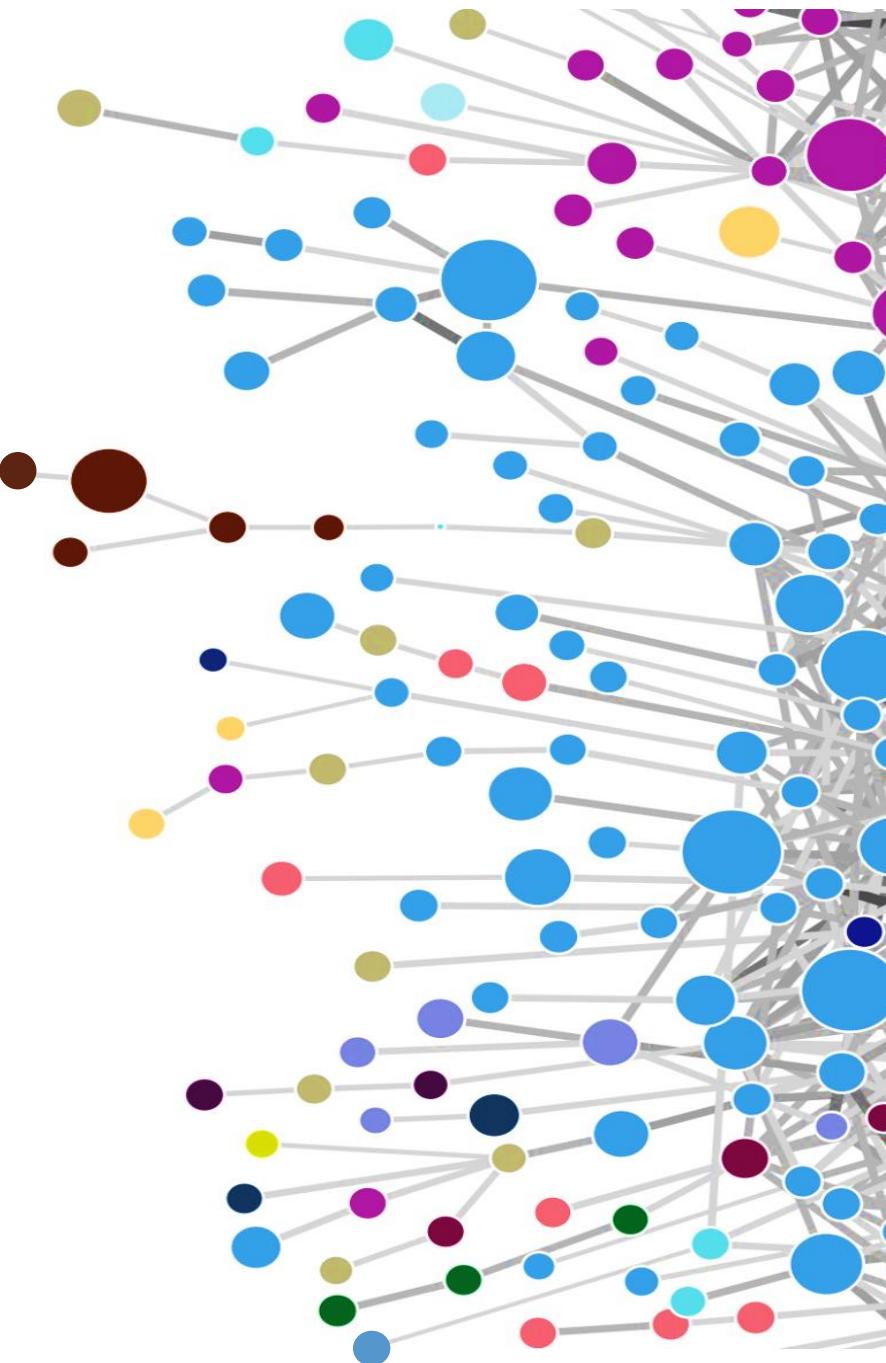




درآمدی بر رویکرد پیچیدگی اقتصادی

بهروز شاهمرادی، عضو هیأت علمی گروه اقتصاد علم
مرکز تحقیقات سیاست علمی کشور





Ricardo Hausmann
Professor of the Practice of
Economic Development
Director of Center for
International Development



César A. Hidalgo is a statistical physicist, writer, and data visualization designer. He is an Associate Professor of Media Arts and Sciences at MIT and the director of the Macro Connections group at The MIT Media Lab



وزارت علم و تکنولوژی
کشور
مرکز تحقیقات بات اعلی کشور

▶ English US (Basic Books) |

▶ Audiobook (Audible) |

▶ Chinese Simplified (CITIC) |

▶ Chinese Complex (Heliopolis Culture Group)

▶ German (Hoffmann und campe) |

▶ Spanish (Editorial Debate) |

▶ Italian (Bollati Boringhieri) |

▶ Russian (EKSMO) |

▶ Japanese (Hayakawa) |

▶ Korean (Munhakdongne)

▶ English UK (Penguin-Random House)



برای کسب اطلاعات بیشتر درباره این کتاب به مصاحبه نشریه «جراغ دانش»
با دکتر شاهزادی، مترجم این کتاب، در همین شماره از نشریه مراجعه کنید.
علاوه‌هایی برای درافت اطلاعات بیشتر از تحویل دیافت کتاب‌های مرکز تحقیقات
سیاست علمی کشور می‌توانند با واحد انتشارات مرکز پژوهش‌های اقتصادی
داخی ۱۰۳ تأسیس نگیرند یا به نشانی وب‌گاه مرکز (Nrisp.ac.ir) مراجعه کنند.



وزارت علم، تحقیقات و فناوری
مرکز تحقیقات سیاست علمی کشور

THE ATLAS OF

ECONOMIC COMPLEXITY

MAPPING PATHS TO PROSPERITY

Hausmann, Hidalgo et al.



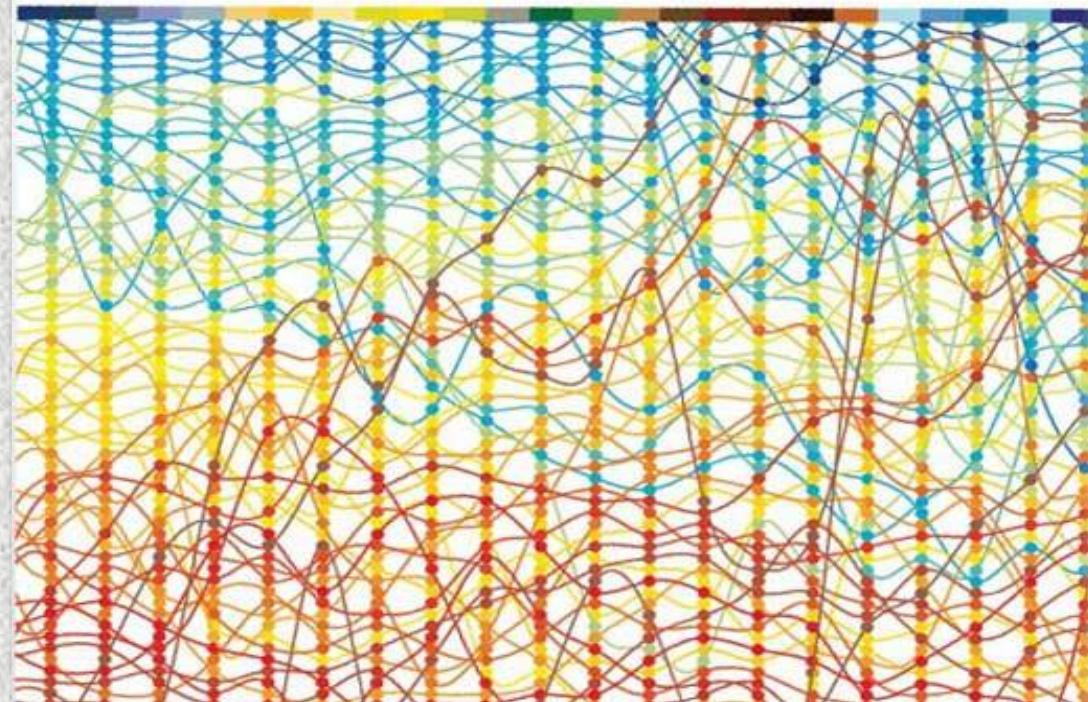
شرکت چاپ و نشر بازارگانی

اطلس پیچیدگی اقتصادی

نقشه راه شکوفایی

ریکاردو هاسمن، سزار آهیدالگو، سباستین یوتوس، مایکل کوسیا، سارا چانگ،
جوان جیمیز، الکساندر سیموس، محمد آیلدریم

