DEFENSE RESEARCH METHODOLOGY

Major General Dr. Budi Pramono , S.I.P., M.M, M.A., (GSC).,
CIQaR ., CIQnR ., MOS., MCE., CIMMR

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DEFENSE RESEARCH METHODOLOGY

QUANTITATIVE RESEARCH METHOD Volume 1

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Author:
Major General Dr. Budi Pramono, S.I.P., M.M, M.A., (GSC)., CIQaR., CIQnR., MOS., MCE., CIMMR

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PREFACE

My praise and thank for Alloh S.W.T, because of given so that we can complete this Defense Research Methodology book well. The purpose of writing this book is none other than to assist in understanding the material regarding the methods used in conducting research in the field of defense science studies which is one of the important things for the success of a research.

The authors would like to thank the publisher, family, colleagues and readers wherever they are, I hope this book is useful and can be used as reference material in the research being asked. Perfection belongs to Allah, of course there are still many shortcomings in this paper, so and suggestions that are built, we expect criticism for the improvement of this book.

Jakarta, September 2022

Major General Dr. Budi Pramono, S.I.P., M.M, M.A., (GSC)., CIQaR., CIQnR., MOS., MCE., CIMMR

SYNOPSIS

Quantitative research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations. Quantitative research is the opposite of qualitative research, which involves collecting and analyzing non-numerical data (e.g., text, video, or audio). Quantitative research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing, etc.

The aim of this study is to explicate the quantitative methodology. The study established that quantitative research deals with quantifying and analyzing variables in order to get results. It involves the utilization and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how. It also describes the methods of explaining an issue or phenomenon through gathering data in numerical form. The study further reveals that quantitative methods can be categorized into; survey research, correlational research, experimental research and causal-comparative research.

AUTHOR

- MG Dr. Budi Pramono, S.I.P., M.M, M.A., (GSC)., CIQaR., CIQnR., MOS., MCE., CIMMR
- NRP : 32402
- PERMANENT LECTURER AT THE REPUBLIC OF INDONESIA DEFENSE UNIVERSITY
- mrpramono.unhan@gmail.com

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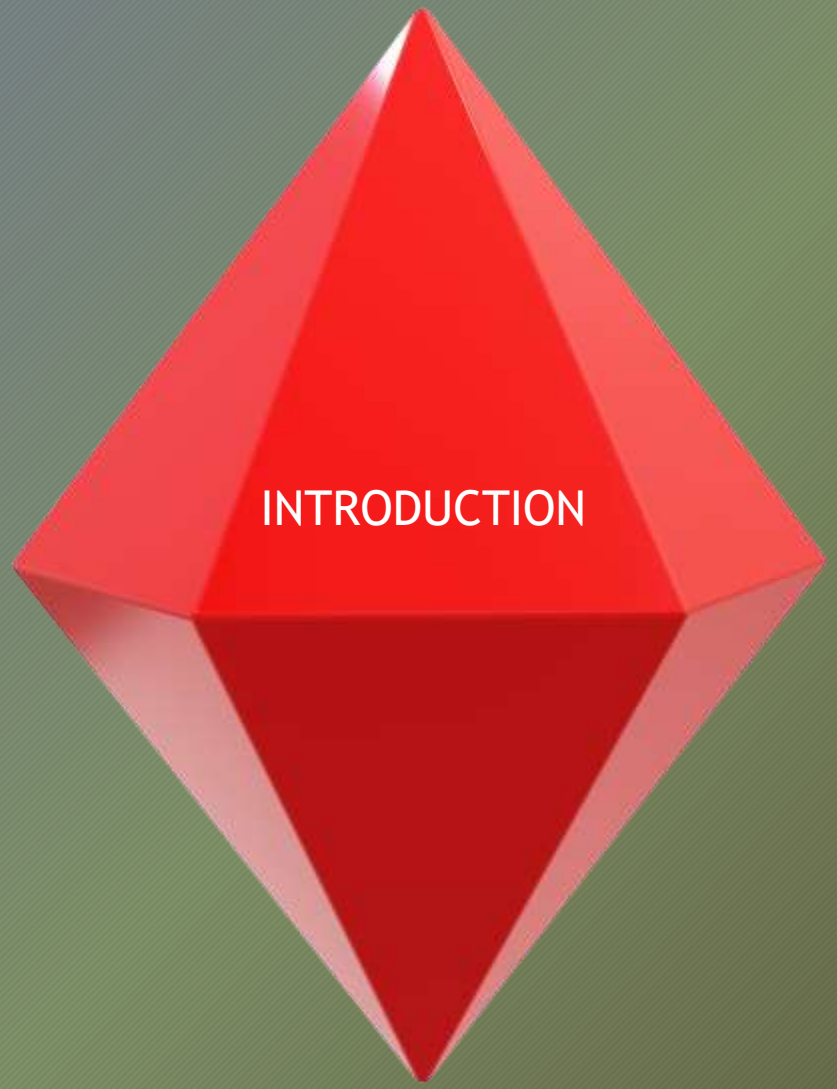
INTRODUCTION

Introduction to Quantitative Research

The following definition, taken from Aliaga and Gunderson (2000), describes what we mean by quantitative research methods very well:

> "Quantitative research is 'Explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)".

