

Sustainable Development Goal Target Interactions in the Philippines: a Two-Method Approach

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In 2015, the United Nations adopted 17 Sustainable Development Goals (SDGs) with 169 targets for transformation toward a more sustainable future by 2030. Around the world, countries struggle with their implementation, deciding priorities, and wonder about the “consistency” of these goals and targets. This study seeks to evaluate and analyze SDG target interactions in the Philippines to determine resolution measures for conflicting targets, and prioritization for reinforcing targets. The problem is modeled as a graph with 169 nodes (targets) and 14,196 edges (target interactions). Two methods are employed. First, experts were asked to evaluate interactions using a 7-point scale. It then becomes an “edge-coloring” problem for the graph. Second, a non-parametric Spearman rank correlation is used on official indicator data with resulting coefficients serving as interaction scores. The graph is similarly colored depending on the correlations. Scores are then interpreted to mean that target pairs interact positively (synergies), negatively (trade-offs), or neutrally (non-classified). Edge colorings are at sdg-interactions.herokuapp.com. Results from both methods were synthesized to formulate recommendations – most notably, negative interactions involving targets 3.1 (“Reduce maternal mortality”), 3.6 (“Reduce road injuries and deaths”), and 3.7 (“Universal access to sexual and reproductive care, family planning, and education”). Negative interactions/ trade-offs should be carefully studied and resolved for better implementation efficiency. Targets that reinforce each other should be prioritized (subject to country objectives) – including 1.1 (“Eradicate extreme poverty”), 1.2 (“Reduce poverty by at least 50%”), 4.2 (“Equal access to quality pre-primary education”), 4.B (“Expand higher education scholarships for developing countries”), 6.2 (“End open defecation and provide access to sanitation and hygiene”), 6.6 (“Protect and restore water-related ecosystems”), 8.1 (“Sustainable economic growth”), 8.5 (“Full employment and decent work with equal pay”), 9.4 (“Upgrade all industries and infrastructures for sustainability”), and 9.5 (“Enhance research and upgrade industrial technologies”). Both methods are hampered by data collection. Efforts to recruit respondents and make the website more “intuitive” are continuing. The method of UN Indicators might be improved since, currently, the mapping of indicators to targets, as well as the weighting of indicators for their effects on targets are “global” – that is, there is only one mapping and one weighting system for all countries, and this has been questioned, pointing to possible localization in the future.

Keywords: Sustainable Development Goals, SDG, SDG interactions, SDG targets, SDG Philippines

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INTRODUCTION

In 2015, the member-countries of the United Nations agreed to adopt the 2030 Agenda for Sustainable Development in the United Nations General Assembly. These agenda, often referred to as Agenda 2030, endeavor to be a framework through which a better future can be secured for the global community. This is to be accomplished by addressing issues of health, education, and environmental preservation, all in a concerted effort toward sustainability. These global issues will be addressed by focusing on the 17 Sustainable Development Goals (SDGs), commonly referred to as SDGs, with 169 specific targets that all involved countries should strive to realize by the year 2030.

At present, the Philippines is still considered to be a third-world country. Plagued with perceived corruption in the government, a lack of quality education, and poor access to healthcare, the country continues to struggle in its overall development. The 17 SDGs of Agenda 2030 were designed by the United Nations to be a model through which all countries regardless of development status can work toward a better and more sustainable future. The goal of this study is to identify what priorities should be made to achieve this agenda. To this end, the study seeks to identify which targets cause conflicts or trade-offs with other targets and which targets positively reinforce others, both within the same goal (intra-goal) or across different goals (inter-goal).

The overall approach involves targets in a graph with 169 nodes and 14,196 edges representing target interactions that are colored based on their scores.

To get the proper coloring, we use two methods, *viz.* [a] by a panel of experts (ISC 2017) and [b] by analyzing official indicator data (Pradhan *et al.* 2017). The respondents for the first method will provide an evaluation of the inter- and intra-goal interactions between the 169 SDG targets *via* the International Science Council (ISC) scoring system (ISC 2017). They are also to provide professional insight regarding negative interactions in order to guide policymakers on how these conflicts can be resolved for the country to carry out the 2030 Agenda.

An analysis of SDG target interactions can assist in directing the country's efforts to achieve the 2030 Agenda by taking advantage of positive target interactions, as well as pointing out negative interactions that need to be further investigated or resolved. By limiting the analysis to the Philippine context, insight into performance in terms of the 2030 Agenda would be better suited to the country's status.

