

Sharing Knowledge, Sharing the Future

글로벌 지식공유 포럼

November 30, 2018 (Fri) | Lotte Hotel Seoul (Crystal Ballroom 2F)

Hosted by




Korea Development
Institute

A stylized world map composed of a grid of small white dots, centered in the background of the slide.

Professor Sebastian Edwards
UCLA

Contents: Our knowledge-related challenges

1. Globalization
2. Economic growth
3. Social conditions
4. The “artificial intelligence revolution”
5. The demographic challenge

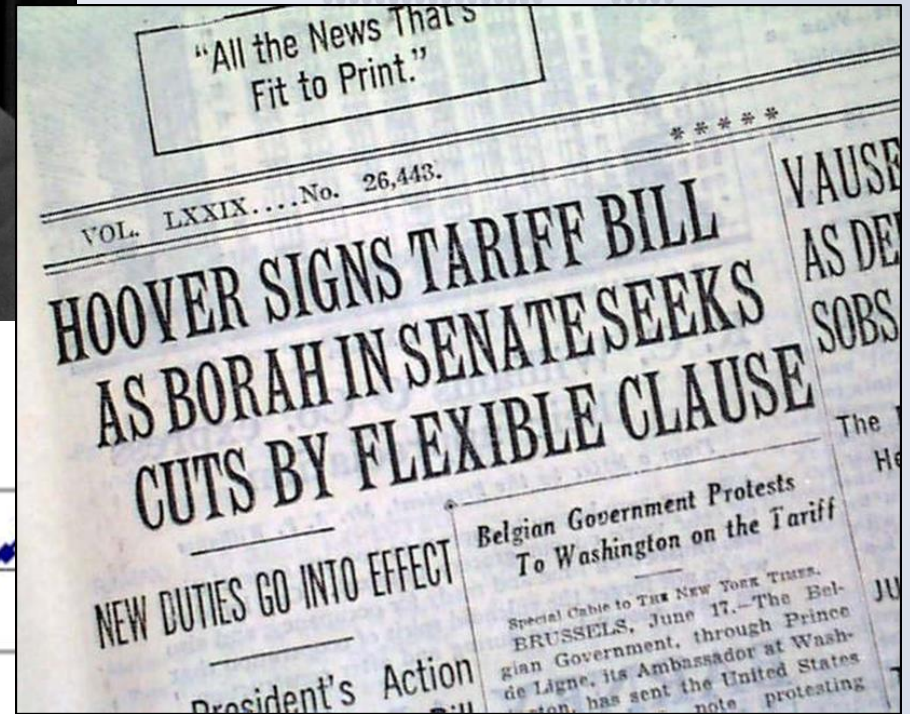


**1. Globalization: International
exchange of goods, services,
capital, people and ideas**

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Trade wars are costly for everyone





2. Economic growth, productivity, and ideas



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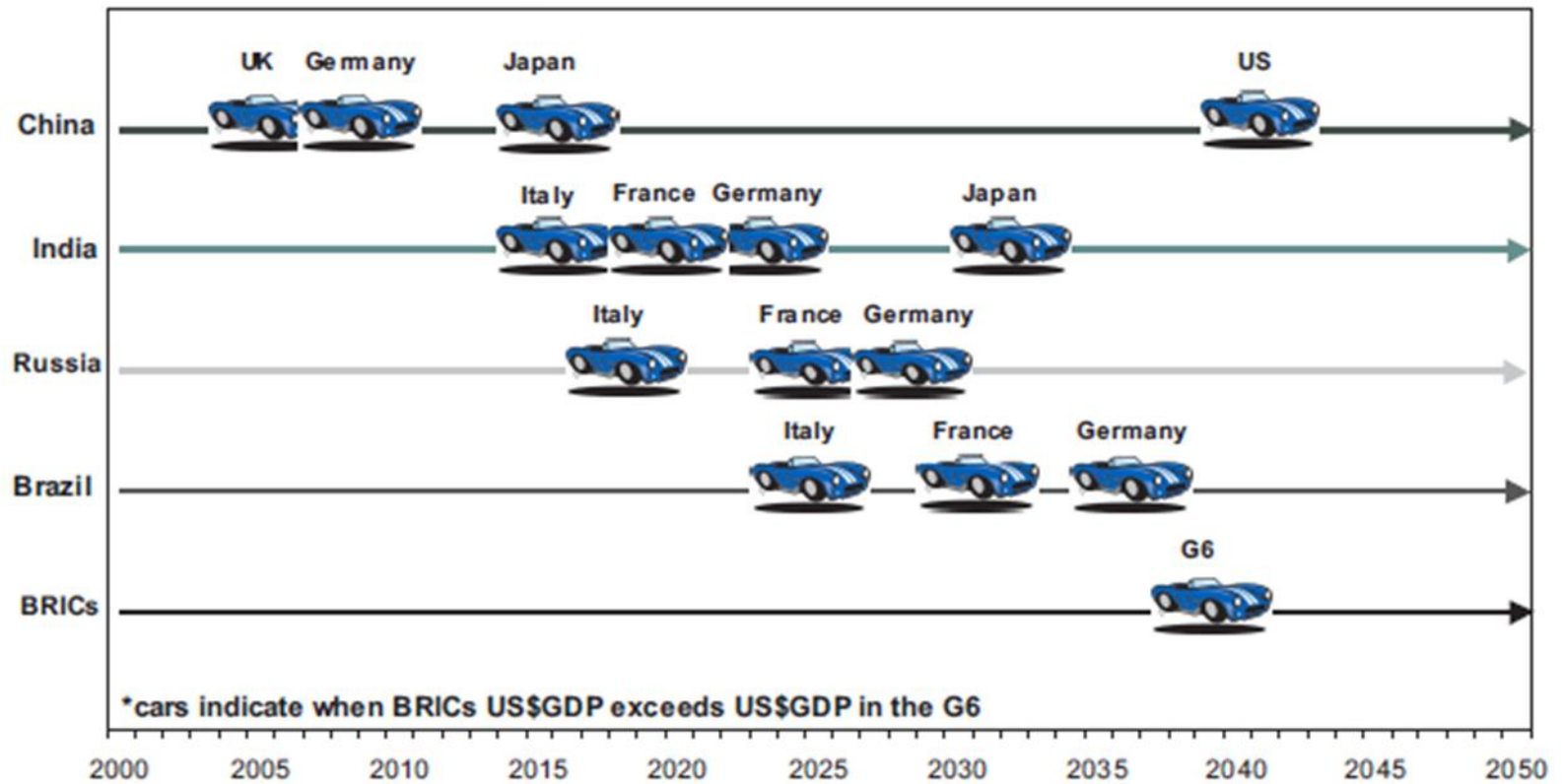
Dreaming With BRICs: The Path to 2050

- Over the next 50 years, Brazil, Russia, India and China—the BRICs economies—could become a much larger force in the world economy. We map out GDP growth, income per capita and currency movements in the BRICs economies until 2050.
- The results are startling. If things go right, in less than 40 years, the BRICs economies together could be larger than the G6 in US dollar terms. By 2025 they could account for over half the size of the G6. Of the current G6, only the US and Japan may be among the six largest economies in US dollar terms in 2050.
- The list of the world's ten largest economies may look quite different in 2050. The largest economies in the world (by GDP) may no longer be the richest (by income per capita), making strategic choices for firms more complex.