General Types of Educational Research

- Descriptive — survey, historical, content analysis, qualitative
- Associational — correlational, causal-comparative
- Intervention — experimental, quasi-experimental, action research (sort of)

- This division is irrespective of the quan/qual divide

What is Quantitative Research?

- Formal, objective, rigorous, systematic process for generating information
- Describes new situations, events, or concepts
- Examines relationships among variables
- Determines the effectiveness of treatments

Types of Research Methodologies

Qualitative Research

Historical

Content Analysis

Ethnographic

Research by Practitioners

Action

Quantitative Research

Experimental

Correlational

Survey

Single-Subject

Causal-Comparative

QUANTITATIVE RESEARCH

Quantitative research is the collection and analysis of numerical data to describe, explain, predict, or control phenomena of interest.

Quantitative Research

This research operates on the philosophical belief or assumption that We inhabit a relatively stable, uniform, and coherent world that we can measure, understand, and generalize about.

This view, adopted from the natural sciences, implies that the world and the laws that govern it are somewhat predictable and can be understood by scientific research and examination. In this quantitative perspective, claims about the world are not considered meaningful unless they can be verified through direct observation.

THE QUANTITATIVE PROCESS

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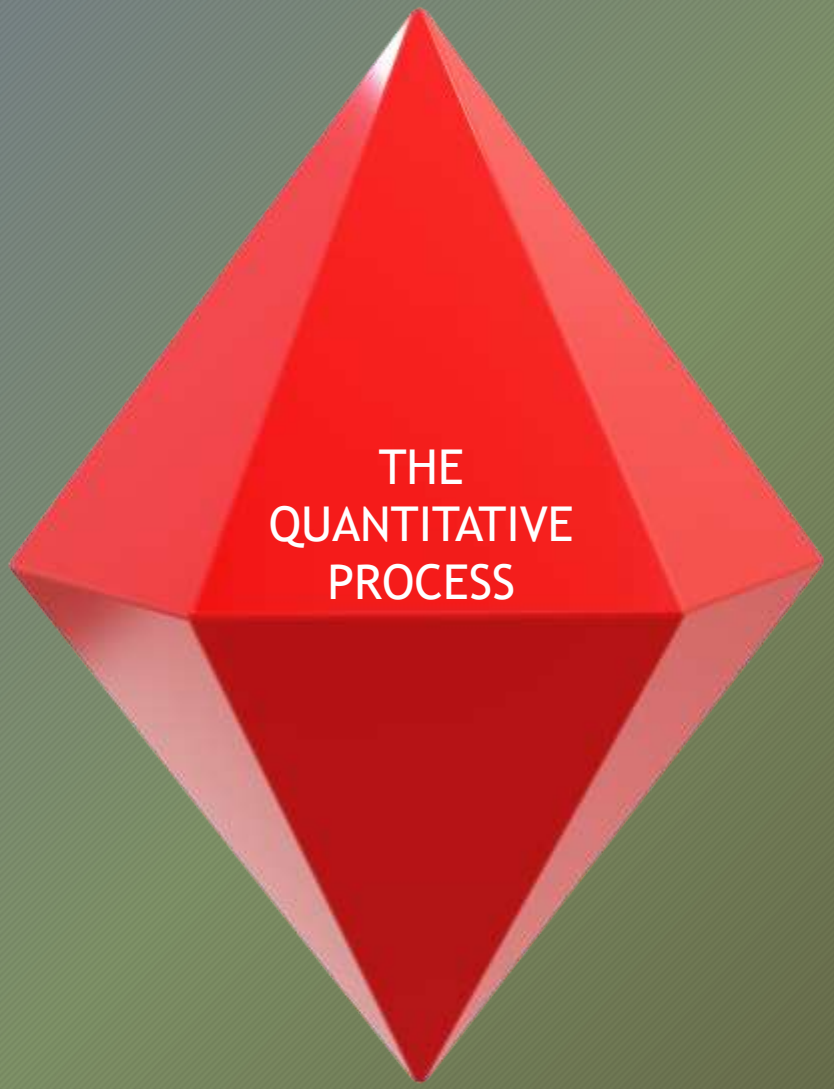
UNIT 2


THE
QUANTITATIVE
PROCESS

THE QUANTITATIVE PROCESS

At the outset of a study,
quantitative researchers state the hypotheses to be examined
and specify the research procedures
that will be used to carry out the study.
They also maintain control over contextual factors that
may interfere with the data collection and identify
a sample of participants large enough to provide
statistically meaningful data.

Types of Quantitative Research

- Descriptive
- Correlational
- Quasi-experimental
- Experiemental

How Would You Describe Correlational Research?

- Looks at the relationship between two or more variables
- Determines the strength and type of relationship
- Explains what is seen
- No cause and effect

How about Quasi-experimental Research?

