

Towards measuring the sustainability of well-being

Is sustainable our actual society?
How will be the future of our children?

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Introduction

- The well-being in Italy has been defined equitable and sustainable. The framework of BES has 12 domains

- Problems in the measurement of sustainability:
 - ❖ do not have a clear theoretical framework and empirical
 - ❖ etymology: sustainability can simultaneously be an idea, a lifestyle, a way of producing a system
 - ❖ to address the sustainability needs to be done many assumptions and normative choices
 - ❖ we are facing dynamic frameworks, and it is difficult to determine whether the defined thresholds are able to ensure a sustainable society
 - ❖ for statisticians not only observations but also forecasts

- For this sustainability was left to be developed in the work of the Scientific Commission BES, our goal is to outline a possible path measurement

- Key issues:
 - a) concepts from different disciplines ↔ overlap and convergence of concepts
 - b) semantic (culture) → measures
 - c) methods (syntax): observations and forecasting models + participative democracy (ex ante)
 - d) policy: normative choices (ex-post evaluation)

Definitions

➤ There is no agreed definition and therefore we can not have a definition of **sustainable system**, since it implies the totality of human activities and interaction with the ecosystem in a future perspective

➤ One of the many definitions found in the literature:

"Sustainability is a **process** aimed at achieving **environmental, economic and social improvement**, both locally and globally, or a **state** that can be maintained at a certain level indefinitely. This process binds in a relationship of **interdependence**, the protection and enhancement of natural resources to the economic, social, in order to meet the **needs of the present generation, without compromising** the ability of **future generations** to meet their own needs. So it is incompatible with the degradation of heritage and natural resources, but also with the violation of human dignity and human freedom, with poverty and economic decline, with the lack of recognition of the rights and equal opportunities "

➤ 1987 Brundtland Report

Aspects of sustainability

Sustainability (macro) economic and financial: economic process that lasts over time, not decline, not to over-consumption of wealth - or under-investment -

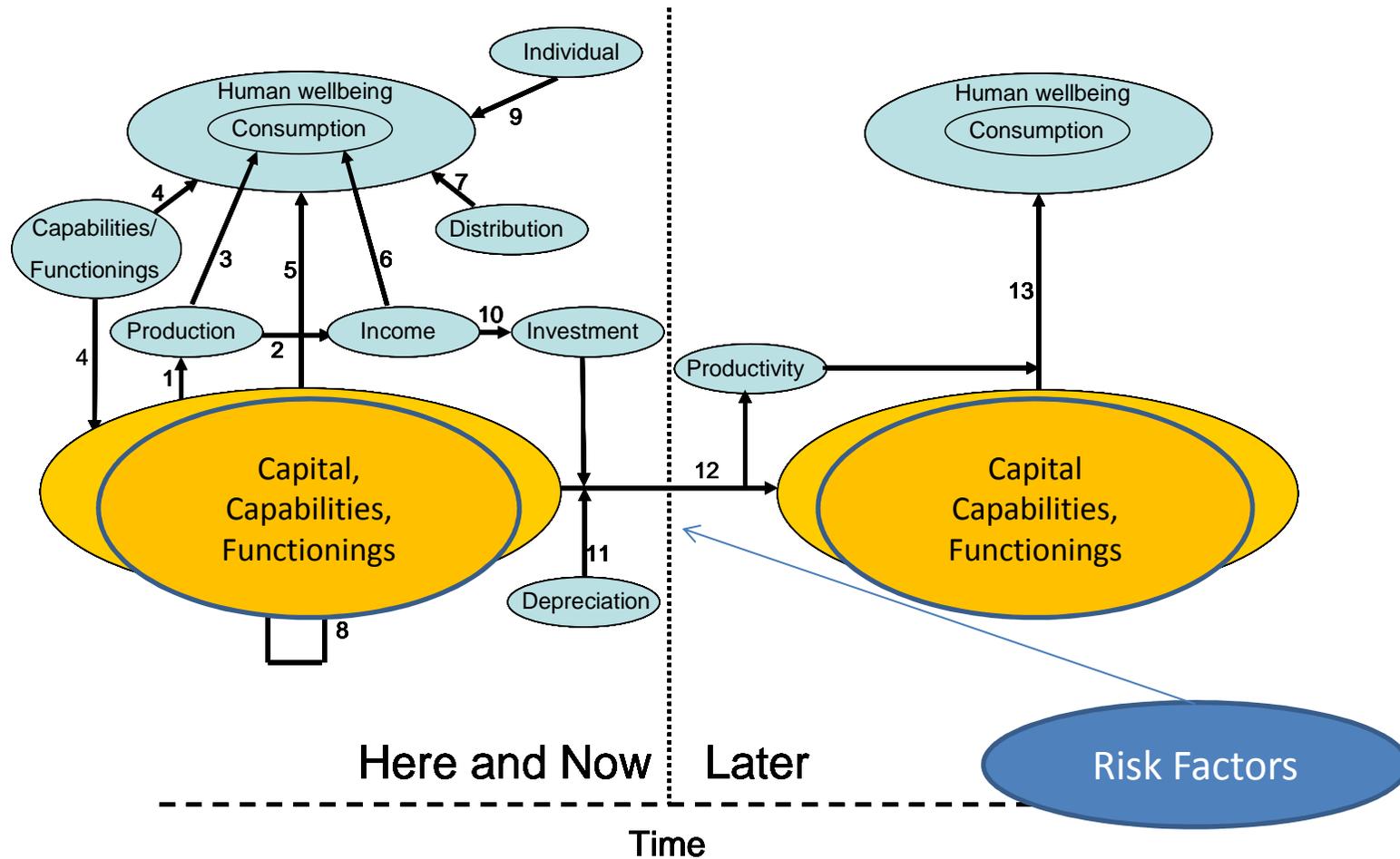
Environmental sustainability: protection and enhancement of natural resources, assessing the consequences of climate change

