

THE ROLE OF EVALUATION IN SUPPORTING A HUMAN SUSTAINABLE DEVELOPMENT: A COSMONOMIC PERSPECTIVE*

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Abstract:

This paper offers a new perspective on the issue of urban sustainability. Starting from a positive perspective on city life, it makes a typology of critical roles of the city that are to be considered with a view to urban sustainability. Next, it is argued that a sine qua non for a structured view on sustainable cities is the use of a more integrated perspective, as offered inter alia by cosmonomic philosophy. Then the paper argues that the use and choice of indicators in multi-criteria analysis for urban sustainability may usefully be based on this integrative methodology.

1. The City as a Human Construct

The modern city is not a recent invention. It has a long history and it has manifested itself in a great variety of appearances. The city has meant the centre of open democracy, as witnessed by the Greek concept of polis. But it has also shown its military significance, as exemplified by fortifications and walls around the city. At present, the city mirrors part of a global network society by acting as a nodal point in an interlinked information and communication configuration (see Castells, 1996). But whatever appearance a city may have had in the history of mankind, it has always formed the cradle of civilization. The key role of the city in ancient times is eloquently presented in a fascinating study of Tulleken (1988), when he argues:

"Yet by 3000 BC, an astonishingly different panorama was unfolding. Along the length of the valley, magnificent cities sprawled on the riverbanks. Around them, fields of grain spread like a tide of fecundity across the once desolated flatlands. Groves of date palms swayed in the wind, offering fruit and shade. Within the massive walls that ringed the cities, temples towered over both streetscape and plain. There were brick places and mansions and street after street of comfortable houses. People thronged the avenues and marketplaces; in hundreds of workshops artisans turned out all manner of goods, from pottery to sparkling jewelry. On holy days, processions of the worshipful wound through the streets to the temples. What had happened in this land the Greeks later called Mesopotamia, 'between the rivers', was the most crucial event in human history: the birth of civilization" (p. 1).

Clearly, the city has also played a critical role in the economic development of a country or region. The grandfather of economics, Adam Smith (1776), has already drawn attention to the strategic position of cities, as exemplified by the following quotation on Italian cities:

"The cities of Italy seem to have been the first in Europe which were raised by commerce to any considerable degree of opulence. Italy lay in the centre of what was at that time the improved and civilized part of the world. The crusades too, though by the great waste of stock and destruction of inhabitants which they occasioned, they must necessarily have retarded the process of the greater part of Europe, were extremely favourable to that of some Italian cities. The great armies which marched from all parts of the world to the conquest of the Holy Land gave extraordinary encouragement to the shipping of Venice, Genoa, and Pisa, sometimes in transporting them thither, and always in supplying them with provisions. They were the commissaries, if one may say so, of those armies: and the most destructive frenzy that ever befell the European nations was a source of opulence of those republics" (p. 406).

Cities seem to be an open intrinsic part of society. And hence they carry all the evils and all the merits of human society. They are a centre of socio-economic interplay, human

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confrontation, political dialectics, and birthplaces of civilization, centres of science and art, and a melting pot of cultures. According to Jane Jacobs (1969), cities generate economic growth *inter alia* from the disordered order of human interaction. In the urban economics literature, we find the concept of agglomeration advantages, which means that a spatial clustering of economic activities (industries, households, and public services) leads to various types of economies of scale, which cannot be generated elsewhere. Sometimes a distinction is made into localization advantages, urbanization advantages, scale advantages, urban externalities and the like. They all point at the fact that a geographic juxtaposition may lead to win-win situations for all actors involved.

In this paper we start from a positive perspective on the city as an appropriate spatial organization of human activities. On the basis of a typology of different roles of the city, we will then question whether and how the concept of a sustainable city can be employed and operationalized. Next, on the basis of the principles of the cosmomic philosophy of the Dutch philosopher Herman Dooyeweerd, we will try to create an analytical framework for judging urban sustainability. This result will then be used to test whether multi-criteria methods are appropriate tools for urban sustainability planning. The paper will be concluded with some retrospective remarks.

