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An interdisciplinary study on indicators: A comparative review of quality-of-life, macroeconomic, environmental, welfare and sustainability indicators

Ioannis A. Pissourios*

Neapolis University Pafos, School of Architecture, Land and Environmental Sciences, Pafos, Cyprus

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ABSTRACT

It is generally recognised that indicator-based research forms a substantial part both of the everyday practice and of the current theoretical pursuits in an extensive set of different scientific fields that relate to the socio-economic and the environmental sphere. However, the lack of an endogenous indicator's theory hinders the enhancement of indicator's research into an autonomous scientific field and subdues the indicators study to the broader ecological, social, or economic context. Thus, scientists are often bounded to the study of indicators within their specialisation area, as evidenced by the very limited number of interdisciplinary studies on the use of indicators that have been published. Based on this deficiency of the current literature, the paper elaborates on the use of indicators in the socio-economic and the environmental area, focusing on fields in which indicators are essential to their practice. Namely, the paper reviews quality-of-life, macroeconomic, environmental, welfare and sustainability indicators in order to detect similarities and differences, pertain to their practice and to the theoretical frameworks in which indicators are utilised. The study concludes that quality-of-life, welfare and sustainability indicators are supported by weak theoretical foundations, as a result to the choice of the respective fields to exploit the possible benefits of an empirical interdisciplinary perspective, a fact that leads the use of indicators to methodological inconsistencies. In contrast, macroeconomic and environmental indicators are supported by a coherent theoretical body, which is reflected in their well-organised structure and leads to their sound practice. Last but not least, the study suggests that the way the aforementioned two fields utilise indicators can provide useful guidance to the formation of future objectives in the quality-of-life, welfare and sustainability indicators' research. Specifically, their corresponding fields should moderate their interest on composite indicators and, instead, their future research should be focused, so much on the identification of their field's key indicators that play a crucial role to the interpretation of the complex phenomena studied, as on the identification of the relationships that link these key indicators together.

1. Introduction

It is generally recognised that the construction, the interpretation and the monitoring of indicators are processes that form a substantial part both of the everyday practice and of the current theoretical pursuits in an extensive set of different scientific fields that relate to the socio-economic and the environmental area. However, the lack of an endogenous indicator's theory prevents their enhancement into an autonomous scientific field and subdues indicator's study in the broader ecological, social, or economic context. This separation (or fragmentation from another point of view) of indicators into ecological, social and economic ones, seems obvious and even desirable for many researchers. Indicators are inextricably linked to their practice and therefore their separation into categories facilitates the dialogue within each scientific field, as each field has specific characteristics, needs, limitations and objectives. However, there is always the risk that due to this division, scientists are bounded to the main stream of research that dominates each field of study, leading them to ignore the developments, the research issues and the practices that characterise or are emerging in other fields (Michalos, 1997). This separation among the scientists of different fields does also becomes evident by the very limited number of publications pertain to interdisciplinary studies on the subject of indicators (Diener and Suh, 1997).

Based on this deficiency of the current literature, the paper elaborates on the use of indicators in five scientific fields within the *socio-economic* and the *environmental* area, focusing on fields in which the use of indicators is essential to their practice. Namely, the paper begins by reviewing *social indicators* (focusing on

* Correspondence address: Ellados 20, Flat 103, Limassol, PC 3036, Cyprus. Tel.: +357 96507694.
E-mail address: pissourios@gmail.com

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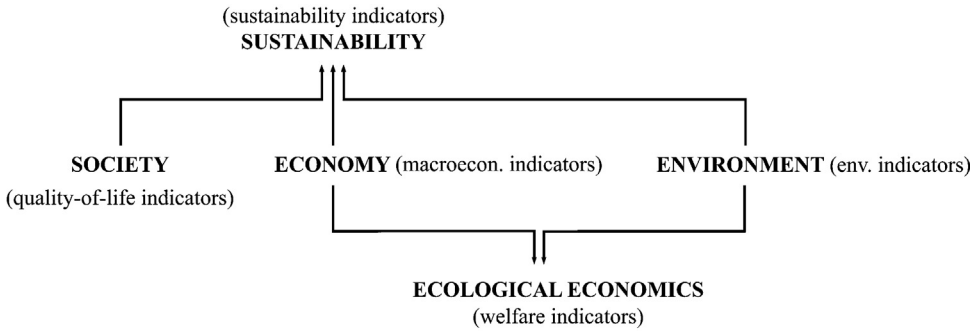

Fig. 1. Selected scientific fields of study within the socio-economic and the environmental area.

quality-of-life indicators), *economic indicators* (elaborating on *macroeconomic* indicators) and *environmental indicators*. Moreover, it considers the joint between economy and environment, a joint that has resulted to the birth of *ecological economics* and to the construction of *welfare indicators*, while reference is also made to *sustainability indicators*, which cover the whole triptych: society-economy-environment (Fig. 1). Main objectives of this review are the identification of the theoretical frameworks in which indicators are utilised, in order to detect similarities and differences among the five scientific fields. Based on this comparative review, the study leads to an interdisciplinary understanding of the indicators' practice, stresses the key virtues and weaknesses that characterise certain fields, and finally states certain guidelines to be followed for overcoming these weaknesses.

