Partnering to accelerate Social Progress

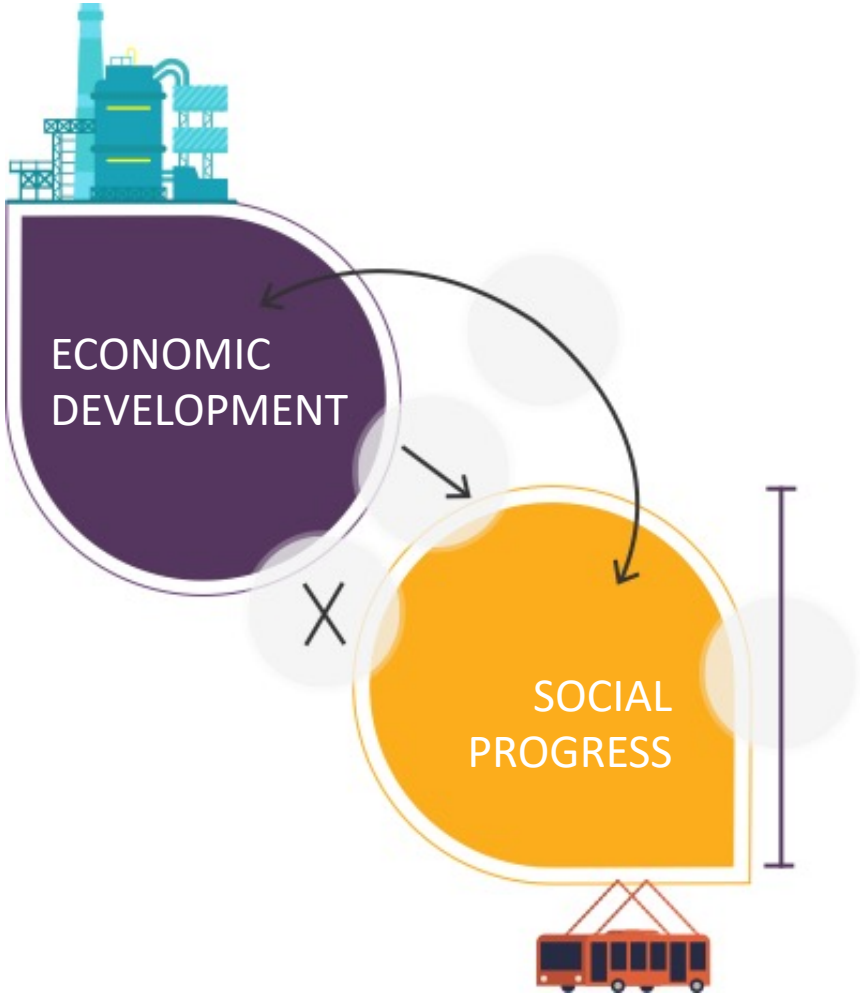
SOCIAL PROGRESS IMPERATIVE

AGENDA

- A brief summary
- Q&A
- Next steps

SOCIAL PROGRESS IMPERATIVE

WHY MEASURE SOCIAL PROGRESS?



Common assumption that economic development automatically generates social progress

Economic development does not always result in social progress

Social progress may also affect economic development

To understand inclusive growth, we need to **measure social progress directly** as a complement to standard economic measures

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We define social progress as:

"the capacity of a society to **meet the basic human needs** of its citizens, establish the building blocks that allow citizens and communities to **enhance and sustain the quality of their lives**, and create the conditions for **all individuals to reach their full potential**."

SOCIAL PROGRESS IMPERATIVE

WHAT IS THE SOCIAL PROGRESS INDEX?

GDP + SPI = INCLUSIVE GROWTH

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The **Social Progress Index** asks universally important questions about the success of society that GDP and other measures of economic progress cannot alone address

Basic Human Needs

Nutrition & Basic Medical Care

Do people have enough food to eat and are they receiving basic medical care?

Water & Sanitation

Can people drink water and keep themselves clean without getting sick?

Shelter

Do people have adequate housing with basic utilities?

Personal Safety

Do people feel safe?

Foundations of Wellbeing

Access to Basic Knowledge

Do people have access to an educational foundation?

Access to Information & Communications

Can people freely access ideas and information from anywhere in the world?

Health & Wellness

Do people live long and healthy lives?

Environmental Quality

Is this society using its resources so they will be available to future generations?

Opportunity

Personal Rights

Are people's rights as individuals protected?

Personal Freedom & Choice

Are people free to make their own life choices?

Inclusiveness

Is no one excluded from the opportunity to be a contributing member of society?

Access to Advanced Education

Do people have the opportunity to access the world's most advanced knowledge?

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Unique design principles

The Social Progress Index design principles allows an exclusive analysis of social progress.

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Social and environmental indicators only Measures social progress exclusively and directly, independent of economic indicators.

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Outcomes, not inputs Measures outcomes or lived experience, regardless of effort spent.

