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Guest Editorial
An Opinion on Multi-Criteria Decision-Making Analysis for Sustainability-Based Spatial Planning Practices. Time to Improve?

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ABSTRACT

The first definition of the sustainable development appeared in 1987 by Brundtland Report. Since then, more than 80,000 scientific documents with the relevant keywords, included in their titles, have been published in Web of Science (WoS) database. It is worth stating that the focus of the scientific efforts in this area has been mainly on the pillars already included in the Brundtland Report for sustainable development, i.e. Environmental, Economic, and Social. However, I believe that besides the mentioned pillars, there is a need to add (at least) another pillar as "Technical" to make sure that sustainable development will ensure the industrial sectors that sustainable development will also take the attributes related to the quality of the products and services into consideration. This will assist in tackling the current global-scale environmental issues more efficiently and practically. When combined with the multi-criteria decision-making processes such an approach may result in the involvement of the scientific community in an integrated approach "...to meet the needs of the present without compromising the ability of future generations to meet their own needs".

1. INTRODUCTION

First of all, I am grateful for the invitiation received from the editors of the "Journal of Settlements and Spatial Planning" to edit a special issue on "multi-criteria spatial decision support systems for sustainable development".

A complex matter such as spatial planning needs to be approached as a multidimensional procedure whose constituents should be analyzed in a systematic manner (Merciu et al., 2019; Kamali et al., 2019; Kamali et al., 2015; Jahanshahi et al., 2019; Kamali et al., 2017). We are aware that a number of decision-making processes have been introduced to the scientific community and some of them have attracted huge attention in recent years, as confirmed by the number of published articles in the literature. On the other hand, sustainability has been introduced as a tool to assist with the "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*", as stated for the first time in the Brundtland Report of 1987.

As stated in the mentioned report, sustainability consists of three main pillars namely "Environmental", "Social" and "Economic", which have to be considered to provide the decision-makers with sustainable solutions, especially in spatial planning practice.

However, we may believe that we are currently in a transition phase from the rapid development of knowledge in various scientific areas. One of the main activities I have been involved in recently is performing scientometric studies in various scientific fields. It should be mentioned that in almost all the scientometric studies that were carried out, the number of publications proves to have a sigmoidal trend, meaning that the increasing rate of the publications tends to decrease, especially after 2018. We may bring a couple of reasons for these trends. Among them, the saturation of the literature with the conventional methodologies and the need to develop a new insight on the possible contributions to accelerate the publications with high degree of novelty. Here, I would like to mention two main fields in which we can establish our scientific discussions in line with the title of the present special issue.

2. MULTI-CRITERIA DECISION MAKING PROCESSES. FUNDAMENTALS

The basis of various MCDM methodologies is more or less the same. A set of parameters is identified. Then a panel of experts is formed and they are asked to represent their opinion based on a pre-provided scale (Likert, for instance). Basically, the process continues until a consensus is reached among the panel. Hence, the process may be performed in one run, two runs and even more. In each run, the panel is being informed about the results of the previous run about the relative importance of the involved criteria or the periodization of the alternatives. To simplify the criticism here, the reader may consider a situation in which there cannot be a consensus among experts due to several reasons such as the nature of the problem, the insufficiency of the existing data to enable a scientific-based judgment, etc. In these conditions, how can we employ a MCDM methodology? Should we force the panel to reach consensus? The answer to this question may be yes, at least based on my experience. The MCDM methodologies seek a final consensus among the panelists. I believe that reaching the consensus cannot be followed as the final goal in many novel scientific areas. In such cases, the panel should be given enough freedom to express what they exactly believe. And this could lead to a no consensus situation. However, extracting a report from the literature on MCDM methods concluding that "*the consensus could not be reached*" (due to some specific reasons) is quite "difficult", if not "impossible". For instance, site selection of large factories for the production of nanostructured materials is a complicated issue requiring (for instance) enough information on the possible adverse effects of such materials on the environment and on the human health. Due to insufficiency (or the contradiction) of the existing information in the literature, a consensus among the expert panel cannot be reached easily. In such conditions, we may introduce novel concepts such as the "degree of consensus", which can be reached in the second run of the questionnaire dispersion among the experts. In the second run, the panel may be informed about the results of the first run (which is the only blind run) and they may be asked to keep or consider minor modifications, if any. Thus, they do not feel the pressure to make unwanted changes in their opinion to reach the desired consensus. The degree of consensus among the experts can be interpreted as the "degree of uncertainty" in the MCDM process, which is currently missing when such methods are applied.

3. SUSTAINABILITY PILLARS. TIME TO REVIEW THE PAST 20 YEARS!

As stated before, after 20 years from the first definition of sustainability, this is the time to express if "we are more sustainable" now compared to 20 years ago? To answer this question I would like to emphasize that the main enemy of sustainability is the release of greenhouse gases resulting in global climate change and global warming. The Earth is now warmer than it was 20 years ago. The large ice mountains in the polar areas are melting and the danger is on the way! This is the time to explore the main reasons for such environmental disasters. Making an advanced search in titles of the documents published in the Web of Science (WoS) database can indicate that more than 80,000 documents have been published on sustainability. They have almost structured their research based on the pillars of sustainability defined in the Brundtland Report (1987). The question here is why, after 20 years of considering the environmental, social and economic aspects, more and more greenhouse gases are being released into the atmosphere. In this regard, I believe that there is a need to add (at least) another pillar as in "Technical" to make sure that sustainable development will satisfy the industrial sectors and that sustainable development will also take the attributes related to the quality of the products and services into account. This way they are more encouraged to adopt the sustainability criteria. Let me bring an example. Site selection of industrial activities is a complex problem and requires a number of considerations. The access to high-quality raw materials that may result in high-quality products, or the access to modern technologies are some of the technical reasons/aspects for setting up industrial activities (Kamali et al., 2019). However, one may not consider none of the three conventional pillars of sustainability, but a fourth pillar. Thus, sustainability concept may force to consider the quality of products for the end-user. Therefore, having the importance of technical criteria, we may be allowed to revise the definition stated in the Brundtland Report (1987) as

follows: “Sustainable development in various sectors should consider the associated technical, environmental, social and economic criteria for a service or a product to meet the needs of the present without compromising the ability of future generations to meet their own needs".

In conclusion, defining the concepts of “Degree of Uncertainty” in MCDM methodologies combined with a “Four-Pillar Sustainability Concept” may lead to a novel and practical way of thinking to promote sustainability in various activities, mainly those related to settlements and spatial planning activities. The author hopes the present editorial note can open a window for further discussion on the definition of sustainability and its integration with MCDM methodologies towards more sustainable decision-making activities.

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