



UNIVERSITÀ
DEGLI STUDI DI TRIESTE



Dipartimento di scienze economiche,
aziendali, matematiche e statistiche
"Bruno de Finetti"

Statistica

Alcune rappresentazioni grafiche

Francesco Pauli

a.a. 2016/2017

Indice

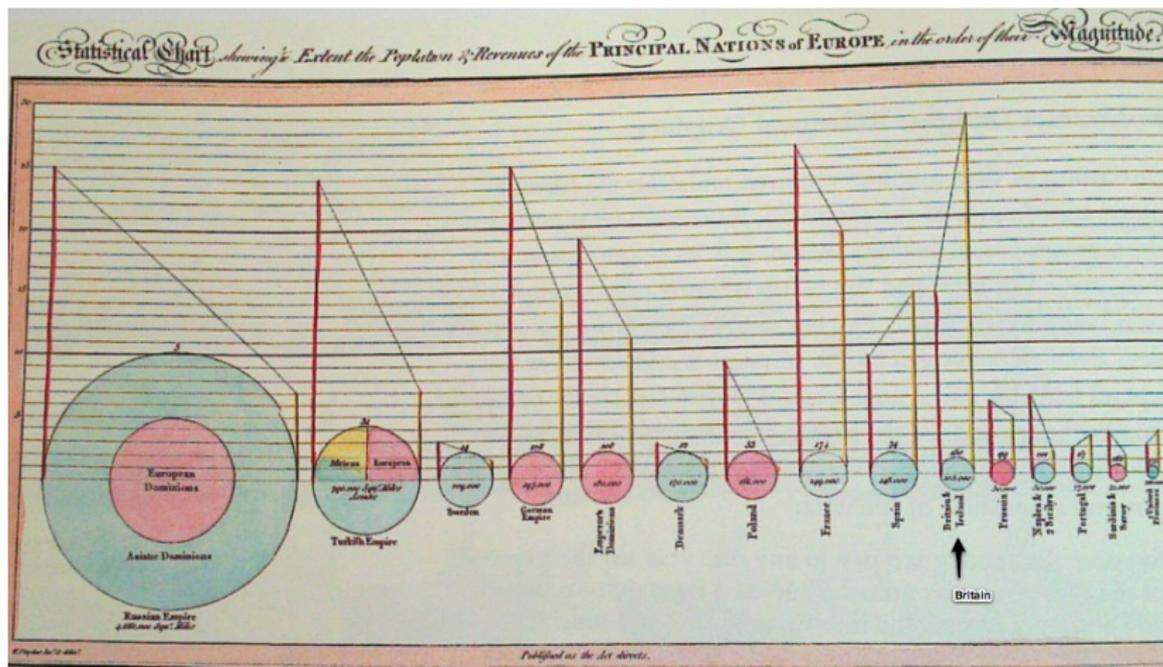
Diagrammi a torta

Diagrammi a barre

Miscellanea

I primi (?) diagrammi a torta

Playfair rappresenta con le aree dei cerchi le estensioni territoriali. La linea a sinistra rappresenta la popolazione, quella a destra il gettito fiscale.



Confronto e diagrammi a torte

Il grafico sotto riportato è pubblicato in *Wind in power*, rapporto pubblicato dall'European Wind Energy Association (pag. 8).

FIGURE 2.3: EU POWER MIX 2000

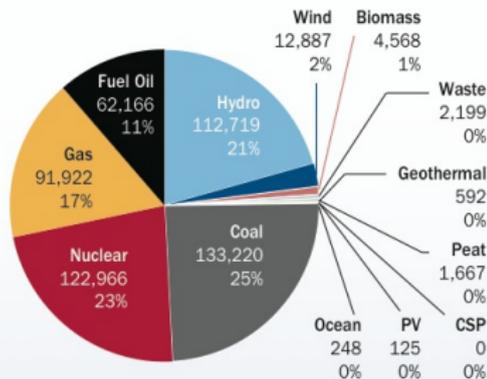
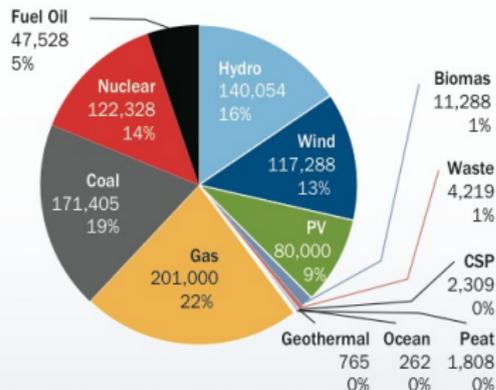


FIGURE 2.4: EU POWER MIX 2013



I dati riguardano la potenza installata per la produzione di energia elettrica (in MW) secondo la fonte nell'UE.

Confronto e diagrammi a torte

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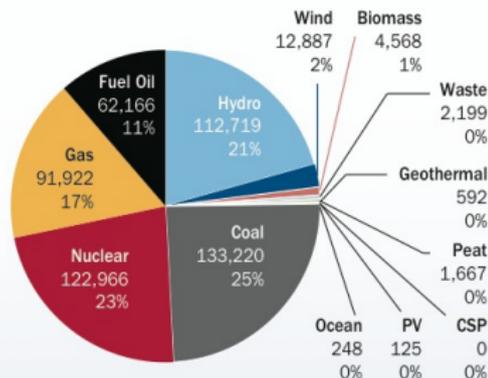
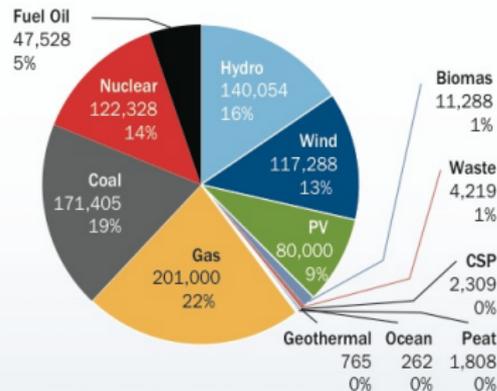


FIGURE 2.4: EU POWER MIX 2013



Lo scopo del grafico (anche in base al testo di accompagnamento qui non riportato) è evidenziare il ruolo crescente dell'energia eolica in particolare e delle rinnovabili in generale sulla produzione di elettricità nell'UE.

Confronto e diagrammi a torte

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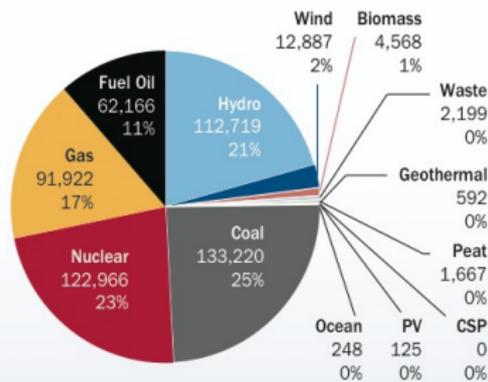
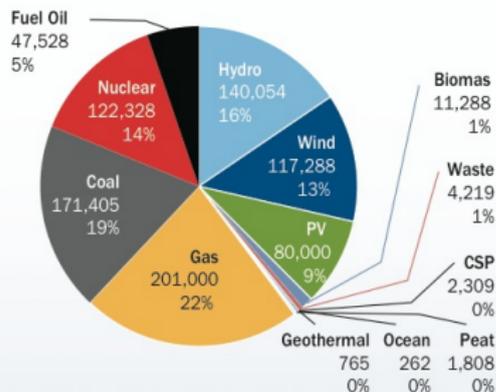
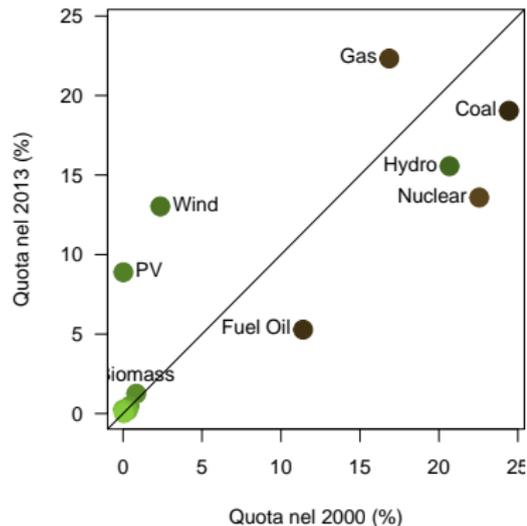
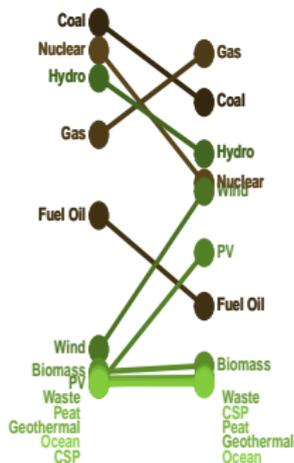
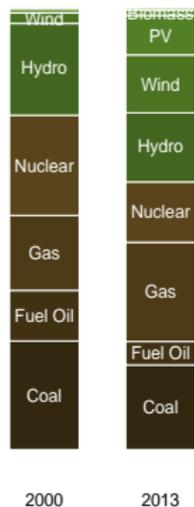


FIGURE 2.4: EU POWER MIX 2013



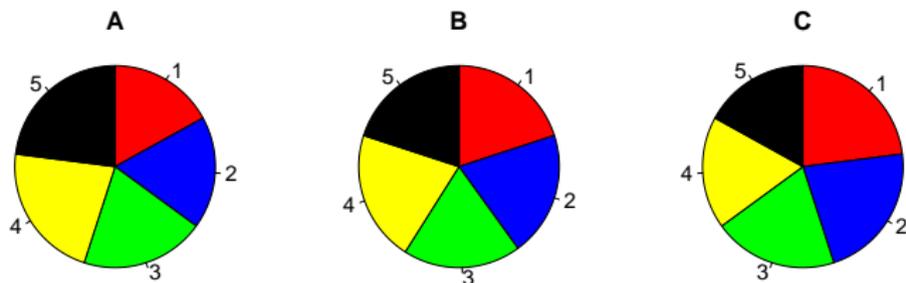
Ci riesce?

Valutiamo delle alternative



Diagrammi a torta: massimo uno!

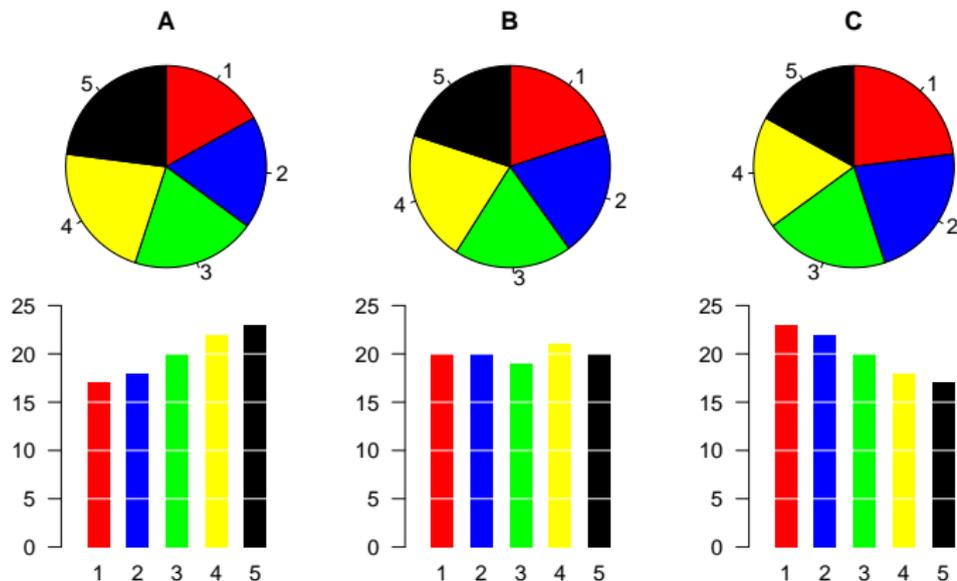
I diagrammi a torta **non** sono un buono strumento per confrontare distribuzioni di frequenza.



