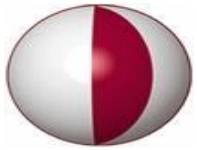

Near East University

MARKETING RESEARCH

MARK 401

Sampling: design and procedures

SESSION 10

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Source:Malhotra and Birks, et al. Chp 14

Dr. Eric Shiu lecture notes

There is no hope of making scientific statements about a population based on the knowledge obtained from a sample, unless we are circumspect in choosing a sampling method.

Chapter outline

1. Sample or census
2. The sampling design process
3. A classification of sampling techniques
4. Non-probability sampling techniques
5. Probability sampling techniques
6. Choosing non-probability versus probability sampling
7. Uses of non-probability versus probability sampling
8. Summary of sampling techniques

Sample or census

Population – The aggregate of all the elements, sharing some common set of characteristics, that comprise the universe for the purpose of the marketing research problem.

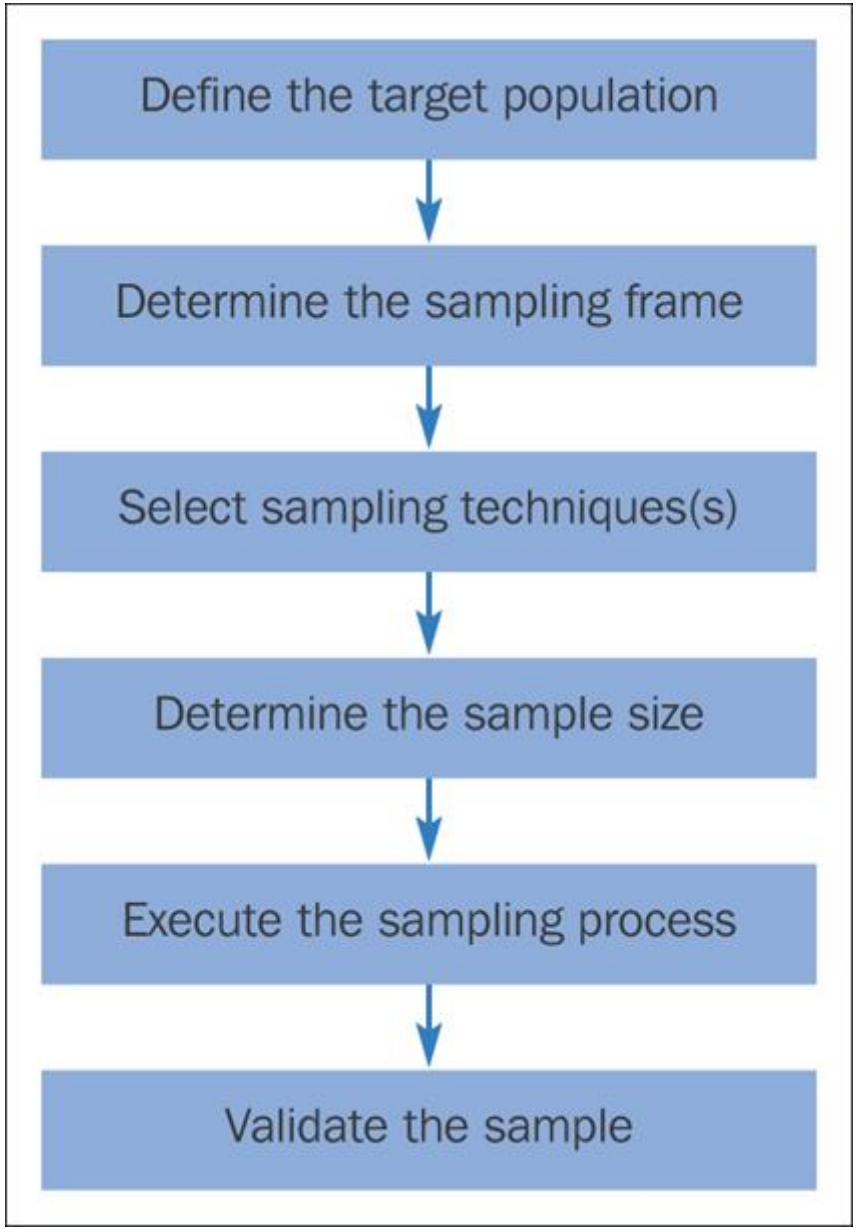
Census – A complete enumeration of the elements of a population or study objects.

