Open Data Barometer

ODB Methodology - v1.0 28th April 2016

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This 4th edition of the Barometer was supported by the Omidyar Network and the Open Data for Development (OD4D) program, a partnership funded by Canada's International Development Research Centre (IDRC), the World Bank, United Kingdom's Department for International Development (DFID), and Global Affairs Canada (GAC). This work was carried out with the aid of a grant from the International Development Research Centre (IDRC), Ottawa, Canada.

This document outlines in detail the construction of the Open Data Barometer rankings, including details of the primary and secondary data used. The methodology used in the fourth edition of the Open Data Barometer broadly replicates the one used in the previous ones. However, there were also small modifications and methodological revisions.

As part of our work towards Common Assessment Methods on Open Data, future versions of the Barometer are likely to keep include additional improvements and/or new components to look further at data use and impacts.

Overview

The sub-indexes, components and overall ranking in the ODB draw on four kinds of data:

Government self assessment - between May and July 2016 a self assessment questionnaire was introduced for the first time in the research process. The purpose of this new self-assessment was two-fold, first for further involvement of government in the assessment process, and second as a valuable additional source of input for the research process. Each of the countries in the survey was invited to complete a simplified version of the full survey questionnaire, providing justifications and sources. The results of the self-assessments were shared after with the researchers team during the peer-review phase with the objective of contrasting and validating the main findings for each of the questions in the survey.

Peer-reviewed expert survey responses - between May and September 2016 we conducted our expert survey, asking trained country specialists to respond to a number of detailed questions about the open data situation in a specific country following the research handbook indications. Each question invited a response on a 0 - 10 scale, with detailed scoring guidance and thresholds provided. Researchers also provided detailed justifications and citations for all scores. Responses were peer-reviewed, re-scored by researchers where required, and cross-checked by the research coordination and quality assurance team.

For the construction of sub-components and sub-indexes, scores were normalised using z-scores for each question. This converts the 0 - 10 score into a measure of how far above or below the mean (in standard deviations) any given answer is. Normalisation gives us the ability to compare how well countries are doing relative to one another, and makes the measurements more robust to marginal alterations in scoring guidance year-on-year.

Detailed dataset assessments - at the same time the team of researchers also investigated the availability of 15 kinds of data within each country, and answered a 10-point checklist with respect to the qualities of data provided. These assessments were also peer-reviewed and subjected to a detailed review by the quality assurance team.

For the Barometer Ranking, an aggregation logic and weightings were applied to the checklist results (see below for details) to generate a score between 0 and 100. These scores were not individually normalised, to allow clear comparison between the different datasets in the Barometer, but the aggregated index of dataset availability (the

Implementation Sub-Index) was normalised using z-scores to bring it onto the same scale as other questions prior to inclusion in overall Index calculations.

Secondary data - in order to complement the expert survey data for the ODB in the Readiness section of the Barometer, we draw on five secondary indicators, each selected on the basis of theory and their ability to measure important aspects of readiness not covered in our survey. Four of these are based on independent expert surveys (by the World Economic Forum; Freedom House and the United Nations Department of Economic and Social Affairs) and one is based on World Bank collated data on internet penetration.

For the Barometer Rankings, these variables are each normalised using the same approach as for our peer-reviewed expert survey data.

Structure

The Barometer builds upon *tripartite* structure with three sub-indexes, each containing three components. The weightings of these in the aggregated Open Data Barometer score and ranking are shown in brackets.

Readiness (35%) (Primary & secondary data)			
Government policies (¼)	**Government action** (¼)	**Entrepreneurs & business** (¼)	**Citizens & civil society** (¼)

Implementation (35%) (Dataset assessments)		
Accountability dataset cluster (⅓)	**Innovation** dataset cluster (⅓)	**Social policy** dataset cluster (⅓)

Impacts (30%) (Primary data)		
Political (⅓)	**Economic** (⅓)	**Social** (⅓)

This structure is based on the idea that:

- Effective OGD initiatives requires involvement of **Government**, **Civil Society** and the **Private Sector**;
- OGD has a range of potential impacts, and the choices made in implementing an OGD policy may affect which of these impacts are realised;

Sub-Indexes

Readiness sub-index: primary and secondary data

The Open Data Barometer measures readiness through three components focussing on: (1) **Government**; (2) **Citizens and Civil Society**; and (3) **Entrepreneurs and Business**. We are not measuring readiness to start an open government data initiative, but rather readiness to secure positive outcomes from such an initiative. As such, we include measures relating to the existence of open data, and a range of interventions that support engagement with and re-use of open data.