Fonte: commons.wikimedia.org/

Diagrammi a torta: massimo uno!

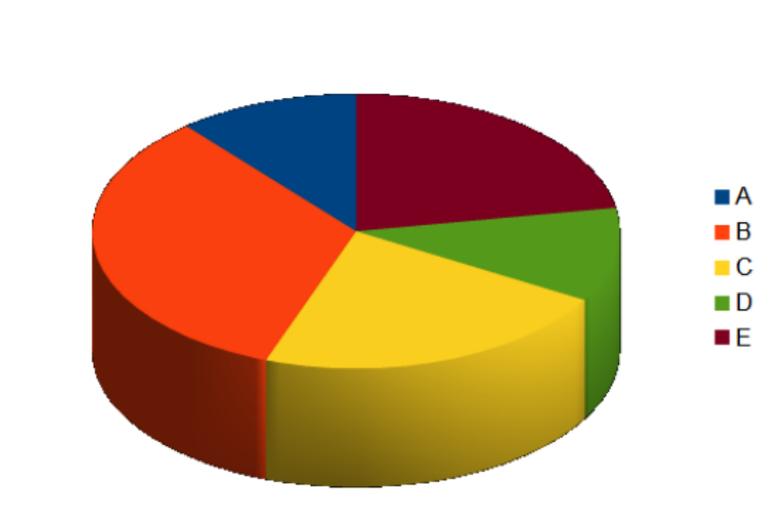
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Fonte: commons.wikimedia.org/

No al 3D!

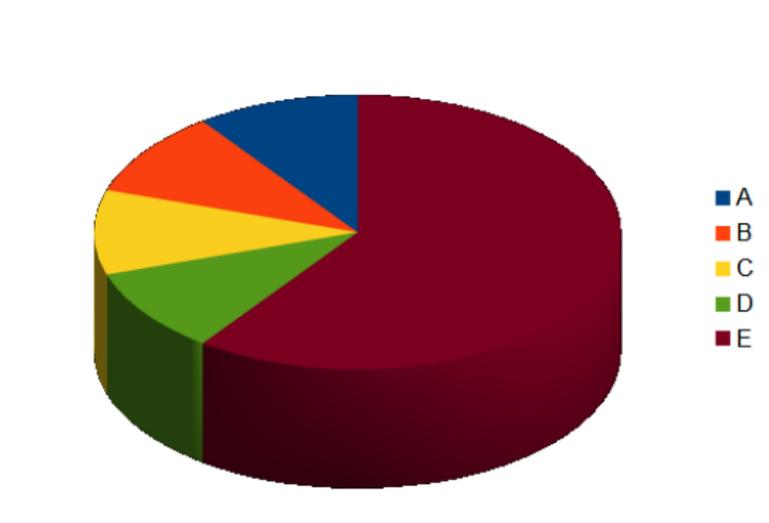
Il diagramma a torta non è facile da leggere per via del fatto che non siamo bravi a confrontare angoli.



Se poi gli angoli sono anche distorti ...

No al 3D!

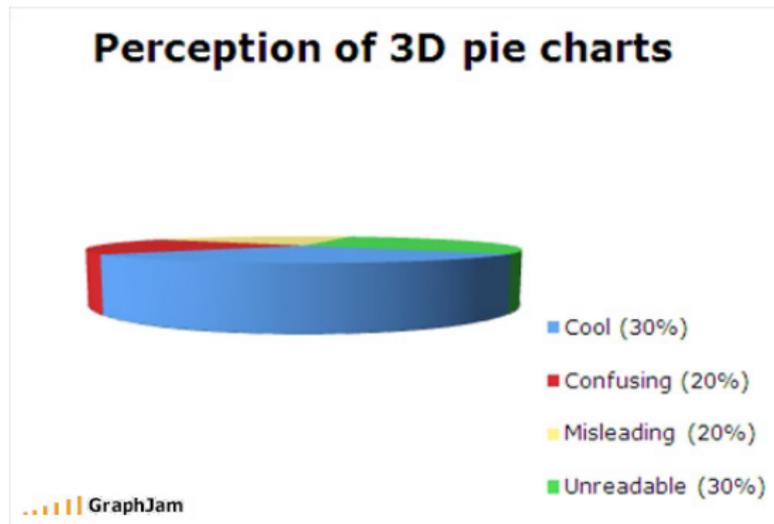
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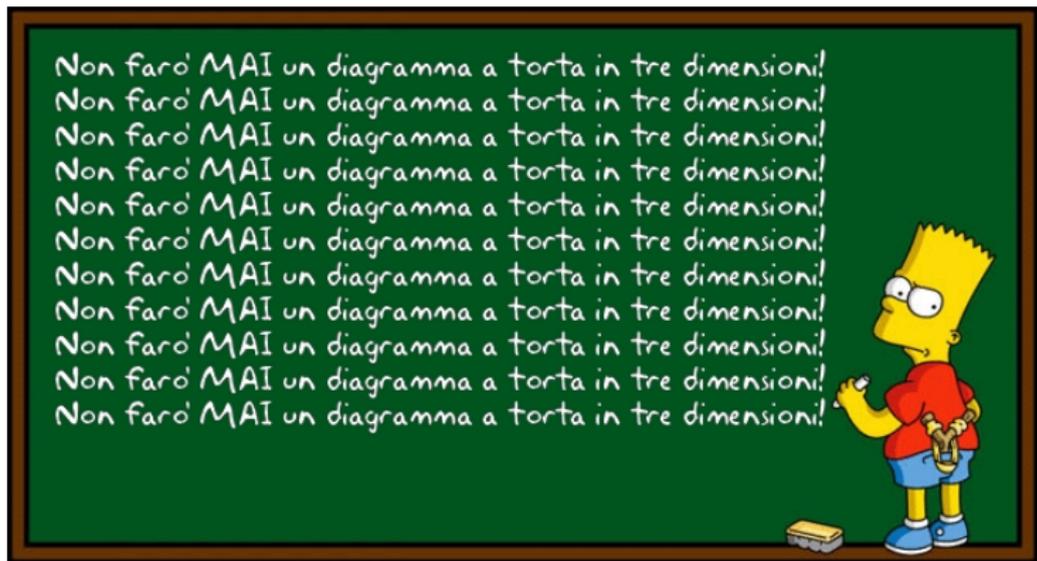
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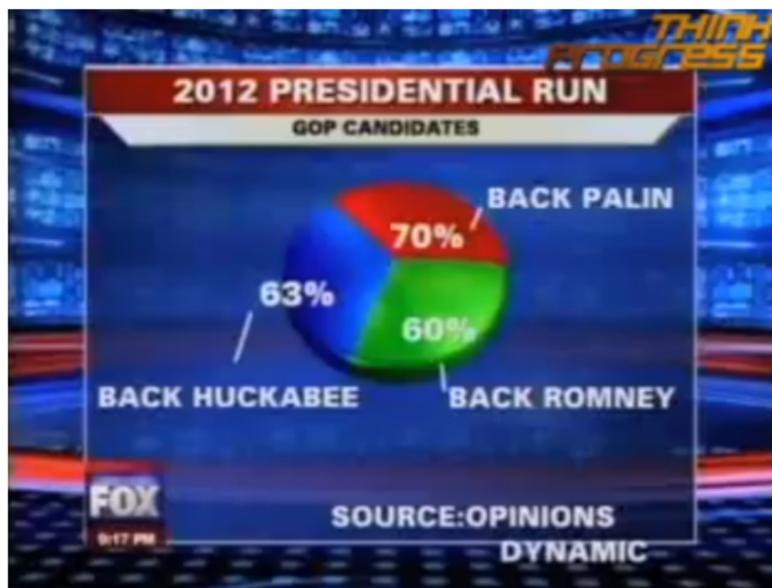


Se poi gli angoli sono anche distorti ...

... quindi



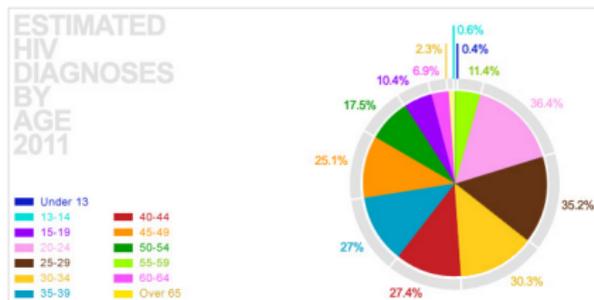
Cosa c'è che non va?



Cosa c'è che non va?

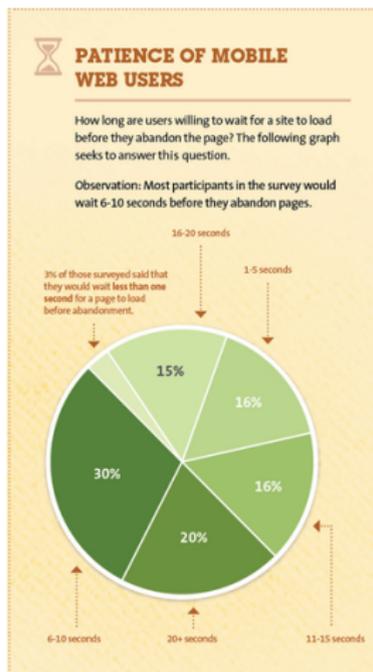
HIV diagnoses by age

2010 diagnoses of HIV infection, by age.²



- Diagnoses are from 46 states and 5 U.S. dependent areas.

Cosa c'è che non va?

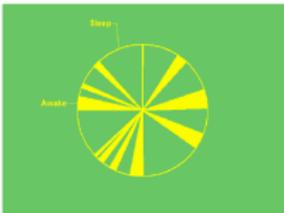


Esempio: gatti

Here we have an example (found at <http://www.thecatscentral.com/cats/interesting-facts-about-cats/>) of the trouble one can get into when using pie charts. Actually, that's not fair. The trouble is using a chart, any kind of chart, as a mere decorative element. The left pie chart is meant to represent 16 hours of sleeping cat, and the one on the right is 18 hours. The wedge which grows from the 16 hour graph to the 18 hour graph is the yellow area, so that must be the data point, which means that the green wedge must represent the cat's non-sleeping time. Starting on the right hand graph, where the yellow wedge is clearly $\frac{1}{6}$ of the total, if $\frac{1}{6}$ of the graph is 18 hours then the entire pie must represent 72 hours. What? It gets worse. In the left hand graph the yellow wedge appears to be $\frac{1}{8}$ of the total. If that is true, then that pie represents 128 hours, the two pies don't even represent the same amount of time! What is this madness?



I think I know, actually. Ignore for a moment the left graph and consider only the right one. Without the first graph to direct your thinking as to which wedge is the 18 hour one, you are free to conclude that perhaps the label is inside its own wedge, making the GREEN wedge equal 18 hours. This would mean that the yellow wedge represents 6 hours, the whole pie equals 24 hours, and all is right with the world. Suppose this graph was created by one member of the team responsible for the entire infographic, let's call him the "math guy". Math guy gives the graph to another team member, let's call him "art guy". Art guy thinks to himself "We have two numbers in the text, we need two graphs". Art guy is not a math guy. He sees the yellow text and assumes it refers to the yellow wedge. The new graph will have a yellow wedge for 16 hours, that wedge clearly needs to be smaller than the yellow wedge representing 18 hours. Art guy chooses arbitrarily to make it half the size of the first one, so that its smaller-area is obvious to the reader. Thus is born a pie chart disaster.



Besides, so anyone who has cats in their life knows, the chart should look more like this anyway.

