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Random Methods in Research Methodology; How to Choose a Sampling Technique for research

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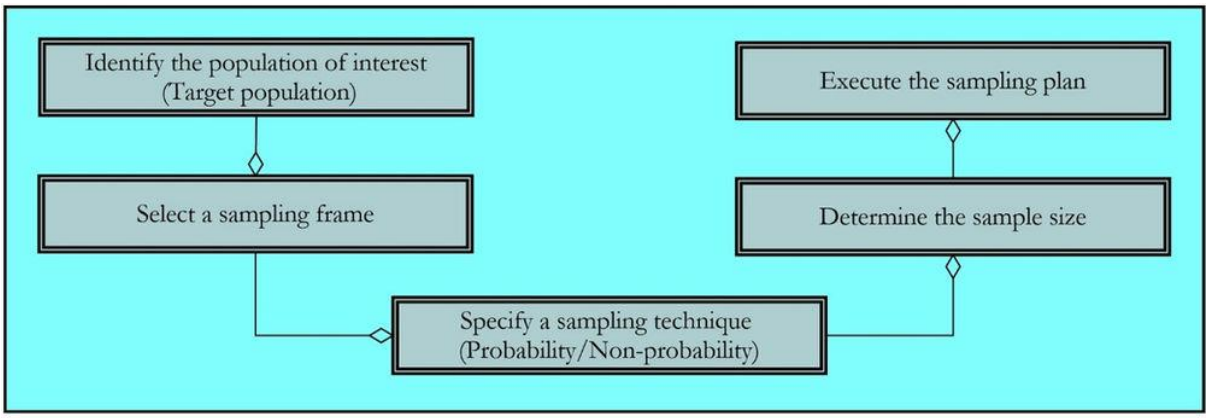
Abstract: To answer the research questions, it is always doubtful that researcher should be ready to collect data from the cases happening around. Thus, there is a desire to pick out a sample for correct checking. Here this paper presents the steps to go through to conduct sampling. Furthermore, as there are differing kinds of sampling techniques/methods, here the right understanding of researcher is needed to opt the right sampling method for the research. In regards, this paper also presents the various forms of sampling techniques and methods that helps us to make a transparent vision.

Key words: Non-Probability Sampling, Sampling Method, Sampling Technique, Research Methodology and Probability Sampling.

SAMPLING METHOD

Whenever a researcher should to answer the questions of research, it is always doubtful that it would find all the knowledge by reading all the cases. There is always a requirement to select a sample. The whole set of cases from which researcher draws a sample is termed as the population. Researchers don't have time and the resources to analyse the whole population so that they use these sampling techniques to reduce the number of cases. Allow us to just have a glance to the steps through which we would like to travel while conducting sampling.



Sampling Process overview

- Stage 1: Define Target Population

Population is explained to be quantity of individuals living in a very particular country. The primary stage of the sampling process is to clearly define the target population.

- Stage2: Select Sampling Frame

Sampling Frame can be understood as list of actual cases from which the sample is taken. The sampling frame must be representative of the population of the place.

- Stage 3: Choose Sampling Technique

Prior to examining the assorted forms of sampling method which we will use, it's worth noting what's meant by sampling, together with reasons why researchers are likely to pick out a sample. Taking a little unit from chosen sampling frame or entire population is named sampling. Sampling is often accustomed make a vision a couple of population or to form generalization in regard to existing theory.

Sampling techniques are basically divided into two parts-

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♣ Probability or sampling
♣ Non- probability or non- sampling

Before choosing some specific type of sampling technique, it is needed to decide broad sampling technique. Various techniques can be seen in next figure.