Social sustainability: equity in the distribution of economic resources between individuals / families, equity of access to key services-health, education, transport, housing-, equity between generations, social inclusion-cultural integration, political participation, ability of a society to work together, political stability, legal and cultural -, equality of opportunity

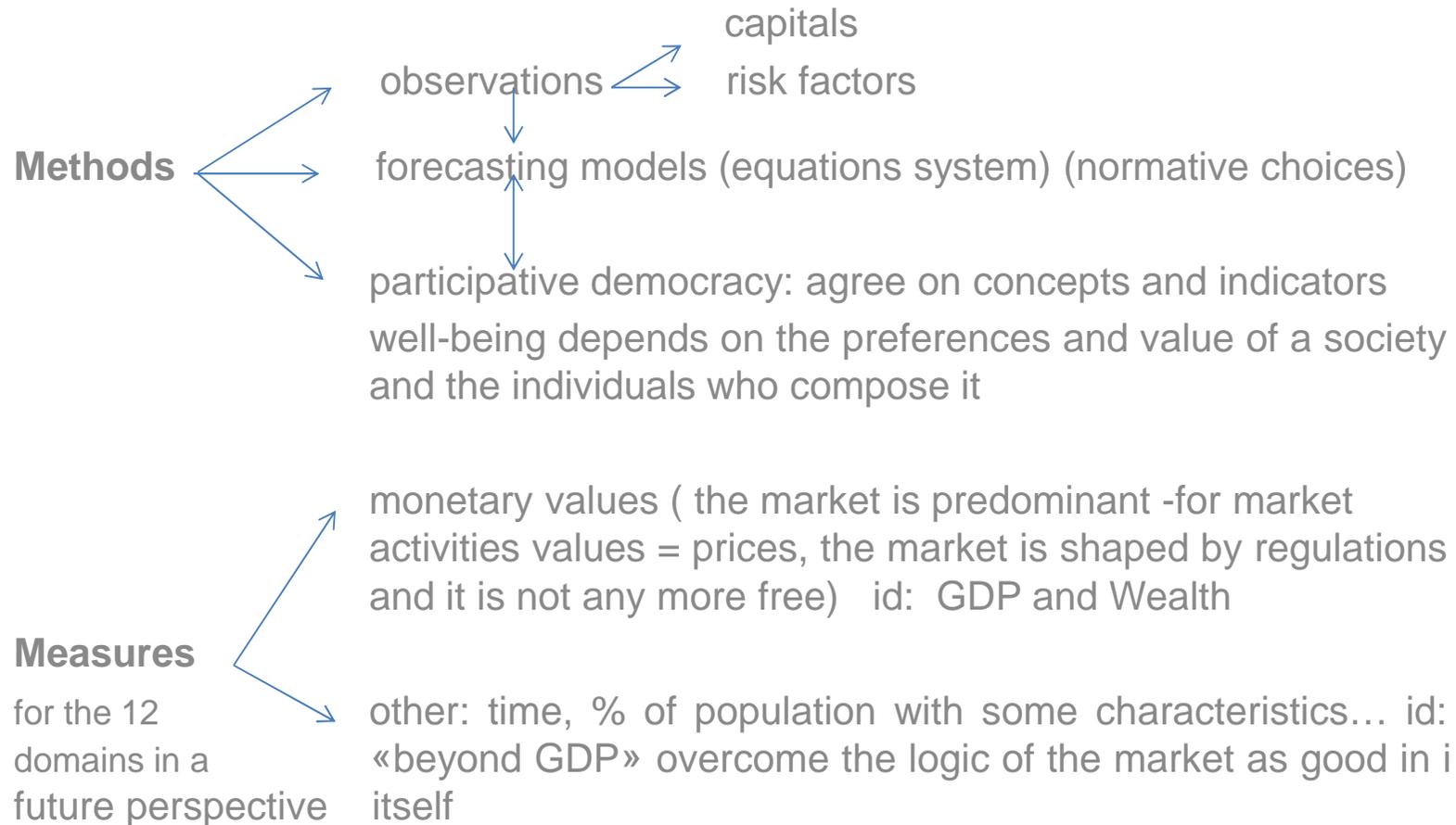
Economic, environmental and social sustainability (micro): concerns the maintenance or improvement of individual levels of well-being that result from individual behavior and that they are in the faculties of the individual