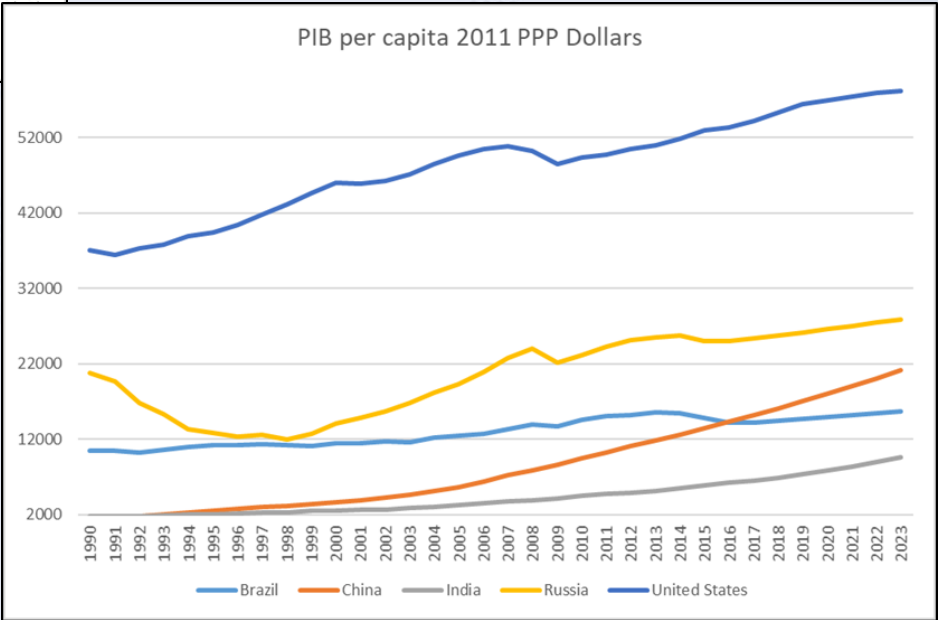
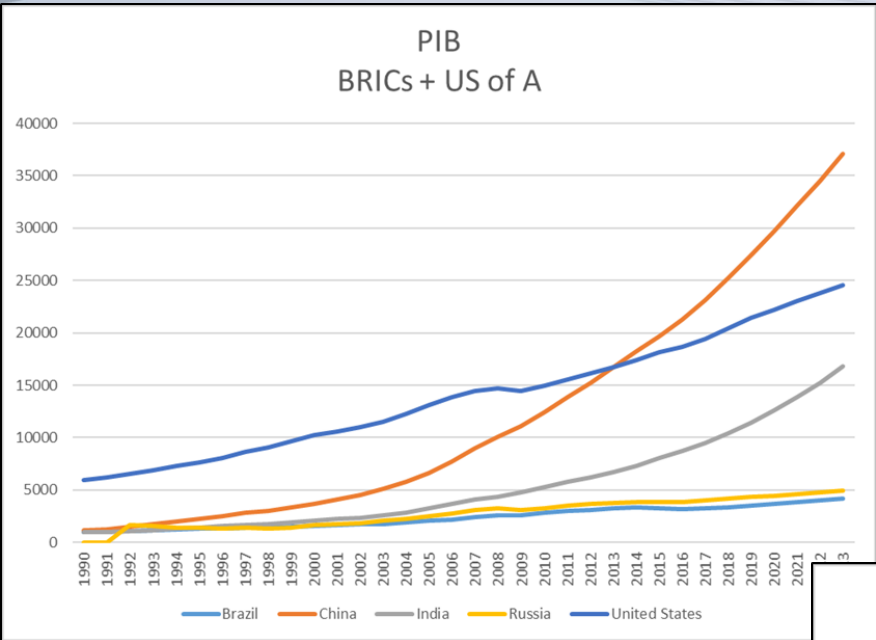
Many thanks to Jim O'Neill, Paulo Leme, Sandra Lawson, Warren Pearson and our regional economists for their contributions to this paper.

Dominic Wilson
Roopa Purushothaman
1st October 2003

Overtaking the G6: When BRICs' US\$GDP Would Exceed G6



GS BRICs Model Projections. See text for details and assumptions.





Appendix I: A Long-Term Model of Growth and Exchange Rates



Growth Model

We provide detail on the underlying assumptions of our models. The model relies on a simple formulation of the overall level of GDP (Y) in terms of a) labour (L) b) the capital stock (K) and c) the level of “technical progress” (A) or Total Factor Productivity (TFP).

We assume that GDP is a simple (Cobb-Douglas) function of these three ingredients:

$$Y = AK^\alpha L^{1-\alpha}$$

where α is the share of income that accrues to capital.

We then need to describe the process by which each of the different components (labour, the capital stock and TFP) change over time.

- For L , we simply use the projections of the working age population (15-60) from the US Census Bureau.
- For K , we take the initial capital stock, assume an investment rate (investment as a % of GDP) and a depreciation rate to calculate the growth in the capital stock:

$$K_{t+1} = K_t(1-\delta) + \left(\frac{I_t}{Y_t}\right)Y_t$$

- For A , the description of technical progress, we assume that technology changes as part of a process of catch-up with the most developed countries. The speed of convergence is assumed to depend on income per capita, with the assumption that as the developing economies get closer to the income levels of the more developed economies, their TFP growth rate slows. Developing countries can have faster growth in this area because there is room to ‘catch up’ with developed countries:

$$\frac{A_t}{A_{t-1}} = 1.3\% - \beta \ln\left(\frac{\text{Incomepercapita}_{PC}}{\text{Incomepercapita}_{US}}\right)$$

where β is a measure of how fast convergence takes place and 1.3% is our assumed long-term TFP growth

rate for the US.

The assumptions needed to generate the forecasts are summarised below:

- Labour force and population, from the US Census Bureau projections
- Depreciation rate (δ) assumed to be 4% as in the World Bank capital stock estimates
- Investment rate assumptions based on recent history, for Brazil (19%), for India (22%) for Russia (25%) for China (36% until 2010, declining to 30% thereafter).
- Income share of capital assumed to be 1/3, a standard assumption (α) from historical evidence
- US long-run TFP growth assumed to be 1.33%, implying steady-state labour productivity growth of 2% - our long-run estimate.
- Convergence speed for TFP (β) assumed to be 1.5%, within the range of estimates from academic research.

Exchange Rate Model

Our model of real exchange rates is then calculated from the predictions of labour productivity growth. Specifically, we assume that a 1% productivity differential in favour of economy A relative to the US will raise its equilibrium real exchange rate against the US dollar by 1%, where our long-run assumption for US productivity growth is again 2%.

$$\Delta \ln(e) = \Delta \ln\left(\frac{Y}{L}\right) - 0.02$$

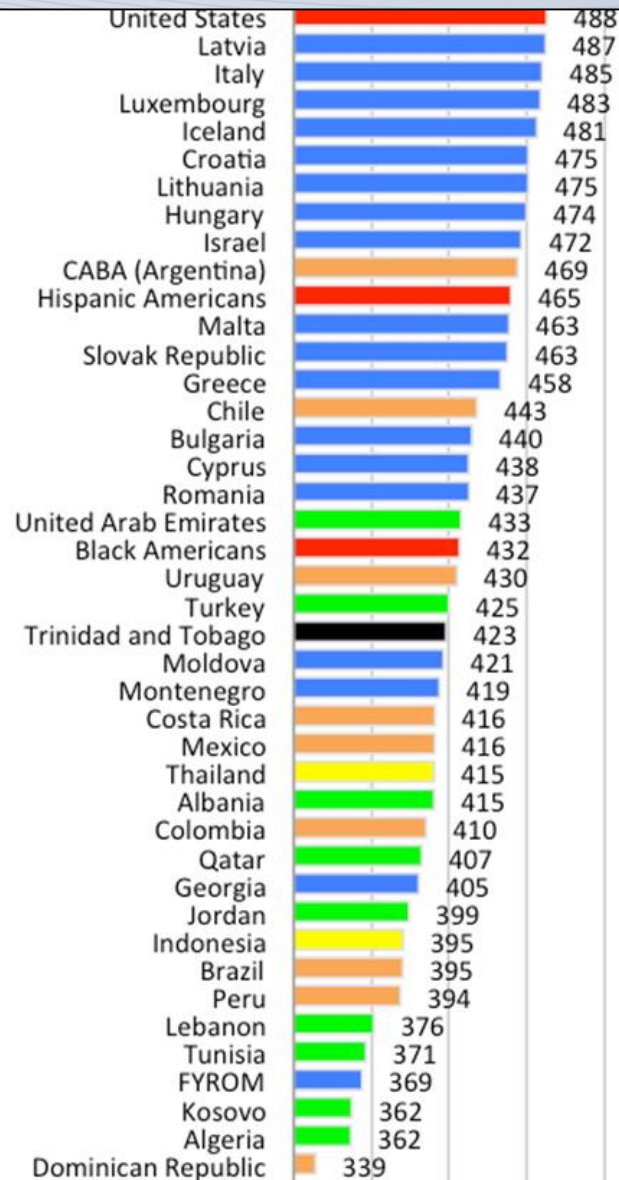
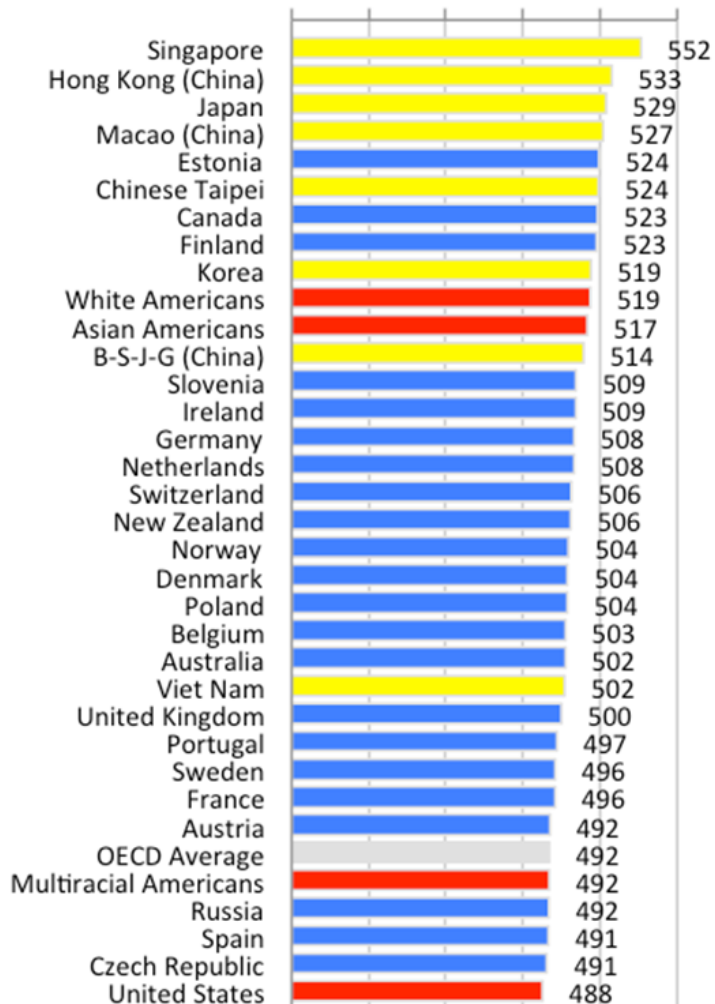
This assumption that the relationship is one-for-one underpins our GSDEER models and the coefficient on relative productivity terms in our GSDEEMER models is generally also clustered around 1. We make the simplifying assumption that over the long term, only productivity differentials play a large role in determining real exchange rates.

