Factors to Consider When Determining the Right Sample Size – Determining the sample size is an important component of any empirical study in which the goal is to make inferences about a population from the sample. It is critical to choose the number of observations that results in a statistical sample.

Formulate a statement about what is expected of the sample. Determine what it is you are trying to estimate, how precise you want the estimate to be and what you are going to do with the estimate once you have it. This can be derived from already established goals.

One should consider the following when selecting a sample size:

Population parameters and spread of the population

Existing Information

Difficulty of Data Collection

Precision of Final Estimates

Population Parameters

The size of the population is a consideration but doesn’t specifically determine the sample size. A key factor in sample size is variability. For a random sample, population elements (i.e. gender or ethnicity) will show up to be measured in approximately the same proportions that they exist in the population. In any given population, more typical elements will show up more often and unusual elements will show up less often. Consequently, if the variability of the population is large, then we must take many samples. Conversely, a small population variance means we don’t have to take as many samples.

Existing Information

If the subject of the current study has been studied before, we can use the prior information to reduce sample sizes. This can be done by using prior mean and variance estimates.

Difficulty of Data Collection

Sample size selection must also be practical and make sense. We want to take a sufficient number of observations to obtain reasonably precise estimates of the parameters of interest but we also want to do this within a practical timeframe and expense. It’s important to quantify the risks associated with the chosen sample size.

Precision of Final Estimates

No sample is perfect, so you must determine how much error is acceptable. The confidence interval determines how much deviation you will allow in your sample. How confident do you want to be that the actual mean falls within your confidence interval? The most commonly used confidence intervals are 90%, 95% and 99% confidences.

Calculating Sample Size

Your selected confidence level corresponds to a Z-score. Z-scores for the most common confidence levels:

* 90% – Z Score = 1.645
* 95% – Z Score = 1.96
* 99% – Z Score = 2.576

Next, plug in your Z-score, Standard of Deviation, and confidence interval into the sample size calculator or into this equation:

Necessary Sample Size = (Z-score) \* SD\*(SD) / (margin of error)

How the math works with a 95% confidence level, .5 standard deviation, and a margin of error (confidence interval) of +/- 5%.

((1.96)2 x .5(.5)) / (.05)2  
(3.8416 x .25) / .0025  
.9604 / .0025  
384.16  
385 respondents are needed