Each of the groups are important for a successful OGD initiative. As Tim Berners-Lee has observed, open data *"has to start at the top, it has to start in the middle and it has to start at the bottom"*. Policies and portals are just one component of an effective open data agenda. In carrying out qualitative Open Data Readiness assessment across a number of countries from 2010 to 2013, the Web Foundation developed a six-dimensional framework for looking at the Political, Organisational, Legal, Social, Economic and Technical context within a country in order to understand factors that may facilitate or inhibit the development of an OGD initiative, and the successful use of open data. These six dimensions have informed the selection of indicators in the readiness section of the Open Data Barometer.

Indicators to measure government policies have been selected on the basis of the principles and recommendations from the International Open Data Charter. In selecting other indicators we have also drawn upon findings from the Open Data in Developing Countries (ODDC) research project which have highlighted important relationship between open data policies and the Right to Information, and the importance of complementing open data release with robust protection for citizens personal data. These two issues are represented in the Barometer by indicators on Right to Information and Data Protection laws. The experience of the Open Data Institute in delivering training and capacity building for the economic re-use of data also informed the design of our indicator on training availability. There were a number of further aspects of readiness we would have liked to include in this section, such as quality of government record keeping, and the statistical capacity of governments. However, we could not locate comprehensive secondary indicators, nor design simple expert survey questions adequate to capture these. We continue to seek approaches to be able to include these in future Barometer studies.

The variables used in the readiness sub-index, along with their variable names[1], are:

Government policies

- **ODB.2015.C.POLI** (Expert survey question): *To what extent is there a well-defined open data policy and/or strategy in the country?*
- **ODB.2015.C.MANAG** (Expert survey question): *To what extent is there a consistent (open) data management and publication approach?*

[1] Primary data variable names reflect the year they were first introduced to the study. E.g. ODB.2013.C.INIT reflects that this variable was first introduced in 2013.

- WEF.GITR.8.01 (Secondary data): Importance of ICT to government vision (World Economic Forum Global Information Technology Report 2016; Variable 8.01; Taken from WEF expert survey)

Government action

- **ODB.2013.C.INIT** (Expert survey question): *To what extent is there a well-resourced open government data initiative in this country?*
- **ODB.2013.C.CITY** (Expert survey question): *To what extent are city or regional governments running their own open data initiatives?*
- UN.OSI (Secondary data): UN E-Government Survey, Government online services index (2016 edition)

Entrepreneurs and businesses

- **ODB.2013.C.TRAIN** (Expert survey question): *To what extent is training available for individuals or businesses wishing to increase their skills or build businesses to use open data?*
- **ODB.2013.C.SUPIN** (Expert survey question): *To what extent is government directly supporting a culture of innovation with open data through competitions, grants or other support?*
- WEF.GCI.9.02 (Secondary data): Firm-level technology absorption (World Economic Forum Global Competitiveness Index, 2016/2017; Variable 9.02; Taken from WEF expert survey)
- WB.NetUsers (Secondary data): Internet users per 100 people (World Bank indicator IT.NET.USER.P2)

Citizen and Civil Society

- **ODB.2013.C.RTI** (Expert survey question): *To what extent does the country have a functioning right-to-information law?*
- **ODB.2013.C.DPL** (Expert survey question): *To what extent is there a robust legal or regulatory framework for protection of personal data in the country?*
- **ODB.2013.C.CSOC** (Expert survey question): *To what extent are civil society and information technology professionals engaging with the government regarding open data?*
- FH (Secondary Data): Freedom House Political Freedoms and Civil Liberties Index (2016)

To ensure variables collected on different scales are comparable all variables in the readiness sub-index are normalised using z-scores prior to aggregation. For presentation, variables are scaled on a 0 – 100 scale.

Implementation sub-index: dataset questions and aggregation

In the Open Data Barometer expert survey we ask researchers to complete a detailed checklist for each of 15 categories of data. The 10 checklist questions are shown below, along with details of the qualitative data researchers were asked to provide in justification for each answer.

