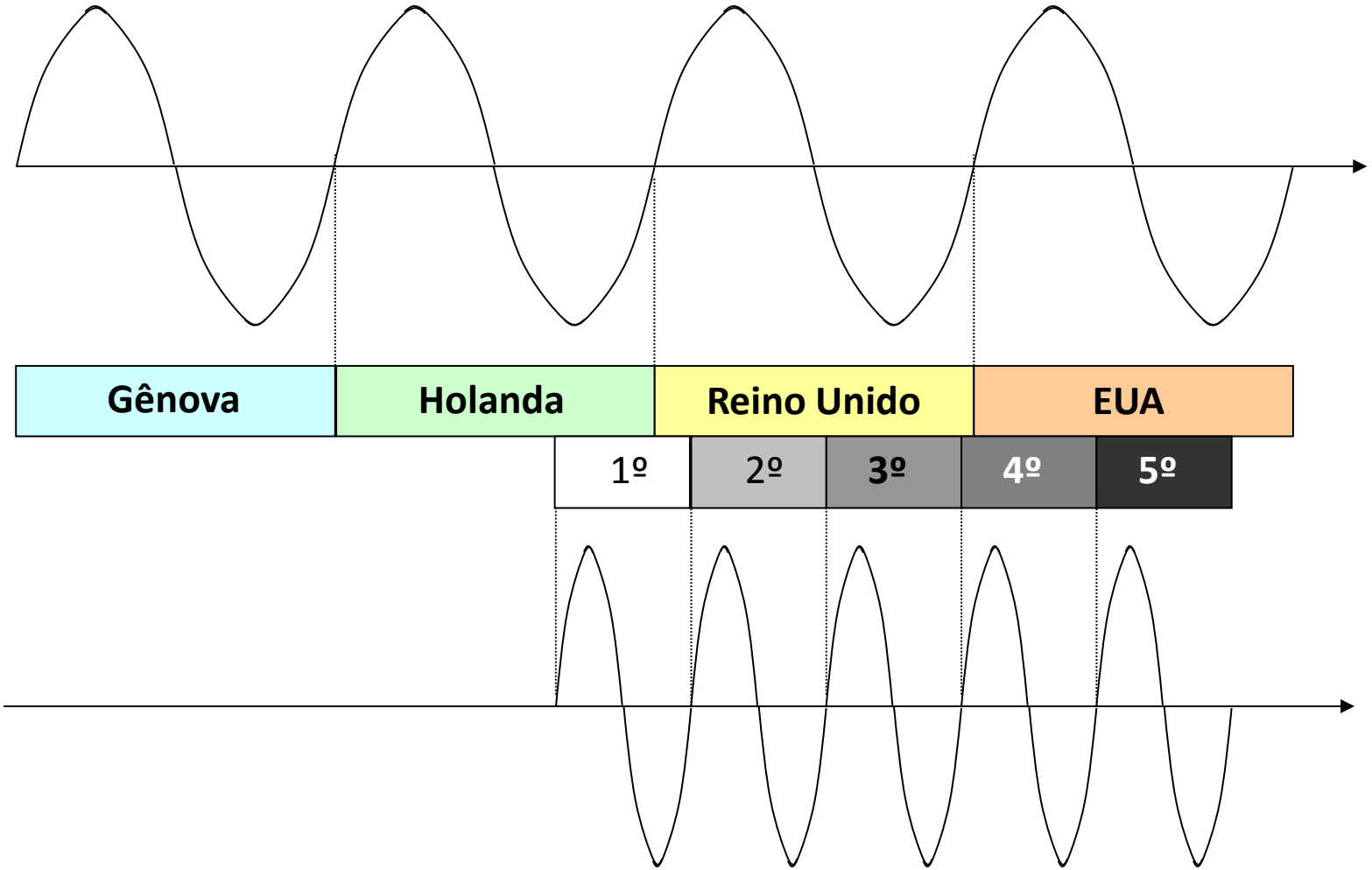
# CENÁRIOS 2015-2100 – Um século em quatro atos

Prof. Paulo Vicente, DSc
Fellow Strategic Planning Society
2015

FUNDAÇÃO DOM CABRAL
FDC
DESENVOLVIMENTO DE EXECUTIVOS E EMPRESAS

# AMBIENTE

## Ciclos hegemônicos

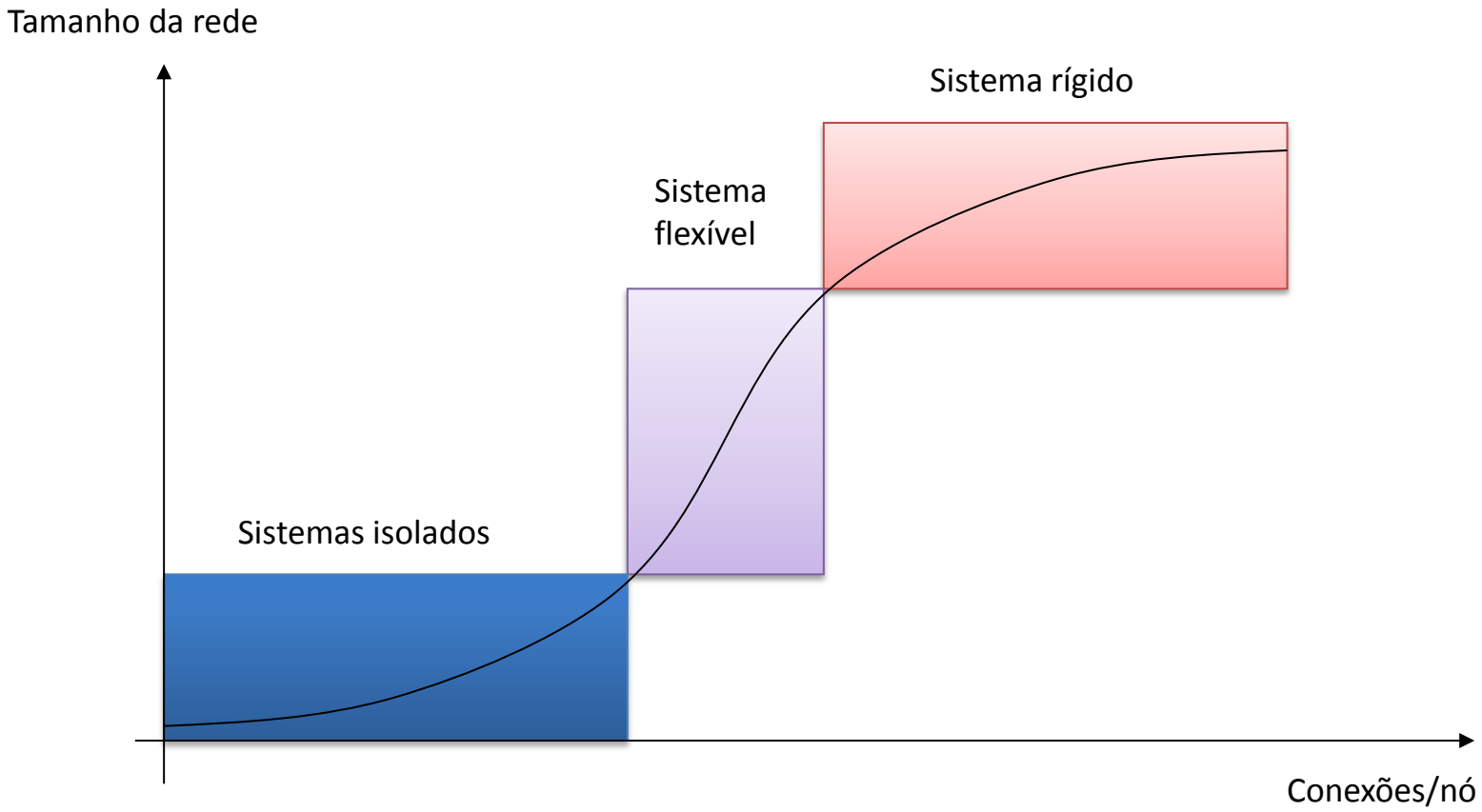



## Ciclos de Kondratieff

# CICLOS DE HEGEMONIA

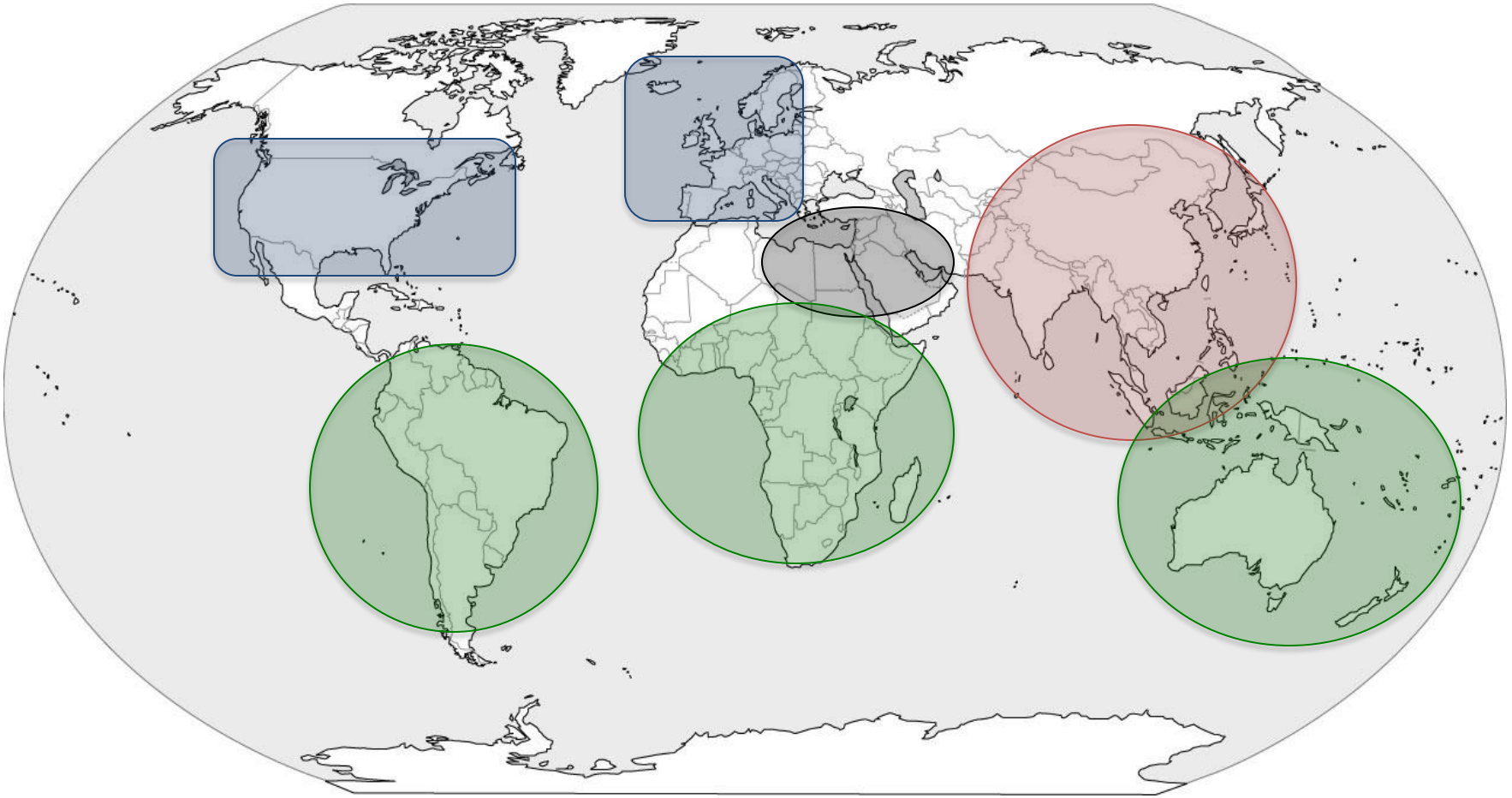
| Período | Nome | Anos |
|---|---|---|
| Hegemonia | Gênova/Habsburgos | 1492-1618 |
| Guerra de Transição | Guerra dos 30 Anos | 1618-1648 |
| Hegemonia | Holanda | 1648-1785 |
| Guerra de Transição | Guerras Napoleônicas | 1785-1815 |
| Hegemonia | Reino Unido | 1815-1914 |
| Guerra de Transição | Guerras Mundiais | 1914-1945 |
| Hegemonia | EUA | 1945-2065? |
| Guerra de Transição | ? | 2065-2095? |