Previous studies have employed two main methods to evaluate SDG interactions – namely, expert evaluation (Bongolan *et al.* 2021) and official indicator data (Pradhan *et al.* 2017; Anderson *et al.* 2021). This study uses both methods to draw a synthesized conclusion. This was motivated by the rather slow data-gathering method of expert evaluation and a desire for a more complete analysis.

By having two different approaches to the same problem, the study aims to provide recommendations backed by two data sources regarding the implementation of positive interactions or the resolution of negative interactions. This is done by synthesizing results from both methods, identifying similar results to put forward a positive answer highlighting targets to prioritize and a negative answer highlighting targets that need to be resolved.

Data Gathering and Interpretation

First method: expert evaluation. For the first method, the use of expert evaluation, a survey was conducted among experts from various fields relating to the SDGs. A description of how the web application for the survey was designed and implemented will be discussed herein.

To ensure the credibility of the SDG target interaction scores, respondents are screened by the study's curators. This is done initially by an invitation from the curators of the study to an interview to determine whether potential respondents are qualified to make target interaction evaluations. These potential respondents are then asked to create an account *via* the sign-up page of the web application where they indicate if they have five or more years of experience in their respective fields related to the advancement of the SDGs.

Upon application, each respondent is required to indicate who among the curators invited them. This curator will then be notified *via* email and on their administrator dashboard of a pending account approval request. Once approved, a respondent will then be able to log into the website where they will be asked to choose a minimum of two SDGs that are best aligned with their expertise. From their selected SDGs, the system will then generate a series of SDG target pairs for them to evaluate.

Each SDG target pair generated by the system represents an interaction between two SDG targets, and the users will then have to score each pair as positive or negative using the 7-point scale used by the ISC (2017). The seven points on the scale are as follows: -3 for canceling, -2 for counteracting, -1 for constraining, 0 for consistent, +1 for enabling, +2 for reinforcing, and +3 for indivisible. This last interaction is defined as when one objective is inextricably linked to the achievement of another [6].

MATERIALS AND METHODS

For each negative evaluation, the respondent is required to provide an explanation/ proposed solution for their response. Explanations for positive evaluations are optional. These explanations are meant to provide insight into the nature of the target interactions, as well as what factors may have caused them to merit such an interaction. For negative interactions, an explanation from the respondents may also provide ideas on how the negative interaction can be resolved. Users have the option to skip SDG target interactions that they do not wish to evaluate immediately to allow for flexibility. As long as they have not finalized their answers by submitting them, they can come back at a later time to provide their scoring.

Any target pair may be evaluated only once, *i.e.* the questionnaire is not a survey. Once an edge (target pair) is colored, a semaphore is set, and that edge is no longer available. In a specific session for a user, target pairs are bound to their user and will not be reassigned to a different respondent unless the respondent skips the question. Since each target pair is to be scored only once, the score given by the respondent is immediately posted, *i.e.* as soon as an answer is submitted, the score will automatically be saved to the database and immediately reflected in the results pages of the web application, including all related graphs. As long as the session is open, respondents may review and edit their answers, for immediate posting. Once the session is closed, that target pair is no longer available.

Second method: official UN indicator data. The second method makes use of official indicator data publicly provided by the United Nations Statistics Division. The indicator data available are based on a time series from 1990 through 2018 and are not complete. Applying the method in Pradhan's study (2017), Anderson *et al.* (2021) used the 2018 indicator data and passed it through a non-parametric Spearman rank correlation. The resulting correlation coefficients were used in this study to determine a score for target interactions. Scores were then interpreted with the same threshold as Pradhan and Anderson's studies. That is, for coefficients less than or equal to -0.6 , the interaction is considered to be a trade-off. For coefficients greater than or equal to 0.6 , the interaction is considered to be a synergy. Values between -0.6 and 0.6 , as well as those indicator pairs that do not have any available data, were considered to be non-classified. From there, the percentage of synergies, trade-offs, and non-classified indicator pair interactions at the target level was used to interpret whether a target pair was synergistic, a trade-off, or neither. That is, if a majority of the indicator pair scores are synergies then the target pair is synergistic, and so on.

