



# Critical & Analytical Thinking Ema Tusianti

Statistics-Indonesia Tirane, 3-4 September 2018



## EMA TUSIANTI, M.Sc

Directorate Analysis and Statistics Development Statistics-Indonesia (BPS)

BIROGLU







# **Challenges** of Statistics Provider



Jakarta, 29 January 2009 Case: Poverty Rate Data Release



Medan, 12 July 2013 Case: Registration of Social Protection Program



Makasar, 29 April 2010 Case: Poverty Rate Data Release

5

Jakarta, 25 May 2010 Case: Labor Minimum Wage Determination

https://daerah.sindonews.com/read/758593/26/pengerusakan-kantor-bps-di-manokwariterekam-cctv-1373273577

8 July 2013

Location: BPS-Statistics Manokwari Regency

- demonstrations making threats to vandalism and property destruction
- threats against officers



BersamaKitaBisa @rohmani\_elqudsi

#### RP 11.000/hari itu TIDAK MISKIN.

Saya usul ke Presiden Jokowi agar seluruh pegawat BPS digaji Rp 330.000 perbulan atau Rp 11.000 perhari, supaya bisa merasakan apa yang mereka umumkan bahwa: penghasilan Rp 11.000/hari tidak termasuk kategori miskin.

#### $\bigcirc \bigcirc \bigcirc \land$

#### 726 likes

mr\_binarycode Mari kita dukung pemerintah untuk menggaji karyawan BPS 11rb perhari kalau dia jomblo, tapi kalau dia punya anak dan istri tinggal dikalikan jumlahnya dengan 11.000( teori dr mereka)

Dan dukung pemerintah untuk memberikan uang jajan anak STIS 11.000 perhari.







11

#### Madyusup

Ko jadi asal BACHOT ya itu BPS, udah digaji rakyat, kerja asal²an. Like · Reply · 2w



#### Riza Zahari

Analisa yang luar biasa....pasti analis-nya tamatan luar negri

# **NSO** roles

- Provide based policy making through enabling comparison of data across regions and countries
- Provide a framework of stable, trusted, regular and coherent base of key national and international statistics
- Coordinating the provision of official statistics produced by Line Ministry

## Enhancing The Production of Statistics

- 1. Demand of data variation increases
- 2. Need of data disaggregation
  - Gender (male female)
  - Child, youth, elderly
  - Expenditure category
  - Business scale
  - etc
- 3. Need of representative data for more detail regions
  - Province: 34
  - Municipalities/regencies: 514
  - Village: 82.190



9

## NATIONAL STATISTICAL DEVELOPMENT SYSTEM (NSDS)



CISS	: Coordination, Integration, Synchronization, and Standardization.
COMINPROD	: Compilation of Administrative Product.
(1)	: BPS actives to coordinate statistical undertaking
(2)	: Government Institutions submit survey plan and BPS provides recommendation.

- (3) Government Institutions give the result to BPS.
- (4) Private/Community submit synapsis to BPS.
- (5) Government Institutions and private/community are coordinated and cooperated together by BPS.

## THE INCREASE OF VARIOUS DATA SOURCE NEED





# Why Critical & Analytical Thinking?

# The Challenges are.....

- Rising public awareness about statistics →
   Statistical literacy
- 2. Politics
  - Confirmation bias
- 3. Fake news and social media development
- 4. Reducing errors on Statistical processes
  - Statistical errors
  - Presentation errors
  - Inappropriate analysis

# Error in statistical methods

- Discarding unfavourable data
- Biased samples
  - Non-random samples
  - Self selection
  - Non-response bias
- Error in reporting
  - Leading questions
  - Deliberate lying
  - Guessing
  - Aiming to give a favourable impression

Source: Peter Harper-Deputy Australian Statistician, Australian Bureau of Statistics National Statistical Service Seminar, 19 August 2011

# **Error in presentation**

- Misleading averages
  - Mean, median and mode
  - Hidden distributions
- Meaningless percentages
- Overgeneralisation
- False precision
- Data dredging/selective presentation
- Inappropriate comparisons
- Misleading charts

Source: Peter Harper-Deputy Australian Statistician, Australian Bureau of Statistics National Statistical Service Seminar, 19 August 2011

# Inappropriate analysis

- Drawing conclusions from inconclusive results
- Misunderstanding indexes
- Missing the context
- Extrapolating the trend
- False causality



Source: Peter Harper-Deputy Australian Statistician, Australian Bureau of Statistics National Statistical Service Seminar, 19 August 2011



Statistics is an essential input for decision-making and the design of good public policies by governments, but they are often victims of excessive politicization.

# Kiana Wilburg

https://www.kaieteurnewsonline.com/2018/06/ 20/idb-wants-to-help-bring-an-end-topoliticization-of-national-statistics-publishesstudy-to-aid-nations-in-capacity-building/

**"Statistical thinking** will one day be as necessary for efficient citizenship as the ability to read and write!"

Quote from the presidential address in 1951 of mathematical statistician Samuel S. Wilks (1906-1964) paraphrasing from HG Wells' book, *Mankind in the Making*. "A person's statistical literacy is their ability to interpret and critically evaluate statistical information, and to communicate and discuss their reactions to this information"

Iddo Gal (2002) https://iase-web.org/documents/intstatreview/02.Gal.pdf



THE AMERICAN STATISTICAL ASSOCIATION

# Critical Thinking

- 1. Consists of mental processes of discernment, analysis and evaluation, especially as it relates to what we hear by way of points that are raised or issues which are put forward for discussion.
- 2. Includes the process of reflecting upon a tangible or intangible item in order to form a sound judgment that reconciles scientific evidence with common sense.
- 3. Critical thinking is most successful when it effectively blends our natural senses or feelings with our logic and intuition, all applied in a systematic manner.

### Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-critical-thinking-different-from-analytical-or-lateral-thinking



- 1. A thinking process or skill in which an individual has the ability to scrutinize and break down facts and thoughts into their strengths and weaknesses.
- 2. Involves thinking in thoughtful, discerning ways, in order to solve problems, analyze data, and recall and use information.

Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-criticalthinking-different-from-analytical-or-lateral-thinking



- Reasons to do and believe things
- Assessing the reasons we are given to do or believe these things calls upon us to think critically and logically.
- to believe that we produce valid and reliable data.



# Objective of Critical Thinking

- how to tell good reasoning from bad reasoning and how to apply that to your own reasoning and to the reasoning of other people.
- how to construct chains of reasoning or arguments that are logical and, therefore, more likely to convince people.

## The place of data statistics in problem solving

**PPDAC** 



**Problem** step is about trying to turn these vague feelings into much more precise goals, some very specific questions that should be able to be answered using data.

**Plan** step is then about deciding what people/objects/entities to collect data on, what things we should "measure", and how we are going to do all of this.

The PPDAC model was developed by R.J. Mackay and W. Oldford in the early 1990s

Analysis step and the Conclusions steps are about making sense of it all and then communicating what has been learned. There is always a back and forth involving doing analysis, tentatively forming conclusions and doing more analysis. **Data** step is about obtaining the data, storing it and "whipping it into shape" (data cleaning). Data analysts are always involved with data cleaning, if only because we almost always discover problems with data during analysis.



# **Steps of doing critical &** analytical thinking

## Critical Thinking

- 1. Deeply evaluating how far information we've got is current, up-to-date and accurate.
- 2. Checking for bias or unsubstantiated assumptions.
- 3. Evaluating how far the
  evidence or opinions presented
  genuinely proves the point(s)
  claimed.

#### Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-critical-thinking-different-from-analytical-or-lateral-thinking



Click away from the story to investigate the site, its mission and its contact info.



#### **CHECK THE AUTHOR**

Do a quick search on the author. Are they credible? Are they real?



#### CHECK THE DATE

Reposting old news stories doesn't mean they're relevant to current events.



**CHECK YOUR BIASES** 

Consider if your own beliefs could affect your judgement.

https://guides.library.manoa.hawaii.edu/c.php?g= 105328&p=4321363

# Critical Thinking

- Weighting up opinions, arguments or solutions against appropriate (usually logical) criteria.
- 5. Making inferences from the data/information and filling in "gaps".
- 6. Taking a clear line of reasoning through to its logical conclusion.
- Checking whether the evidence/argument really support the conclusions.

#### Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-critical-thinking-different-from-analytical-orlateral-thinking



Headlines can be outrageous in an effort to get clicks. What's the whole story?



#### SUPPORTING SOURCES?

Click on those links. Determine if the info given actually supports the story.



If it is too outlandish, it might be satire. Research the site and author to be sure.



- 1. Focusing on facts and evidence.
- 2. Analyzing data or information or systems.
- 3. Dissecting data/information and the analysis of complex things into simpler constituents.
- 4. Reasoning thinking that is coherent and logical.

### Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-critical-thinking-different-from-analytical-or-lateral-thinking

# ANALYTICAL THINKING: DATA ANALYSIS

- 5. Partitioning, breakdown an analysis into mutually exclusive categories.
- Eliminating extraneous data or analysis of a problem into alternative possibilities followed by the systematic rejection of unacceptable alternatives.
- 7. Analyzing trends or the analysis of changes over time.

### Jon Warner

https://www.linkedin.com/pulse/20141113145010-29175303-is-criticalthinking-different-from-analytical-or-lateral-thinking

## OBSERVE YOUR FEELINGS & PEOPLE CLAIMS

We have feelings about many of the claims we might read and feelings of Proponents & Opponents

Be aware of (dis) confirmation bias

We are independent???



## Raw materials on critical thinking are .....





• Is that a big number?

Many numbers mean little until we can **compare** them with a more familiar quantity.

• What is the historical trend?

Simplifying information
 – statistical inferences, composite index

#### What does it mean?

• There is no single right answer

Is this a causal relationship?

• all statistics are a summary of a more complicated truth

What influential factors and forward impacts?

• Back to details

What's being left out?

• There is no shame in leaving something out. No chart, table or tweet can contain everything. But what is missing can matter.

# ALWAYS QUESTIONING & BE CURIOUS

- Curiosity is a cardinal virtue because it encourages us to work a little harder to understand what we are being told, and to enjoy the surprises along the way.
- Almost any statistical statement raises questions:
  - Who claims this?
  - Why?
  - What does this number mean?
  - What's missing?
- Curiosity can put us into a better frame of mind to engage with statistical surprises. If we treat them as mysteries to be resolved, we are more likely to spot statistical foul play, but we are also more open-minded when faced with rigorous new evidence.

