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Criteria for Choosing a Survey Method in Statistical Research

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Abstract: *Selecting an appropriate survey method is a critical aspect of statistical research, influencing the accuracy, reliability, and overall quality of the findings. This paper explores key criteria for choosing a survey method, considering theoretical and methodological principles, the characteristics of the studied population, and available information. It discusses the importance of defining the statistical population, identifying its units, and assessing its size and structure. The study further examines sample selection, emphasizing random, stratified, and quota-based approaches while addressing the challenges associated with different sampling techniques. Additionally, the paper highlights the impact of economic and time constraints on survey research and the role of statistical errors in determining result accuracy. By applying rigorous statistical methods and understanding the limitations of various sampling techniques, researchers can optimize survey design for more reliable and valid outcomes.*

Keywords: *survey research; statistical sampling; population characterization; sample size determination; survey methodology; probability-based surveys; economic constraints; statistical inference.*

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1. Introduction

A first set of principles regarding survey procedures relates to the fundamental concepts of statistical knowledge. Statistical research aims to reveal the truth as a whole or as a particular unitary community, also known as a population. (SCOALAARGESEANA.RO, 2021)

This survey-based analysis system operates on the hypothesis of understanding such a reality by researching a representative sample extracted from society through a well-established scientific method.

The goal of statistical knowledge cannot be achieved merely by drawing an analogy from a part to the whole but rather by uncovering the characteristics of that whole through a complex intellectual transformation.

Essentially, statistical research is based on reasoning and aims to reconstruct reality through adaptation by analysing a specific part of the whole. This understanding of statistics as a concept presents various specific challenges, such as defining the statistical population as a whole, estimating the population's magnitude, identifying particular units, and analysing their characteristics.

At the same time, conducting a survey raises several issues, such as determining the sample size, assessing the accuracy of the results, and specifying the originality constraints.

2. Criteria for Choosing a Survey Method

From the theoretical and methodological perspectives of statistical perception, a set of principles is first defined to guide the selection of a survey method.

This set may include aspects such as the nature of the phenomenon or statistical population, the available data on the population, the nature and size of the sample, and the accuracy of survey conclusions.

For each perspective, certain key aspects require special attention from professionals involved in survey research.

3. The Reality of the Studied Population and the Possibilities of Its Characterization

Statistical populations are real, meaning they are finite, measurable, and composed of observable individual units. (Mnerie, et. al., 2012)

Generally, survey-based research determines the nature, internal characteristics, scope, and duration of a studied phenomenon, as well as the specific aspects of defining the statistical population.

However, certain situations may complicate population characterization, such as determining its exact size, identifying particular units, and establishing characteristics based on three main aspects: ability, scope, and period.

Some examples of these situations include:

- In evaluating the specific value of products, for instance, the studied population consists of products obtained from the production line over a certain period (e.g., one day, two days, or a month). However, the exact size of this population is often unknown.
- In researching real phenomena, such as natural occurrences, defining individual events is only possible when analysed statistically.

These limitations in population characterization also translate into constraints when selecting a survey method. Random sampling poses significant challenges because it requires listing and identifying all units within the studied population. Consequently, in such cases, experimental or composite surveys are preferred.

In professional practice, these challenges often lead to the creation of "pseudo-random" or "opportunistic" surveys, where researchers, for the sake of efficiency, may forgo strict scientific rigor and select samples arbitrarily rather than through a structured, representative selection process.

4. Available Information

The availability of information in society varies significantly and can be collected through various means, such as prior studies, official documents, and pre-calculated analyses.

These sources of information can be used either before sampling (pre-experiment) or after the survey is conducted (post-experiment).

When information is available at the individual level, a survey framework exists that enables the implementation of random or composite sampling methods.

In general, additional information originates from previous studies or from survey data that are not fully available for the entire research scope. In such cases, experimental surveys, such as quota sampling or stratified sampling, may be used.

If the population is known to be organized based on one or more parameters closely related to the survey's subject, the sample can serve as a micro-model of the overall population using stratified or quota sampling techniques.

Additionally, supplementary information can be used after the sample has been analysed to refine the accuracy of the results. However, this improvement is only possible for probability-based surveys.