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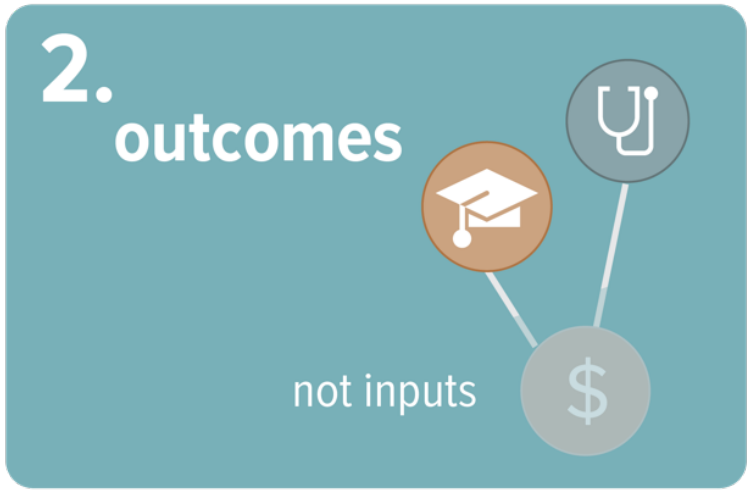

Social and environmental indicators only Measures social progress exclusively and directly, independent of economic indicators.

Outcomes, not inputs Measures outcomes or lived experience, regardless of effort spent.

Holistic and relevant to all communities Multidimensional measure that encompasses the many inter-related aspects of thriving societies everywhere.

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Outcomes, not inputs Measures outcomes or lived experience, regardless of effort spent.

Holistic and relevant to all communities Multidimensional measure that encompasses the many inter-related aspects of thriving societies everywhere.

Actionability Practical tool that helps leaders and decision-makers implement policies and programs to drive faster social progress.

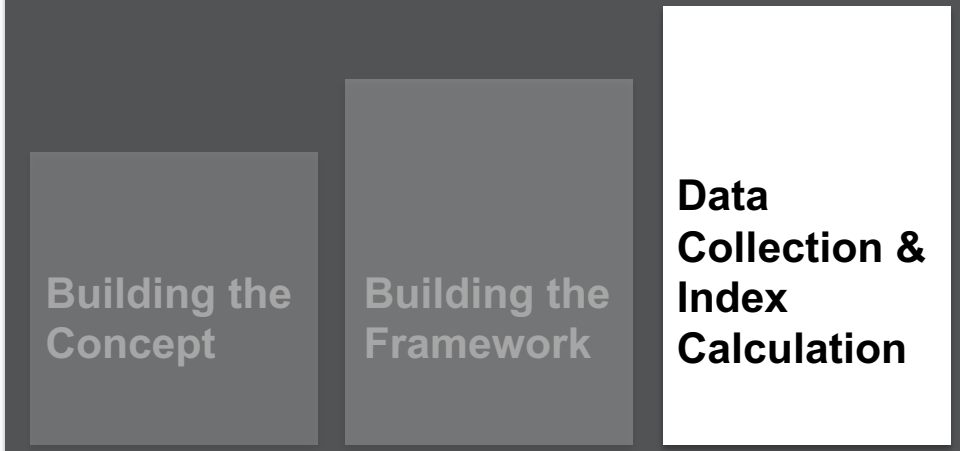
SOCIAL PROGRESS IMPERATIVE

DATA COLLECTION AND INDEX CALCULATION

Decision 3: What data do we use? Solely secondary sources, reprocessing of primary data, collecting primary information?

Using the best available data – for the best possible model.

- Is there enough information to measure concepts that matter?
- Is this information credible and consistent?
- Are we measuring outcomes?
- Can we monitor those indicators on a regular basis?



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PREPARATIONS BEFORE INDEX CALCULATIONS

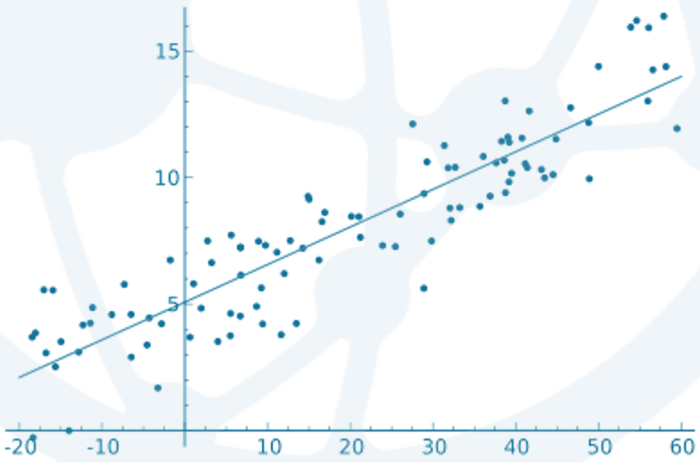
Imputation of missing data

Identify outliers

Make scale adjustments and transform highly skewed indicators (capping, bucketing)

Invert indicators that are negatively related to Social Progress

Standardisation (z-scores)



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MISSING VALUES

Identify blanks and zeros
- **Look for patterns**
- **Are zeros actually zeros?**

Identify extreme values, aka outliers
- **Are these true or potentially mistakes?**

In 1870, a German chemist named Erich von Wolf was researching the nutritional benefits of spinach. In his notes, he accidentally printed the decimal point in the vegetable's iron content in the wrong spot. Wolf accidentally increased the vegetable's iron level to 10 times the actual amount — 3.5 grams of iron suddenly became 35 grams, an extremely high amount of iron.