ترجمه و تألیف: دکتر بهروز شاهمرادی



وزارت علم، تحقیقات و فناوری

مرکز تحقیقات یاست علی لور

آیا معیارهای رایج برای محاسبه رشد و توسعه یافتنگی اقتصادها مناسبند؟



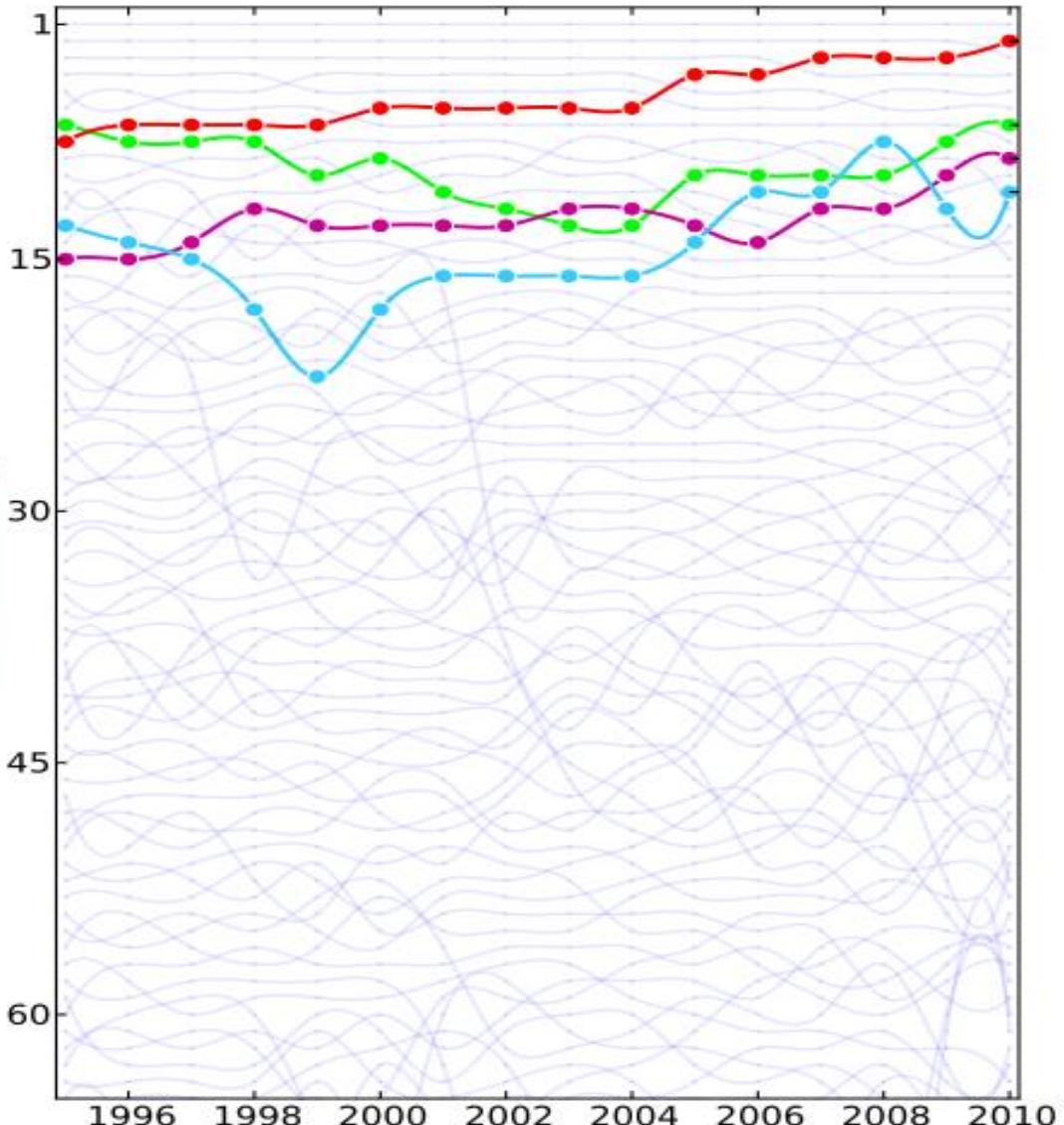
GDP

=



GDP

Ranking

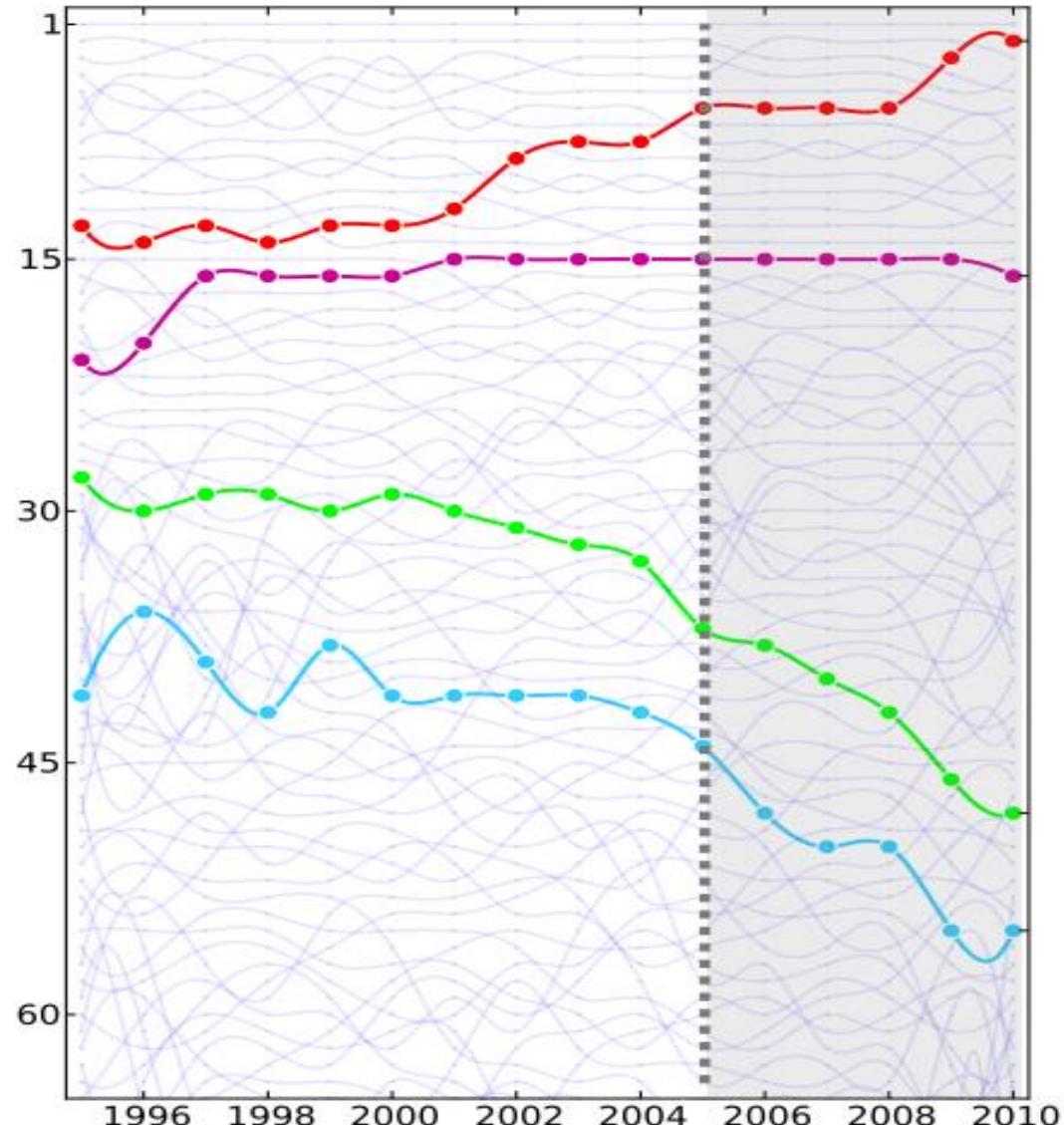


China

India

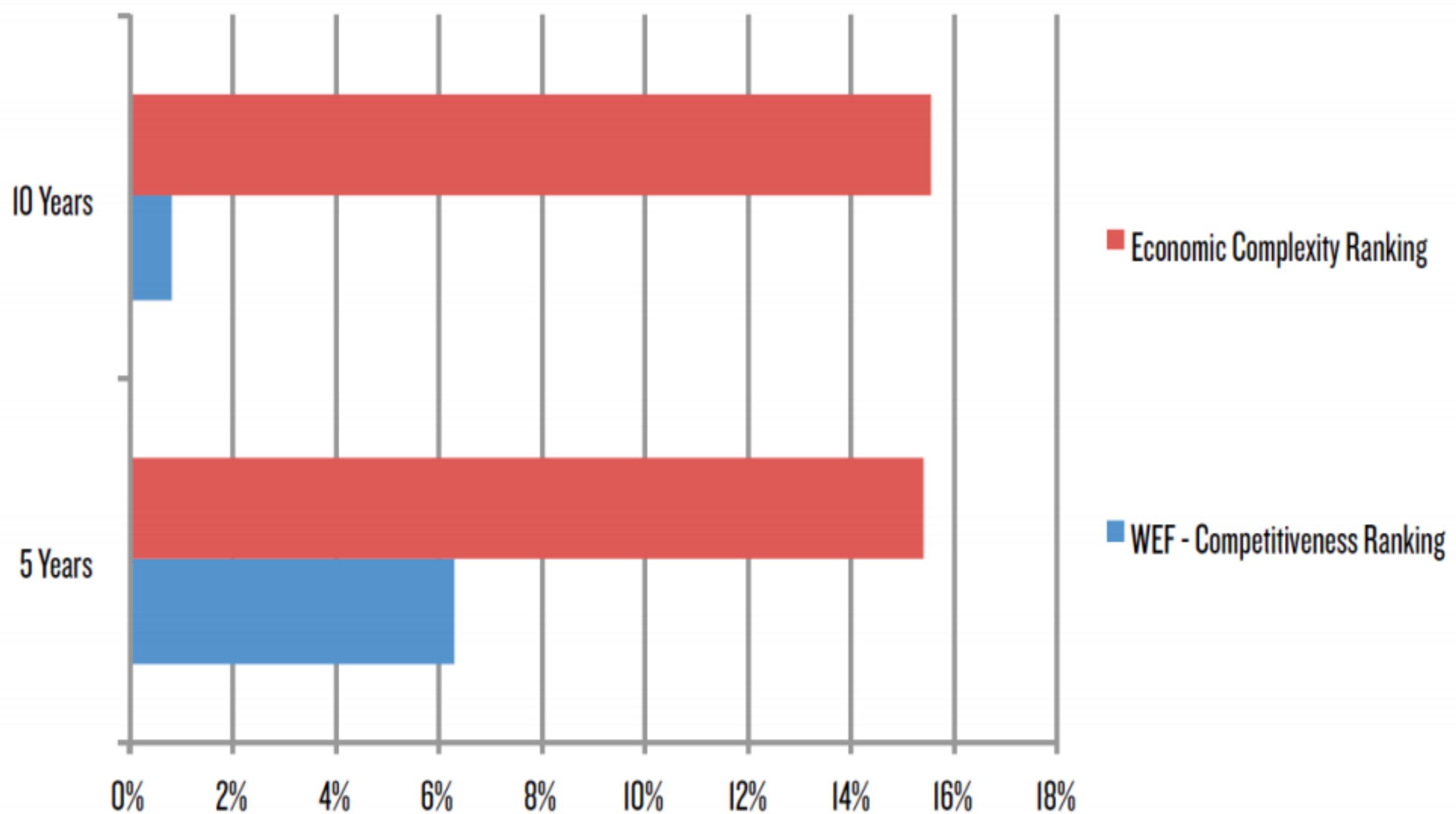
Fitness

Ranking

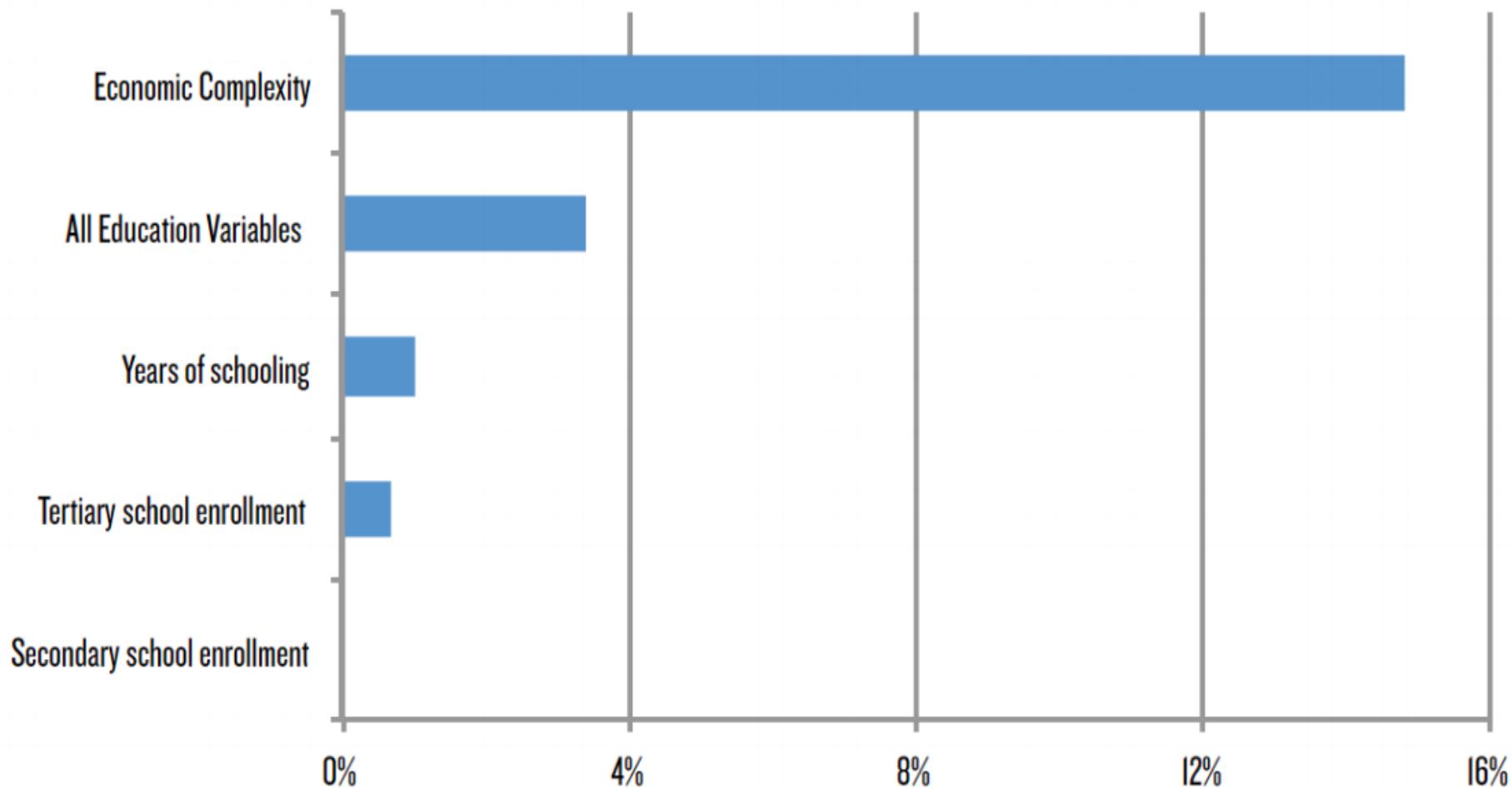


Brazil

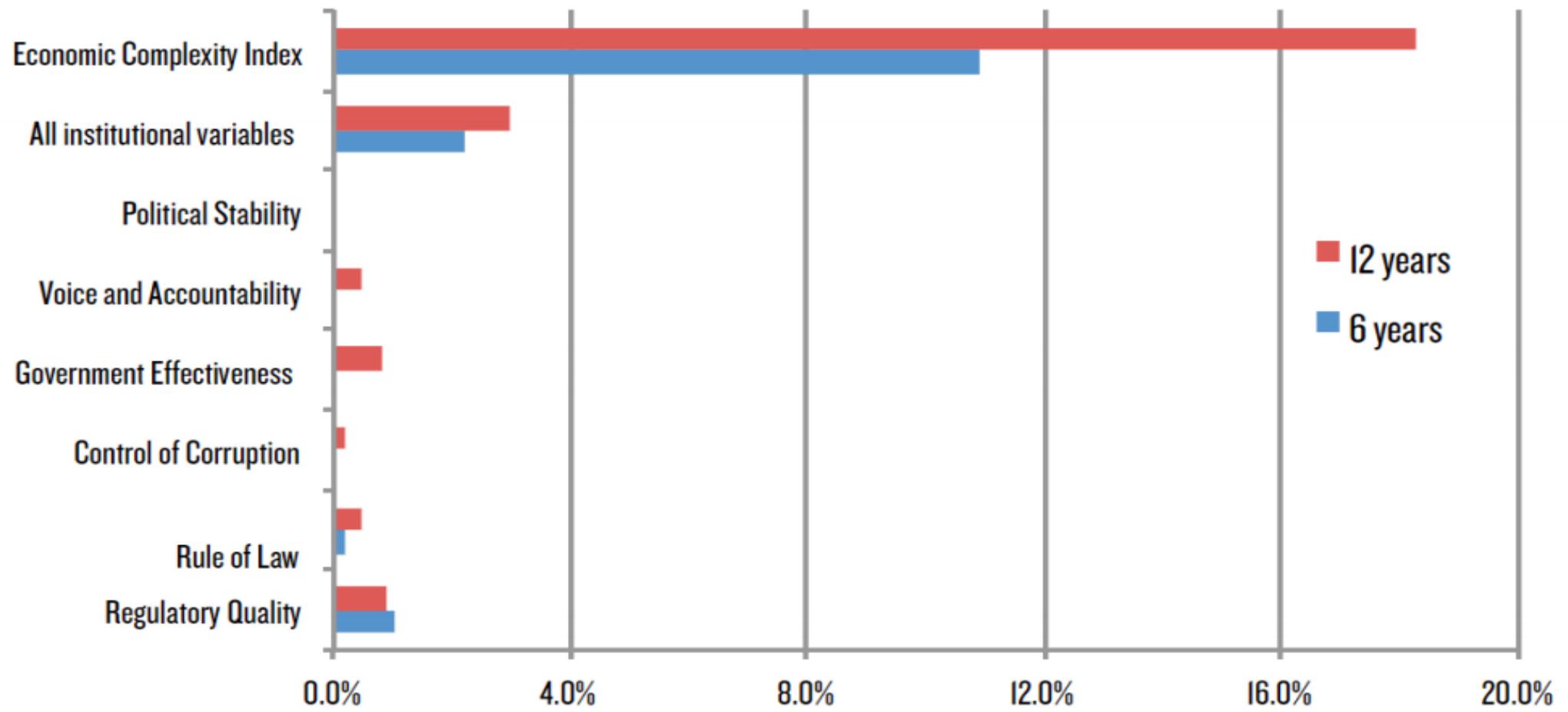
Russia



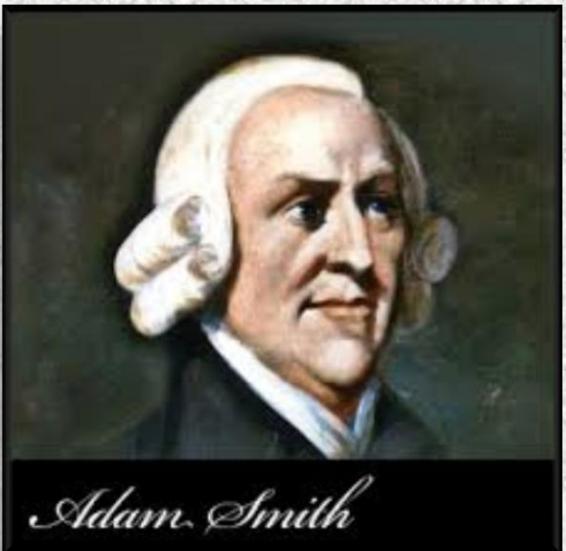
Who can account for growth?



Who can account for growth? Complexity vs. Governance



Why are countries poor (or rich?)



- When Adam Smith published his book in 1776, the richest country in the world was 4 times richer than poorest countries
- According to the World Development Indicators (2011) published by the World Bank, the poorest countries in the world in 2008 were:

US\$ per capita

At market prices

PPP

Poorest

Congo, Dem. Rep.	99	297
Burundi	111	354
Guinea-Bissau	128	497
Eritrea	147	584

X 4

Haiti	410	1088
Guinea	417	1113
Bangladesh	462	1233
Kenya	464	1470

X 4

Cape Verde	1632	3239
Turkmenistan	1705	6138
Ecuador	1746	7402
Morocco	1770	4056

X 4

Chile	6229	13370
Mexico	6591	13407
Croatia	6796	17219
Czech Republic	7632	23341

X 4

The richest

US\$ per capita
At market prices PPP

Australia	24401	33369
Belgium	25055	33520
Germany	25420	33665
Canada	26143	36039

Hong Kong, China	34587	40599
Switzerland	37789	37780
United States	38206	43179
Japan	40481	31484
Norway	42684	49711

"Truly awesome . . . brilliant in its simplicity and power." —Steven Levitt, coauthor of *Freakonomics*

THE ORIGINS OF POWER, PROSPERITY, AND POVERTY

WHY NATIONS FAIL

DARON ACEMOGLU JAMES A. ROBINSON



SAN MIGUEL

LA MUCHAS ENTRAN A LA RÍO A LA RÍO.

EL ESTUDIO que una fundación alemana realizó en 2010 en el que se examinaron más de 100 países, incluyendo el que más desarrollo económico tiene y el que más no tiene, muestra que las economías más prósperas son las que tienen más libertad y menor desigualdad. Los economistas Daron Acemoglu y James A. Robinson, autores de este libro, sostienen que la libertad y la igualdad entre los ciudadanos es la base para la prosperidad. A través de la historia, han visto que las élites ricas y poderosas, que controlan las instituciones políticas y económicas, crean un sistema que favorece a su clase social, creando desigualdades y limitando las libertades de la sociedad.

Asimismo, el libro explica al sistema de una economía de mercado y distingue medianamente entre la economía de mercado y la economía de Estado. La diferencia entre ambas esencialmente es que la economía de mercado es más eficiente y más dinámica, ya que las empresas compiten entre sí para ofrecer mejores servicios y precios más bajos. La economía de Estado, por otro lado, es más estatalizada y centralizada, lo que significa que el gobierno controla más aspectos de la economía, como la producción de bienes y servicios y la regulación de las empresas.

En resumen, el libro argumenta que la libertad y la igualdad entre los ciudadanos son las claves para la prosperidad y el desarrollo sostenible. Al final, el lector se pregunta si el mundo ha aprendido la lección.

ESTRUCTURA: El libro se divide en tres partes principales: la primera parte examina las raíces históricas del desarrollo económico; la segunda parte analiza las diferencias entre las economías de mercado y las economías de Estado; y la tercera parte examina las estrategias para promover la prosperidad y el desarrollo sostenible en todo el mundo.

ESTRATEGIAS: El libro sugiere que para promover la prosperidad y el desarrollo sostenible, es necesario garantizar la libertad y la igualdad entre los ciudadanos. Esto implica la protección de los derechos humanos, la eliminación de la corrupción y la promoción de la transparencia en el gobierno. También es importante fomentar la innovación y la creatividad, así como la educación y la formación profesional.

CONCLUSIONES: El libro concluye con la idea de que la libertad y la igualdad entre los ciudadanos son las bases para la prosperidad y el desarrollo sostenible. Al final, el lector se pregunta si el mundo ha aprendido la lección.



Two Nogales

Mexico



USA



Productivity per worker in US\$

The least productive

Guerrero

5281

Honduras



X 2

Sinaloa

10945

Jamaica



X 2

Guanajuato

20827

Malasia



X 2

Nuevo Leon

42281

Korea



Productivity per worker in US\$

The least productive

Guerrero 5281 Honduras

x 2

Sinaloa 10945 Jamaica

x 2

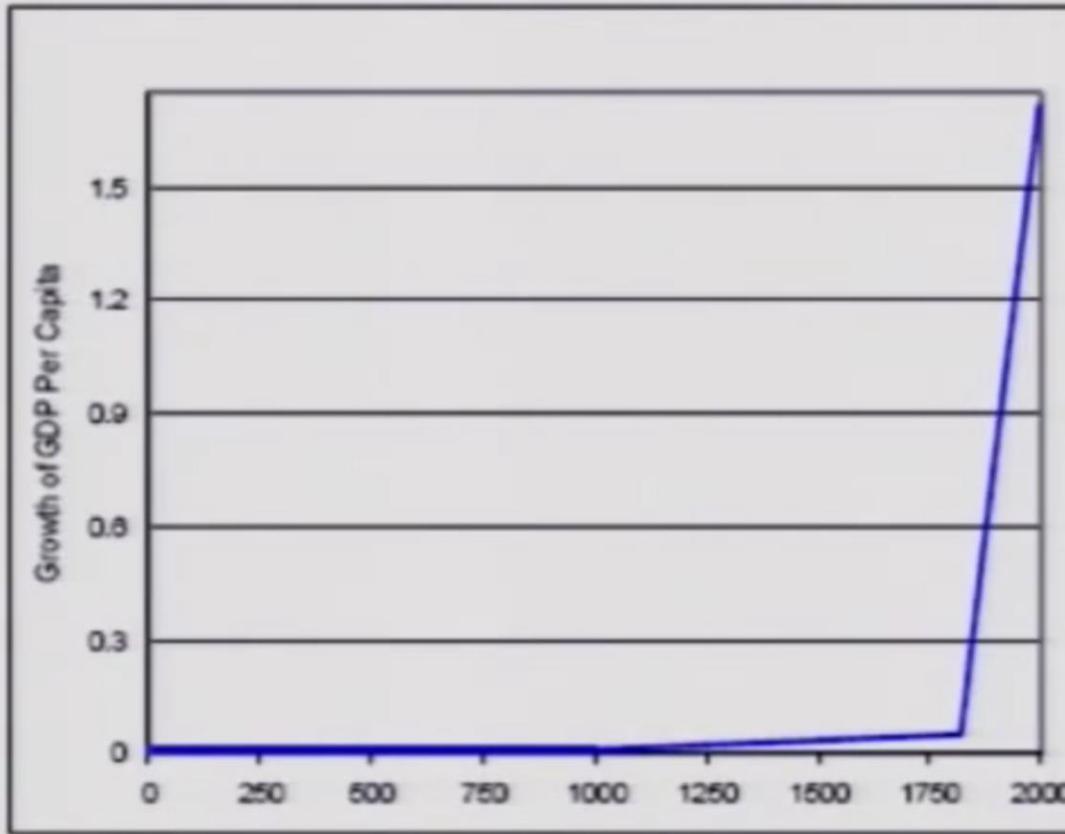
Guanajuato 20827 Malasia

x 2

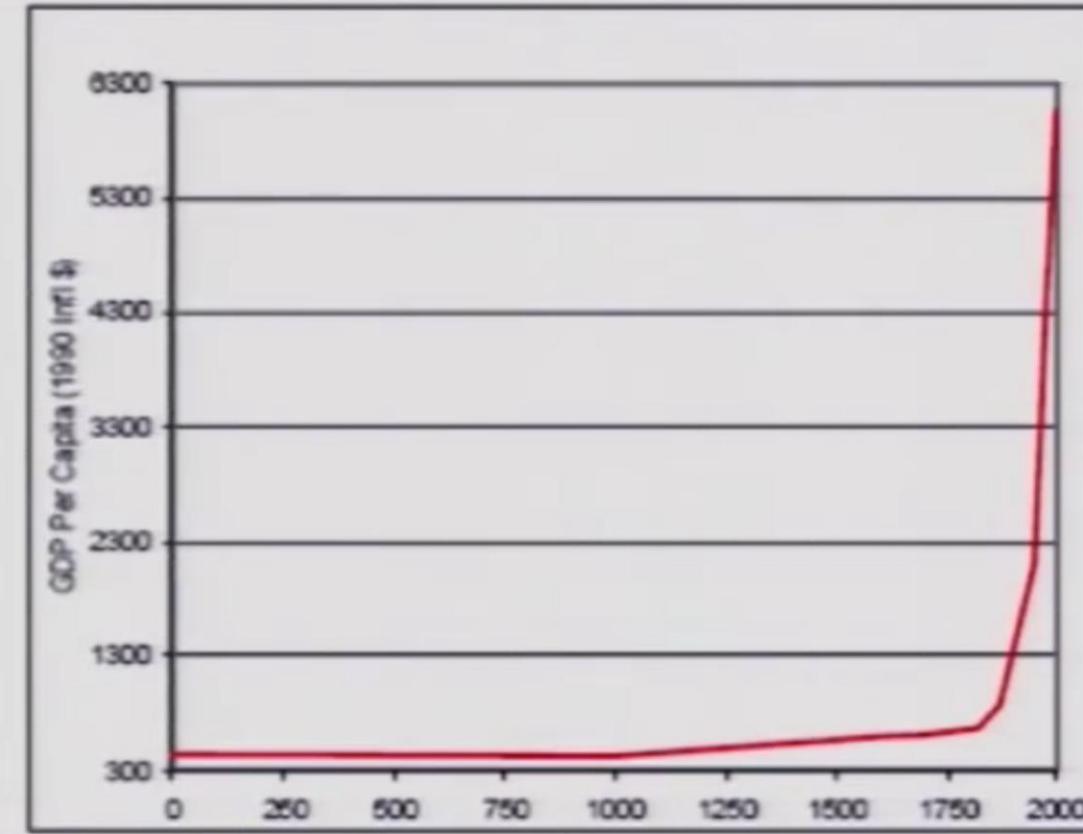
Nuevo Leon 42281 Korea

انفجار رشد درآمد سرانه

Average Annual growth of GDP Per Capita



GDP Per Capita

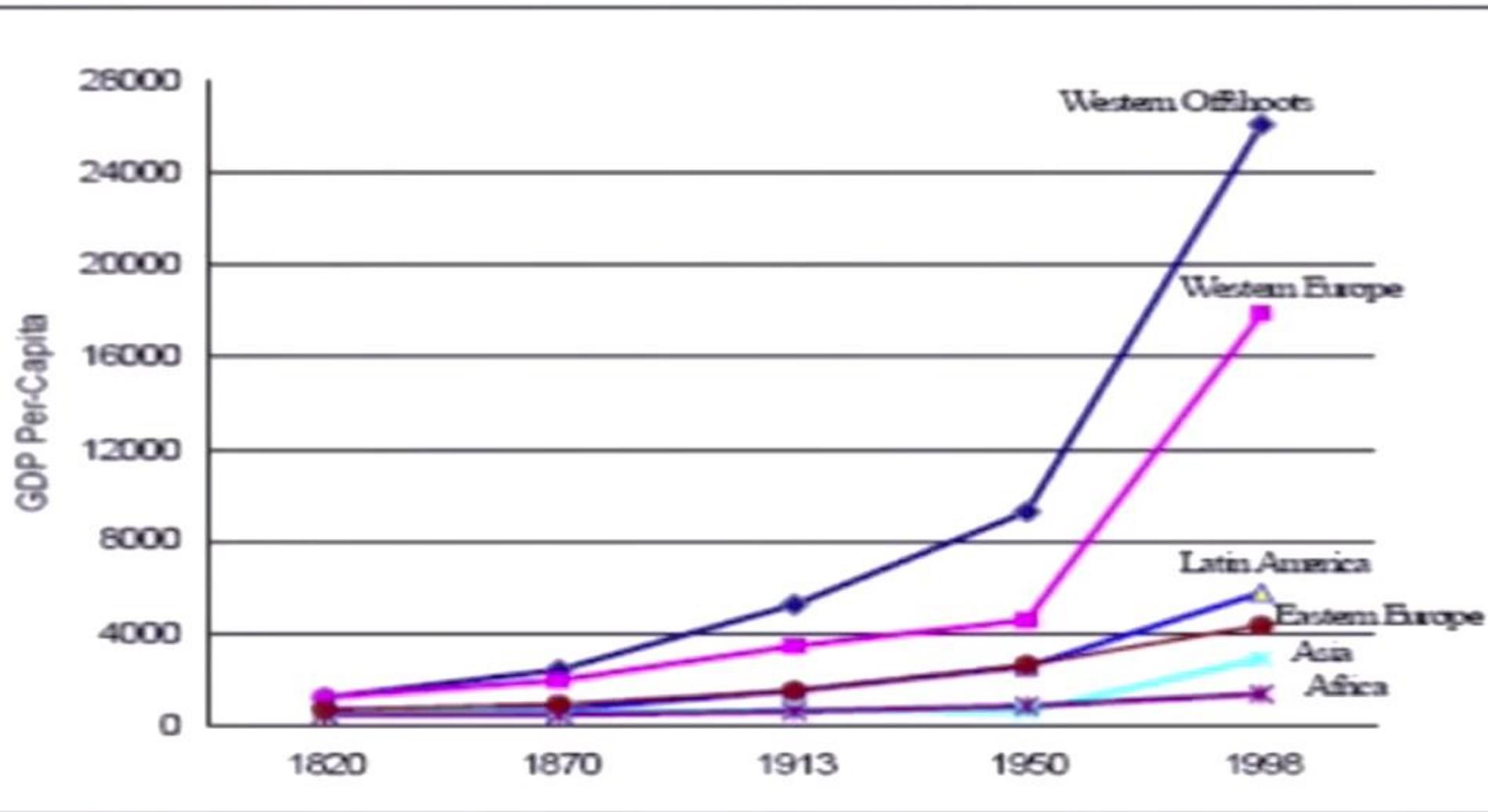


سیر درآمد سرانه جهان در طول سالهای ۱ تا ۲۰۰۱
منبع: مادیسون (۲۰۰۳؛ ۲۰۰۱)

