



Wellbeing Indices: A Comprehensive Inventory of Standards and a Review of Current Comparative Measures

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1. Introduction

There have been numerous attempts to construct alternative, non-monetary indices of wellbeing by combining in a single statistic different factors that are thought to influence quality of life. The main problem in all these measures is selection bias, arbitrariness in the factors that are chosen, and the random assignment of weights to different indicators. The Economist (2005).

Social scientists continuously seek to make meaningful empirical arguments about concepts that are difficult to quantify such as happiness, wellbeing, and QOL (e.g., see OECD, 2008). Developed well, multi-dimensional indices can be effectively used to measure complex phenomena and previously immeasurable qualities, including wellbeing, which is a field of increasing importance to policy makers. These instruments provide a new, comprehensive measure by combining many indicators on multiple levels that, taken alone, would incompletely capture a concept.

GDP has been used in the past as the primary measure of wellbeing. However, scholars such as Costanza et al. (2007), Stiglitz et al. (2009), and O'Donnell and Oswald (2015) have called for more holistic and consolidated macro measures. The increased interest in wellbeing and its effective measurement is reflected in various annual cross-country summary measures including the UN's Human Development Index (HDI), created in 1990; the Where-to-Born Index (WBI) from *The Economist*, first published in 2005; the Legatum Prosperity Index (LPI), first offered by the Legatum Institute in 2007; and the Better Life Index, introduced in 2011 by the Organization for Economic Cooperation and Development (OECD).

In 2012, the United Nations (UN) Sustainable Development Solutions Network (SDSN) commissioned the annual World Happiness Report (WHR), and in 2015, the UN agreed on a set of Sustainable Development Goals (SDG) featuring societal wellbeing among its

primary foci. Costanza et al. (2016, p. 350), however, held that the SDG only provide “diluted guidance at best,” and therefore recommended that subjective wellbeing be applied as a dependent variable in determining appropriate weighting of the over 300 indicators in the SDG, allowing for a future “sustainable wellbeing index.”

The purpose of this paper is to contribute to the ongoing discussion of how to best quantify wellbeing for comparison across geographical boundaries.¹ Specifically, we attempt to establish a comprehensive inventory of standards for societal wellbeing indices. Then we assess the above-mentioned indices based on the measurements' conceptual grounding in the academic literature, along with their applicability, structure, content, and methodology. The empirical evaluation includes statistical analysis of construct, content, criterion, predictive validity, and internal consistency. Because a focus on the nomological network and careful construct development is more prevalent in psychology, organizational behavior, marketing, and similar fields, our suggestions and theoretical platform rest slightly more on established psychometric scale criteria than it does on economic literature.

The following section provides theoretical background and establishes standards for measuring wellbeing on a societal level. In the third section we evaluate the stated indices, and in the fourth section we draw conclusions. The appendices contain supporting material.

2. Theory

This section addresses important general construct measurement and validation procedures that set the standards for the analytical assessments of the various indices, highlights important theoretical concepts and empirical findings of the literature, and establishes critical requirements for a comprehensive societal wellbeing measure.

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¹ Our analysis follows the lead of Veenhoven (2000), Costanza et al. (2007, p. 268), and Van Praag and Ferrer-i-Carbonell (2008, p. vi), who maintain that the wellbeing notion should denote QOL as a whole. We suggest wellbeing can be operationalized as a superordinate latent construct consisting of the underlying variables of happiness and life satisfaction (See Appendix A).

2.1. Wellbeing Frameworks

Wellbeing research often takes one of three paths. The traditional economic method uses the preference satisfaction (PS) framework, which assumes that people naturally make optimal decisions to maximize their own utility and that observing behavior will reveal true wellbeing. Limitations to this approach include the fact that observable “choice behavior” data often are lacking. Furthermore, interpretation is not always straightforward because the data rest on the assumption that individuals make rational choices based on access to full information, unlimited computational capabilities, etc. (Wong, 1978).

Another approach follows the broad, objective wellbeing (OWB) framework, which rests upon requirements chosen by scholars based on their ideas about what constitutes wellbeing, including judgments about ethics, morality, and virtue. OWB measures include human functionings and capabilities (Sen, 1985), economic growth (Wilkinson, 2007), fairness and social justice (Rawls, 2001), and virtue (Bartlett and Collins, 2011). However, Claasen (2014) argues that even well-established OWB measures often appear paternalistic in their assumptions that certain things are good or bad for wellbeing and that OWB, despite its name, is grounded in subjective notions of what constitutes a good society.

The subjective wellbeing approach (SWB) refers to the way people experience their own lives and is often measured through self-reports, such as population surveys. The contemporary wellbeing literature generally defines subjective wellbeing as a latent variable consisting of two dimensions—evaluative wellbeing (EWB) and affective wellbeing (AWB). Like PS and OWB, the SWB framework is not without its limitations. Appendix A summarizes the SWB concept, and Section 2.3.2 discusses its shortcomings.