While the story has since been debated, and the error is likely to be due to poor scientific methods rather than a mistakenly placed decimal point, it helps to demonstrate that **extreme values need to be carefully scrutinized**.

MISSING VALUES

Check why a value is missing

- **Irrelevance of measure**
- **Suppressed values**

If the value is simply missing….

- Assess all missing values on case by case basis rather than apply one size fits all approach.
- Be clear and transparent about the imputation method and why we selected it.
- Not interpret and directly compare imputed values as and with recorded values.

Bearing in mind that SPI is used to inform policy and decision-making, and this needs to be taken into account when deciding on the best imputation method. Sometimes this can also mean that the indicator must be excluded if there are any missing values, because any type of imputation would not be acceptable to policy-makers.

IMPUTATION METHODS

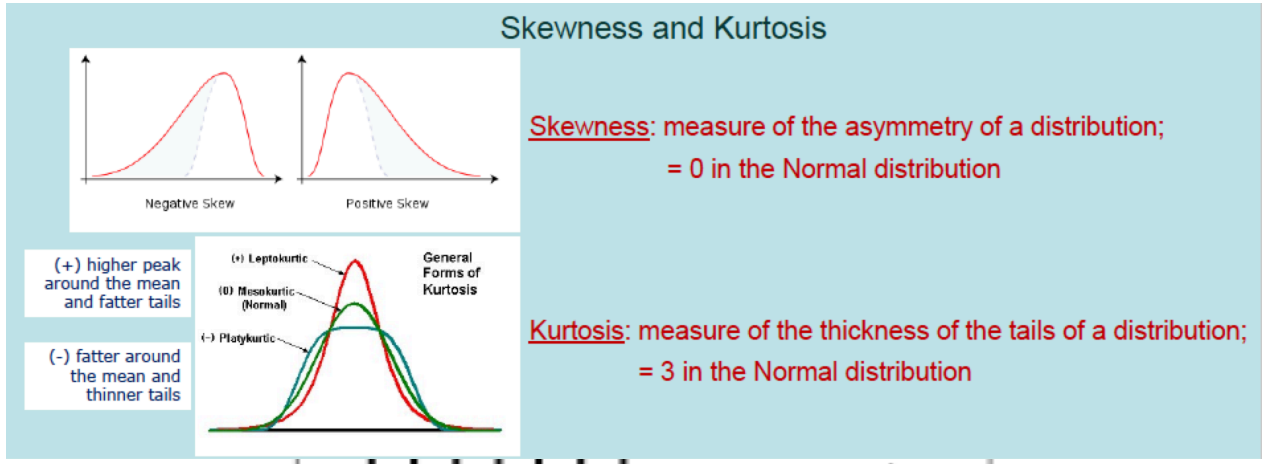
Historical or more recent values
Averaging all, or neighbouring units
Higher level of geography
Regression

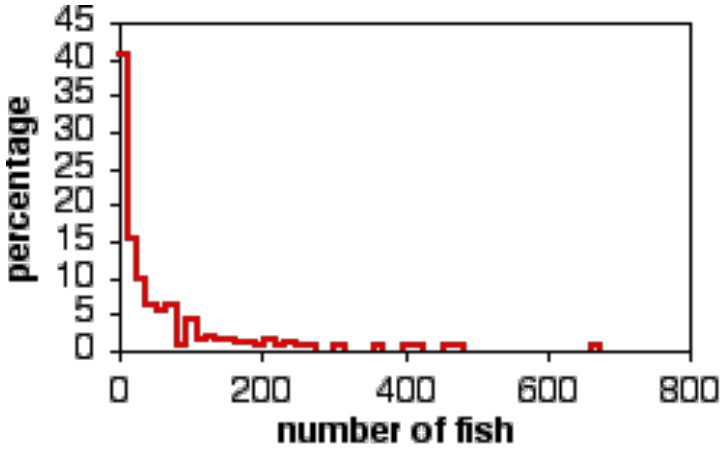
Each imputed data point should be assessed to ensure accuracy. In case the imputed value does not meet expectations alternative imputation methods need to be considered and tested.

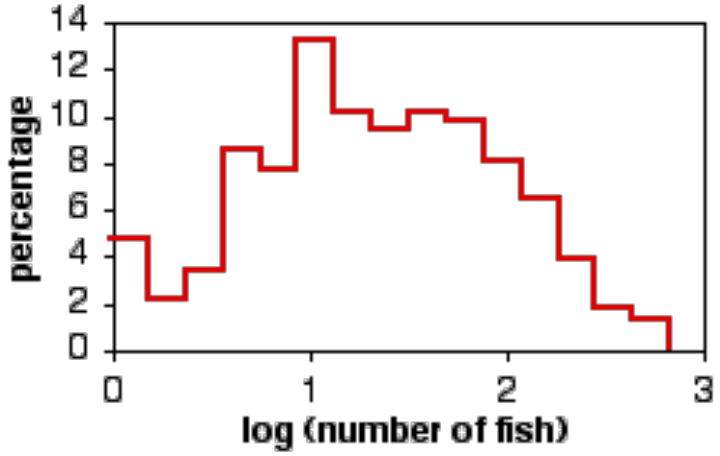
INDICATOR TRANSFORMATIONS

Identification of outliers

Distribution
- capping
- log tr.