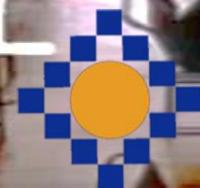
Income per capita in the US



The Great Divergence

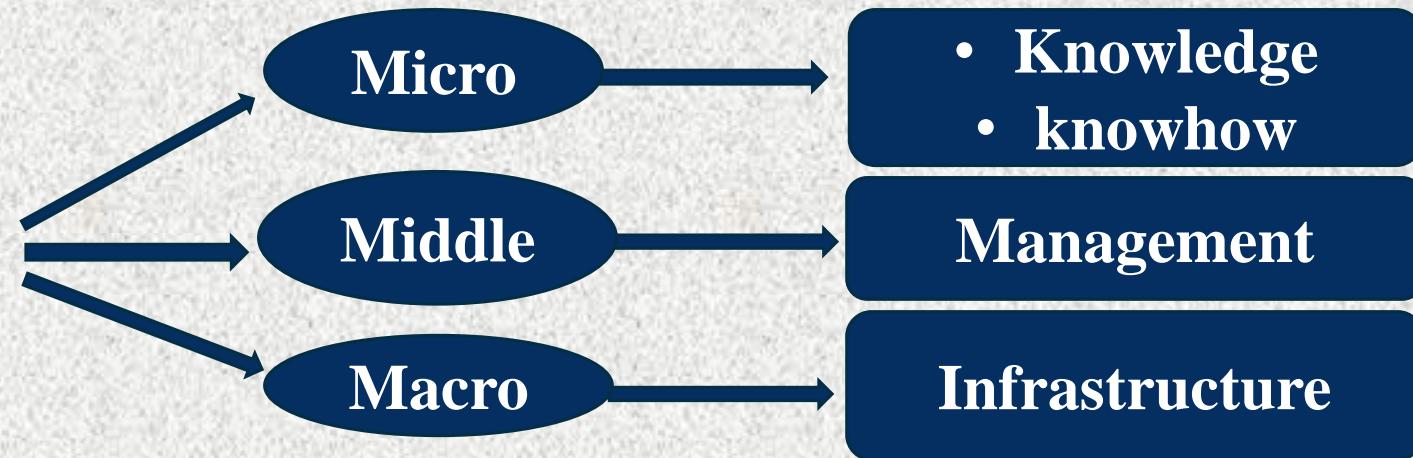


منبع: مادیسون (۲۰۰۱)

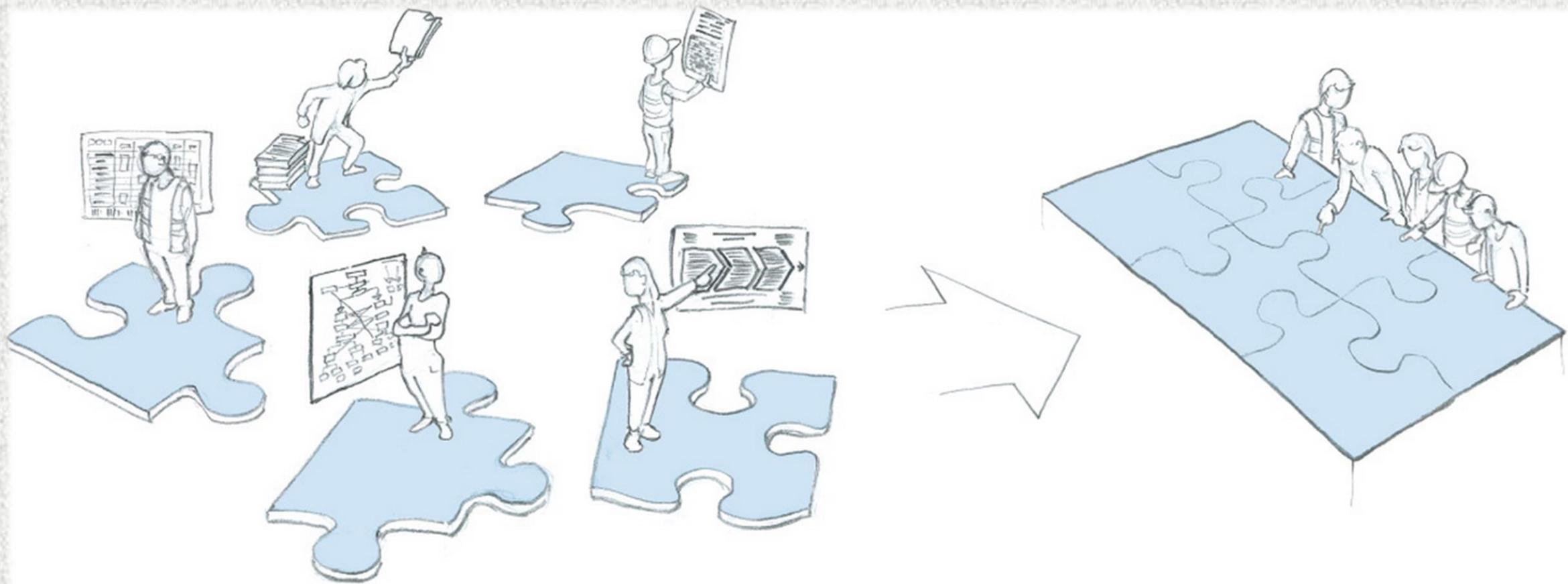


نیزت عینم تجیات و فادری
مرعیات میاست علی اکبر

► Capabilities



Personbyte and Firmbyte Theory

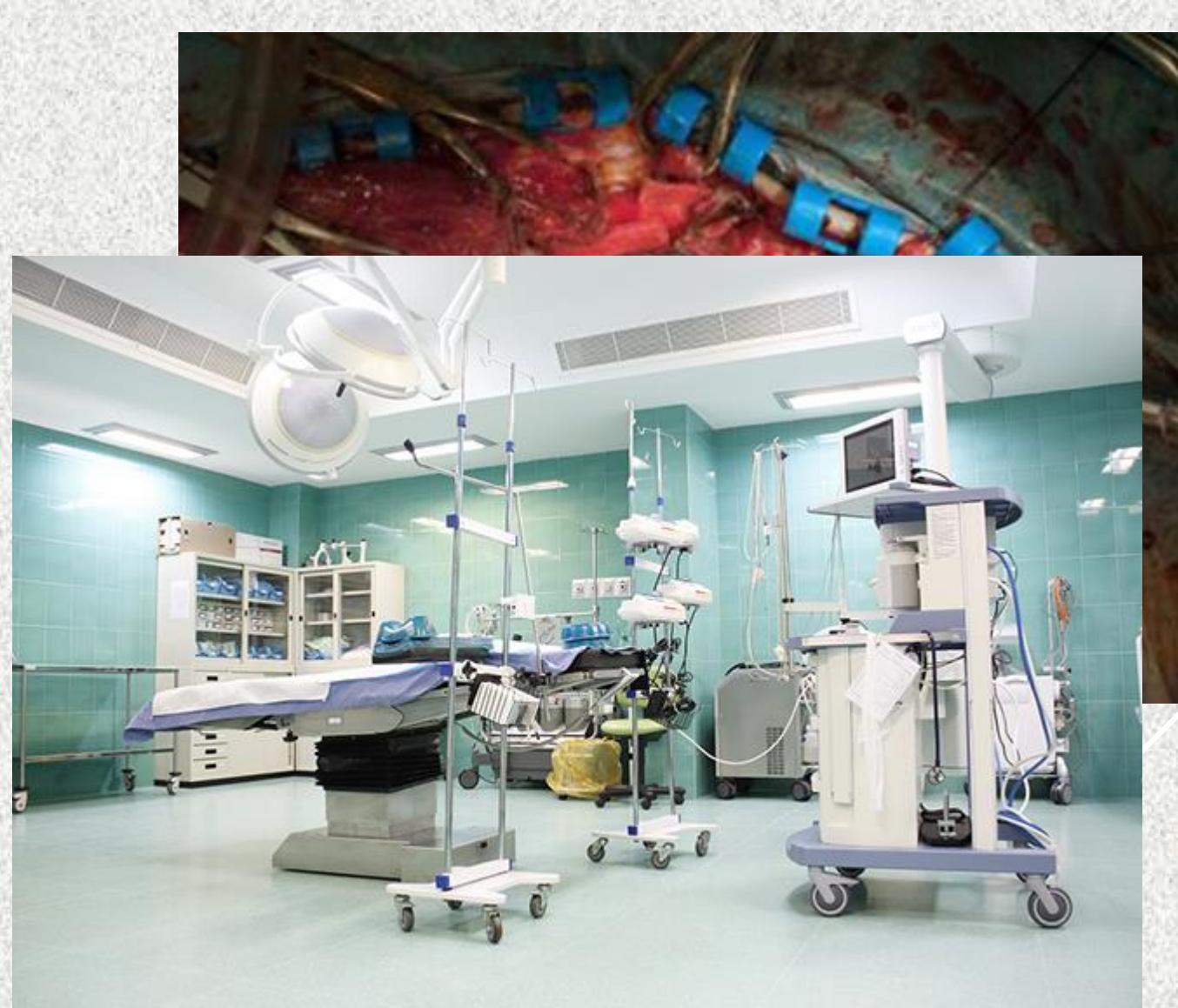
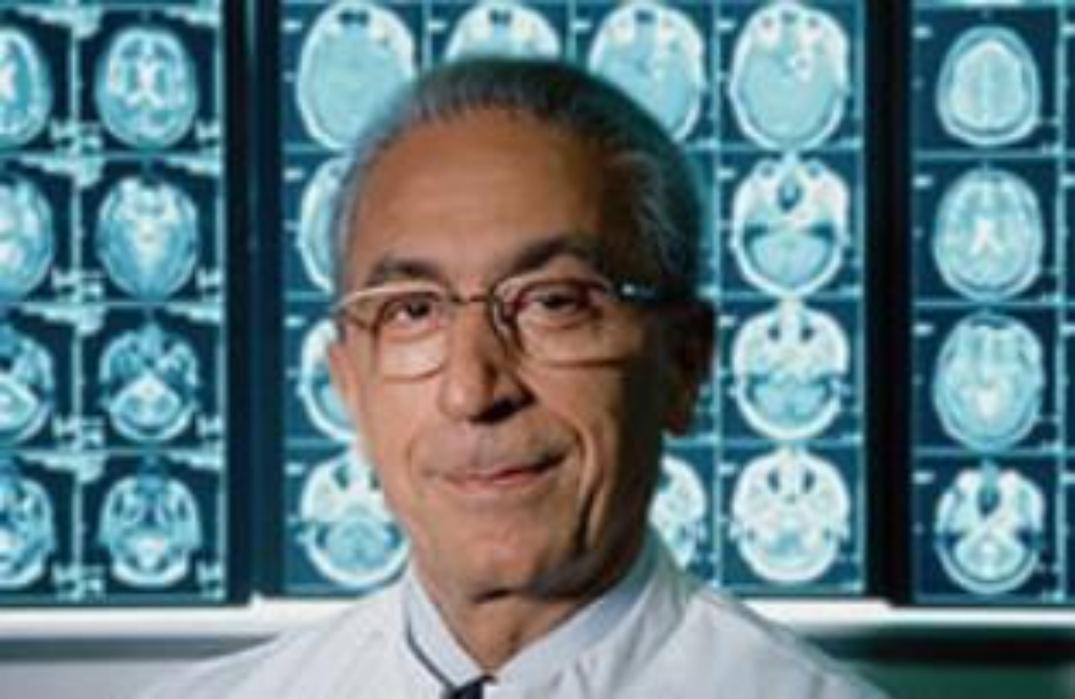








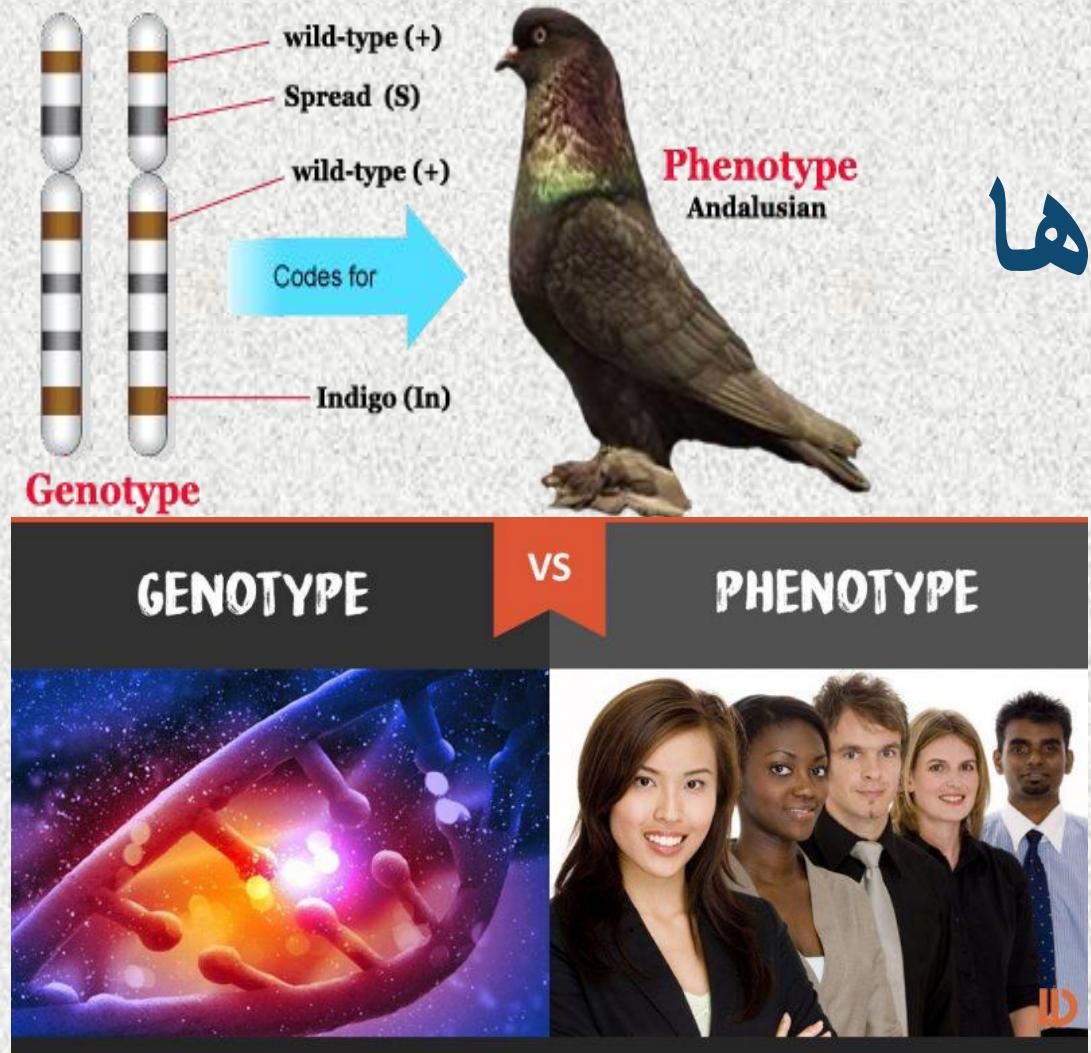




**How to measure
Personbyte
or
Capabilities
in a country?**



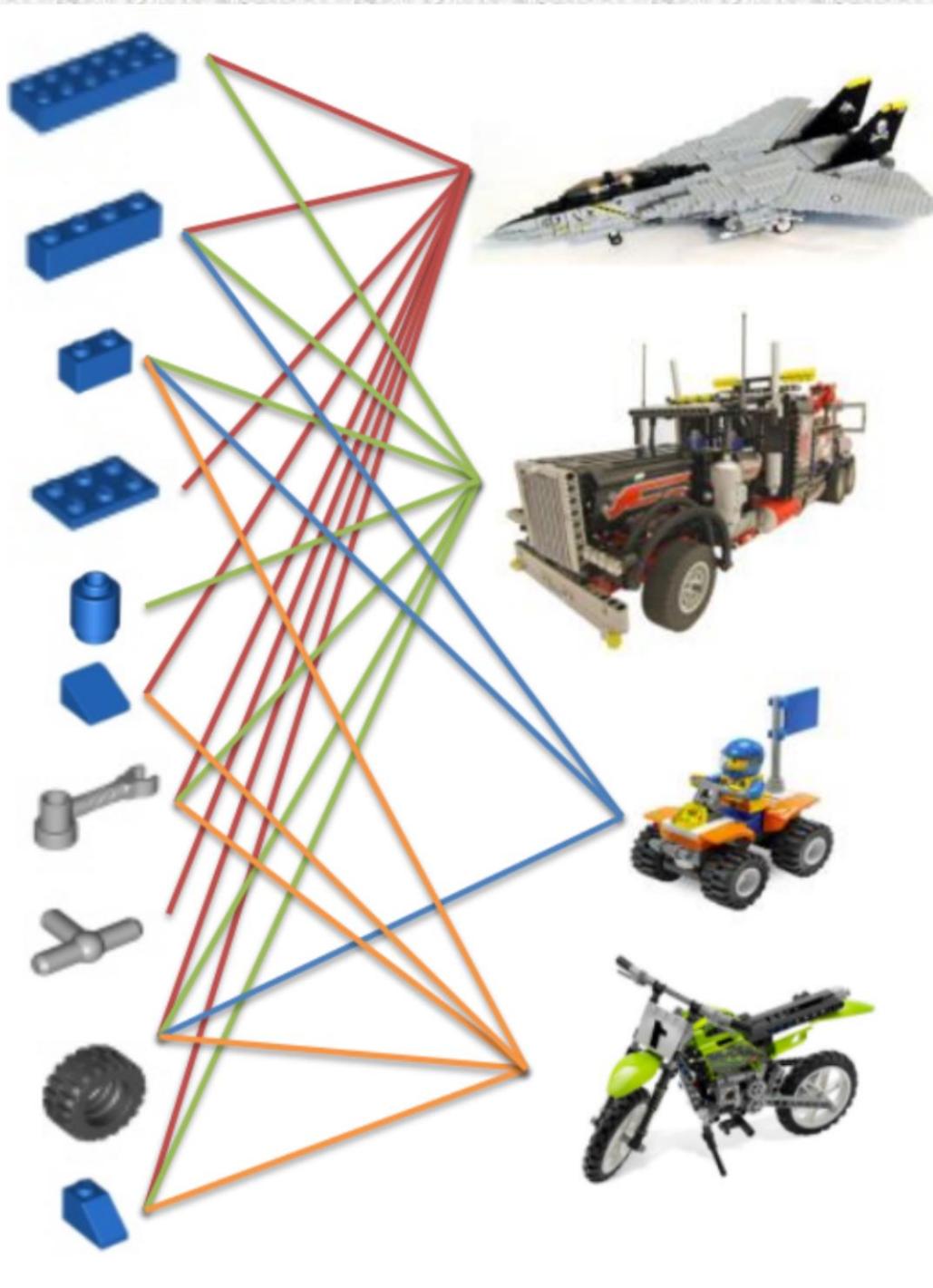
اگر ساخت یک محصول، نیازمند نوع خاصی از قابلیت ها یا نفربایت باشد، آنگاه می‌توان نتیجه گرفت که کشورهایی که آن محصول را تولید می‌کنند قابلیت ها یا نفربایت های مورد نیاز برای تولید آن را نیز دارند. (هیدالگو، 2015)



اندازه گیری حجم قابلیت ها

از فنوتیپ به ژنوتیپ

اگر ساخت یک محصول، نیازمند نوع خاصی از قابلیت ها یا نفربایت ها باشد، آنگاه می توان نتیجه گرفت که کشورهایی که آن محصول را تولید می کنند قابلیت ها یا نفربایت های مورد نیاز برای تولید آن را نیز دارند. (هیدالگو، 2015)