Analytical Methods

The study looks into two things as part of its analysis of

results across both data-gathering methods: the nature of intra-goal target interactions and the ugliest and most beautiful targets, both explained hereafter. Results from both these analytical methods across both data gathering methods were then used to come up with positive and negative answers.

Intra-goal target interactions. Taking Goal #7 ("Ensure Access to Affordable, Reliable, Sustainable, and Modern Energy For All") as an example, it has three targets, *viz.*:

- [7.1] By 2030, ensure universal access to affordable, reliable, and modern energy services; 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix;
- [7.3] By 2030, double the global rate of improvement in energy efficiency;
- and two "implementation targets", *viz.*
- [7.A] By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology;
- [7.B] By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in accordance with their respective programs of support.

The original ISC study (2017) failed to check intra-goal target interactions for consistency, hence our additional step of checking interactions between targets under the same SDG, which preliminary analyses show to be very possible. The implication is that negative intra-goal interactions should be resolved, whereas positive ones should be reinforced.

Ugliest and most beautiful targets. The study also looks into what we refer to as ugly and beautiful targets. We define an ugly target as an SDG target that has at least one negative interaction with another target, whether intra-goal or inter-goal. On the other hand, a beautiful target is an SDG target with no negative interactions. We determine a target's "ugliness" or "beautiffulness" by the number of negative and positive interactions they have respectively. Thus, the more negative interactions a target has, the uglier it is, and the more positive interactions it has, the more beautiful it is.

The motivation for this analysis is first to determine which targets need to be prioritized, ensuring that they do not have any conflict with other targets. A list of the most beautiful targets provides a priority list of targets to

be reinforced. Another motivation for this analysis is to identify the ugliest targets that need to be resolved. Having only a few targets to focus on allows for a straightforward recommendation for policymakers.

Synthesis of results for a positive and negative answer.

In order to come up with a positive answer, the study looks at positive interactions from expert evaluation and synergies from official indicator data. Similar target pairs among positive/synergistic intra-goal target interactions are then identified, as well as the common targets in the lists of the most beautiful targets. These targets or target pairs will then be recommended for prioritization.

For the negative answer, the study looks at negative interactions from expert evaluation and trade-offs from official indicator data. Similar target pairs among negative/trade-off intra-goal target interactions are also identified as well as common targets in the lists of the ugliest targets. These targets or target pairs will then be recommended to be resolved.

Web Application

In order to gather data for the first method and display the results for both methods, a web application was developed and deployed to Heroku at the address <http://sdg-interactions.herokuapp.com/>. This application is divided into two main components:

- 1) front-end (user interface and design): ReactJS, a JavaScript framework; and
- 2) back-end (data management): API (Application Programming Interface) developed using Flask, a Python framework.

The front and back-end components were developed separately, both deployed to Heroku, with the front end serving as the home of the main website. Website features are discussed herewith.

Graph views. The current progress of the study, based on how much data has been gathered so far, can be viewed by the public on the website. One does not need to have an account in order to view the graphs and other results of the study.

A graphical representation is used by the study in order to capture the nature of different target interactions based on the interpretation of results previously discussed. The graphs portray SDG targets as nodes, whereas the edges that connect them represent the target interactions. Nodes are color-coded based on the official colors of their corresponding SDGs used on the UN SDG website. That is, nodes for SDG 1 targets are colored red, nodes for SDG 7 targets are colored yellow, nodes for SDG 9 targets are colored orange, and so on. The nodes are also

labeled with their SDG and target number. This allows users to easily distinguish targets apart.

Figure 1 shows the targets of Goals 8 (Decent Work and Economic Growth) and 16 (Peace, Justice, and Strong Institutions). Clicking on a node (circle) will display the target, and clicking on an edge (colored line) will show the explanation. Negative interactions are the edges colored yellow, orange, and red; explanations are required for these. Blue or positive interaction might have optional comments. The above examples show a negative interaction between targets 16.8 and 8.4, and an intra-goal negative between implementation targets 16.A and 16.B.

For the results of expert evaluation which uses the 7-point scale, edges representing target interactions that have been evaluated to be positive (+1, +2, and +3) are colored blue, negative interactions (−1, −2, and −3) are red, and zero (0) interactions are black. Different shades of blue and red are used for the links corresponding to positive or negative interactions, respectively. That is, the more positive or the more negative the interaction is, the darker the shade of the color (darker blue or darker red) used for the edge. Edges representing unevaluated target interactions are colored gray.