Sustainability is to look towards the future

Sustainable development now versus later (TF UNECE/Eurostat/Oecd, our adaptations)



Choosing methods and measures



Sustainability: capital approach

Sustainability: what resources (wealth) can be used to face future risks or future needs (by individuals and society)

- How today's decisions affect the future evolution of the capital stock, such as stocks determine the actual future results in various dimensions, how it is distributed capital between generations
- Measurement method that calculates the **capital stock**:
 - ❖ Economic (SNA), Knowledge capital (SNA)
 - ❖ Natural (SEEA)
 - ❖ Human
 - ❖ Social
- Analysis of the stock that is passed on to **future generations** including inequalities, the study of the components of **investment**, **depreciation** and **resource efficiency**
- Monetary and physical indicators (economical and non-economical aspects)
- Evolution of the SNA, (which already covers part of the economic capital and knowledge capital) through the environmental and social satellite accounts

Sustainability: capital approach

➤ Two directions:

❖ **macro:** estimation of capital from the national accounts and their evolution with the environmental and social satellite account (estimations for institutional sectors)

❖ **micro:** economic - human and social resources and community resources available to families / individuals (monetary and physical indicators)

➤ Advantages and disadvantages:

❖ This approach allows to determine what are the ingredients (capital) of wealth for the future sustainability and more accurately determine the weight to be attributed to the different ingredients (with respect to the various sustainability indices in circulation)

❖ The amount of information to mobilize is great, the technical difficulties are high and there is still instability in the theories for social capital and human capital. Not all dimensions of well-being can be analyzed according to this approach

The capital approach: open questions

1. What are the outputs/outcomes to consider and what methods of estimation (human and social)
2. Determine the factors of depreciation and revaluation of some capital in particular: natural, human and social development
3. What prices/reference values to use? (the question of shadow prices), especially when there are no markets
4. How to enhance non-market production, relevant to well-being: understanding the role and how to estimate non-market components both input and output
5. How we consider the transnational activities
6. Need for interpretative models to determine whether or not there is substitutability between the different types of capital (weak or strong sustainability) (the problem of the thresholds here too)
7. Estimation of resource productivity
8. Discount rate used in stocks estimates