# Building Networks

- Academicians
- Expert
- Practitioners
- Other government organizations
- International organization



# **BPS Outputs are monitored by many stakeholders**

### Statistics Forum, Constitution No 16 Year 1997 29th article:

- 1) Government create statistics forum giving advices and critics of statistical outputs
- 2) The members of this organization are government, experts, practitioners, academicians, community



### **International Organization**

Outputs are reported to United Nations



#### Community

Outputs are reported by data release



# **Application** in Indonesia


### Albania: Population 2017 : 2,873,457 people

Surface Area 2017 : 28,750 sq.km

### Indonesia: Population 2017 : 263,991,379 people (92x) Surface Area 2017 : 1,910,931 sq.km (66x)

## Top Key Indicators: Albania Vs Indonesia

### Albania

### (www.instat.gov.al)

- Consumer price index/inflation
- Economic growth
- External trade
- Unemployment rate

### Indonesia

### (www.bps.go.id)

- Consumer price index/inflation
- Economic growth
- External trade
- Unemployment rate
- Poverty rate
- Gini ratio
- Human Development
  Index

## Top Key Indicators: Albania Vs Indonesia



Source: http://databank.worldbank.org/data/reports.aspx?source=2&country



Source: http://databank.worldbank.org/data/reports.aspx?source=2&country



Source: http://www.ilo.org/ilostat

## Top Key Indicators: Albania Vs Indonesia



Source: http://databank.worldbank.org/data/reports.aspx?source=2&Topic=11



Source: http://hdr.undp.org/sites/default/files/rankings.pdf http://hdr.undp.org/sites/default/files/hdr\_2016\_statistical\_annex.pdf



## **Case 1** Poverty Rate Critics: "BPS released too low poverty rate???"



Profil Kemiskinan di Indonesia Maret 2018 No. 57/07/Th. XXI. 16 Juli 2018

### BERITA RESMI STATISTIK

badan pusat statistik

### Profil Kemiskinan di Indonesia Maret 2018

Persentase penduduk miskin Maret 2018 turun menjadi 9,82 persen

- Pada bulan Maret 2018, jumlah penduduk miskin (penduduk dengan pengeluaran per kapita per bulan di bawah Garis Kemiskinan) di indonesia mencapal 25,95 juta orang (9,82 persen), berkurang sebesar 633,2 ribu orang dibandingkan dengan kondisi September 2017 yang sebesar 26,58 juta orang (10,12 persen).
- Persentase penduduk miskin di daerah perkotaan pada September 2017 sebesar 7,26 persen, turun menjadi 7,02 persen pada Maret 2018. Sementara itu, persentase penduduk miskin di daerah perdesaan pada September 2017 sebesar 13,47 persen, turun menjadi 13,20 persen pada Maret 2018.
- Selama periode September 2017–Maret 2018, jumlah penduduk miskin di daerah perkotaan turun sebanyak 128,2 ribu orang (dari 10,27 juta orang pada September 2017 menjadi 10,14 juta orang pada Maret 2018), sementara di daerah perdesaan turun sebanyak 505 ribu orang (dari 16,31 juta orang pada September 2017 menjadi 15,81 juta orang pada Maret 2018).
- Peranan komoditi makanan terhadap Garis Kemiskinan jauh lebih besar dibandingkan peranan komoditi bukan makanan (perumahan, sandang, pendidikan, dan kesehatan). Sumbangan Garis Kemiskinan Makanan terhadap Garis Kemiskinan pada Maret 2018 tercatat sebesar 73,48 persen. Angka ini naik dibandingkan kondisi September 2017, yaitu sebesar 73,35 persen.
- Jenis komoditi makanan yang berpengaruh besar terhadap nilai Garis Kemiskinan di perkotaan maupun di perdesaan adalah beras, rokok kretek filter, telur ayam ras, daging ayam ras, mie instan, dan gula pasir. Sedangkan komoditi nonmakanan yang berpengaruh besar terhadap nilai Garis Kemiskinan di perkotaan maupun perdesaan adalah perumahan, bensin, listrik, pendidikan, dan perlengkapan mandi.

Profil Kemiskinan di Indonesia Maret 2018

### Data release



## **Trending Topic: BPS has been criticized**



6 hari yang lalu - The Indonesian Central Statistics Agency (BPS) has recorded the country's poverty rate at 9.82 percent as of March 2018, the lowest in recorded history and the ...

### Poverty Isn't Decreasing, Indonesia's Official Poverty Line Is Just Too ...



- 1. Focusing on facts and evidence --> find the reasons behind by compiling supporting data
- 2. Analyzing data or information or systems.

Identifying related indicators/information:

- Inflations
- Poor people related indicators: farmers
- Government programs
- Other benchmarks



- 3. Dissecting data/information and the analysis of complex things into simpler constituents.
- 4. Reasoning thinking that is coherent and logical.

Analyse supporting data/information:

- Inflations
- Poor people related indicators: farmers
- Government programs
- Other benchmarks



- Per capita expenditure 40% population (lowest income) September 2017-March 2018 increase by 3,06 percent.
- Cash transfer increase 87,6 percent on first quarter 2018
- Rice distribution for the poor on the first quarter was punctual



- Farmer Terms of Trade (Ratio of Prices Received by Farmers Indices and Prices Paid by Farmers Indices) on March 2018 was above 100, (101,94)
- Rice price increase 8.57 percent on September 2017-March 2018 making poverty rate decrease was not as high as March 2017-September 2017. On March 2017-September 2017 rice price did not change significantly.