INDICATOR TRANSFORMATIONS

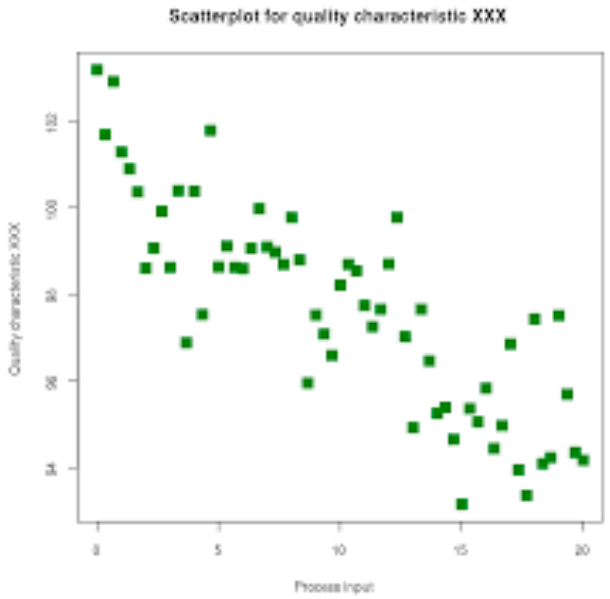
- Inversion
- Z-score
- Min-max standardization
  (*performed at the level of components*)

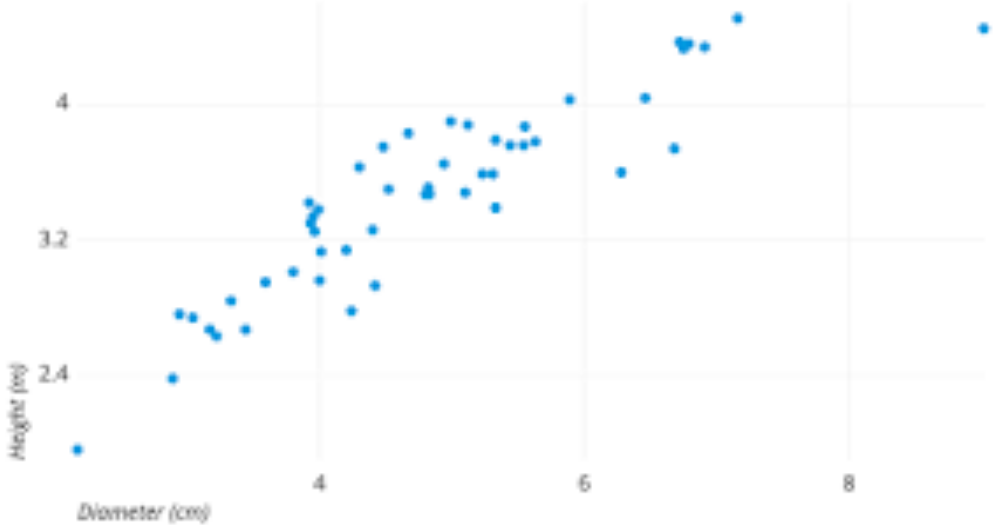
INDICATOR TRANSFORMATION: INVERSION

- for the index construction, all indicators are supposed to go in the same direction, i.e. higher values should indicate better performance

- some indicators (such as mortality indicators) are negatively related to Social Progress: higher values of maternal mortality indicate lower/worse performance (and vice versa)

- a simple way to deal with this: we invert such an indicator by multiplying all its values by -1