# GUERRAS DE TRANSIÇÃO

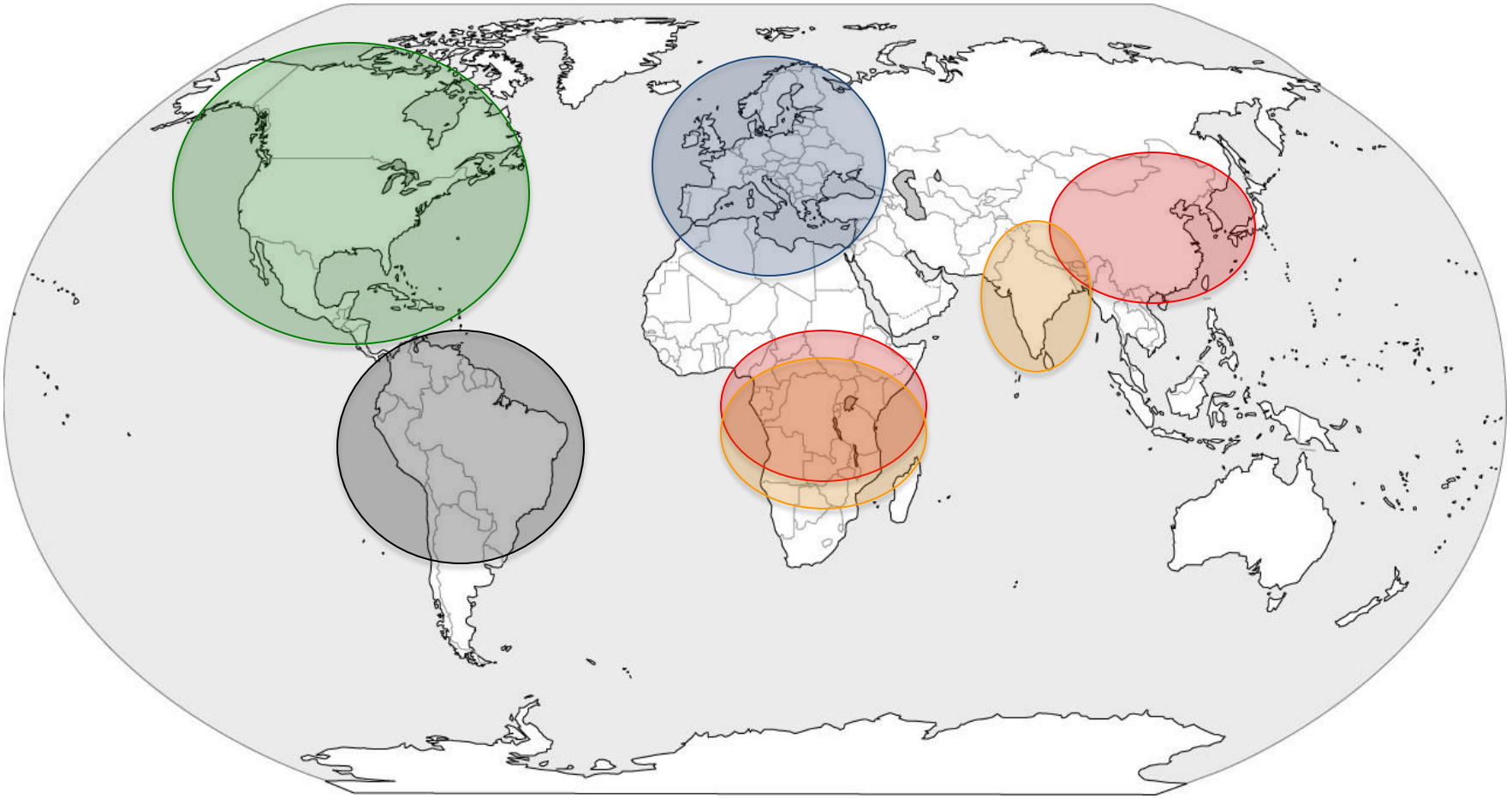


# OBJETIVOS CONFLITANTES

# Competição por recursos naturais



# NOVA POTÊNCIA HEGEMÔNICA



# KONDRATIEFFS

| Ciclo | Tecnologias | Datas |
|---|---|---|
| 1º | Mecanização inicial | 1770-1820 |
| 2º | Vapor e ferrovias | 1820-1870 |
| 3º | Eletricidade e engenharia pesada | 1870-1930 |
| 4º | Produção em massa e Fordismo | 1930-1980 |
| 5º | Telemática | 1980 -2030? |
| 6º | ?? | 2030-2080? |

# 5°CICLO DE KONDRATIEFF

| | |
|---|---|
| Recuperação | 1980-1990 |
| Expansão | 1990-2005 |
| Esgotamento | 2005-2020? |
| Crise | 2020-2030? |

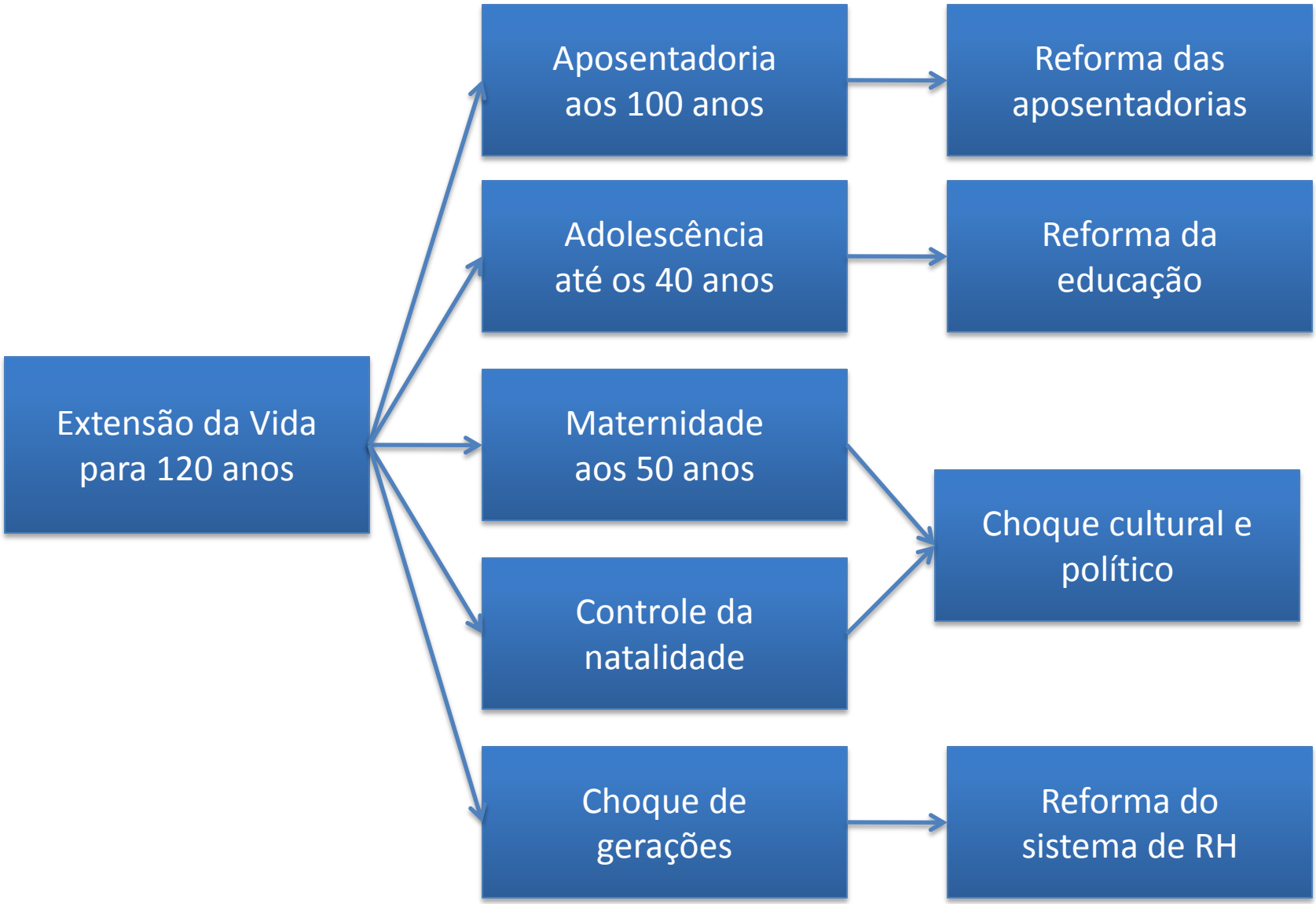
# UM SÉCULO EM QUATRO ATOS

| Ciclo | Período | Subfase | Hegemonia |
|---|---|---|---|
| 5º Ciclo | 2005-2018 | Esgotamento | EUA |
| 5º Ciclo | 2018-2030 | Crise | EUA |
| 6º Ciclo | 2030-2042 | Recuperação | EUA |
| 6º Ciclo | 2042-2055 | Expansão | EUA |
| 6º Ciclo | 2055-2067 | Esgotamento | EUA |
| 6º Ciclo | 2067-2080 | Crise | Transição |
| 7º Ciclo | 2080-2092 | Recuperação | Transição |
| 7º Ciclo | 2092-2104 | Expansão | Nova hegemonia |

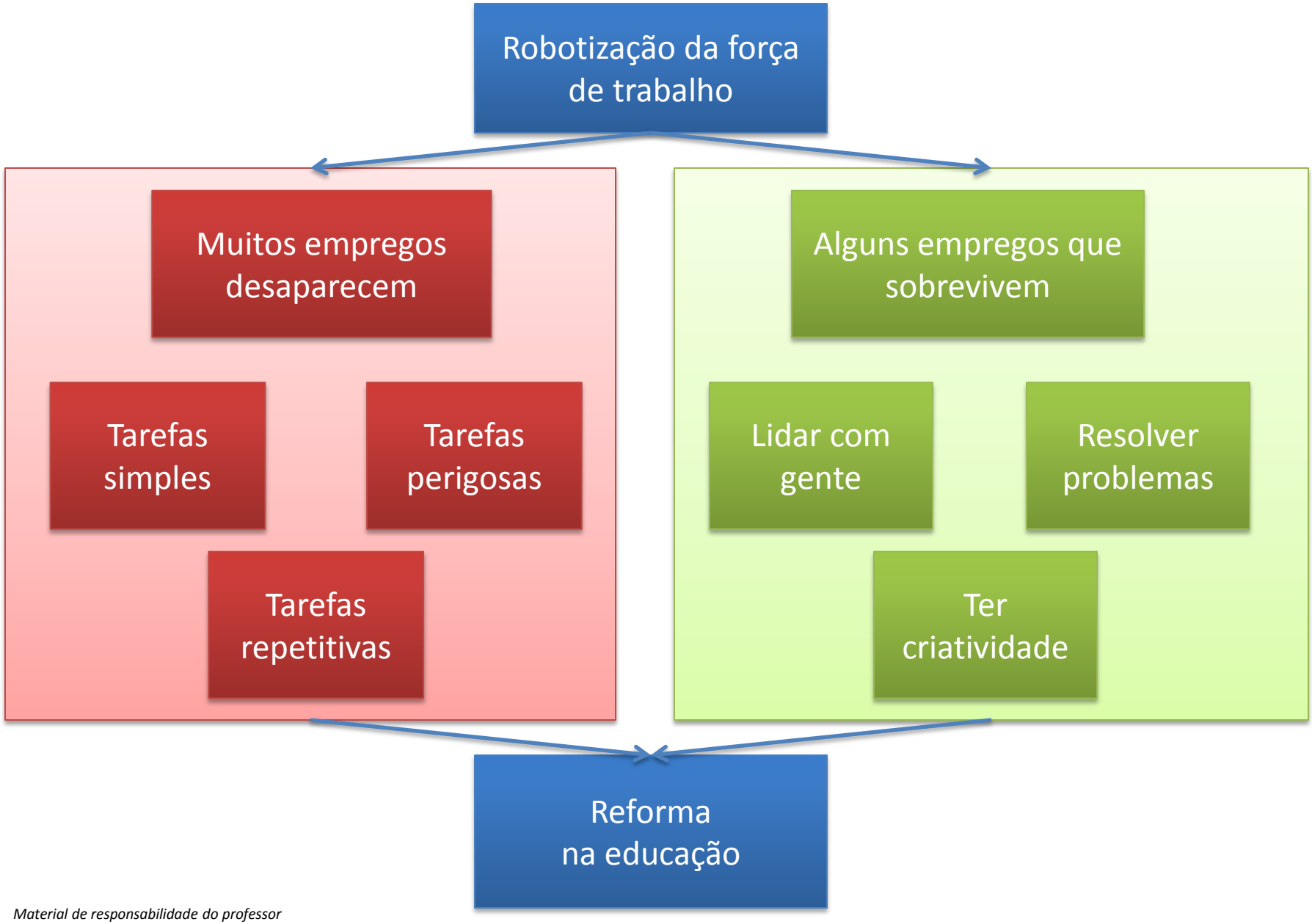
# TENDÊNCIAS SOCIAIS

- Novo ciclo de vida
- Tríplice alfabetização
- Trabalho/lazer em rede
- Trabalho em movimento
- Conceito de casa expandida
- Três faixas de fuso horário