2. Roles of Cities

Urbanization has become a common spatial organization of human activity world-wide, in both the developing and developed countries. A few hundred years back, only a small portion of a nation's population lived in the city, but at present we observe an average urbanization rate of about seventy percent. The geography of our world has clearly exhibited a major transition towards urban forms of life. Clearly, some authors have questioned this ongoing historical trend by referring to the phenomenon of suburbanization or even de-urbanization. It is of course an undeniable fact that a process of urban sprawl has taken place, but this phenomenon did not destroy urban functions, but on the contrary reinforced urban functions. This spatial distribution only meant that the action radius of the city was increasing, but the people leaving the city centre were in their economic activity still largely - directly and indirectly - depending on central urban functions.

It has to be admitted that city life does not only have positive benefits, but also several disadvantages. A discussion on city life is often witnessing uneasy feelings. O'Sullivan (2000) quotes two authors who express contrasting views on the merits of the city: "*Cities have always been the fireplace of civilization, whence light and heat radiated out into the dark*" (Theodore Parker) and "*I'd rather wake up in the middle of nowhere than in any city on earth*" (Steve McQueen) (p.1). Despite the existence of mixed feelings about the city, the idea that the city is a 'blessing in disguise' is still prevalent. This has also to do with the great variety of roles cities are able to play. We will mention here a few of such important roles of cities, without striving for an exhaustive list.

Shelter role

The city is offering settlement facilities for numerous people, based on its scale advantages in housing many citizens. Shelter has even become a human right, and cities are able to care for the housing needs of people. From this perspective, cities offer a significant contribution to a sustainable human habitat.

Religious role

In the early biblical history the city was often regarded as the source of evil (Babylon, Nineveh). But in the later history we observe a more positive appreciation of the city. Jerusalem was the seat of King David and the New Jerusalem became even a metaphor for a total re-birth of mankind.

Cultural role

Historically, the city was the place where arts and sciences were flourishing. Venice, Bologna, Padua, Paris, Augsburg, Amsterdam and many other places offer an overwhelming

evidence of the favourable seedbed conditions of an urban way of life for the advancement of culture.

Political role

Democracy was a new type of governance which found its seedbed in the city. And still nowadays political power is largely concentrated in cities and governments have established their premises in cities. De-concentration of physical government facilities (e.g., premises) has never become very successful. Administrative functions are usually executed in capital cities of countries, or at least in cities with a critical political mass.

Economic role

The city is the market place for economic activity. It is also the place where usually products are designed and often manufactured. Furthermore, it is a marketplace where capital is supplied and advisory services are offered. In addition, the city is - as a result of various types of agglomeration advantages - a very efficient way of organizing production and consumption.

Social role

Cities house thousands of people who are through the associative nature of city life able to communicate with a great number of others, intensively or less intensively. But they have a social contact and communication spectrum which far exceeds that of a random distribution of people.

Engineering role

The city is of the cradle of technological inventions and innovations. It brings together craftsmanship, technical expertise, hardware, software and org-ware. As a result, cities are still the breeding places for the genesis of new products and services.

Network role

In an emerging network society cities become more and more the virtual centres of global network forces. The city brings together a triple-C potential: communication, competence and creativeness. Despite doomsday scenarios on the 'death of distance' and on the threats to city life, it is more plausible that cities continue to reinforce their role in local, regional, national and international networks.

The manifold strategic functions of the city have also attracted many negative forces which might erode city life. Congestion, pollution, poor health conditions and criminality are examples of phenomena which exert a threat for survival of the modern city. The world-wide concern on cities has led to the popularity of the concept of urban sustainability. This will be further discussed in the next section.