5. The Nature and Size of the Sample

Once the population is characterized, an important aspect of survey design is defining the sample. This step focuses on data collection and the practical ability to analyse individual statistical units. (Spătaru, 2004)

The chosen survey method depends on how the units can be identified as sources of statistical data. These units may be simple (e.g., objects, individuals) or complex (e.g., families, companies) and can be recognized individually or as part of a group (e.g., clusters, sequences).

Typically, for population studies, survey data at the unit level are unavailable. Therefore, obtaining a sample involves first extracting broad units and then identifying the specific units for analysis using a comprehensive sampling plan.

6. Determining Sample Size

One of the major challenges in survey implementation is determining sample size. There are two scenarios:

1. The sample size is known or pre-determined.
2. The sample size needs to be estimated.

If the sample size is predetermined, it is typically based on epistemological considerations, budget constraints, or previous studies of similar nature.

For example, in public opinion surveys using quota sampling, the sample size is usually set at approximately 1,000 individuals. Similarly, budget constraints may dictate the sample size. If sample size is determined by budget, it is calculated based on total research costs (C) and unit cost per surveyed individual (c), using the formula:

$$n = \frac{C}{c}$$

Figure 1. Sample Size and Budget Ratio

However, in probability-based surveys, sample size can be determined based on the desired accuracy of results. For example, to estimate a proportion with a ±3% margin of error at a 95% confidence level, a simple random sample of 1,067 individuals is required.

7. Accuracy of Results

In statistics, accuracy refers to how closely a result reflects reality. Accuracy is estimated based on the degree of statistical error, which accumulates at each stage of the statistical process. (Francis, 2005)

A key concept in statistical science is measuring these errors to determine the reliability of results. Some errors can be quantified, while others remain unpredictable and cannot be calculated numerically.

In surveys, sampling errors indicate the difference between sample-based results and the actual population values. Accuracy is important for both data producers and data users, and statistical results must always be accompanied by methodological explanations regarding data definition, applicability, and error estimation.

Survey reliability is particularly relevant when selecting the sampling method. Probability-based surveys allow for precise error estimation, while experimental surveys only provide rough estimates of accuracy.

A statement such as, "The results are accurate within a margin of ±3%," is valid only for probability-based surveys. If such precision is required, a convenience or non-random survey cannot be used.

8. Economic and Time Constraints

Economic and time constraints play an important role in statistical surveys, though they should not be the determining factors. (Mnerie, D. & Mnerie G. V., 2017)

Like any human endeavour, survey-based research is subject to budget and time limitations. However, these constraints should be flexible and aligned with scientific rigor to ensure high-quality research.

Factors such as total cost, cost per unit, and survey execution time are crucial in decision-making but should not compromise the accuracy and validity of the results.

9. Conclusion

Survey research serves as a fundamental tool in statistical inference, allowing researchers to derive insights about a population from a sample. The accuracy of estimations depends on the properties of the chosen estimators, with unbiasedness, efficiency, and consistency being critical. Confidence intervals enhance reliability by accounting for estimation uncertainty. By applying rigorous statistical methods, researchers can ensure robust conclusions and meaningful predictions based on survey data.

References

Francis, A. (2005). *Statistică şi matematică pentru managementul afacerilor*, Editura Tehnică, Bucureşti.

Mnerie, D., Mnerie, G. V. (2017). *Marketing internaţional*, Editura Fundaţiei pentru Cultură şi Învăţământ "Ioan Slavici", Timişoara.

Mnerie, G. V., Dorneanu, L., Mnerie, D., Nani, V., Mariş, S., Saizescu, C., & Ularu, N. (2012). *Elemente de matematici aplicate, statistică şi econometrie*, Editura Fundaţiei pentru Cultură şi Învăţământ "Ioan Slavici", Timişoara, Editura Eurostampa, Timişoara.

Spătaru L. (2004). *Analiză economico-financiară*, Editura Economică, Bucureşti.

Școala Argeșeană. (2021). *Sondajul de opinie și rolul său în cercetarea de marketing*. Retrieved from https://www.scoalaargeseana.ro/didactica-magna/1656-sondajul-de-opinie-si-rolul-sau-in-cercetarea-de-marketing