2. Indicators' use within the socio-economic and the environmental area

2.1. Social indicators: the case of quality-of-life indicators

Well-being or *quality-of-life* indicators have been widespreaded over the last 35 years, being accepted as an autonomous scientific field of study. The basic aim of the researchers of this field is to reach a single measurement that summarises the quality-of-life of the community that is studied. Such a measurement will allow various comparisons to be made among different communities, or will allow the study of the evolutionary tendencies regarding the quality-of-life of a given cultural or geographic unit (Diener and Suh, 1997).

There are two, not alternative, but complementary (Diener and Suh, 1997; Santos and Martins, 2007; Veenhoven, 2002; UK Audit Commission, 2005; Petrosillo et al., 2013), approaches to study the quality-of-life of a certain community: the *quantitative approach* which yields the so-called *objective quality-of-life* and is based on the manipulation of observable and measurable social indicators, and the *qualitative approach* that yields the so-called *subjective quality-of-life* and is based on the citizens' perceptions of the conditions of their lives (Brajša-Žganec et al., 2011; D'Acci, 2011; Diener and Suh, 1997). Methodologically, the estimation of the objective quality-of-life is based on the collection of a wide variety of social indicators, which then are combined through an aggregation procedure, in order to construct a *composite indicator* that yields a specific quality-of-life value for the given community. On the other side, subjective approach tries to measure the quality-of-life that is psychologically experienced, thus researchers carry out interviews and fill in questionnaires with fixed answers in order to collect the subjective opinions of the citizens regarding their welfare and the conditions of their lives (Santos and Martins, 2007). These fixed answers (e.g. how safe do you feel in the area where you live) can be converted to percentages (e.g. % of people feeling safe in the area they live in), and form subjective indicators of quality-of-life (Petrosillo et al., 2013). After filling a respectable number of questionnaires, the mean value of these subjective indicators shows the total quality-of-life of the community interviewed. As seen from above, while the subjective approach is based on the *direct* measure of the quality-of-life that individuals experience, the objective approach is based on an *indirect* procedure, in which the role of indicators is inherent to this methodology and of fundamental importance. Thus, the analysis of the quality-of-life indicators performed below is solely focused on the objective approach.

Many socioeconomic phenomena are complex and therefore difficult to be measured and evaluated. Complexity also implies multidimensionality (Muro et al., 2011), and in the case of quality-of-life this multidimensionality implies that a great number of social indicators, ranging from physical and biosocial to psychological, economic, social, political and cultural, has to be studied (Bunge, 1975; Diener and Suh, 1997; Sirgy, 2011). For instance, variables such as infant mortality, doctors per capita, homicide rates, policemen per capita, GDP per capita, life expectancy at birth years, church attendance and unemployment rate have been frequently sampled, as they are obviously related to a community's quality-of-life (Diener and Suh, 1997). Based on such social indicators, several quality-of-life composite indicators have been constructed during the last years, such as the *Human Development Index*, the *Gross National Happiness*, the *Quality-of-Life Index*, the *Life Quality Index* and the *Well-being & Progress Index* (D'Acci, 2011).

However, the multidimensionality of the quality-of-life estimation issue leads to a number of methodological problems. Firstly, the whole idea of aggregating individual social indicators in order to obtain a unique value of quality-of-life should be rested on a widespread agreement on the indicators under consideration. However, an agreement of this kind cannot be reached, even in the least complex and heterogeneous societies (Diener and Suh, 1997). Moreover, although social indicators are thought to be 'objective', they are often contaminated by measurement problems (Diener and Suh, 1997). For example, sexual harassment is reported and counted in by different cultural blocks in different varieties. Last but not least, even when there is an agreement on the social indicators that will be studied, and agreement about what should be counted, there may still be a debate on the values of the indicators that represent something 'good' or something 'bad' for the society. For example, Diener and Suh (1997) stress that infant mortality might be reduced from five per 1000 births to one only with an enormous medical expense, and by saving some infants who are badly deformed or severely retarded. Whether this decrease would be desirable and worth the cost to society is a subjective value judgement.

Moreover, the objective approach of quality-of-life is fundamentally based on the use of composite indicators for which certain weaknesses have been stressed out (Dobbie and Dail, 2012; Nardo