Countries

capabilities

Products



Countries

Products

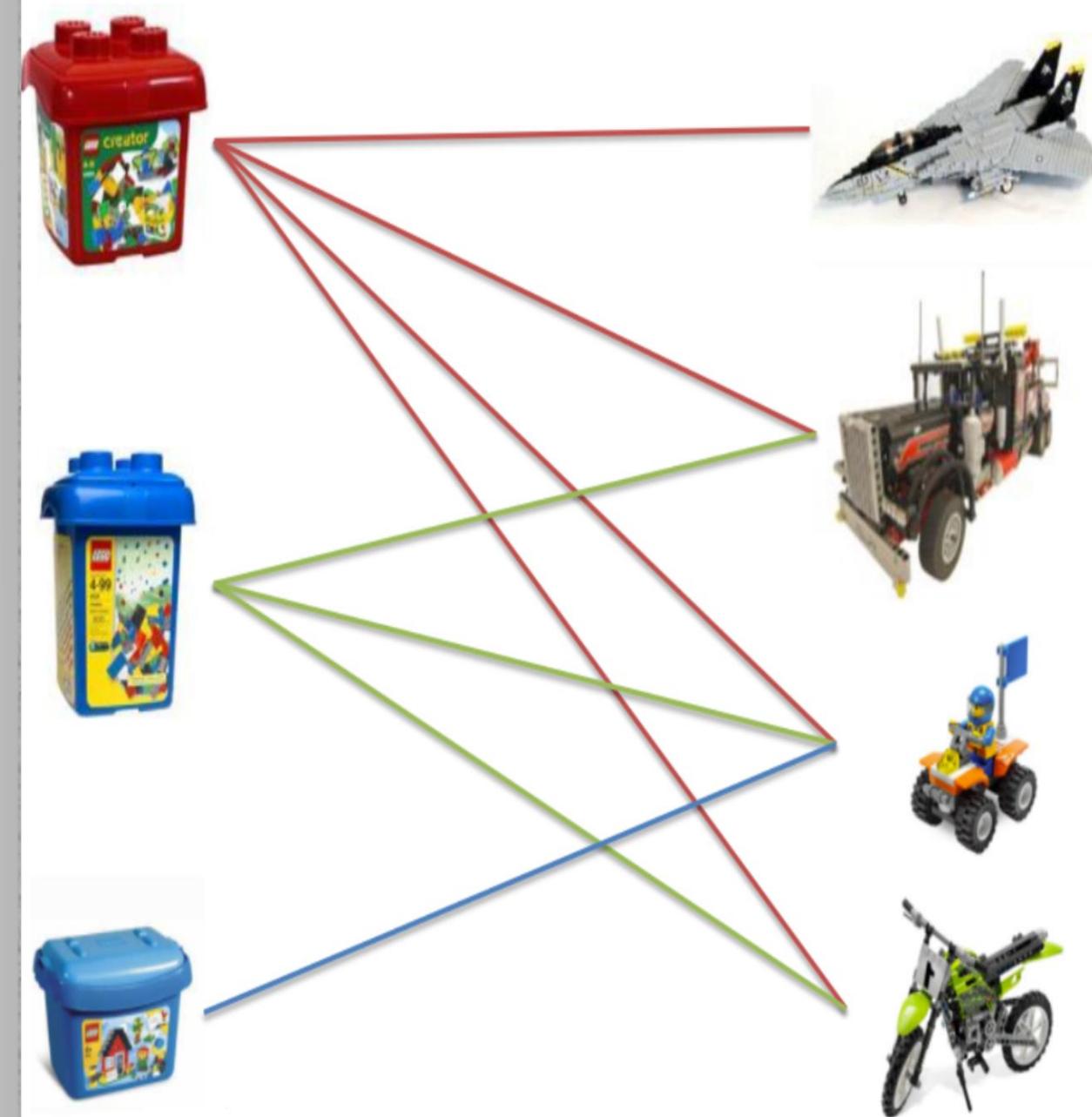


TABLE : TOP 5 PRODUCTS BY COMPLEXITY

Product Code (SITC4)	Product Name	Product Community	Product Complexity Index
7284	Machines & appliances for specialized particular industries	Machinery	 2.27
8744	Instrument & appliances for physical or chemical analysis	Chemicals & Health	 2.21
7742	Appliances based on the use of X-rays or radiation	Chemicals & Health	 2.16
3345	Lubricating petrol oils & other heavy petrol oils	Chemicals & Health	 2.10
7367	Other machine tools for working metal or metal carbide	Machinery	 2.05

TABLE : BOTTOM 5 PRODUCTS BY COMPLEXITY

Product Code (SITC4)	Product Name	Product Community	Product Complexity Index
3330	Crude oil	Oil	 -3.00
2876	Tin ores & concentrates	Mining	 -2.63
2631	Cotton, not carded or combed	Cotton, Rice, Soy & Others	 -2.63
3345	Cocoa beans	Tropical Agriculture	 -2.61
7367	Sesame seeds	Cotton, Rice, Soy & Others	 -2.58

رتبه	نام کشور	ECI
1	ژاپن	2/26
2	سوئیس	2/17
3	کره جنوبی	2/03
4	آلمان	2/01
5	سنگاپور	1/89
.		
43	ترکیه	0/366
50	عربستان	0/171
87	ایران	-0/611
.		
124	گینه	-1/66
125	نیجریه	-1/7
126	گابن	-1/7
127	پاپوآ گینه نو	-1/73



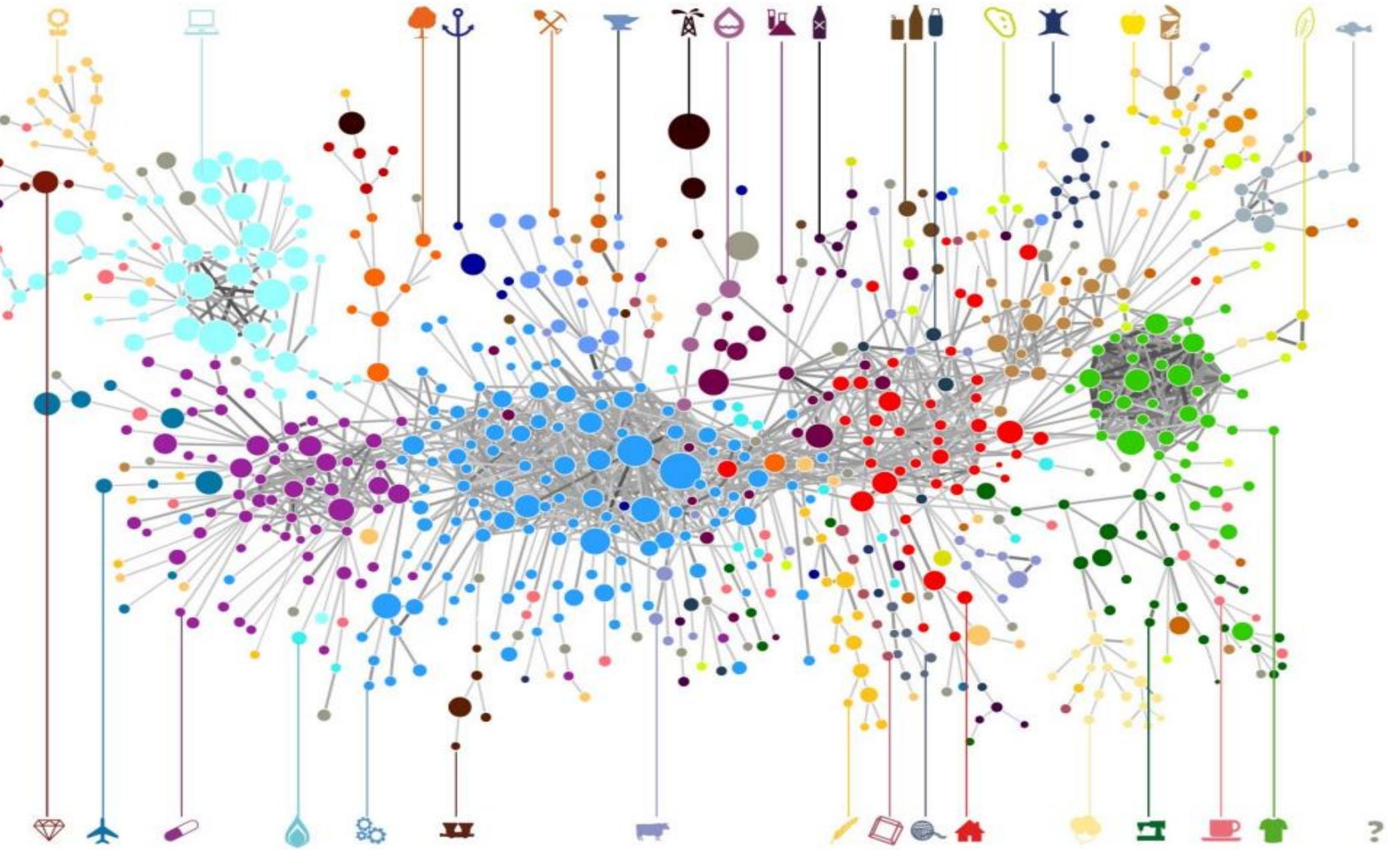
وزارت علوم تحقیقات و فناوری
مرکز تحقیقات سیاست علمی کشور



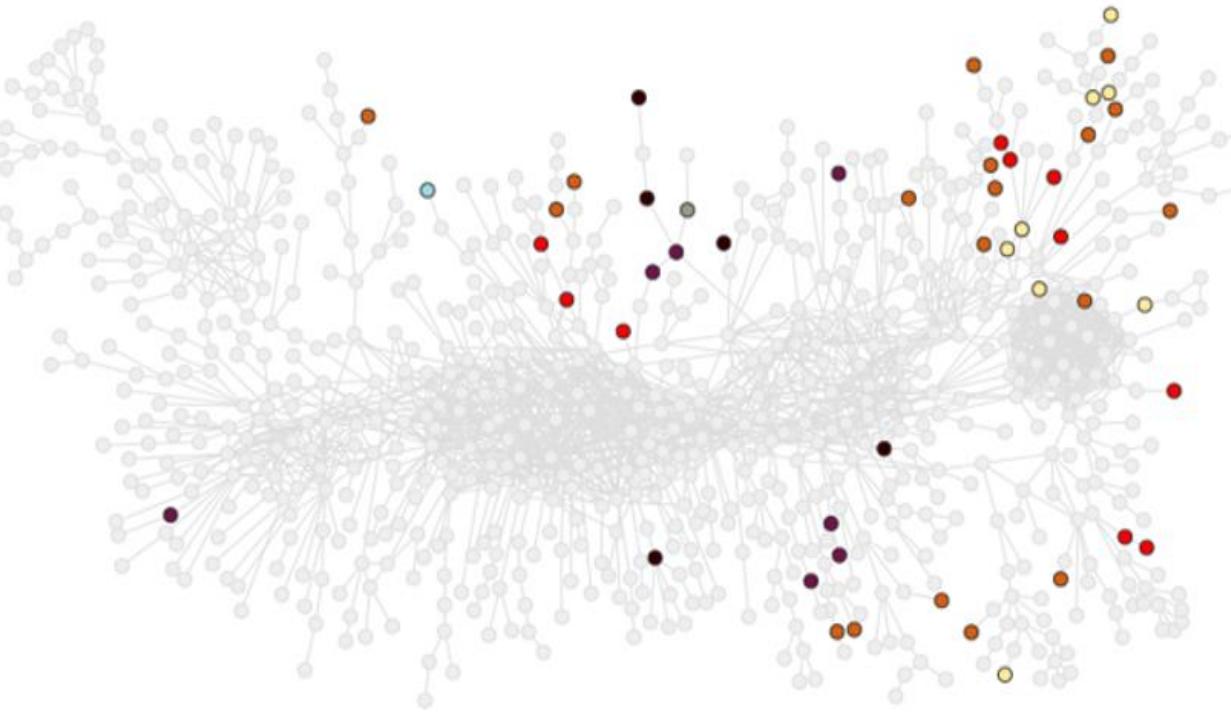
Mapping out the Forest



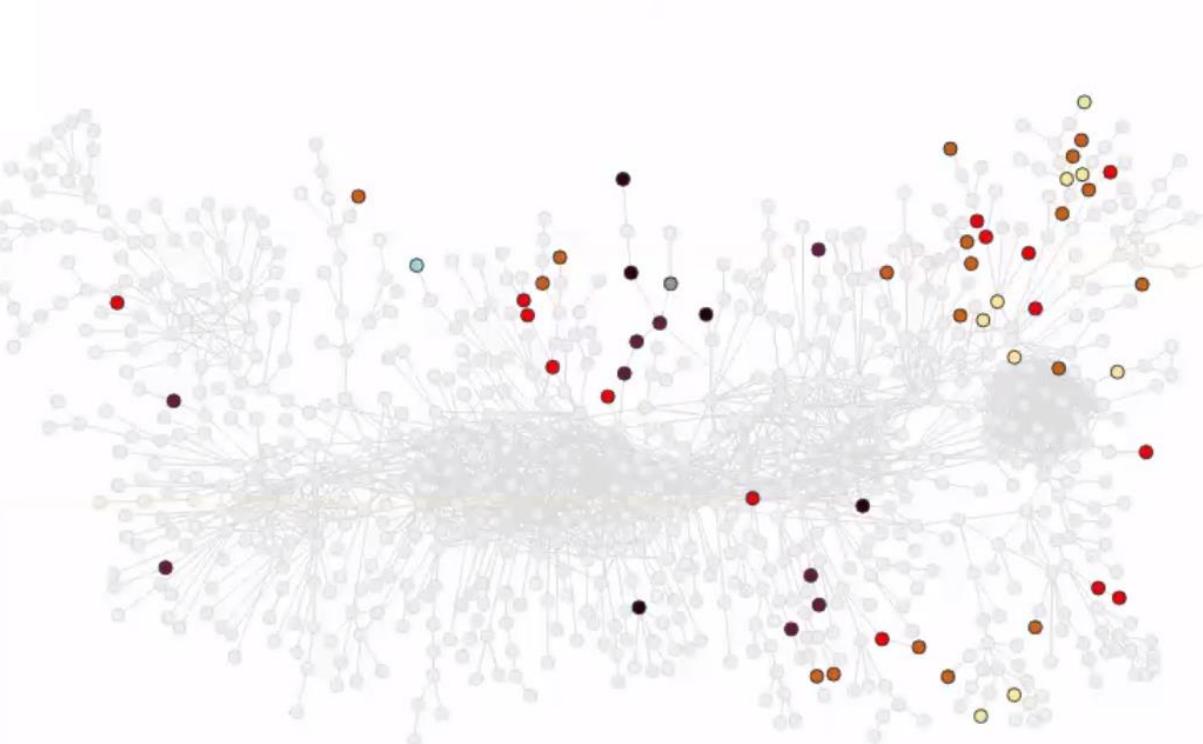
وزارت علوم، تحقیقات و فناوری
مرکز تحقیقات ساینسی علی کشور



