

# Pertemuan 3 PEMILIHAN SAMPEL DAN TEKNIK SAMPLING



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## Jenis Teknik Sampling

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### Simple Random Sampling

- Metode ini melibatkan pemilihan anggota populasi secara acak sehingga setiap anggota memiliki kesempatan yang sama untuk dipilih.
- Bisa dilakukan dengan cara mengundi atau menggunakan generator nomor acak.
- Contoh: Peneliti ingin menilai kepuasan pengguna terhadap layanan bus di kota besar: (1) Peneliti dapat menggunakan daftar semua penumpang yang terdaftar dengan kartu perjalanan dan memilih sampel secara acak dari daftar tersebut (2) Peneliti survei di dalam bus dengan memilih sampel secara acak

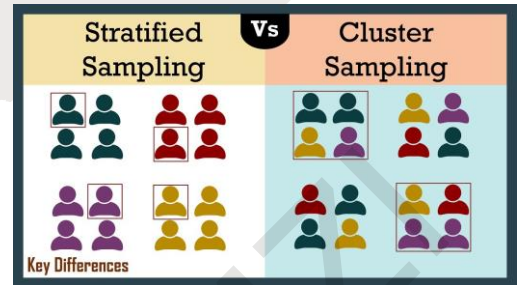
### Systematic Sampling

- Peneliti memilih elemen dari populasi dengan interval yang tetap setelah menentukan titik awal secara acak.
- Misalnya, dalam sebuah populasi 1000 orang, peneliti memilih setiap orang ke-10 setelah nomor awal yang acak.

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### Stratified Sampling

- Digunakan ketika populasi dibagi menjadi subgrup atau strata yang berbeda yang memiliki karakteristik tertentu. Sampel kemudian diambil dari setiap stratum secara proporsional untuk memastikan representasi yang adil dari seluruh populasi.
- Misal: untuk mengukur efisiensi rute transportasi umum, peneliti mungkin membagi layanan transportasi ke dalam strata berdasarkan jenis (bus, kereta, tram, dll.), dan kemudian mengambil sampel proporsional dari penumpang dari setiap jenis untuk mendapatkan gambaran yang merata.



### Cluster Sampling

- Populasi dibagi menjadi kluster yang biasanya sudah ada secara geografis atau organisasi. Beberapa kluster dipilih secara acak, dan semua individu dalam kluster terpilih menjadi sampel.
- Misal: Dalam studi yang mengeksplorasi penggunaan sepeda di berbagai kawasan kota, peneliti dapat membagi kota menjadi beberapa kluster (misalnya, lingkungan atau distrik) dan memilih beberapa kluster tersebut secara acak untuk melakukan survei terhadap semua pengguna sepeda di area tersebut.

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### Convenience Sampling

- Metode non-probabilistik di mana sampel dipilih berdasarkan ketersediaannya yang mudah dan dekat dengan peneliti.
- Teknik ini sering kali tidak mewakili populasi secara keseluruhan.



### Quota Sampling

- Teknik non-probabilistik yang melibatkan pemilihan sampel yang mencerminkan karakteristik tertentu dari populasi. Peneliti menentukan kuota untuk berbagai subgrup berdasarkan atribut yang diperlukan.



### Purposive or Judgmental Sampling

- Pendekatan non-probabilistik di mana peneliti menggunakan pertimbangan mereka sendiri untuk memilih anggota populasi yang paling mungkin memberikan informasi yang diinginkan,
- Seringkali digunakan dalam penelitian kualitatif



### Snowball Sampling

- Peneliti memulai dengan sejumlah kecil peserta yang memenuhi kriteria dan kemudian menggunakan peserta ini untuk menghubungi peserta lain.
- Sering digunakan dalam populasi sulit dijangkau.



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# Menentukan ukuran sampel

## 1. Tentukan Populasi Target

- Peneliti perlu tahu ukuran dan karakteristik populasi yang diteliti.
- Dalam populasi yang sangat besar, ukuran sampel tidak harus bertambah secara proporsional untuk mencerminkan seluruh populasi.

## 2. Tentukan Margin of Error (Confidence Interval):

- Tingkat kesalahan yang bisa diterima.
- Margin of error yang lebih kecil membutuhkan sampel yang lebih besar.
- Misalnya, margin of error 5% berarti Anda menerima bahwa hasil yang Anda dapatkan bisa 5% lebih tinggi atau lebih rendah dari nilai sebenarnya dalam populasi.

## 3. Tentukan Tingkat Kepercayaan (Confidence Level):

- Tingkat kepercayaan (biasanya diatur pada 95% atau 99%) adalah probabilitas bahwa interval kepercayaan yang dihitung memang mencakup nilai populasi yang sebenarnya.
- Tingkat kepercayaan yang lebih tinggi memerlukan sampel yang lebih besar.

