



QUANTITATIVE RESEARCH DESIGN AND APPROACHES

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WHAT WILL YOU LEARN

- What is Quantitative Research Method?
 - Why you do quantitative research?
 - What quantitative research method for?
 - What are the main characteristics?
 - How to plan quantitative research design?
 - What is the basic methodology for a quantitative research design?
 - How to gather data?
 - How to analyze the data?
 - What are the advantages and limitations?
 - Tips for conducting quality quantitative research
 - Key points



RESEARCH METHOD

“No research without action, no action without research”

- Kurt Lewin



WHAT IS RESEARCH METHOD?

- Research methods are the strategies, processes or techniques utilized in the collection of data or evidence for analysis in order to uncover new information or create better understanding of a topic.
- There are different types of research methods which use different tools for data collection.



TYPES OF RESEARCH



Qualitative

This type of research is useful in the exploration of how or why things have occurred, interpreting events and describing actions.



Quantitative

This type of research is useful for finding out how many, how much, how often, or to what extent.



Mixed Methods

Integrates both Qualitative and Quantitative Research. It provides a holistic approach combining and analysing the statistical data with deeper contextualised insights.



QUANTITATIVE RESEARCH METHOD



Quantitative research is the process of collecting and analyzing numerical data using mathematically based methods (Creswell, 1994). It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.



Quantitative research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing, etc.

WHY DO QUANTITATIVE RESEARCH?

- If your study aims to find out the answer to an inquiry through numerical evidence.
- Use qualitative research at the beginning of a design process to uncover innovations. Use quantitative research at the end of a design process to measure improvement.
- You have an idea, established what you thought was going on, and test these ideas with large surveys.
- Testing of hypotheses.



WHAT QUANTITATIVE RESEARCH METHOD FOR?



DESCRIPTIVE RESEARCH

Overall summary of your study variables.



CORRELATION RESEARCH

Investigate relationships between your study variables.



EXPERIMENTAL RESEARCH

Examine whether there is a cause-and-effect relationship between variables.



WHAT ARE THE MAIN CHARACTERISTICS

The data is usually gathered using structured research instruments.

The results are based on larger sample sizes that are representative of the population.

The research study can usually be replicated or repeated, given its high reliability.

Researcher has a clearly defined research question to which objective answers are sought.

All aspects of the study are carefully designed before data is collected.

Data are in the form of numbers and statistics, often arranged in tables, charts, figures, or other non-textual forms.

Project can be used to generalize concepts more widely, predict future results, or investigate causal relationships.

Researcher uses tools, such as questionnaires or computer software, to collect numerical data.

HOW TO PLAN QUANTITATIVE RESEARCH DESIGN?



Identify the research problem.

- How the automatic enforcement system (AES) implementation affect driver behavior on the road?



Prepare the research questions that need to be answered to address the research problem.

- The driver perception of being caught (POBC) speeding.
- What are the factors influence drivers' perception of being caught speeding on the road?



Review existing literature on the research problem and questions.

- To ensure that there is no duplication. If someone has already answered this, you can rely on their results.
- Describes the theoretical framework -- provide an outline of the theory or hypothesis underpinning your study.



Develop a research plan.

- This includes identifying the target group, sample, and method of data collection; conducting data analysis; collating recommendations; and arriving at a conclusion.

WHAT IS THE BASIC METHODOLOGY FOR A QUANTITATIVE RESEARCH DESIGN?

Make your observations about something that is unknown, unexplained, or new. Investigate current theory surrounding your problem or issue.

Hypothesize an explanation for those observations.

Make a prediction of outcomes based on your hypotheses. Formulate a plan to test your prediction.

Collect and process your data. If your prediction was correct, go to step 5. If not, the hypothesis is rejected.

Verify your findings. Make your final conclusions. Present your findings in an appropriate form for your audience.

HOW TO GATHER DATA?

- Makes use of tools such as questionnaires, survey, measurements and other equipment to collect numerical or measurable data.
- Your result will be tabled containing data in the form of numbers and statistics.