For the results of official indicator data, links for synergies (greater than or equal to 0.6), trade-offs (less than or equal to −0.6), and non-classified (between −0.6 and 0.6) interactions are simply colored blue, red, and black respectively.

For all graphs, both nodes and edges can be clicked to display details about the chosen target or interaction. The graph may also be resized and moved around for ease of use. A graph query interface has been provided to display the results of both data-gathering methods used. In a graph query page, users can select two SDGs to generate a graph for. The system will then display a graph showing all the target interactions between those two SDGs.

Other featured pages. Other featured pages display the current results of the study in text or tabular form for readability. For both data-gathering methods, a page listing all target pairs with negative/trade-off interactions is provided, as well as a page for positive/synergistic interactions. Another page displays a list of all targets with their descriptions, color-coded to show whether they are beautiful or ugly. As discussed previously, beautiful targets, those that do not have any negative interactions, are colored blue, whereas ugly targets are colored red. Those that do not have an evaluation yet are colored black.

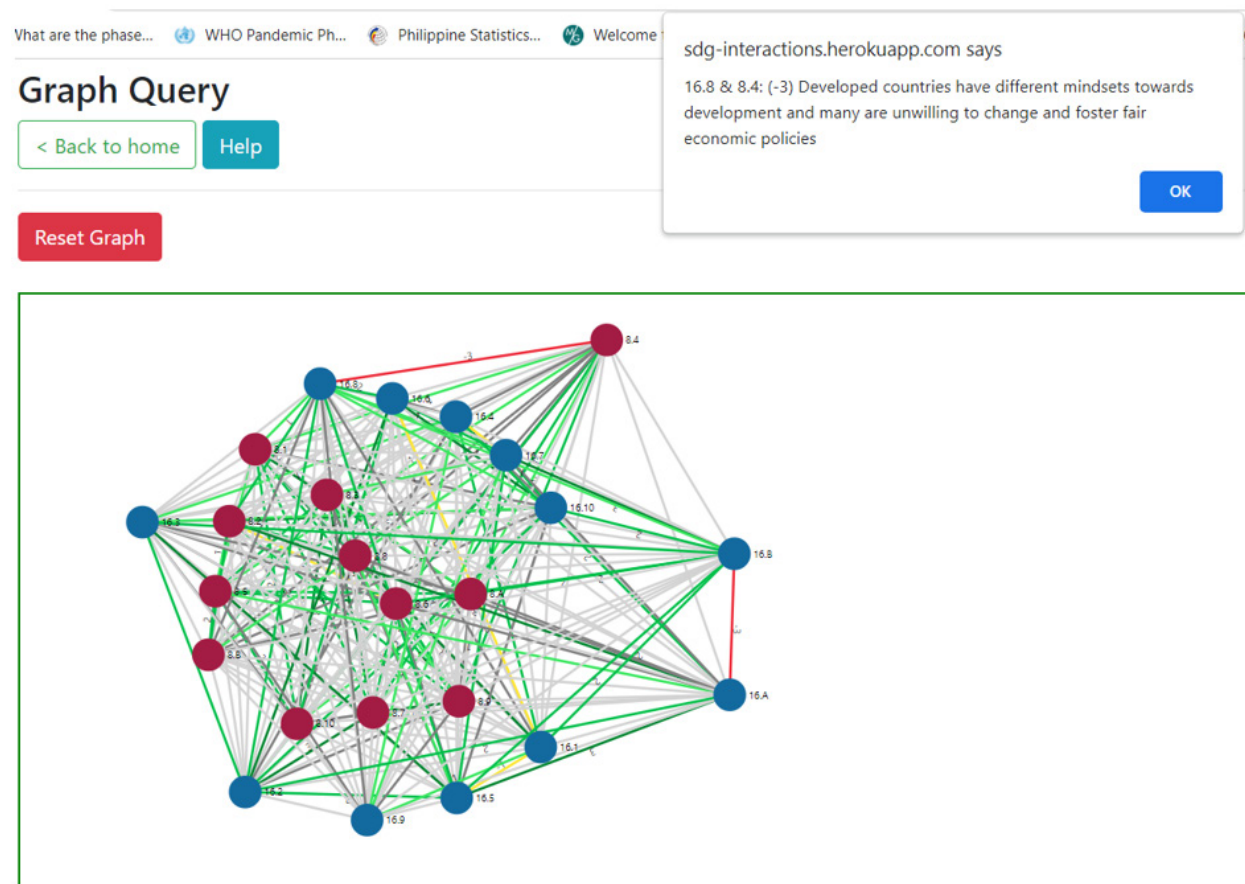


Figure 1. Sample target interactions.