# Novo Ciclo de Vida



# Robotização da força de trabalho



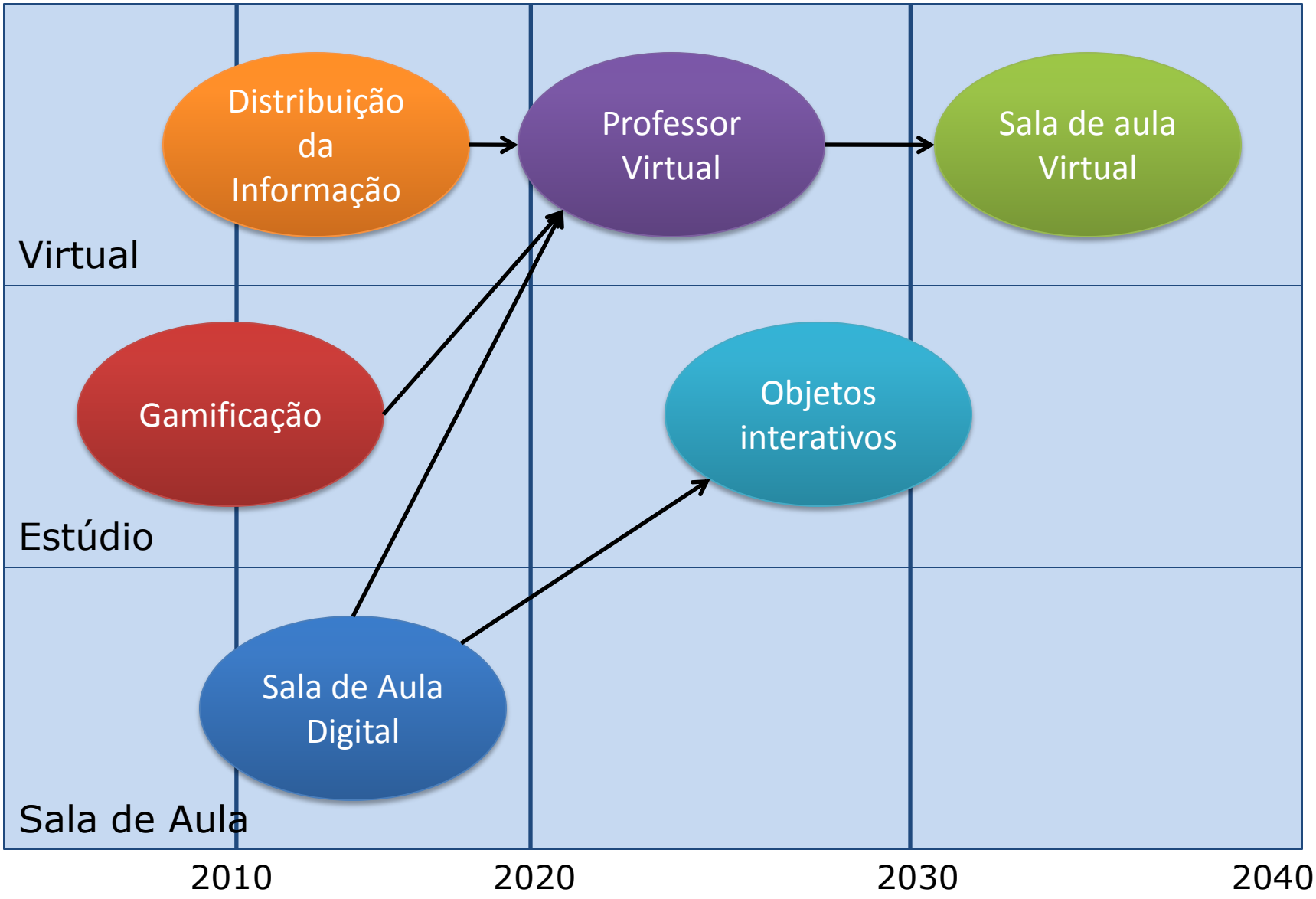
# Empregos do Futuro

- Lidar com Gente
  - Marketing
  - Vendas
  - Gestão Geral
  - Gestão de Projetos
  - Política

- Resolver problemas
  - Estratégia
  - Empreendedorismo
  - Pesquisa e desenvolvimento
  - Gestão financeira

- Ter Criatividade
  - Arte
  - Marketing
  - Comunicação

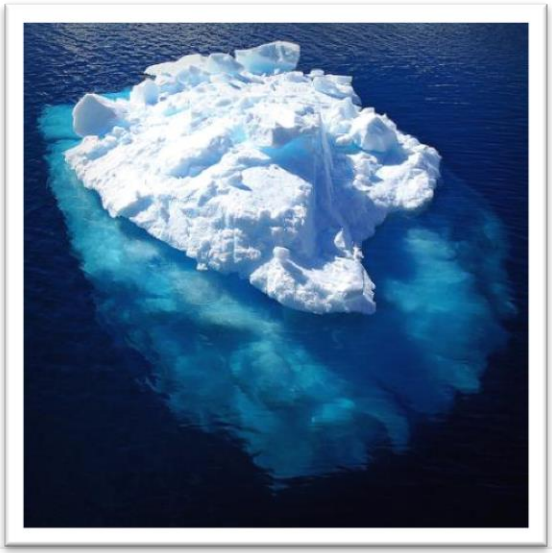
# Educação do Futuro

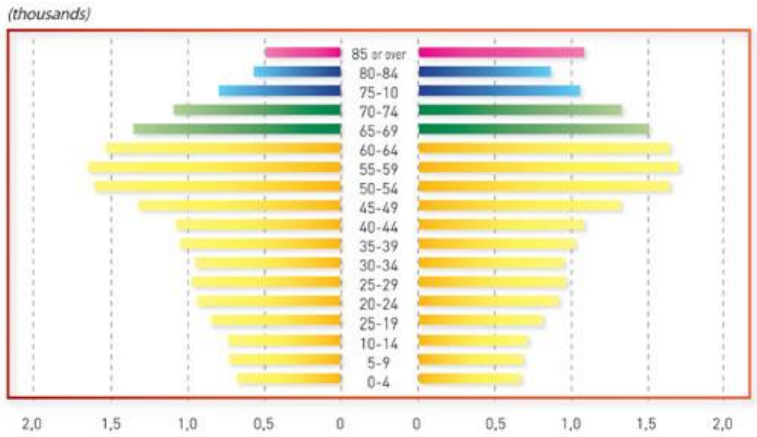



Fonte: adaptado de US Labor Department, 2011

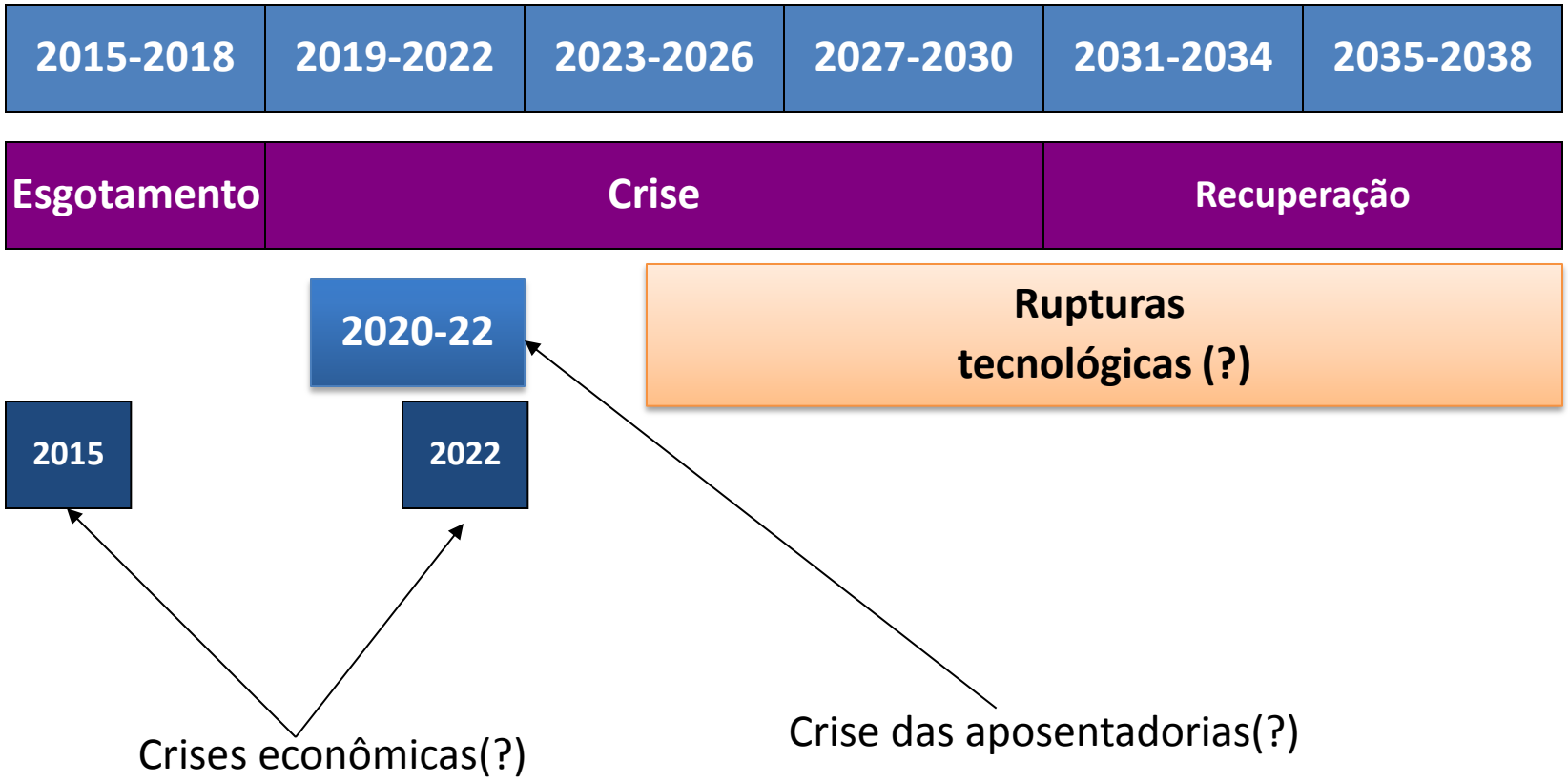
# CRISES POTENCIAIS

- Crise das aposentadorias
- Degelo das geleiras
- Mudança da Matriz energética
- Estados ineficientes e ineficazes
- Terrorismo e conflito cultural






# 20 ANOS NO FUTURO



# RUPTURAS TECNOLÓGICAS (DOD)

- Nanotecnologia
- Biotecnologia
- Medicina avançada
- Neuroergonomia

- Geração de energia
- Materiais e manufatura
- Energia dirigida
- Tecnologia espacial

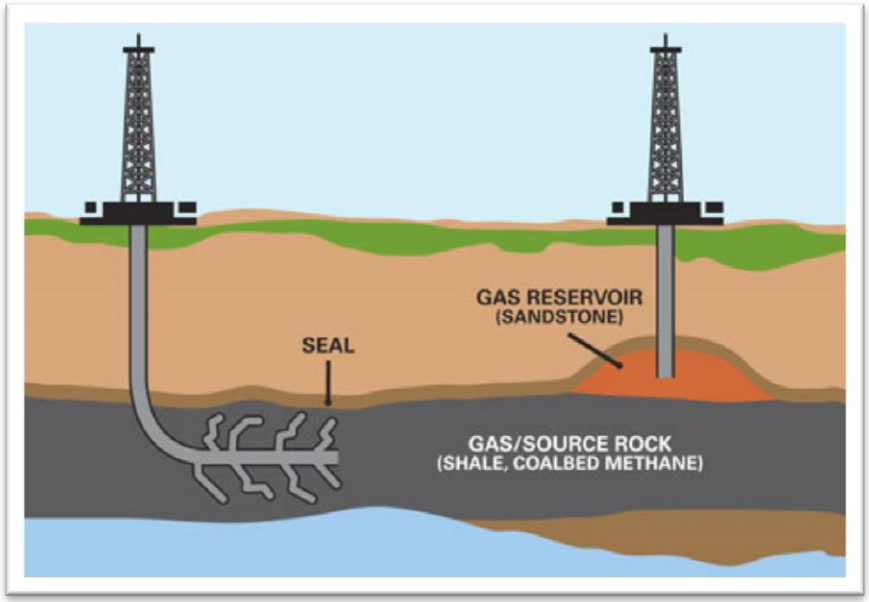
- Guerra de informação
- Inteligência artificial

- Robótica
- Sensores

FY 2015 – US$69,5 bilhões de P&D (DoD)
+US$65,69 bilhões de P&D (não DoD).