Sample – A subgroup of the elements of the population selected for participation in the study.

Table 14.1 Sample versus census

Factors	*Conditions favouring the use of*	
	Sample	*Census*
1 Budget	Small	Large
2 Time available	Short	Long
3 Population size	Large	Small
4 Variance in the characteristic	Small	Large
5 Cost of sampling errors	Low	High
6 Cost of non-sampling errors	High	Low
7 Nature of measurement	Destructive	Non-destructive
8 Attention to individual cases	Yes	No

Figure 14.1 The sampling design 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, for example, 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.

Define the target population (Continued)

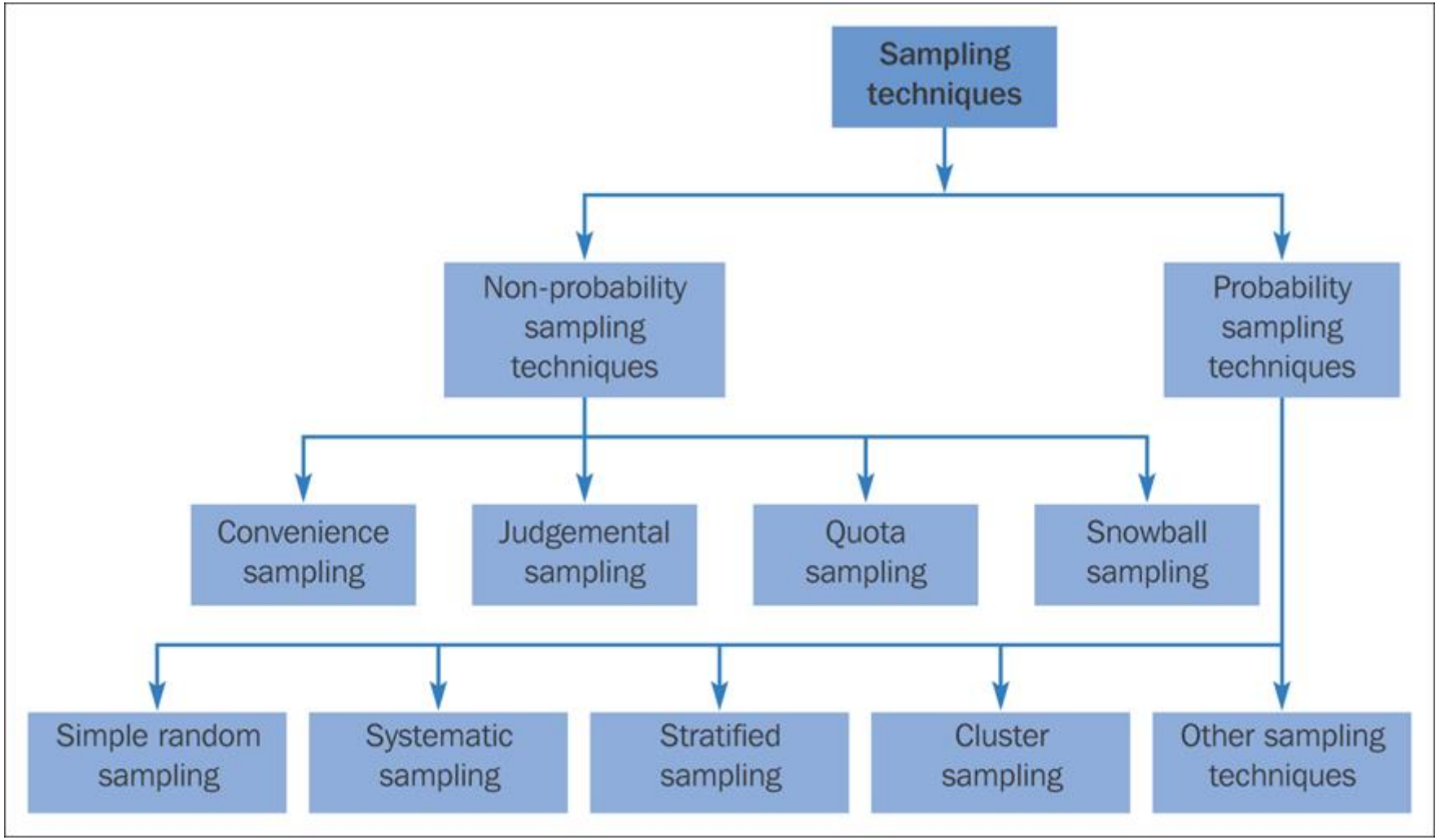
Important qualitative factors in determining the sample size are:

- 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

Table 14.2 Sample sizes used in marketing research studies

Type of study	*Minimum size*	*Typical range*
Problem identification research (e.g. market potential)	500	1,000–2,500
Problem-solving research (e.g. pricing)	200	300–500
Product tests	200	300–500
Test marketing studies	200	300–500
TV, radio or print advertising (per commercial/ad tested)	150	200–300
Test market audits	10 stores	10–20 stores
Focus groups	6 groups	6–12 groups

Figure 14.2 A classification of sampling techniques



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 organisations
- street interviews without qualifying the respondents
- ‘people on the street’ interviews

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
- expert witnesses used in court

A Graphical illustration of judgmental sampling

A	B	C	D	E
1	6	**11**	16	21
2	7	12	17	22
3	**8**	**13**	18	23
4	9	14	19	**24**
5	**10**	15	20	25

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, 11, 13, 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.

	Population composition	**Sample composition**	
Control Characteristic	Percentage	Percentage	Number
Sex			
Male	48	48	480
Female	52	52	520
	100	100	1000

Quota sample example

Propensity to donate		Male 48%		Female 52%		Totals
		Have a flag	No flag	Have a flag	No flag	
Age		50%	50%	50%	50%	
18 to 30	25%	30	30	33	32	**125**
31 to 45	40%	48	48	52	52	**200**
46 to 60	15%	18	18	19	20	**75**
Over 60	20%	24	24	26	26	**100**
Totals		**120**	**120**	**130**	**130**	
Totals			**240**		**260**	**500**

A graphical illustration of quota sampling

A	B	C	D	E
1	**6**	11	16	21
2	7	12	17	**22**
3	8	**13**	18	23
4	9	14	19	24
5	10	15	**20**	25

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.

A graphical illustration of snowball sampling

Random Selection

Referrals

A	B	C	D	E
1	6	11	16	21
2	7	**12**	17	22
3	8	**13**	**18**	23
4	**9**	14	19	24
5	10	15	20	25

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 are no element from group E.

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.

A graphical illustration of simple random sampling

A	B	C	D	E
1	6	11	**16**	21
2	**7**	12	17	22
3	8	13	18	23
4	**9**	14	19	**24**
5	10	15	20	25

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 ith 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 (Continued)

- 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.

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 (Continued)

- 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.

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 (Continued)

- 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.

Table 14.3 Choosing non-probability versus probability sampling

Factors	*Conditions favouring the use of:*	
	Non-probability sampling	*Probability sampling*
Nature of research	Exploratory	Conclusive
Relative magnitude of sampling and non-sampling errors	Non-sampling errors are larger	Sampling errors are larger
Variability in the population	Homogeneous (low)	Heterogeneous (high)
Statistical considerations	Unfavourable	Favourable
Operational considerations	Favourable	Unfavourable

Table 14.4a Strengths and weaknesses of basic sampling techniques

Technique	*Strengths*	*Weaknesses*
Non-probability sampling		
Convenience sampling	Least expensive, least time consuming, most convenient	Selection bias, sample not representative, not recommended for descriptive or causal research
Judgemental sampling	Low cost, convenient, not time consuming. Ideal for exploratory research designs	Does not allow generalisation, subjective
Quota sampling	Sample can be controlled for certain characteristics	Selection bias, no assurance of representativeness
Snowball sampling	Can estimate rare characteristics	Time consuming

Table 14.4b Strengths and weaknesses of basic sampling techniques

Technique	*Strengths*	*Weaknesses*
Probability sampling		
Simple random sampling (SRS)	Easily understood, results projectable	Difficult to construct sampling frame, expensive, lower precision, no assurance of representativeness
Systematic sampling	Can increase representativeness, easier to implement than SRS, sampling frame not always necessary	Can decrease representativeness depending upon 'order' in the sampling frame
Stratified sampling	Includes all important subpopulations, precision	Difficult to select relevant stratification variables, not feasible to stratify on many variables, expensive
Cluster sampling	Easy to implement, cost effective	Imprecise, difficult to compute and interpret results