Education and knowledge

2015 PISA Mean Scores

by Steve Sailer

325 375 425 475 525 575





FACE-TO-FACE TEACHING



ICT IN SUPPORT OF FACE-TO-FACE TEACHING



BLENDED LEARNING (FACE-TO-FACE + ONLINE)



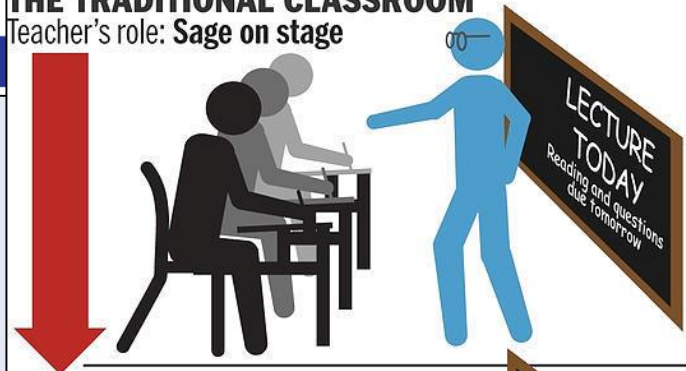
FULLY ONLINE DISTANCE LEARNING

eLEARNING

The Flipped Classroom

THE TRADITIONAL CLASSROOM

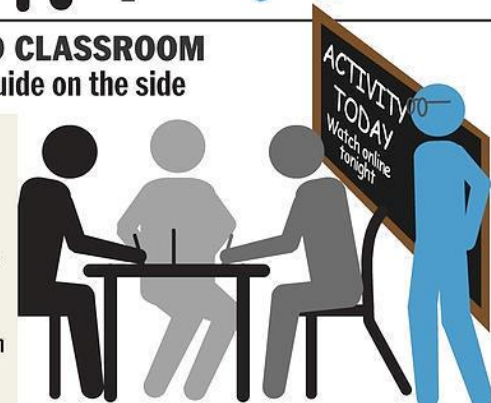
Teacher's role: Sage on stage



THE FLIPPED CLASSROOM

Teacher's role: guide on the side

- Students watch lectures at home at their own pace, communicating with peers and teachers via online discussions
- Concept engagement takes place in the classroom with the help of the instructor



