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Policy Impact of Composite Indicators

A. Introduction

“Composite Indicators” is not a new concept, yet both demand for and production of composite indicators has intensified in the recent years. The Modern Economy, in comparison to the Agricultural and Industrial Era, has a much bigger degree of complexity and it is, thus, difficult to represent it satisfactorily with a set of simple and one-dimensional indicators. Moreover the development and proliferation of the information and communication technologies gave a decisive impulse in the generation of statistical data and indicators.

In this environment the Policy Maker is submerged by an overwhelming volume of quantitative and qualitative information, the aggregation and utilisation of which poses significant difficulties and impedes decision and policy-making; in this regard, there is a dilemma for the policy- and decision-maker on how to elaborate, interpret and, on a solid basis, apply effective policies.

Composite Indicators have this precise mission: to make a synthesis, with the adequate methods, of all the individual indicators related to a specific subject under study, and depict all this information in a simple and easy-to-understand way (i.e., a single index).

It is obvious that this work is neither simple nor easy. It is not easy to represent, under a unique indicator, multidimensional concepts such as the “competitiveness” of the economy of a country, the “happiness” and the “health” of a population. As it was proven in many cases, the synthesis of many indicators is not always successful and for that reason Composite Indicators frequently exhibit “paradoxes” and in a few cases widely recognized Composite Indicators may even create political “disturbances”.

For example, for the year 2007-8, Italy is ranked 46th in the World Economic Forum (WEF) Global Competitiveness Index, behind South Africa (44), Portugal (40), Puerto Rico (36), Tunisia (32), Thailand (28), Chile (26) and Malaysia (21).

In another area, the Times published on November 2007 the rankings of Universities all over the world; in the Top-10, six universities from the USA and four from the UK appear. The first ranked French University (L’Ecole Normale Supérieure) is in the 26th place while the first ranked German University (Heidelberg) is in the 60th place!

B. The methodology for the generation of Composite Indicators

Composite indicators are constructions, based on other individual indicators, thus the greatest impact of their application happens at the construction phase rather than at the execution (i.e. collecting the data and convoluting it, etc). If the method applied and the choices made are not appropriate, there is a great danger to derive erroneous results and thus erroneous decisions and applied policies¹.

The generation of a composite indicator requires the creation of a composite team. The statisticians play a key-role but cannot and should not be alone in the construction phase. Depending on the topic of the indicator they need expertise from other sciences, therefore, Scientific Experts are required too (e.g., the generation of a CI for health requires the participation of doctors of many specialisations, psychologists, sociologists, managers of health organizations, etc). The Statistician is the one to produce the initial list of individual indicators which will be used as the base for the calculation of the CI. He will examine and guarantee completeness and perfection (collection methodology, coverage, quality and completeness of data for the required period, etc). He should explain to specific members of the Team, who may not have

¹ This paper does not intend to present techniques and methods used for the selection of individual indicators; it rather focuses on the conditions and methods required for the creation of a Composite Indicator.

a thorough knowledge on statistics, the methodology and the techniques that will be used for the individual indicators and the calculation of CI. He will perform a lot of experiments excluding certain individual indicators, incorporating others, etc. He will also carry out a lot of experiments with the weights and will perform a sensitivity analysis. The final list should be adopted after brainstorming critically, studying the content and technicalities of each indicator and their relation with the topic of the CI and consensus. Special attention is required in this process since an inappropriate individual indicator may transfer wrong input into the CI. The Team should also propose additional indicators relative to the content of the CI which, after thorough examination by the Statistician can be included in the final list. If a CI has also the capacity of forecasting then retrospective experiments should be undertaken to examine this specific feature.

The weighting of the individual indicators is a very critical point in the process and should be a product of wide consultation, interaction and consensus among the Team members.

In difficult cases external expertise could be employed too (e.g. Delfi² procedure).

The Team should also include ideally people from the policy making. Their participation will allow for a thorough knowledge of the content and the capacity of the CI, but more than that, they will constitute the first "pilot" users which will push forward the limits, the imperfections and the problems of the CI.

