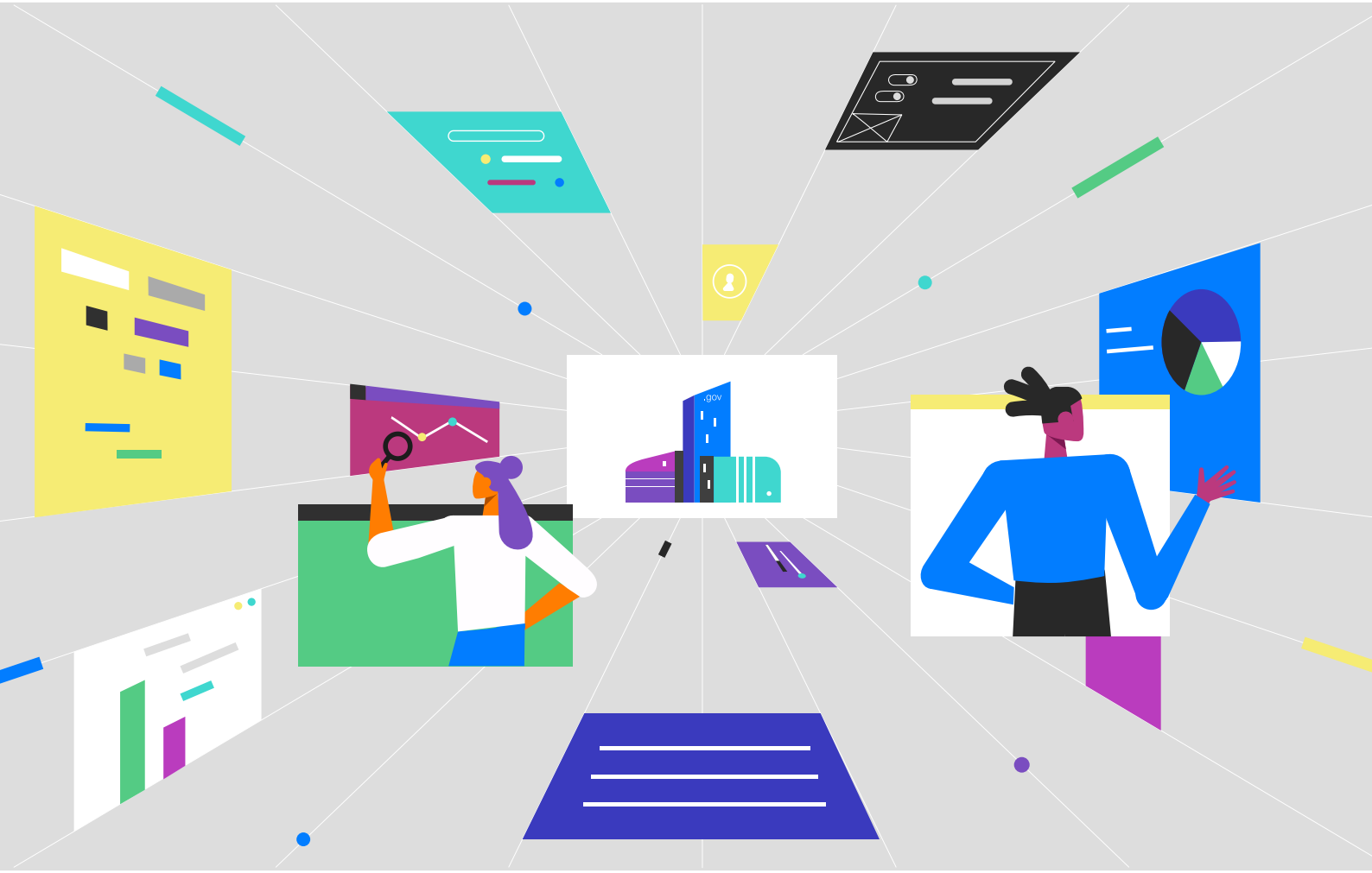
The Alan Turing Institute

Data Challenge: Policy Priorities & AI for SDGs

The Challenge



Context

Your team has been hired to advise the government of the Republic of Dellerisia. The Dellerisian Government is one of the main supporters of the 2030 Agenda and has made substantial efforts to align its policy priorities to the Sustainable Development Goals (SDGs). Despite its efforts, Dellerisia faces several challenges on multiple development dimensions. The interdependencies between policy issues and an imperfect public governance have made policy prioritisation difficult to formulate and implement in a coherent manner in the past 15 years. Hence, the Dellerisian Office for the Executive has requested the assistance of experts who can use their data in novel ways to formulate innovative expenditure strategies.

