Università degli Studi di Firenze

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# OBTAINING WEIGHTS: FROM OBJECTIVE TO SUBJECTIVE APPROACHES IN VIEW OF MORE PARTICIPATIVE METHODS IN THE CONSTRUCTION OF COMPOSITE INDICATORS

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### CHOOSING ...

1. ... analytical approach
2. ... and obtaining ***weights***
3. ... and identifying the aggregating technique
4. ... models and conceptual approaches in order to assess
   I. robustness
   II. discriminant capacity

Indicators construction is developed through different stages

Each stage requires a decision / choice to be taken

Decisions:

**TECHNICAL or VALUE JUDGMENTS**

Methodology aimed at constructing indicators

"technology" → procedure

a specialistic training is needed to apply in a scientific and objective way

Actually,

**THE PROCEDURE,**

even though scientifically defined,

**IS FAR FROM BEING OBJECTIVE AND ASEPTIC**

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**START HERE**

That's all folks!

Thank you for your attention

### GENERAL STATEMENTS

$$CI_i = \sum_{j=1}^{k} x_{ij} w_{ij}$$

where
$CI_i$ composite indicator for case $i$
$k$ number of indicators to be aggregated
$x_{ij}$ indicator $j$ to be aggregated for case $i$
$w_{ij}$ weight $j$ to be attribute to $x$ for case $i$

To define indicator's contribution to CI a criterion has to be adopted

weighting system

improving and refining the model of measurement

"WEIGHTING SYSTEM" identification needs to take into account:

- rationale and theoretical framework
- meaning and contribution of each indicator
- quality and statistical adequacy of indicators

**GENERAL BASIC CONDITIONS**

The identified weights

- are *non negative* numbers
- *add up to unity*
- are related to the corresponding *score*
- may require to be rescaled to fall within [0; 1]

weights assign differential importance to the indicators

not represent simply a technical problem

weights → judgment values

these methodological decisions are hardly objective

Generally are accepted and shared by the scientific community

But can be shared by a larger community?

### CONCLUSIONS

This work aims at systematically framing the issue and showing the possible approaches to obtain weights in a subjective perspective

anticipating a research proposal we are going to define

clarifying many technical issues.

**DIFFICULTIES**

Obtaining subjective weights requires and relies on the accomplishment of large survey projects aimed at collecting "importance" data.

-Time -Resources -Sampling -Field work -...

Approaches for obtaining weights can produce:

**"OBJECTIVE WEIGHTS"**

a. statistical methods

**"SUBJECTIVE WEIGHTS"**

b. multi-attribute approaches

c. scaling approaches

### OBTAINING WEIGHTS

Identification of a subjective weighting system needs

to take into account:

- theoretical issue
  - "importance" is a distinct construct?
- psychometric properties of importance ratings
  - internal consistency and test-retest reliability

a model:

chosen by considering
- the criterion
- the level
- the techniques
- the approach

*«Constructing composite indicators should take into account the agreement among citizens concerning the importance to be assigned to each indicator»*
(Hagerty and Land, 2007)

Seen in this perspective, this topic can be placed in the ambit of obtaining a larger legitimacy of social indicators.

### C. SCALING APPROACHES

Among all the approaches we need to select those using data ...

- which nature is comparative or preferential (in yellow in the previous table)
- produced by a comparative scaling technique (in pink in the previous table)

- Group weighting:
  - *Thurstone model (differential scale)*
  - *Unfolding model (perceptual mapping)*
- Individual weighting:
  - *Conjoint model*

### A. STATISTICAL METHODS

Weights are determined through

1. Correlation Analysis
2. Principal Component Analysis

→ the same data on which weights will be applied

3. Data Envelopment Analysis → the concept of efficient performance

### B. MULTI-ATTRIBUTES APPROACHES

allow subjective weights to be identified at individual level through an indirect approach by

- managing combined comparisons
- applying methods aimed at making decision among alternatives

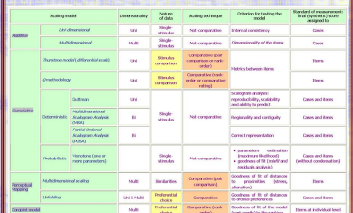
1. Multi-Attribute Decision Making:
   - Analytic Hierarchy Process (AHP)
2. Multi-Attribute Compositional Models:
   - Conjoint Analysis (CA)

### C. SCALING APPROACHES

can be classified through their features:

- Dimensionality
- Nature of data
- Scaling technique
- Criterion for testing the model
- Standard of measurement
- Contribution of each multiple measure

### C. SCALING APPROACHES



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