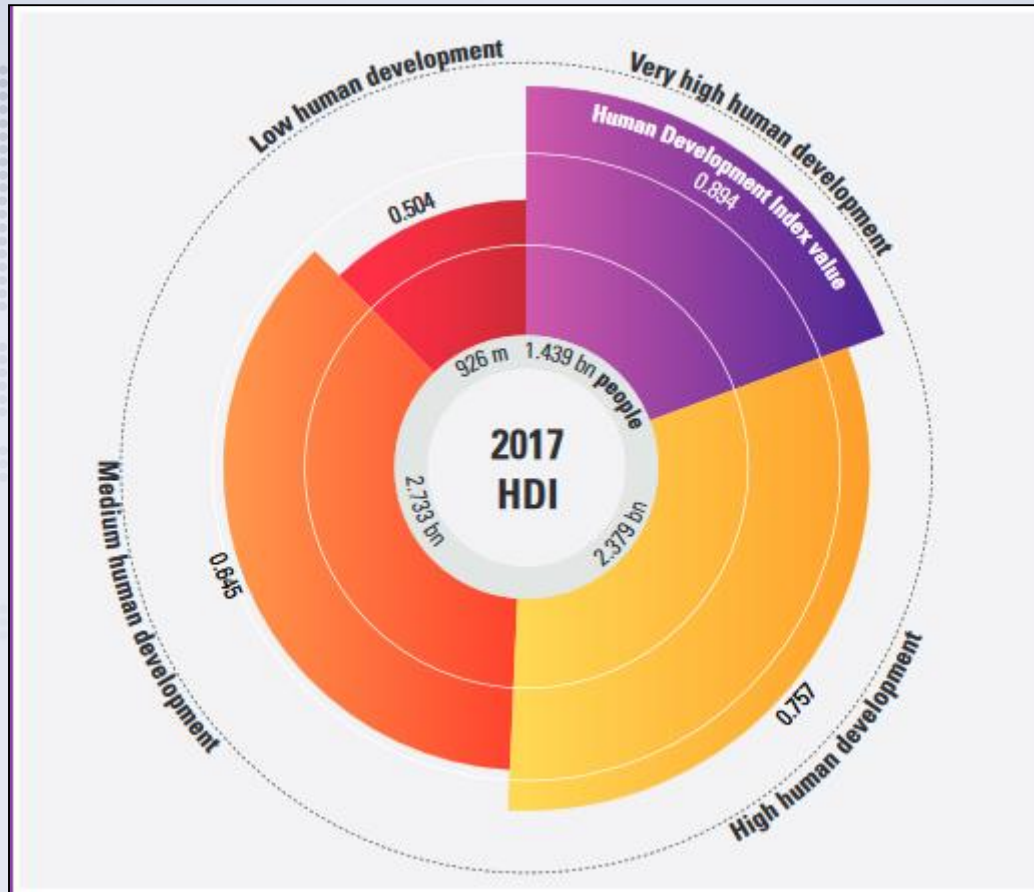
SOURCE: Knewton

DESERET NEWS GRAPHIC



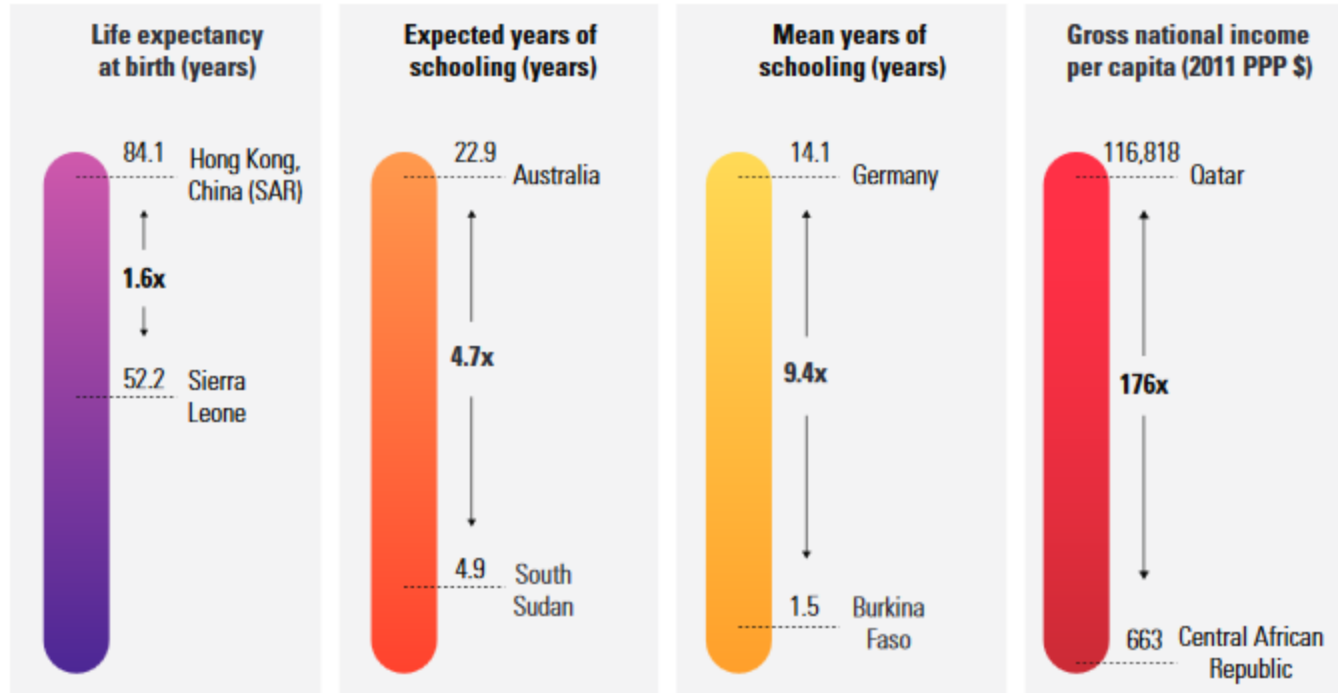
3. Social conditions and knowledge

Human Development Index



Inequalities in social outcomes

Inequalities in human development outcomes around the world, 2017



Source: Human Development Report 2017

Educating girls: Most effective way of sharing knowledge

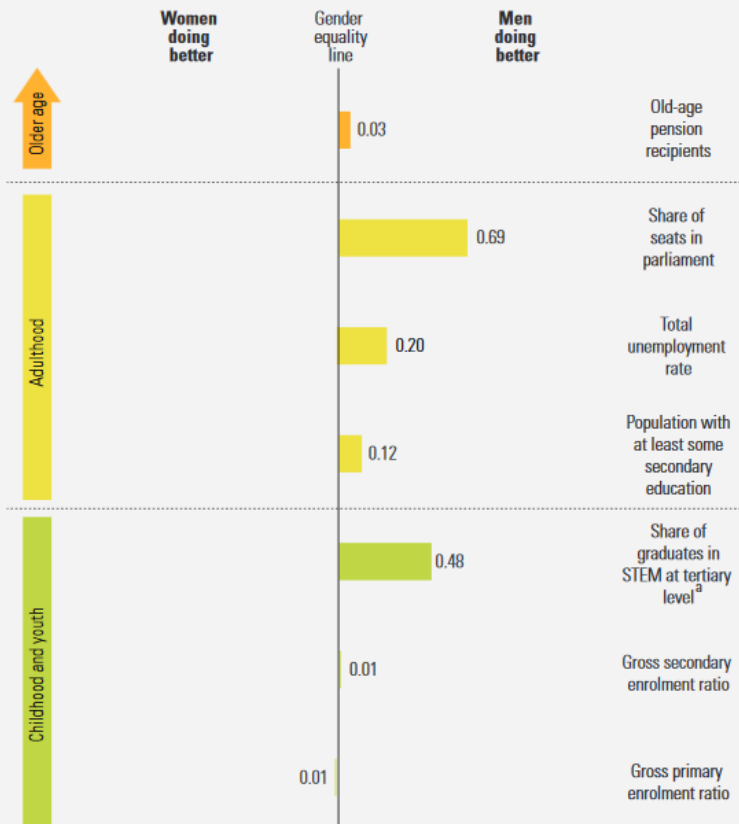


Women are not trained in STEM

FIGURE 10

Life-course gender gap, 2017

(deviation from gender parity)



a. STEM includes science, mathematics, engineering, manufacturing and construction.

Source: Human Development Report Office.

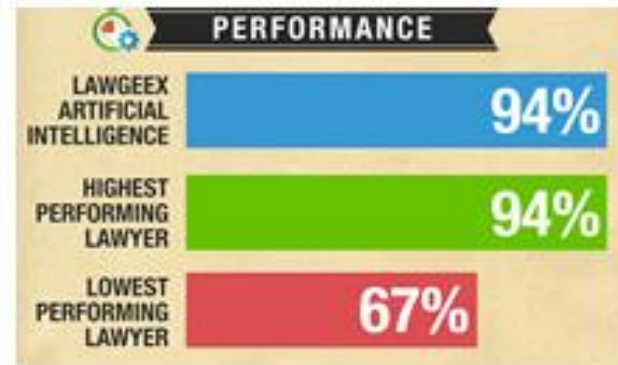
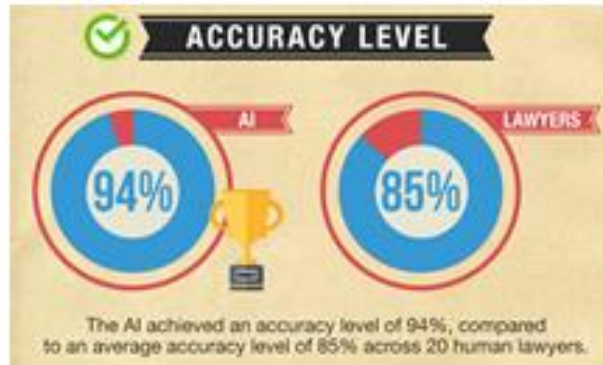


4. The artificial intelligence revolution and knowledge

Intelligent machines, intelligent cities

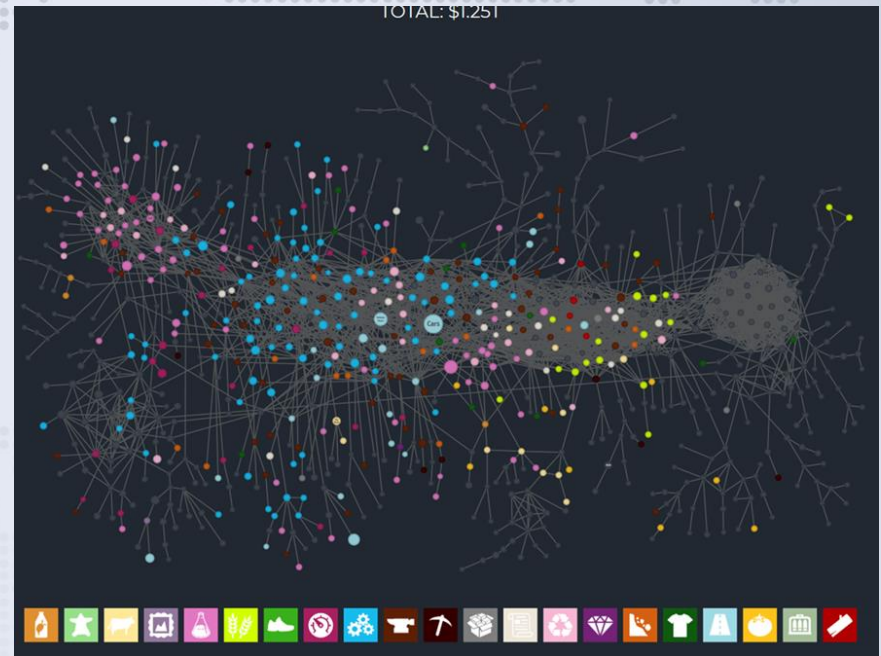
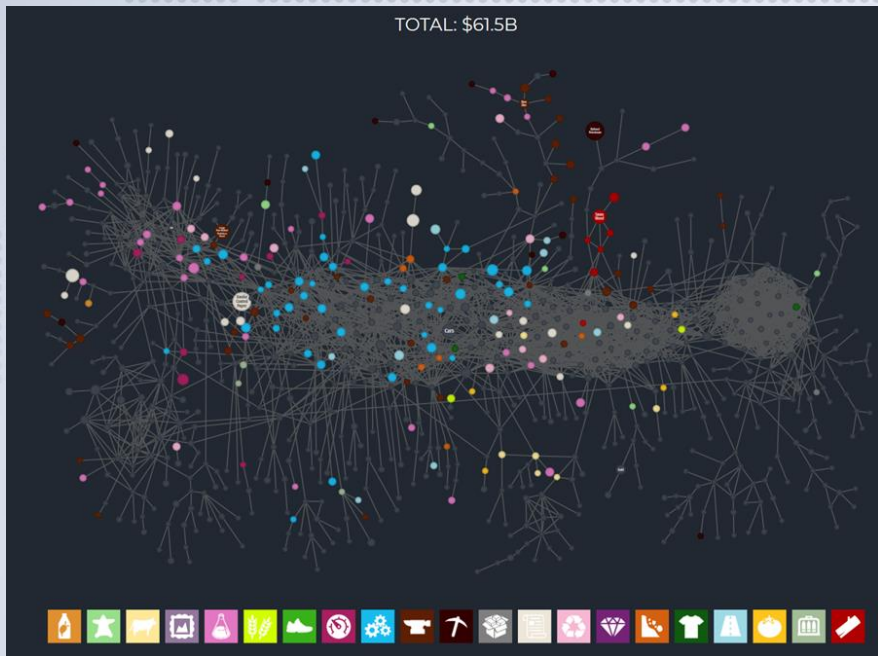


