

Human Development Index: a case study in graphical representation

The poster describes the process of developing graphical metaphor and representations of the Human Development Index —HDI— and its components (United Nations Development Programme): the *Development Tree*. The project was commissioned by César A. Hidalgo, head of MacroConnections group, MIT Media Lab, and Faculty Associate, Center for International Development, Harvard University, while writing the “Graphical Statistical Methods for the Representation of the Human Development Index and its Components,” for the Human Development Report Office (Hidalgo, 2010). Concept and visual representations were developed by Isabel Meirelles in collaboration with Northeastern University students during Spring 2010, prior to their graduation: Geoff House, David Landry and Alex Simoes.

The objective was to explore the use of visual representations as an alternative to the mathematical forms currently used to aggregate the HDI. The HDI is a composite measure of one health, one income and two education indicators, which are aggregated numerically through a set of formulas that reduce all these dimensions to a single number. To keep the information on the dimensions that get aggregated away when done numerically, we proposed representing the HDI graphically as a tree, where the trunk represents the total aggregate value, and the branches its components and subcomponents. By using appropriate design rules for the sizes of each branch we preserve the information encoded in the mathematical definition of the HDI, and augment it, by providing a representation that allows differentiating between countries that might differ in HDI structure despite having a similar aggregate HDI value.

Hidalgo, César. (2010). “Graphical Statistical Methods for the Representation of the Human Development Index and its Components,” *Human Development Research Paper 2010/39* http://hdr.undp.org/en/reports/global/hdr2010/papers/HDRP_2010_39.pdf

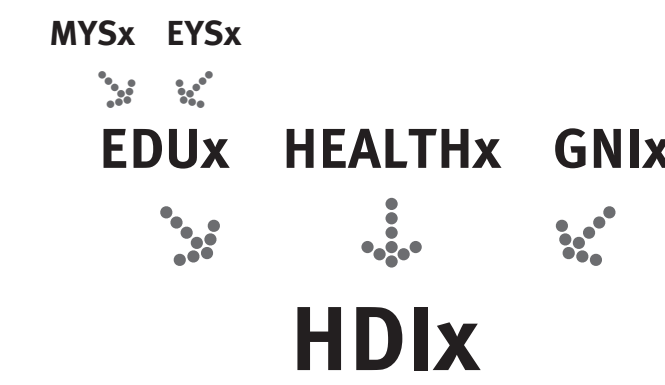
Mathematical Representation

$$HDI_x = \sqrt[3]{EDU_x \cdot HEALTH_x \cdot GNI_x}$$

$$EDU_x = \frac{MYS_x \cdot EYS_x - \min(MYS_x, EYS_x)}{\max(MYS_x, EYS_x) - \min(MYS_x, EYS_x)}$$

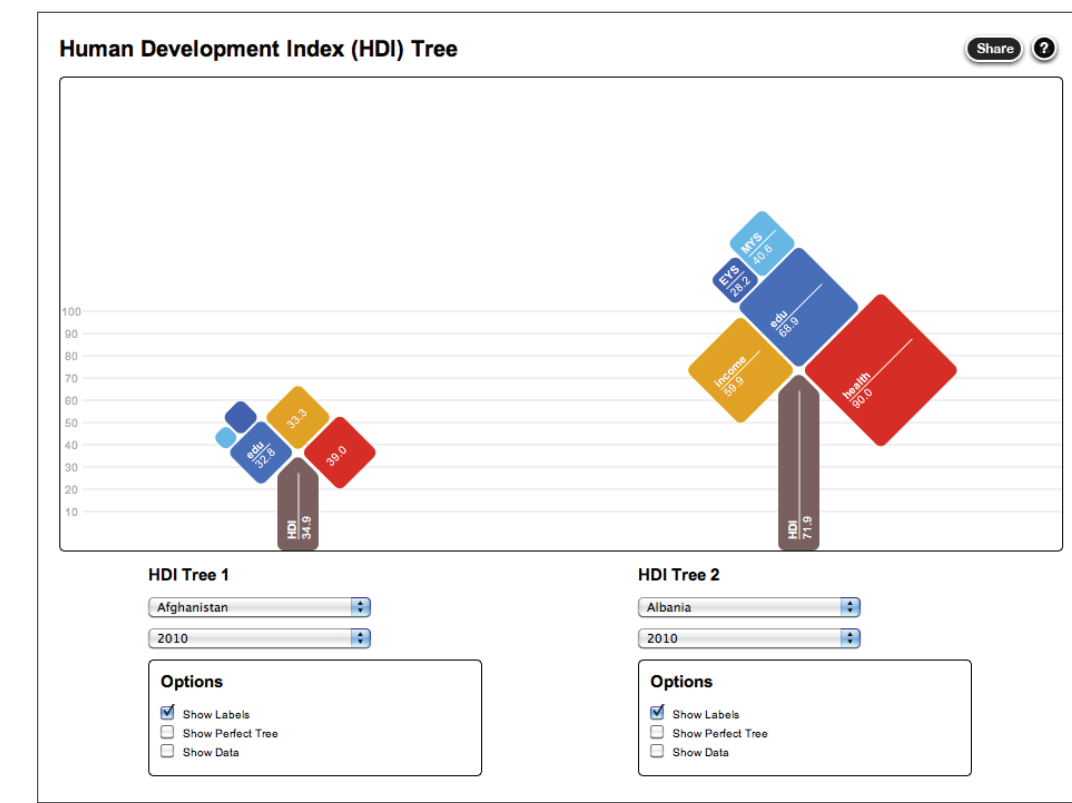
HDIx: Human Development Index
 EDUx: Education Index
 GNIx: Income Index
 HEALTHx: Health Index
 MYSx: Mean Years of Schooling Index
 EYSx: Expected Years of Schooling Index