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## 4. Menentukan Standar Deviasi (tergantung persamaan yang digunakan)

- Standar deviasi populasi yang diestimasi digunakan untuk mengukur variabilitas dalam populasi.
- Cara menentukan standard deviasi:
  - Dari Data Sampel, jika data sampel telah terkumpul
  - Dari Studi Sebelumnya
  - Menggunakan Rentang Data: Jika memiliki rentang data yang mungkin (maksimum dan minimum), bisa mengestimasi standar deviasi sebagai rentang dibagi 4 (sebagai aturan praktis).
  - Pengalaman Subjektif (asumsi).
  - Melakukan pilot study atau studi pendahuluan untuk mengumpulkan data awal yang dapat digunakan untuk mengestimasi standar deviasi.
- Jika data tidak tersedia, banyak peneliti menggunakan standar deviasi 0.5 sebagai estimasi yang konservatif karena ini memaksimalkan ukuran sampel.

## 5. Menentukan jumlah sampel. Pada penelitian kuantitatif di bidang transportasi, yang sering digunakan yaitu: Slovin, Cochran, Yamane, Fisher.

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## Jenis Survey Wawancara

### Face to face

- Paper and pencil
- Using Apps

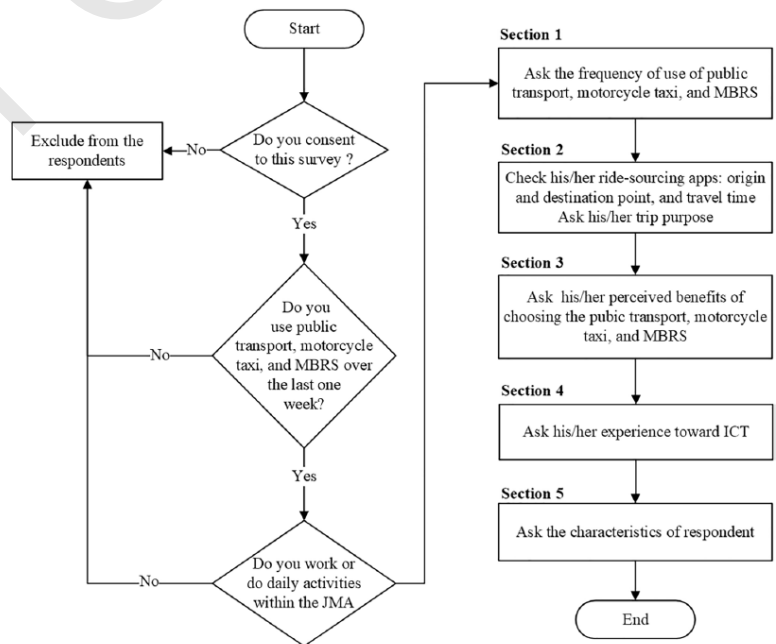
### Online survey



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### Studi Kasus 1 – Random Sampling

To compete or not compete: exploring the relationships between motorcycle-based ride-sourcing, motorcycle taxis, and public transport in the Jakarta metropolitan area



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- To aid the surveyor in collecting the data, we involved two types of respondents: users who had just completed a MBRS trip and those who had used MBRS within the last week.
- For both respondent types, they had to show their trips recorded on their smartphone applications
- The interview survey was conducted from March to July 2016.
- To maintain the accuracy of the collected data, we involved well-trained surveyors who were familiar with the JMA.
- Both surveyors and respondents were compensated.
- Surveyors began by showing respondents their official survey permission from the Transportation Research and Development Agency, of the Indonesian Ministry of Transportation.
- They asked respondents to consent to the study and whether they fulfilled the initial requirements.
- The first requirement was that the respondent should have used the three transport modes over the previous week.

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- The second was that the respondents should work and perform daily activities in the JMA, though they may come from outside the area (Bogor, Depok, Tangerang, Bekasi).
- Surveyors also informed the respondents that the collected data was used for research purposes only, and that there would be no questions regarding their name, address, phone number, or email address.
- Surveyors went to random key locations in Central Jakarta and its vicinity that were expected to have a high concentration of MBRS users, such as railway stations, bus stops, shopping areas, and workplaces. Those were chosen because most of the public transport hubs, shopping centers, and government offices were concentrated there.
- Surveyors randomly intercepted MBRS users on the street in key locations.
- Hours of the survey were divided into two time blocks—7 to 10 AM and 4 to 7 PM.
- *Results: Out of the 786 respondents who participated in the survey, 438 (55.72%) completed the questionnaire*

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## Studi Kasus 2 – Systematic sampling: Role of ride-hailing in multimodal commuting