Percentage of price increase on some commodities, September 2017- March 2018



## Is poverty line (PL) too low?









## Is Poverty Line too low? Benchmarking to WB standard

## World Bank Standard (US\$ PPP)

- World Bank uses *purchasing power parity*, PPP USD not the real USD
  - Cut of point poverty of world bank standard (*baseline* 2011):
    1,9 US\$ PPP as a cutting point of *extreme poverty*
- Convertion value of 1 US \$ PPP engan baseline 2011: Year 2016: 1 US \$ PPP = Rp 4 985,7 , source: World Bank (http://databank.worldbank.org/data/home.aspx)



Position of poverty line to world bank standard in US \$ PPP: Year 2016: nat PL Rp 364 527,-/capita/month is amounted to 2,44 \$ PPP/day Year 2018: nat PL Rp 401 220,-/capita/month is amounted to 2,50 \$ PPP/day

## ANALYTICAL THINKING: DATA ANALYSIS

- 5. Partitioning, breakdown an analysis into mutually exclusive categories.
- Eliminating extraneous data or analysis of a problem into alternative possibilities followed by the systematic rejection of unacceptable alternatives.

### **Poverty Rate by Area** September 2016 – March 2018



High diparity between urban and rural



### Analyzing trends or the analysis of changes over time



## **Encounters The Issues: Media Talks**

### Opini 7

### Pro-Kontra Angka Kemiskinan

Angka kemiskinan dikonsumsi pendu-duk referensi yang Indonesia sebesar 9.82 persen yang diumumkan Badan Pusat Statistik pada 16 Juli 2018 disambut hangat disertai pro-kontra. Penyebabnya, angka kemiskinan satu digit menventuh "posisi ekonomis dan politis".

envataan ini menyebab-



dengan pengeluaran yang sangat rendah. Misalnya petani dengan penghasilan Rp 200.000 per bulan. Untuk memenuhi kehutuhannya, ia masih bisa memetik savuran dari kebun sendiri, mencari ikan di sungai tanpa membayar dan sebagainya untuk memenuhi ke butuhannya

Akan sulit mencari satu angka kemiskinan" yang dapat memuaskan seluruh masyarakat sehingga pro-kontra akan terus berlanjut. Hal paling utama yang harus dilakukan bangsa Indonesia saat ini bukan mem-



### SAYA TIDAK MAIN-MAIN ENGAN ANGKA

KEPALA HADAN PUSAT STATISTIK

-9.87 mm

kuensinya, angka kemiskinan yanj

berbasis pendapatan tendensinya akan membesar.

Dengan konfigurasi problematika

tersebut, ukuran yang lebih realisti

untuk menggambarkan kemiskinar

riil ialah kekayaan (wealth). Kekaya

patan (yang bersifat incremental). Dasar perhitungan kekayaan ialah konsep stok, yakni posisi pada satu

an jalah nilaj akumulasi dari per

titik waktu tertentu

MEDIA INDONESIA

Kan kontroversi terhadap besaran angka kemiskin i kelannan mini-ium dari komoditas lai Bahaya Buta Data

rensi

sar makanan yang riil

kemudian disetara

kan dengan 2100 ki-

lokalori/kapita/hari.

Penvetaraan nilai pe-

ngeluaran kebutuhan

minimum makanan

dilakukan dengan

menghitung rata-rata

kalori dari ke-52 ko-

moditas. Selanjutnya

GKM disetarakan de

ngan 2.100 kilokalori

dengan mengalikan

2.100 terhadap harga

implisit rata-rata ka-

lori menurut daerah

dari penduduk refe-

kan penjumlahan

GKNM merupa-

nul di attes 5 permen

Armen Stefanis of Addressy ENES-31822 (St.

Masyarakat dunia modern kini semakin kompetitif dan menghendaki keterukuran yang fact-based, berdasarkan data, dalam merencanakan. mengevaluasi, dan mengkritisi masa depan negara. Mereka melek data (data literacu)

abarantyo dipahani usuara henar

all terminations Negata magic actuality haad designs he n penduanganan yang esidener Au-erdanarkan bulati, Handeya pan elek-ementary yang disebut kedua, in-ia dan beberapa mgara berkembang corps condening tertalit-to th. Have dari kelidakan perubanganan rajad kutang prahiki mengerengati olektad

### term proper warranged had Buts data dan makra data

Tinto chains chaladies in advantation of the baseline

na di daerah, data daga iter technicag tideb ishih datt sekada inemert. Di statem maskab skitumen pe-Anthones beliefs manual of data stars had

beyah akan merupengel jika para perena aisa di pennt dan di daerah keliru dalam me-mulami datanya. Kelompak openini dar Retikut sekalar beberapa contoh, Be-nik bapati di daetah berpendi barggi



### and signify young enough that page redait di kalengaterenya. Tepedatekan di orbagai kenerenyakan kalena sang bagati terlisten karang yalum data. Dikarpak darrah, antak men

testang kembutan, diarahij kebujakan merkandi angka kemutian secara Nerhald remokas angla pengengaran Data Badar Pasat Ratistik (1975) se-mujakkan harno 2 penera angka peng-anggaran di daerah kita, padahar di tengkat 12734 memerican komunition als dia lintan, dan memperit ant bentang provided wang diskibut Jike yong bernengkatan menalami makine data akan terlebah dahada menghave old the garger history. Surrough too human class

**Statistical Literacy** 

ke determinen determinen pekok yang langsung terkail angka kemutian bay?? dang baik, dan sebaliknya. Kita hone babwa ripmalikan angka pengenggianan ili tingkat manintal date di tingkat provinbrear antal mensikkan IPM, hadirpa n/hafnapatro/hota sauget berferde karrene jauh dati harapan.

