Chapter 12

Sampling: Design and Procedure
**Figure 12.1 Relationship of Sampling Design to the Previous Chapters and the Marketing Research Process**

<table>
<thead>
<tr>
<th>Focus of this Chapter</th>
<th>Relationship to Previous Chapters</th>
<th>Relationship to Marketing Research Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Sampling Design Process</td>
<td>- Research Design Components (Chapter 3)</td>
<td>- Problem Definition</td>
</tr>
<tr>
<td>- Nonprobability Sampling Techniques</td>
<td></td>
<td>- Approach to Problem</td>
</tr>
<tr>
<td>- Probability Sampling Techniques</td>
<td></td>
<td>- Research Design</td>
</tr>
</tbody>
</table>

- Field Work
- Data Preparation and Analysis
- Report Preparation and Presentation

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Figure 12.2 Sampling Design Procedures: An Overview
Opening Vignette

Sample or Census (Table 12.1)

Sampling Design Process (Figs 12.3, 12.4 & 12.5) (Table 12.2)

A Classification of Sampling Techniques (Fig 12.6)

Nonprobability Sampling Techniques (Fig 12.7 & Fig 12.8) (Table 12.3)

Convenience  Judgmental  Quota  Snowball

Probability Sampling Techniques (Figs 12.8- 12.11)

Simple Random  Systematic  Stratified  Cluster

Choosing Nonprobability vs. Probability Sampling (Table 12.4)

Internet Sampling (Fig 12.12)

Application to Contemporary Issues (Fig 12.13)

International  Social Media  Ethics

Be a DM! Be an MR! Experiential Learning

What Would You Do?

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Census or Sample

Census
A complete enumeration of the elements of a population or study objects.

Sample
A subgroup of the elements of the population selected for participation in the study.
## Table 12.1 Sample vs. Census

<table>
<thead>
<tr>
<th>CONDITIONS FAVORING THE USE OF</th>
<th>Sample</th>
<th>Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Budget</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>2. Time available</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>3. Population size</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>4. Variance in the characteristic</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>5. Cost of sampling error</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>6. Cost of nonsampling errors</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>7. Nature of measurement</td>
<td>Destructive</td>
<td>Nondestructive</td>
</tr>
<tr>
<td>8. Attention to individual cases</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Figure 12.3 Sampling Design Process

1. Define the Population
2. Determine the Sampling Frame
3. Select Sampling Technique(s)
4. Determine the Sample Size
5. Execute the Sampling Process
Define the Target Population

The target population is the collection of elements or objects that possess the information sought by the researcher and about which inferences are to be made. The target population should be defined in terms of elements, sampling units, extent, and time.

- **An element** is the object about which or from which the information is desired, e.g., the respondent.

- A **sampling unit** is an element, or a unit containing the element, that is available for selection at some stage of the sampling process.

- **Extent** refers to the geographical boundaries.

- **Time** is the time period under consideration.
Important qualitative factors in determining the sample size:

- the importance of the decision
- the nature of the research
- the number of variables
- the nature of the analysis
- sample sizes used in similar studies
- incidence rates
- completion rates
- resource constraints
Figure 12.4 Defining the Target Population

**Time Frame:**
Upcoming Summer

**Extent:**
Domestic United States

**Sampling Unit:**
Households with 18 year old females

**Element:**
18 year old females

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**Figure 12.5 Sampling Frame Error**

**Target Population:**
Single parent households in Chicago

**Sampling Frame:**
List supplied by a commercial vendor
Figure 12.6 Classification of Sampling Techniques

- Nonprobability Sampling Techniques
- Probability Sampling Techniques
<table>
<thead>
<tr>
<th>Type of Study</th>
<th>Minimum Size</th>
<th>Typical Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem identification research (e.g., market potential)</td>
<td>500</td>
<td>1000 – 2500</td>
</tr>
<tr>
<td>Problem solving research (e.g., pricing)</td>
<td>200</td>
<td>300 – 500</td>
</tr>
<tr>
<td>Product tests</td>
<td>200</td>
<td>300 – 500</td>
</tr>
<tr>
<td>Test marketing studies</td>
<td>200</td>
<td>300 – 500</td>
</tr>
<tr>
<td>TV/radio/print advertising (per commercial or ad tested)</td>
<td>150</td>
<td>200 – 300</td>
</tr>
<tr>
<td>Test-market audits</td>
<td>10 stores</td>
<td>10 – 20 stores</td>
</tr>
<tr>
<td>Focus groups</td>
<td>2 groups</td>
<td>10 – 15 groups</td>
</tr>
</tbody>
</table>
Figure 12.7 Nonprobability Sampling Techniques

Nonprobability Sampling Techniques

- Convenience Sampling
- Judgmental Sampling
- Quota Sampling
- Snowball Sampling
Convenience Sampling

**Convenience sampling** attempts to obtain a sample of convenient elements. Often, respondents are selected because they happen to be in the right place at the right time.