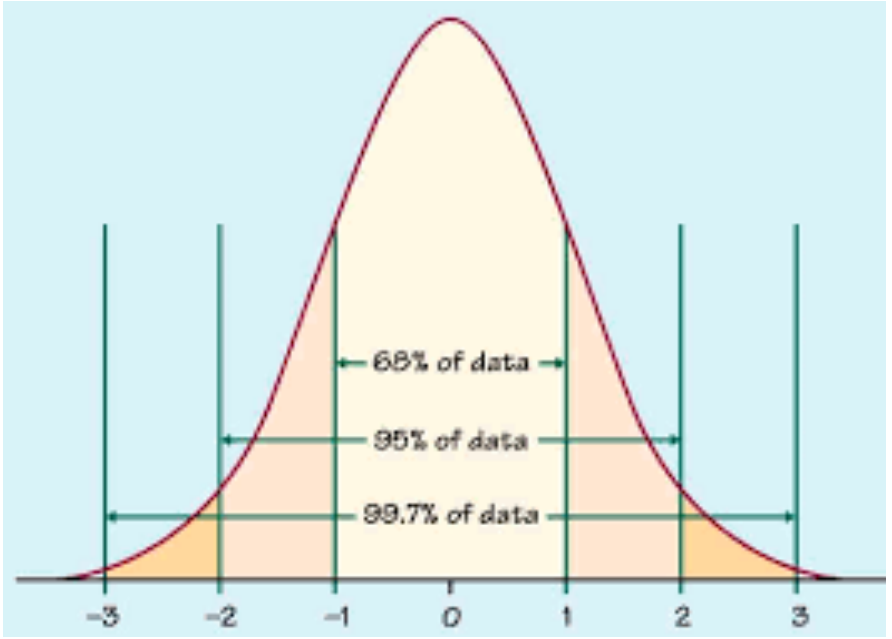


INDICATOR TRANSFORMATION: Z-SCORE STANDARDIZATION

- to standardize the data so that they are measured them on the same scale

- to get a z-score for an observation, substract the mean from a raw value for that observation and divide the difference by the standard deviation:

$$z = \frac{Observation\ - Mean}{Standard\ Deviation}$$



the result is a standard score (= z-score) that measures the number of standard deviations that a given data point is from the mean (the z-scores can take positive as well as negative values)

UTOPIAS AND DYSTOPIAS

Before calculating the index, it is important to determine the values that would represent the absolute best case (**utopia**) and the absolute worst case (**dystopia**) for each indicator. In the dataset, two fictitious units should be created to represent all the best case scenarii and all the worst case scenarii.

The utopia and dystopia values will be used to transform scores to the 0-100 scale, where 0 is the worst possible score and 100 is the best possible score (refer to “Calculating component, dimension and index scores”).

This makes the final scores more easily interpretable and comparable across components.

INDICATOR TRANSFORMATION: MIN-MAX STANDARDIZATION

$$\frac{(X_j - Worst\ Case)}{(Best\ Case - Worst\ Case)} * 100$$

to re-scale values to 0-100 scores because of better comparability & clearer interpretation

(*the min-max standardization is performed* ***only after the indicators are aggregated into components***)

WEIGHTING AND AGGREGATION

The individual component scores are calculated by summing the weighted scores of indicators to reach the component.

$$Component_c = \sum_i (w_i * indicator_i)$$

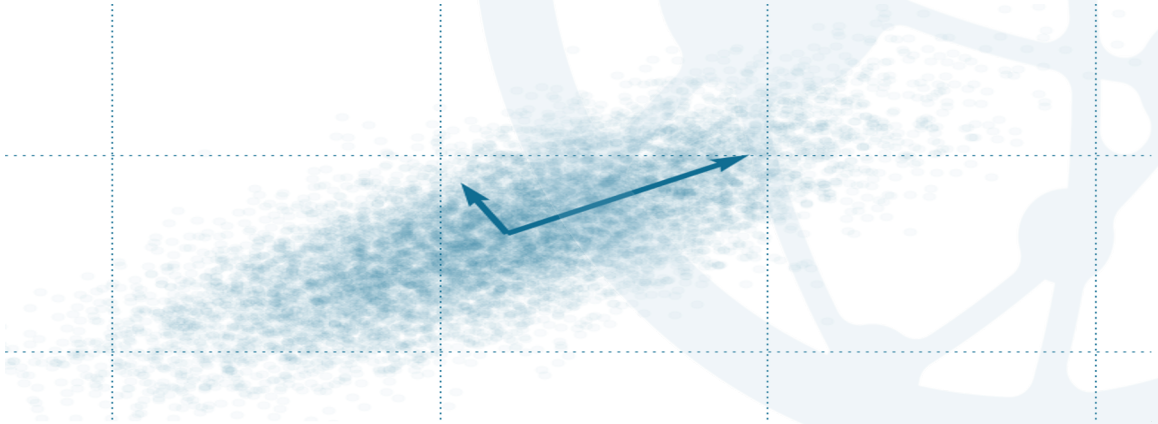
$$\frac{(X_j - Worst\ Case)}{(Best\ Case - Worst\ Case)} * 100$$

For comparability, we **now** re-scale the components to 0-100 scores using the min-max method

APPLYING THE PRINCIPAL COMPONENTS ANALYSIS

Principal Components Analysis (PCA) is used to evaluate the fit of indicators within components and determine indicator **weights** within components. If indicators are chosen well to reflect a component, this method help us to identify **robust and consistent** combinations of indicators for each component.

To create indexes with **variables that measure similar things** (conceptually). To get a small set of variables (preferably uncorrelated) from a large set of variables (most of which are correlated to each other)



AGGREGATION METHODS

Arithmetic mean – global SPI
Generalized weighted mean – EU RSPI, YPI
Geometric mean – US SPI

ARITHMETIC MEAN

The simplest, most obvious and most widespread aggregation method => widely known and easy to understand

- the quantity obtained by summing two or more numbers or variables and then dividing by the quantity (#) of numbers or variables

$$\frac{1}{n}\sum_{i=1}^{n} x_i$$

Perfect substitutability – compensates bad performance in one with good in another

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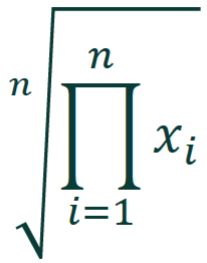
GEOMETRIC MEAN

Indicates the central tendency or typical value of a set of numbers by using the product of their values (as opposed to the arithmetic mean which uses their sum).