RESULTS

Since two methods for data gathering have been used, results from both methods will first be discussed separately and then synthesized in order to draw conclusions in the form of positive and negative answers.

First Method: Expert Evaluation

From a total of 169 SDG targets, the total number of interactions amounts to 14,196 ($169 * 168 / 2$). Of these interactions represented by graph edges, 1,256 (8.85%) edges have been colored so far – of which 36 (2.87%) are negative, 981 (78.11%) are positive, and 239 (19.03%) are zero (consistent).

Intra-goal target interactions (negative). Among the evaluated negative interactions, 12 are intra-goal interactions. These interactions fall under SDG 3 (“Good Health and Well-being”), SDG 4 (“Quality Education”), SDG 5 (“Gender Equality”), SDG 8 (“Decent Work and Economic Growth”), SDG 10 (“Reduced Inequality”), SDG 12 (“Responsible Consumption and Production”), and SDG 16 (“Peace, Justice, and Strong Institutions”).

SDG 16 has the most negative intra-goal target interactions, totaling four. It is followed by SDG 3, which has three while the rest of the involved SDGs have only one each.

Figure 2 is a screenshot of the negative target interactions, sorted by score. Explanations of the score may be viewed by clicking on the edges of the graphs.

Intra-goal target interactions (positive). Among the evaluated positive interactions, 315 are intra-goal interactions. These interactions are distributed across all SDGs, with the top three being SDG 3 (“Good Health and Well-being”) having 35, SDG 8 (“Decent Work and Economic Growth”) having 33, and SDG 16 (“Peace, Justice, and Strong Institutions”) having 29.

Ugliest and beautiful targets. From the current results, 116 of the 169 targets (68.7%) are beautiful, 51 (30.2%) are ugly, and two (1.1%) do not have any evaluated target interactions.

Ugliest targets. Among the ugly targets, 15 have multiple negative interactions. Target 13.1 (“Strengthen resilience and adaptive capacity to climate-related disasters”) has the largest number of negative interactions (scores –3,

Negative Target Interactions

<div> < Back to home Info </div>		
Score		
-3 Show Info	13.1 Climate Action	14.C Life below Water
-3 Show Info	13.1 Climate Action	14.5 Life below Water
-3 Show Info	16.B Peace, Justice, and Strong Institutions	16.A Peace, Justice, and Strong Institutions
-3 Show Info	8.4 Decent Work and Economic Growth	16.8 Peace, Justice, and Strong Institutions
-3 Show Info	8.1 Decent Work and Economic Growth	11.6 Sustainable Cities and Communities
-3 Show Info	8.2 Decent Work and Economic Growth	13.3 Climate Action
-2 Show Info	5.B Gender Equality	16.2 Peace, Justice, and Strong Institutions
-2 Show Info	5.1 Gender Equality	13.1 Climate Action
-2 Show Info	3.A Good Health and Well being	16.1 Peace, Justice, and Strong Institutions
-2 Show Info	12.5 Responsible Consumption and Production	17.15 Partnership for the Goals
-2 Show Info	1.5 No Poverty	2.A Zero Hunger
-2 Show Info	1.2 No Poverty	2.A Zero Hunger
-2 Show Info	8.2 Decent Work and Economic Growth	12.3 Responsible Consumption and Production

Figure 2. Negative target interactions.

–2, or –1) with other targets, totaling four, making it the ugliest target. It is followed by targets 5.B, 8.2, 12.4, and 16.1 – which have three each.

Figure 3 shows the “Ugly and Beautiful” Targets button, sorted by goals. The presentation is color-coded to show which targets have negative interactions.

Most beautiful targets. Among the beautiful targets, 108 have multiple positive interactions. Target 7.1 (“Universal access to modern energy”) has the largest number of positive interactions with other targets, totaling 65, making it the most beautiful target. It is followed by targets 1.3 and 5.5, which have 31 each.