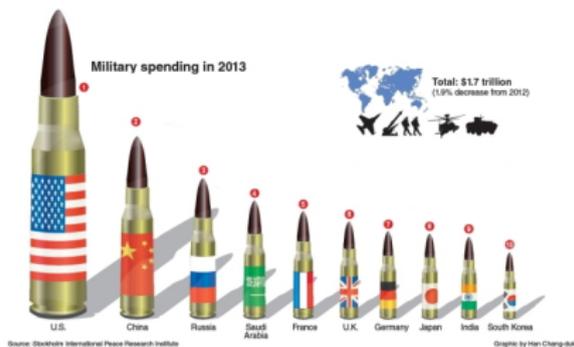
Indice

Diagrammi a torta

Diagrammi a barre

Miscellanea

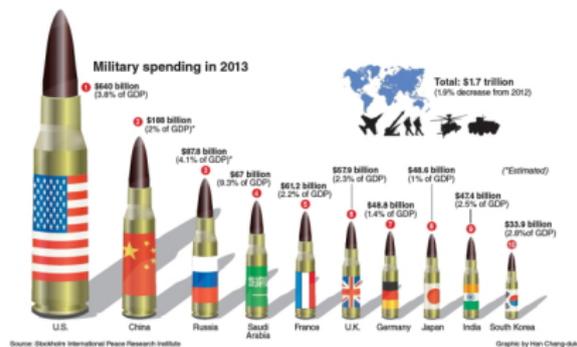
“Diagrammi a barre” o diagrammi a barre



Gli USA spendono più della Cina.

Ma quanto? —

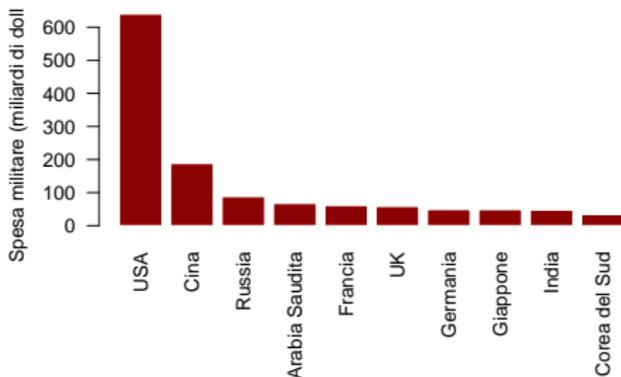
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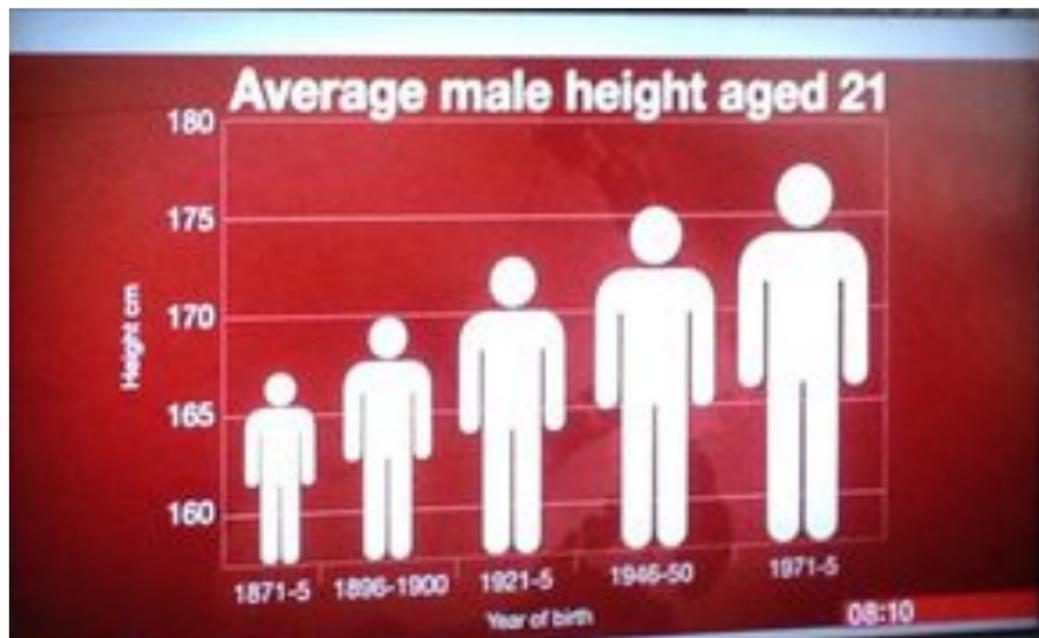
La spesa degli USA è 3.4 volte quella della Cina



Un diagramma a barre, è ok?



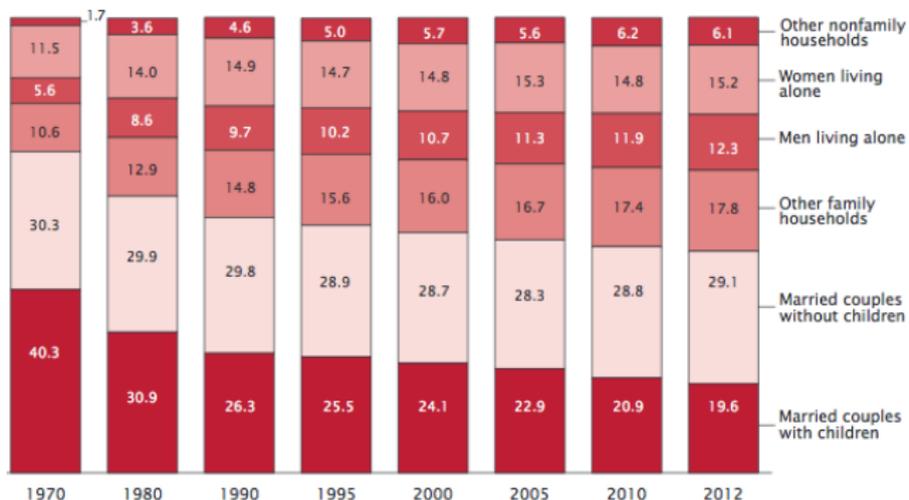
Cos'è? E com'è?



Esempio: famiglie

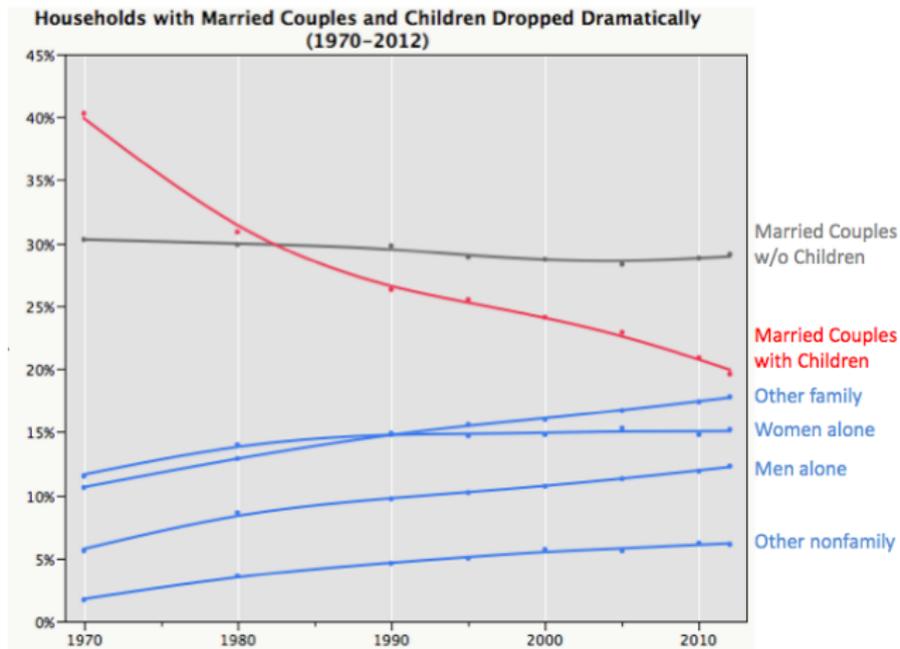
Households by Type, 1970 to 2012: CPS

(In percent)

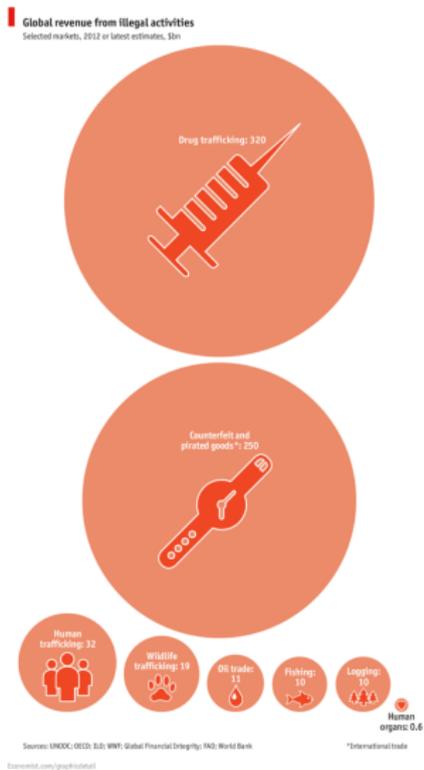


Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, selected years, 1970 to 2012.

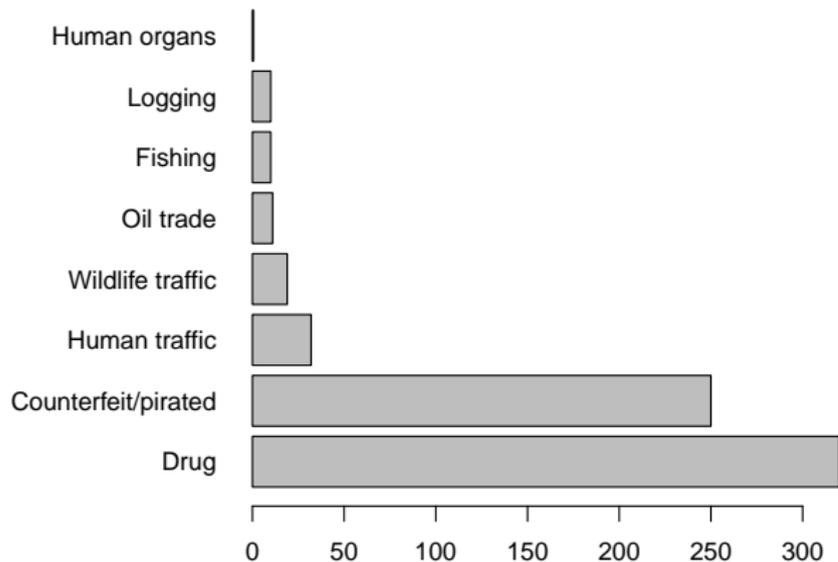
Esempio: famiglie



Esempio: attività illegali



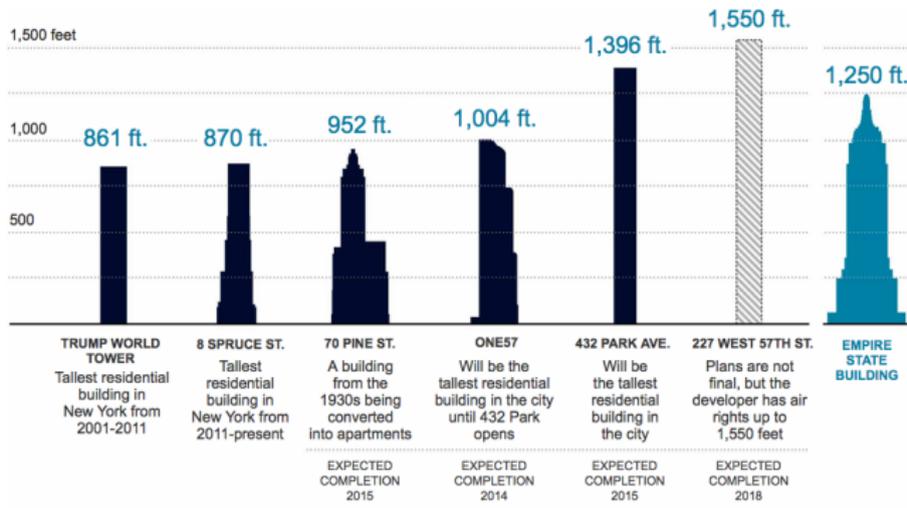
Esempio: attività illegali



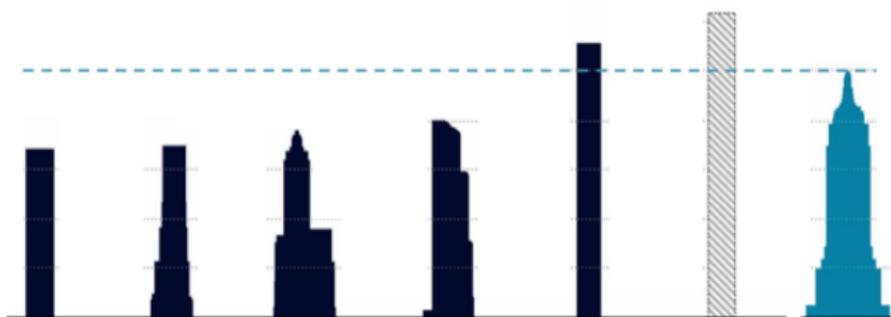
Esempio: grattacieli

Living in the Clouds

Two residential towers are set to surpass the Empire State Building in height. [Related Article >](#)