jaoh dari harayan, Aigka batas garis kensiskinun (GR) yong Ep 402003/hapita per halan sidh schagian pengenal kenyang saja dihagi dengan 30 hari, menghasilkan angka Jip 120001 hai diperdebatkan dengan sengit. ayhattapatraylatta sangat instanda kannas adaraya fakhar ansindhata penahatah. Contesh lain, bagaimana kaselitan bulerke Penhanganan Manunia (EPM) kita akan menungkat mengatasi ketostingalan dari negara tetanggi dan disparitan antar-ni-Padalad, become GE to bertariael am-tar-rismah tangga, bargantang bencom jumlah anggotanya. Jika manah tanggo

adeat manufall from an ultaren kemiduan per balan 19 (202) ata-Garia batas itu masih sengai rendah Te-tai, karena yang disahan adah mereda panj harna yang disahan ata-dah mereda pairs date. Hal yong some terjall desgan

Sementik brutes (P100), produkt regional brutes (P1000), milai tani, influti, dan masih banyak and do tutar petani, inflasi, dan masih contuk lain yang terse diperde totage dissubnue di huar yang dissub

### Herritshayakan bangsa

on Plankers Plankersky Amerika

Kaltur memerikal atau kultur data me-mung secara kuntura bahan tembiai kita 2016 terbinas dengan kultur terbida ku-sistatit sormatit dan terkadang saliyektit Dapat dipohami jika antara apa yang di-ceritakan oleh data dan yang dipenle-harkan di publik dan atau antara apa yang deurung dates program perchangana dengan apa yang detaktuat oleh data se our sendoring berjands.

Kits blast bortleggad dark sergara mak pang mengeneng tradict data driver of bate Monghriths hebijakan perserinta hole Mongheithd kologaian pu Islanarhon atao data yang diput agan honar arbagai cut masyan hono litra pengitahaan. UN Indenesia, karena tingginy

but a data shibut prosburger product sure bounded day bothad maked and

design their fidure strongies. The acco dity of public shiften; public pulies and for dos oradie pasitrel on publicitar's derivation can be impress if statistics, shats

in past at the center of public debate." KEn yulini hungsa ini akati bibit repot maju jiku dalam merupatakan, meng kritici, dan merupatakan suata kebajaka dars dalars memeratukan tanget masa depan diperioani dengan tradeci barn, yaitu kultur memerikal kultur data dan terua benajara while studied builts date

SABTU, 21 IULI 2018

Haryo Kuncoro Direktur Riset SEEBI

6

Direktur Riset SEEBI (The Socio-Economic & Educational Susiness Institute) lakarta. Staf pengajar FE UNI, Alumnus program Doktor PPs-UGM individu dianggap tetap mampu Yogyakarta berkonsumsi.

geluaran hanya mampu mer ngeluaran hanya mampu menang-kap efek pendapatan. Kenaikan ADAN Pusat Statistik (BPS) belum lama ini merilis data kemiskinan. Per Maret 2018, jumlah pen-duduk miskin ialah 25,95 juta ADAN Pusat Statistik (BPS) harga akan mengurangi kuantitas barang yang diminta. Dengan asum-si pendapatan yang tidak berubah, naga beli konsumen menuru ang (9.82%), me juta orang (10,64%) pada tahun sebelumnya. Dengan capaian ini, kemiskinan di Indonesia untuk kali okok tidak ter masuk ke kualifikasi 'miskin' ertama dalam sejarah menembus Penuhi kebutuhan dasar

kemistinan di Indonesia untuk kali pertamata. Desertamata di pertamata di pertemata Pendekatan kel

pengeruanian harga kebutunan pengeruanian harga kebutunan kemiskinan. Oleh karenanya, penyusuta angka kemiskinan layak diapre-leak bendari tatun melak diapre-Per definisi, pendapatan jalah

balas jasa yang diperoleh individu karena terlibat dalam kegiatan

kemiskinan sekaligus mencermin-kan tingkat produktivitas. Angka ous consumption). Artinya, pengeluaran minimum independen dengan besaran pen-dapatan. Tanpa pendapatan pun, kemiskinan yang tinggi menun-

pihak lain. Konsumsi ialah elemen jukkan tingkat produktivitas yang injeksi pada alur kegiatan ekonomi

**OPINI** 



sumen dan produsen. Oleh karena-

titik waktu tertentu. Angka penduduk miskin yang mengacu ke konsep kekayaan nis-caya jauh lebih 'pahit'. Dari con-toh kasus sebelumnya, meski bisa menjadi sangat sensitif terhadap perubahan status ekonomi sebagai sumber utama pendapatannya.

perinkan stains ekotomi sebagai perinkan stains ekotomi sebagai seconary ayan ekotomi sebagai hubungan kerja, inishnya, pasi keroda sebagai sebagai sebagai keroda sebagai keroda sebagai sebagai sebagai sebagai sebagai sebagai sebagai sebagai keroda sebagai seba

Tidak komprehensif Faktor kepraktisan agaknya menjadi alasan BPS menghindari penerapan konsep pendapatan. Rumah tangga terutama golongan menengah-atas memiliki insentif

bukit empiris merunjukati so-atu negara mengalami kesulitan menekan angka kemiskinan jika sudah berada di level 10%. Angka yang diklaim sebagai perangkap core kemiskinan ini sangat boleh jadi ialah tipe mereka yang tidak memiliki kekayaan sehingga perlu upaya radikal untuk menanggu-langinya.