- The geometric mean is defined as the nth root of the product of *n* numbers:



- **Partial substitutability** - compensates up to a point/rewards balanced performance/penalises low performance in any of the elements to be aggregated

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GENERALIZED WEIGHTED MEAN

Across the components and, even more, across the dimensions the effect of compensability is generally more accentuated. An inequality-adverse type of aggregation is then adopted to mitigate this effect. It is a well-known principle that deficiency in one component should lead to a general failure, given that acceptable social progress levels are ensured if a region performs well enough across all the different social aspects.

$$I_j = \begin{cases} \left(\frac{1}{q}\sum_{i=1}^{q} x_i^{\beta}\right)^{1/\beta} & \beta \neq 0 \\ \left(\prod_{i=1}^{q} x_i\right)^{1/q} \text{ for } \beta = 0 \quad \text{(geometric mean)} \end{cases}$$

Full compensability can be avoided, or at least mitigated, by adopting a type of aggregation which stands in between an arithmetic and the geometric average, the generalised weighted mean (Annoni and Weziak- Bialowolska, 2016; Decancq and Lugo 2013; Ruiz 2011).

Under this assumption that $0 < \beta < 1$, the generalised mean is said to be inequality-adverse: a rise in the level of one component in the lower tail of the distribution will increase the mean value by more than a similar rise in the upper tail, thus giving more importance to low levels (Ruiz 2011). The closer β is to 0, the higher this effect will be. Consequently, the order β plays the important role of balancing the achievements between two components.

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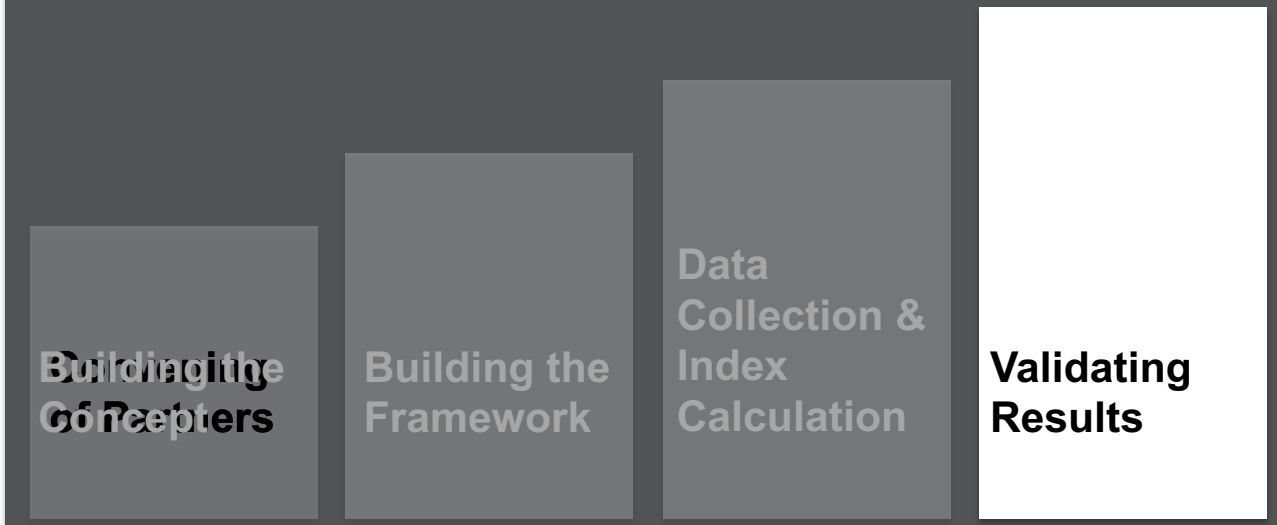
Validating results

Decision 4: How do we validate the results?
Relying on statistical robustness, benchmarking, reality check?

- Is the model robust and stable enough?
- With whom do we want to compare our performance?
- Does this picture of social progress reflect the current state of human wellbeing in this given context, at this specific time?



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INTERNAL CONSISTENCY

Cronbach's alpha provides a measure of **internal consistency** across indicators. An applied practitioner's rule of thumb is that the alpha value should be above 0.7 for any valid grouping of variables.

To evaluate the **"fit between"** the individual indicators within a component, by calculating Cronbach's alpha for the indicators in each component.

APPLYING THE PRINCIPAL COMPONENTS ANALYSIS

After performing the factor analysis in each component, assess this goodness of fit using the Kaiser Meyer Olkin measure of sampling adequacy. In general, KMO scores should be above 0.5.

WEIGHTING AND AGGREGATION

Each dimension is simply the average of the four components that make up that dimension; and the overall index is calculated as the simple average of the three dimensions.

$$Dimension_d = \frac{1}{4} \sum_c Component_c$$

$$SPI = \frac{1}{3} \sum_d Dimension_d$$

CONSULTATION – INTEGRAL PART OF ASPI

November 2018-March 2019

- The purpose of the first round of consultations were to introduce the SPI, and seek input on a 'wishlist' of potential indicators that could be included in the Index, as well as collating potential data sources. A total of thirteen consultation meetings were held:
    - Local government – 1
    - Peak body – 1
    - Industry – 2
    - University/academics – 7

June 2019-August 2019

- A list of 53 preliminary indicators, their definition, and data source were presented at an event at the Progress 2019 Conference in Melbourne.