In many cases where machine-readable open data was not available (question c), researchers provided additional answers with respect to the non machine-readable data published by governments (e.g. providing details on whether PDF census information is up to date or not). This information is valuable for building an understanding of different patterns of information and data management within governments, but should not generally feature in a score that measures the availability of open data. Therefore, we apply a validation logic to the original survey data gathered from the Barometer survey to ensure that, after questions a and b, we are measuring only the properties of machine-readable datasets.

Following validation, we weight the checklist responses, awarding the value in the weight column of the table below for answers of *'Yes'*. The weighting is designed to emphasise the four questions (c, d, e, f) which pick out key aspects of the Open Definition. A positive score on these variables is also used to calculate a binary *'Is Open Data'* variable, which is used in presenting dataset listings and in selected summary statistics.

Question	Weight	Chaining logic	Qualitative data collected
a - **Does the data exist?**	5	IF a = No THEN 0 ELSE 5	Description of data; Agency responsible; Reasons for non-collection
b - **Is it available online from government in any form?**	10	IF a = No THEN 0 ELSE (IF b = Yes THEN 10 ELSE 0)	URL; Limits on data published; Policies preventing publication
c - **Is the dataset provided in machine-readable formats?**	15	IF b = No THEN 0 ELSE (IF c = Yes THEN 15 ELSE 0)	URL; File formats;
d - **Is the machine-readable data available in bulk?**	15	IF c = No THEN 0 ELSE (IF d = Yes THEN 15 ELSE 0)	URL

e - **Is the dataset available free of charge?**	15	IF c = No THEN 0 ELSE (IF e = Yes THEN 15 ELSE 0)	Details of charging regimes
f - **Is the data openly licensed?**	15	IF c = No THEN 0 ELSE (IF f = Yes THEN 15 ELSE 0)	URL; License details
g - **Is the dataset up to date?** *Logic: lose 5 points if machine readable data is the data is outdated. Gain 10 points if it is timely.*	10	IF c= No THEN 0 ELSE (IF g = No THEN -5) ELSE (IF c = Yes AND g = Yes THEN 10)	Last update date; Frequency of updates
h - **Is the publication of the dataset sustainable?**	5	IF c = No THEN 0 ELSE (IF h = Yes THEN 5 ELSE 0)	Evidence of sustainability
i - **Was it easy to find information about this dataset?**	5	IF c = No THEN 0 ELSE (IF i = Yes THEN 5 ELSE 0)	Notes on discoverability
j - **Are (linked) data URIs provided for key elements of the data?**	5	IF c = No THEN 0 ELSE (IF j = Yes THEN 5 ELSE 0)	URL of linked data publication

The following table shows the categories of data covered in the technical survey, along with a brief definition of each. These definitions were designed to avoid creating a strong bias against states who have less advanced internal systems for managing

data, and to be able to capture cases where states are making an effort to share the data that they do have. We also sought to gather information about where data is managed federally rather than nationally, to avoid penalising countries with a federal system, although recognising that from the perspective of a data re-user, nationally aggregated data may be much more useful than separate non-standardised federal datasets.

By putting forward categories of data, rather than specific named datasets, we allowed researchers to exercise judgement as to the extent to which countries were making data of this kind available, whilst also sourcing specific examples of datasets that fit into these categories in different countries, and generating a rich collection of qualitative information about the reasons that certain data may or may not be available in different countries, and the extent to which certain datasets tend to exist at national or federal levels. This qualitative data will feed into future iterations of the Open Data Barometer design.

Variable	Short Name	Long Name	Description
ODB.2013.D1	Map	Mapping data	*A detailed digital map of the country provided by a national mapping agency and kept updated with key features such as official administrative borders, roads and other important infrastructure. Please look for maps of at least a scale of 1:250,000 or better (1cm = 2.5km).*
ODB.2013.D2	Land	Land ownership data	*A dataset that provides national level information on land ownership. This will usually be held by a land registration agency, and usually relies on the existence of a national land registration database.*
ODB.2013.D4	Stats	National statistics	*Key national statistics such as demographic and economic indicators (GDP, unemployment, population, etc), often provided by a National Statistics Agency. Aggregate data (e.g. GDP for whole country at a quarterly level, or population at an annual level) is*

