

A Review of Network Analysis for SDG 17 (Partnership) - Partnership for the Goals

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Abstract—This study investigates the use of network analysis as a visualisation tool for the United Nations Sustainable Development Goal 17 (Partnerships for Goals). Network analysis offers a strong framework for mapping and comprehending the complex web of multi-stakeholder linkages required to achieve sustainable development goals. This visualisation approach unveils previously hidden patterns in partnership ecosystems by depicting organisations as nodes and collaborative partnerships as connecting edges. The study shows how network visualisation may identify critical bridge organisations, relationship gaps, and collaboration clusters in government, the commercial sector, civil society, and academic institutions. We demonstrate how network analysis aids evidence-based decision making by uncovering structural elements of partnership networks that narrative descriptions alone cannot convey. One example is the UNDP's SDG Partnership Platform. The visualisation technique's capacity to illustrate partnership dynamics across several dimensions—such as organisational type, geographic breadth, and SDG priority areas—makes it especially useful for establishing global collaborations. This study emphasises network analysis as an important tool for better partnership coordination, resource allocation, and, ultimately, progress towards all sustainable development goals through increased cooperation.

Keywords - SDG 17, Partnership Visualization, Network Analysis

I. INTRODUCTION

Sustainable Development Goal 17 (SDG 17) focusses on establishing global partnerships to promote sustainable development, acknowledging that the complex issues addressed by the 2030 Agenda need coordinated action across sectors and countries. Network analysis visualisation emerges as a valuable tool for understanding and optimising multi-stakeholder collaborations. Network visualisation converts abstract partnership data into understandable patterns that highlight the fundamental architecture of collaboration ecosystems by depicting organisations as nodes and collaborative partnerships as connecting edges. This technique allows stakeholders to discover critical bridge organisations, relationship gaps, and collaborative clusters that are otherwise buried in standard reporting methodologies. As development issues become more linked, network analysis visualisation offers both diagnostic insights into existing partnership landscapes and strategic assistance

for improving cooperation efficiency in order to accelerate progress across the SDGs.

II. ILLUSTRATION/PROCESS FLOW

About the Partnership Accelerator



Figure 1: Partnership Enabling Eco-system

The 2030 Agenda Partnership Accelerator is a collaboration endeavour between UN DESA and The Partnering Initiative (TPI) collaborates with the United Nations Office for Partnerships, UN Global Compact, and UN Development Coordination Office.

The Partnership Accelerator seeks to create a partnership-enabling environment that engages businesses in sustainable development and accelerates the quantity and effectiveness of partnerships to achieve the 2030 Agenda. It intends to:

1. Raise understanding and build the partnering skills and competencie
2. Support the organizational change required for our institutions to become 'fit for partnering'
3. Draw out good practice and support the development of efficient SDG partnership platforms

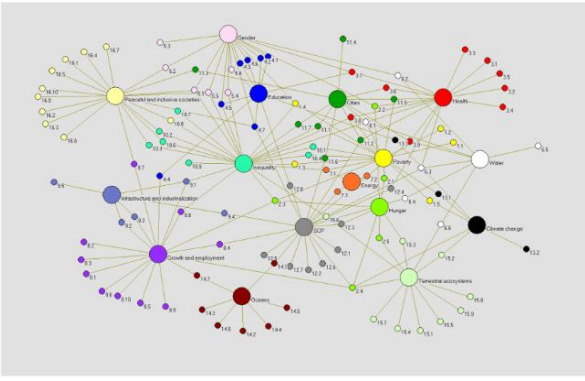


Figure 2 : Sustainable Development Goals as a network of targets (DESA study)

According to the Millennium Institute (2017a), the integration of policies in several sectors might impact SDG implementation. The Institute created a comprehensive system dynamics model based on the well-known Threshold 21.

The Integrated Model for Sustainable Development Goals Strategies is a scenario simulation model. The iSDG model may provide "country-specific development scenarios to show the implications of policy on a country's progress towards the SDGs" (Millennium Institute, 2017b). The model analyses the impact of different policy scenarios versus a business-as-usual scenario across sectors over the medium to long term, integrating the three elements of sustainability into a unified framework. The iSDG Model

The three-dimensional framework encompasses 30 dynamically interacting areas that address all 17 SDGs. The model also aids in understanding the linkages between the objectives and targets.

The Millennium Institute (2017c) provides a tool for measuring synergies, allowing for analysis of each policy's contribution to the final outcome for any indicator, as well as synergies between policies.

III. ADVANTAGES AND LIMITATIONS

Against this backdrop, however, there are substantial gaps in the existing knowledge on the analysis of SDG interlinkages.