\$62B USD



► **RCA>1**



RCA>0/5

PRODUCT SPACE OF IRAN IN 2014

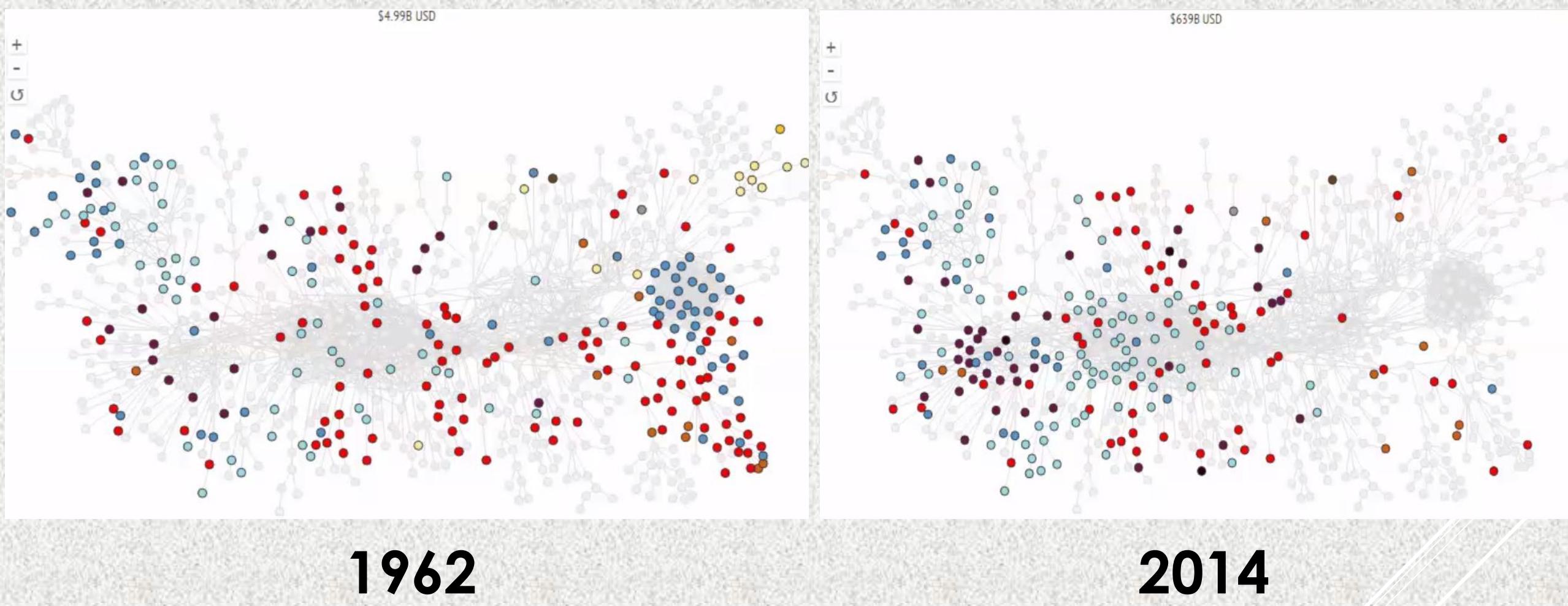




1962

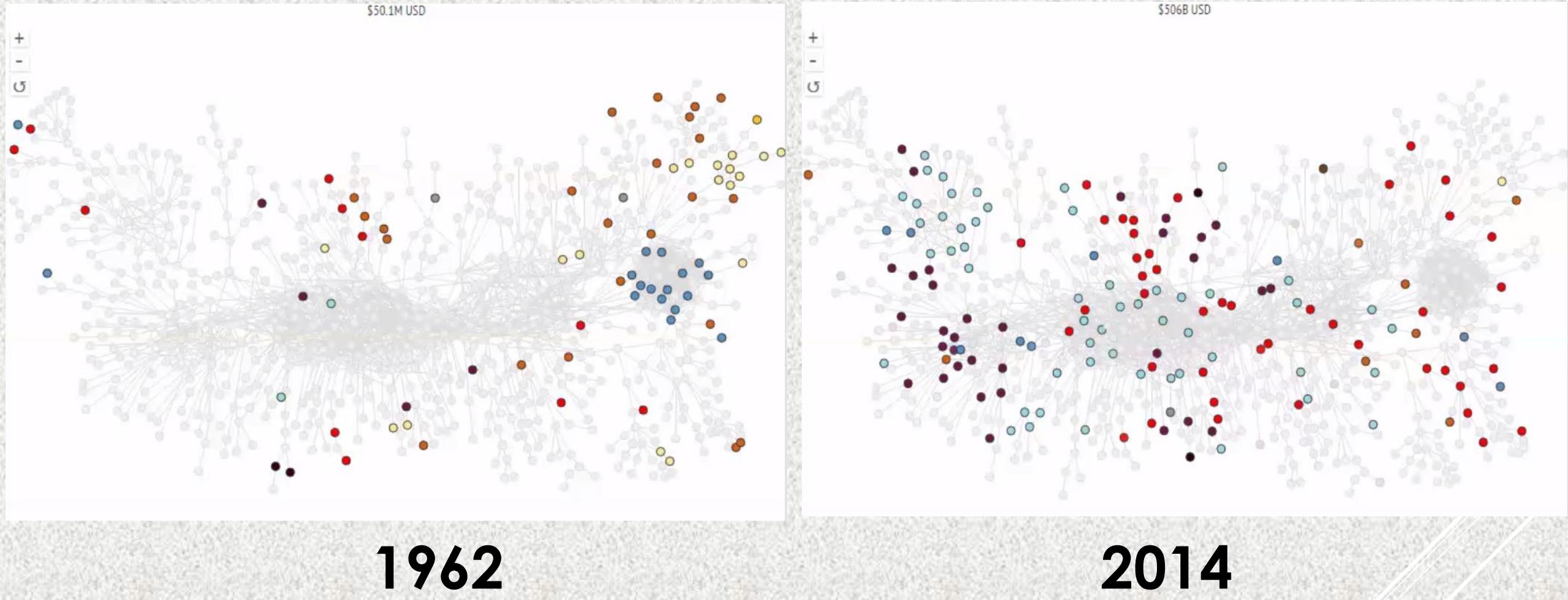
2014

SINGAPORE



JAPAN



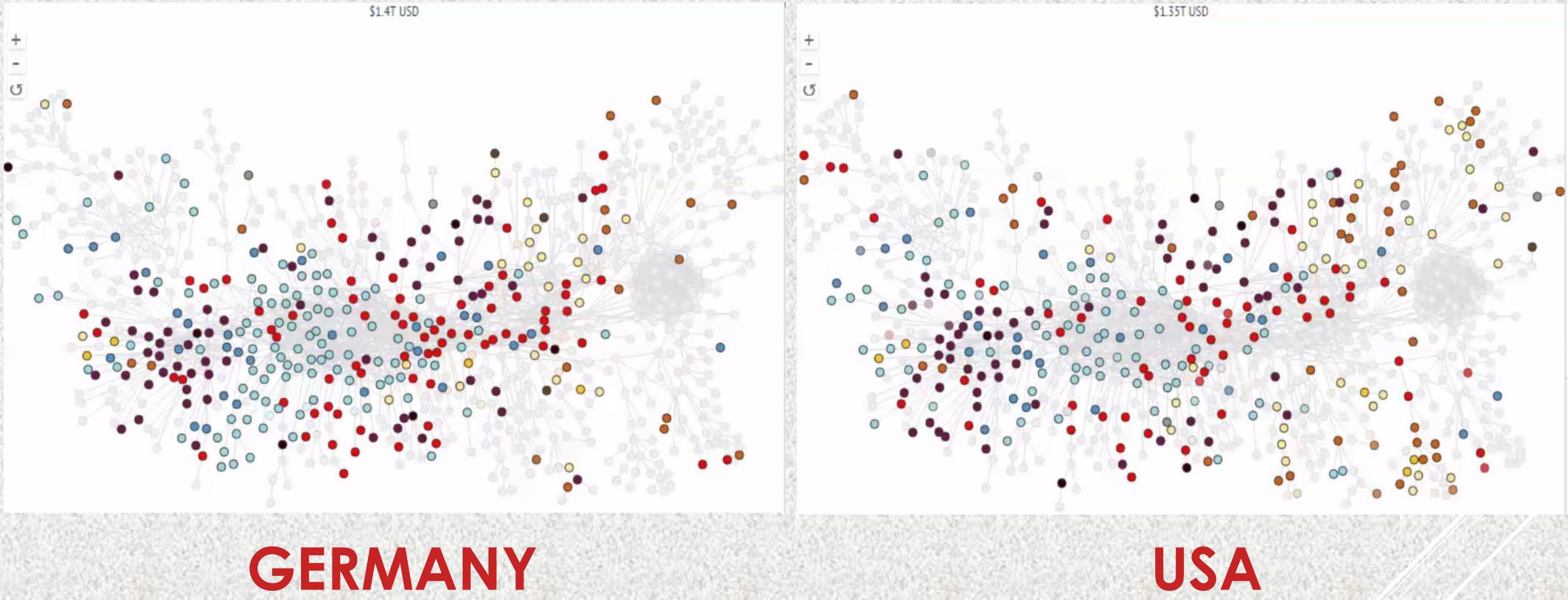


1962

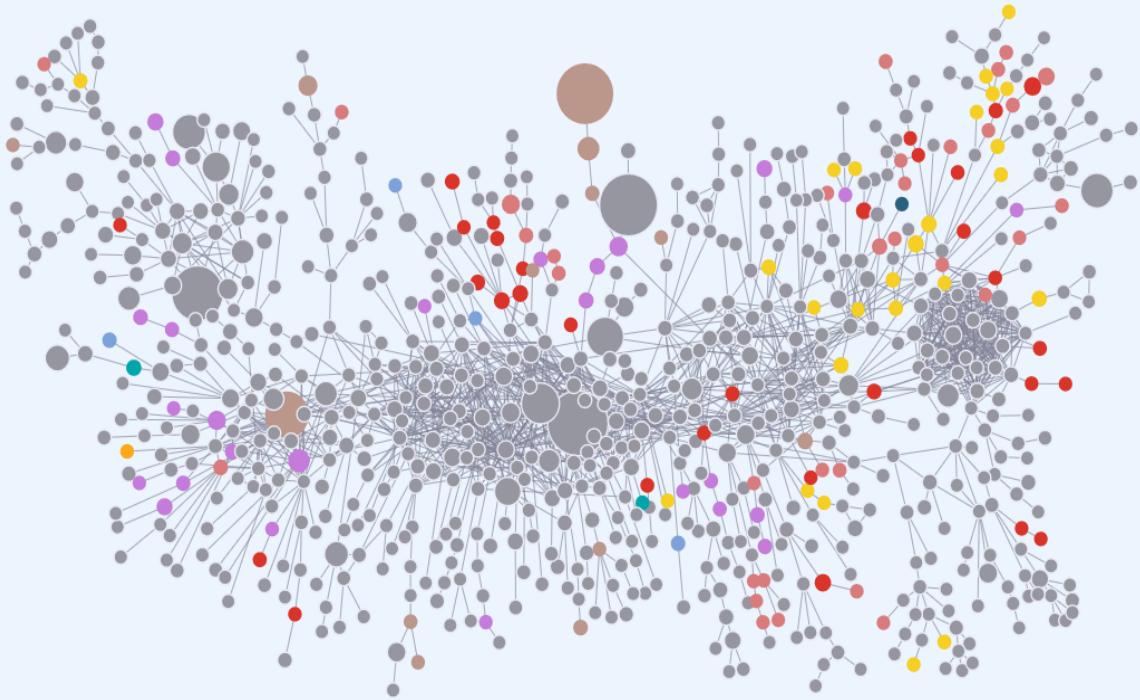
2014

KOREA



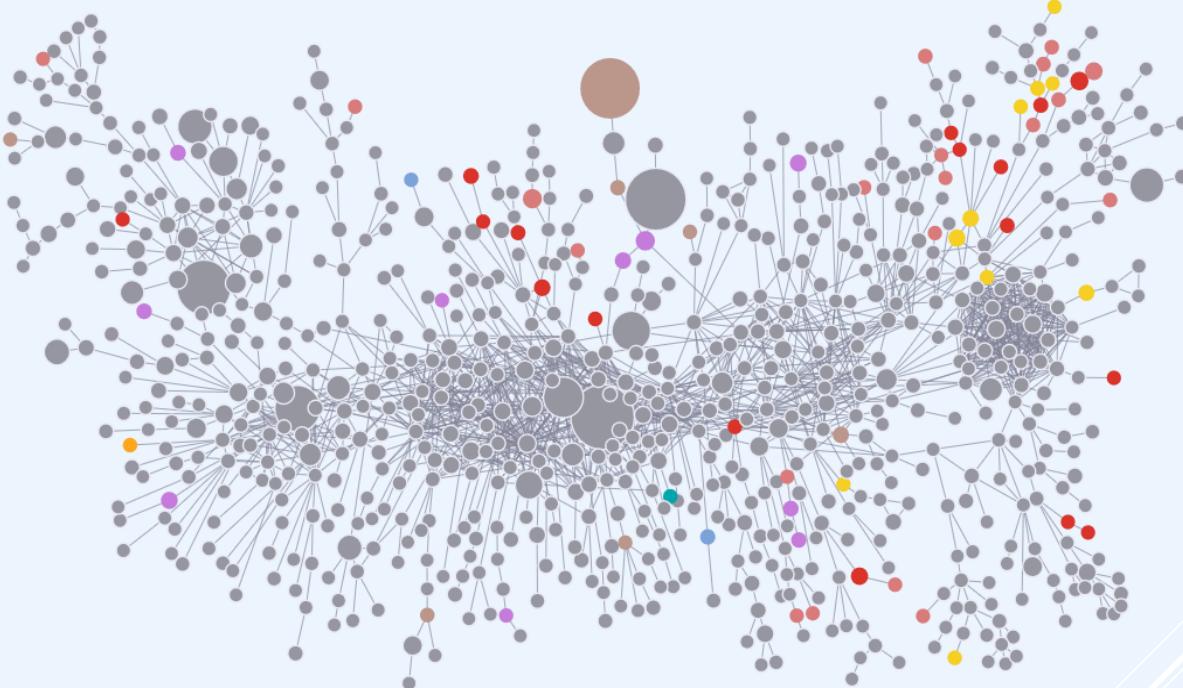


\$45.6B



RCA>0.2

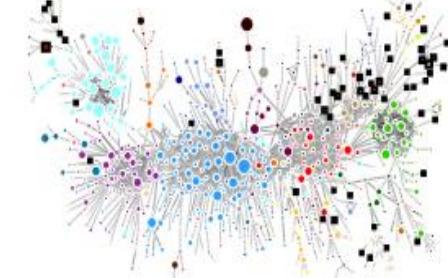
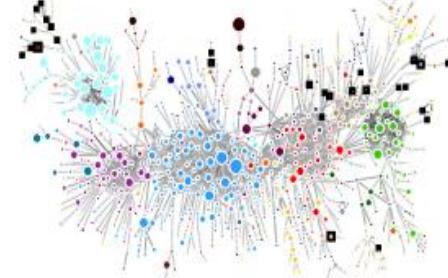
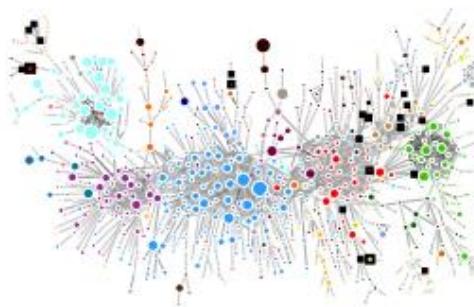
\$45.6B



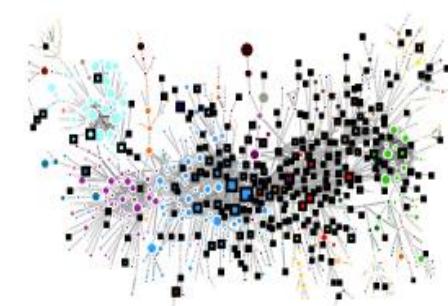
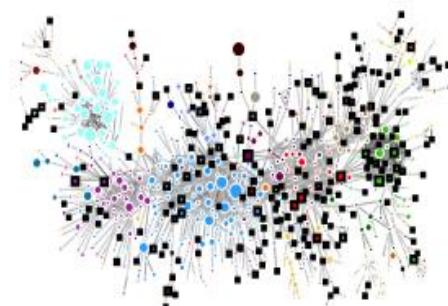
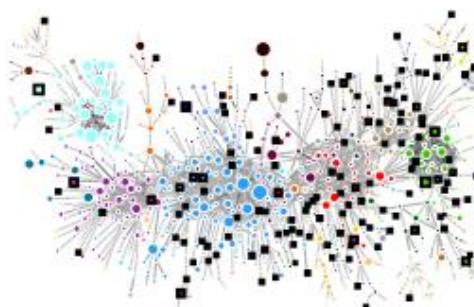
RCA>1

ELECTRONICS
MACHINERY
AIRCRAFT
BOILERS
SHIPS
METAL PRODUCTS
CONSTR. MATL. & EOPT.
HOME & OFFICE
PULP & PAPER
CHEMICALS & HEALTH
AGROCHEMICALS
OTHER CHEMICALS
INOR. SALTS & ACIDS
PETROCHEMICALS
LEATHER
MILK & CHEESE
ANIMAL FIBERS
MEAT & EGGS
FISH & SEAFOOD
TROPICAL AGRIC.
CEREALS & VEG. OILS
COTTON/RICE/SOY & OTHERS
TOBACCO
FRUIT
MISC. AGRICULTURE
NOT CLASSIFIED
TEXTILE & FABRICS
GARMENTS
FOOD PROCESSING
BEER/SPRITS & CIGS.
PRECIOUS STONES
COAL
OIL
MINING

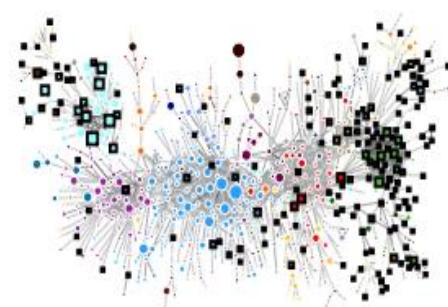
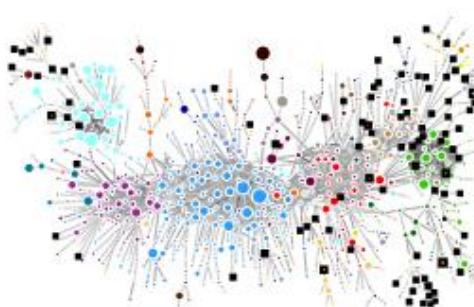
GHANA



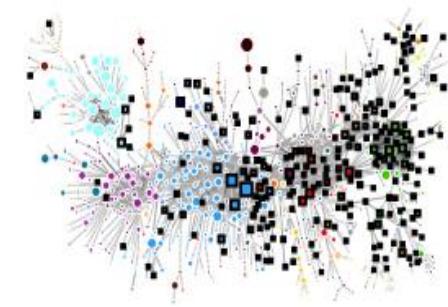
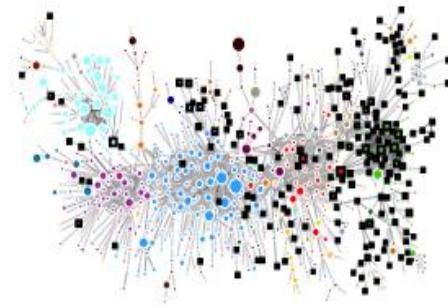
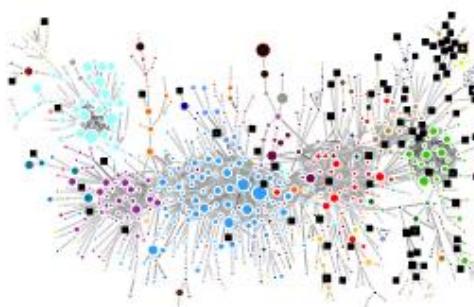
POLAND



THAILAND



TURKEY



THE BIRTH OF SUCCESSFUL INDUSTRIES

STEVEN KLEPPER

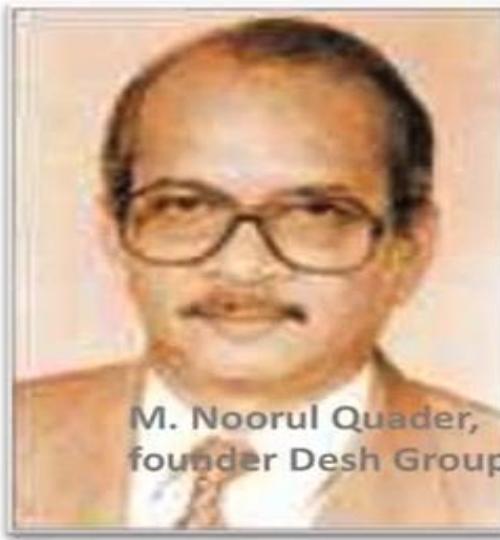
NEW INDUSTRIES...

- A successful firm is established
- Employees learn from the firm
- Employees leave the firm to set up new firms
- Spin-offs are often much more successful than other firms...
- ... and generate a new wave of spin-offs

= A CLUSTER OF HIGH PERFORMING FIRMS ARISE



TEXTILES IN DHAKA



M. Noorul Quader,
founder Desh Group

- 1979: Desh sends 126 Bangladeshi workers for a 6 month intensive training in Korea
- 1988: 56 spin-off companies by Dash workers have been established

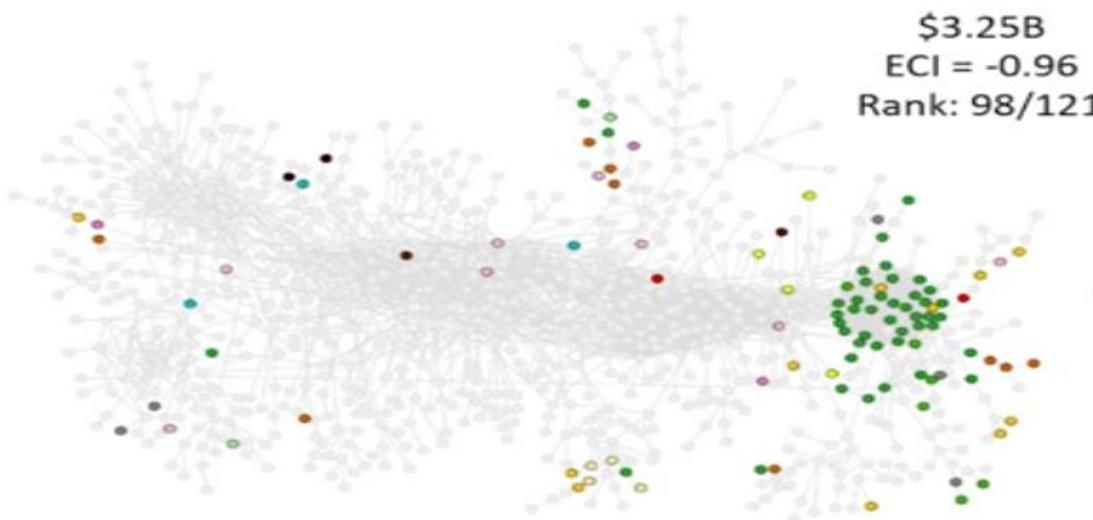
(Klepper and Mostafa, 2011)



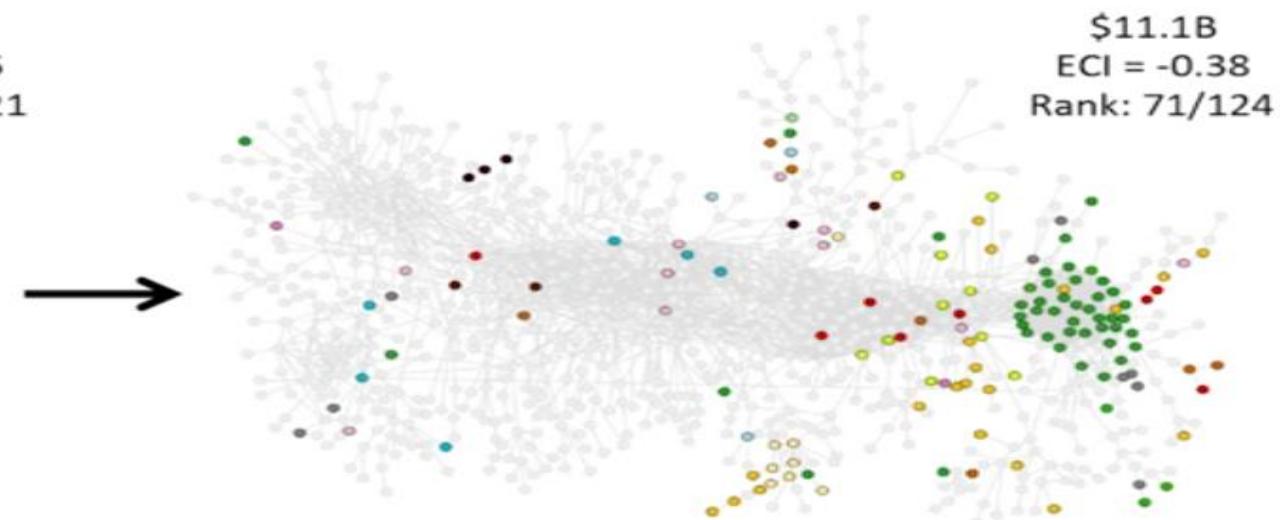
وزارت علوم تحقیقات و فناوری
کٹور
مرکز تحقیقات سیاست علمی کشور