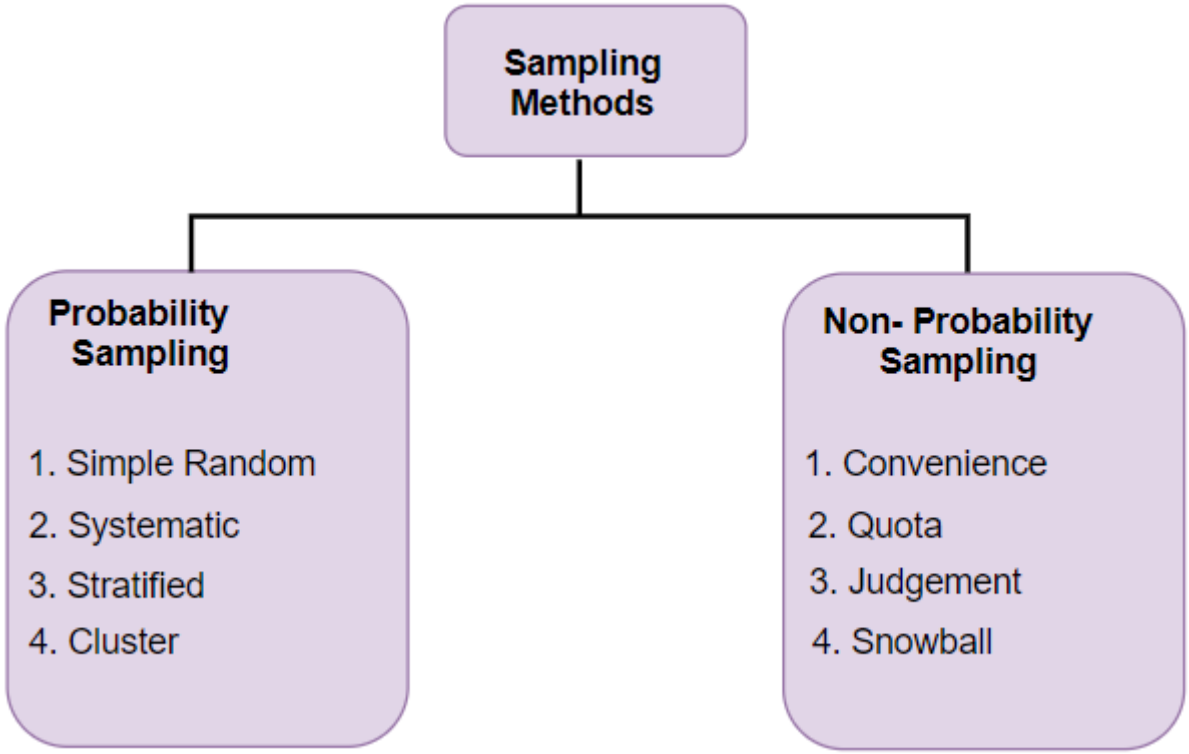

Figure 2. Sampling Techniques

1. PROBABILITY SAMPLING

Probability sampling is that each item within the population has an equal chance of being included in sample. A way to undertake sampling are often if researcher was to construct a sampling frame first then used a random number generation malicious program to choose a sample from the sampling frame. Probability or sampling has the best freedom from bias but may represent costly sample in terms of your time and energy for a given level of sampling error (Brown, 1947).

1.1. Simple random sampling

The random sample simply means every case of the population has an equal probability of inclusion in sample. The disadvantages related to this easy sampling include (Ghauri and Gronhaug, 2005):

1. An entire frame (a list of all units within the whole population) is required.
2. In some studies, like surveys by personal interviews, the prices of obtaining the sample is high if the units are geographically widely scattered.
3. The quality errors of estimators may be high.

1.2. Systematic sampling

Systematic sampling is where every nth number of cases after a random start are selected. as an example, if surveying a sample of consumers, every fifth consumer could also be one among the chosen one from your sample. The advantage of this sampling technique is its ease and ease.

1.3. Stratified random sampling

The population is split into subgroups and a random sample is taken from each subgroup so on get right answers is completed within the process of representative sampling. A subgroup may be a natural set of things utilized in sampling process. Subgroups may well be relied on company size, gender or occupation (to name but a few). representative sampling is usually used where there's a good deal of variation within a population. Its purpose is to make sure that each stratum(subgroup) is sufficiently represented (Ackoff, 1953).

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1.4. Cluster sampling

Whole population is split into clusters or groups, Cluster sampling is that the one where it's done. Initially, a random sample is taken from it, all of which are employed in the ultimate sample (Wilson, 2010). Cluster sampling may be a method with advantages for the researchers who have subjects that are divided over large geographical areas because it saves time and money (Davis, 2005). The stages to cluster sampling are often explained as follows:

1. Choose cluster for sampling frame, like kind of an organization or a realm.
2. Number each of the clusters.
3. Select sample using sampling.

1.5. Multi-stage sampling

The process of moving from thick to thin sample is multi-stage sampling, step by step process are employed in it (Ackoff, 1953). If, as an example, an Indian publisher of an automobile magazine were to conduct a survey, it could simply take a random sample of automobile owners within the whole Indian population. It's visible, this can be both expensive similarly as time consuming. A less expensive alternative would be to use multi-stage sampling rather using that. within the process, this is able to involve dividing India into variety of countries. A number of the regions here are chosen randomly, so subdivisions are made, perhaps supported agency areas. Next, a number of these areas are again chosen indiscriminately then divided into smaller sections, like towns or cities. The most purpose of multi-stage sampling is to pick out samples which are focused in few nations. Once again, this protects time and money of the surveyer.