3. The Sustainable City

Sustainable development as a general concept has already a long history and dates back to 1987, when the World Commission on Environment and Development (WCED) headed by Gro Harlem Brundtland, published its report under the title 'Our Common Future'. Ever since, a world-wide debate is going on, addressing the concept of sustainable development. Despite political consensus on the importance of this notion, there was no scientific agreement on the definition of this concept. Gradually however, it became clear that sustainability should incorporate at least economic, social and environmental dimensions. This has led to a distinction into economic sustainability (EcS), social sustainability (SS), and environmental sustainability (ES). The various characteristics and their linkages have been clearly outlined by Goodland (1994) and are represented in Figure 1.

Clearly, the distinction into three types of sustainability leads also to a distinction into three classes of objectives, viz. economic objectives (e.g., growth, equity, and efficiency), social objectives (e.g., social participation, cohesion, and cultural identity) and environmental objectives (e.g., biodiversity, carrying capacity, resilience).

It was in the past years increasingly recognized that sustainable development was not only referring to global issues, but also to more manageable policy directions, such as sectors or regions. Hence, notions such as sustainable agriculture, sustainable tourism, sustainable

transport, sustainable regions and sustainable cities came to the fore (see for a broader exposition also Giaoutzi and Nijkamp 1995, Capello et al. 1998 and Satterthwaite 1999).

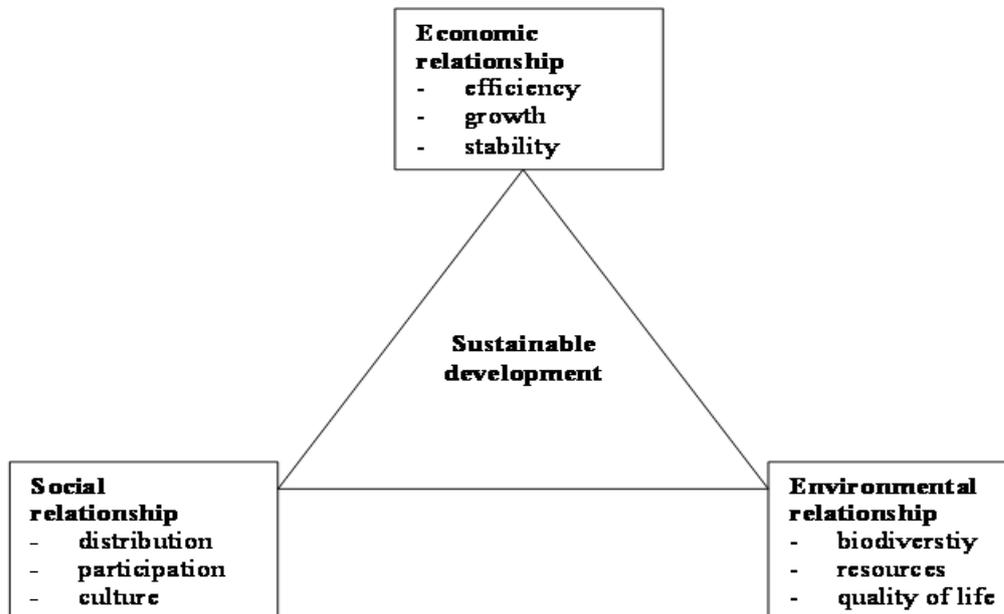


Fig. 1. Description of social, economic and environmental sustainability
Source: Goodland (1994, p.277)

In this section we will address in particular the concept of a sustainable city. A sustainable city is more than an environmentally-benign city; it should also fulfil economic goals and act as a home for man. Thus, a sustainable city is based on a symbiosis between various and sometimes conflicting objectives (see also Priemus 1999). It has been extensively argued in Capello et al. (1998) that a city - through its potential for agglomeration advantages - has far more opportunities for sustainable development than dispersed ways of living and working. Examples are environmental benefits from public transport instead of private modes, or energy efficiency for concentration of households. Clearly, there are also bottlenecks as a result of massive densities of people or economic activities.