Sri Lanka is not on the path of Vietnam

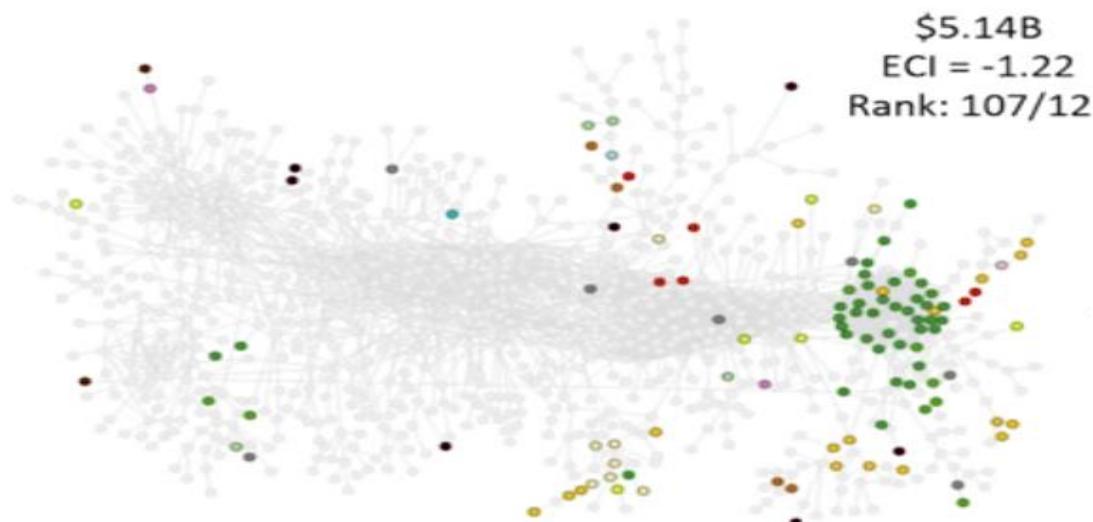
Sri Lanka's Exports, 1995



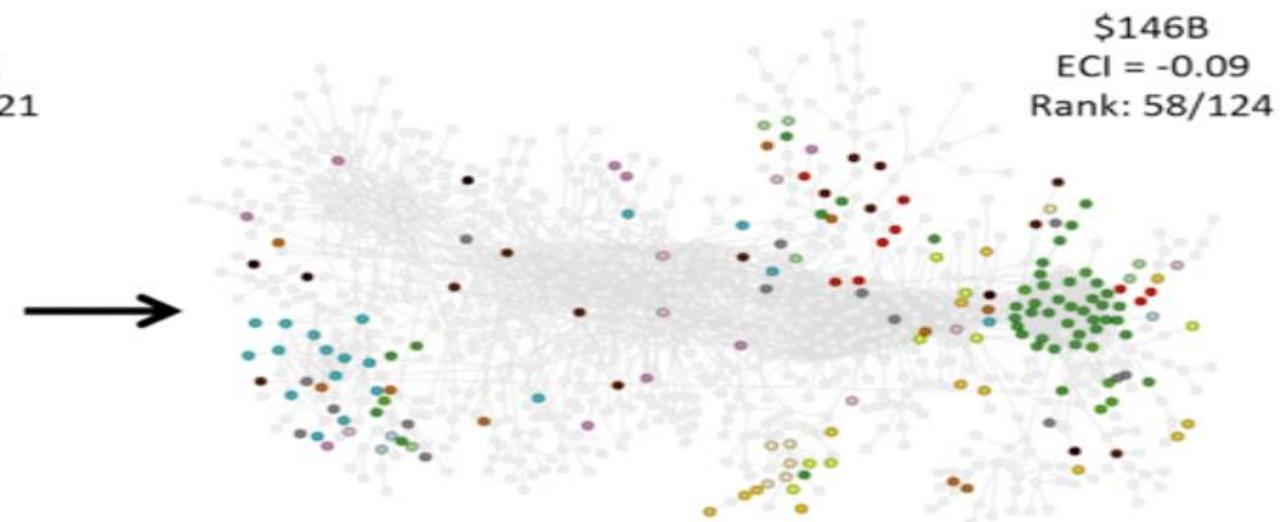
Sri Lanka's Exports, 2014



Vietnam's Exports, 1995



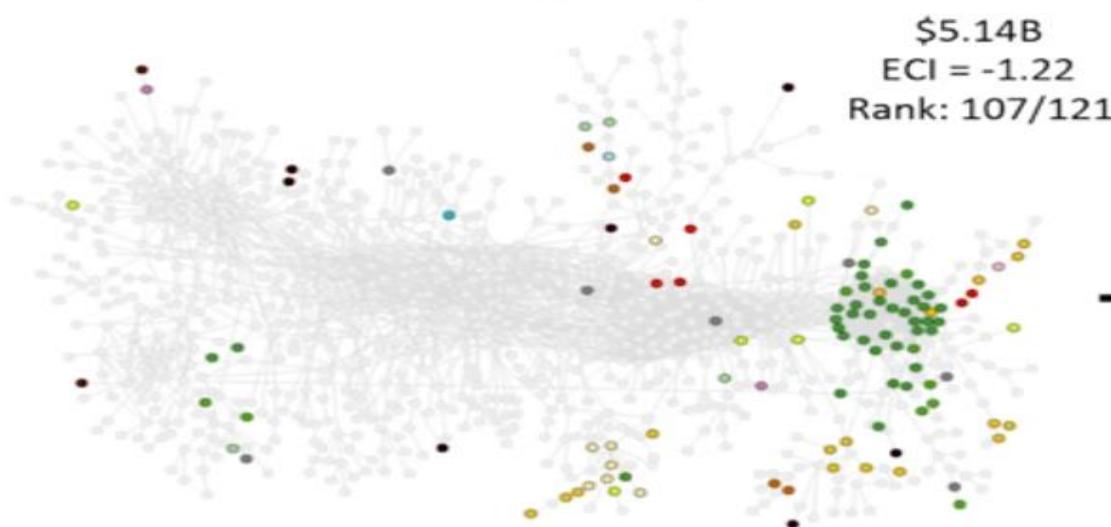
Vietnam's Exports, 2014



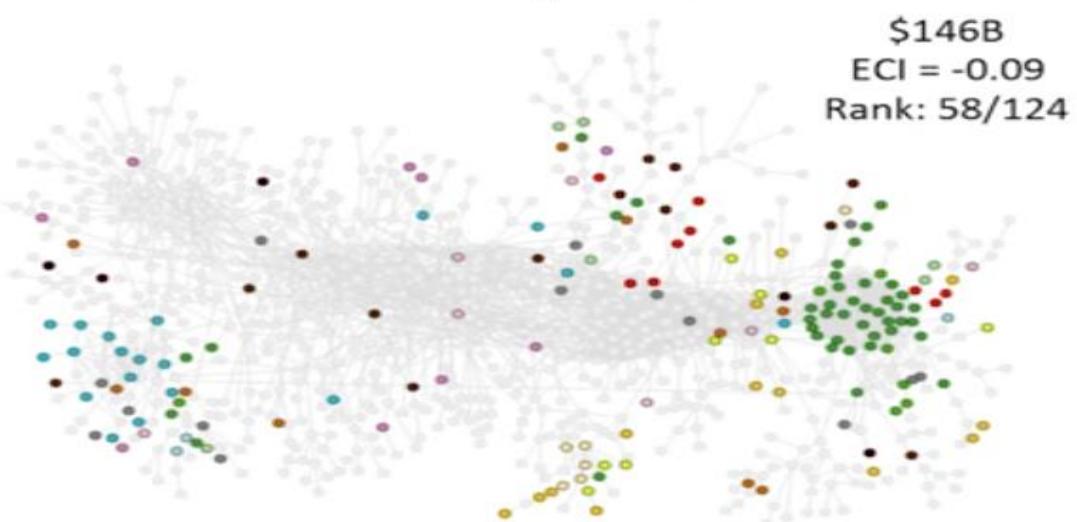
Source: *Atlas of Economic Complexity*

...or the path from Vietnam to Thailand

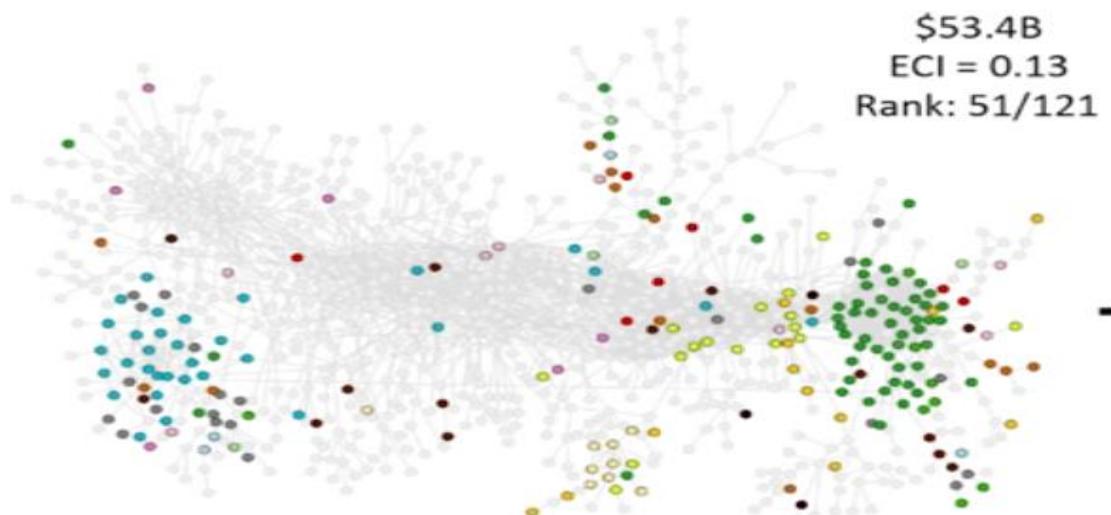
Vietnam's Exports, 1995



Vietnam's Exports, 2014



Thailand's Exports, 1995



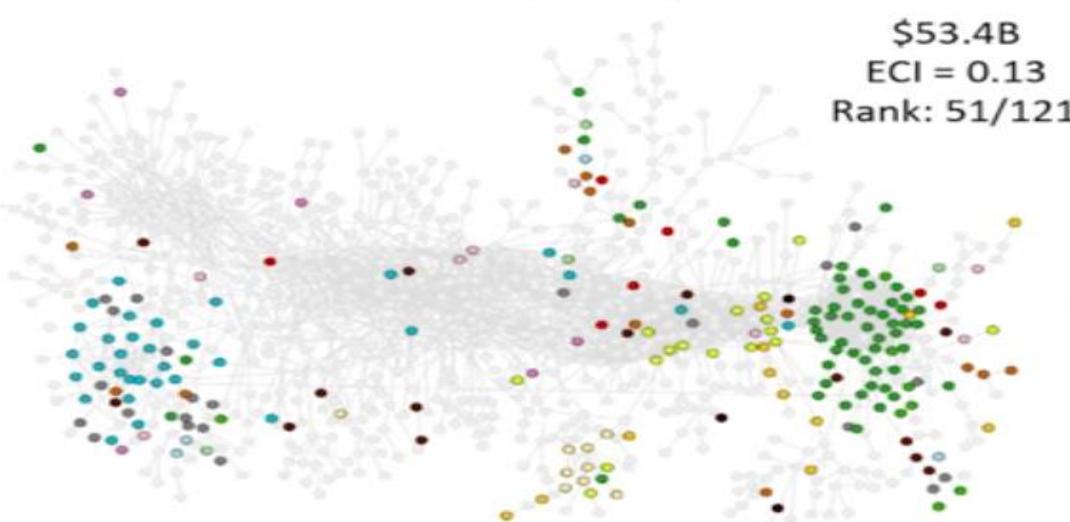
Thailand's Exports, 2014



Source: *Atlas of Economic Complexity*

...or the path from Thailand to China

Thailand's Exports, 1995



Thailand's Exports, 2014



China's Exports, 1995



China's Exports, 2014



Source: *Atlas of Economic Complexity*

Laminar regime

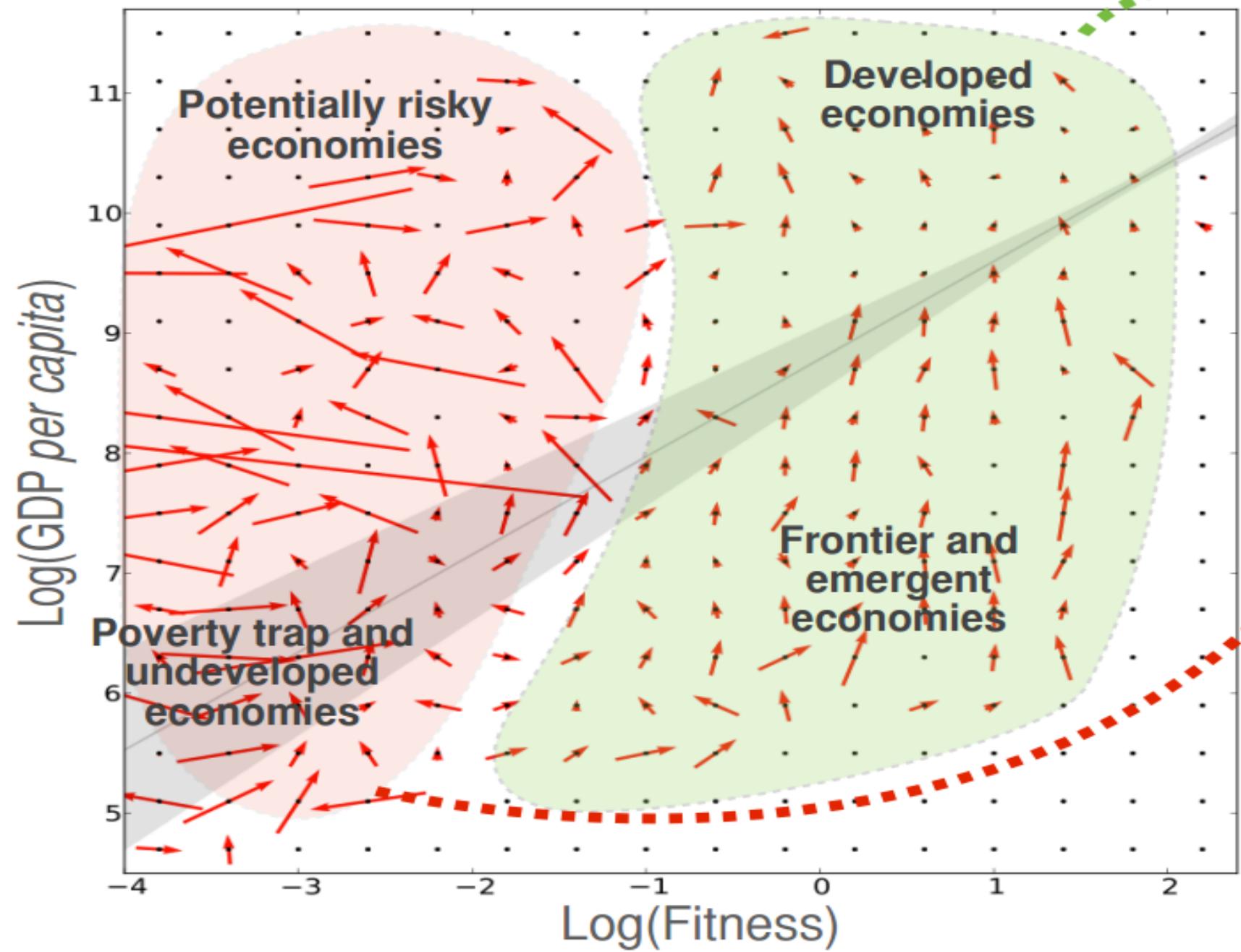
Fitness is the relevant and driving variable for the economic dynamics in this regime

high predictability

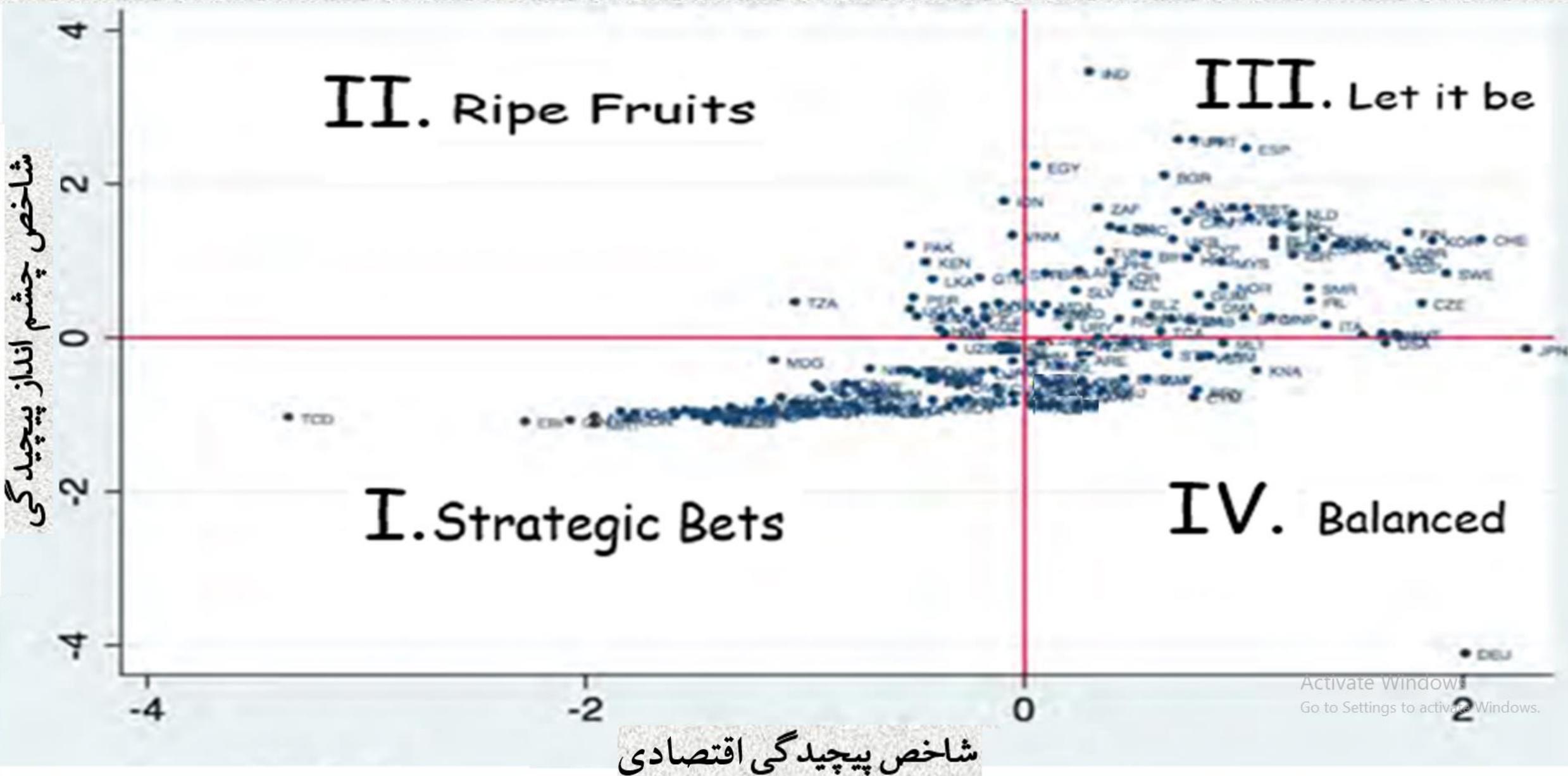
Chaotic regime

Dynamics is ruled by several other exogenous factors competing with Fitness

low predictability

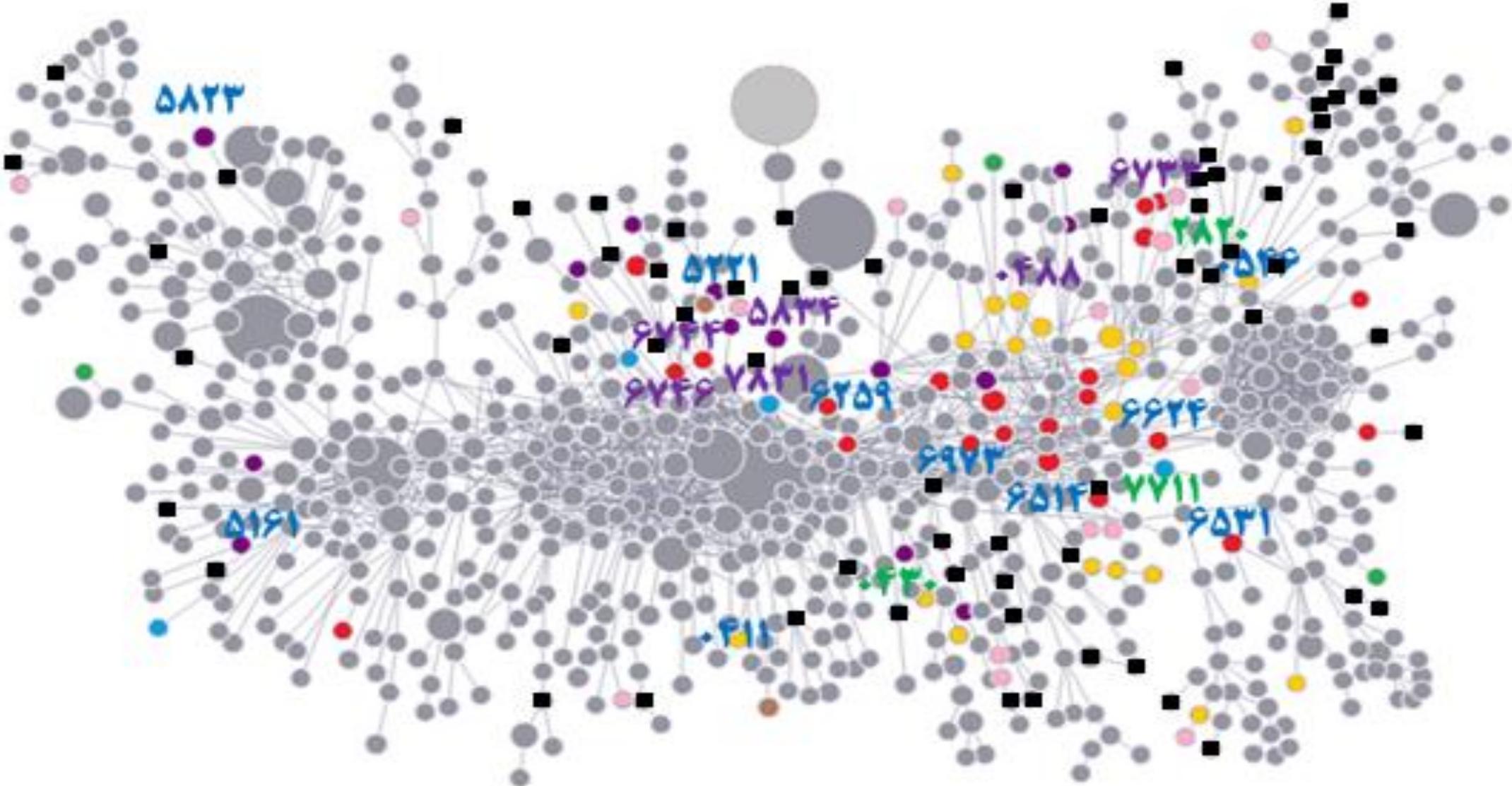


استراتژی کلی کشور جهت تنوع بخشی به صنایع



HOW DO YOU IDENTIFY POTENTIAL NEW SECTORS?

- Distance
 - How far is the industry from the current capabilities of the country or region?
- Complexity
 - How productive is the industry?
- Strategic value
 - How much does the development of the industry facilitate further diversification?