Panin teebucihan diski uga menatihan bekrajanya efek-harga. Kenalian barga akan disas-atil rurah tanggi dengan mengu-produk sejenih yang harga relatif-nya lehih marah. Dengan begitu, konsumer masih bia menenuhi kehunhan dagar mela tanga per pengentak sejenih yang harga relatif-nya lehih marah. Dengan begitu, konsumer masih bia menenuhi kehunhan dagar mela tanga per pengentak sejenih yang dengan disak langsung menyiratkan simpulan bandingkan besida tini han amen kelaa aka, menengah, dan bawah, tu berarti indeka dini han amen kejan aka, menengah, dan bawah, tu berarti indeka dini han amen kejan aka, menengah, dan bawah, tu berarti indeka dini han amen kejan tinikan pengeluaran di kelam signifikan pengeluaran di kelam

Secara teoretis, pendekatan pe

masing-masing. Alhasil, perhitungan angka ke Ainasii, pernirungan angka ke-miskinan dengan mengacu ke pen-dapatan lebih representatif. Dengan pendekatan ini, kemiskinan dipan-dang sebagai ketidakmampuan dari sisi sumber daya ekonomi. Pen-duduk miskin lalah mereka yang

angka kemiskinan layak diapre-siasi kendati tetap perlu diaudit. Pengeluaran untuk kebutuhan da-

Mengaudit Kemiskinan Satu Digit



## **Case 2** Economic Growth : "Fail to meet the target"



Pelopor Data Statistik Terpercaya Untuk Semua

Target:

5.12%

## **Economic Growth, 2017**

### (released on 5<sup>th</sup> February 2018)





### Pertumbuhan Ekonomi Indonesia Tak Capai Target SBY Kritik Pertumbuhan Ekonomi 5 Persen (Lagi) Hendra Kusuma - detikFinance



SAH, CNN Indonesia | Sabtu, 20/01/2018 15:20 WIB





### DPR RI Kritik Pemerintah Soal Pertumbuhan Ekonomi Indonesia

Kamis, 19 Juli 2018 13:51





Parliament, former president and economist criticize existing government who can not reach economic growth target

Anggota Banggar RI Bambang Haryo



- 1. Focusing on facts and evidence --> find the reasons behind by compiling supporting data
- 2. Analyzing data or information or systems.

Identifying related indicators/information:

- Economic situations of partner countries
- Global economic growth
- Some commodity prices
- Inflation
- Export import
- Government expenditure realization
- Investment
- Other related indicators



- 3. Dissecting data/information and the analysis of complex things into simpler constituents.
- 4. Reasoning thinking that is coherent and logical.

Identifying related indicators/information:

- Economic situations of partner countries
- Global economic growth
- Some commodity prices
- Inflation
- Export import
- Government expenditure realization
- Investment
- Other related indicators

## **FENOMENA ON QUARTER IV-2017**

- The prices of oil & gas and non-oil & gas commodities in the international market in Quarter IV / 2017 generally increase both (q-to-q) and (y-on-y).
- Global economic growth continues to show an increase in the fourth quarter of 2017.
- The economic situation of some of Indonesia's trading partners grows relatively strong:
  - China at 6.8 percent (Q3 / 17) and (Q4 / 17).
  - The United States strengthened from 2.3 percent (Q3 / 17) to 2.5 percent (Q4 / 17).
  - ✤ Japan strengthen from 1.5 percent (Q3 / 17) to 2.0 percent (Q4 / 17).
  - Singapore weaken from 5.4 percent (Q3 / 17) to 3.1 percent (Q4 / 17).

## **FENOMENA ON QUARTER IV-2017**

- Inflation rate is 0.92 percent (q-to-q) and 3.61 percent (Y-on-y).
- The realization of government expenditure (APBN) in the Quarter IV / 2017 increase by 29.22 percent
- The value of exports in the fourth quarter / 2017 reached USD45.35 billion, or increased by 4.50 percent (q-to-q) and 13.16 percent (y-on-y).
- The value of Indonesian imports in the fourth quarter / 2017 reached USD44.41 billion, an increase of 10.53 percent (q-to-q) and 20.15 percent (y-on-y).

## **FENOMENA ON QUARTER IV-2017**

- The realization of investments in the Quarter IV / 2017 increase of 1.7 percent (q-to-q) and 12.7 percent (y-on-y).
- Wholesale car sales (sales to dealer level) in the fourth quarter / 2017 increased by 2.00 percent (q-to-q) and 1.48 percent (y-on-y).
- Wholesale motorcycle sales (sales to dealer level) in the fourth quarter of 2017 down by 5.72 percent (q-to-q) and 2.15 percent (y-on-y).
- The number of foreign tourists in the fourth quarter of 2017 down by 17.94 percent (q-to-q) and 2.71 percent (y-on-y).
- Cement production in the Quarter IV / 2017 rise 2.10 percent (q-to-q) and 13.72 percent (y-on-y).
- Cement sales in the fourth quarter of 2017 increase 2.67 percent (q-to-q) and 13.07 percent (y-on-y).

## ANALYTICAL THINKING: DATA ANALYSIS

- 5. Partitioning, breakdown an analysis into mutually exclusive categories.
- Eliminating extraneous data or analysis of a problem into alternative possibilities followed by the systematic rejection of unacceptable alternatives.

### Growth of Manufacturing Sector (y-on-y)



Q1/16 Q2/16 Q3/16 Q4/16 Q1/17 Q2/17 Q3/17 Q4/17

### Fenomena

- The increase in Food and Beverage Industry is mainly driven by an increase in palm oil production.
- Growth of Textile and Garment Industry is driven by increasing domestic and foreign demand
- Growth of Metal Industry was driven by the activity of smelters and increasing construction activities carried out by the government and the private sector
- Growth of Machinery and Equipment Industry is in line with the increase in construction and mining activities.