Sustainability: risk factors method, key concepts

Sustainability: vulnerability assessment that a country or an individual or a society have to face with respect to achieved levels. Means focus on risk factors not only with an intergenerational, but cross-generational as well, threatening well-being achieved and looking at transnational influences on well-being from other countries activities

➤ **Vulnerability:** imbalances throughout the life itself, but also between generations. Individuals and families are exposed to potential misfortunes from various sources throughout their lives: economic recession, crimes, adverse weather, natural disasters, physical illnesses and/or mental disabilities. The vulnerability also refers to the inability of individuals/families to anticipate, withstand, recover damages resulting from an adverse shock (**micro**)

➤ The vulnerability could be declined even when compared to systems, to the community as a whole, such as the ecosystem or the economic system; so imbalances of social welfare (**macro**)

➤ **Transnational activities** are important for sustainability: means see, apart from of course the environmental aspects, aspects of social and economic relationships between countries that impact on the well-being of a country (in aid transfers, imports, migration/human capital transfers). E.g., a high financial exposure abroad can lead to contagion from the financial crisis, high energy dependence abroad can be a vulnerability of the country, supranational scale pollutants, loss of national skills abroad impoverishes national human capital, macroeconomic imbalances (EU-MIP-Macroeconomic Imbalances Procedure)

Sustainability: risk factors method, key concepts

➤ The increase in **inequality** leads to an increase of risk factors for certain social groups or society as a whole. Empirical evidence: some global imbalances arising from inequalities. Equity bring to social stability (broader agreement in society) and economic growth (better democracy, better education, better technology, better infrastructure, better financial reforms for control)

➤ The level of **risk** may vary depending on the level of development of the country, but ultimately individuals/families/communities can face a set of circumstances that can seriously threaten their well-being (loss of job or non-employment, a serious illness or diseases that develop in the long run, divorce, a victim of a crime, lack of confidence in the institutions ...)

➤ Method of **risk analysis** (probability associated with events, observed frequencies, Delphi method) used to prevent possible disasters. By applying this method and assuming that each dimension is a system that works for context, input, process, outcome, the measure of risk should be referred to the inputs, the process, the context that affect the outcome. It is a method to develop both micro and macro

Advantages and disadvantages: draws scenarios with associated probability, identify risks of unsustainable if it continues with the current trends of behavior.

Relatively easy to achieve potentially in all dimensions, although there are technical and normative difficulties

Risk factors method: open questions

1. How to determine the long-term outcome, and how to set the thresholds (through a process of public sharing?), how to define the probabilities associated to risks? (think in terms of confidence intervals?). Monitor only the risk factor trends? Or dangerous thresholds should be fixed?
2. Risk of one dimension or multiple risk of various dimensions, then need to model/s that linking various dimensions (e.g., health and environment, health, education and the labor market). But, the links among the various dimensions are not certain and uncertain are often the directions of causality. There is a composite index that synthesizes the risk factors (global risk) or at least by dimension (risk of dimension)? It is true that if several risk factors are present at the same time in different dimensions the global risk increases
3. How to consider the risks concerning aspects of international transactions?
4. Define without arbitrariness risk factors in a micro (individual behavior) and in a macro context (whole collectivity)
5. For some dimensions we could have risk factors that are input or outcome in other dimensions (circularity of questions)

Method based on risk factors: some examples

Education

Contest: socio-economic, backgrounds of student ...

high levels of education, absence
or low work/productivity statement
mismatch civic sense

Input:

Volunteer
Parents
teachers and educators
materials (books ...)
Fixed assets (school buildings, computers, equipment ...)...

processes

outcome

Risk factors:

Macro: portion of population with low levels of education, early school leavers (critical threshold), low qualifications of teachers, poor research in universities, lack of integration between research and teaching, poor maintenance of school buildings, high spatial gaps in education quality and quantity, unequal access to services ...

Micro: lack of motivation to study, familiar situations not stimulating, ...

A method based on risk factors: some examples

Health

Contest: environmental conditions,
socio-economic conditions of the people ...