Different mechanisms for moving knowhow

- Labor mobility between firms
- Immigration
- Business travel
- FDI

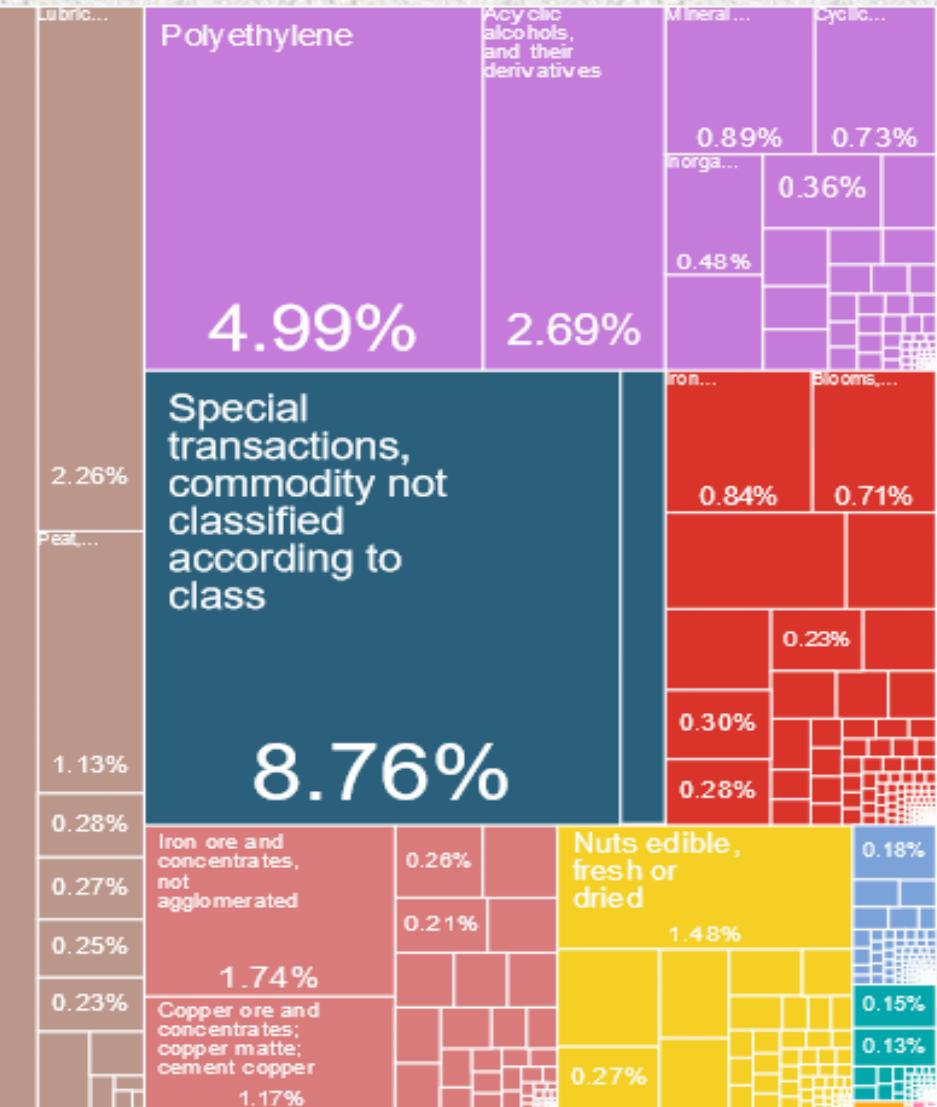


Iran Exported in 2016

\$ 45.6 B

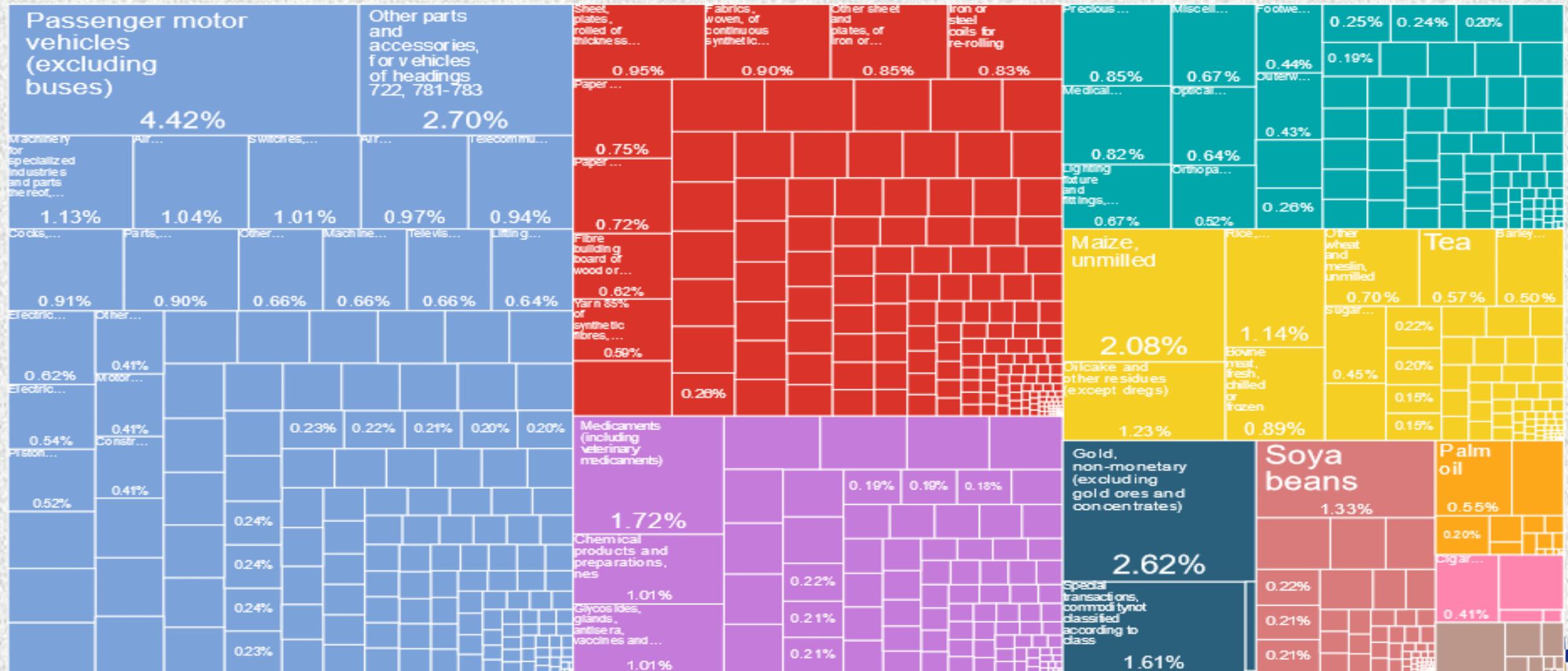
Crude
petroleum
and oils
obtained
from
bituminous
materials

59.83%

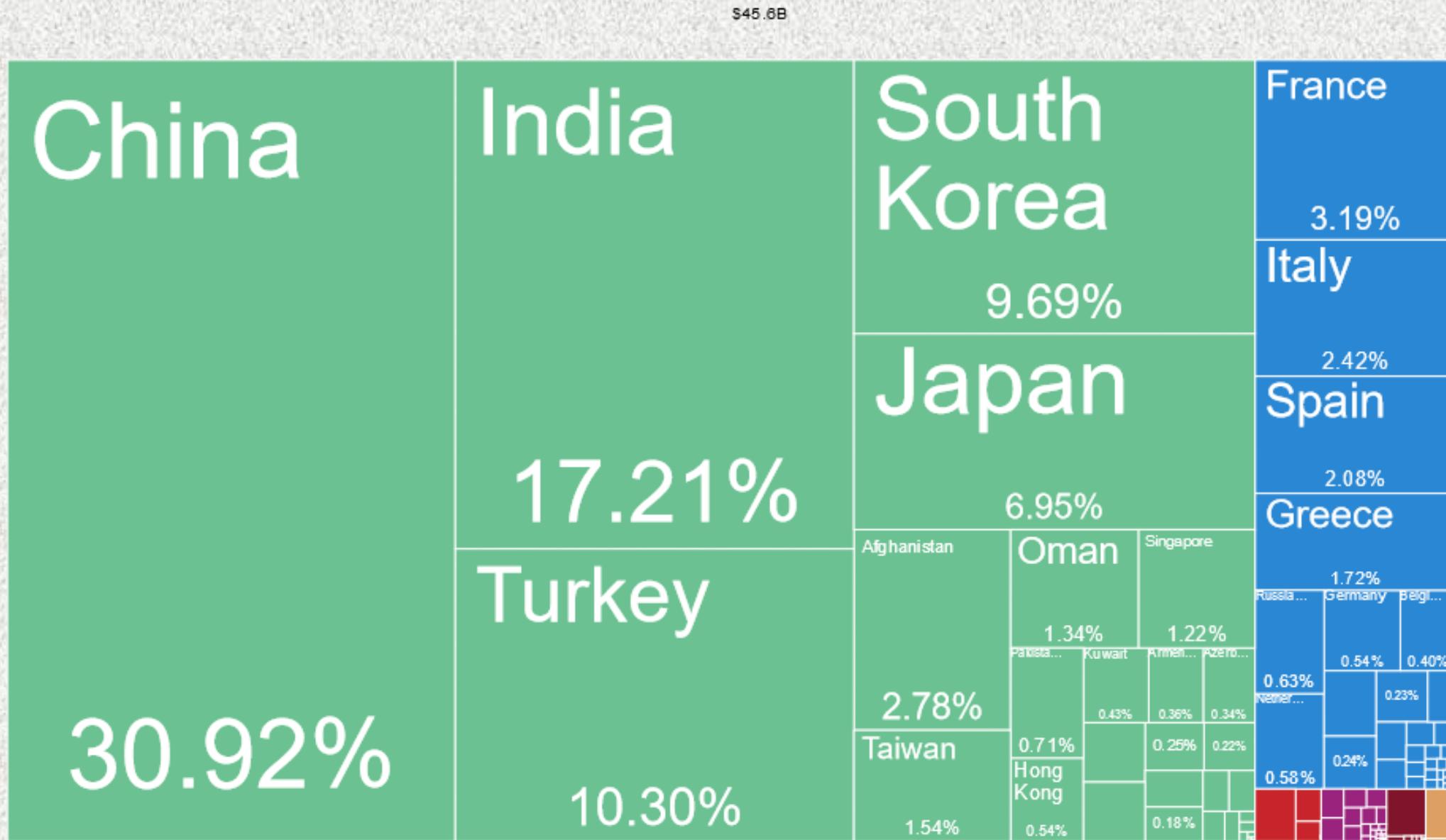


Iran Imported in 2016

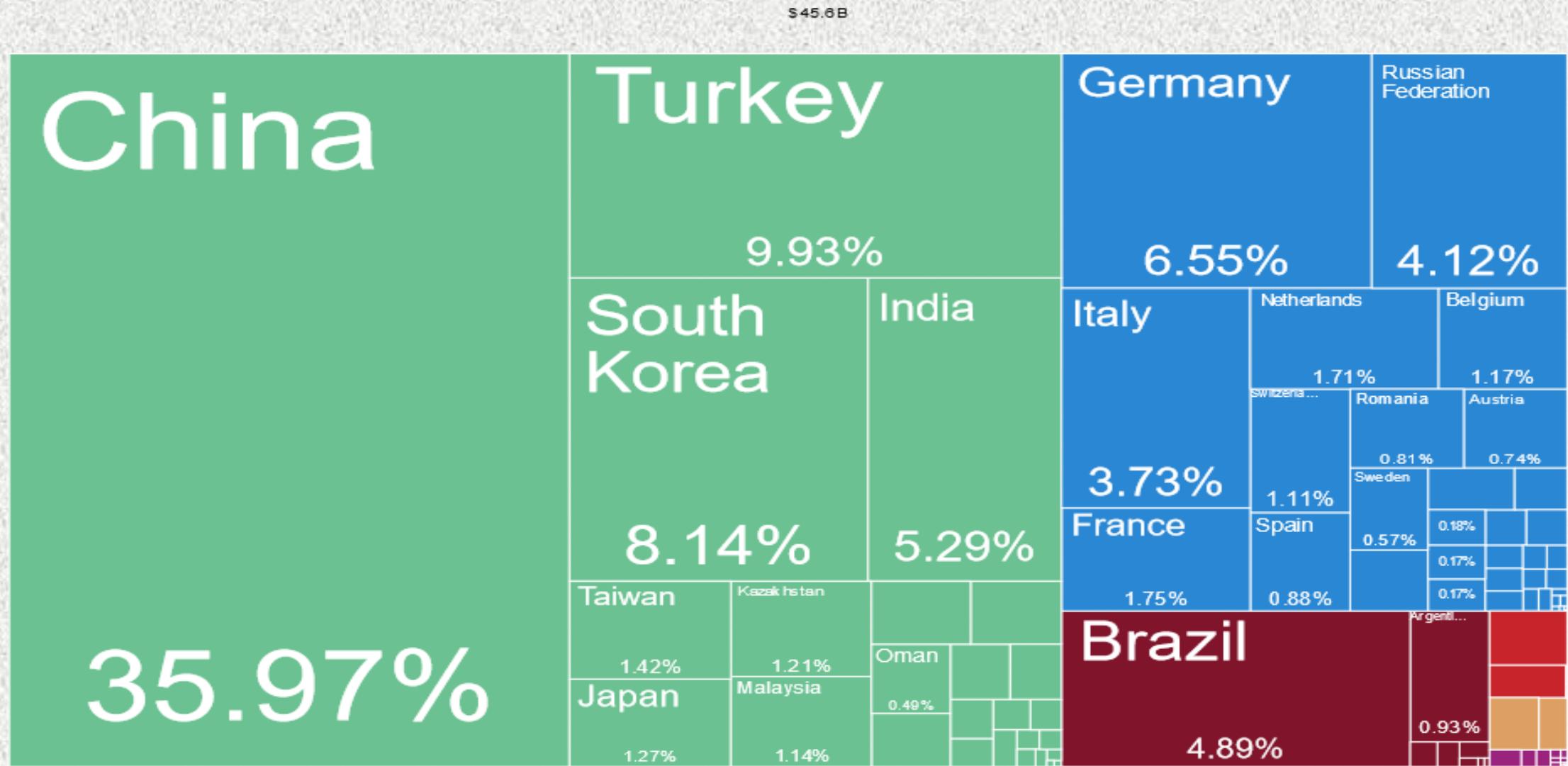
\$45.6B



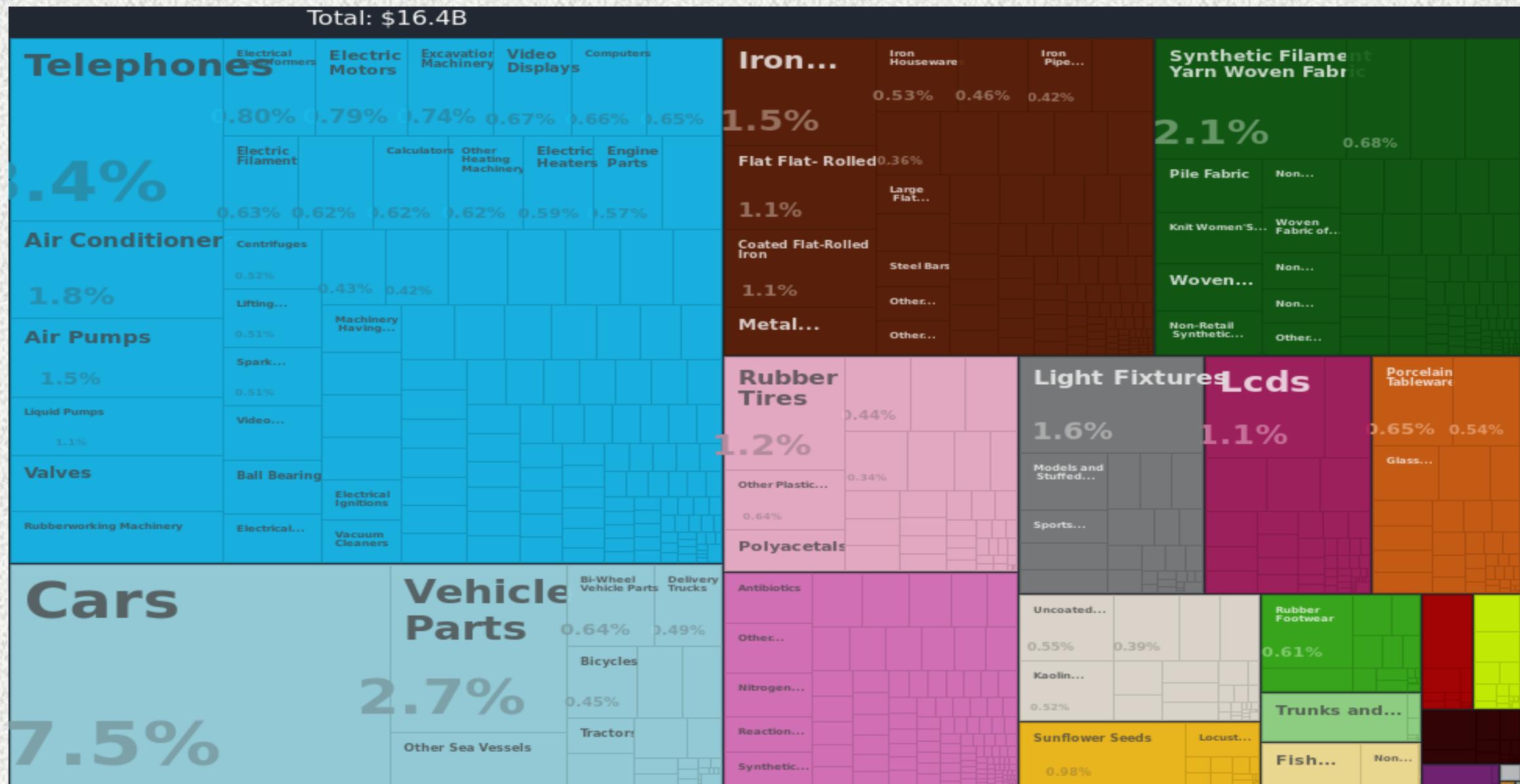
The top export destinations of Iran in 2016



The top import origins of Iran in 2016



What does Iran import from China (2016)



What does Iran export to China (2016)

Total: \$14.8B

Crude Petroleum

63%

**Iron
Ore**

5.6%

**Copper
Ore**

3.5%

**Refined
Petroleum**

1.2%

Chromium Ore

0.61%

Sulphur

Coal Tar Oil

0.61%

Slag...

**Ethylene
Polymers**

14%

**Acyclic
Alcohols**

1.5%

5.7%

Refined Copper

Cyclic
Hydrocarbon

1.5%

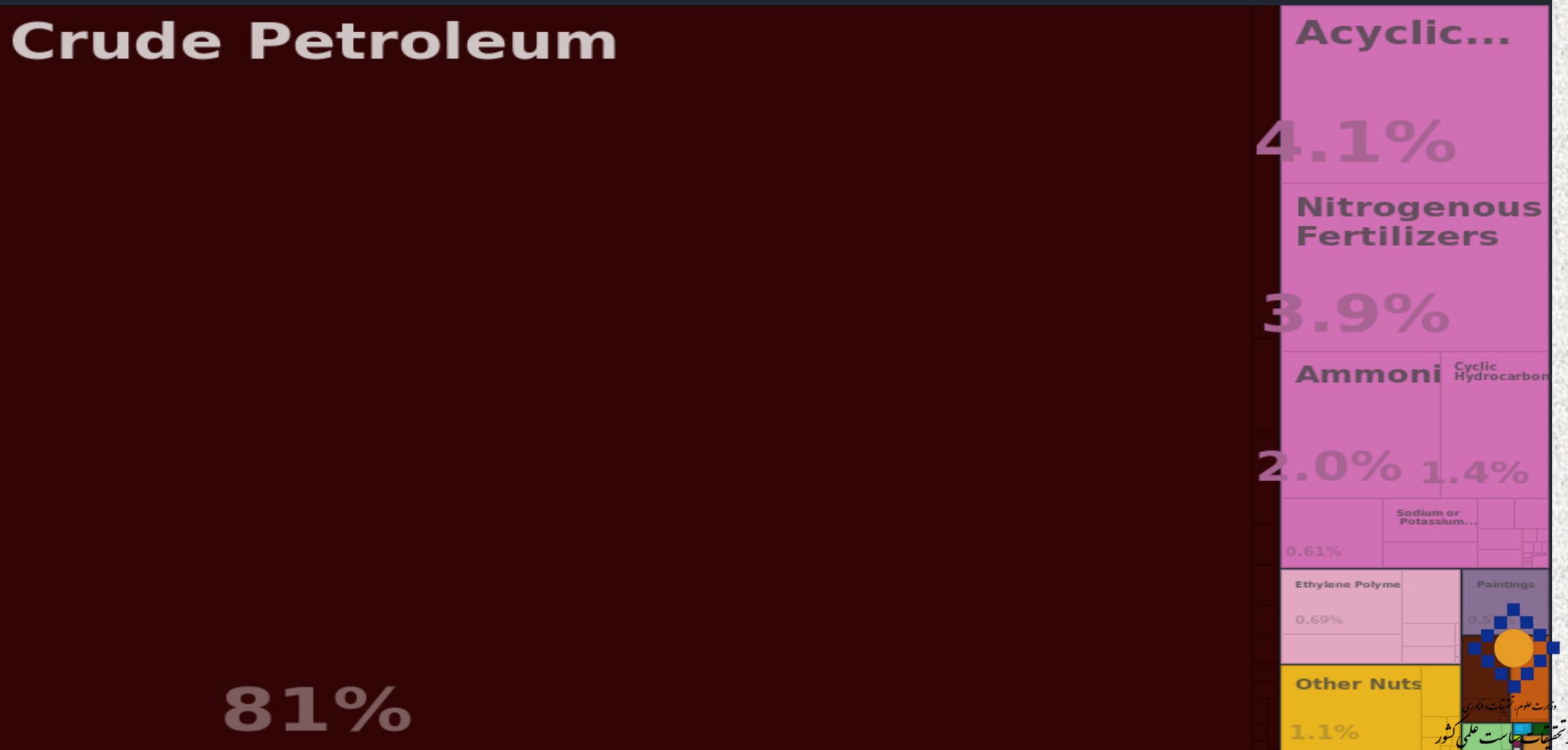
What does Iran import from India(2016)



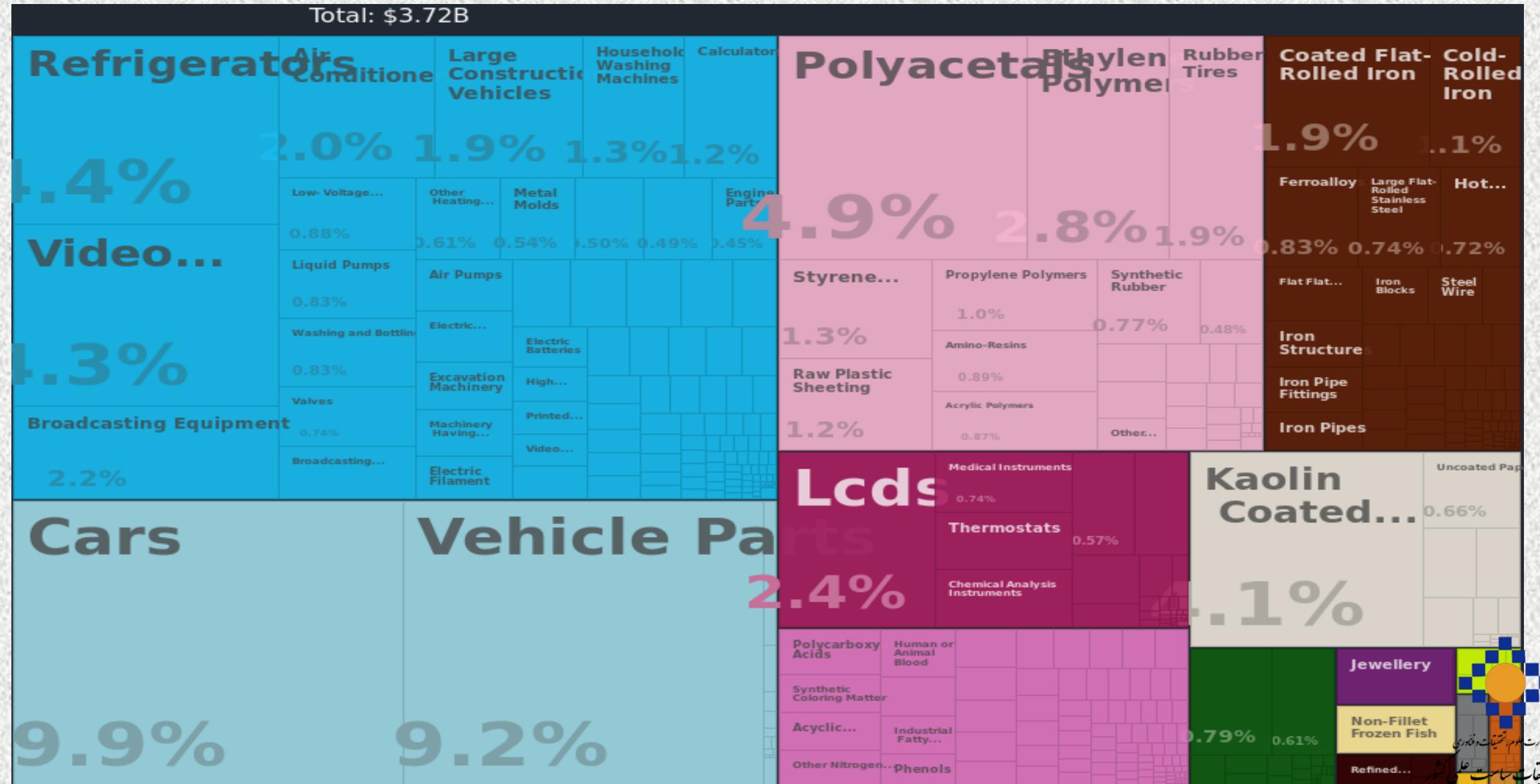
What does Iran export to India (2016)

Total: \$8.25B

Crude Petroleum



What does Iran import from South Korea (2016)



What does Iran export to South Korea(2016)

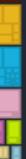
Total: \$4.65B

Crude Petroleum

Crude
Petroleum

98% !