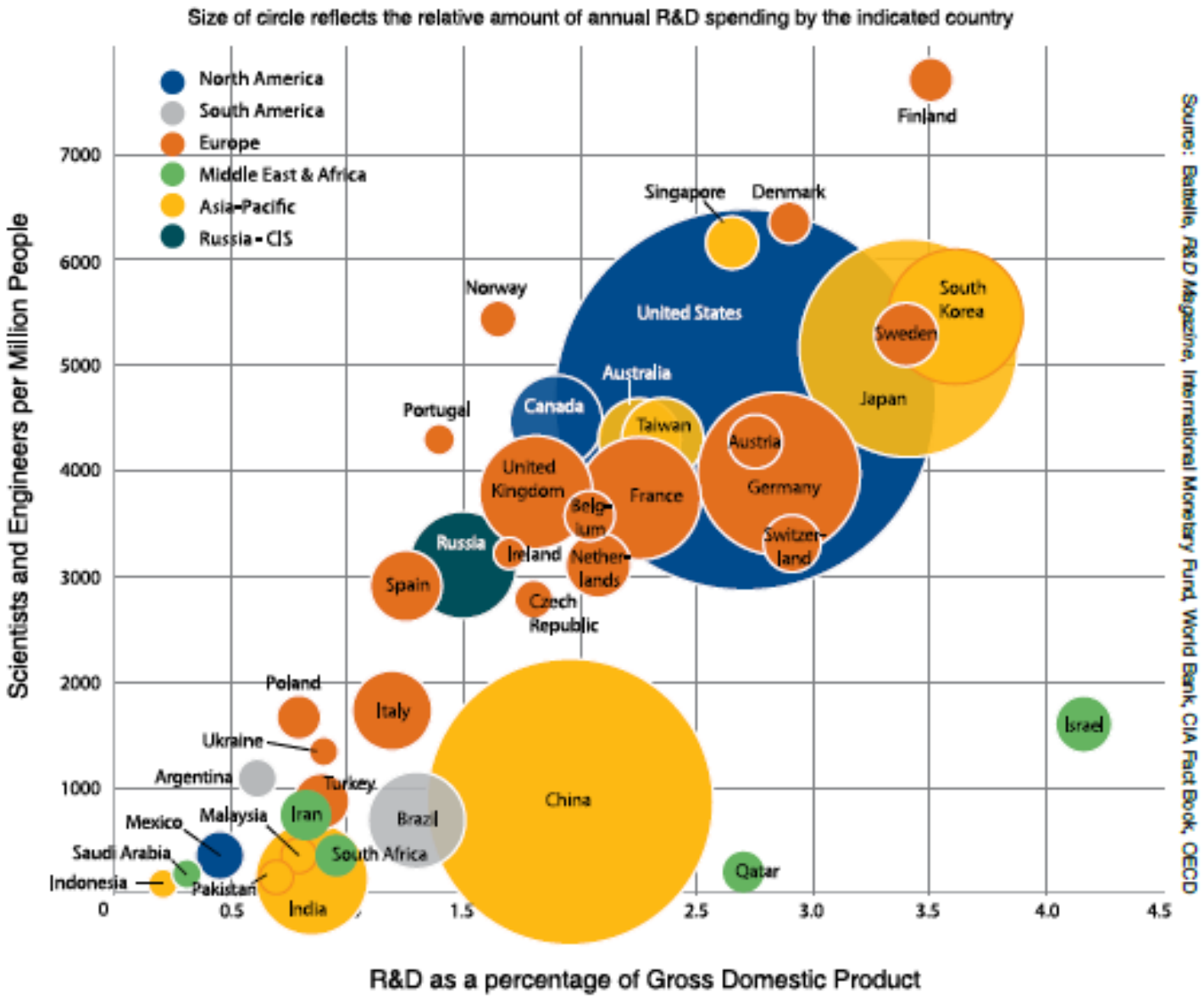
# REINDUSTRIALIZAÇÃO DOS EUA


Robotização



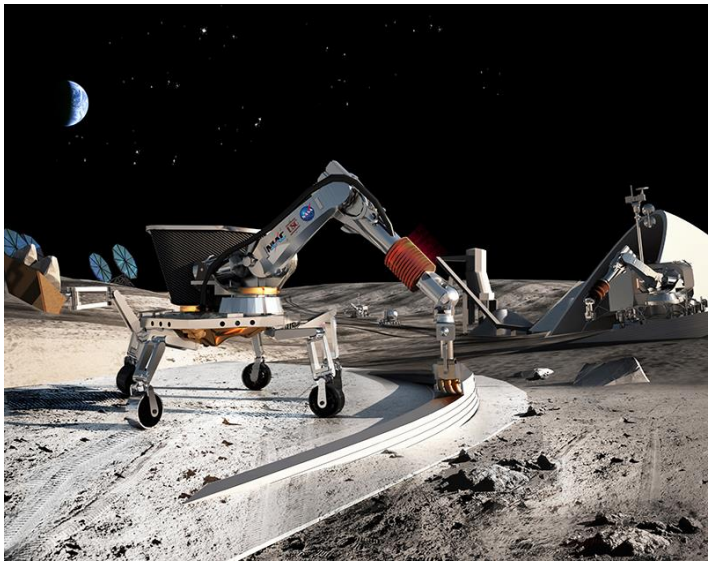

Gás de Xisto (*Shale Gas*)

# PESQUISA E DESENVOLVIMENTO NO MUNDO (forecast 2014)

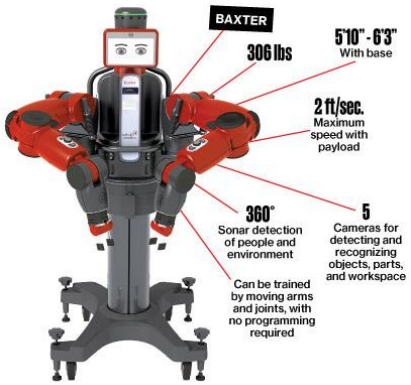


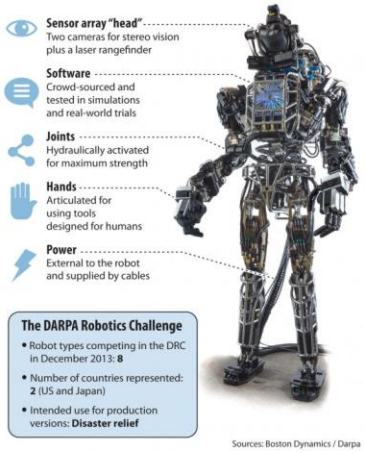

*Fonte*: R&D magazine, 2013.

# Construção Civil



# ROBÓTICA INDUSTRIAL



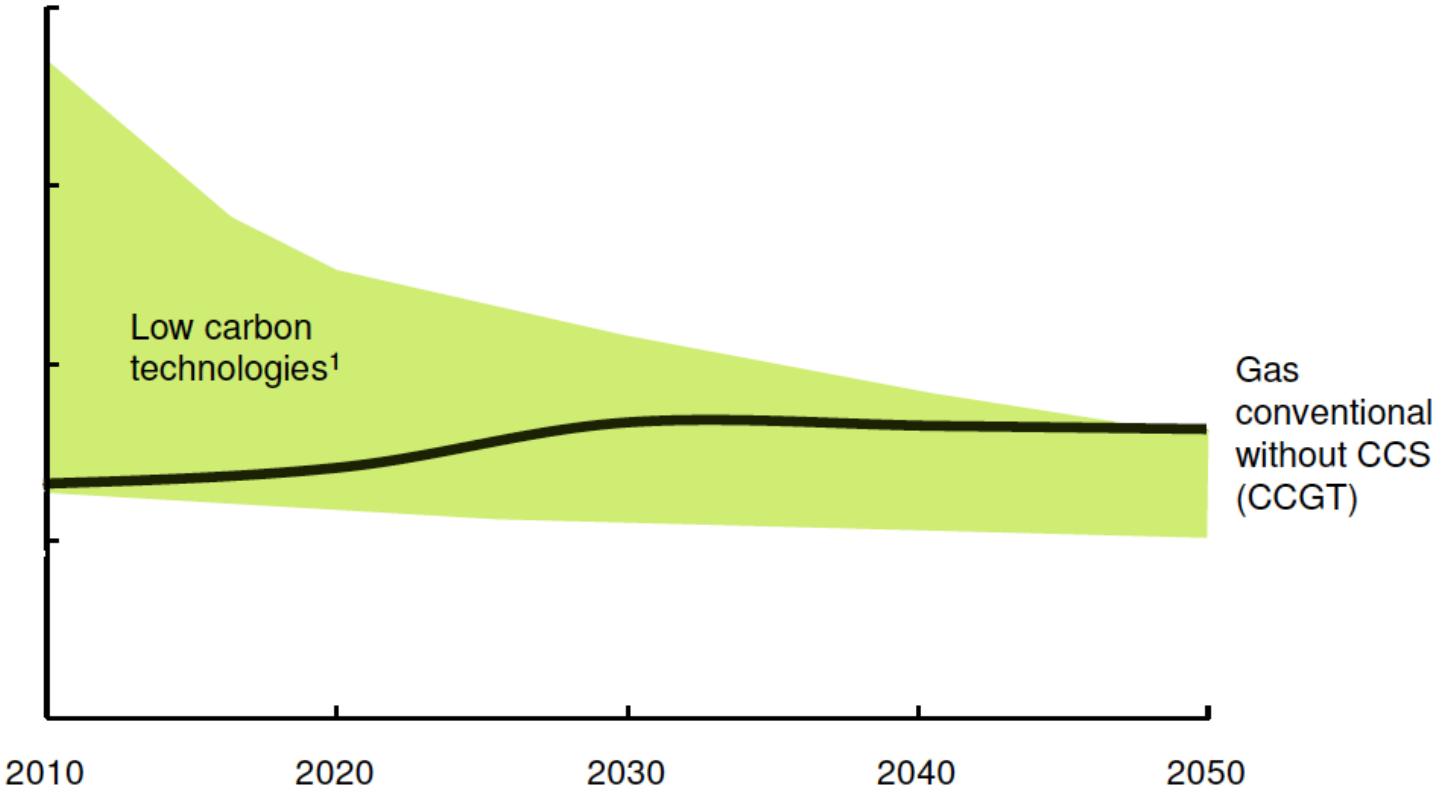





# ECONOMIA DE BAIXO CARBONO

**Low carbon technology costs decrease while gas plant costs increase**

LCoE evolution of gas conventional compared to low carbon technologies, € per MWh (real terms)
Example based on the 60% RES / 20% nuclear / 20% CCS pathway, Iberia




1 Technologies included: Coal CCS, Nuclear, Wind onshore and offshore, Solar PV, Solar CSP and biomass dedicated

*Fonte*: European climate foundation, 2010.

# GÁS DE XISTO (*SHALE GAS*)

**Table 6. Top 10 countries with technically recoverable shale gas resources**

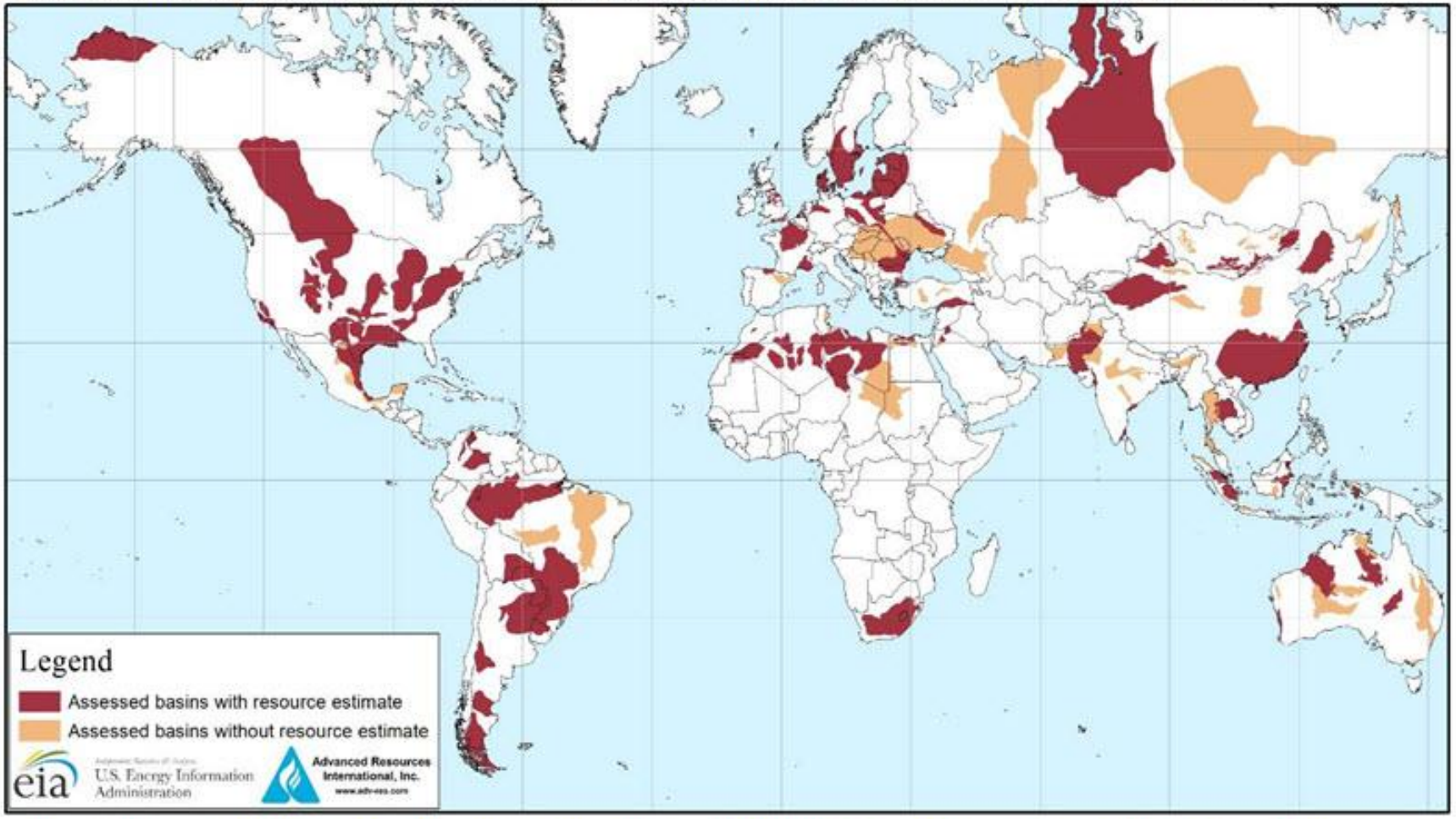
| Rank | Country | Shale gas (trillion cubic feet) | |
|---|---|---|---|
| **1** | China | 1,115 | |
| **2** | Argentina | 802 | |
| **3** | Algeria | 707 | |
| **4** | U.S.[1] | 665 | (1,161) |
| **5** | Canada | 573 | |
| **6** | Mexico | 545 | |
| **7** | Australia | 437 | |
| **8** | South Africa | 390 | |
| **9** | Russia | 285 | |
| **10** | Brazil | 245 | |
| | **World Total** | **7,299** | **(7,795)** |

[1] EIA estimates used for ranking order. ARI estimates in parentheses.

*Fonte*: US Energy information Administration (EIA), 2013.