			considered acceptable for this category.
ODB.2013.D5	Budget	Detailed budget data	*National government budget at a high level (e.g. spending by sector, department etc). Budgets are government plans for expenditure, (not details of actual expenditure in the past which is covered in the spend category).*
ODB.2013.D6	Spend	Government spend data	*Records of actual (past) national government spending at a detailed transactional level; at the level of month to month government expenditure on specific items (usually this means individual records of spending amounts under $1m or even under $100k). Note: A database of contracts awarded or similar is not sufficient for this category, which refers to detailed ongoing data on actual expenditure.*
ODB.2013.D7	Company	Company registration data	*A list of registered (limited liability) companies in the country including name, unique identifier and additional information such as address, registered activities. The data in this category does not need to include detailed financial data such as balance sheet etc.*
ODB.2013.D8	Legislation	Legislation data	*The constitution and laws of a country.*
ODB.2013.D9	Transport	Public transport timetable data	*Details of when and where public transport services such as buses and rail services are expected to run.*

			Please provide details for both bus and rail services if applicable. If no national data is available, please check and provide details related to the capital city.
ODB.2013.D10	Trade	International trade data	*Details of the import and export of specific commodities and/or balance of trade data against other countries.*
ODB.2013.D11	Health	Health sector performance data	*Statistics generated from administrative data that could be used to indicate performance of specific services, or the healthcare system as a whole. The performance of health services in a country has a significant impact on the welfare of citizens. Look for ongoing statistics generated from administrative data that could be used to indicate performance of specific services, or the healthcare system as a whole. Health performance data might include: Levels of vaccination; Levels of access to health care; Health care outcomes for particular groups; Patient satisfaction with health services.*
ODB.2013.D12	Education	Primary and secondary education performance data	*The performance of education services in a country has a significant impact on the welfare of citizens. Look for ongoing statistics generated from administrative data that could be used to indicate performance of specific services, or the education system as a whole. Performance data might include: Test scores for pupils in national examinations; School attendance rates;*

			Teacher attendance rates. Simple lists of schools do not qualify as education performance data.
ODB.2013.D13	Crime	Crime statistics data	*Annual returns on levels of crime and/or detailed crime reports.Crime statistics can be provided at a variety of levels of granularity, from annual returns on levels of crime, to detailed real-time crime-by-crime reports published online and geolocated, allowing the creation of crime maps.*
ODB.2013.D14	Environment	National environmental statistics data	*Data on one or more of: carbon emissions, emission of pollutants (e.g. carbon monoxides, nitrogen oxides, particulate matter etc.), and deforestation. Please provide links to sources for each if available.*
ODB.2013.D15	Elections	National election results data	*Results by constituency / district for the most all national electoral contests over the last ten years.*
ODB.2013.D16	Contracting	Public contracting data	*Details of the contracts issued by the national government.*

To generate the three sub-components in the Implementation sub-index we cluster these datasets into three groups, based on a qualitative analysis of the common ways in which these categories of data are used. As previously discussed, these clusters are not mutually exclusive. It is within the nature of open data that a dataset can be used for multiple purposes – and a single dataset might have applications across innovation, improving policy, and increasing accountability. However, for simplicity of presentation and analysis we place each dataset in only one cluster. Further work is needed to refine these clusters in future analysis, and readers are encouraged to explore different groupings of datasets in remixing our research.

Innovation	Social Policy	Accountability
Data commonly used in open data applications by entrepreneurs, or with significant value to enterprise.	*Data useful in planning, delivering and critiquing social policies & with the potential to support greater inclusion and empowerment.*	*Data central to holding governments and corporations to account. Based on the 'Accountability Stack'.*
Map Data, Public Transport Timetables, Crime Statistics, International Trade Data, Public Contracts.	Health Sector Performance, Primary or Secondary Education, Performance Data, National Environment Statistics, Detailed Census Data.	Land Ownership Data, Legislation, National Election Results, Detailed Government Budget, Detailed Government Spend, Company Register.

Impacts sub-index

Recognising the early stage of open data developments around the world, we sought to develop an approach to capture stories of impact, and to be able to compare the relative strength of impact these indicated across different categories of impact, and across different countries. Our approach was to treat online, mainstream media and academic publications about open data impacts as a proxy for existence of impacts, with researchers asked to score the extent of impact on a 0 – 10 scale. Scoring guidance outlined that the highest scores should only be given for peer-reviewed studies showing impact, and emphasised the importance of sources making a direct connection between open data and observed impacts. For scores over 5 researchers were asked to cite at least two separate examples in the given category.