Sorry: You are fired!!!!



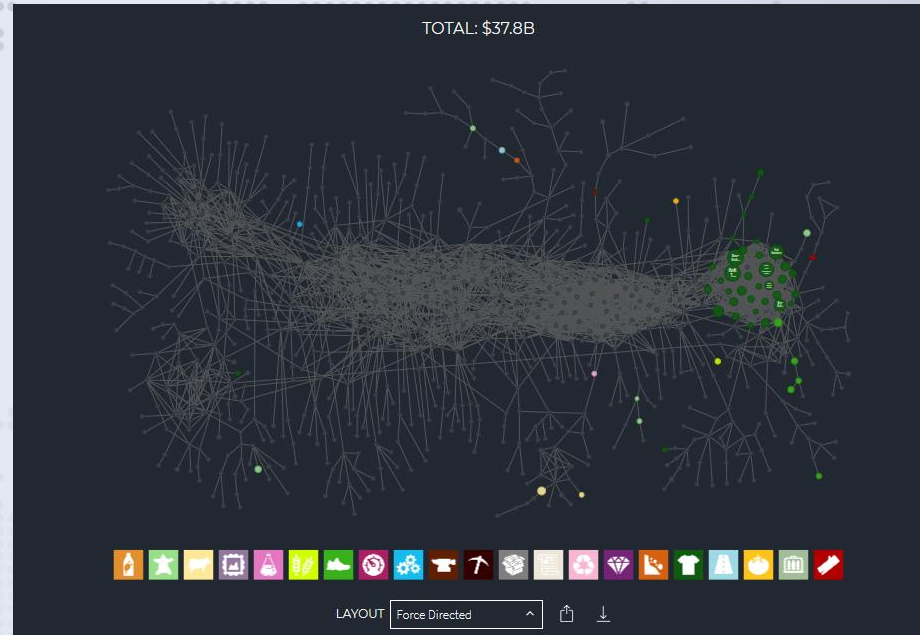
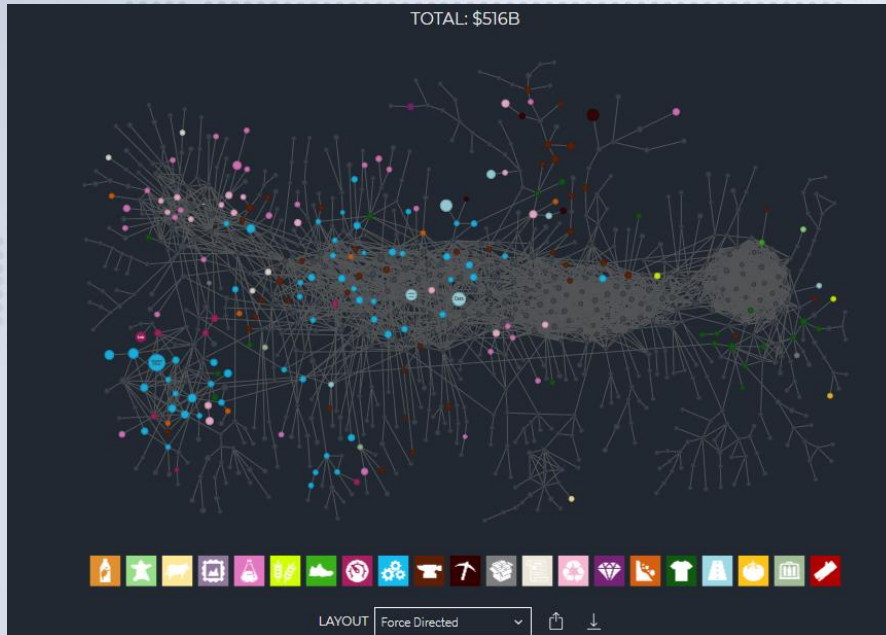
Export Complexity:

Finland and Germany



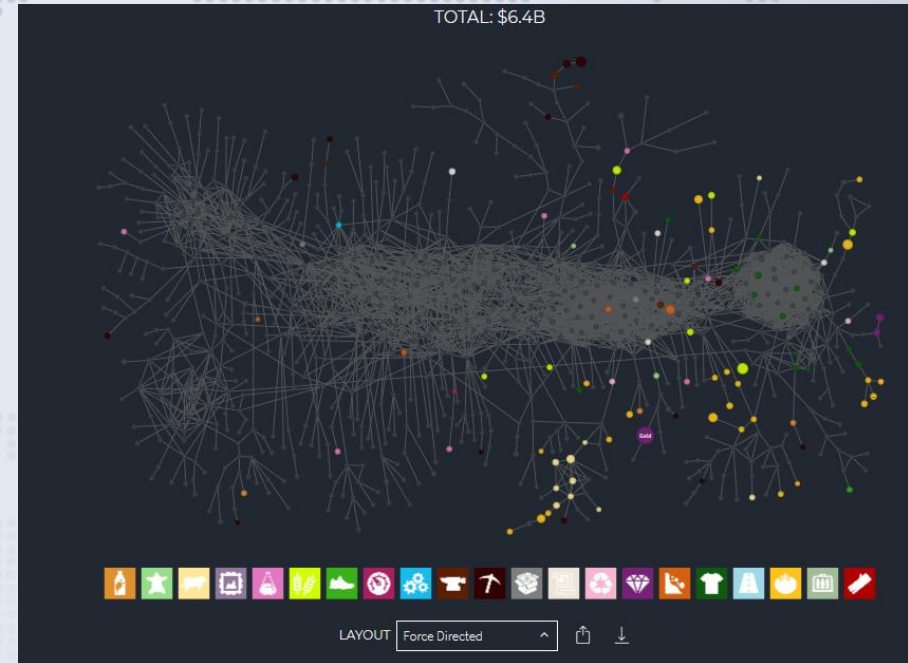
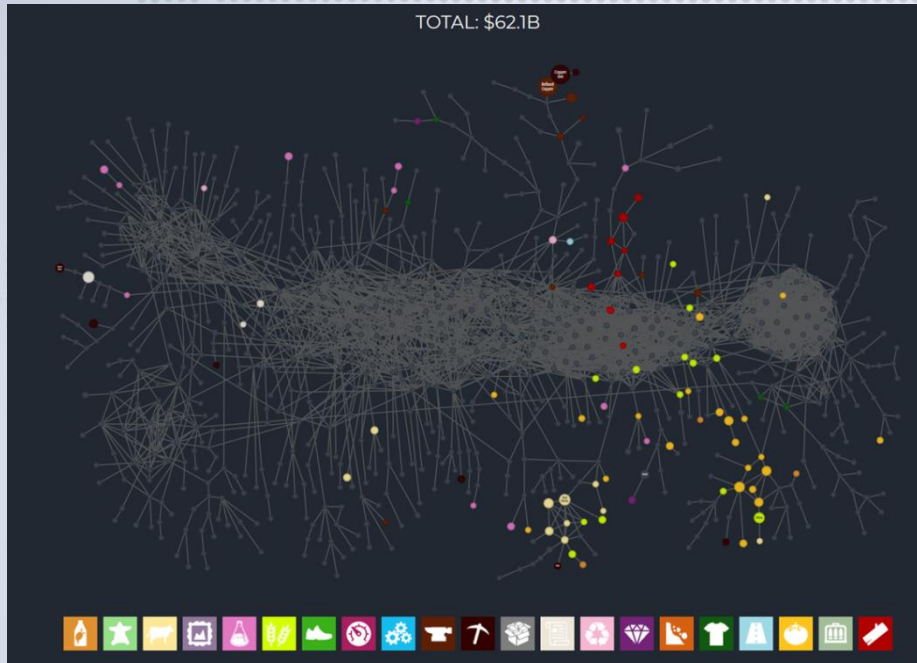
Export complexity:

Republic of Korea and Bangladesh



Export complexity:

Chile and Tanzania



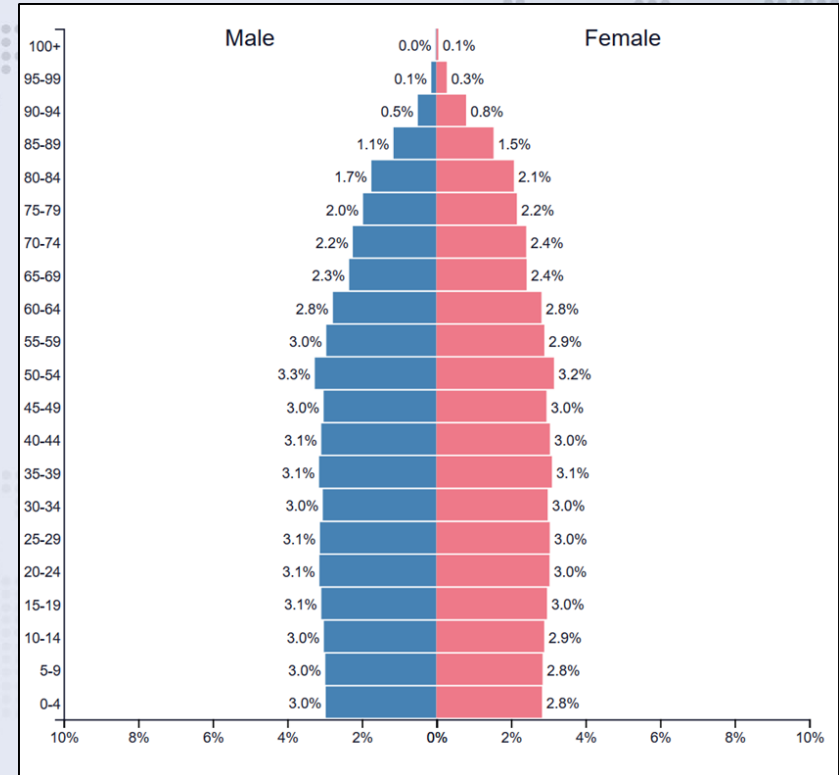
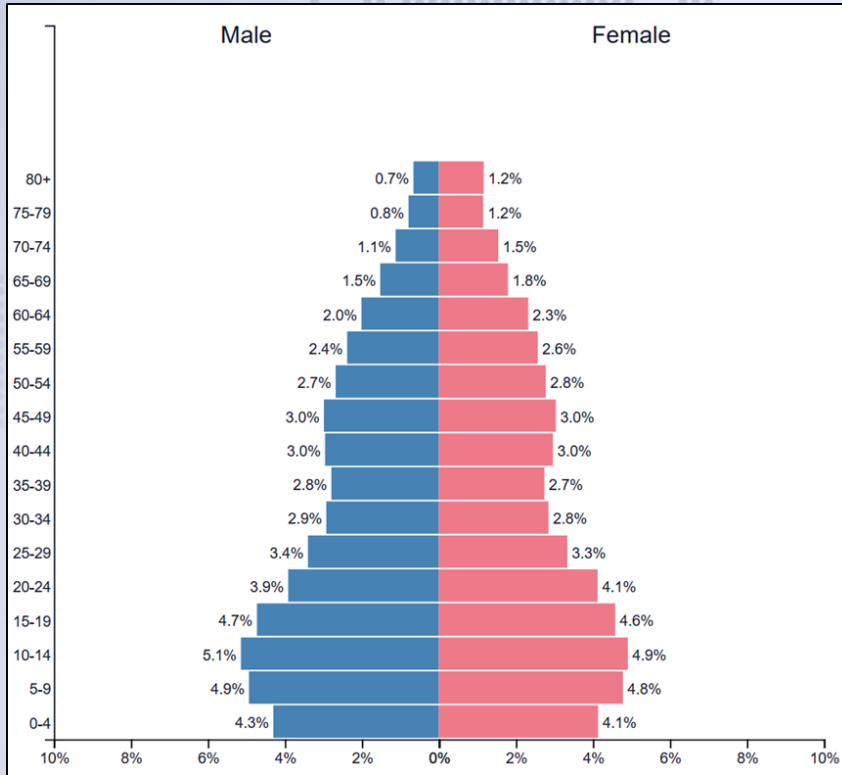
Man vs machine, or

Man and machine?

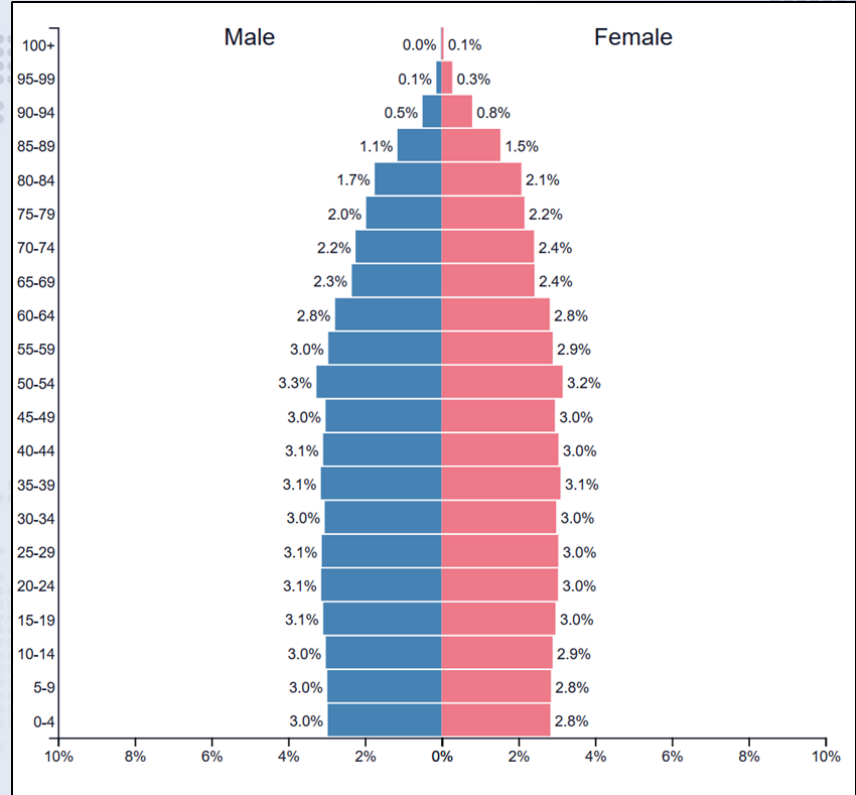
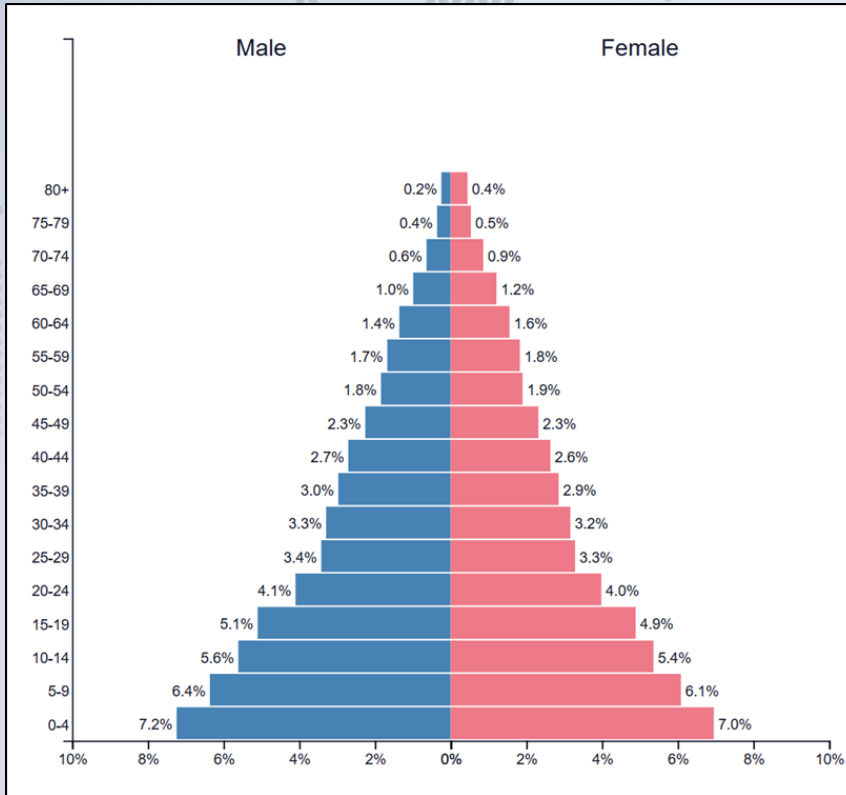