Esempio: grattacieli



Indice

Diagrammi a torta

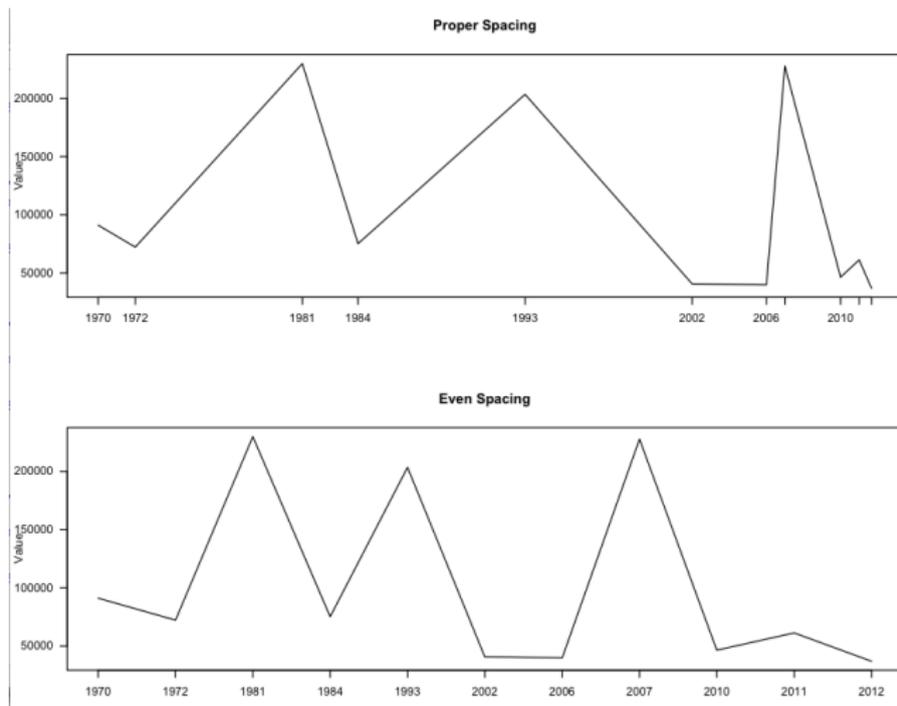
Diagrammi a barre

Miscellanea

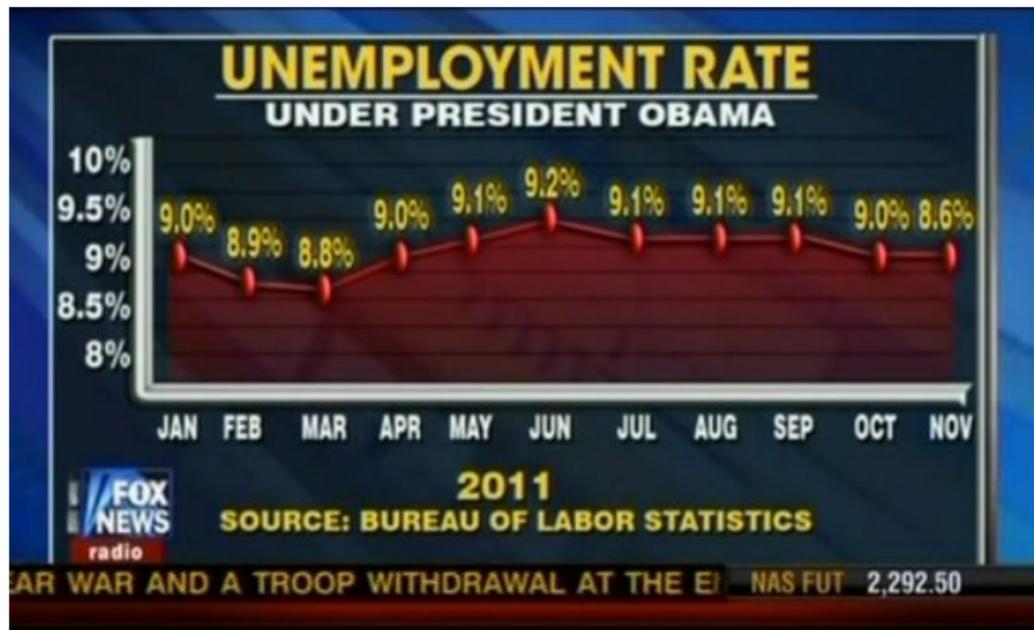
Esempio: incendi in italia



Esempio: incendi in italia



Esempio



Body Mass Index

Prevalence of Overweight and Obesity

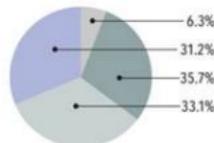
The data presented in this publication are from two surveys conducted by the Centers for Disease Control and Prevention (CDC): the National Health and Nutrition Examination Survey (NHANES)^{2,3} and the National Health Interview Survey (NHIS).⁴

Overweight and Obesity among Adults Age 20 and Older, United States, 2009–2010

Adults Age 20 and Older²

- More than two-thirds (68.8 percent) of adults are considered to be overweight or obese.
- More than one-third (35.7 percent) of adults are considered to be obese.
- More than 1 in 20 (6.3 percent) have extreme obesity.
- Almost 3 in 4 men (74 percent) are considered to be overweight or obese.
- The prevalence of obesity is similar for both men and women (about 36 percent).
- About 8 percent of women are considered to have extreme obesity.

Estimated Percentage by BMI

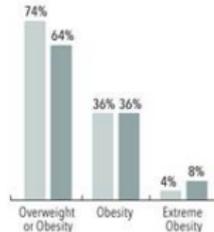


A text description of this image is available on a separate page.

- Normal weight or underweight (BMI under 24.9)
- Overweight (BMI of 25 to 29.9)
- Obesity (BMI of 30+)
- Extreme obesity (BMI of 40+)

Source: NHANES, 2009–2010

Estimated Percentage by Sex



A text description of this image is available on a separate page.

- Men
- Women

Source: NHANES, 2009–2010

Body Mass Index

Prevalence of Overweight and Obesity

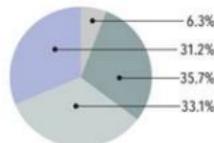
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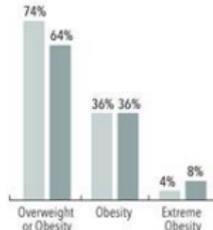


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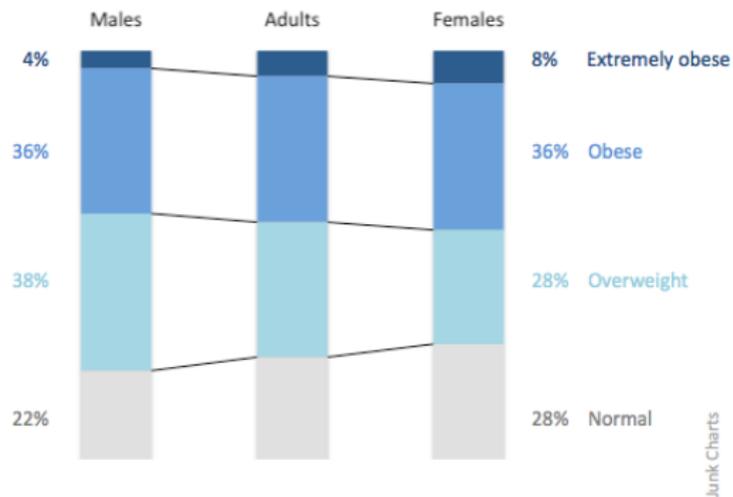
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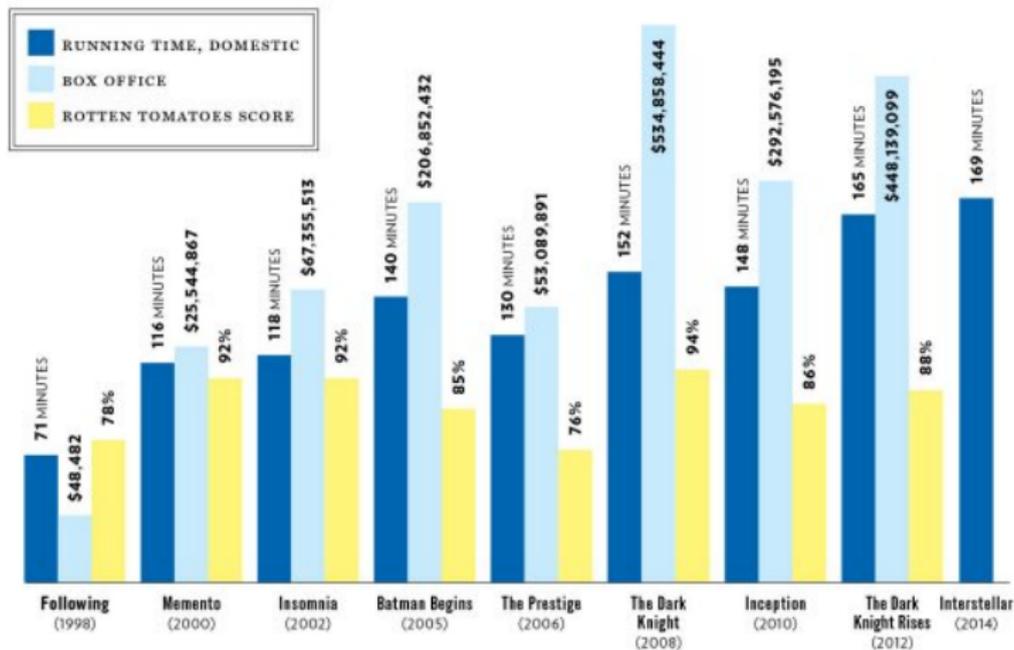
Source: NHANES, 2009–2010

- ▶ i colori confondono (e non è facile la lettura)
- ▶ il diagramma a barre ha categorie nidificate, meglio 3 grafici