Growth of Wholesale and retail, Car and Motorcycle Service and Repair (y-on-y)



Q1/16 Q2/16 Q3/16 Q4/16 Q1/17 Q2/17 Q3/17 Q4/17

### Fenomena

- $\checkmark$  Growth of car sales.
- ✓ Growth of domestic and imported goods.



### Fenomena

- Agriculture, Forestry, and Fisheries are growing slowly compared to the previous year.
- Source of increase mainly from capture fisheries and aquaculture production, and palm products

## Others way of doing inference

- Data plotting
- Statistical inference
- Modelling

## **CORRELATION BY PLOTTING**

Association

**No Association** 



Strong versus Weak Association

Positive versus Negative Association



## **CORRELATION BY PLOTTING**



## **STATISTICAL INFERENCE**

- Statistical inference means drawing conclusions based on data by testing hypotheses and deriving estimates
- There are a many contexts in which inference is desirable, and there are many approaches to performing inference.
- There are many modes of performing inference including statistical modeling, data oriented strategies and explicit use of designs and randomization in analyses



# Data Visualization



- Data/statistics visualization is important for the impressions of the reader
- Data can be visualized by table and graphs

## Objectives

- Giving the big picture
- Highlighting information





What would be highlighted?

- <u>Comparisons</u>
- <u>Change over time</u>
- <u>Frequency distribution</u>
- <u>Correlation</u>
- <u>Contribution/share of an item/chategory to the</u> <u>general picture</u>


# Table and Graph







### Shorting the data by frequency, letter, or natural order





Shorting the data by frequency, letter, or natural order



Scale gives different impressions



Long series data uses line chart



Scale gives different impressions

**D** Tips





### Simple is better





#### Bar Chart or Pie Chart?











- Jakarta Pusat
- Jakarta Barat
- Jakarta Utara
- Jakarta Timur
- Jakarta Selatan

### 2D is better than 3D





Series data with more than one category





Map visualization



#### Landessprachen in den Kantonen, 2000 Langues nationales parlées dans les cantons, en 2000



Map visualization with complex information





Dynamic graph gives more better visualization

- <u>https://color.adobe.com/explore/?filter=most-popular&time=month</u>
- Adobe colour



Colour determines harmonization of a whole publication

### **EXAMPLE 1: Colour Choice**





■IPG ■IPM L ■IPM P

91,03

■Tidak mempunyai ■ SD = SLTP = SLTA ■ Perguruan Tinggi

13,84

24,30

16,33

26,00

19,54

Perempuan

9,43

30,50

19,05

26,88

14,14

Laki-laki





### **EXAMPLE 1: Colour Choice**





### **Multimedia also leaves a lasting impression**



Source: Lester, P.M. (2006). Syntactic Theory of Visual Communication

It only takes us 150 milliseconds to process an image (60,000x faster)

http://neomam.com/interactive/13reasons/

# Fish as an alternative ....."National Nutrition Day"

### Sebagai alternatif makanan bergizi

Ikan merupakan sumber protein hewani terbesar yang dikonsumsi masyarakat Indonesia. Sub sektor perikanan merupakan sumber pertumbuhan ekonomi baru.



Samber: Publikasi Kansumsi Kalari dan Protein Penduduk Indonesia dan Provinsi 2015 - Susenas September 2015



anter Arrest Refer Material 2017-2014



Sunder : Benile Repair Statistik

penting untuk memberikan edukasi bagi masyarakat tentang pentingnya status gizi untuk mencegah stunting\*, demi masa depan Indonesia.

Disampaikan pada Kampanye Gizi Nasional untuk mencegah stunting, Jakarta, 6 Desember 2015

"Stanting adalah tinggi baden yang karang dari-2 standar deviasi dari status gial WHO Child Growth Standard



Nila Moeloek

Kampanye Gizi

Nasional sangat

# Woman Domestic & Public Roles ... "Mothers Day"



#### Peran Publik dan Domestik Perempuan Masa Kini

Perempuan memiliki peran yang sangat penting dalam pengelolaan rumah tangga sekaligus pembangunan bangsa.

37,79%

14,63%

20 Tahun

Berilah pelajaran kepada anak-anak perempuan, dan dari sinilah peradaban bangsa dimulai. Jadikanlah mereka ibu-ibu yang cakap, cerdas dan baik, maka mereka akan menyebarluaskan peradaban di antara bangsanya kepada anak-anak peradaban, dan kepandaian mereka akan diteruskan. R.A Kartini

15 tahun ke atas yang bekerja tahun 2016 48,00%

Perempuan yang menjadi tahun 2015 29,50%

Pengusaha Industri Kecil dan Menengah dengan jenis kelamin perempuan tahun 2015 41,99%



# Water on daily life ..... "The World Water Day"



### Forest Functions & Exploitations ...... "The World Forest Day"



### PEMANFAATAN HUTAN PERLU DIIMBANGI Dengan upaya pelestarian

Welchoparrestava secondiglicker succional holiskojna.

enegen es centre la ver regensails en, ar transfortikan

etilange keers ongeron wati



el niega tar politana ogrupikka som aj niektorena kostorijska og politana Zurena i nereto si na svag nelspakti kontrologika og na sjolika tesevision mensioni som offici

Hutan sebagai tempat tinggai Jum ah dosa di dalam hutan 2,057 dosa, dan disekitar hutan 15,217 dosa ang ang kan Kan Juga 2,5 d



Hutan untuk keanekaragaman hayati Luas kawasan kenserwasi daratan didominasi oleh taman nasional 55,00 persen.