5. Demographics and knowledge

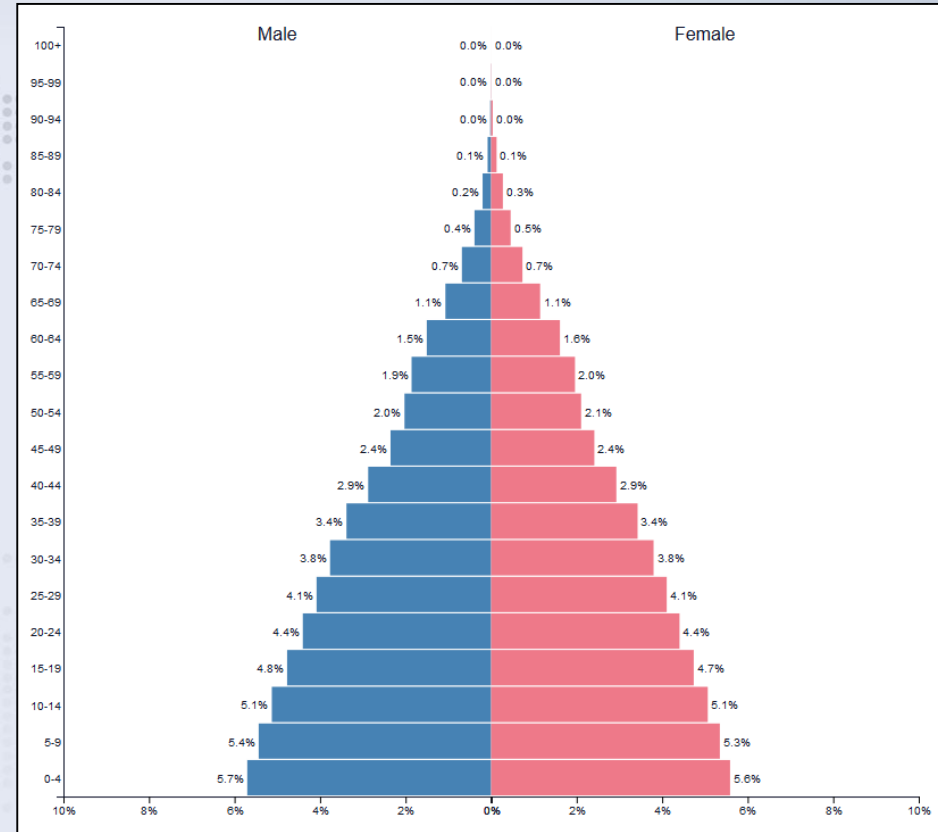
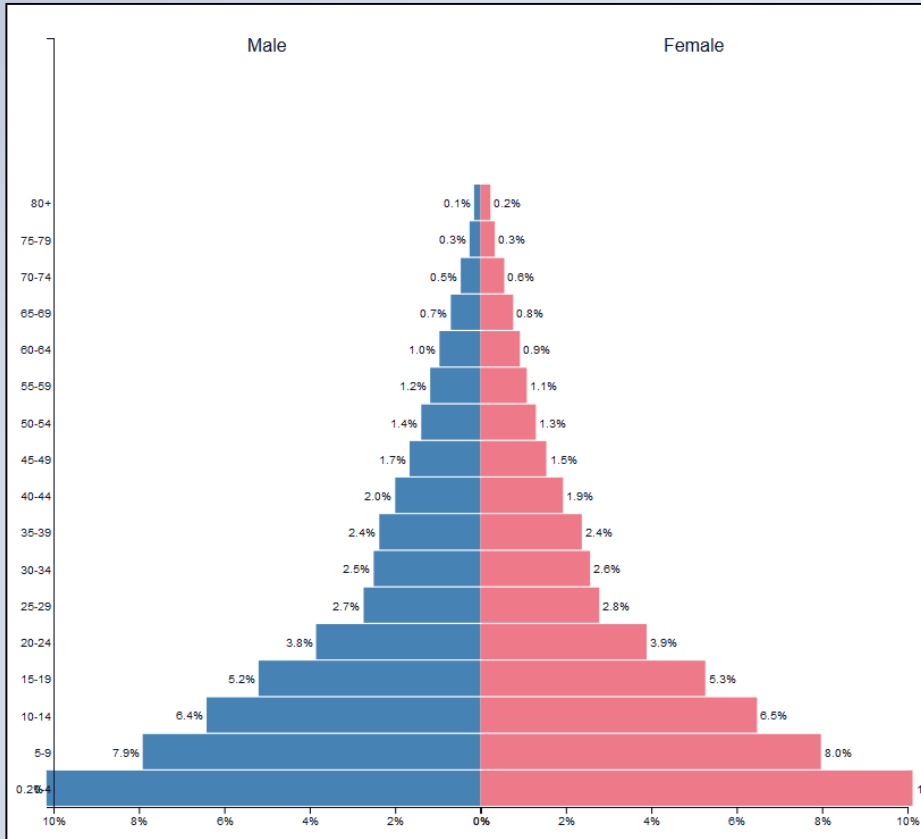
Demographics: USA, 1970-2045