(a) Comprehensive studies on the interlinkages between SDG targets which covers all the 169 targets are inadequate and underdeveloped. There are some ongoing works on this issue, such as ICSU's guide to SDG interactions (2017), but complete studies are not yet available.

(b) Quantification of the SDG interlinkages is limited in the existing literature though there are a few works on categorizing different types of interlinkages with pre-defined weights.

(c) Most of the existing works are limited to the study on the general structure of the SDG interlinkages through identification of the interlinkages in general. But identification and quantification of these interlinkages at national level is still missing.

(d) The focus of most existing works is placed on the identification of the interlinkages. There is hardly any literature which provides comprehensive analysis on identified SDG interlinkages. All these limitations constrain the application of SDG interlinkages as practical knowledge to support SDG integration and policy coherence. To echo these knowledge gaps in the existing

A. Advantages

Network analysis visualisation offers significant benefits for understanding SDG 17 relationships. This technique displays the full structure of collaborative ecosystems, highlighting the links between varied stakeholders that would otherwise be concealed. By mapping organisations and their interactions, network visualisation highlights pivotal actors that propel partnerships ahead, as well as isolated entities that may benefit from better integration. The method is particularly effective at identifying strategic gaps where new connections might increase collaborative impact, allowing decision-makers to prioritise relationship-building efforts. When updated on a regular basis, these visualisations may trace the growth of partnerships over time, illustrating progress towards the goal of creating more interconnected networks for sustainable development.

Potential sources of partnership value creation: Collaborative Advantage This research study presents an integrated approach for analysing SDG interlinkages between goals. Potential uses and policy ramifications are discussed.

This research identifies binary linkages between 169 SDG targets, with "0" indicating no relationship and "1" indicating a potential relationship. It is based on a thorough review of scientific literature and relevant policy documents from major international policy processes involved in SDG monitoring and indicators.

Different from other existing studies working on the identification of SDG interlinkages itself, we synthesised existing studies by taking the union of multiple sets of the reference interlinkages provided by various existing studies. The advantage of this approach is to provide an upper bound of the interlinkages covering all the 169 targets which helps fill in the knowledge gap related to the above (a) that comprehensive study on the interlinkages between SDG targets which covers all the 169 targets is lacking.

B. Limitations

In addition, network analysis has significant limits when used to SDG collaborations. The strategy is strongly reliant on accessible data, which is frequently inconsistent and incomplete across organisations and areas. The visualisation inherently compresses complicated interactions into fundamental links, which may obscure the quality, complexity, and nature of ties. Many visualisations merely provide static snapshots rather than representing the dynamic, ever-changing nature of cooperation. Furthermore, effective implementation necessitates specialised technical competence, which may not be available to all parties. Perhaps most importantly, the quantitative focus of network research may fail to capture critical qualitative aspects of partnerships, such as trust levels, power imbalances, and cultural elements that impact collaborative success. The found relationships are quantified by correlation analysis of indicator-level data related to the relevant goals. Nine country-specific quantified networks of SDG interlinkages are presented based on time-series data (2001-2014) gathered for chosen countries, mapping 51 indicators to 108 objectives (out of 169 owing to lack of trackable data). This addresses problems in quantifying SDG interlinkages and conducting national-level research (b) and (C), which are currently lacking.

We used Social Network Analysis (SNA) to depict and investigate the structure of SDG interlinkages in nine countries, including country-specific aspects based on various criteria.

Centrality measurements include degree, eigenvector, betweenness, and proximity. This pioneering study addresses knowledge gaps in quantifying and understanding SDG interlinkages, rather than only identifying and visualising them (c) and (d), respectively.

There are several limitations which may constrain the effective use of the proposed integrated approach as a practical tool supporting national SDG integration and policy

coherence. These limitations includes:

- Challenges in identification of SDG interlinkages in particular at the national level;
- Challenges in well-defined indicators with reliable data;
- Challenges in reliable and trackable data for the quantification
- Limitations in the quantification of causality
- Challenges in defining the functions of the SDG network and selection of appropriate metrics for the structural analysis of the SDG network.

IV. SUMMARY

SDG 17's network analysis visualisation translates complicated partnership data into usable insights by depicting organisations as nodes and collaborative ties as connecting lines. This method identifies essential structural patterns in multi-stakeholder cooperation ecosystems that standard approaches cannot detect, such as crucial bridge organisations, partnership gaps, and collaboration clusters. By visualising the architecture of sustainable development partnerships across sectors (government, corporate sector, civil society, and academia), stakeholders may discover strategic possibilities to improve coordination and optimise resource allocation. The technique's capacity to portray relationship dynamics across organisational kinds, geographic locations, and thematic areas makes it especially useful in fulfilling SDG 17's aim of strengthening global partnerships.

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