Any appearance of "paradoxes" is a clear indication of the weaknesses of the CI. If this is the case, more analysis and new rounds of calculations and analysis should be undertaken.

C. The use of Composite Indicators for Policy Making

It is rare to find National or Regional Programs without having among their objectives the amelioration of the values of a set of indicators. For example, the National Reform Programs of the EU countries are obliged to take into consideration the Lisbon Strategy and all its Structural Indicators (14 Structural Indicators covering 6 domains : General Economic Background, Employment, Innovation and Research, Economic Reform, Social Cohesion and Environment). The same rule applies for Structural Programs financed by the Structural Funds of the EU. In the next programming period (2007-2013) of the Program "Competitiveness and Entrepreneurship" of Greece, which covers 8 sectors (R&D, Industry, Energy, Tourism, Trade, etc) beyond the Lisbon Strategy Indicators, it is also required to improve additional indicators, as those defined and monitored by the WEF and the IMD.

The use of a CI by a Policy Maker should go through its "decomposition". The decomposition process is essential to allow for the understanding of the Policy Maker of the individual indicators that compose the CI, of the method of convolution, of the weighting system, etc. After the "decomposition", the Policy Maker, should study each indicator separately and should understand its contribution to the CI. Only then could, the PM assess the way his country or region could improve the values of the individual indicators by policy making. He should also create a sub-list of the indicators which can be improved by the available means (financial and other) and he should define the necessary policies for improving the individual indicators and consequently the CI. Last, but not least, he should define his targets for the individual indicators and for the CI overall. To achieve the above- mentioned task, the Policy Maker needs information and documentation that should accompany the CI (CI folder).

The Policy Maker is rarely an experienced statistician who can investigate a CI in-depth, besides this is not his role. Consequently, in most cases, he is not be in a position to study the pros and cons, the weak and strong points of the CI, to take them into consideration while using the CI. Therefore a CI should be

² The **Delphi method** is a systematic interactive [forecasting](#) method for obtaining forecasts from a panel of independent experts. The carefully selected experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, participants are encouraged to revise their earlier answers in light of the replies of other members of the group. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer.

accompanied by all the essential information and evidence, and all essential metadata which will help him in the effective application of the indicator.

First of all, the CI folder should provide detailed information on each individual indicator: methodology, coverage, source of information, etc. The folder should describe the aggregation method in a simple and comprehensible way even to the non-specialist. The folder should also provide the weights and the method for their selection. It would be ideal to provide the software for the calculation of the indicator in order to give the user the possibility to proceed to the experiments altering the system of weights, excluding certain individual indicators, etc.

Usually the CIs are used for ranking countries, regions, institutions and generally statistical units. It is however known that the rankings give an oversimplified picture of existing relations among the units. The distance separating the units in a ranking are considered equal, while this seldom happens. When a CI gives a ranking of units it should also provide the absolute values of the units so one can observe the degree of stability (or instability) of the ranking. With the absolute values one can realise the state of a unit (e.g., a country) for the indicator independently from its place in the ranking (in rankings there are always first and last units). Through the absolute values a Policy Maker can realise the absolute difference among countries, regions, etc, as well as the likelihood of changing the place in the ranking by a policy action. He can also observe the progress, in comparison with previous measurements of the indicator due to the application of an adequate policy, even if the position of the country in the ranking didn't change.

D. Policies for the Composite Indicators

The generation of indicators suitable for the mapping out and the support of policies also presuppose adequate policies for the indicators.

The indicators do not only describe states/situations but also create them. For example, if a country is ranked high in a "Competitiveness" Indicator, it would quite probably have a positive impact in attracting investments and human capital, and thus reinforce further the actual competitiveness of the economy. On the contrary, a country ranked at the bottom of the list, would most probably be associated with a negative perception that would further undermine the economy and its competitiveness.

In another example, the talented students and eminent professors would prefer a University ranked high than one at the end of the list, something that will further strengthen the capacity of universities at the top.

