

Model for Sustainability in Healthcare Organizations

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INTRODUCTION

Sustainable development may be defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987).

Decision-making in an environmental framework incorporates different technical, socio-economic, environmental and political questions, which conflict with one another; it is also necessary to add the existence of different stakeholder views (Huang, Keisler, & Linkov, 2011). These conditions are ideal for the application of Multi-Criteria Decision Analysis (MCDA) techniques, since they provide acceptable compromise solutions (Munda, Nijkamp, & Rietveld, 1994); in fact, the literature indicates that the application of MCDA techniques produces a significant improvement in the decision-making process which could guarantee public acceptance of a specific solution (Huang, Keisler, & Linkov, 2011). This has allowed the literature which applies MCDA in the environmental field to grow considerably over the last two decades.

There are many contributions which apply MCDA in order to analyse different environmental questions in a variety of industries, for example, the textile industry (Aragones-Beltran et al., 2009), renewable energy (Higgs et al., 2008), the electronic industry (Hsu & Hu, 2008), waste treatment (Lahdelma, Salminen, & Hokkanen, 2002), the extraction industry (Lamelas et al., 2008), power generation (Liang et al., 2006), manufacturing (Tseng, Lin, & Chiu, 2009), chemical industry (Pilavachi, Chatzipanagi, & Spyropoulou, 2009), public transport (Tzeng & Lin, 2005). Herva and

Roca (2013) review the application of MCDA techniques to corporate environmental evaluation. However, contributions regarding the hospital environment are almost non-existent, despite the fact that hospital facilities also generate waste and environmentally harmful pollutants.

Healthcare organizations should promote environmental awareness, keeping a balance with economic and clinical needs, such as to guarantee sustainable development. This implies minimizing the environmental impact, as well as improving the health of hospital workers and users and those who live nearby (Comunidad de Madrid, 2005).

A body committed to looking after the health of the public must be aware of the need to include within its strategy objectives which lead to sustainable development. A large number of health organizations are therefore working towards certificates in environmental standard ISO 14001 or the EMAS regulation. As a part of this process, health centres produce annual sustainability records, which have necessitated the definition of environmental indicators to facilitate data comparison and the long term development of the environmental behaviour of the hospital. However, not all the environmental areas or the indicators recorded have the same impact on the environment; some may have serious repercussions while other only involve slight costs. It is also possible that several indicators are related and so the same environmental area is assessed more than once.

It is here that methodologies for the development of an assessment system, such as auditing, a system of key performance indicators or a balanced scorecard, may fail; this latter technique also has further limitations (Grigoroudis, Orfanoudaki,

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& Zopounidis, 2012). On the other hand, the application of MCDA techniques allows for an objective modelling of the decision problem since one or more decision makers give judgements, providing an evaluation of the importance that each environmental issue has for an organization. These techniques also have the capacity to analyze both quantitative and qualitative criteria simultaneously and so guarantee that there will be no redundancy in the evaluation of items, as the criteria considered must be independent. In the case of the multicriteria technique Analytic Hierarchy Process (AHP), it divides a complicated process of decision making, with numerous conflicting criteria, into a hierarchical system of elements, easing the decision-making process. The use of pairwise comparisons, furthermore, allows a ratio scale of measurement to be obtained and so more precise information about the preferences of decision makers can be generated; thus it is not necessary to define explicitly a measurement scale for each criterion (Bozbura, Beskese, & Kahraman, 2007). It is also the only technique to incorporate a system for assessing the consistency of the judgements given by the decision makers (Liberatore & Nydick, 2003). The application of AHP is not mathematically complex (Durán, 2011) and can be easily understood by the managers or those ultimately responsible for decision making.

Among the literature which applies AHP for assessing and weighting criteria and indicators for sustainable development with different objectives are Mendoza and Prabhu (2000), Mendoza and Prabhu (2003), Brent, Heuberger, and Manzini (2005), Mulder and Brent (2006), and Brent, Rogers, Ramabitsa-Siimane, and Rohwer (2007).

However, when the decision makers give their judgements they prefer to use a linguistic expression rather than a crisp number because it is difficult to give an exact figure in the assessment and evaluation of decision making problems (SeongKon et al., 2011). Fuzzy set theory takes into account this uncertainty, vagueness or ambiguity. The inclusion of fuzzy theory in decision making has increased significantly in the literature, which

shows the need to incorporate such features in a problem characterized by imprecision and subjectivity (Herva & Roca, 2013).

Decision making in health care is no different from that applied in other areas, but health care decisions can have serious consequences for the patient's quality of life and society in general and this makes the choice of an alternative more difficult. Health care decision makers habitually use ad hoc or deliberative processes (Diaby, Campbell, & Goeree, 2013); but these methodologies are criticized for their lack of transparency, structure, and comprehensiveness, as they fail to explicitly incorporate patient preferences, unmet needs, and ethical and social values (Devlin & Sussex, 2011). Decisions taken in this field, then, are based on experience or on subjective judgements not backed up by objective mathematical tools which might support the decision or guarantee that the choice or the result can be justified to the hospital management or the public, who are the customers of any health institution.

Nevertheless, MCDA techniques provide a structured and transparent approach to identifying a preferred alternative by clear consideration of the relative importance of the different criteria and the performance of the alternatives with the criteria. Thus, the MCDA methods are seen to be a valuable decision support tool for healthcare decision making (Baltussen, Stolk, Chisholm, & Aikins, 2006). The use of MCDA methods is increasing in the field of health. The use of MCDA methods in health care decision making is in fact recommended more and more frequently (Devlin & Sussex, 2011) (Thokala & Duenas, 2012). The extant literature mainly applies AHP in medical diagnosis (Dolan & Bordley, 1993), patient participation (Singpurwalla, Forman, & Zalkind, 1999), therapy (Singh, Dolan, & Centor, 2006), organ transplantation (Koch & Rowell, 1997), project and technology evaluation and selection (Pecchia et al., 2013), and health care evaluation and policy (Chang, 2006). A literature review on the application AHP in medical and health care decision making may be consulted in Liberatore

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