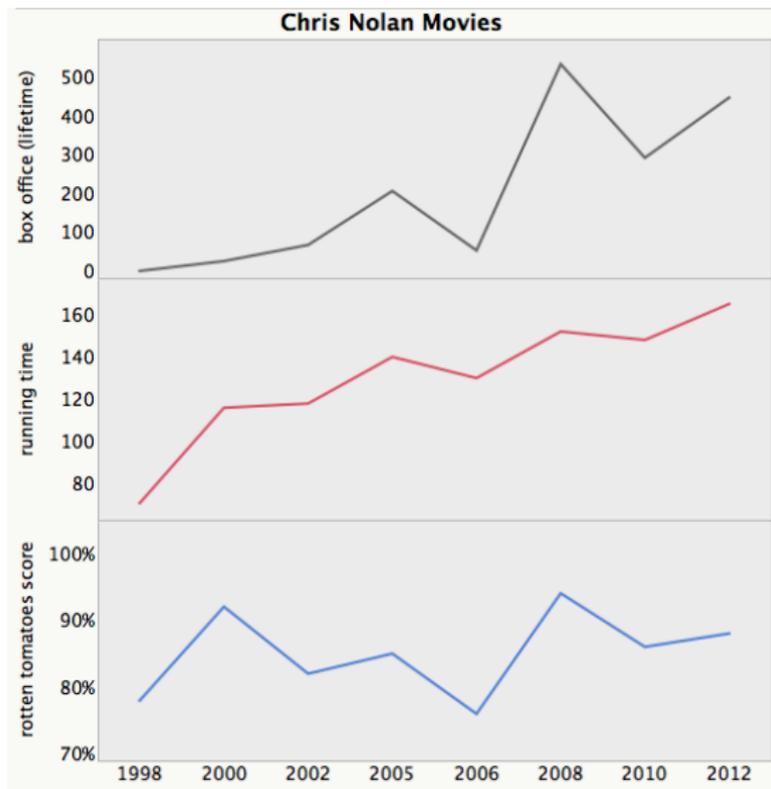
Body Mass Index



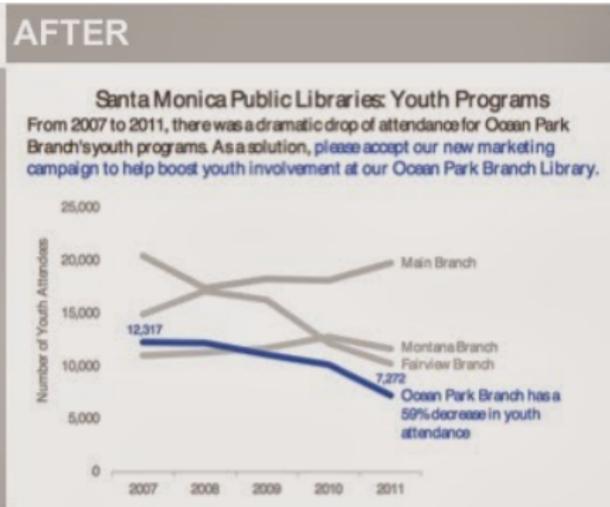
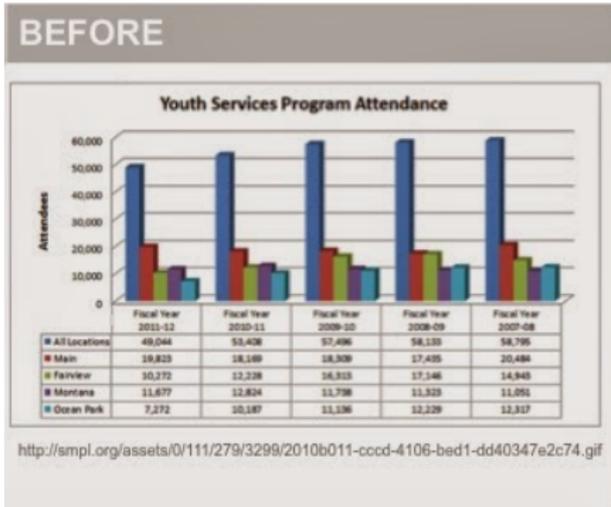
Film



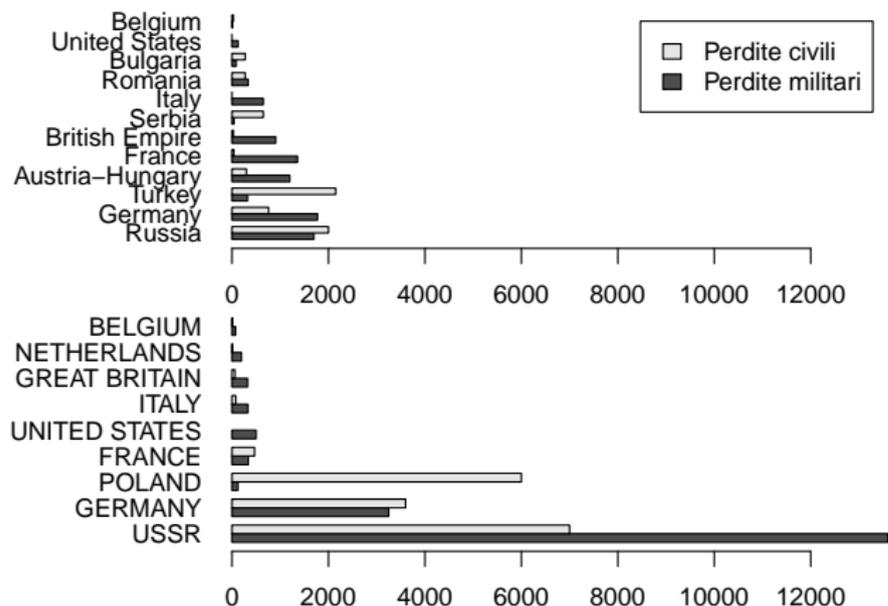
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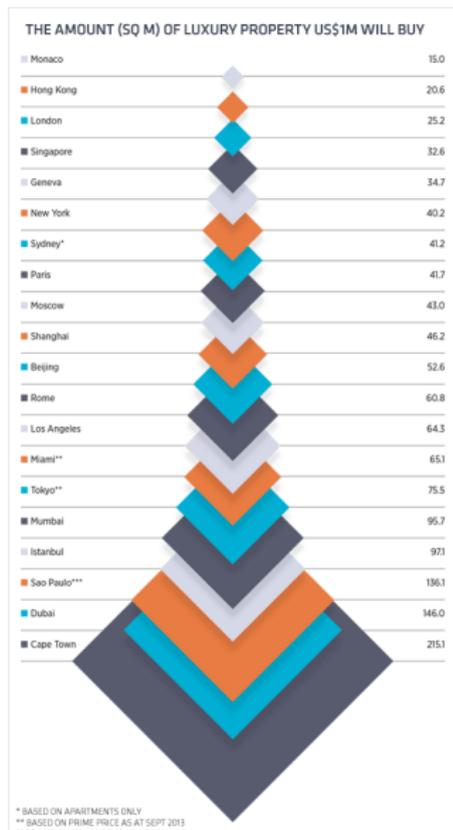
Esempio



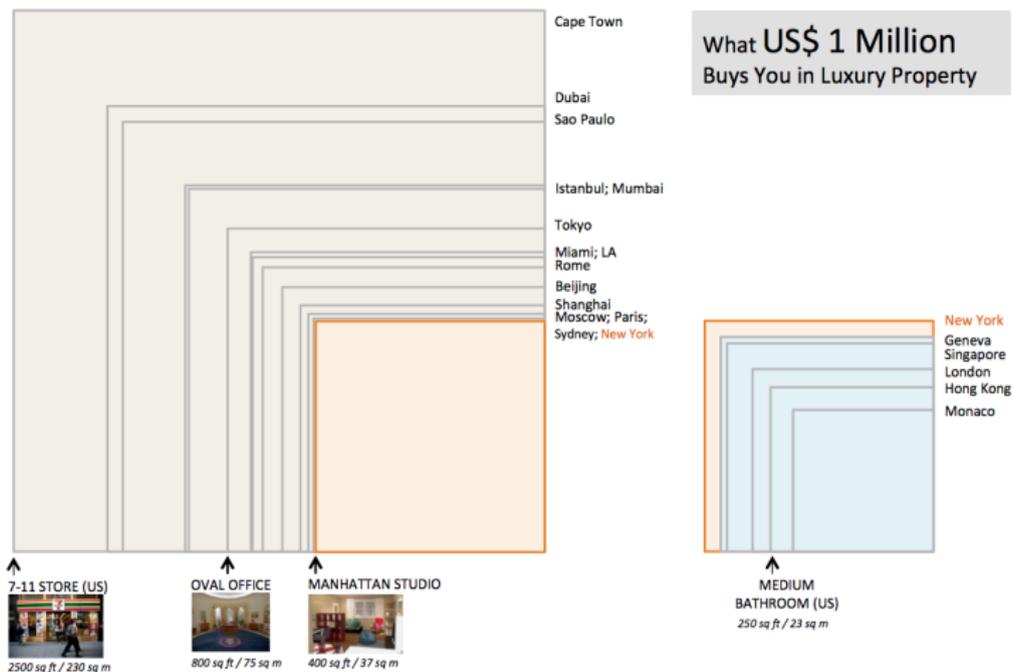
Un grafico sulle vittime delle due guerre mondiali