Longevity
conditions of physical and mental health
functional autonomy

Input:

Population
diet and life style
Health System environment...



processes



outcome

Risk Factors:

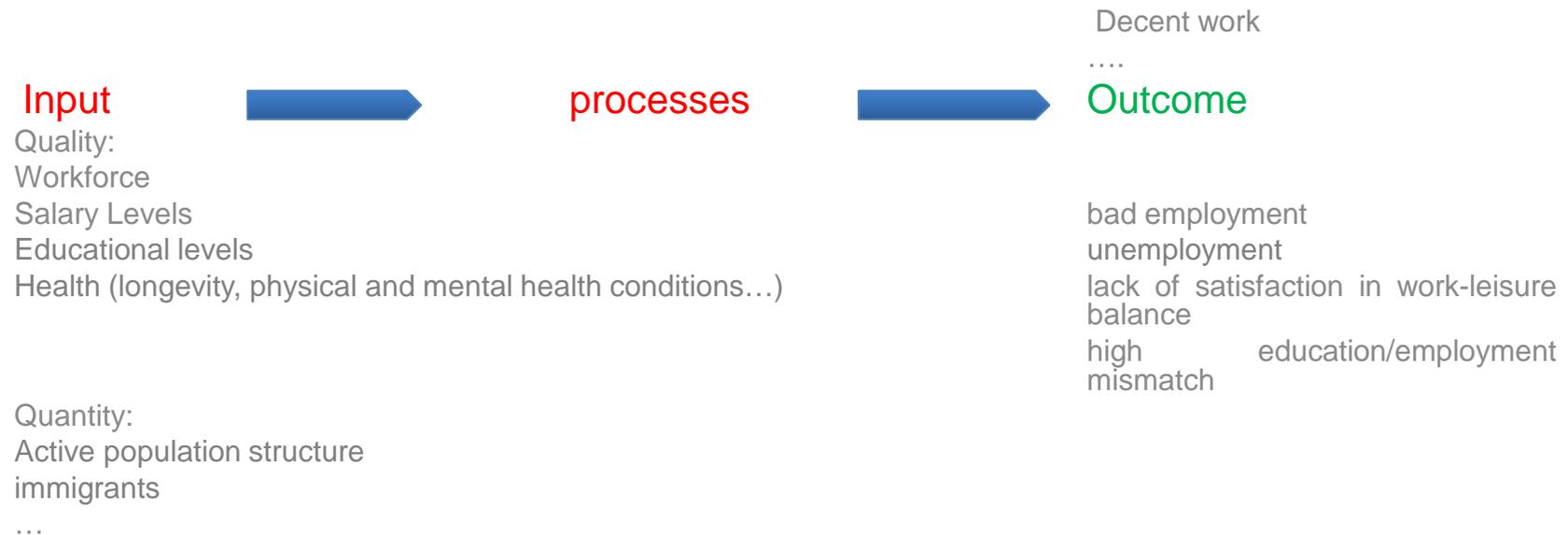
Macro: pollution, climate change, work hazards, inefficient health care system, barriers to access to services, imbalances between supply and demand of health services ...

Micro: obesity, alcohol consumption, smoking, lack of physical activity, unbalanced diet, failure to prevent ...

A method based on risk factors: some examples

Work and life balance

Contest: legislative framework, Enterprise System ...



Risks Factors:

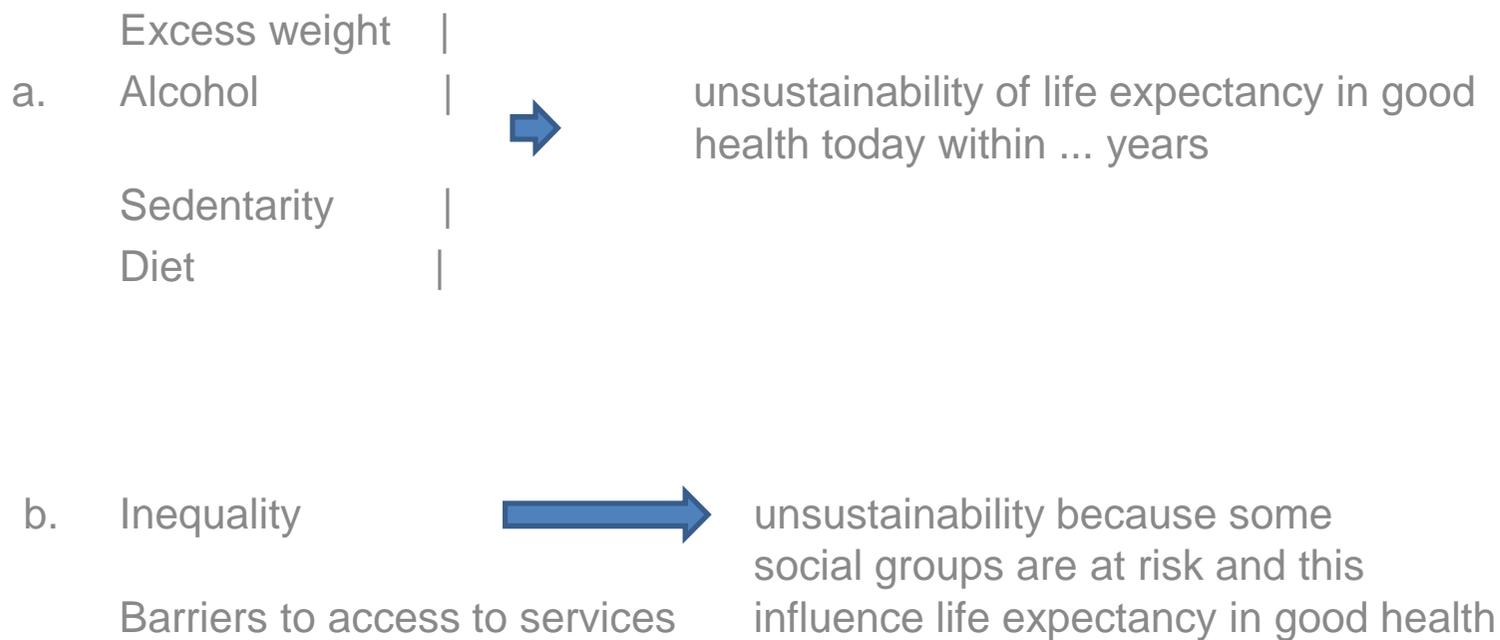
Macro: low levels of education, ageing of the working population, low wage, labor market legislation or legislative framework security (contractual type), high fixed-term work, lack of services for people with children working, income inequalities, inequalities in employment opportunities between generations, from supply and demand imbalance, under-invest in human capital ...

Micro: personal training strategies, long-term unemployment, dangerous lifestyles, personal low salary levels, dangerous and arduous work, low job satisfaction, low satisfaction in work-leisure balance, high involuntary part-time ...

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HEALTH

Risk Factors



c. Other Risk Factors

- Lack of prevention
- Pollution, climate change
- Job risks
- risks arising from inefficient health systems and imbalances between D and S health services



Impact on mental and physical health



Life expectancy

www.misuredelbenessere.it

Human Capital and Health Research to be developed

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EDUCATION

Risk Factors

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- Low level of education (anche se migliorato tra 2004 e 2011) →
 - worst lifestyles, less active
 - poor employment
 - risky work environment
 - poor level of access and conscious enjoyment of cultural goods and services
- Delay in education with respect to European average:
 - Depends on the social background, socio-economic context, the territory
 - Scarce science skills (e.g. mathematics)
 - Diminishes the cultural participation

Research on going

Human Capital looking at:

- Productive aspect
- Well-being aspect in general

Determinants:

EDUCATION (expertise, skill, individual and social behaviors):

- family
- society
- educational systems (primary, secondary, tertiary and post-tertiary)
- training
- learning by doing

CULTURE (proxy cultural participation):

- cinema, theatre, museums, archaeological sites, books, music/concerts ...