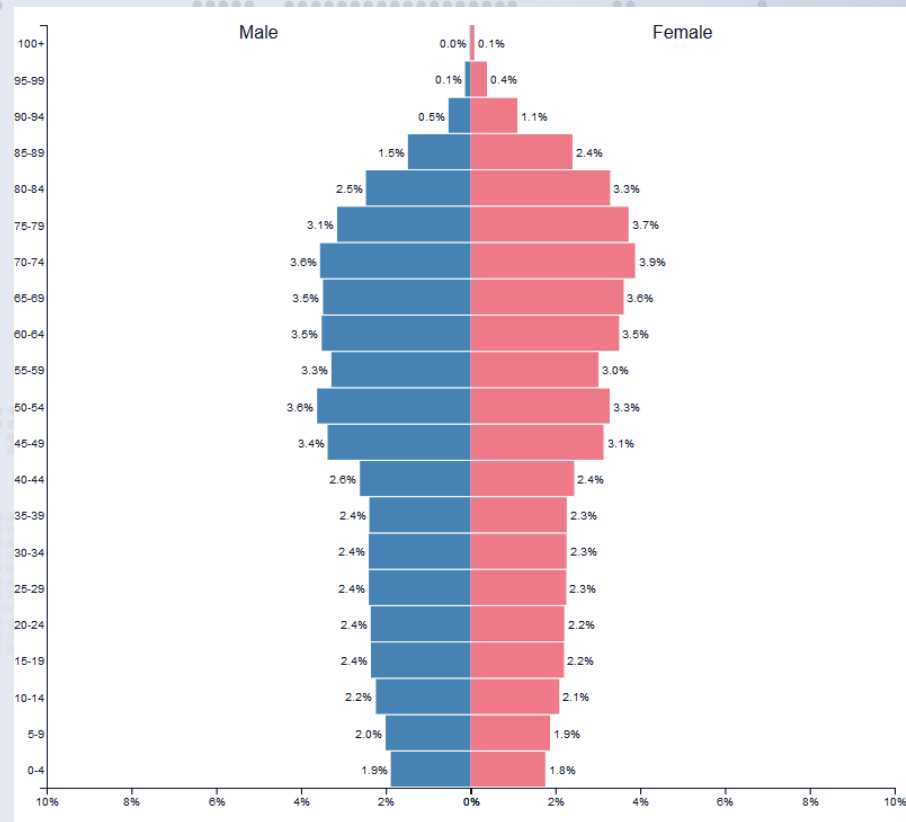
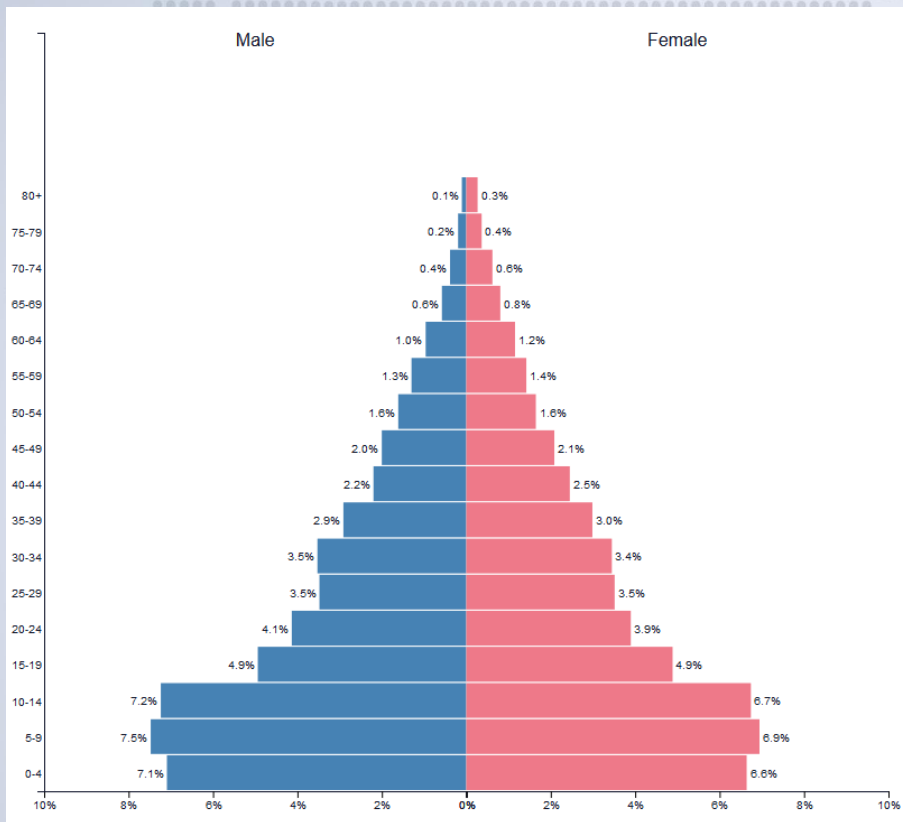
Demographics: Chile, 1970-2045



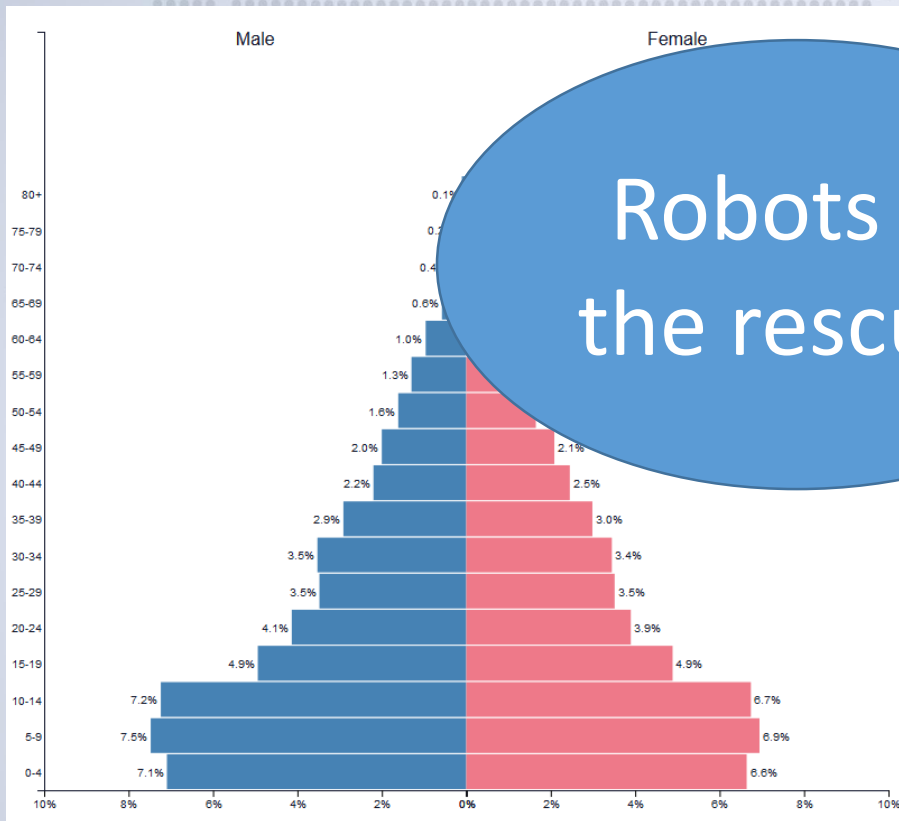
Demographics: Kenya, 1970-2045



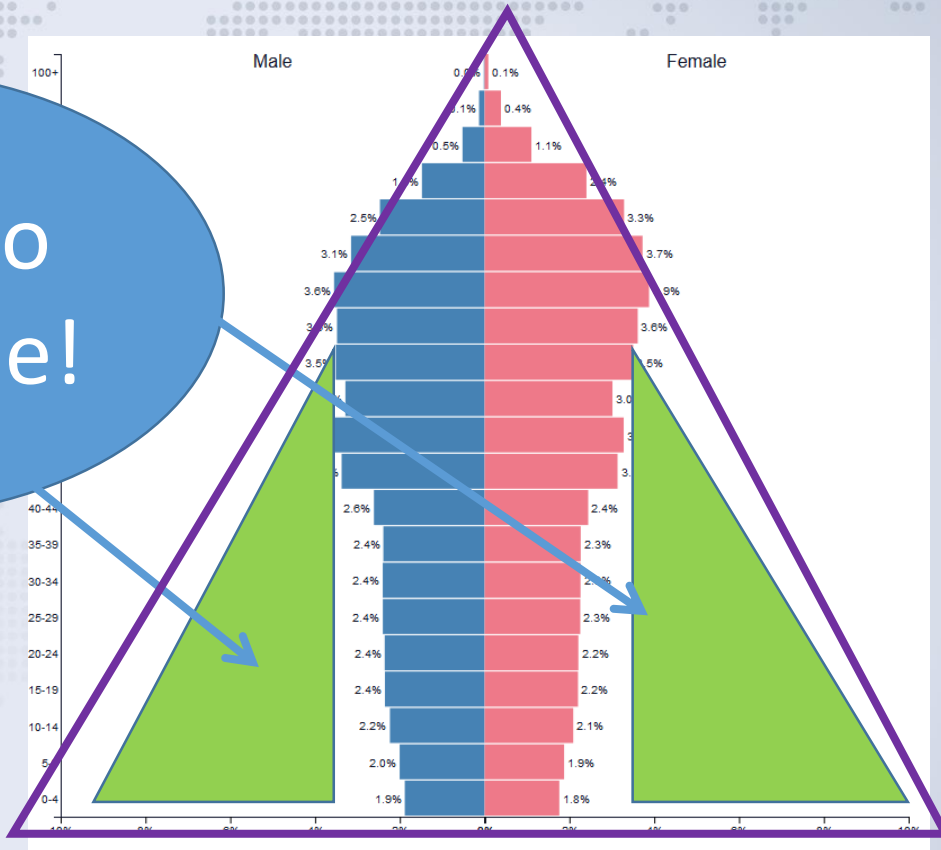
Demographics: Republic of Korea, 1970-2045



Demographics: Republic of Korea, 1970-2045



Robots to the rescue!



Summary: Knowledge-sharing is the basis to the solution of our main challenges

1. Globalization
2. Economic growth
3. Social conditions
4. The “artificial intelligence revolution”
5. The demographic challenge