About the Republic of Dellerisia

The Republic of Dellerisia has a population of 75 million inhabitants. It has a stable political system composed of a parliament with a single chamber and a multi-party electoral system with four major political forces. While the dominant political parties have formed the government at different points in time in the last 15 years, governments tend to give continuity to major programmes that already exist when they take office.

Dellerisia has a territory of approximately 400,000 km^2, extensive coasts, and neighbouring countries of similar economic and population sizes. As of today, Dellerisia is considered a middle-income country by international organisations. It enjoys an open economy with exports dominated by basic manufactured and agricultural goods, and imports characterised by high-value manufactured goods and services.

To provide more detailed information about Dellerisia and its current state of development across various policy dimensions, the Statistics Bureau has prepared four datasets:

- A collection of 81 development indicators covering the 17 SDGs. These data consist of annual time series of the last 15 years, each one classified into an SDG target.
- Government expenditure data classified into the SDG targets for the last 15 years.
- A network of interdependencies between the development indicators constructed from statistical analysis and expert opinions.
- A list of development goals for each indicator, i.e., the values that the government aspires to achieve for each indicator by 2030.

Further details on these data are provided in a separate document.

The Challenge

The Dellerisian Office for the Executive has been introduced to the Policy Priority Inference (PPI) framework. The members of its technical team believe that this tool could be used to overcome the complexities associated with the interdependencies between policy issues and the political economy of government spending. Their aim is to formulate innovative expenditure strategies that help them align their policy priorities to the SDGs. Since this is the first time they are learning about PPI, the Dellerisian Office for the Executive has requested your assistance in formulating such a strategy using the PPI online app.

Given the flexibility of PPI and the multidimensionality of the SDGs, the Dellerisian Government is open to various types of strategies that aim at different aspects of the 2030 Agenda. Here are 15 example questions that could be answered with the aid of PPI:

1. How feasible are the development goals?
2. How coherent is the current budget with the goals?
3. How would an optimal budget look like?
4. What policy issues should be prioritised?
5. Which budget tranches are the least and most effective in impacting the indicators?

6. How can expenditure efficiency and effectiveness be improved through public governance?
7. What is the best budget that could be achieved through minimal changes?
8. What are the policy issues that are the least and most sensitive to changes in government expenditure?
9. Which policy issues could have idiosyncratic bottlenecks?
10. Which synergies between policy issues or targets should be promoted?
11. What trade-offs between policy issues or targets should be discouraged?
12. Which policy issues act as systemic bottlenecks?
13. Which policy issues act as development accelerators?
14. Which policy issues are the least and most resilient?
15. Which policy issues are critical?

These questions should serve as a reference, but they are not the only ones for which the government would want answers. In other words, the government is not looking for answers to all these questions, but for a **rigorous, creative, coherent, and holistic** policy prioritisation strategy that may cover a subset of these or other challenges.

Expected output

The expected output from this consultancy is a report proposing a policy prioritisation strategy based on the analysis that you develop using the PPI app. The report has a **limit of 2500 words,** set by the provided template. In this report, your team will present the challenges or questions to be tackled, justify why they are important, propose an analytical strategy, present the results, formulate the policy prioritisation strategy, and discuss its potential impacts. You may attach **two additional pages with up to six supporting visuals** (e.g., figures and tables) that should be referenced in the report.

While the PPI app provides three basic visualisations, you are free to download the simulation data and produce other visualisations using any tools you like. **The report should be anonymous** as it will be evaluated by independent judges. Thus, in summary, these are the main characteristics of the expected output:

- Report length: Up to 2500 words (using the provided template) + 2 additional pages with maximum 6 supporting visuals (figures and tables)
- Report authorship: anonymised
- Submission procedure: send your reports to ppai4sdg@turing.ac.uk
- Submission deadline: 2 February at 23:59 UTC (submissions after this date will not be considered)

Evaluation of the report

Your consultancy is one of several that the Dellerisian Government has commissioned. Once all consultancy reports have been submitted, a panel of expert judges will evaluate them and choose the best one to become the foundation of the Dellerisian National Development Plan for the rest of the decade.