Diagrammatic Representation

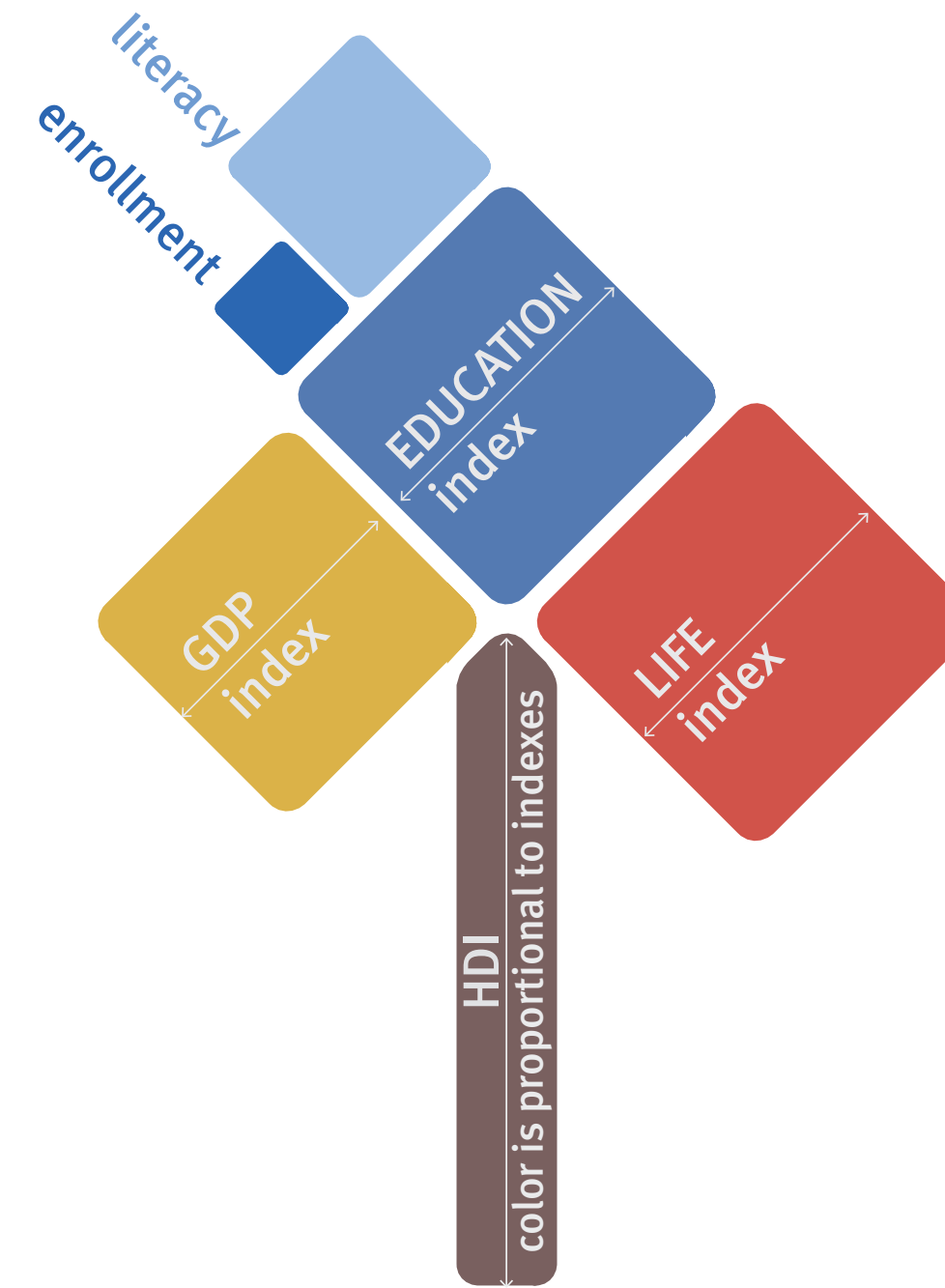


Interactive Applet

Interactive applet at the UNDP site developed by Hidalgo and Simoes: <http://hdr.undp.org/en/humandev/lets-talk-hd/>



Metaphorical Representation

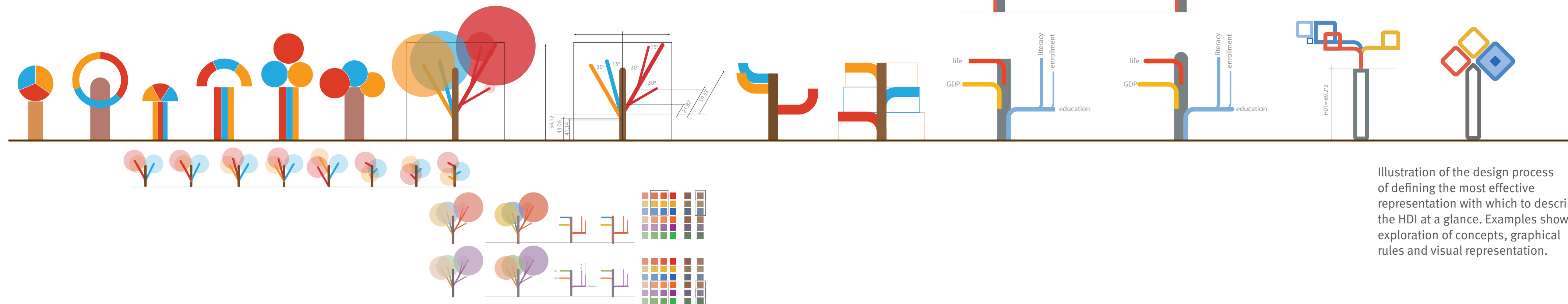


The HDI Tree is a visual representation used to illustrate the Human Development Index together with its components and subcomponents. The design rules of the HDI tree are:

- The height of the tree trunk is proportional to the total value of the HDI
- The side of the tree branches are proportional to each sub-indicator
- The branches are ordered in increasing order from left to right
- The color of the trunk is the average color of the components

Development Tree:

The design process of exploring graphical representations



Africa: 1970–2005

Telling the story of 35 countries in Africa by comparing indices

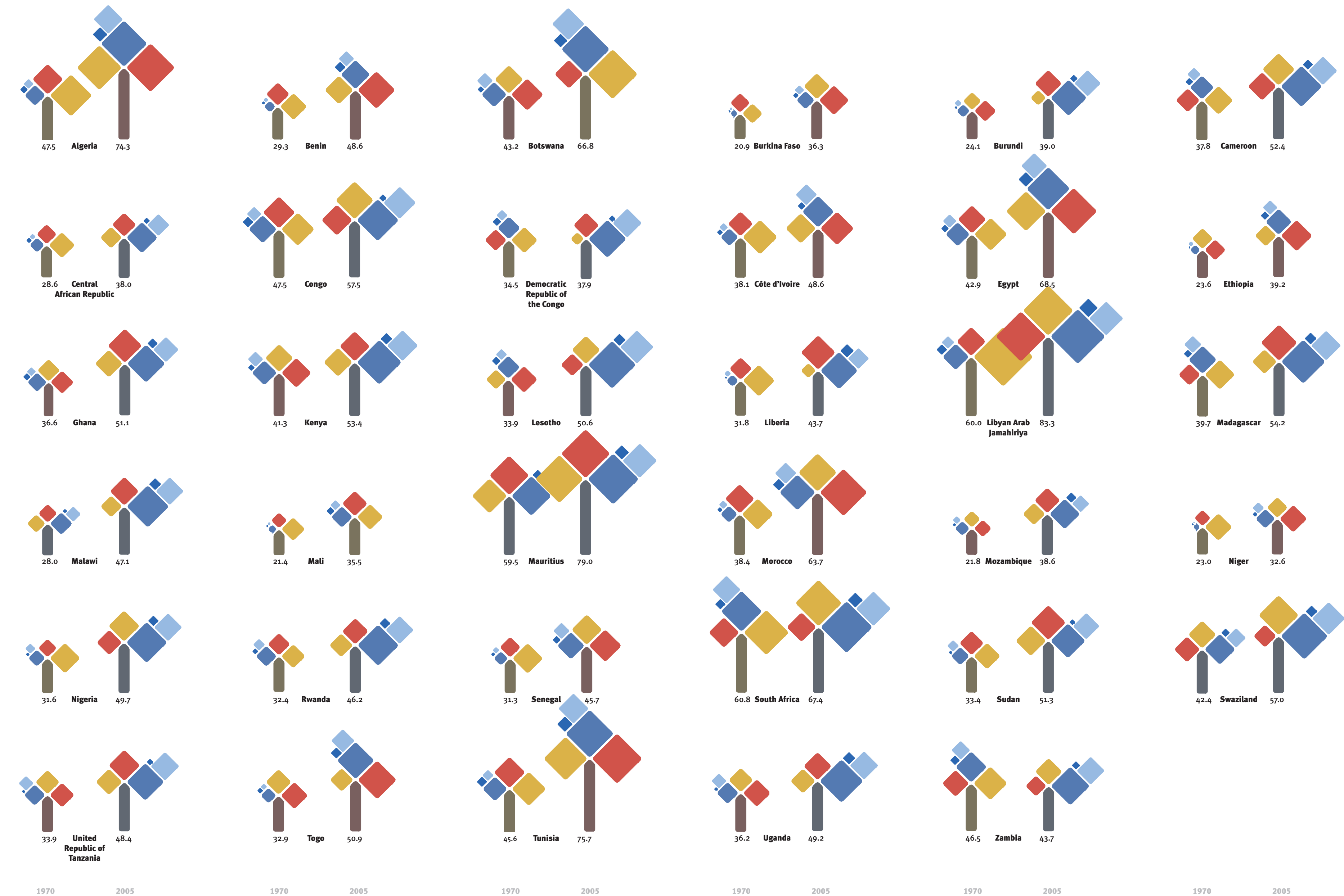
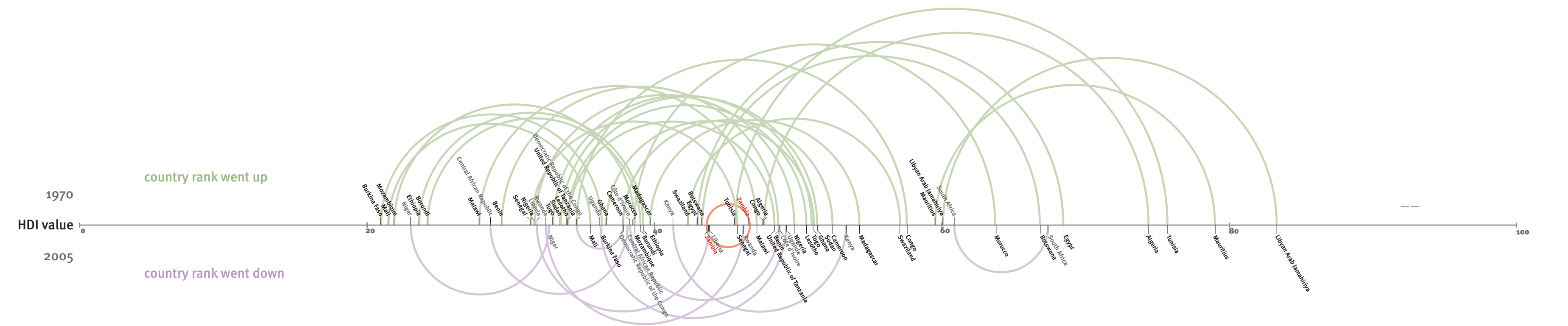


Illustration of the design process of defining the most effective representation with which to describe the HDI at a glance. Examples show exploration of concepts, graphical rules and visual representation.