2.2. Designing a Holistic Societal Wellbeing Measure

In an influential paper, Costanza et al. (2007, pp. 267–272) called for a consolidated, macro wellbeing measure and proposed a framework for its development. They suggested three main criteria: the measurement tool should identify a minimum set of needs that occur cross-culturally and over time, each component should be weighted “in terms of its relative contribution to subjective wellbeing,” and it should contain interacting objective and subjective elements. This paper provides support for these criteria and suggests additional guidelines for careful construct development, summarized in Table 1.

2.2.1. Construct Measurement and Validation Procedures

Diamantopoulos (2005) and Finn and Kayande (2005) argue that both theoretical and empirical criteria are necessary to design and validate measurement models. This section establishes important principles for developing consistent, reliable, and valid wellbeing measures. Many of these principles may also be applied to instruments within the broader field of ecological economics. Among others, we draw on observations from Bollen (1989); Ping (1998); Hinkin et al. (1997); Edwards (2001); Costanza et al. (2007); and Maggino and Zumbo (2012) to guide our analysis.

The meaning of a construct, including the latent variable wellbeing and its sub-constructs, depends on its relationship with its indicators, antecedents, outcomes, and other constructs to which it is connected. Consequently, mapping the theoretical context and relationships of indicators and constructs contained in a measure is imperative to building sound and robust indices (Bagozzi, 1982; Avila et al., 2015). This contextual map represents a nomological network and includes the first two of the ten categories of benchmarks listed in Table 1, which are critical for validity and reliability.²

² Pre-analytical choices, such as the normative underpinnings of the nomological network, and other assumptions, may influence scale building, and it is good practice to make these explicit (e.g., see Kovacic and Giampietro, 2015).

Table 1
Inventory of standards for a comparative societal wellbeing index.

Theoretical requirements for validity and reliability	
1. Foundation	A. Well-grounded in scholarly theory B. Explicit and clearly defined nomological network C. Reflects the “stylized facts” of the SWB literature
2. Structure	A. Multi-scale, multi-item indicators B. Well-defined constructs and indicators C. Indicators weighted according to effect size D. Comprises subjective and objective indicators
3. Methodology	A. Transparent methodology B. Credible sources and results C. Well-defined standardization and aggregation methods D. Ability to disaggregate the instrument E. Data and scores comparable across observations F. Follows conventional guidelines for missing data imputation G. Data available in raw and normalized form
4. Applicability	A. Cross-cultural, temporal, and spatial
Some criteria for analytical examination of validity and reliability	
5. Construct validity	A. Contrast analysis B. Eigenvalue above 1.0 C. Interpretable parameter estimates D. Comparative Fit Index (CFI) ≥ 0.90 (preferably ≥ 0.95) E. Tucker Lewis Index (TLI) ≥ 0.90 (preferably ≥ 0.95) F. Root Mean Square Error of Approximation (RMSEA) ≤ 0.08 (preferably ≤ 0.05) G. Standard Root Mean Square Residual (SRMR) \leq researcher specified value
6. Convergent validity	A. Factor Loadings of 0.50 or greater B. Average variance extracted (AVE) 0.50 or greater C. Coefficient of determination of 0.15 or higher for f^2 estimates
7. Discriminant validity	A. Construct AVE must be greater than the shared variance with other constructs B. Heterotrait-monotrait ratio of the correlations (HTMT) lower than 0.90
8. Criterion validity	A. Model explains and predicts subjective wellbeing
9. Construct reliability	A. Cronbach's alpha of 0.70 or greater B. Composite reliability 0.70 or greater
10. Ranking models	A. Ramsey significance test B. Akaike's information criterion C. Bayesian analysis

A wellbeing measure should be internally consistent and satisfy content, criterion, and construct validity standards. Content validity refers to the extent to which a measure represents all facets of a given construct. Regarding wellbeing measures, we have identified four areas of content validity: foundation, structure, methodology, and applicability.

First, a sound wellbeing measure must be founded in the academic literature. This means that the overall model is well-grounded in scholarly theory; that relationships among constructs are stated, justified, and reasonable; that the scholarly findings are reflected; and that challenges and additions to the existing literature are convincing.

A second principle involves structure. The literature corroborates the common understanding that wellbeing is a multifaceted concept comprised of several core components, each containing underlying sub-components. A wellbeing measurement should therefore include multi-scale, multi-item indicators to represent these constructs. Single items used in isolation lack the precision and scope required to represent a complex theoretical concept. Single-item constructs are also more prone to random measurement error, but this problem is minimized when additional indicators are added to a construct and scores are combined (Maridal, 2013). Moreover, from a mathematical perspective, constructs with single indicators cannot be estimated in a latent variable framework; that is, it is not possible to estimate the construct variable/item loading and the residual variance of the item based on a single

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