From an environmental perspective, urban sustainability has also played an important role in recent discussions on urban spatial configurations, such as 'the resourceful city', 'the green city', 'the garden city', 'the ecological city', 'the edge city' and 'the virtual city'. Thus far, no unambiguous concept has emerged and, in reality, we observe a parallel development of various contemporaneous urban policy concepts (Nijkamp and Perrels 1994). Although it is likely that environmental quality problems may become more severe with urban size, there is no clear evidence that urban size as such causes environmental decay. This is also evident from new developments in smart growth and new urbanism.

Some authors have interpreted a sustainable city in a rather narrow sense by addressing predominantly urban form (for instance, in a compact city perspective, see Jenks et al. 1996) or urban transport (in relation to energy consumption, see Newman and Kenworthy 1989). It should be noted however, that the urban environment is a multi-faceted phenomenon ranging from 'hard' pollution indicators to 'soft' quality-of-life indicators. The urban environment is, in addition, the playing ground of many conflicting interests, institutionally, sectorally and geographically, so that the concept of the sustainable city is an interesting test case for the notion of 'civitas' or civil society (Selman, 1996). This paper will, therefore, adopt a broad perspective on urban sustainability.

It also ought to be recognized that the efficiency of the city in achieving sustainability goals is partly due to the ecological footprint of the city: a significant share of the environmental burden caused by activities taking place in the urban territory is exported to other areas (see also Wackernagel and Rees 1995).

An evident major problem in urban sustainability analysis is the definition and operationalization of proper indicators, e.g., on density, green areas, pollution emission, waste water, energy consumption, waste noise etc. (see also Finco and Nijkamp 2000). Many indicators are used and collected on an ad hoc basis and lack a clear policy and methodological foundation. In various planning evaluation studies, such indicators form the input for a multi-criteria analysis. There may thus be a need for a more rigorous and thorough basis for sustainability indicators. In the next section, we will present some ideas based on the cosmological philosophical school.

4. Towards a Methodological Underpinning

The design of a typological framework for mapping out the manifold dimensions of modern city life - and of urban sustainability in particular - is not an easy matter. The development of a theoretical, ontological system as a basis for classifying urban sustainability indicators is fraught with many problems, because of the multiplicity of characteristic aspects involved and the varied nature of all relevant aspects in modern city life. Such a classification should provide a relevant differentiation of key factors and an operational framework for multidisciplinary work in urban planning. The cosmological philosophy of Dooyeweerd (1953-1955, 1968), though theoretical in nature, may provide a useful framework for tackling more properly these issues. It is explicitly trans-disciplinary; yet it provides integration rather than fragmentation between disciplines. It may offer a very useful checklist to guide urban development planning, ensuring that not only one, but all aspects of the environmental system and human life, from the numerical to the credal, be present in urban planning research (Lombardi and Basden 1997). It finally helps to understand the nature of a city in such a way that it not only presents a multi-faceted ideal, but also may be able to provide specific guidance in planning theory and practice (see also Lombardi and Nijkamp 2000).

The theory of Dooyeweerd has been postulated in a number of recent studies related to cybernetics, information systems and organizational learning (see also Basden 1996). It has been studied and developed by other contemporary authors, such as Clauser (1991) and Hart (1984), who illuminated some of its benefits in understanding and explaining how social systems and institutions work. Finally, it has been applied to urban planning and design for understanding urban sustainability in the built environment (Lombardi 1995, 1999, 2001; Lombardi and Brandon 1997; Lombardi and Basden 1997).

This theory proposes a pluralist ontology, in which temporal reality has fifteen aspects or dimensions (named 'modalities'), each of which has a kernel meaning (in brackets): Quantitative (amount), Spatial (continuous extension), Kinematic (movement), Physical (energy and mass), Biotic (life functions), Sensitive (sense, emotion), Analytical (distinction), Historical (including technological-cultural) (formative power), Communicative or Lingual (symbolic meaning), Social (social intercourse), Economic (frugality), Aesthetic (harmony, beauty), Juridical (rights, what is due), Ethical (self-giving love), Pistic-credal (faith, vision, commitment). Each modality in this sequence presupposes the existence of one or more previous modalities thus creating a hierarchical structure.