2. NON PROBABILITY SAMPLING

Non probability sampling is commonly related to the case study research, its design and qualitative research of the sample. With regards to the latter, case studies tend to focused on small samples and are intended to look at a real-life phenomenon, to not make statistical inferences in respect to the broader population (Yin, 2003). A sample of participants or cases doesn't have to be representative, or random, rather it should be a transparent rationale is required for the inclusion of some cases or individuals instead of others.

2.1. Quota sampling

Quota sampling is that style of non-random sampling technique within which participants are chosen on the idea of predetermined characteristics so the whole sample here will have the identical distribution of various characteristics because the wider population already has (Davis, 2005).

2.2. Snowball sampling

Snowball sampling is that the non-random sampling method that uses some cases to assist encourage other cases to require part within the study, thereby it increases sample size. This method is most applicable in small populations because it is difficult to access them thanks to their closed nature.

2.3. Convenience sampling

Convenience sampling is one in every of the way of choosing participants because they're often readily and simply available for research. Typically, convenience sampling because its name says is that the favoured sampling technique among students(researchers) as it is inexpensive and a simple option compared to a number of the opposite sampling techniques (Ackoff, 1953). Convenience sampling often helps to beat many of the constraints related to the research. As an example, using friends or family as a part of sample is less complicated than targeting the people whom you don't know.

2.4. Purposive or judgmental sampling

Purposive or judgmental sampling (as name already suggest) may be a strategy during which particular settings persons or events are selected deliberately so as to supply important information that can't be obtained from other choices (Maxwell, 1996). It's where the researcher includes cases or participants within the sample because they believe that they important inclusion.

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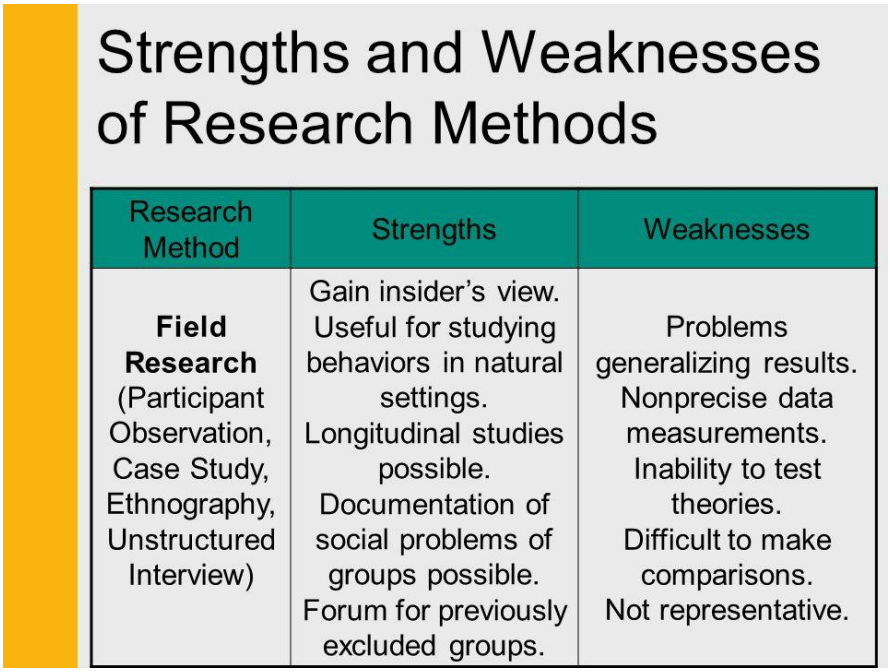

Table: Strengths And Weakess Of Sampling Techniques

Stage 4: Determine Sample Size

In order to keep up a correct for random sample and avoid sampling errors or biases, a random sample has to be of adequate size that doesn't create any issues. what's adequate depends on several issues which are often confusing to people doing surveys for the primary time. this can be because what's important here isn't the proportion of the research population that are taken to be sampled, but absolutely the size of the sample selected relative to the complexity of the population here, the aim of the researchers and therefore the reasonably statistical manipulation that may be utilized in data analysis is seen. to place it bluntly, larger sample sizes reduce sampling error but at a rate which is decreasing. Many statistical formulas are available for determining sample size.

There are number of approaches, incorporating variety of various formulas, for calculating the sample size for categorical data steps are followed.