HOW TO ANALYSE THE DATA?

DESCRIPTIVE STATISTICS



You can get a summary of your data and include measures of averages and variability.

You can also use graphs, scatter plots and frequency tables to visualize your data and check for any trends or outliers.

You can make predictions or generalizations based on your data.

You can test your hypothesis or use your sample data to estimate the population parameter.



INFERENCE STATISTICS

REPORTING THE QUANTITATIVE RESULTS

- **Explain the data collected** and their statistical treatment as well as all relevant results in relation to the research problem you are investigating.
- **Report unanticipated events** that occurred during your data collection. Explain how the actual analysis differs from the planned analysis. Explain your handling of missing data and why any missing data does not undermine the validity of your analysis.
- **Explain the techniques** you used to "clean" your data set.
- **Choose a minimally sufficient statistical procedure**; provide a rationale for its use and a reference for it. Specify any computer programs used.
- **Describe the assumptions for each procedure** and the steps you took to ensure that they were not violated.
- When using **inferential statistics**, provide the descriptive statistics, confidence intervals, and sample sizes for each variable as well as the value of the test statistic, its direction, the degrees of freedom, and the significance level [report the actual p value].
- **Avoid inferring causality**, particularly in nonrandomized designs or without further experimentation.
- **Use tables to provide exact values**; use figures to convey global effects. Keep figures small in size; include graphic representations of confidence intervals whenever possible.
- **Always tell the reader what to look for in tables and figures.**

WHAT ARE THE ADVANTAGES?



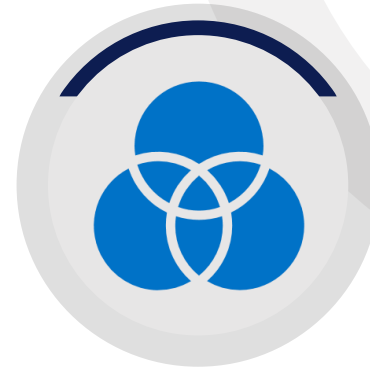
REPLICATION

Repeating the study is possible because of standardized data collection protocols and tangible definitions of abstract concepts.



DIRECT COMPARE

The study can be reproduced in other cultural settings, times or with different groups of participants. Results can be compared statistically.



LARGE SAMPLES

With statistically significant sample sizes, the results can be generalized to an entire target group.