September-October 2019

- Following the calculation of the beta-Index, additional consultations were carried out with stakeholders to receive feedback on the final indicators, the scores that the SPI calculations produced, and the overall messaging and narrative of the Australian SPI scores.

AMPLIFY Social Impact

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Questions and Answers

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Next steps

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STORING DATA

The Social Progress Index framework offers a useful structuring method for folders, it is very intuitive and easy to navigate. Data should be stored according to (Dimensions and) Components.
For example:

- BHN
  - NBMC
  - WS
  - S
  - PS
- FoW
  - ABK
  - AIC
  - HW
  - EQ
- Opp
  - PR
  - PFC
  - Incl
  - AAE

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KEEPING TRACK

Storing summary information on indicators in one place – Indicator tracker

Basic Human Needs	Nutrition and	Undernourishment (% of pop.)	11/09/2018	30/04/2019	Yes	Sept. 2019	Annual	Yes	http://www.f	The prevalence	2001-2017	No	No
Basic Human Needs	Nutrition and	Maternal mortality rate (deaths/100,0(	9/xx/18	30/04/2019	Yes	Sept. 2019	Annual	Yes	http://ghdx.he	Maternal death	1990-2030	No	No
Basic Human Needs	Nutrition and	Child mortality rate (deaths/1,000 live	10/xx/18	01/05/2019	Yes	Oct. 2019	Annual	Yes	http://www.c	Probability of d	1950-2017	Yes	No
Basic Human Needs	Nutrition and	Child stunting (% of children)	9/xx/18	30/04/2019	Yes	Sept. 2019	Annual	Yes	http://ghdx.he	Prevalence of st	1990-2030	No	No
Basic Human Needs	Nutrition and	Deaths from infectious diseases (deaths	9/xx/18	06/05/2019	Yes	Sept. 2019	Annual	Yes	http://ghdx.he	Age-standardize	1990-2017	Yes	Yes
Basic Human Needs	Water and Sar	Access to at least basic drinking water (	Mid June/19	18/06/2019	Yes	June 2020?	Annual	Yes	https://washd	The percentage	2000-2017	No	No
Basic Human Needs	Water and Sar	Access to piped water (% of pop.)	Mid June/19	19/06/2019	Yes	June 2020?	Annual	Yes	https://washd	The percentage	2000-2017	No	No
Basic Human Needs	Water and Sar	Access to at least basic sanitation facilit	Mid June/19	20/06/2019	Yes	June 2020?	Annual	Yes	https://washd	The percentage	2000-2017	No	No
Basic Human Needs	Water and Sar	Rural open defecation (% of pop.)	Mid June/19	21/06/2019	Yes	June 2020?	Annual	Yes	https://washd	The percentage	2000-2017	No	No
Basic Human Needs	Shelter	Access to electricity (% of pop.)	01/05/2019	28/06/2019	Yes	May 2020	Annual	Yes	https://data.w	The percentage	1990-2017	No	No

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FEW MORE TIPS – SEE DATA COLLECTION AND MAINTENANCE GUIDELINES

- Maintaining original data
- Keeping indicator manipulations separate
- Bringing it all together and Indicator labelling