# GÁS DE XISTO (*SHALE GAS*)

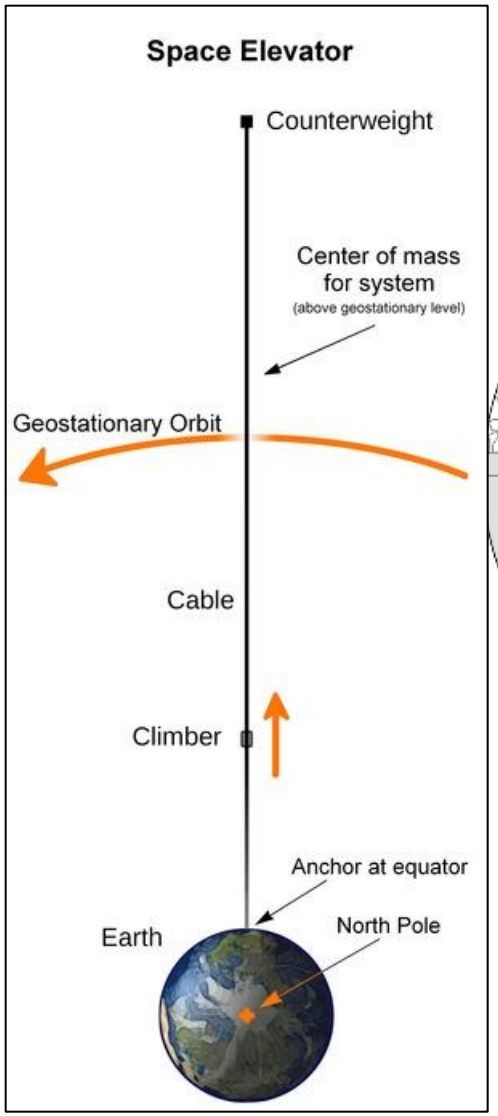
Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013

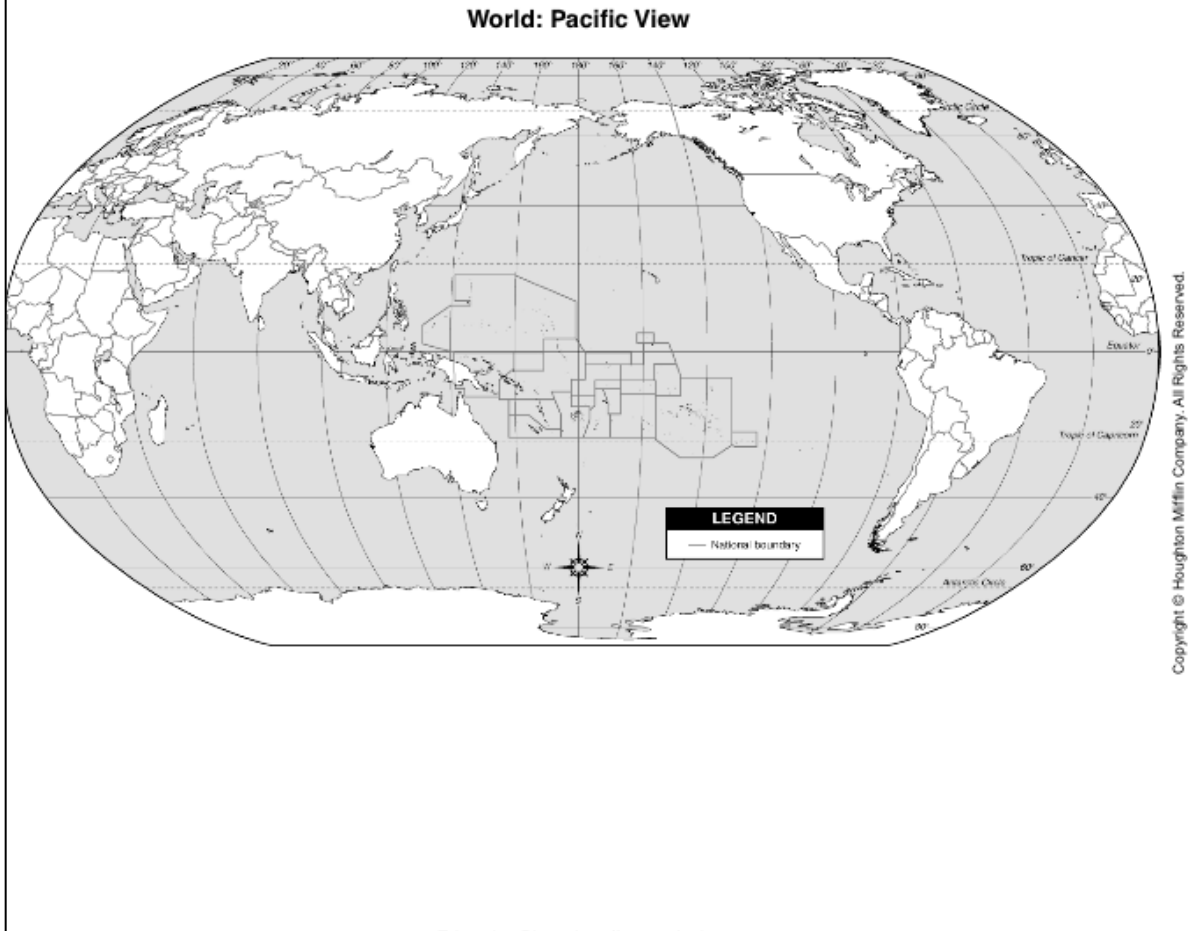



Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

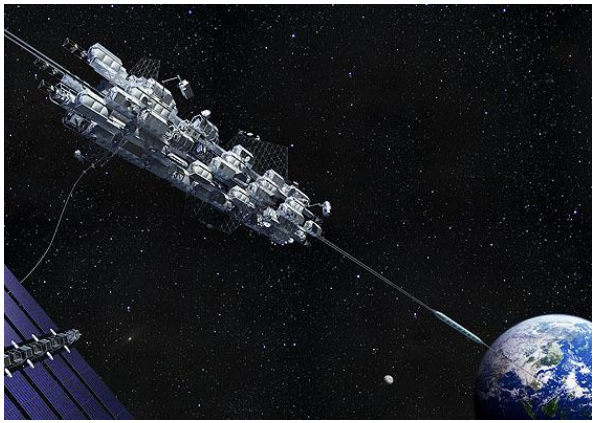
*Fonte*: US Energy information Administration (EIA), 2013.

# ELEVADOR ESPACIAL

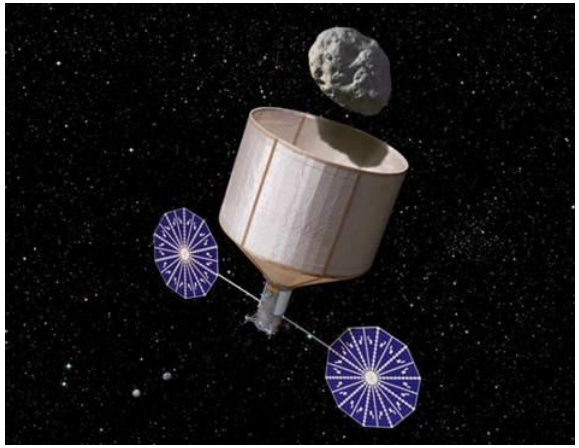


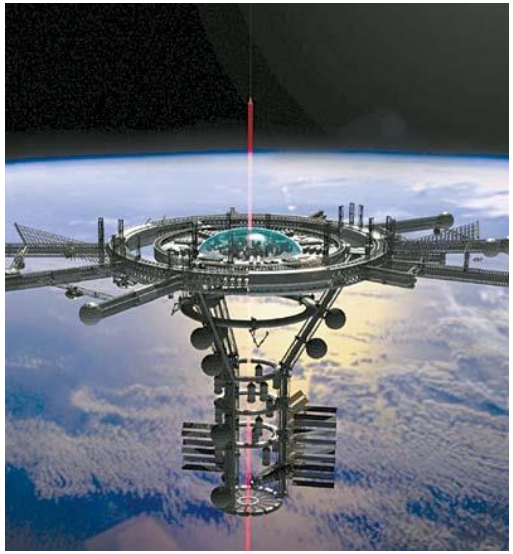
# ELEVADOR ESPACIAL



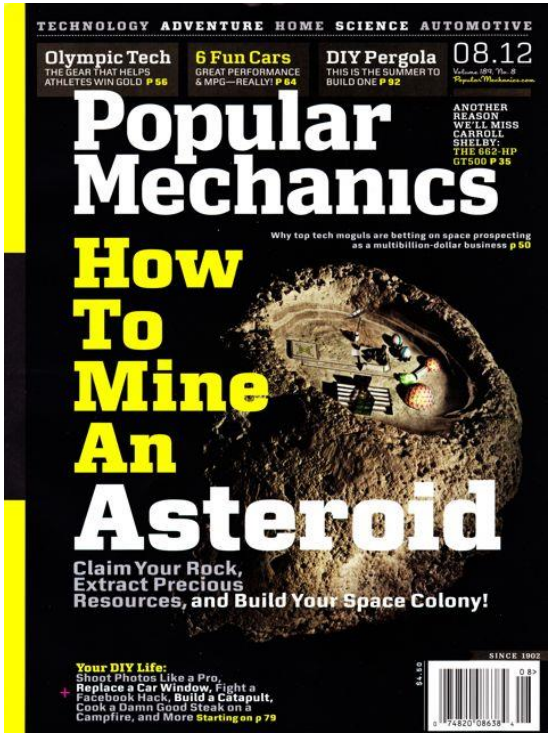
Obayashi Corp



Space Lasso 2020–NASA

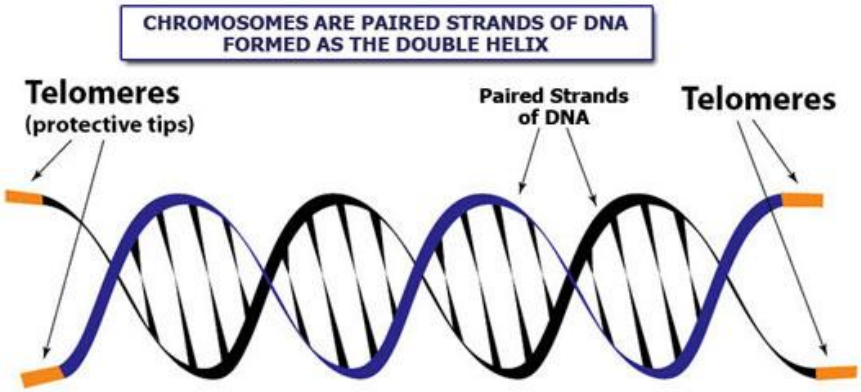


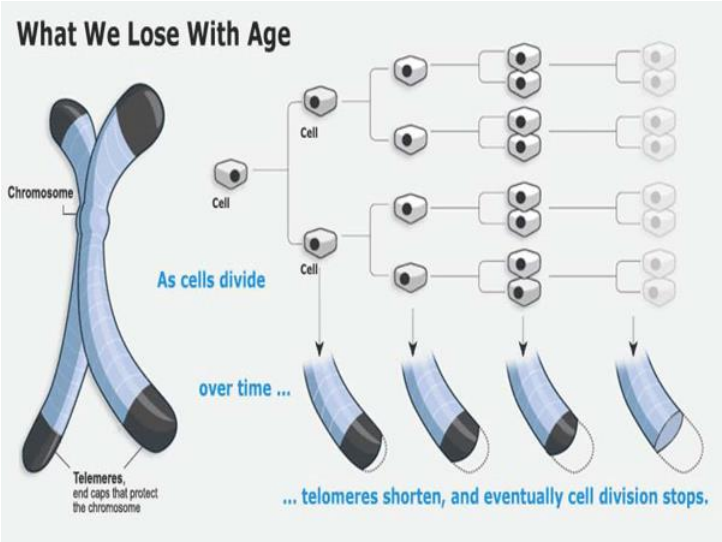
JPL/NASA



# HET (*HUMAN ENHANCEMENT TECHNOLOGIES*)

Terapia de telômeros.