Each aspect provides a set of 'laws' (including norms and regularities) - e.g. laws of arithmetics, laws of physics, laws of aesthetics, laws of ethics, etc. - which not only guide but also enable entities or species (people, animals, etc.) to function in a variety of ways. The laws of the earlier aspects are more determinative, while those of subsequent aspects are more normative. Although each aspect is irreducible to each other, there are definite relationships between the modalities which define their position. For instance, the economic modality is dependent on the social, the social on the communicative, the communicative on the historical, and so on (Lombardi and Basden 1997).

These relationships between modalities allow an entity (or a system) to function in a coherent rather than fragmented manner. In other words, there are two ways a 'thing' or object may possess properties of a modality: 'actively' and 'passively'. The two functions are not mutually exclusive. All 'things' function simultaneously passively in all the modalities, so that it is only the active functions of certain modalities that a 'thing' may lack and which exhibit the sequential order of appearance noticed above (Hart 1984).

Though each system is subject to the specific law(s) of every modality (either as subject or object), there is one modality that qualifies the system, i.e. it endows the system with its ultimate mission character and uniqueness, distinguishing it from other types of system. The way 'things' of a particular type are 'qualified' by its associated modality and are governed by the laws of their qualifying modality, is named their 'qualifying functions'. The qualifying aspect of a 'thing' is the modality whose laws guide and regulate the internal organization or development of the 'thing' considered as a whole and which the highest aspect is also in the above mentioned sequential order in which the 'thing' functions actively. For example, a rock is qualified by the physical modality, a tree by the biotic, a dog by the sensitive, while a man having all the fifteen modalities active is qualified by the credal one (the highest in the list). It is noteworthy that there is no direct causal link between modalities, e.g. better lingual communication does not automatically bring better social relations (Lombardi and Basden 1997).

Finally, the correspondence between the orders of different modalities allows one modality (named 'source') to be used as a metaphoric representation of another or several other modalities (named 'idiom'). For example, the quantitative modality is often used for explaining the functioning of other systems, such as the social system. Social scientists can then use the laws of mathematics to manipulate aspects related to the social modality or the economic modality and derive conclusions which have been difficult to arrive at without the aid of these laws. However, it is important to note that these conclusions rest upon the laws of the numeric modality and not on the basis of the spatial or social modality. Therefore, while they may be mathematically valid, they need not be necessarily valid in the other spheres. In particular, though every modality can be an 'idiom' for another, its effectiveness as an idiom varies and the degree of correspondence declines as the distance between one modality and another increases. Therefore, the numeric modality is not a very suitable idiom for the ethical modality and it would be better to use a closer modality such as the juridical modality.

In the context of spatial development, this ordered structure of aspects may offer a useful classification system for spatial development and a guide for the identification of potential barriers to interaction between regions. It may provide the theoretical underpinning of a new taxonomy of sustainable cities which is able to support decision-making processes and the mapping of qualitative factors in an urban sustainability context. This classification is concisely summarized in Table 1. It provides a systematic and logic design, which is comprehensive, but avoids an overload of unprocessed information. The various items may also constitute the basis for urban sustainability planning. The various elements of Table 1 can be re-grouped for sustainability purposes into 3 major clusters:

- A. Spatial-physical: quantitative, spatial, kinematic, physical, biological
- B. Socio-cultural: sensitive, analytical, historical, communicative, social
- C. Institutional-behavioural: economic, aesthetic, juridical, ethical, creedal

If one takes for granted that this cosmomic approach offers a comprehensive framework for scientific research, and then also our analytical apparatus should be tested on its ability to meet the above classification. This will be discussed in the next section with a particular view to multi-criteria analysis.