- use of students and members of social organizations
- mall intercept interviews without qualifying the respondents
- department stores using charge account lists
- “people on the street” interviews
Group D happens to assemble at a convenient time and place. So all the elements in this Group are selected. The resulting sample consists of elements 16, 17, 18, 19, and 20. Note, no elements are selected from group A, B, C, and E.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>1</td>
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<td>11</td>
<td>16</td>
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<td>17</td>
<td>22</td>
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<td>3</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>23</td>
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<tr>
<td>4</td>
<td>9</td>
<td>14</td>
<td>19</td>
<td>24</td>
<td></td>
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<tr>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>
Judgmental Sampling

Judgmental sampling is a form of convenience sampling in which the population elements are selected based on the judgment of the researcher.

- test markets
- purchase engineers selected in industrial marketing research
- bellwether precincts selected in voting behavior research
- expert witnesses used in court
The researcher considers groups B, C, and E to be typical and convenient. Within each of these groups one or two elements are selected based on typicality and convenience. The resulting sample consists of elements 8, 10, 13, 22, and 24. Note, no elements are selected from groups A and D.
Quota Sampling

**Quota sampling** may be viewed as two-stage restricted judgmental sampling.

- The first stage consists of developing control categories, or quotas, of population elements.
- In the second stage, sample elements are selected based on convenience or judgment.

<table>
<thead>
<tr>
<th>Control Characteristic</th>
<th>Population composition</th>
<th>Sample composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Percentage</td>
<td>Percentage</td>
</tr>
<tr>
<td>Male</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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A quota of one element from each group, A to E, is imposed. Within each group, one element is selected based on judgment or convenience. The resulting sample consists of elements 3, 6, 13, 20, and 22. Note, one element is selected from each column or group.
Snowball Sampling

In **snowball sampling**, an initial group of respondents is selected, usually at random.

- After being interviewed, these respondents are asked to identify others who belong to the target population of interest.
- Subsequent respondents are selected based on the referrals.
Elements 2 and 9 are selected randomly from groups A and B. Element 2 refers elements 12 and 13. Element 9 refers element 18. The resulting sample consists of elements 2, 9, 12, 13, and 18. Note, there is no element from group E.
Figure 12.9 Probability Sampling Techniques

- Simple Random Sampling
- Systematic Sampling
- Stratified Sampling
- Cluster Sampling
Simple Random Sampling

- Each element in the population has a known and equal probability of selection.

- Each possible sample of a given size (n) has a known and equal probability of being the sample actually selected.

- This implies that every element is selected independently of every other element.
Select five random numbers from 1 to 25. The resulting sample consists of population elements 3, 7, 9, 16, and 24. Note, there is no element from Group C.
Systematic Sampling

- The sample is chosen by selecting a random starting point and then picking every $i$th element in succession from the sampling frame.

- The sampling interval, $i$, is determined by dividing the population size $N$ by the sample size $n$ and rounding to the nearest integer.

- When the ordering of the elements is related to the characteristic of interest, systematic sampling increases the representativeness of the sample.
Systematic Sampling (Cont.)

- If the ordering of the elements produces a cyclical pattern, systematic sampling may decrease the representativeness of the sample.

For example, there are 100,000 elements in the population and a sample of 1,000 is desired. In this case the sampling interval, \( i \), is 100. A random number between 1 and 100 is selected. If, for example, this number is 23, the sample consists of elements 23, 123, 223, 323, 423, 523, and so on.
Select a random number between 1 to 5, say 2. The resulting sample consists of population 2, \((2+5=) 7\), \((2+5\times2=) 12\), \((2+5\times3=) 17\), and \((2+5\times4=) 22\). Note, all the elements are selected from a single row.

