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PHD THESIS

Stakeholder involvement in decision making: the development of a mass participation tool

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This work deals with the multi-criteria group decision-making (MCGDM) problems by involving a large number of participants, i.e., mass-participation decision-making. In a decision-making problem, sometimes there is a need to involve multiple stakeholder groups because of different reasons. For example, a sustainability decision-making problem needs to account not only for economic development but also for environmental and social actions; it must involve the key stakeholder groups in decisions. Decision-making requires support from key stakeholder groups, and the stakeholder groups need to express their opinions because the decision outcome will have an impact on those groups in turn. However, when larger groups, such as citizens, are involved in the decision-making process, decision-making problems become more complicated. Thus, it may be insufficient to invite only representatives of stakeholder groups, as conventional MCGDM does. In these cases, it might be more appropriate to establish a channel to hear from more voices in order to foster legibility and transparency in decision-making. A possible solution is to involve more participants in the decision-making process. However, involving more participants also further increases the cost and complexity of the decision process and increases the number of potential conflicts among the participants due to the larger number of participants. Furthermore, the assessments made by participants who do not receive guidance or lack expertise run a higher risk of inaccuracy.

Therefore, this work presents a new mass-participation decision-making framework, with the intention to exploit the benefits of mass-participation decision-making

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and minimize the drawbacks because of higher participants. It is based on a MCGDM framework called the multi-actor multi-criteria analysis (MAMCA). With MAMCA, stakeholder groups can be made aware of the interests of other groups, so as to have a better mutual understanding of their positions, thereby making them more prone to searching for compromised solutions and to possibly reach a consensus. The proposed mass-participation framework aims to provide a more legible procedure to increasing the level of representation; this is done by including more participants at different stages of the decision-making process when necessary, while also minimizing the negative effects when the number of participants increases. To better facilitate the decision-making process, a mass-participation tool is further developed based on the proposed mass-participation framework. This dissertation presents this mass-participation tool with five contributions, which include three theoretical contributions: a new criteria pre-processing framework for systematically selecting criteria for MCGDM problems, a new clustering algorithm for clustering participants within large stakeholder groups, and a new consensus reaching model to help policymakers and representatives of stakeholders find compromised solutions; and two practical contributions: new MAMCA software and a new mass-participation survey tool.