Table 1. Classification of urban roles/functions by means of modality order

Modalities	Nucleus of meaning	Taxonomy of urban roles/barriers (examples)
Quantitative	Knowledge of 'how much' of 'things'	Low volume of resources Large population size
Spatial	Continuous extension/ expansion	Connectivity potential Spatial distance
Kinematic	Movement, flows	Missing links in traffic infrastructure Opportunities from telecommunication
Physical	Energy, mass	Natural obstacles Due access to energy sources
Biological	Life function	Overpopulation High environmental sustainability
Sensitive	Senses, feelings	Sense of safety Criminality
Analytical	Discerning of entities, logic	Educational and training backlog High skills of network actors
Historical	Formative power, technology and cultural development	Long-term isolated location Distinct evolution of human systems
Communicative	Informative, symbolic representation, linguistic	Language and vocabulary backlog Network externalities
Social	Social intercourse, social exchange	Ethnic segmentation Socio-economic harmony
Economic	Prudence in handling limited resources	Low entry cost to network participation Lack of monetary integration
Aesthetic	Harmony, beauty	Disparities in creative arts Abundance of cultural heritage
Juridical	Retribution, fairness, rights	Harmonization of legal system Administrative and bureaucratic rules
Ethical	Love, moral, code of conduct	Internal social group protection Political and ideological protection
Credal	Faith, commitment, trustworthiness	Cultural-religious segmentation Work ideology and trust

5. A Multiple Criteria Framework

Multi-criteria analysis has become a useful tool in evaluation and planning studies, also in regard to urban sustainability analysis (see Finco and Nijkamp 2000). In public decision-making, normally a wide range of decisions has to be made without a clear reliance on the market system. This is partly caused by the nature of choices in the public sector (with emphasis on multi-actor participatory democratic modes of decision-making) and partly by the complexity of government projects (with long-lasting and often uncertain implications). And it is indeed increasingly recognized that decisions based on market forces alone do not necessarily lead to optimal results. In the context of urban policy, structural market failures as well as

unexpected external factors may need a policy system that ensures an improvement of socio-economic and environmental conditions.

In the past, several methods have been developed and applied in policy analysis, in which a market evaluation played a prominent role. The most well-known example of such a market evaluation method is based on cost-benefit analysis (as an operational application of welfare theory). This method forms the foundation for many policy assessment methods and has been successfully applied in many case studies in the public sector. Despite its great many merits, it is increasingly recognized in modern policy analysis that it also has severe limitations, because not all relevant welfare implications of public sector initiatives can be expressed using the 'measurement rod of money' (Nijkamp et al. 1991).

Cost-benefit studies seem to be most applicable and appropriate if the decision concerns a well-demarcated and a priori precisely defined project which does not generate many unpriced or qualitative externalities. If however, the decision concerns a more general policy programme (of which the details and even sometimes the major features are unknown), then the translation of the impacts into precisely measurable and quantitative consequences and subsequently into monetary figures is often rather problematic. Similarly, if a public investment is likely to generate a wide diversity of social costs (e.g. landscape destruction, loss of safety, health effects, loss of biodiversity or rare species, destruction of archaeological sites); it is often a heroic research task to come up with reliable figures that are broadly accepted in the policy area. This does not mean that cost-benefit analysis would have to be discredited; but it would have to be complemented with more appropriate evaluation tools.

As a response to the shortcomings of conventional evaluation studies, a great diversity of modern assessment methods has been developed over the last 10 years in order to extend the range of and to provide a complement to conventional cost-benefit analysis and to offer a perspective for procedural types of decision-making in which various quality aspects are also incorporated. Many of these methods simultaneously investigate the impacts of policy strategies on a multitude of relevant criteria, partly monetary, partly non-monetary (including qualitative facets). They are often coined multi-criteria methods and are also known as multi-assessment methods (Nijkamp 1999).