- ♣ n= p (100-p)z2 /E2 n is that the required sample size
- ♣ Let P is that the percentage occurrence of a state
- ♣ E is that the percentage maximum error needed
- ♣ Z is that the value like level of confidence needed

There are two major factors of this formula (Bartlett et al., 2001). Firstly, there are many considerations associated with the estimation of the degree of precision and risk that the researcher is willing to accept: E is that the margin of error (the level of precision) or the danger that the researcher is willing to just accept (for example, the plus or minus figure reported in newspaper poll results). within the social research, the acceptance of error is of fifty only. So, as an example, if in an exceedingly survey on job satisfaction the dissatisfied responders were 40% rather it'd lie between 35% and 45%. The smaller the worth of E the greater the sample size is required as technically speaking the sample error is inversely proportional to the root of n, however, an oversized sample cannot guarantee you precision because of their size (Bryman and Bell, 2003).
Z may be taken because the level of confidence that the revealed by the results of survey findings as they're accurate. What this suggests is really the degree to which we are able to make certain that the characteristics of the population are accurately estimated by the sample survey. Z is that the statistical value akin to level of confidence needed. the most idea behind this can be that if a population were to be sampled repeatedly the common value of a variable or question obtained would be adequate to verity population value. In management research the everyday levels of confidence won't to be are 95% (0.05: a Z value up to 1.96) or 99% (0.01: Z=2.57). A 95% level of confidence implies that 95 out of 100 samples will have verity population value within the margin of error (E) specified. The second main component of a sample size formula focuses on the estimation of the variance or heterogeneity of the population (P). Researchers of management are commonly concerned with determining sample size for the problems involving the estimation of population percentages or proportions (Zikmund, 2002). The variance of a

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proportion or the proportion occurrence of how a selected question is seen during this formula, for instance, are going to be answered is P(100-P). Where, P= the share of a sample having a characteristic of some sort, as an example, the 40 you look after the respondents who were dissatisfied with amount they're paid, and (100-P) is that the percentage (60%) who lack the characteristic or this belief. the most issue is how can anyone estimate the worth of P before conducting the survey? There are this main point which suggests that researchers should use almost 50% as an estimate of P, as this can lead to the maximization of variance and produce the utmost sample size (Bartlett et al., 2001). The sample size determining formula, of the population has virtually shown no effect on how well the sample is probably going to explain the population and as Fowler (2002) argues, it's most unusual for it (the population fraction) to be a serious consideration when choosing sample size (Fowler, 2002).
Table 2 presents sample size that it'd be necessary for given combinations of precision, confidence levels, and a population percentage or variability of fifty (the figure which many researchers suggest to maximise variance).

n	Mean TFR	95% Confidence Interval		Bias	MSE
		Lower	Upper		
100	1.99	1.37	2.61	0.084	0.106
200	1.94	1.39	2.49	0.031	0.08
300	1.93	1.53	2.32	0.022	0.041
400	1.92	1.52	2.32	0.012	0.041
500	1.92	1.63	2.21	0.016	0.022
700	1.90	1.67	2.14	-0.004	0.014
900	1.90	1.69	2.11	-0.005	0.011
1000	1.91	1.73	2.13	0.019	0.011
1200	1.91	1.73	2.08	0.002	0.008
1500	1.90	1.73	2.08	-0.002	0.008

The number of obtained responses are reflected by sample size, and not necessarily the amount of questionnaires distributed (this number is commonly increased to make amends for non-response). However, in most surveys that are social and management, the response rates for postal and e-mailed surveys are very rarely 100%. Probably the foremost common and time effective thanks to ensure minimum samples are met is to extend the sample size by up to 50% within the first distribution of the survey (Bartlett et al., 2001).

- Stage 5: Collect Data

Firstly target the population, frame sampling, technique of sampling and sample size are established, then the subsequent step is to gather data.

- Stage 6: Assess Response Rate

Response rate are often defined as number of cases agreeing to require part within the study. The cases here are picked from original sample. In reality, most researchers never achieve a 100% response rate within the earlier attempts. Reasons for this might include refusal to retort, ineligibility to retort, inability to reply, or the respondent has been located but researchers are unable to create contact with them or the other reason may be seen. In total, response rate is very important because each non response is responsible to be bias the ultimate sample. Clearly defining sample, employing the proper sampling technique and generating an outsized sample, in some respects can help to cut back the likelihood of sample bias and can allow the researcher to gather data which is in right form and may help it to create that study successful.

CONCLUSION

In this paper, the researcher has discussed different types of sampling methods/techniques. Also, the six steps which should be taken to conduct sampling were explained in it to give a clear vision. As mentioned previously, there are two types of sampling methods namely; probability sampling and non-probability sampling. Each of these methods have their own way of being performed. Non-probability Sampling includes Convenience sampling, Snowball sampling, Judgment

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sampling, and Quota sampling whereas Probability Sampling includes Simple random, Multi Stage random, Cluster sampling, Systematic sampling and Stratified sampling.

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