Second Method: Official UN Indicator Data

Among the total 14,196 target interactions, only 528 were classified: 292 (2.06%) are evaluated to be synergies, whereas 236 (1.66%) are trade-offs. The rest of the interactions are considered non-classified either because there is no sufficient data or a majority of the resulting Spearman rank correlation coefficients at the target level are inconclusive (between –0.6 and 0.6).

Table 1 summarizes the findings from the UN Indicator method, which are described in detail below.

Intra-goal target interactions: trade-offs. Among the evaluated trade-offs, 23 are intra-goal interactions. These interactions fall under SDG 1 (“No Poverty”), SDG 3

(“Good Health and Well-being”), SDG 7 (“Affordable and Clean Energy”), SDG 9 (“Industry, Innovation, and Infrastructure”), SDG 10 (“Reduced Inequalities”), SDG 15 (“Life on Land”), and SDG 17 (“Partnership for the Goals”).

SDG 3 has the most trade-off intra-goal target interactions, totaling ten. It is followed by SDG 17, which has four, then SDGs 7, 9, 10, and 15 – which have two each.

Intra-goal target interactions: synergies. Among the evaluated synergies, 21 are intra-goal interactions. These interactions fall under SDG 1 (“No Poverty”), SDG 3 (“Good Health and Well-being”), SDG 4 (“Quality Education”), SDG 6 (“Clean Water and Sanitation”), SDG 7 (“Affordable and Clean Energy”), SDG 8 (“Decent Work and Economic Growth”), SDG 9 (“Industry, Innovation, and Infrastructure”), SDG 15 (“Life on Land”), and SDG 17 (“Partnership for the Goals”).

SDG 3 also has the most synergistic intra-goal interactions, totaling five. It is followed by SDG 8, which has four, then SDGs 15 and 17, which have three each.

Ugliest and most beautiful targets. From the current results, 110 of the 169 targets (65.09%) are beautiful, whereas 59 (34.91%) are ugly.

Ugliest targets. Among the ugly targets, 54 have multiple negative interactions. Target 3.4 (“Reduce mortality from non-communicable diseases and promote mental health”)

Ugly and Beautiful Targets

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[Info](#)

Target	Description
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
1.3	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable
1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership, and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
1.5	By 2030, Build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters
1.A	Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions
1.B	Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions
2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

Figure 3. Ugly and beautiful targets.

has the largest number of negative interactions with other targets, totaling 27, making it the ugliest target. It is followed by targets 10.6 (“Enhanced representation for developing countries in financial institutions”) and 16.8 (“Strengthen the participation in global governance”) having 26 each.

Most beautiful targets. Among the beautiful targets, only two have synergistic interactions with the rest being non-classified. The targets are, namely, target 8.5 (“Full employment and decent work with equal pay”) and target 17.5 (“Invest in least developed countries”).

DISCUSSION

Novelty of the Study

What makes this study different from existing studies is that as opposed to just using one method, either expert evaluation or official indicator data, this study makes use of both. Results from both are compared and common targets/target pairs are identified in order to have strong recommendations with regard to targets or target pairs and their prioritization and resolution.

Synthesis of Results and Recommendations

Since available data or responses are limited for both methods, we still have a long way to go to evaluate all 14,196 target interactions. More respondents need to be recruited to provide expert evaluations for the first method, and because updates to official indicator data are not conducted wholly, *i.e.* only select indicators are updated at a time, data used should be filled in and updated as it becomes available.

Still, from available responses and indicator data, we can try to formulate initial recommendations for policymakers in the form of positive and negative answers tailored to the Philippine setting.

One insight that can be gained from the results so far is that most target interactions are either positive or neutral, *i.e.* few are negative. This is a good sign that supports the 2030 Agenda in that it is largely applicable to the Philippine context. This also means that there are relatively few negative interactions that need to be resolved.