HEALTH: positive relationship between level of education and health level

- health determinants and influences of education

- *DEMOGRAPHY*: positive (?) relationship between demography and human capital; demographic support policies

- determinants of population development

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WORK

Risk Factors

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- Poor job opportunities (▼ employment ▲ rate of non-participation at work-job dissatisfied – in particular young people, (women), foreigners, territorial)
- Lack of decent work, or good jobs (▲ part time workers in the long run, youth long-term instability, ▼ over educated workers in relation to the work done, = irregular, ▼ access to employment, ▲ job satisfaction)

- ❑ Work Demand : business/ institutions system, mismatch between skills available and those needed, de-taxation of work ...
- ❑ Work Supply: education/culture/training, population development, pension system, health

Research on going

Some interrelations (risk and capital):



Sustainability: Forecasting Models

Model = formalized framework (simultaneous equations) of interrelations between objective and subjective magnitudes (ex-ante, ex-post)

Economical: up to now only this. General equilibrium theory, neo-classical, Keynesian theory, Walrass theory

Environmental: on going. Environmental economy, Henley, Conrad, Clark, Tietenberg, Ecological economy , Soderbaum, Common, Stage

Social: only some experiement (es. the Economist used a model to forecast the Arab spring)

Examples:

AIM, ASF,ASTRA, CAPRI, CETAX, E3ME, ECOMOD, FAIR, GINFORS, IGSM, IMAGE, LEITAP, MARKAL, TIMES, MIRAGE, NEME, OECD GREEN, PACE, PAGE2002, PHOENIX, POLE, QUEST, SECOND GENERATION MODEL, VLEEM, WORLD ENERGY MODEL, WORLDWIDE GOVERNANCE INDICATORS...

Sustainability: Forecasting Models

Step by step process:

Economic Forecasting Model of Istat

Economic development (including technology too)

Economic + Environmental Forecasting Model

Economic development including natural resources (natural capital)

Economic + Environmental + Social Forecasting Model

- sustainable development, final goal of the process: to verify ex ante and evaluate ex post policies
- Brundtland Report, Lisbona Strategy

Limits:

No linear approximations

Limited data available

Evolution of the population

Thresholds effect, physical and temporal limits

Uncertainty behavior

Asymmetrical Relations

Assumptions

Conclusions and future development

- There is an **objective difficulty to connect the various areas** and understand the meaning of relations, as there is **high uncertainty** even within areas. It is important to look at the drivers of well-being outcomes
- For some components of well-being, the **classical approach** based on evaluation of "**capital**" and its variations has no theoretical framework stable and conceptual and measurement problems are still to be solved
- The **method** based on **risk factors** to assess the **vulnerability** of systems, both collective and individual, seems more flexible, applicable to all aspects of well-being. It could also highlight the interlinkages between the dimensions and maybe reach consolidations of Bes dimensions
- The approaches presented are not alternative, and they can be composed to define **a path for the measurement of sustainability** for all dimensions of well-being, as a variation of the stock of capital could be an indicator of risk
- The economic and environmental fields have developed over a long time measurement of unsustainability, through the **identification of unsustainable imbalances** in the long run, or **measures that highlight dangerous thresholds** have been reached
- **Not only** development of **indicators**, but also **forward-looking models**

Conclusions and future development

➤ Economic **forecasting models** have a longer tradition than the social field, where there are very few different models, some experiments for the environmental aspects are promising

➤ In defining outcomes (what we want to sustain) it is important the **public debate**. A. Sen: In a **democratic** and **cohesive society**, people must recognize themselves in the "public debates", that must reflect their needs and their aspirations. This is part of the measuring method. In Italy you have chosen the way of sharing and public discussion: Istat-CNEL Board blogs, surveys ...

➤ The **Scientific Committee**, formed at Istat, and the sustainability of **BES** Group **Process**:

- ❖ Sustainability group Activation and Scientific Committee: first analysis
- ❖ Discussing indicators within Cnel and other forms of social involvement (possible investigation of citizens): selection of outcome and indicators
- ❖ Refining indicators analysis in the Scientific Commission: fining indicators set
- ❖ Selection in Scientific Committee of forecasting models
- ❖ Approval within Cnel: final indicators and analysis set

References: most international and national authors are quoted in the paper



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Thank you for your attention