> Hutan untuk perekonomian Rilai PDB Kehutanan dan Penebangan Kayu sak tar Sarth Jum rupiah Santet JPP Adriasi Adrivenuntsporger cata 200

#### Hutan untuk wisata

Rp

-Sehanyak 0,17 persen rumah tangga sekitar kawasan hutan memanfashkan hutan wisata sebagai sumber mata pencaliarian Sung PA kotisa éstika dara ango sekartasa a marik darawa mi LUAS HUTAN INDONESIA MENCAPAI SEKITAR 89. 136,4 RIBU HA ATAU 46,65 Persen Dari Daratan Di Indonesia

n ar sher eta ar bara an da Para da a Isar bara da ar fadhar ni tara arang an Internation (1970) 183





Ocean contributions to economy .... "The World Ocean Day"



### 1 of 3 woman experienced violence... "International day – stop violence against woman"





Meh amin kesetaraan bendel serta democidaya can se unanwanifa can perempiran



ienninika i secora nationalis trent da e upita veti nuurunnises a remus minerals orientationingfall rain three arzh un 3380 me rengal en super substant al bael kolempoù

PEREMPUAN USIA 15-64 TAHUN YANG MENGALAMI DAN TIDAK MENGALAMI KEKERASAN FISIK DAN/ATAU SEKSUAL



Perempuan yang tidak bekerja lebih banyak mengalami kekerasan seksual dan/atau fisik perempuan yang

Surraya: SES & Kamer, DEDR, Survei Remaker on Hung. Youmpuss Sacional (SP-DH) 2016

### The highest young smoker number in the world... "A day without tobacco"



#### NDONESIA NEGARA DENGAN JUMLAH Erokok muda tertinggi di dunia

Venjamin ken dupan yang sehat dan meningkatkan kesejanteraan sebunih Seminduk semina usia



Mengurangi hingga separt galangka kematian dini akibat penyasil lidas menular, melalui pencenahan dan pengosalan, serta meningkatkan kesehatan mental dan kesejahteraan

#### PERSENTASE PEMUDA (16-30 TAHUN) YANG MEROKOK SETIAP HARI DALAM SEBULAN TERAKHIR MENURUT TINGKAT PENDIDIKAN, 2016

KNEARAR KNUWRIALI BAJ-PAIAR MARK

Persentase Pengeluaran Perkapita untuk Rokok Terhadap Total Pengeluaran Wakanan, Maret 2016

States, 35 B allow Register and Antone Red descales generation



Satu dari empat pemuda di Indonesia adalah perokok dan mayoritas merokok setiap hari

Succession, Action Ball State (Action 2011)





Pelopor Data Statistik Terpercaya Untuk Semua

# Thank You www.bps.go.id

Jl. Dr. Sutomo 6-8 Jakarta 10710

(021) 3841195, 3842508, 3810291



(+62) 85210454221



ema.tusianti@yahoo.co.id



Ema Tusianti



Ema Tusianti Researchgate

# The place of data statistics in problem solving

**PPDAC** 



**Problem** step is about trying to turn these vague feelings into much more precise goals, some very specific questions that should be able to be answered using data.

**Plan** step is then about deciding what people/objects/entities to collect data on, what things we should "measure", and how we are going to do all of this.

The PPDAC model was developed by R.J. Mackay and W. Oldford in the early 1990s

Analysis step and the Conclusions steps are about making sense of it all and then communicating what has been learned. There is always a back and forth involving doing analysis, tentatively forming conclusions and doing more analysis. **Data** step is about obtaining the data, storing it and "whipping it into shape" (data cleaning). Data analysts are always involved with data cleaning, if only because we almost always discover problems with data during analysis. "I keep saying that the sexy job in the next 10 years will be statisticians, and I'm not kidding."

Hal Varian, Chief Economist, Google



#### **"YOU CAN HAVE DATA**

WITHOUT INFORMATION, BUT YOU CANNOT HAVE INFORMATION WITHOUT DATA." Fake VS Fact

DANIEL KEYS MORAN



## Get the whole story





- A bar graph (also known as a bar chart or bar diagram) is a visual tool that uses bars to compare data among categories.
- A bar graph may run horizontally or vertically. The important thing to know is that the longer the bar, the greater its value.
- The graph represents categories on one axis and a discrete value in the other. The goal is to show the relationship between the two axes.
- Bar charts can also show big changes in data over time.





- A line chart or line graph is a type of chart which displays information as a series of data points called 'markers' connected by straight line segments
- The line graph consists of a horizontal x-axis and a vertical yaxis.
- A line graph, also known as a line chart, is a type of chart used to visualize the value of something over time.



# Grafik XY (<u>Scatter Chart</u>)

- A scatter plot is a type of plot or mathematical diagram using Cartesian coordinates to display values for typically two variables for a set of data.
- If the points are color-coded, one additional variable can be displayed.
- The data are displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis





- A pie chart (or a circle chart) is a circular statistical graphic which is divided into slices to illustrate numerical proportion.
- In a pie chart, the arc length of each slice (and consequently its central angle and area), is proportional to the quantity it represents.
- An obvious flaw exhibited by pie charts is that they cannot show more than a few values without separating the visual encoding (the "slices") from the data they represent





- An area chart or area graph displays graphically quantitative data.
- It is based on the line chart.
- The area between axis and line are commonly emphasized with colors, textures and hatchings.
  Commonly one compares with an area chart two or more quantities





- The spider web or radar chart is a chart and/or plot that consists of a sequence spokes with each spoke representing one of the variables.
- The data length of a spoke is proportional to the magnitude of the variable for the data point relative to the maximum magnitude of the variable across all data points.
- A line is drawn connecting the data values for each spoke.