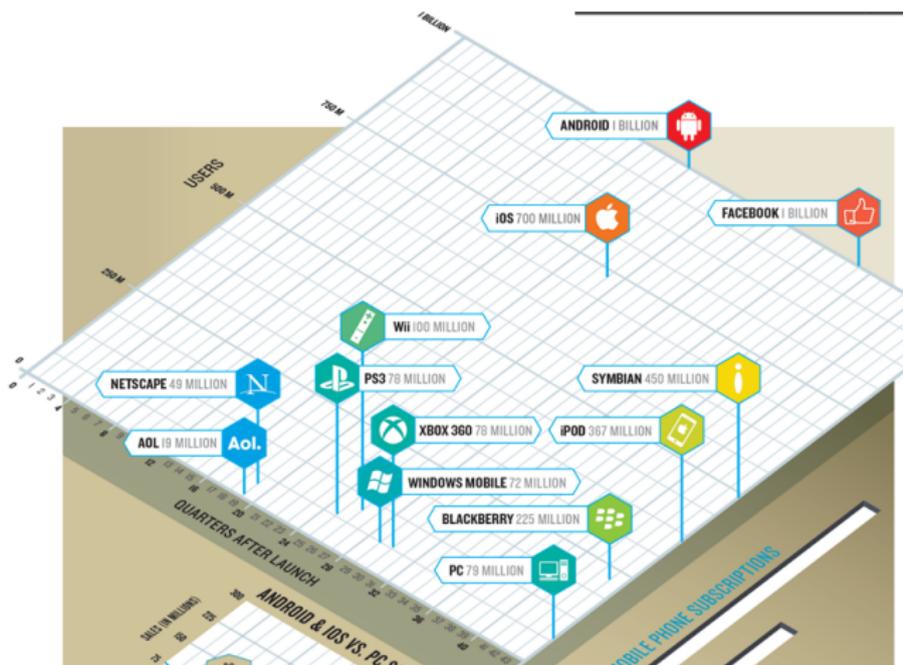
Prezzi delle case



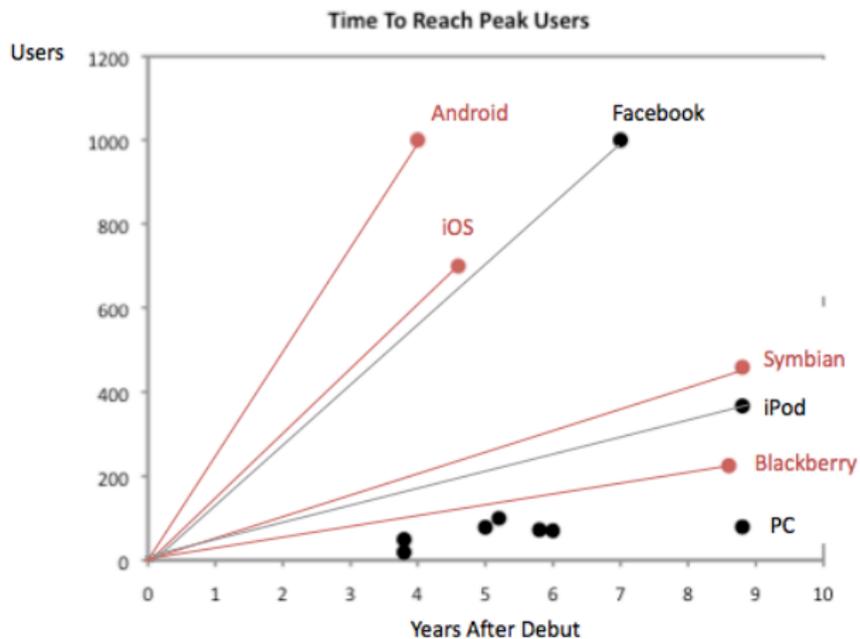
Prezzi delle case



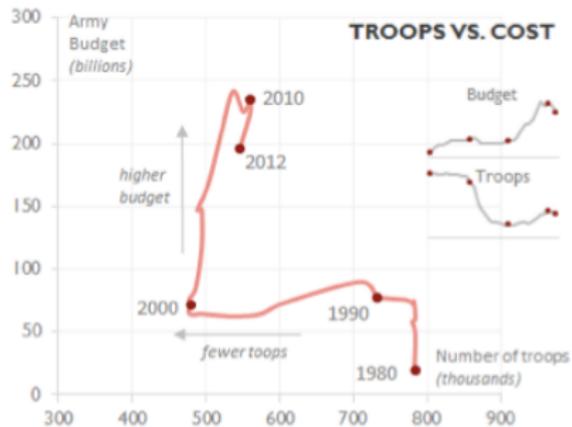
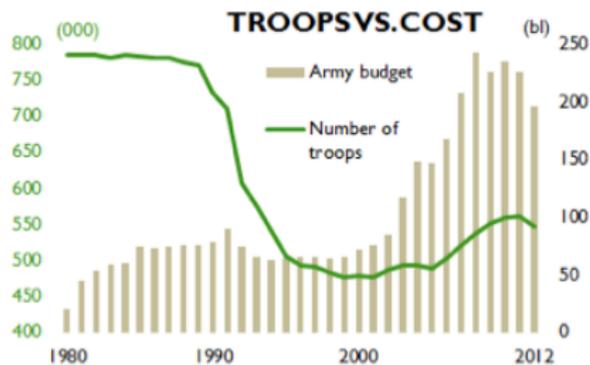
Tecnologia



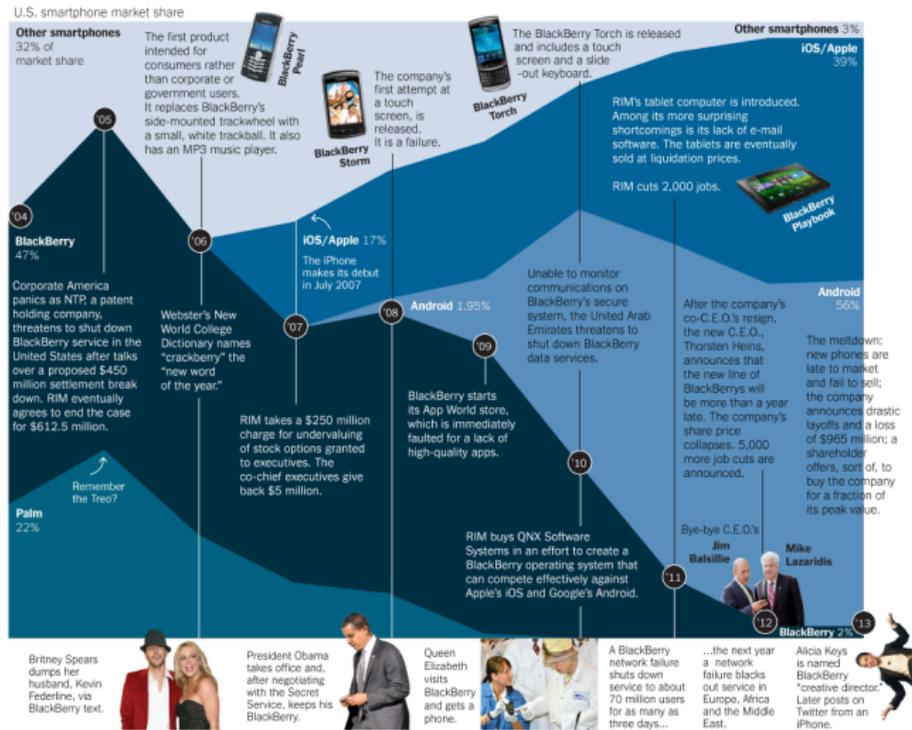
Tecnologia



Esempio

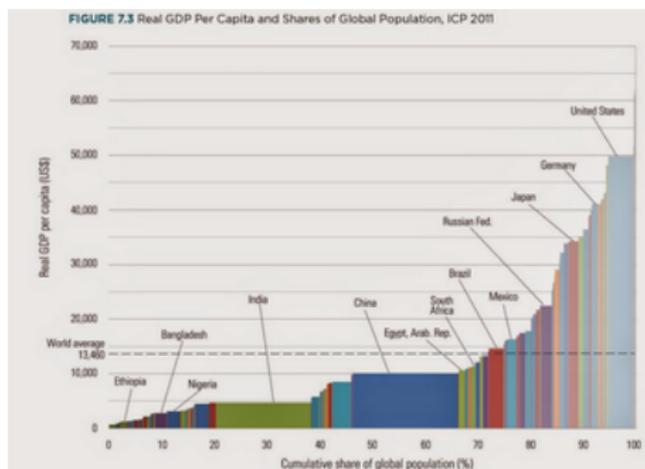


Esempio: blackberry



Tre grandezze collegate

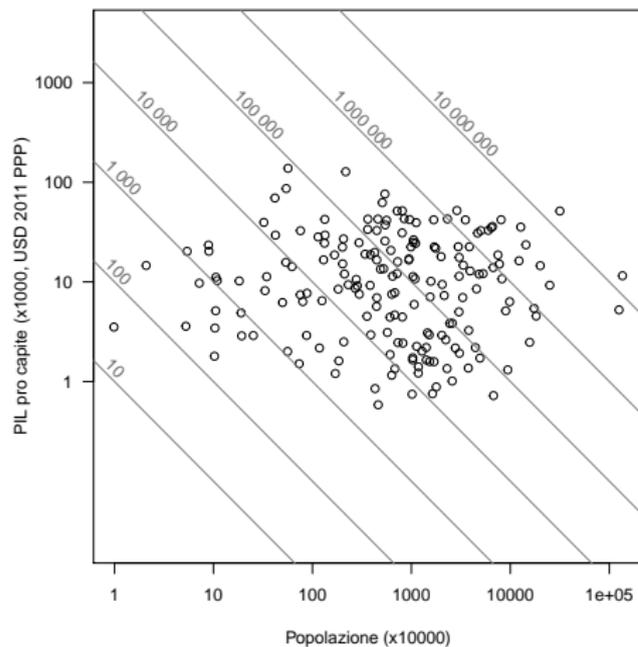
Il grafico sotto riportato è pubblicato in un rapporto della Banca Mondiale.



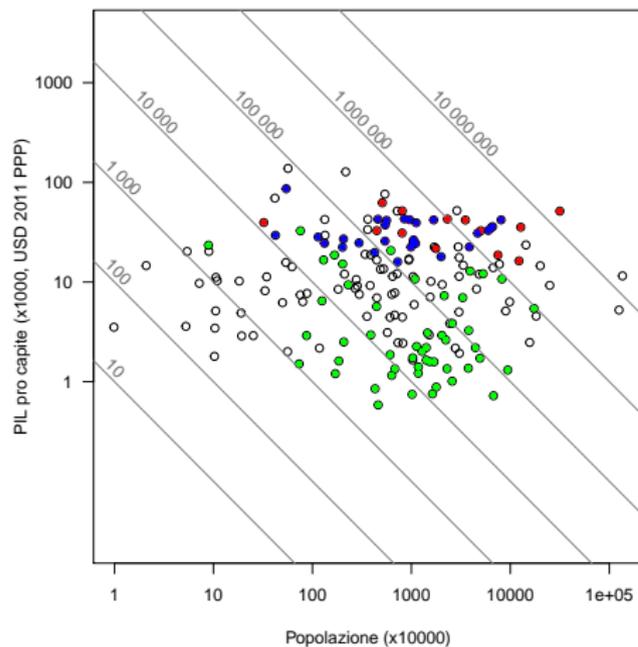
We can see that while China has overtaken Germany and Japan to become the world's second-largest economy (i.e., total area of the rectangle) its citizens are nowhere near being as rich as those of those countries or even Mexico.

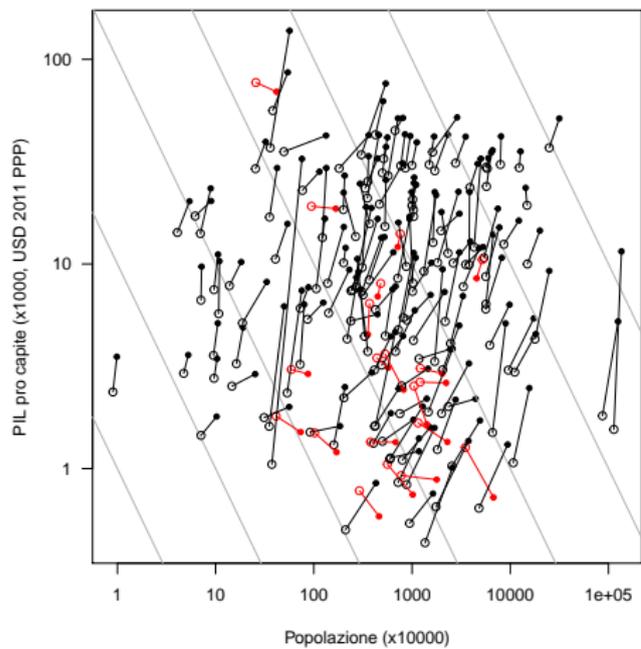
Tre grandezze collegate (continua)

Un grafico alternativo



Tre grandezze collegate (continua)



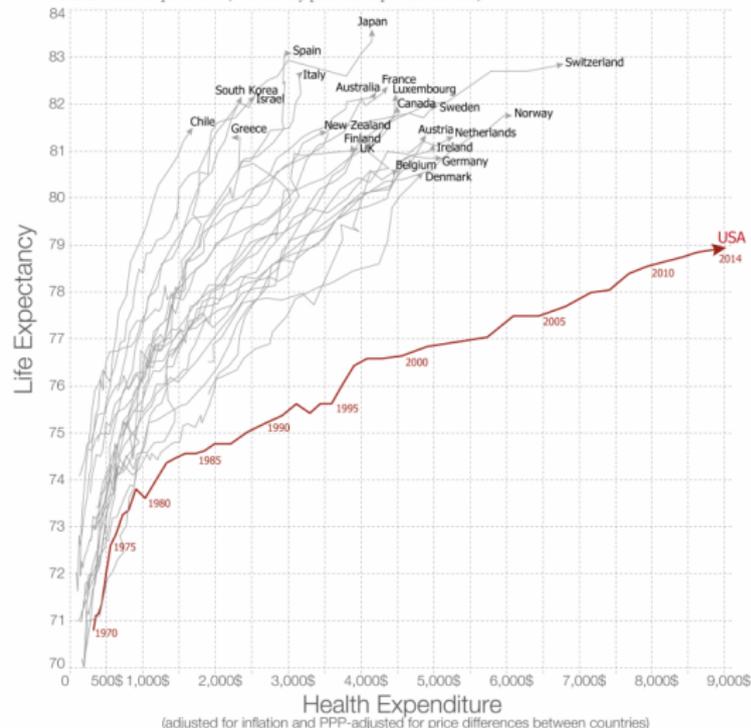


Life Expectancy and Health Expenditure

Life expectancy vs. health expenditure over time (1970-2014)



Health spending measures the consumption of health care goods and services, including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. Shown is total health expenditure (financed by public and private sources).