As mentioned earlier, the four leading criteria to evaluate the proposed policy prioritisation strategies are:

1. Rigour: How well sustained are the claims made in the report, i.e. are they backed up by evidence stemming from the data or from the PPI analysis? It will also consider the sophistication of the analysis, i.e. whether it tries to estimate potential impacts by formulating intuitive counterfactual scenarios, or simply looks at the forecast of a baseline scenario.
2. Creativity: How innovative is the use of PPI in formulating the policy prioritisation strategy? For example, does the analysis develop bespoke metrics to assess the impact of certain financial interventions?
3. Coherence: How well 'put together' is the policy prioritisation strategy and its supporting evidence? The government seeks to assess if there is a consistent narrative that justifies the chosen challenges and the consistency of the analysis conducted.
4. Holism: How holistic is your strategy? For example, does it consider multiple development dimensions or only a subset? It is not a requirement to cover the 17 SDGs if the choice of development dimensions is well justified by the coherence of the strategy.

The evaluation of the report will prioritise **quality over quantity**. In other words, a policy prioritisation strategy will not be seen as better just because it tries to tackle the largest number of challenges or questions. Instead, the Dellerisian Government is **looking for solid proposals where the qualitative and quantitative insights of the consultants come together in a coherent and rigorous package**. Each report will be scored by multiple judges according to an evaluation rubric that follows the aforementioned criteria.

About the PPI online app and its limitations

PPI was originally developed in the Python programming language. Despite Python being a relatively friendly programming framework, learning how to use it still represents a major adoption barrier. Hence, the creators of PPI developed a JavaScript version of the model that runs on web browsers; that is the PPI online app.

Computing power on a web browser is significantly more constrained than when using the Python version of PPI. Therefore, some compromises had to be made in terms of the accuracy that can be achieved with the online app. Mainly, the level of precision that can be achieved with the app is significantly lower than with Python. This means that the outputs of two independent sets of outputs (using the same input data) could exhibit slight differences. However, overall, they are always qualitatively consistent and highly correlated.

This difference in precision means that the PPI online app is a tool for fast exploratory analysis. In other words, it should be used for the preliminary qualitative assessment of policy prioritisation strategies, and should not be deployed to give precise estimates. The objective of the app is to lower PPI's adoption barriers so the users can become familiar with the framework before investing the time needed to use the Python version. This challenge focuses on the app because the Dellerisian government wants to compare broad policy prioritisation strategies before making a bigger investment in the full deployment of PPI.

How to learn to use the PPI app?

The challenge provides many resources to learn how to use PPI. Here are some tips on what to do first in order to ease the learning curve:

1. Read this recent academic paper that uses PPI to estimate the impact of international aid: https://doi.org/10.1016/j.worlddev.2023.106256.

2. Study the chapters that you find most relevant to your ideas in the PPI book.
3. Carefully watch all the video tutorials on the PPI online app.
4. Once you have viewed the video tutorials, carefully read the steps of the PPI app workflow explained in the official website: https://policypriority.org/app.
5. You should use the video tutorials and the app website together to get a good grasp of how to use the app.
6. Once you are ready to play with the app, download the challenge datasets and carefully read the metadata worksheets.
7. Always use this document as your primary source of information regarding the challenge; especially the section on **data and supporting documents**.
8. Use the document *key_concepts.pdf* to as your main PPI glossary.
9. Book mentoring appointments with the technical experts of PPI through the following link: https://www.picktime.com/ppai4sdg.

Data and supporting documents

All the supporting datasets and documents can be accessed through the following link:

http://tinyurl.com/dellerisia

In the *Datasets* folder, you will find the following files:

- development_indicators_PPI.xlsx: The data on development indicators formatted and ready to be used by the PPI app.
- government_expenditure_PPI.xlsx: The data on the government budget formatted and ready to be used by the PPI app.
- interdependencies_PPI.xlsx: The network of interdependencies between the development indicators formatted and ready to be used by the PPI app.
- development_goals_PPI.xlsx: The development goals for each indicator. This file is not necessary for the PPI app but will be useful for your analysis.
- development_indicators_series.xlsx: The time series of the indicators. You do not need to use this file for the challenge. However, it may provide information about the historical behaviour of the indicators that could enrich your analysis.