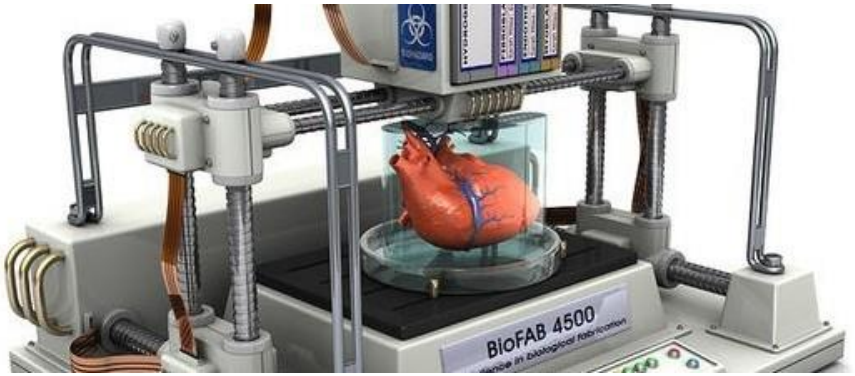


T.A. SCIENCES®
CELL REJUVENATION THROUGH TELOMERASE ACTIVATION

≈+24% de longevidade

# HET (*HUMAN ENHANCEMENT TECHNOLOGIES*)

Nanomedicina

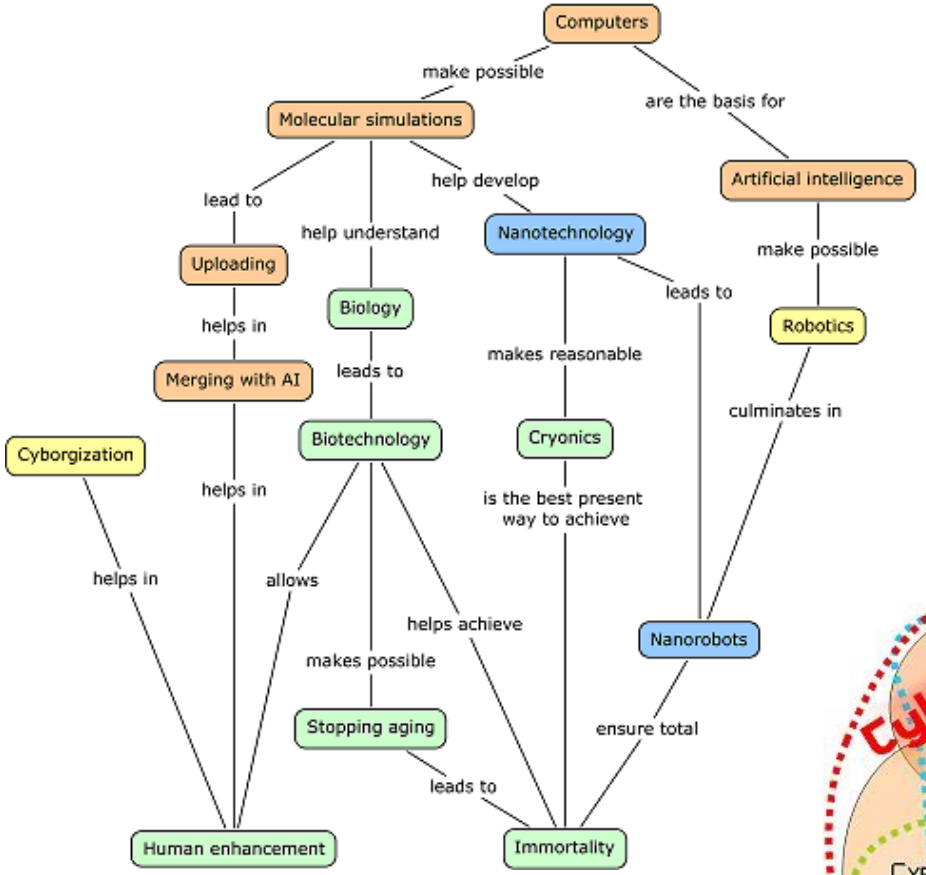


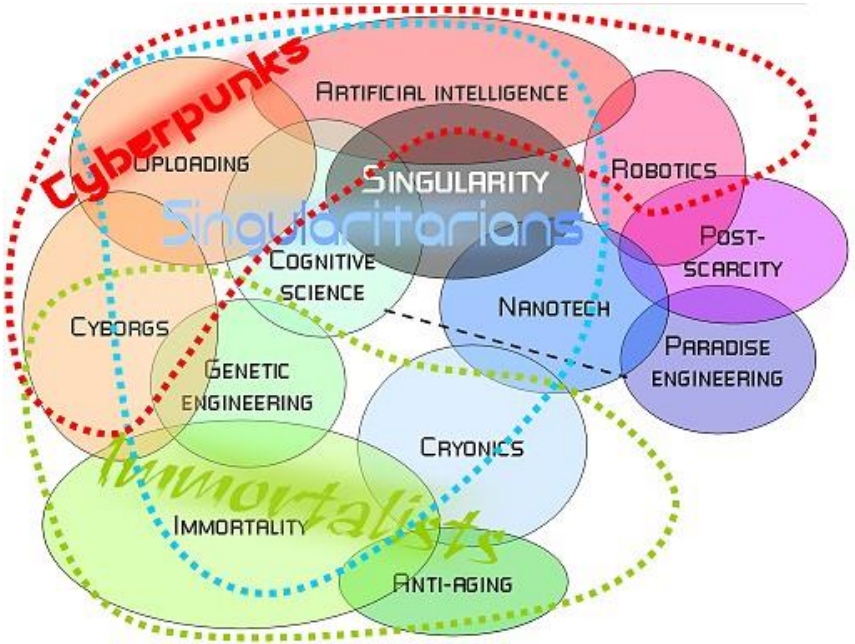

Bioimpressão

DBS (*Deep Brain Stimulation*)

Exoesqueletos biônicos

# HET (*HUMAN ENHANCEMENT TECHNOLOGIES*)



# OBRIGADO!

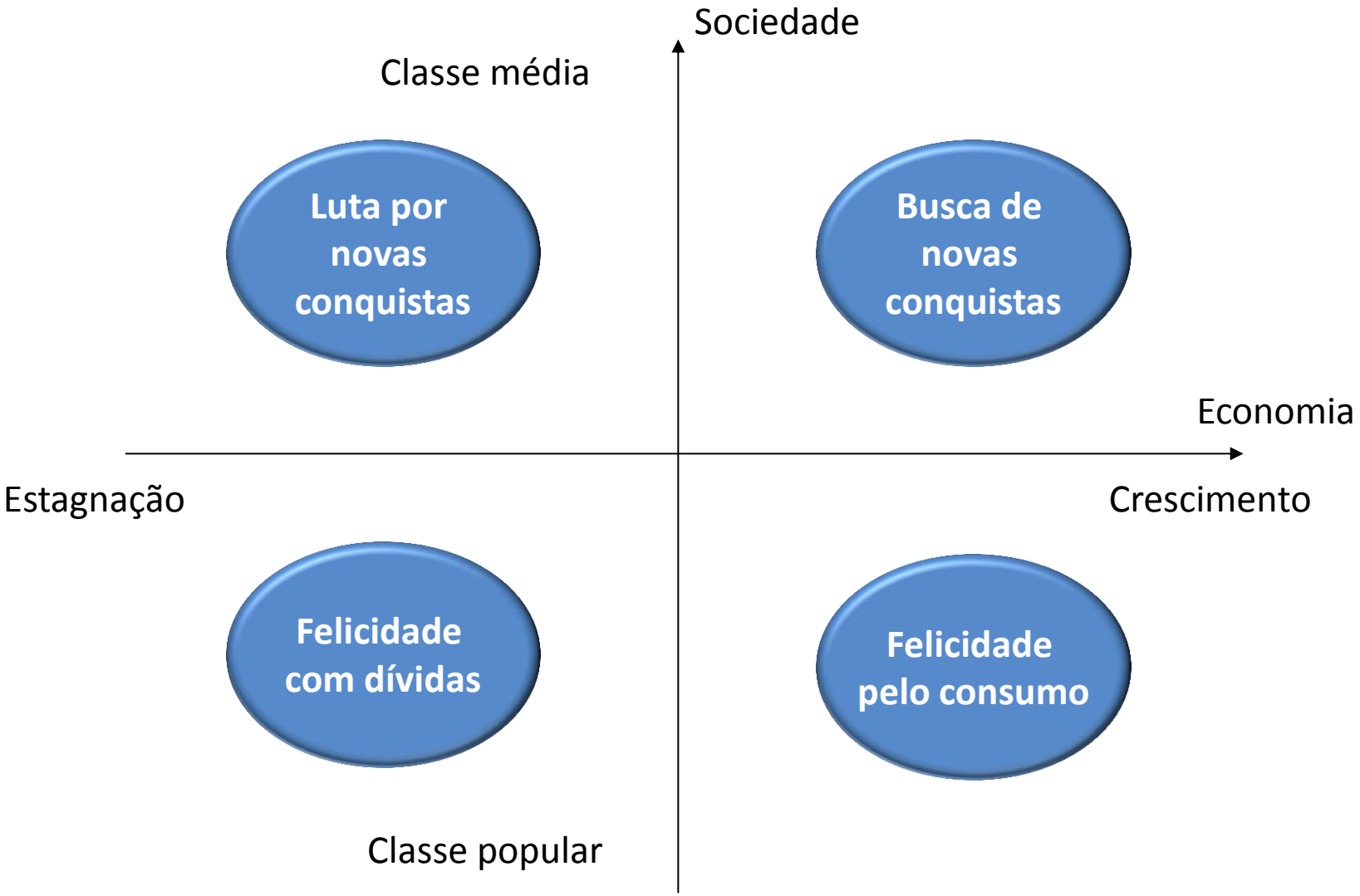
paulo.alves@fdc.org.br

# EXTRAS

# DOIS ANOS NO FUTURO

- Riscos Brasil
  - Eleições – Segundo mandato
  - Ajuste fiscal 2015 – Risco financeiro
  - Risco Petrobras – Risco financeiro
  - Risco de crise imobiliária – Risco financeiro
  - Risco de Downgrade – Risco Financeiro
  - Risco de Apagão – Risco econômico
  - Risco de El Niño 2015 – Risco climático