The six questions asked in this section, organised by sub-component, were:

Political

- **ODB.2013.I.GOV** (Expert survey question): *To what extent has open data had a noticeable impact on increasing government efficiency and effectiveness?*
- **ODB.2013.I.ACCOUNT** (Expert survey question): *To what extent has open data had a noticeable impact on increasing transparency and accountability in the country?*

Social

- **ODB.2013.I.ENV** (Expert survey question): *To what extent has open data had a noticeable impact on environmental sustainability in the country?*

- **ODB.2013.I.INC** (Expert survey question): *To what extent has open data had a noticeable impact on increasing the inclusion of marginalised groups in policy making and accessing government services?*

Economic

- **ODB.2013.I.ECON** (Expert survey question): *To what extent has open data had a noticeable positive impact on the economy?*
- **ODB.2013.I.ENTR** (Expert survey question): *To what extent are entrepreneurs successfully using open data to build new businesses in the country?*

These variables are all normalised using z-scores prior to aggregation.

Computation

To calculate each component an average of the variables in that component is taken. The average of components is used to generate each sub-index.

The weighted average of the sub-indexes is used to generate the overall Open Data Barometer score.

For consistency, the normalised scores for all the sub-indexes, and the readiness and impacts components, have been rescaled to a 0 - 100 range using the formula [(x - min)/(max - min)]*100 prior to presentation. This means that a score of 100 on these components and sub-indexes illustrates the highest scoring country across all those included in the Barometer Global ranking. **It does not mean that a score of 100 is perfect**.

All scores in a study of this kind are subject to a margin of error. To offer an indicative comparison between countries we offer a ranking based on rounding each country's overall ODB score to its closest integer value (no decimal places), and placing countries in order of score. This ranking, and each of the other scores, should be treated as the starting point for exploration, rather than a definitive judgement on each country's open data readiness, implementation and impacts.

Index weightings

Whilst the ultimate goal of the Open Data Barometer is to understand and increase open data impact, at present our methods offers only a rough proxy measure of impact, through the publication of media or academic stories on impact. An analysis of the data in, and between, years, suggests this method offers a useful heuristic for extent of impact, but does have a relative risk of false-negative results, when research does not locate stories of impact, and false-positives, when media incorrectly attribute impacts to open data, or report arguments for potential benefits as actual impacts and benefits. Scores on the impact variables also lack a normal distribution, being heavily skewed towards zero. As a result, we judged it was not yet possible to give impact the highest weight in our overall rankings.

Similarly, on theoretical grounds, whilst some variables within the readiness sub-index do reflect explicit actions on open data, such as those addressing the presence of initiatives, and support for innovation, other variables within this sub-index are

capturing elements of wider context in the country. In seeking to measure progress towards being able to secure impacts of open data, having readiness alone is not enough: this readiness should be translated into action.

This is the basis for the 35-35-30 (Readiness-Implementation-Impact) weightings in the final Open Data Barometer score.

Future editions will draw upon updated indicators and methodologies in order to further the robustness of impact measurement, and to introduce a stronger focus on data use. This also provides the basis for a gradual shift in this edition towards a marginally lower weighting of implementation, creating space for new variables, whilst offering the opportunity to keep some degree of comparability across indexes in future years also.

Changes since the first edition

When making comparisons between different editions it is important to be aware of minor methodological changes. Whilst we have made every effort to keep indicators consistent, learning from the our experience and the evolution of the open data field has led to a number of minor adaptations.

Primary data collection

A government self assessment questionnaire was introduced for the first time during the third edition in the research process. Each of the countries in the survey was invited to fill a simplified version of the full survey questionnaire, providing complete justifications and sources but without scores. The results of the self-assessments were shared after with the researchers team during the peer-review phase with the objective of providing further background to contrast and validate the main findings for each of the questions in the survey.

Indicator changes

Two new *Government Policies* primary indicators have been added to the 3rd edition:

- **ODB.2015.C.POLI** (Expert survey question): *To what extent is there a well-defined open data policy and/or strategy in the country?*
- **ODB.2015.C.MANAG** (Expert survey question): *To what extent is there a consistent (open) data management and publication approach?*

The purpose of these new indicators is to assess the progress of governments in implementing the International Open Data Charter principles.

