
- Experimentalist approach
- Need theoretical framework
- Develop complex, multi-dimensional models
- Not a comparative measure, but an analytical tool
- Consistent across economies and times

The Opportunity

- Need next steps at four levels:
 - Indicator selection and data collection
 - Statistical approaches and models
 - Theory building
 - Understanding how statistics are used (political economy)

Exploration of New Models

- How to interrogate the data? Reduce subjectivity?
Reduce amount of data needed?
- Can theory guide hypotheses? Can hypotheses guide selection of statistical approaches?
 - Structural equation modeling
 - Hierarchical linear modeling
 - Partial least squares
 - Analytic hierarchy process
 - Mixed quantitative-qualitative approach
 - Other?

Conclusions

- Time to move beyond focus on composite indicators
- Need attention to all four levels
- In particular, more emphasis on theory development
- Seek unified model of IT and development
- Consistent across economies and times
- Need new research agenda and next steps

THANK YOU!

RDT4@PSU.EDU