In the era of globalisation and the vertiginous flow of information, the economies of countries will depend more and more on their "public image". The CIs, with their increasing generation, are reflections of that public image. It is critical that those reflections are as reliable as possible and do not create distortions. The EU Member States and the European Commission should pay the topic of indicators particular attention. In many cases, the image projected for the European Countries and Europe in general by widely used CIs is not "accurate". In this regard, Europe should not adopt a "defensive" attitude but rather an "aggressive" one in the CI development and use.

The EU has a profile which includes quite a lot of positive elements, somewhat disregarded by many widely used CIs: the Welfare State, the quality of life, the respect for the environment, the safety, etc are elements that Europe has high on the agenda in comparison with other regions of the world in addition to offering a high development index and a high standard of living. This profile is not exhibited satisfactorily in many indicators. For example in the Competitiveness Index (WEF) the EU countries occupy 12 out of the 30 top places while in the Quality of Life Index by the Economist the EU countries obtained 18 out of the 30 top places.

As an example of the above, the quality of life is a basic factor for reinforcing the competitiveness of an economy, therefore indicators concerning the quality of life (environment, health, safety, quality of

employment, equality of sexes, etc) should be incorporated in many CI (including the indicators for competitiveness).

Such incorporation can't be achieved with a superficial intervention but through the promotion of basic research on CIs. Research should be supported with the objective to create new CIs in precise domains. This does not mean that the EU should intervene in the indicators in a way to obtain a positive image for its Member States. The objective should be the development of CI which cover a large number of dimensions of their topics and reflect the reality in a reliable way.

Up to now the European Commission has made some efforts for the development of the research for new indicators. In the 6th Framework Programme there was a Priority for "Policy Oriented Research" where research for policy issues (agriculture, fishery, environment, health, immigration, transports, Information Society, etc) was supported and in which directly or indirectly some indicators were developed and a few of these were CIs. Under this Priority of the FP6 and in a focused Task "Development of Composite Indicators of the Knowledge-Based Economy" a project with the title "Knowledge Economy Indicators" was approved.

In the 7th Framework Programme significantly higher attention is paid to the Indicators as proved by the increased amount of budget and the range of topics.

There is the **Activity 8.6 : Socio-economic and scientific indicators** - the use and value of indicators in policymaking at macro and micro levels with Rationale "*The European Union, its Member States and regions are all involved in policy making. Policy should not be driven solely by indicators but it should be evidence based and make appropriate use of both quantitative and qualitative indicators together with relevant analytical methods including modelling. To do this, indicators and analytical techniques are needed that address the policy issues in question therefore, research under this topic should aim to improve the relevance, quality and quantity of indicators made available to policy makers together with the analytical techniques and models used for the in support of all aspects of policy. The impact assessment of policies and programmes should promote the development and the use of indicators in this context*".

Under this Activity there are three areas :

Area 8.6.1 How indicators are used in policy (6.1.1 Current use of and emerging needs for indicators in policy)

Area 8.6.2 Developing better indicators for policy (6.2.1 Improved ways of measuring both the potential for and impact of policy)

Area 8.6.3 Provision of underlying official statistics (6.3.1 Specific statistical issues)

It is obvious that a higher number of projects will be approved covering a variety of topics and this is an advantage for the European Policy Makers.

Our opinion is that a part of this research should be focused on "specific topics" of Composite Indicators as was the case in FP6 : Task "Development of Composite Indicators of the Knowledge-Based Economy". For example we should strive to create a new Composite Indicator on "Competitiveness" which incorporates variables for the welfare, the quality of life etc and which overcome the deficiencies of the existing CI of the WEF and IMD. Another "specific topic" could be the creation of a CI for the "Evaluation of the Universities". Similarly, research should be performed for other important "Specific topics".

References

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<http://composite-indicators.jrc.ec.europa.eu/>

The website of the research project Knowledge Economy Indicators

<http://kei.publicstatistics.net/Downloads.html>

Joint JRC-OECD Handbook on composite indicators

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Structural Indicators

COMMUNICATION FROM THE COMMISSION

COM(2001) 619 final, Brussels, 30.10.2001