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<tr>
<td>A</td>
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<td>D</td>
<td>E</td>
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<tr>
<td>1</td>
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<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

Figure 12.10  A Graphical Illustration of Probability Sampling Techniques: Systematic Sampling
Stratified Sampling

- A two-step process in which the population is partitioned into subpopulations, or strata.
- The strata should be mutually exclusive and collectively exhaustive in that every population element should be assigned to one and only one stratum and no population elements should be omitted.
- Next, elements are selected from each stratum by a random procedure, usually SRS.
- A major objective of stratified sampling is to increase precision without increasing cost.
Stratified Sampling

- The elements within a stratum should be as homogeneous as possible, but the elements in different strata should be as heterogeneous as possible.

- The stratification variables should also be closely related to the characteristic of interest.

- Finally, the variables should decrease the cost of the stratification process by being easy to measure and apply.
In proportionate stratified sampling, the size of the sample drawn from each stratum is proportionate to the relative size of that stratum in the total population.

In disproportionate stratified sampling, the size of the sample from each stratum is proportionate to the relative size of that stratum and to the standard deviation of the distribution of the characteristic of interest among all the elements in that stratum.
Randomly select a number from 1 to 5 for each stratum, A to E. The resulting sample consists of population elements 4, 7, 13, 19, and 21. Note, one element is selected from each column.
Cluster Sampling

- The target population is first divided into mutually exclusive and collectively exhaustive subpopulations, or clusters.

- Then a random sample of clusters is selected, based on a probability sampling technique such as SRS.

- For each selected cluster, either all the elements are included in the sample (one-stage) or a sample of elements is drawn probabilistically (two-stage).
Cluster Sampling (Cont.)

- Elements within a cluster should be as heterogeneous as possible, but clusters themselves should be as homogeneous as possible. Ideally, each cluster should be a small-scale representation of the population.

- In **probability proportionate to size sampling**, the clusters are sampled with probability proportional to size. In the second stage, the probability of selecting a sampling unit in a selected cluster varies inversely with the size of the cluster.
Randomly select 3 clusters, B, D, and E. Within each cluster, randomly select one or two elements. The resulting sample consists of population elements 7, 18, 20, 21, and 23. Note, no elements are selected from clusters A and C.
Figure 12.11 Types of Cluster Sampling

- Divide Population into Cluster
- Randomly Sample Clusters
- One Stage: Include All Elements from Each Selected Cluster
- Two-Stage: Randomly Sample Elements from Each Selected Cluster
### Table 12.3  Cluster Sampling vs. Stratified Sampling

<table>
<thead>
<tr>
<th>Cluster Sampling</th>
<th>Stratified Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only a sample of the subpopulations (clusters) is selected for sampling.</td>
<td>All of the subpopulations (strata) are selected for sampling.</td>
</tr>
<tr>
<td>Within a cluster, elements should be different (heterogeneous), whereas</td>
<td>Within a strata, elements should be homogeneous with clear differences (heterogeneity) between the strata.</td>
</tr>
<tr>
<td>homogeneity of similarity is maintained between different clusters.</td>
<td></td>
</tr>
<tr>
<td>A sampling frame is needed only for the clusters selected for the sample.</td>
<td>A complete sampling frame for the entire stratified subpopulations should be</td>
</tr>
<tr>
<td></td>
<td>drawn.</td>
</tr>
</tbody>
</table>
Figure 12.12 A Classification of Internet Sampling