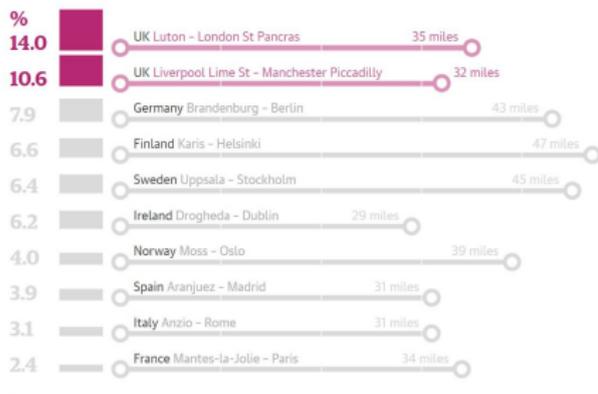


Costo del trasporto ferroviario in Europa

Quanto costa viaggiare in treno?

Costa di più in Italia, in Gran Bretagna o ...

Monthly cost of a season ticket as a percentage of average monthly wages



Guardian graphic | Source: Action for Rail, Guardian Research, OECD, Distances are approximate

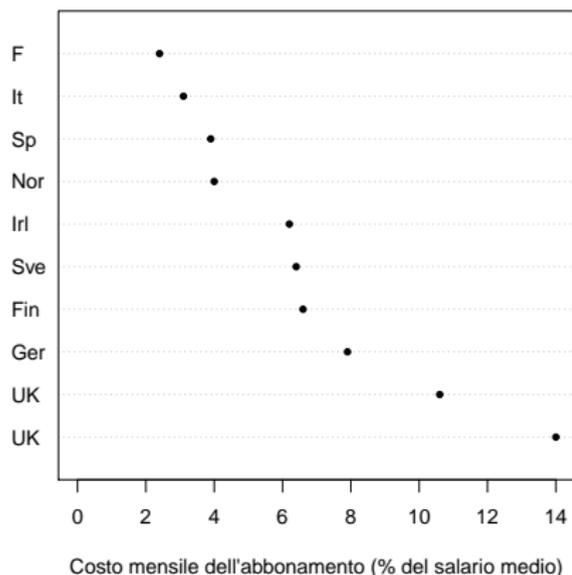
La domanda è interessante, che dati devo raccogliere?

- scegliere dei percorsi ragionevolmente simili (per importanza delle città collegate, distanza, ...)
- ottenere i prezzi e renderli paragonabili (PPP o, come qui, percentuale del reddito)

Costo del trasporto ferroviario in Europa

Quanto costa viaggiare in treno?

Costa di più in Italia, in Gran Bretagna o ...



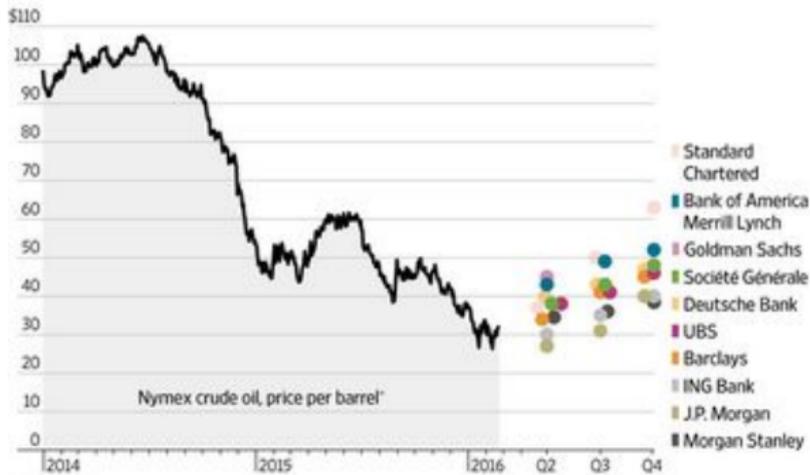
La domanda è interessante, che dati devo raccogliere?

- ▶ scegliere dei percorsi ragionevolmente simili (per importanza delle città collegate, distanza, ...)
- ▶ ottenere i prezzi e renderli paragonabili (PPP o, come qui, percentuale del reddito)

Prezzo del petrolio e previsioni

Looking Ahead at Oil Prices

Where investment banks currently (February 2016) see the price per barrel of U.S. crude-oil futures in the next few quarters



*Through Feb. 24

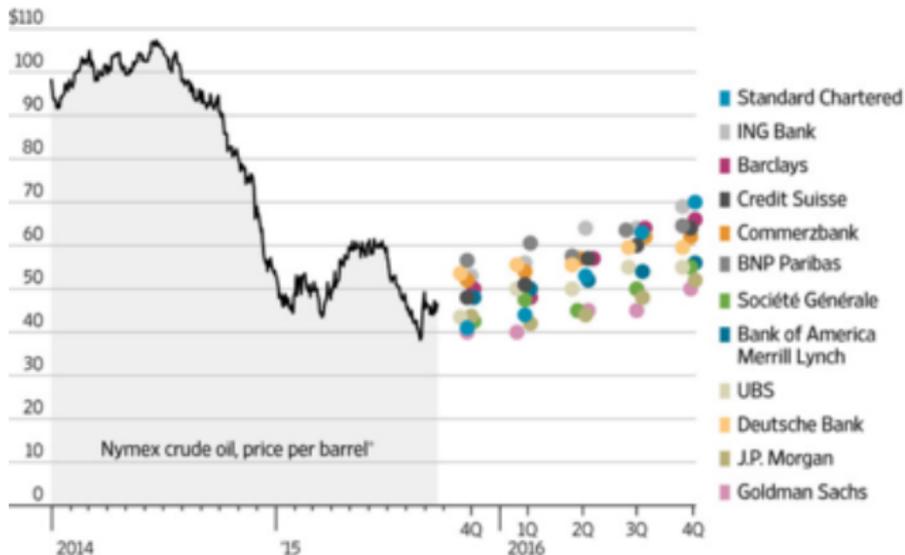
Source: WSJ Market Data Group (Nymex crude prices); the companies

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Prezzo del petrolio e previsioni

Looking Ahead at Oil Prices

Where investment banks currently (September 2015) see the price per barrel of U.S. crude-oil futures in the next few quarters



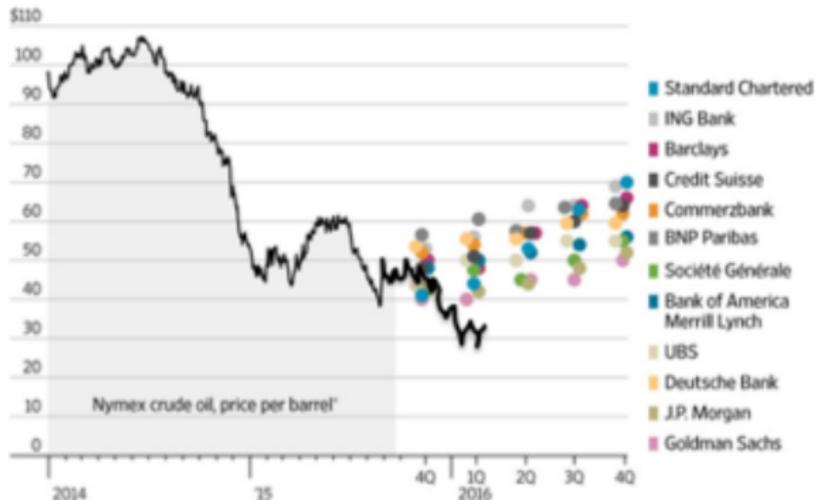
*Through Sept. 21. Note: Only 12 of the 13 banks surveyed submitted prices for Nymex crude. Sources: WSJ Market Data Group (Nymex crude prices); the companies

THE WALL STREET JOURNAL.

Prezzo del petrolio e previsioni

Looking Ahead at Oil Prices

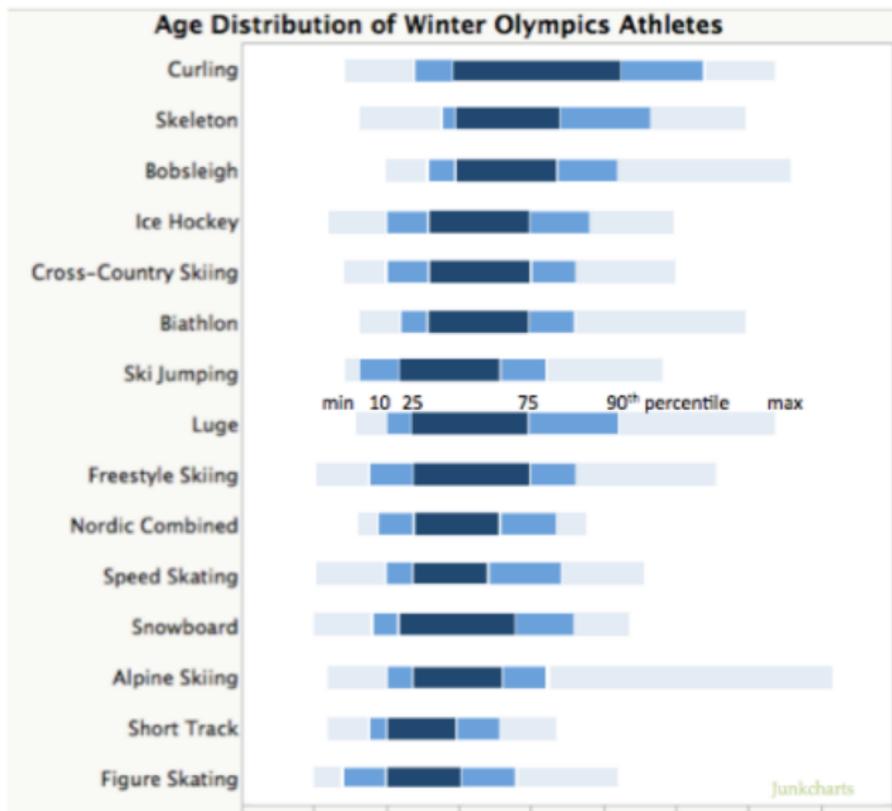
Where investment banks currently (September 2015) see the price per barrel of U.S. crude-oil futures in the next few quarters



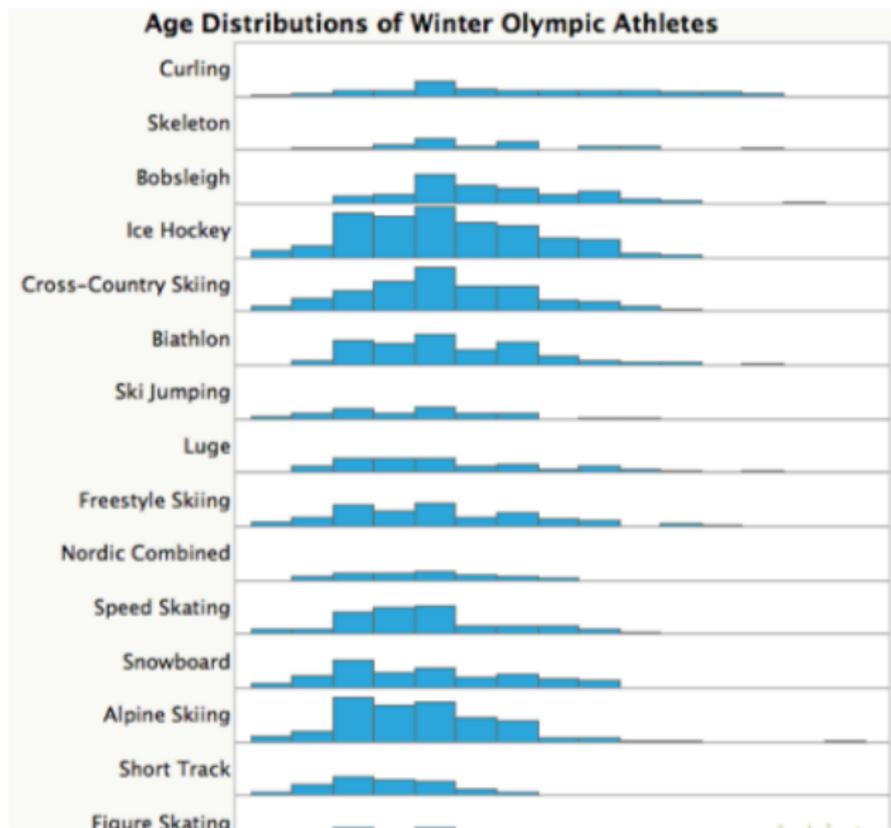
*Through Sept. 21. Note: Only 12 of the 13 banks surveyed submitted prices for Nymex crude. Sources: WSJ Market Data Group (Nymex crude prices); the companies