# ELEIÇÕES 2014

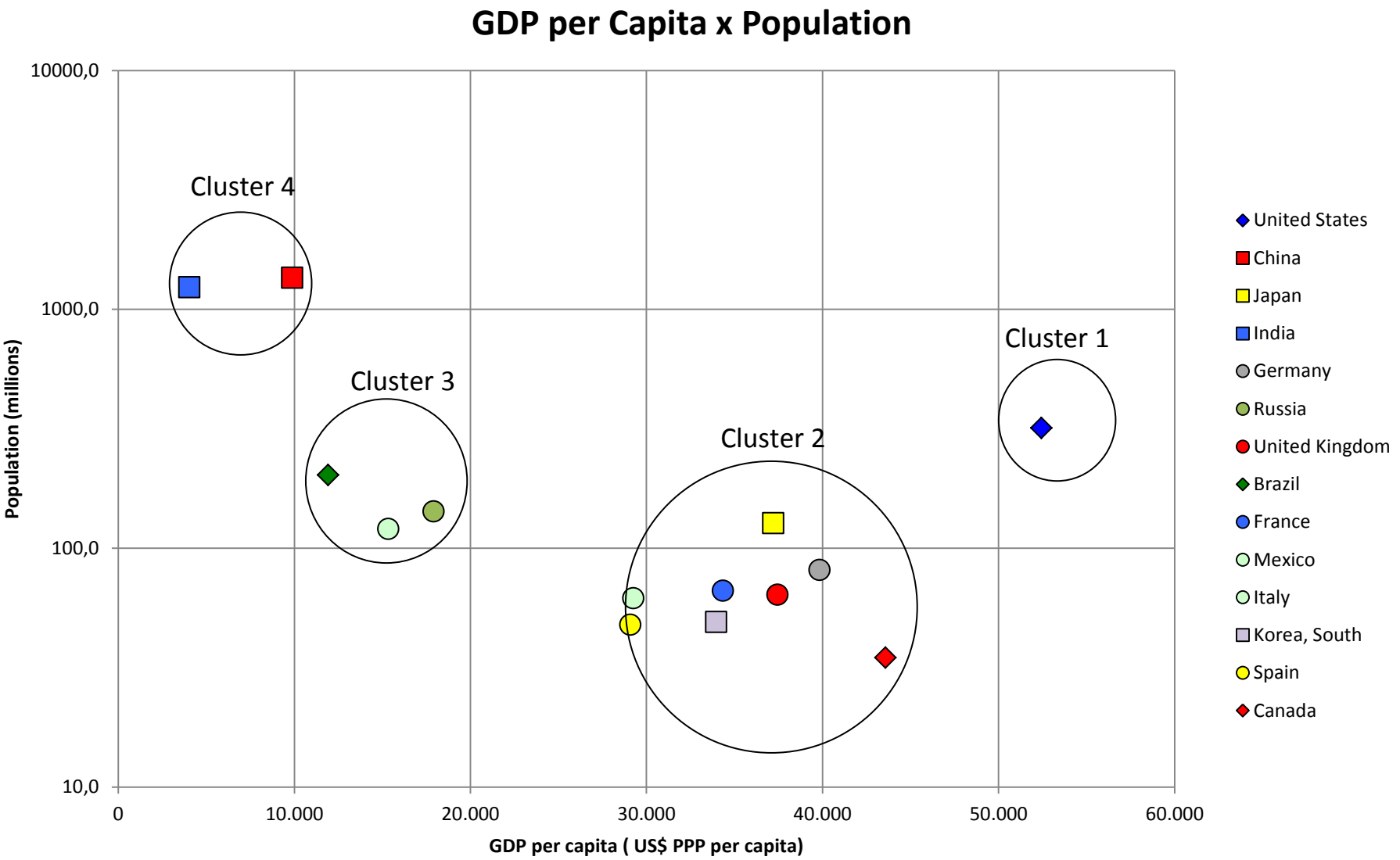


# TOP 45 ECONOMIES

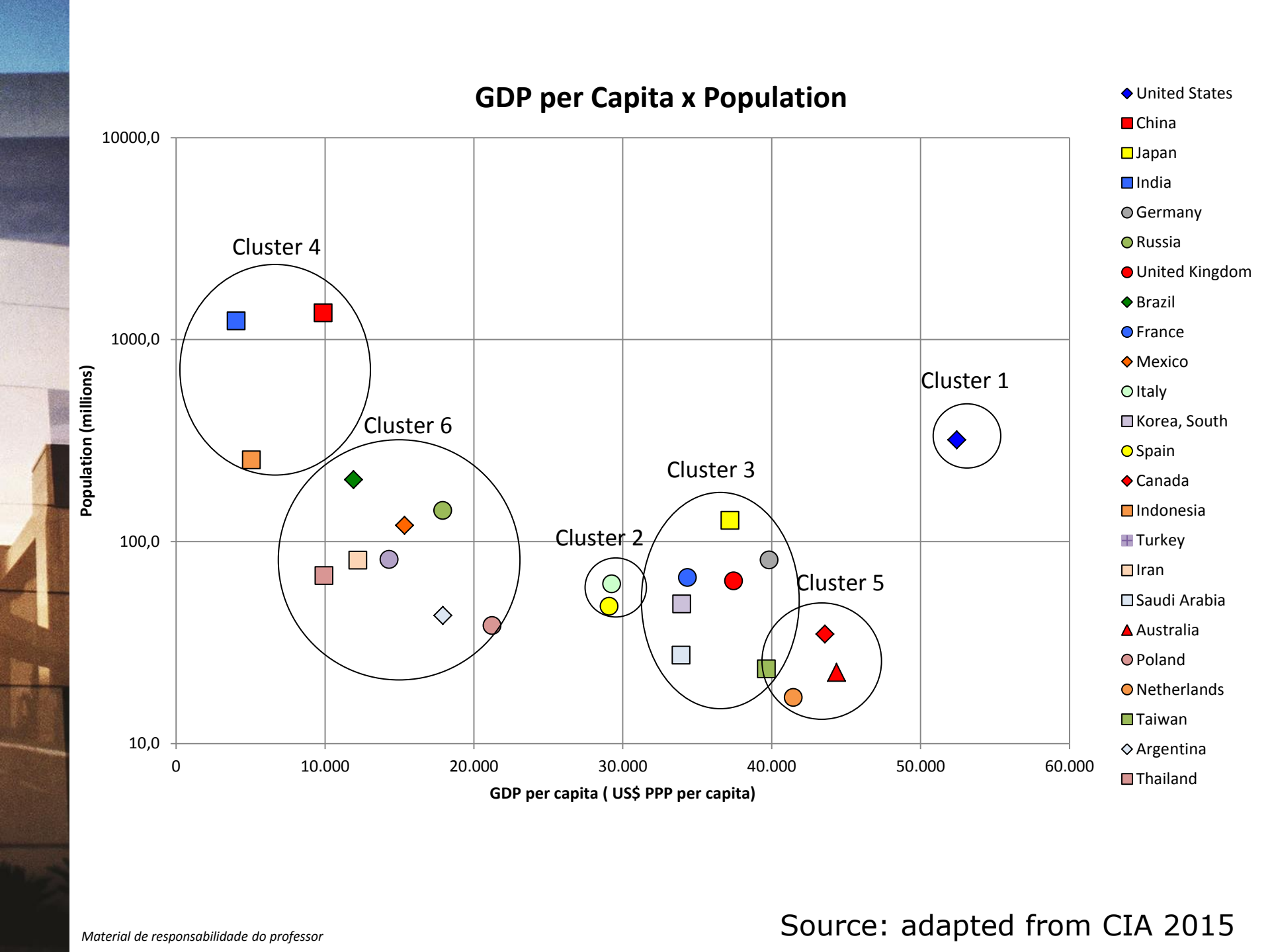
| Rank | Nation | GDP (bil US$) | % | Sum % |
|---|---|---|---|---|
| 1 | United States | 16720,00 | 19,16% | 19,16% |
| 2 | China | 13390,00 | 15,35% | 34,51% |
| 3 | India | 4990,00 | 5,72% | 40,23% |
| 4 | Japan | 4729,00 | 5,42% | 45,65% |
| 5 | Germany | 3227,00 | 3,70% | 49,35% |
| 6 | Russia | 2553,00 | 2,93% | 52,27% |
| 7 | Brazil | 2416,00 | 2,77% | 55,04% |
| 8 | United Kingdom | 2387,00 | 2,74% | 57,78% |
| 9 | France | 2276,00 | 2,61% | 60,39% |
| 10 | Mexico | 1845,00 | 2,11% | 62,50% |
| 11 | Italy | 1805,00 | 2,07% | 64,57% |
| 12 | Korea, South | 1666,00 | 1,91% | 66,48% |
| 13 | Canada | 1518,00 | 1,74% | 68,22% |
| 14 | Spain | 1389,00 | 1,59% | 69,81% |
| 15 | Indonesia | 1285,00 | 1,47% | 71,28% |
| 16 | Turkey | 1167,00 | 1,34% | 72,62% |
| 17 | Australia | 998,30 | 1,14% | 73,77% |
| 18 | Iran | 987,10 | 1,13% | 74,90% |
| 19 | Saudi Arabia | 927,80 | 1,06% | 75,96% |
| 20 | Taiwan | 926,40 | 1,06% | 77,02% |
| 21 | Poland | 814,00 | 0,93% | 77,96% |
| 22 | Argentina | 771,00 | 0,88% | 78,84% |
| 23 | Netherlands | 699,70 | 0,80% | 79,64% |

| Rank | Nation | GDP (bil US$) | % | Sum % |
|---|---|---|---|---|
| 24 | Thailand | 673,00 | 0,77% | 80,41% |
| 25 | South Africa | 595,70 | 0,68% | 81,10% |
| 26 | Pakistan | 574,10 | 0,66% | 81,75% |
| 27 | Egypt | 551,40 | 0,63% | 82,39% |
| 28 | Colombia | 526,50 | 0,60% | 82,99% |
| 29 | Malaysia | 525,00 | 0,60% | 83,59% |
| 30 | Nigeria | 478,50 | 0,55% | 84,14% |
| 31 | Philippines | 454,30 | 0,52% | 84,66% |
| 32 | Belgium | 421,70 | 0,48% | 85,14% |
| 33 | Venezuela | 407,40 | 0,47% | 85,61% |
| 34 | Sweden | 393,80 | 0,45% | 86,06% |
| 35 | Switzerland | 371,20 | 0,43% | 86,49% |
| 36 | Austria | 361,00 | 0,41% | 86,90% |
| 37 | Vietnam | 358,90 | 0,41% | 87,31% |
| 38 | Peru | 344,00 | 0,39% | 87,71% |
| 39 | Singapore | 339,00 | 0,39% | 88,09% |
| 40 | Ukraine | 337,40 | 0,39% | 88,48% |
| 41 | Chile | 335,40 | 0,38% | 88,87% |
| 42 | Bangladesh | 324,60 | 0,37% | 89,24% |
| 43 | Romania | 288,50 | 0,33% | 89,57% |
| 44 | Czech Republic | 285,60 | 0,33% | 89,90% |
| 45 | Algeria | 284,70 | 0,33% | 90,22% |

Fonte: CIA, 2015




Source: adapted from CIA 2015






Source: adapted from CIA 2015

# Social classes

| | | Population | Average gross annual household income | GDP per capita | Equivalent nation |
|---|---|---|---|---|---|
| | % | Millions | R$ (ABEP 2012) | PPP (US$) | CIA |
| A1 | 0.5 | 1 | 155,112.00 | 72,690.54 | Singapore/Luxemburg |
| A2 | 3.6 | 7.2 | 101,016.00 | 47,339.39 | Hong Kong/Switzerland |
| B1 | 9.6 | 19.2 | 53,016.00 | 24,845.03 | Greece/Slovakia |
| B2 | 20.8 | 41.6 | 30,780.00 | 14,424.51 | Turkey/Bulgaria |
| C1 | 26.3 | 52.6 | 18,492.00 | 8,665.95 | Jamaica/Belize |
| C2 | 23.2 | 46.4 | 12,288.00 | 5,758.56 | Armenia/Georgia |
| D | 15.2 | 30.4 | 8,568.00 | 4,015.24 | India/Vietnam |
| E | 0.8 | 1.6 | 5,724.00 | 2,682.45 | Sudan/Nigeria |

Fontes: IBOPE, ABEP, IBGE and CIA, 2014

# Social classes

| Class | GDP per capita | Nation |
|---|---|---|
| | 100,900.00 | Qatar |
| | 78,000.00 | Luxemburg |
| A1 | 72,690.54 | |
| | 60,800.00 | Singapore |
| | 51,700.00 | USA |
| A2 | 47,339.39 | |
| | 44,900.00 | Switzerland |
| B1 | 24,845.03 | |
| | 23,000.00 | Portugal |
| | 15,400.00 | Mexico |
| B2 | 14,424.51 | |
| | 12,500.00 | World |

| Class | GDP per capita | Nation |
|---|---|---|
| | 11,700.00 | Brasil |
| | 9,100.00 | China |
| C1 | 8,665.95 | |
| | 7,300.00 | Ukraine |
| | 6,100.00 | Paraguay |
| C2 | 5,758.56 | |
| | 5,300.00 | Mongolia |
| D | 4,015.24 | |
| | 3,800.00 | India |
| E | 2,682.45 | |
| | 1,800.00 | North Korea |
| | 400.00 | Congo |

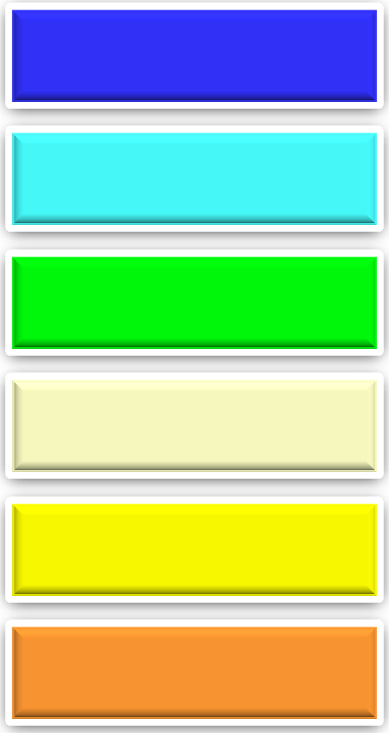
Fontes: IBOPE, ABEP, IBGE and CIA, 2014

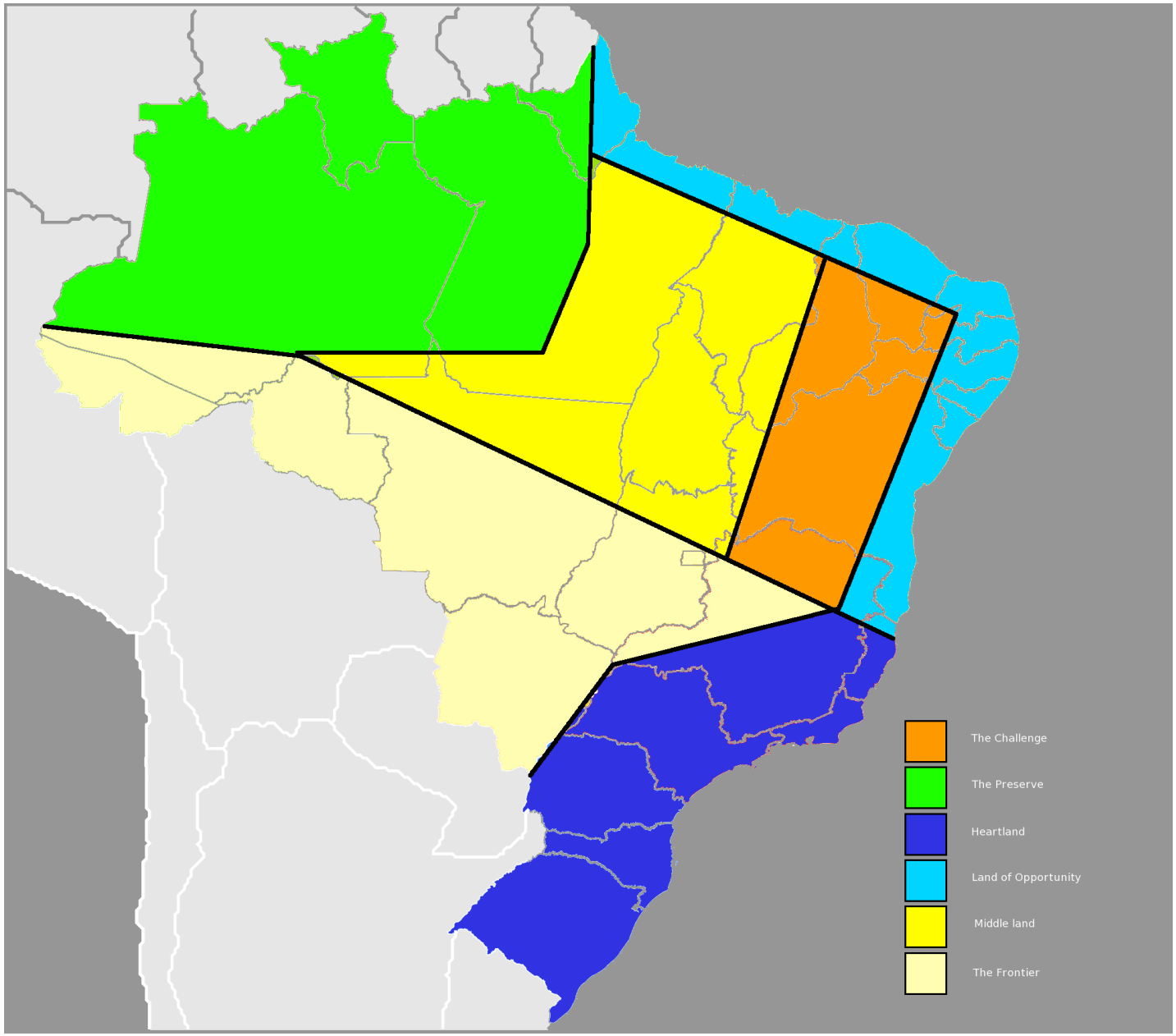
# Barreiras ao crescimento

- Protecionismo
- Tax and legal System
- Infra-estrutura de Transporte
- Energia
- Educação
- R&D
- Defesa e Segurança

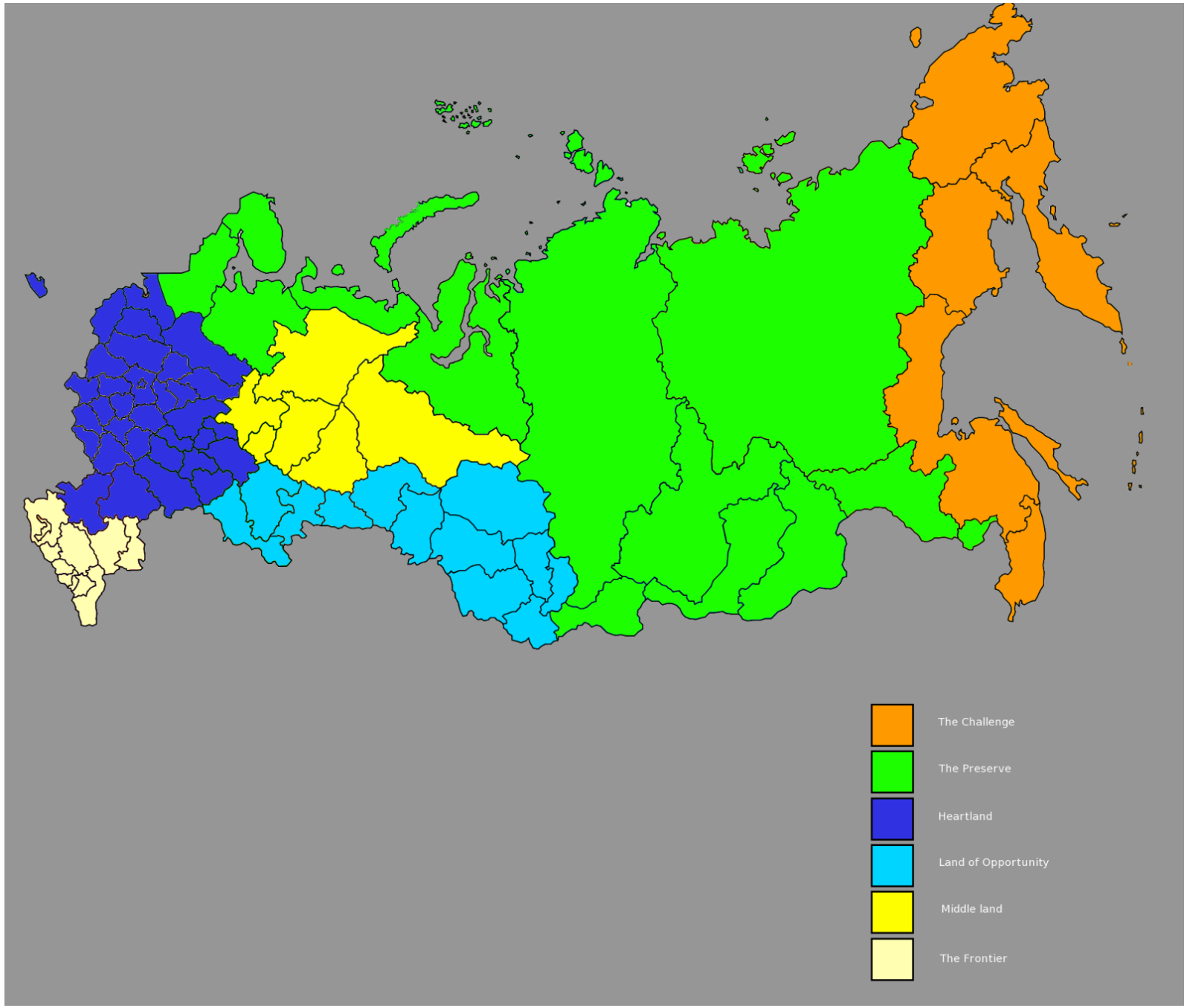
# ANÁLISES TERRITORIAIS COMPARATIVAS

- Heartland
- Land of Opportunity
- Preserve
- Frontier
- Middlelands
- Challenge