Negative answer. It can be observed that SDG 3 (“Good Health and Well-being”) is the only common goal between the two data-gathering methods that have negative/trade-off intra-goal interactions with three under the first method and 10 under the second method. While none of the target pairs are common, we can narrow down as a focus for resolution the commonly involved targets 3.1

(“Reduce maternal mortality”), 3.6 (“Reduce road injuries and deaths”), and 3.7 (“Universal access to sexual and reproductive care, family planning, and education”). Target 3.6 in particular is problematic, having conflict with seven other SDG 3 targets: 3.1, 3.4, 3.5, 3.7, 3.8, 3.9, and 3.D. Looking at the targets being flagged, all concern “Good Health and Well-being” but might eventually boil down to (national) priorities, and competition for resources. Infant mortality is everyone’s quick and dirty indicator for poverty, even if “bacterial sepsis of newborn, pneumonia, and respiratory distress of newborn” are all easy to diagnose, and the cure is not anything most doctors and nurses will not be familiar with (DOH n/d). On the other hand, maternal mortality might speak more to access to health care – in particular, prenatal health care. Both problems might be solved with seminars for young and expectant mothers, but road deaths talk to a different audience altogether – mainly motorists (public and private), traffic safety engineers, and facilities managers.

Among the ugly targets that have multiple negative interactions, the following targets are common among the two methods: 3.6, 3.7, and 8.2 (“Diversify, innovate, and upgrade for economic productivity”).

Even though they may not be common across both data gathering methods, efforts should also be made to investigate the ugliest targets such as targets 3.4 (“Reduce mortality from non-communicable diseases and promote mental health”), 10.6 (“Enhanced representation for developing countries in financial institutions”), and 16.8 (“Strengthen the participation in global governance”).

Positive answer. Since target interactions are mostly positive, the focus should, thus, be narrowed down to targets that reinforce their corresponding SDGs by having positive/synergistic interactions. The common SDGs across both methods are SDG 1 (“No Poverty”), SDG 3 (“Good Health and Well-being”), SDG 4 (“Quality Education”), SDG 6 (“Clean Water and Sanitation”), SDG 8 (“Decent Work and Economic Growth”), and SDG 9 (“Industry, Innovation, and Infrastructure”), with the following target pairs also being common:

- 1.1–1.2
- 3.7–3.1, 3.2
- 4.2–4.B
- 6.2–6.6
- 8.1–8.5
- 9.4–9.5

Thus, targets 1.1 (“Eradicate extreme poverty”), 1.2 (“Reduce poverty by at least 50%”), 4.2 (“Equal access to quality pre-primary education”), 4.B (“Expand higher education scholarships for developing countries”), 6.2 (“End open defecation and provide access to sanitation and hygiene”), 6.6 (“Protect and restore water-related ecosystems”), 8.1 (“Sustainable economic growth”), 8.5 (“Full employment and decent work with equal pay”),

9.4 (“Upgrade all industries and infrastructures for sustainability”), and 9.5 (“Enhance research and upgrade industrial technologies”) need to be prioritized, particularly with their best-paired targets. Note that targets that reinforce target 3.7 are excluded since target 3.7 is already listed as a problematic target in the negative answer.

Furthermore, the common beautiful targets across both methods were 8.5 (“Full employment and decent work with equal pay”) and 17.5 (“Invest in least developed countries”). Note that target 8.5 is both synergistic with another target under SDG 8 and is also a beautiful target. Thus, among the priority targets, target 8.5 should be given special interest.

Focus should also be given to beautiful targets with an unusually high number of positive interactions from either method such as targets 7.1 (“Universal access to modern energy”), 1.3 (“Implement social protection systems”), and 5.5 (“Ensure full participation in leadership and decision-making”).

Scope and Limitations

Experts who have contributed to the study hail mostly from [1] the University of the Philippines (UP) College of Social Work and Community Development and [2] the National College of Public Administration and Governance at UP Diliman. Their responses, in the form of SDG interaction scores dated up until March 2022, were analyzed in this study.

For the official indicator data method, results have been retrieved from a study conducted by Anderson (2022), wherein a Spearman rank correlation was run on publicly available UN indicator data from 2018. Future updates to official indicator data must be used to keep the current analysis up-to-date.

Future pursuits of this study should focus on gathering more data for both methods to have a more complete analysis. Another thing to consider, as noted in Pradhan’s study (2017) would be the possibility of false trade-offs and synergies arising from very little data or seemingly conflicting targets/indicators that actually reinforce each other and vice versa.

However, since the ultimate goal of the study is to provide a guide toward sustainable development in the Philippines, the results of the study from the initial data can already be considered. Recommendations based on the results translate to problematic targets/target pairs whose interactions need to be resolved and good targets or target pairs to be prioritized.

Results of the study are limited to the Philippine setting, although the methodology may be adapted to other smaller or larger contexts at risk of difficulty in data gathering.

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