**Table 1**  
Number of Respondents and Stations Sampled.

Mass Transport Mode	Number of Corridors/ Lines	Number of Stations/ Stops	Number of Stations/ Stops Sampled	Avg. Daily Passengers	Commuters Sampled
CL	6	106 (30%)	44 (32.1%)	1,200,000 (54.3%)	2,709 (53.5%)
BRT	13	228 (64.6%)	83 (60.6%)	900,000 (40.7%)	2,055 (40.6%)
MRT	1	13 (3.7%)	6 (4.4%)	100,000 (4.5%)	240 (4.7%)
LRT	1	6 (1.7%)	4 (2.9%)	10,000 (0.5%)	60 (1.2%)

- The data collection process was divided into two stages. The first stage was conducted from 12 to 20 December 2019, which covered 2,576 respondents, while the second stage was held from 13 February – 4 March 2020 and included 2,488 respondents.
- These data collection periods were before the COVID-19 pandemic, which has impacted Indonesia's transit ridership since the middle of March 2020.
- This study involved a research team that consisted of 15 surveyors and 5 coordinators or supervisors.
- The data collection process was held during "peak hours", which were at 6 – 9 AM and 4 – 7 PM.
- The respondents' criteria were those who regularly use respective public transportation. Occasional users were not allowed to be recruited.

- The respondents were selected randomly from those exiting the gate or waiting inside the station area using a 5-person interval (e.g., the surveyor approached every 5th person exiting the gate).
- If the respective person did not meet the respondents' criteria or she/he refused to be interviewed, the field surveyor was allowed to take the closest persons without having an interval of 5 persons at the intercept location.
- The questionnaire used in this study was designed for short interviews and lasted about 15–20 min.

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## Study 3 – Stratified Sampling: What determines the acceptance of socially optimal traffic coordination?: A scenario-based examination in Germany

- In total 502 car drivers were recruited via a panel supplier and two university mailing lists.
- Sampling resulted in two subsamples.
- The first subsample was a representative subsample that completed the dedicated questionnaire part based on a SOTIS (social optimizing traveler information system) description.
- The surplus participants completed the questionnaire part based on the description of a user optimizing traveler information system (UOTIS).
- The first subsample consisted of 391 drivers stratified by car drivers' kilometers driven per year, and driving license holders' age and gender structure in Germany.
- The proportions in the sample did not significantly differ from the proportions in Germany
- The second subsample consisted of 111 drivers. 56.0% were female. Their mean age was  $M = 30.18$  years ( $SD = 11.38$ ) with a range of 18 to 68 years.

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## Studi Kasus 4 - Online Survey :Ride-hailing app use for same-day delivery services of foods and groceries during the implementation of social activity restrictions in Indonesia

- This study focused on Generation Z individuals aged 19–24 years and millennials aged 25–40 years
- The online survey in this study was conducted during the implementation of IRSA in August 2021
- We distributed the questionnaire randomly via WhatsApp, Facebook, and emails.
- We asked our friends and colleagues to help spread the online questionnaire
- The data collection was limited to respondents aged between 19 and 40 years.
- We also asked four trap questions (Liu and Wronski, 2018) to ensure that the respondents paid attention to the questionnaire.
- One question was related to the number of wheels that motorcycle-based ride-hailing vehicles used. Those who did not answer “twowheel” were removed as respondents.
- Response duration in fulfilling this questionnaire also become a consideration to avoid the bias data

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## Studi Kasus 5

### Populasi komuter Bodetabek menuju Jakarta

No	Kota Asal	Populasi
1	Bogor	149.018
2	Kota Bogor	18.103
3	Depok	296.488
4	Tangerang	69.793
5	Kota Tangerang	172.410
6	Kota Tangerang Selatan	159.024
7	Bekasi	113.701
8	Kota Bekasi	277.234
	Jumlah	1.255.771

Statistik Komuter Jabodetabek tahun 2019 oleh Badan Pusat Statistik

- *Proportional Stratified Random Sampling.*

- Jumlah sampel yang dipilih sebanyak 1.000 responden dengan tingkat kepercayaan 95 % dan *margin of error* 1,96.

- Rumus:

$$n_i = \frac{N_i}{N} \times n$$

$N_i$  : Jumlah Populasi untuk Kota  $i$

$N$  : Jumlah Total Populasi (1.255.771)

$n$  : Jumlah sampel total yang diinginkan (1.000)

No	Kota Asal	Populasi	Sampel
1	Bogor	149.018	119
2	Kota Bogor	18.103	14
3	Depok	296.488	236
4	Tangerang	69.793	56
5	Kota Tangerang	172.410	137
6	Kota Tangerang Selatan	159.024	127
7	Bekasi	113.701	90
8	Kota Bekasi	277.234	221
	Jumlah	1.255.771	1000

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