It is noteworthy that, in the past few years, an avalanche of assessment and evaluation studies has been undertaken in the regional, transportation and environmental field, but unfortunately, an integral study and a systematic comparison of findings of previously undertaken assessment studies has proven to be difficult due to different analytical approaches and differences in presentation. Several problems underlying a decision-making process in an urban sustainability context have to be coped with, such as:

- the relevant urban information or available data always contain a component of uncertainty;
- the data or information may be stored in different statistical data bases that may be difficult to access, manipulate, compare and study;
- a large set of often conflicting urban objectives or targets has to be taken into account;
- the decision-making process itself might be influenced by power relations or selfish motivations of urban stakeholders; and
- a decision-making process has to take place within the shortest time possible to avoid countervailing effects from the side of various urban actors.

The above considerations highlight that the policy objective of urban sustainability is not unambiguous, but may lead to conflicting actions. Is it possible to devise a decision support system that is able to shed clear light on this difficult issue? The answer to this question may be given by referring to conflict management techniques development in the multi-assessment literature. The existence of multiple objectives means that, in a given societal setting, the best possible alternative or policy has to be determined that also creates sufficient public acceptability or at least social feasibility. In other words, the basic question is: how to determine the optimal policy?

It is generally accepted nowadays that most decisions - certainly in the public domain - can be typified as multiple objective or multi-criteria problems (Janssen 1991, Nijkamp et al. 1991, Beinart and Nijkamp 1998). This means that an optimal - or most acceptable - compromise

alternative from a set of competing alternatives has to be identified which best satisfies a number of - often conflicting - objectives or decision criteria. Another complicating factor is that usually in the public policy domain, besides a set of quantitative criteria, qualitative criteria must also be taken into account in a multi-actor decision-making process. Examples are the interest of the biotic and a-biotic environment, the protection of school children, accessibility conditions of the elderly generation, or the risk of criminality in public transport.

As mentioned above, cost-benefit analysis has severe shortcomings when it comes to an operationalization of intangible aspects, so that this theoretically elegant method has often limited applicability. In most public policy evaluation studies, especially the assessment of environmental impacts turns out to be troublesome, since all advantages and disadvantages of policy options would have to be translated into a common monetary unit. Hence, incommensurable criteria of an unpriced and intangible nature cannot be included a decision-making procedure based on a standard cost-benefit analysis. Furthermore, in the current policy practice in many countries there is hardly any applicable and meaningful way of including distributional impacts on welfare (e.g., through a weighting system for different groups) into policy evaluation. Therefore, a proper decision-making tool is needed that is able to handle qualitative and intangible information in a proper way. Consequently, for our analysis of urban sustainability initiatives, it seems useful to resort to multi-criteria analysis (MCA) as a modern decision support method in the public sector and elsewhere.

It also seems plausible that the great many aspects of urban sustainability can meaningfully be checked on completeness, consistency, duplication and internal logic by deploying the classes A to C (and its 15 constituents) from Dooyeweerd's cosmonomic methodology. Clearly, a more rigorous empirical test framework would be needed.

6. Concluding Remarks

Although the city forms the heartland in a modern network society, local or urban sustainability is seemingly a small-scale policy objective in a large world. But it ought to be recognized that it plays a crucial role in the wider context of international climate and environmental policy. Each city has a vast range of policy options ranging from the built environment to public transport, from waste management to energy policy, from information campaigns to efficient water use. The responsibility of local authorities far exceeds the boundaries of their city, as is witnessed by the urban ecological footprint indirect. But the challenge is to bring the issue of the global environment close to the citizen, as he/she is the key actor in any sustainability policy. Local instruments should, therefore, appeal to the individual household and at the same time refer to a broader environment. This idea is also convincingly reflected in the Local Agenda 21 (see also Selman 2000). Urban sustainability management is thus a complex undertaking, as it has to address a formidable number of aspects. In the paper we have tried to offer a novel approach to multi-criteria analysis of sustainability initiatives by referring to cosmonomic philosophical thoughts offering a systematic typology for multidimensional urban planning issues. They offer at least a coherent and rather complete framework for judging and designing a multi-criteria analysis by way of a meta-experiment.

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