98%



What does Iran import from Japan? (2015)

Total: \$282M

Delivery Trucks

31%

Cars

14%

Vehicle...

3.5%

**Vehicle
Chassis**

1.4%

**Air
Pumps**

4.6%

Transmissions

Rubberworking

0.56%

Centrifuges

Liquid...

Gaskets

Sewing Machin

Aluminium...

4.5%

**Reaction and Catalytic
Products**

3.8%

**Engine Valve
Parts**

2.5%

2.3%

**Medical
Instrumen**

6.1%

X- Ray...

2.0%

Optical Fibers

1.4%

Coated
Flat-Rolled
Iron

**Iron
Pipes**

0.94%

0.85%

Cutting...

Rubber Tires

Rubber
Belting

0.89%

0.53%

Synthetic Rub

ber

0.80%

Photographic...

Artificial Filament Tow

Sowing...

Industrial Fatty...

1.0%

Seats

0.63%

Pens

0.35%

Industrial Fatty...

Seats

0.72%



مرکز تحقیقات سایت عالی ایران
دانش علوم تجارت فردی

What does Iran export to Japan? (2015)

Total: \$2.89B

Crude Petroleum

Crude
Petroleum
98% !

98%

What does Iran import from Turkey (2015)

Total: \$3.62B

Jewellery

24%

Valves

1.3%

Refrigerators

0.70%

Metal...

0.46% 0.43%

Air Pumps

Liquid Pumps

Low-Voltage Protection Equipment

1.2%

Engine Parts

0.68%

Electric Motors

Insulated...

Excavation Machinery

Spark-Ignition Engines

1.1%

Electrical Transformers

Electrical...

Electrical...

Centrifug

Synthetic Filament Yarn Woven Fabrics
Non-Retail Synthetic Staple Fiber Yarn
Non-Woven Textiles

1.3% 1.0% 0.76%

Processed...
0.55%

Knit Men's Suits
Hand-Woven...

Embroidery
Woven Fabrics
Retail...

Knit T-Shirts

Rolled Tobacco
2.2%

Processed Tobacco
1.5%

Coffee and...
Cocoa...

Other Plastic Sheetings
0.86%

Monofilament
0.59%

Raw Plastic...
Other Plastic...

Self...
Other...
Amino-Resins
Acrylic...

Metal Mountings
0.89% 0.76% 0.56%

Iron Blocks
0.54% 0.49% 0.44%

Padlocks
Other Iron...
Iron Pipe...

Cold...
Iron...

Wood Fiberboard
3.1%

Densified Wood
0.73% 0.50%

Wood...
Interior...

Toilet Paper
2.4%

Cellulose Fibers Paper
1.1%

0.37%

Zinc Ore
Trunks...

Glues
1.1% 0.66%

Aqueous Paints
0.44% 0.42%

Beauty...
Scented...

Industrial Fatty...
Soap

Other Furniture
0.74%

Seats

Vehicle...
2.3%

Interior...

Other Nuts
0.98%

Interior...

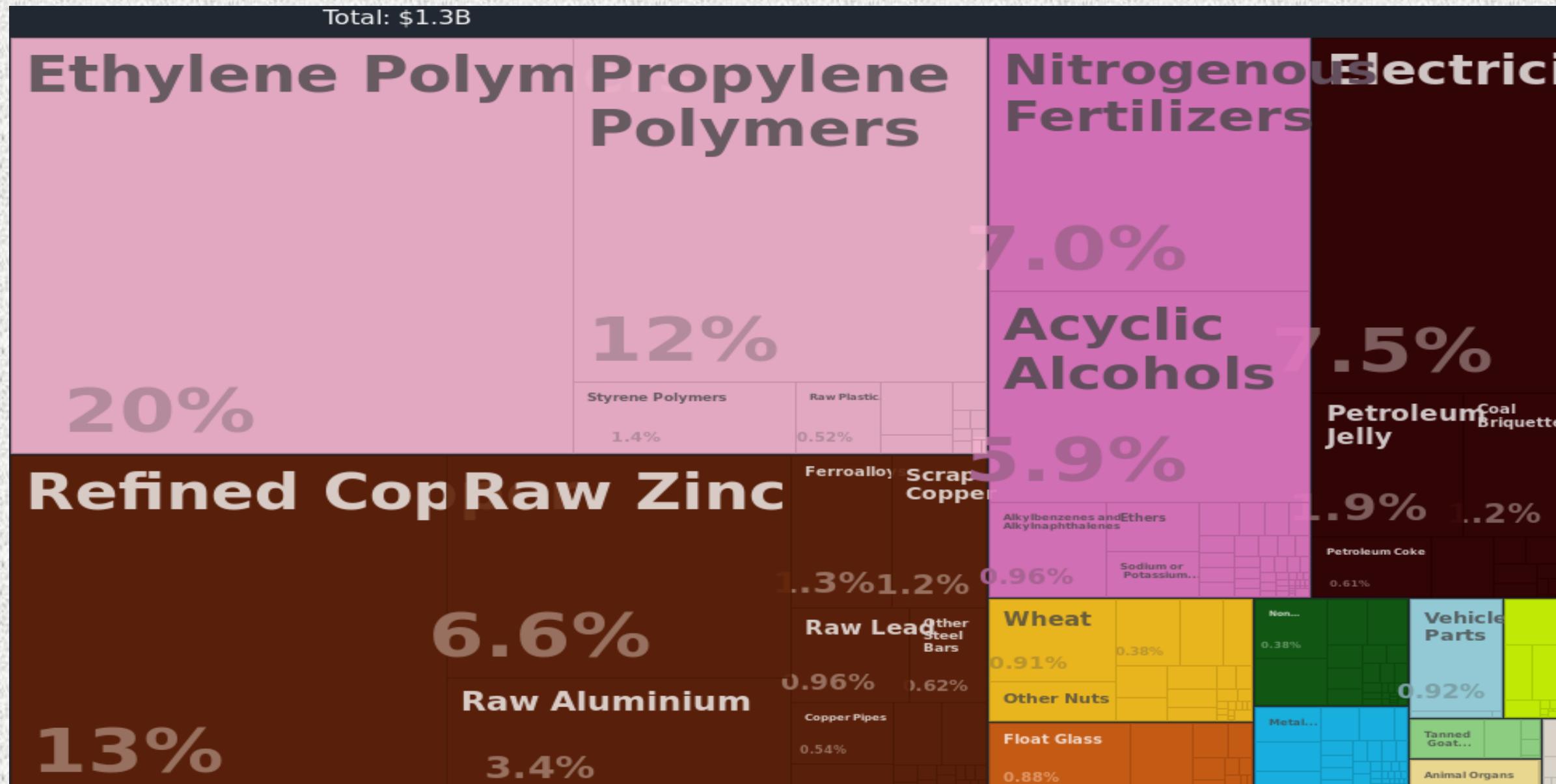
Interior...

Interior...

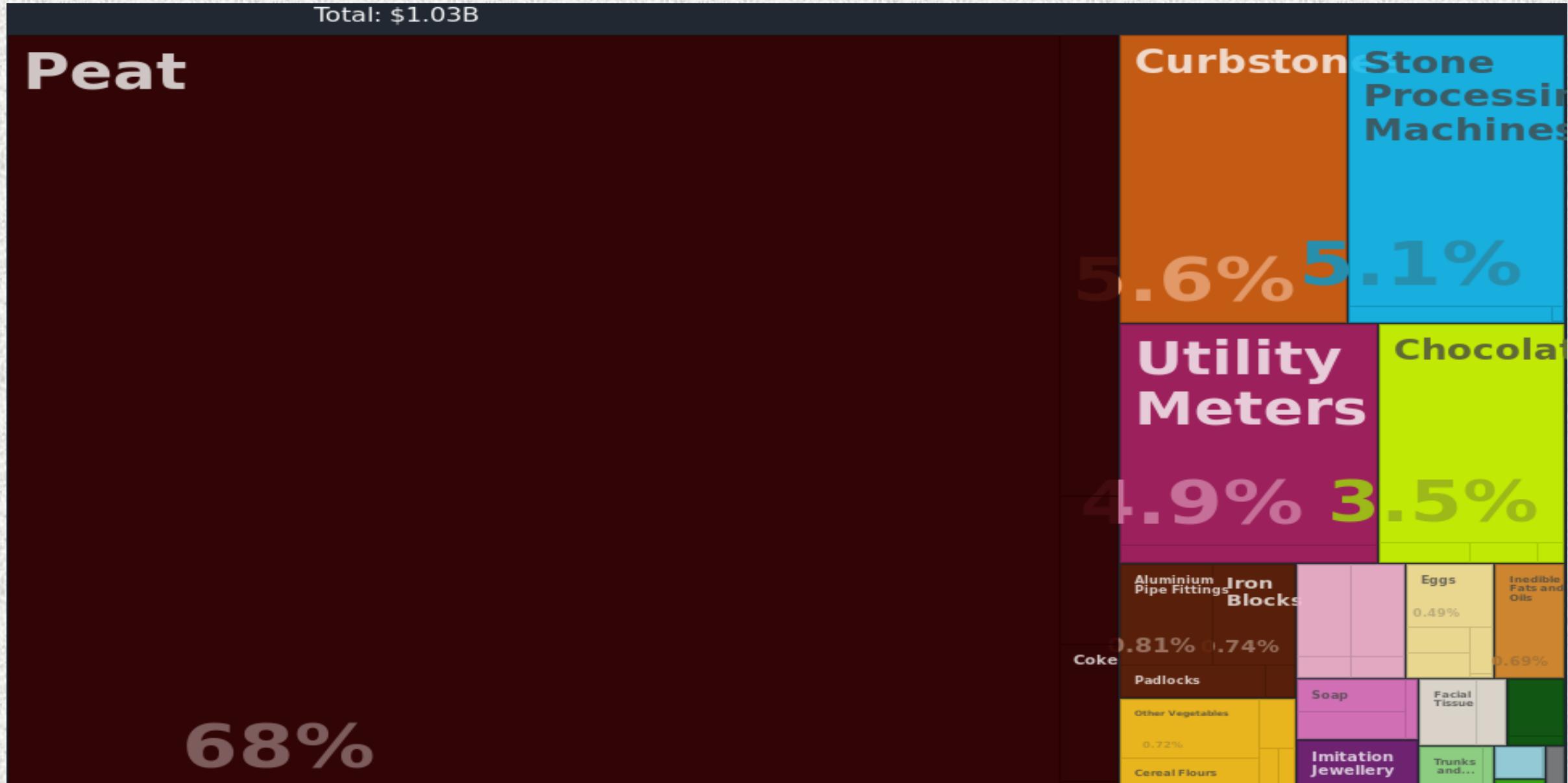
Interior...



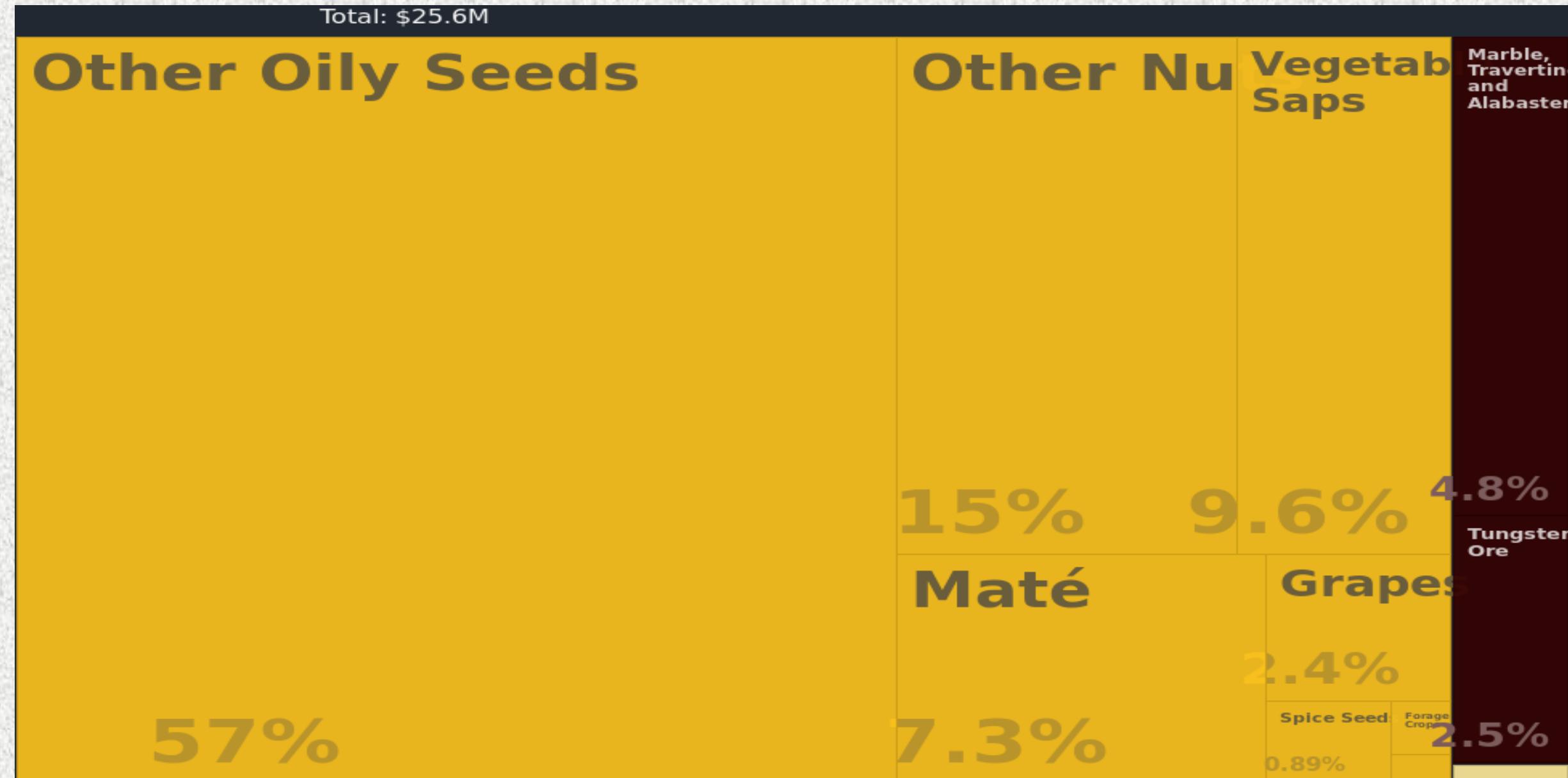
What does Iran export to Turkey(2015)



What does Iran export to Afghanistan? (2015)

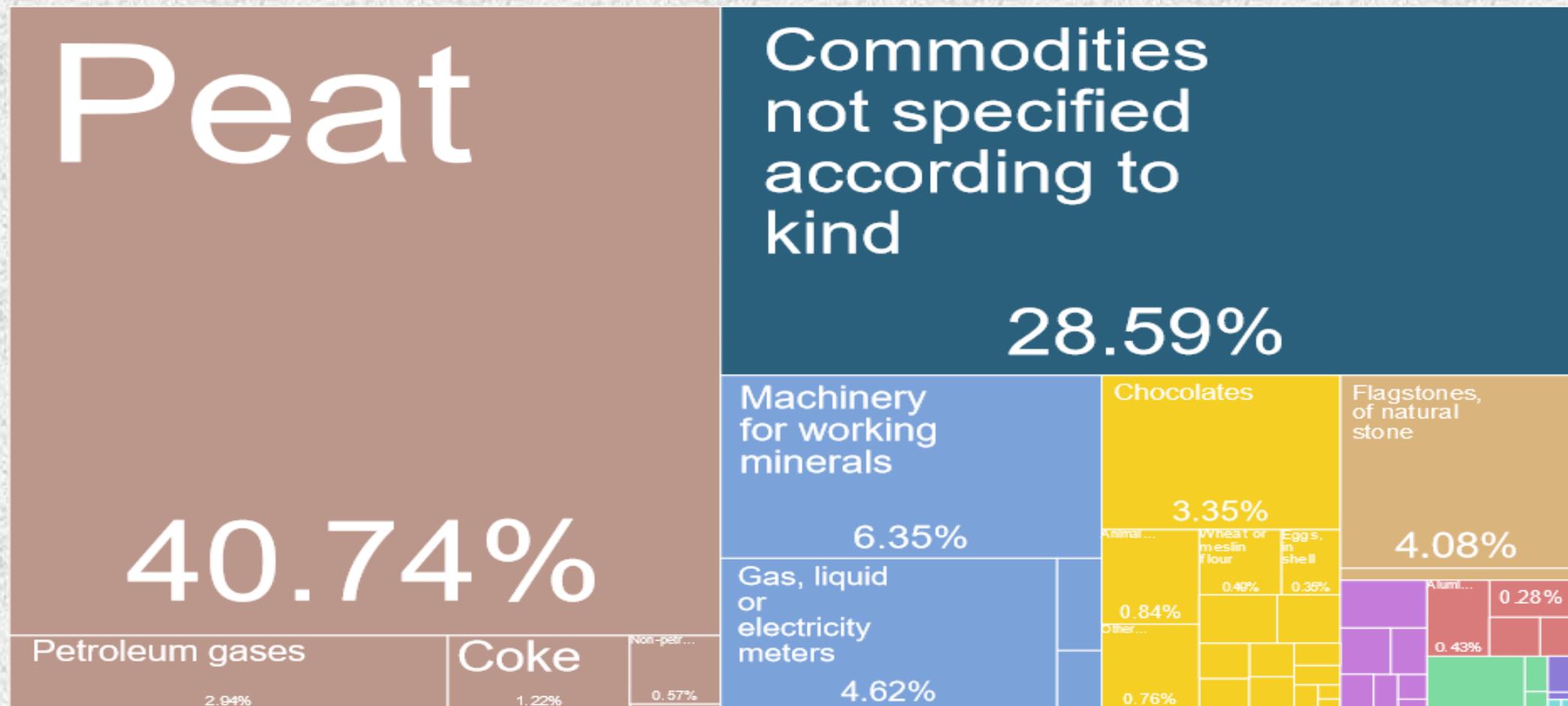


What does Iran import from Afghanistan? (2015)



What does Iran export to Iraq? (2016)

\$1.27B



What does Iran import from Iraq? (2015)



ارزیابی اقتصاد مقاومتی در سایه پیچیدگی اقتصادی

شناسایی هدف

ارزیابی قابلیت ها

بررسی امکان دستیابی به هدف

برنامه ریزی در راستای رسیدن به هدف

