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Article

A Novel ICT Framework for Sustainable Development Goals

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Abstract: Sustainable development is critical to ensure the future of humanity. Therefore, the assessment and governance of sustainability becomes a central challenge our society is facing. This paper provides a novel ICT framework for addressing sustainable development goals. It is characterized by both local and global considerations, in the context of economic, ecological, and social aspects of sustainable development. The framework consists of three modules: data module, sustainability module, and governance module. Data module integrates data from several sources, processes data, infers knowledge, and transforms data into understandable information and knowledge. The second module implements SDGs at the level of municipality/city, ensures ranking of locally transformed SDGs to arrange them in line with the values and needs of the local communities, and proposes an integrated approach in modeling the social-ecological systems. By implementing governance theories, the governance module permits an effective citizen engagement in governance of SDGs. The ICT framework addresses short-term and long-term SDGs and allows for the vertical and horizontal linkages among diverse stakeholders, as well as for their contributions to the nested rule structures employed at operational, collective, and constitutional levels. Thus, the framework we provide here ensures a paradigm shift in approaching SDGs for the advancement of our society.

Keywords: sustainable development goals; ICT framework; governance science; sustainability science; data science; digital democracy

1. Introduction

At the UN Sustainable Development Summit in September 2015, the world leaders adopted a new 2030 Agenda for Sustainable Development which is "a plan of action for people, planet and prosperity" designed to "shift the world onto a sustainable and resilient path" [1]. At the heart of this universal, integrated and transformative Agenda are the 17 Sustainable Development Goals (SDGs) (Figure 1 depicts all 17 goals arranged into three pillars: social, environmental, and economic), 169 associated targets, and 232 indicators. Total number of indicators listed in the global indicator framework of SDG is 244. However, as nine indicators repeat under two or three different targets, the total number reduces to 232.

Far more ambitious than the Millennium Development Goals (MDGs), the new SDGs framework contains several bold objectives to be achieved by the year 2030, including the end of poverty (SDG 1), and hunger (SDG 2), good health and well-being for all (SDG 3), universal secondary education (SDG 4), access to affordable, sustainable and modern energy (SDG 7), sustainable cities and communities (SDG 11), actions to combat climate change (SDG 13), protecting and promoting sustainable use of the oceans, seas and marine (SDG 14) and of the terrestrial ecosystems (SDG 15) [2]. The SDGs, otherwise known as the Global Goals, are integrated (and indivisible) and create balance between