- **Internet Sampling**
  - **Online Intercept Sampling**
    - Random
    - Nonrandom
  - **Recruited Online Sampling**
  - **Other Techniques**
    - Nonpanel
      - Opt-in Panels
      - Opt-in List Rentals
    - Panel
      - Recruited Panels
<table>
<thead>
<tr>
<th>Technique</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nonprobability Sampling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Convenience sampling</strong></td>
<td>Least expensive; least time consuming; most convenient</td>
<td>Selection bias; sample not representative; not recommended for descriptive or causal research</td>
</tr>
<tr>
<td><strong>Judgmental sampling</strong></td>
<td>Low cost; convenient; not time consuming</td>
<td>No generalization; subjective</td>
</tr>
<tr>
<td><strong>Quota sampling</strong></td>
<td>Sample can be controlled for certain characteristics</td>
<td>Selection bias; No assurance of representativeness</td>
</tr>
<tr>
<td>Technique</td>
<td>Strengths</td>
<td>Weaknesses</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Snowball sampling</td>
<td>Can estimate rare characteristics</td>
<td>Time consuming</td>
</tr>
<tr>
<td>Probability Sampling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple random sampling (SRS)</td>
<td>Easily understood; results projectable</td>
<td>Difficult to construct sampling frame; expensive; lower Precision; no assurance of representativeness</td>
</tr>
<tr>
<td>Systematic sampling</td>
<td>Can increase representativeness; easier to implement than SRS; sampling frame not needed</td>
<td>Can decrease representativeness</td>
</tr>
<tr>
<td>Technique</td>
<td>Strengths</td>
<td>Weaknesses</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Stratified sampling</strong></td>
<td>Includes all Important Subpopulations; precision</td>
<td>Difficult to select relevant stratification variables; not feasible to stratify on many variables; expensive</td>
</tr>
<tr>
<td><strong>Cluster sampling</strong></td>
<td>Easy to implement; cost effective</td>
<td>Imprecise difficult to compute and interpret results</td>
</tr>
<tr>
<td>Factors</td>
<td>CONDITIONS FAVORING THE USE OF</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonprobability Sampling</td>
<td>Probability Sampling</td>
</tr>
<tr>
<td>Nature of research</td>
<td>Exploratory</td>
<td>Conclusive</td>
</tr>
<tr>
<td>Relative magnitude of sampling</td>
<td>Nonsampling errors are larger</td>
<td>Sampling errors are larger</td>
</tr>
<tr>
<td>and nonsampling errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variability in the population</td>
<td>Homogeneous (low)</td>
<td>Heterogeneous (high)</td>
</tr>
<tr>
<td>Statistical considerations</td>
<td>Unfavorable</td>
<td>Favorable</td>
</tr>
<tr>
<td>Operational considerations</td>
<td>Favorable</td>
<td>Unfavorable</td>
</tr>
</tbody>
</table>

Table 12.5
Choosing Nonprobability vs. Probability Sampling
Figure 12.13  A Concept Map for Sampling Techniques

Sampling Techniques

Nonprobability Sampling
- selection based on convenience/judgment
  - sample based on convenience
  - subsequent selection based on referrals
    - two-stage restricted judgmental sampling
  - sample based on judgment
    - Quota Sampling
    - Judgmental Sampling

Probability Sampling
- selection based on chance
  - a random sample of clusters selected based on a two-step process
    - Cluster Sampling
    - Stratified Sampling
  - every ith element is selected
    - Systematic Sampling
  - each element has a known and equal probability of selection
    - Simple Random Sampling

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International Marketing Research

- Identification and access to the relevant sampling elements varies widely across countries.
- A reliable sampling frame might not be available. Government data in many developing countries might be unavailable or highly biased.
- Identification of the decision maker and the relevant respondent might have to be done on a country-by-country basis.
- Equivalence of samples is a key issue in marketing research studies extending beyond the home country. Researchers must minimize the effects of sample differences that are not relevant to the main purposes of the study.
Probability sampling techniques are uncommon in international marketing research. Rather, there is a reliance on quota sampling for both consumer and industrial surveys.

Sampling techniques and procedures vary in accuracy, reliability, and cost from country to country. To achieve comparability in sample composition and representativeness, it might be desirable to use different sampling techniques in different countries.
Marketing Research & Social Media

- General social media content available in the public domain may not be representative or even appropriate in all cases.
- There are ways in which one could improve the representativeness of information gleaned from general social media analysis and monitoring.
- Instead of targeting an entire site, select sections of sites that suit the brand’s profile. Careful screening can result in a more targeted and representative sample.
Marketing Research & Social Media (Cont.)

- Narrow your search results by designing search queries that mine social media content with consumer-, category-, or brand-related terms.
- Use text analysis that detects age, gender, geography, or other characteristics that distinguish different types of voices and then filter the results to more accurately reflect your target population.
Appropriate definitions of the population, sampling frame, and sampling technique are essential if the research is to be conducted and the findings are to be used ethically.

Probability sampling techniques should be used whenever the results are to be projected to the population.

When conducting research with small populations, as in business-to-business marketing or employee research, researchers must be sensitive to preserving the respondents’ anonymity.
Acronym: Sample

The sampling design process and the steps involved may be represented by the acronym SAMPLE:

S - Sampling design process
A - Amount: sample size determination
M - Method: sampling technique selection
P - Population definition
L - List: sampling frame determination
E - Execution of the sampling process