Four different *Readiness* indicators (ODB.2013.C.COURSES; ODB.2013.C.UNIDATA; ODB.2013.C.CSDATA; ODB.2013.C.BIZDATA) were tested as part of the original survey during the first edition only. The results for such indicators were published but never included in the final report or following editions of the surveys given that the outcomes were not conclusive.

One additional dataset (D16 - Public Contracts) was added and another one (D3-Services) was removed from the technical assessment in the second edition. The new *Public Contracts* dataset was included in the ‘Innovation & Economic Growth’

implementation sub-component, based on the potential role of transparent contracting data in creating a more competitive landscape in public procurement.

The operational definitions for a number of datasets in the technical assessment were also updated for the second edition. The datasets affected included: Mapping, National Statistics, Detailed budget, Detailed data on government spend, Company Registration and Elections. The changes were minor in each case.

Structure

The *Government Policies* component was totally new for the 3rd edition (containing two new indicators as well: ODB.2015.C.POLI and ODB.2015.C.MANAG) and the *Government Action* component was previously named just '*Government*'.

One former external indicator of the *Government Action* component (WEF.GITR.8.01) has been moved to the new *Government Policies* component in the third edition.

There were 15 datasets in all editions of the Barometer, but D3 (Services) was only existing in the first edition and D16 (Public Contracts) was only existing in the 2nd and 3rd ones.

Sample selection

The number of countries is different for each edition (77 for the first one; 86 for the second one; 92 for the third one and 115 for the fourth one).

In an ideal scenario, the Barometer might be covering all countries in the world but unfortunately, and as in any other project, the available resources and timelines impose also some limitations with respect to our final world coverage. For that reason, in every new edition of the Barometer we try to follow some simple criteria for the inclusion of new countries:

- Cover as many countries as possible in total.
- Expand on the top of the countries from each of the previous editions.
- Include low, middle and high income economies from all global regions.
- Ensure a sufficient spread across the world and keep at the same time a fair balance between the different world regions.
- Take into account the feedback and demand from the global community and our regional partners on successive editions.
- Be sure we could find the required local researchers for each country included.
- Ensure availability of other secondary indicators we use in our research.

Aggregation changes

In the second edition, datasets which are available in any forms, but which are judged not to be up-to-date had 5 points subtracted from their 0 - 100 score. Datasets which are judged to be updated will still receive +10 points on this score according to the following formula:

```
IF g = No THEN -5
ELSE
  IF (c = Yes AND g = YES) THEN 10
  ELSE  0
```

This change was to reflect the fact that a number of datasets which were out of date in 2013 remain so in this years survey, and to offer the same score in 2014 would not reflect the further drops in the timeliness of this data. The formula was further refined for the third edition as follows:

```
IF c=No THEN 0
ELSE
  IF g = No THEN -5
  ELSE
    IF (c= Yes AND g = YES) THEN 10
```

This change was to avoid further penalisation of outdated non machine readable datasets, given that those are already not featuring in the score as after questions a and b, we are measuring only the properties of machine-readable datasets.

The first edition Barometer incorrectly reported the sub-indexes as equally weighted on page 37. The first edition weights were: Readiness (1/5); Implementation (3/5); Impact (1/5) (i.e. 60% of the overall ranking was based on implementation). In the second edition 50% of ranking was based on implementation, with the rest split 25% to readiness, and 25% to impact. As we kept improving our methods since the third edition 30% of ranking is based on impact, with the rest split 35% to readiness and, and 35% to implementation.

The higher weighting of implementation in the first two editions of the Open Data Barometer reflects the focus, at that pilot phase of the project, on exploring progress towards open data implementation and impact over time, and judgements on the relative strength of the primary data collected in each year. The small and continuous reduction in weighting of implementation from the first to current edition reflects the direction of travel in the Barometer towards assessing use and impact, whilst seeking to maintain comparability of rankings between the different editions and ensuring that score changes can still be clearly explained by changes of underlying variables.

Tools

Data collection

Primary data collection was carried out using a custom survey platform. Details of the platform can be found on GitHub.

Analysis

Analysis was carried out via R, with a parallel check of calculations using Google Spreadsheets.