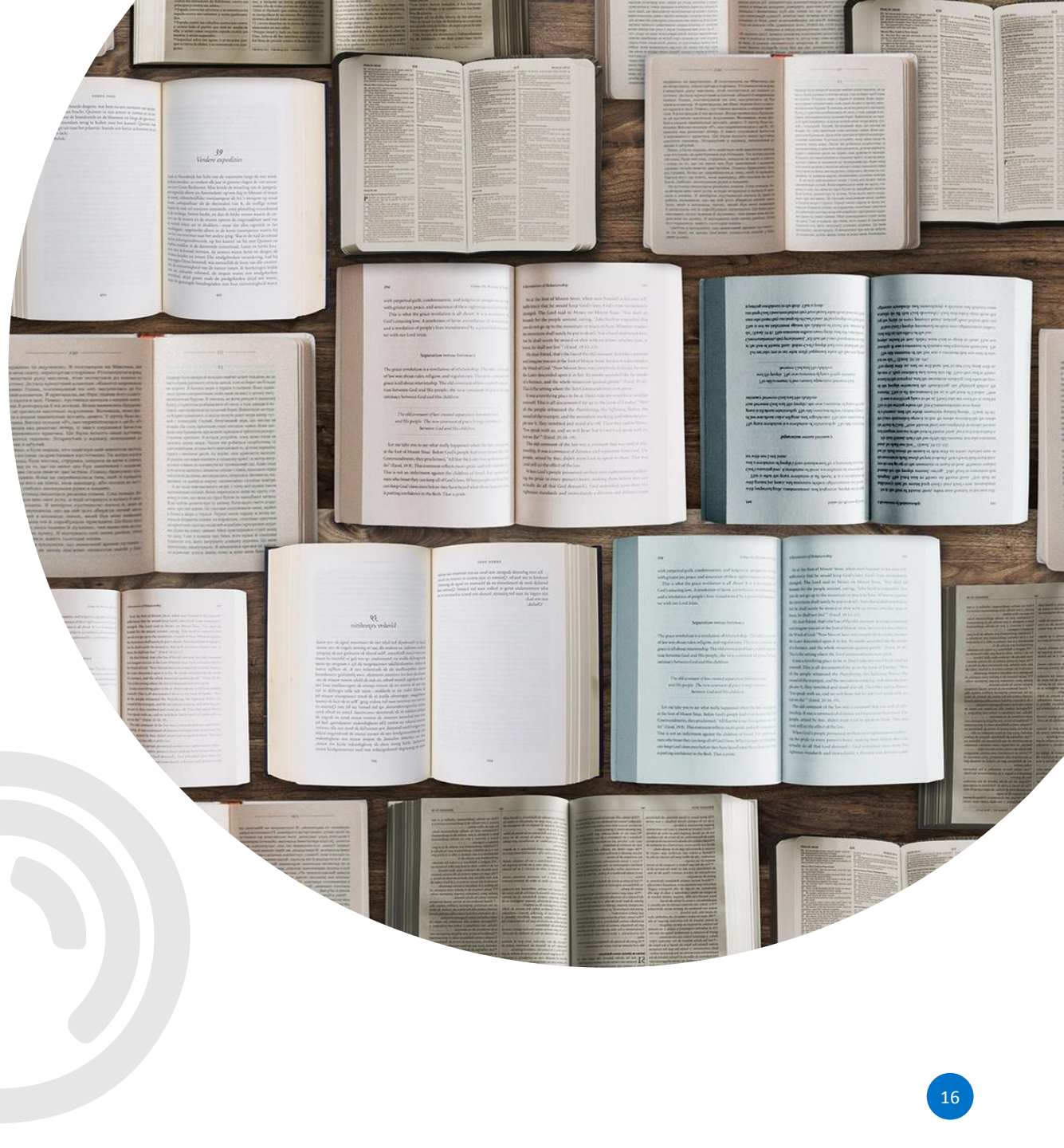


HYPOTHESES TESTING

Report your research variables, predictions, data collection and testing methods and making a conclusion.

IS THERE ANY LIMITATIONS?

- Does not account for people's thoughts or perceptions about what you're evaluating.
- Does not explore the "why" and "how" behind a phenomenon.
- Predetermined variables and measurement procedures can mean that you ignore other relevant observations.
- Missing data, imprecise measurements or inappropriate sampling methods are biases that can lead to the wrong conclusions.
- Quantitative research often uses unnatural settings like laboratories or fails to consider historical and cultural contexts that may affect data collection and results.



TIPS FOR CONDUCTING QUALITY QUANTITATIVE RESEARCH

Simple questions

- Avoid 'marketing-speak' and keep things conversational, use terms and phrases that the person on the other end is going to understand.

Asking both emotional & rational decisions

- This could be as simple as showing some stimulus and asking an open-ended question: 'how this idea made you feel?' or by providing a list of emotions for the respondent to choose from

Don't lead the questions toward the answers you want to hear.

Try to get both the why and the what

Before you launch the survey, take a moment to sit down in front of your questionnaire and think about what the results will look like.

Be sure to construct your research methodology so that you can easily replicate in future for easy comparison across each point in time.

Understand the importance of timing

KEY POINTS

Has its main purpose in quantification of data (to describe variables).

To examine relationships among variables.

To determine cause-and- effect interactions between variables.

Allows generalizations of results from a sample to an entire population of interest.

Measurement of the incidence of various views and opinions in a given sample.





Questions
Answers

THANK YOU!

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