All the necessary datasets have already been pre-processed to be used with the PPI app, so you do not need to do any data cleaning. Here is some additional about the data:

- The indicators have been pre-processed so that the lowest and highest observed values are 0 and 1 respectively, so are not in any specific unit.
- In the simulations, the indicators can achieve values higher than 1 because the **max_value** column of the *development_indicators_PPI.xlsx* file is set to 2. Likewise, the indicators cannot become less than 0 because the **min_value** column is set to 0.
- The higher the value of an indicator, the better the outcome it reflects. Thus, for example, an increase in an indicator on unemployment means that there has been an improvement in this policy issue; this is why the government's goals (in the *development_goals_PPI.xlsx* file) are above 1.
- In the *development_indicators_PPI.xlsx* file, each indicator is linked to one SDG target only. This is because the visualization tools of PPI can assign only one colour to each indicator. However, it does not mean that that the indicator is affected by only one target. The complete mapping between SDG targets and indicators is provided in the *government_expenditure_PPI.xlsx* file, in the *template_relation_table* worksheet.
- The values of the budget in the *government_expenditure_PPI.xlsx* file represent hundreds of millions USD. They represent the total amount of resources that the Dellerisian government spend throughout the entire sample period.
- On the one hand, Dellerisia organises its budget at the level of each SDG target. On the other, the PPI app uses numeric identifiers to distinguish each budgetary tranche in the *government_expenditure_PPI.xlsx* file. Therefore, the worksheet *target2programme_map* in this file provides a table that translates each SDG target into the unique numeric identifier that the app uses.

In the *Documents* folder, you will find the following files:

- key_concepts.pdf: A glossary of key concepts developed in the PPI research programme that will help you frame your strategy.

- report_template.docx: The template to be used to create your report.
- SDGs.pdf: The United Nations resolution that establishes the Sustainable Development Goals. Here you can find full descriptions of each SDG and target.

The *Publications* folder contains all the academic papers produced by the PPI research programme. They are not necessary for the challenge but may provide useful information for those interested in the methodology. For a full technical explanation of the model behind PPI, please consult the following open-access paper: https://doi.org/10.1016/j.worlddev.2023.106256.

PPI book

The creators of PPI have published a comprehensive book that integrates the methodological and practical aspects of this research programme. It provides everything needed to gain a deep understanding of the potentials and applications that can be developed with PPI. Physical copies of the book can be purchased through Cambridge University Press' portal: http://tinyurl.com/theppibook.

The electronic version of the book can be purchased through the platform Vitalsource. From 29 January to 2 February 2024, the electronic version of the PPI book can be obtained with a 20% discount using a discount code that will be provided via email.

In addition to the discount codes, each team will get a full free electronic copy of the book. Hence, each team will be asked to select the member who will receive the code. **Important**: the codes for the free book are not transferrable, so only one person in the team should use this resource.

App support

The app, and all the supporting materials of the PPI online app can be found in its official website: http://policypriority.org/pages/app. This website provides access to

the app and explanations for each step of the workflow. You can also learn about the PPI app workflow through the video tutorials provided here.

Technical support

The Dellerisian Government has hired the creators of PPI to provide technical support to your team. Throughout the week of the challenge, three technical experts will be available via email and video calls. This kind of support consists of conceptual and technical clarifications and will exclude any revisions or feedback of your analysis. The support team will not provide advice on best analytic practices, neither suggest ideas nor strategies for your report.

Teams can book PPI support time here: https://www.picktime.com/ppai4sdg.

Winners and prizes

The evaluation of the reports will take place in the week following the submission deadline. During the closing event of the challenge, on 9 February 2024, the winning team will be announced.

The winners will receive an invitation to visit The Alan Turing Institute during the week of 18 March 2024, for which the Institute will cover travel and accommodation costs. They will also attend the annual conference AI UK (https://ai-uk.turing.ac.uk) taking place at the Queen Elizabeth II Centre in Westminster, London. This will be a great opportunity to network with the vibrant AI & Policy community. The winning team will be given the option to present their report and talk about their experience in taking the challenge in a stand at the conference.