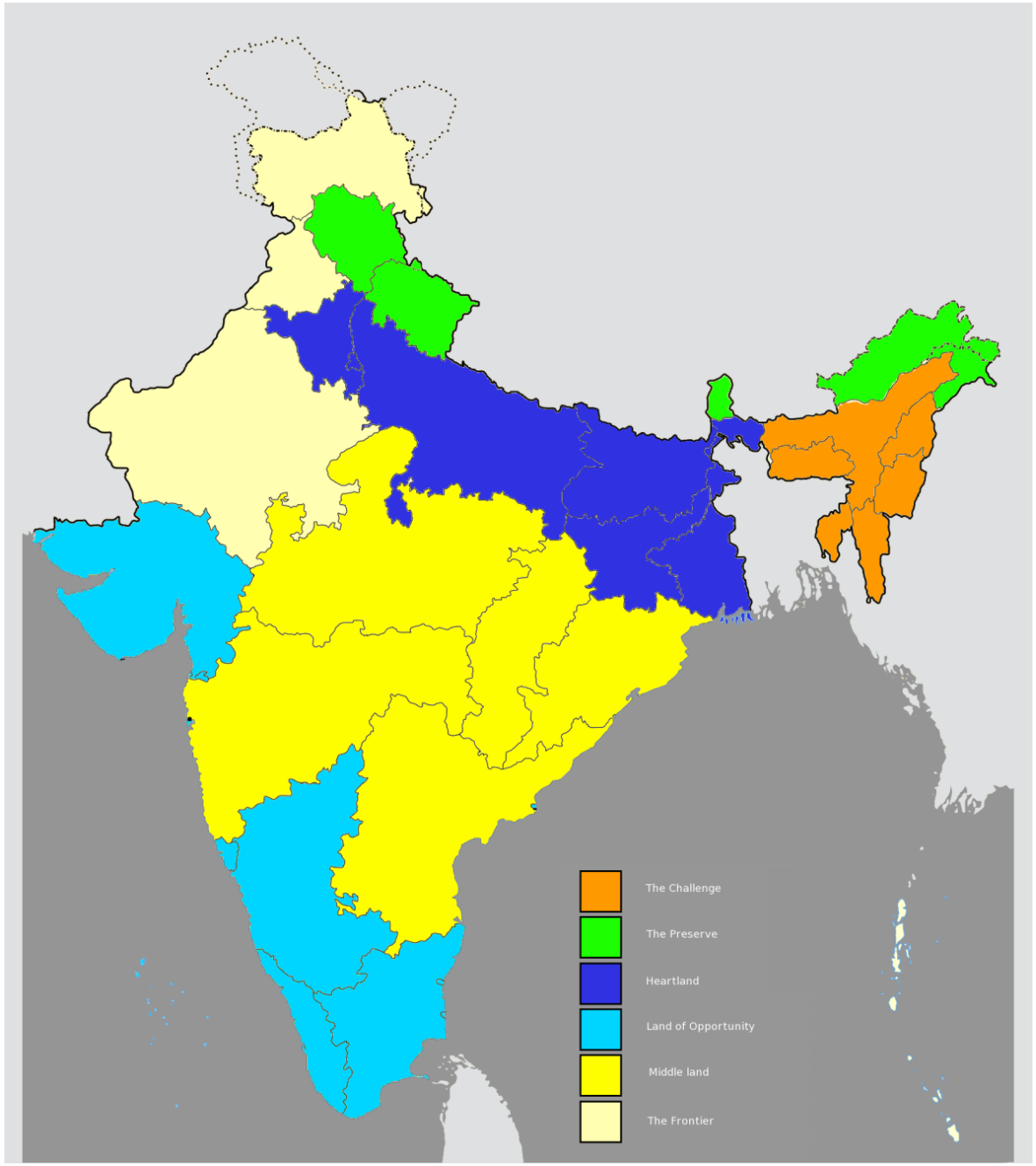





*Material de responsabilidade do professor*

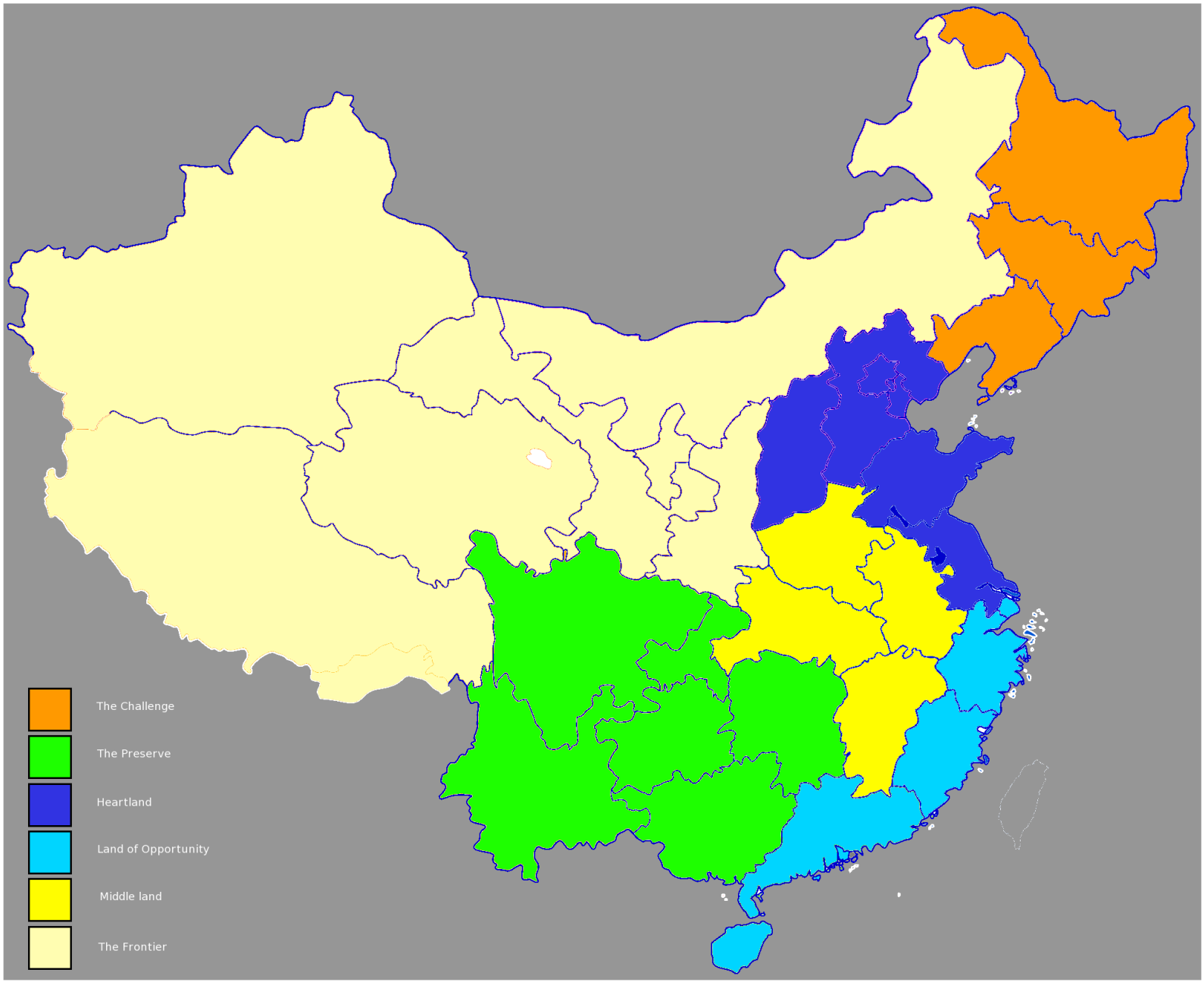



*Material de responsabilidade do professor*




*Material de responsabilidade do professor*


*Material de responsabilidade do professor*



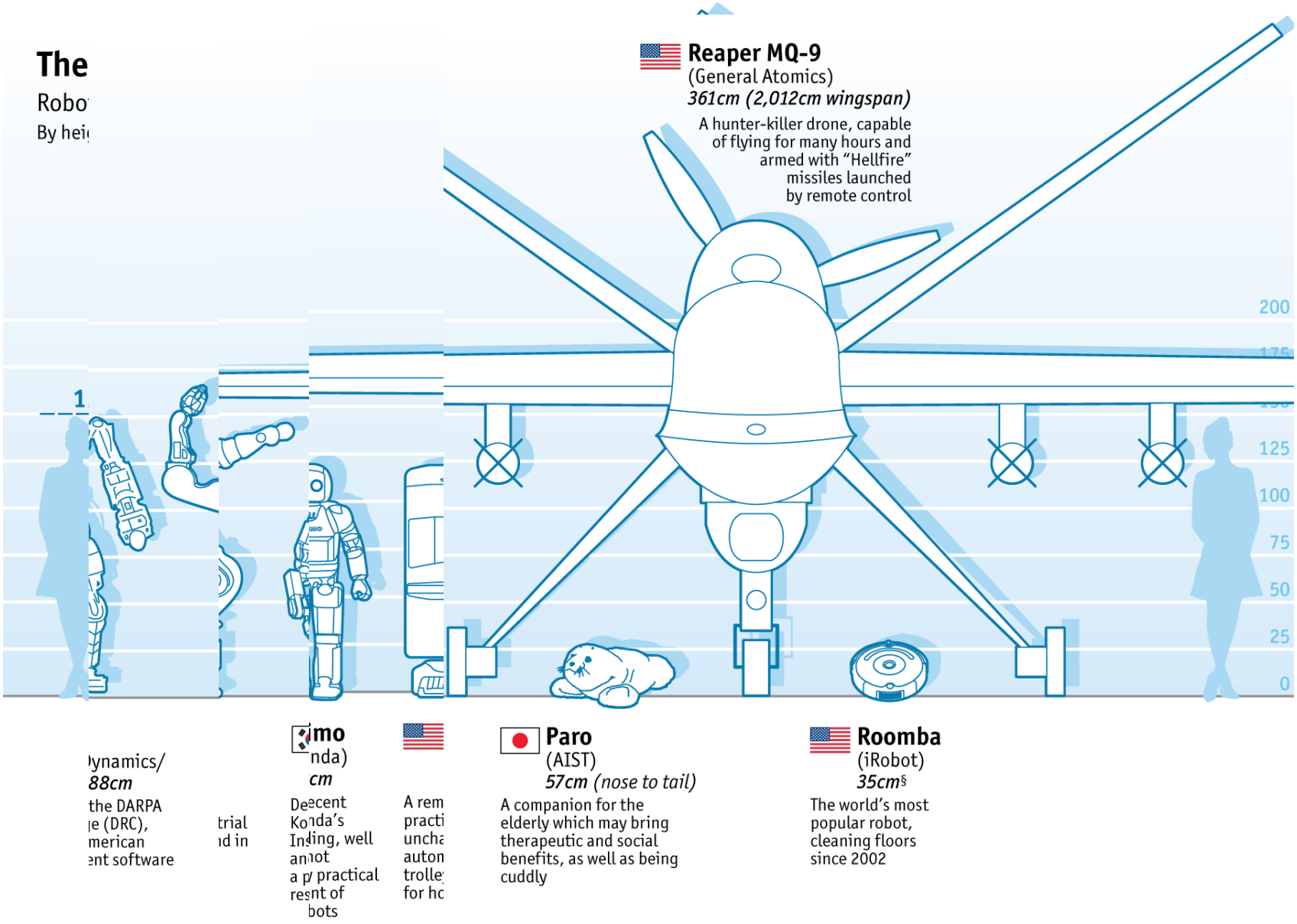

*Material de responsabilidade do professor*


*Material de responsabilidade do professor*


*Material de responsabilidade do professor*

# ROBÓTICA MILITAR

# ROBÓTICA INDUSTRIAL




*Fonte*: The Economist, 2014