Province Name	Province acronym	Year	nbmc_SchNutProg	nbmc_InfantDR	nbmc_IMMR	nbmc_LessFood	nbmc_Hungry	ws_PipedWater	ws_UnsafeWater	ws_Sanitation	ws_PitToile
Western Cape	(WC)	2018	-0.08	-16.59	-68.30	-18.29	-0.06	0.77	0.92	0.93	0.0
Eastern Cape	(EC)	2018	-0.26	-15.93	-148.47	-32.12	-0.04	0.33	0.86	0.44	-26.4
Northern Cape	(NC)	2018	-0.22	-34.81	-121.37	-15.00	-0.09	0.50	0.86	0.77	0.0
Free State	(FS)	2018	-0.23	-34.34	-174.63	-25.45	-0.07	0.43	0.89	0.76	-13.7
KwaZulu-Natal	(KZN)	2018	-0.22	-16.10	-127.14	-24.90	-0.09	0.35	0.92	0.45	-22.8
North-West	(NW)	2018	-0.20	-39.16	-172.17	-24.05	-0.07	0.27	0.92	0.48	-8.6
Gauteng Province	(GP)	2018	-0.09	-22.38	-128.78	-20.22	-0.04	0.61	0.97	0.89	0.0
Mmpumulanga Province	(MP)	2018	-0.24	-21.03	-132.19	-14.94	-0.06	0.26	0.87	0.43	-22.8
Limpopo Province	(LP)	2018	-0.31	-20.28	-165.16	-23.60	-0.02	0.13	0.97	0.24	-23.8
Western Cape	(WC)	2017	-0.07	-18.53	-68.30	-14.17	-0.06	0.77	0.91	0.93	0.0
Eastern Cape	(EC)	2017	-0.26	-17.58	-148.47	-34.23	-0.04	0.31	0.85	0.42	-26.4
Northern Cape	(NC)	2017	-0.21	-31.50	-121.37	-34.48	-0.11	0.49	0.88	0.74	0.0
Free State	(FS)	2017	-0.22	-35.64	-174.63	-17.92	-0.07	0.45	0.86	0.75	-13.7
KwaZulu-Natal	(KZN)	2017	-0.21	-18.96	-127.14	-31.34	-0.09	0.35	0.91	0.44	-22.8
North-West	(NW)	2017	-0.19	-33.90	-172.17	-20.69	-0.07	0.27	0.93	0.48	-8.6
Gauteng Province	(GP)	2017	-0.09	-21.33	-128.78	-26.32	-0.06	0.63	0.97	0.88	0.0
Mmpumulanga Province	(MP)	2017	-0.25	-22.92	-132.19	-17.80	-0.08	0.28	0.86	0.42	-22.8
Limpopo Province	(LP)	2017	-0.33	-23.98	-165.16	-22.46	-0.02	0.13	0.95	0.25	-23.8
Western Cape	(WC)	2016	-0.07	-16.80	-66.50	-6.06	-0.08	0.77	0.98	0.93	0.0
Eastern Cape	(EC)	2016	-0.28	-18.60	-174.15	-31.69	-0.05	0.32	0.84	0.42	-34.8
Northern Cape	(NC)	2016	-0.19	-37.09	-120.68	-19.74	-0.10	0.47	0.91	0.73	-1.8
Free State	(FS)	2016	-0.22	-37.65	-203.26	-20.65	-0.07	0.44	0.87	0.75	-18.1
KwaZulu-Natal	(KZN)	2016	-0.21	-19.04	-127.82	-28.57	-0.11	0.35	0.90	0.46	-23.6
North-West	(NW)	2016	-0.18	-33.13	-180.08	-36.17	-0.07	0.26	0.91	0.47	-9.8
Gauteng Province	(GP)	2016	-0.09	-21.51	-149.75	-22.49	-0.06	0.64	0.97	0.88	-0.0
Mmpumulanga Province	(MP)	2016	-0.24	-22.39	-119.54	-23.73	-0.07	0.28	0.86	0.41	-22.8
Limpopo Province	(LP)	2016	-0.35	-23.32	-149.32	-26.98	-0.03	0.12	0.97	0.24	-24.5
Western Cape	(WC)	2015	-0.08	-18.10	-83.90	-11.41	-0.08	0.77	0.98	0.93	0.0
Eastern Cape	(EC)	2015	-0.28	-16.44	-172.70	-33.93	-0.05	0.31	0.82	0.42	-52.8

Data | NBMC | WS | Shelter | PS | ABK | AIC | HW | EQ | +

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CHECKING FOR CORRELATIONS

- With each component indicators – a simple correlation matrix helps us identify best indicators
- Remember that some indicators might be inversely related, so a negative correlation does not automatically mean a bad fit

	ps_MurderRate	*ps_HHAffCrime*	*ps_RobbAggCir*	*ps_CrimeSafety*	*ps_YSatCrimeRed*	*ps_YSatSafe*	*ps_Burglary*	*ps_FeelSafe*	*ps_FeelSafeDay*	*ps_FeelSafeNight*	*ps_WorryBurgled*	*ps_WorryViolentCrime*	*ps_Neighbourhood*	*ps_maliciousdamagetoproperty*
ps_MurderRate	1.00													
ps_HHAffCrime	0.47	1.00												
ps_RobbAggCir	0.29	0.36	1.00											
ps_CrimeSafety	0.29	0.37	0.54	1.00										
ps_YSatCrimeRed	0.16	0.18	0.68	0.54	1.00									
ps_YSatSafe	-0.13	-0.04	-0.48	-0.23	-0.61	1.00								
ps_Burglary	0.11	-0.32	0.15	0.13	0.14	-0.25	1.00							
ps_FeelSafe	0.27	0.02	0.37	0.27	0.49	-0.57	0.18	1.00						
ps_FeelSafeDay	0.49	-0.04	0.41	0.29	0.45	-0.44	0.25	0.81	1.00					
ps_FeelSafeNight	0.09	-0.15	0.27	0.16	0.38	-0.49	0.14	0.57	0.51	1.00				
ps_WorryBurgled	0.17	-0.27	0.24	0.04	0.33	-0.35	0.38	0.59	0.62	0.56	1.00			
ps_WorryViolentCrime	0.33	0.01	0.33	0.35	0.44	-0.39	0.22	0.63	0.71	0.59	0.77	1.00		
ps_Neighbourhood	0.25	0.15	0.54	0.39	0.49	-0.24	0.03	0.27	0.32	0.55	0.25	0.37	1.00	
ps_maliciousdamagetopro	0.32	0.45	0.51	0.29	0.30	0.04	-0.13	0.08	0.17	0.07	-0.02	0.18	0.44	1.00

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Thank you.

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