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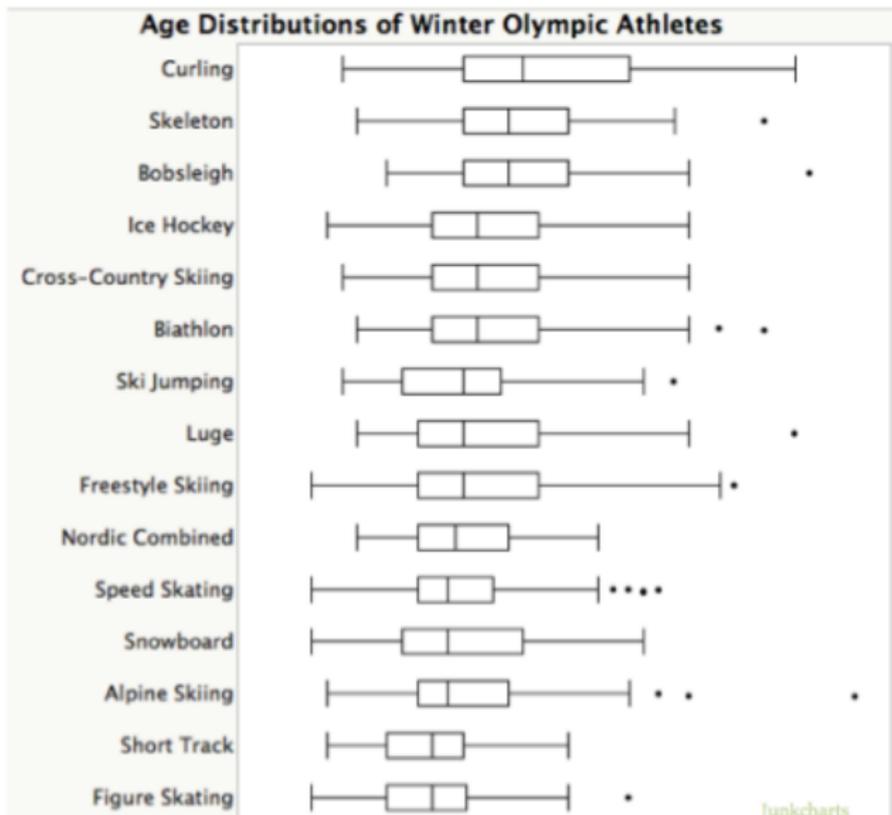
Età degli atleti olimpionici



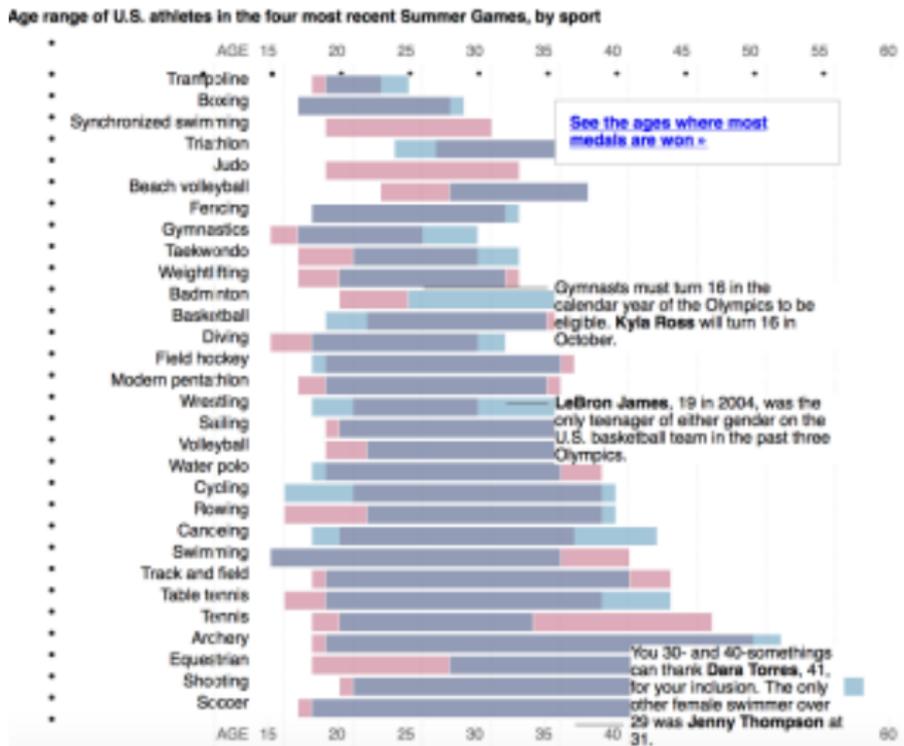
Età degli atleti olimpionici



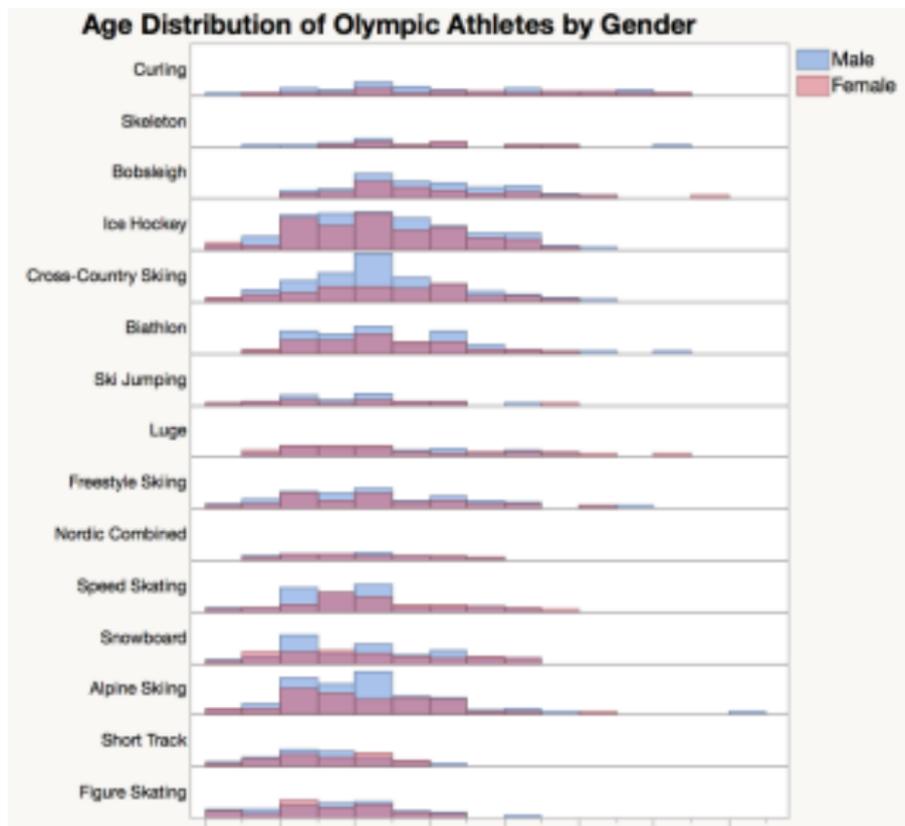
Età degli atleti olimpionici



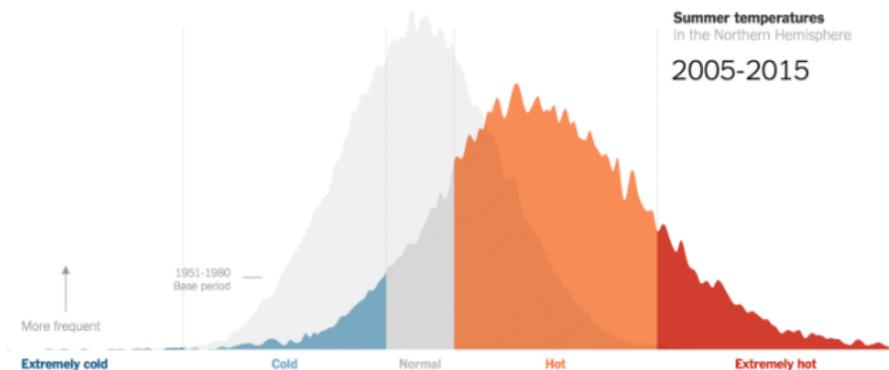
Ancora età degli atleti olimpionici



Ancora età degli atleti olimpionici



Riscaldamento globale?



Pare di sì.

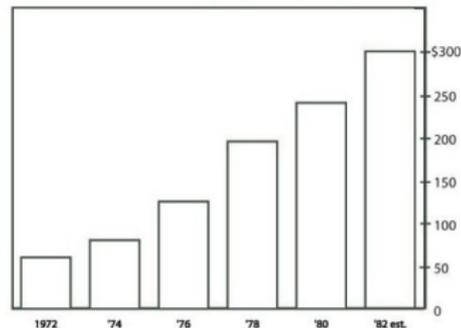
Il grafico-mostro

MONSTROUS COSTS

Total House and Senate campaign expenditures, in millions



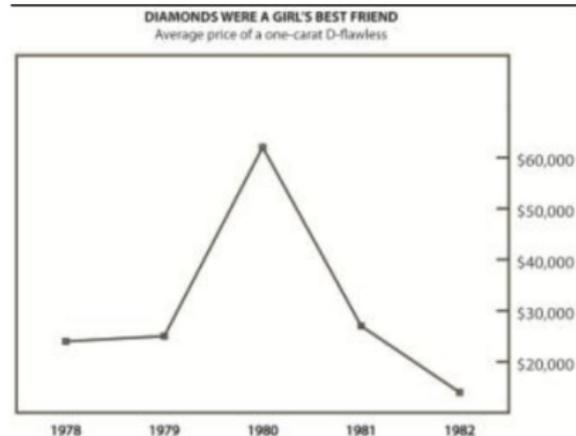
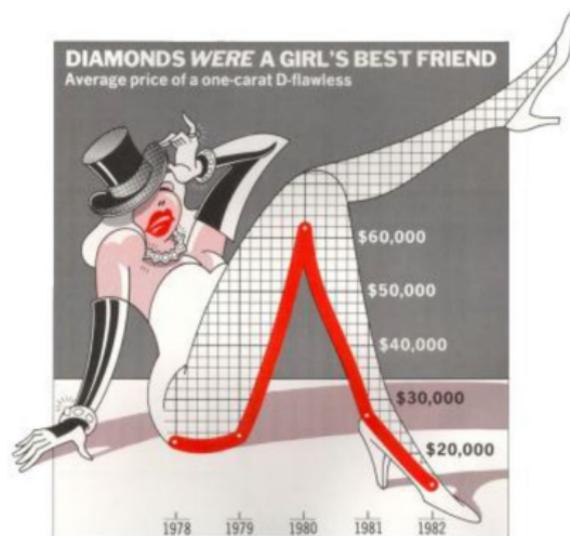
MONSTROUS COSTS
Total House and Senate campaign expenditures, in millions



Qui è prevalente lo scopo di attrarre l'occhio del lettore (rispetto a comunicare le grandezze), d'altronde è un manifesto di propaganda.

Sull'estetica a ognuno il suo giudizio.

Donne e diamanti



Anche qui, pur non essendoci uno scopo propagandistico, vi è più un tentativo di attirare l'attenzione che di descrivere un fenomeno.

Altro

- ▶ <https://digg.com/2019/tech-companies-main-revenue-stream-data-visualization>
- ▶ <https://www.theguardian.com/cities/ng-interactive/2017/feb/14/are-you-at-risk-how-pollution-increases-your-chance-of-de>
- ▶ http://junkcharts.typepad.com/junk_charts/2016/11/here-are-the-cool-graphics-from-the-election.html