- Examines cause-and-effect relationships
- Less control by researcher than true experimental designs
- Samples are not randomly selected.
- All variables in the study cannot be controlled by the researcher.

What are the Main Characteristics of Experimental Research?

- Controlled manipulation of at least one independent variable
- Uses experimental and control groups
- Random assignment of the sample to the experimental and control groups

What is the Aim of Experimental Research?

- Looks at cause-and-effect relationships
- Highly controlled, objective, systematic studies
- Involves the measurement of independent and dependent variables

Important Concepts in the Quantitative Research Process

- Basic Research
- Applied Research
- Rigor
- Control
- Extraneous Variables
- Sampling

What is Applied Research?

- Attempts to solve real problems in clinical practice
- Studies the effects the intervention may have on patients
- Applies findings in the real world on real patients

Why is Rigor Important?

- Striving for excellence in research and adherence to detail
- Precise measurement tools, a representative sample, and a tightly controlled study design
- Logical reasoning is essential.
- Precision, accuracy, detail, and order required

What Measures of Control are Utilized?

- Rules that are followed to decrease the possibility of error in part determine the design of the study.
- Different levels of control depending on study
  - Quasi-experimental studies partially controlled regarding selection of subjects
  - Experimental studies highly controlled because of precision of sample selection

Control in Quantitative Research

Type of Quantitative Research	Researcher Control	Research Setting
Descriptive	Uncontrolled	Natural or partially controlled
Correlational	Uncontrolled or partially controlled	Natural or partially controlled
Quasi-experimental	Partially controlled	Partially controlled
Experimental	Highly controlled	Laboratory

SAMPLING METHOD

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UNIT 3


SAMPLING
METHOD

What are Sampling and Sampling Methods?

- Process of selecting subjects who are representative of the population
- Random sampling
  - Each member has an equal chance of being selected.
  - Has the most control
- Convenience sampling
  - Whoever is available

Settings in Quantitative Research

- Natural or field settings

- Partially controlled settings

- Highly controlled or laboratory settings

Sampling

- The first step in selecting a sample is to define the population to which one wishes to generalize the results of a study
- The sample is drawn from the population
- -Data is collected from the sample
- -Statistics are used to determine how likely the sample results are reflective of the population

- A number of different strategies can be used to select a sample. Each of the strategies has strengths and weaknesses.
- There are times when the research results from the sample cannot be applied to the population because threats to external validity exist with the study.
- The most important aspect of sampling is that the sample represent the population.

SIMPLE RANDOM SAMPLING

- Each subject in the population has an equal chance of being selected regardless of what other subjects have or will be selected.
- A random number table or computer program is often employed to generate a list of random numbers to use.
- A simple procedure is to place the names from the population is a hat and draw out the number of names one wishes to use for a sample.

STRATIFIED RANDOM SAMPLING

- – A representative number of subjects from various subgroups is randomly selected.
- The subgroups are called strata and the sample drawn from each strata is proportionate to the propsrtions of the strata in the sample
- E.g. if a population has 100 teachers (50 elementary, 30 secondary and 2 tertiary), then in a sample of 10, 5 should be from the elementary stratum, 3 from secondary stratum and 2 from the tertiary stratum

CLUSTER SAMPLING

In cluster sampling, intact groups, not individuals,
are randomly selected.

Any location within which
we find an intact group of population members
with similar characteristics is a cluster.
Examples
of clusters are classrooms, schools, city blocks, hospitals,
and department stores.

When is it used?

Cluster sampling is done when the researcher is unable to obtain a list of all members of the population.

It is also convenient when the population is very large or spread over a wide geographic area.

For example, instead of randomly selecting from all fifth graders in a large city, you could randomly select fifth-grade classrooms and include all the students in each classroom. Cluster sampling usually involves less time and expense and is generally more convenient

An extension of the Cluster Random Sample is the

TWO-STAGE CLUSTERE RANDOM SAMPLE.

In this situation, the clusters (classes in our example) are randomly selected and then students within those clusters are randomly selected.

CONVENIENCE SAMPLING

- Subjects are selected because they are easily accessible. This is one of the weakest sampling procedures.
- An example might be surveying students in one's class.
- Generalization to a population can seldom be made with this procedure.

PURPOSIVE SAMPLING

- Subjects are selected because of some characteristic.

Also referred to as judgment sampling and is the process of selecting a sample that is believed to be representative of a given population.

Sample selection is based on the researcher's knowledge and experience of the group to be sampled using clear criteria to guide the process.

SYSTEMATIC SAMPLING

- – Systematic sampling is an easier procedure than random sampling when you have a large population and the names of the targeted population are available.
- Systematic sampling involves selection of every nth (i.e., 5th) subject in the population to be in the sample.

- Suppose you had a list of 10,000 voters in your area and you wished to sample 400 voters for research

- We divide the number in the population (10,000) by the size of the sample we wish to use (400) and we get the interval we need to use when selecting subjects (25).
- In order to select 400 subjects, we need to select every 25th person on the list.

ETHICS OF RESEARCH

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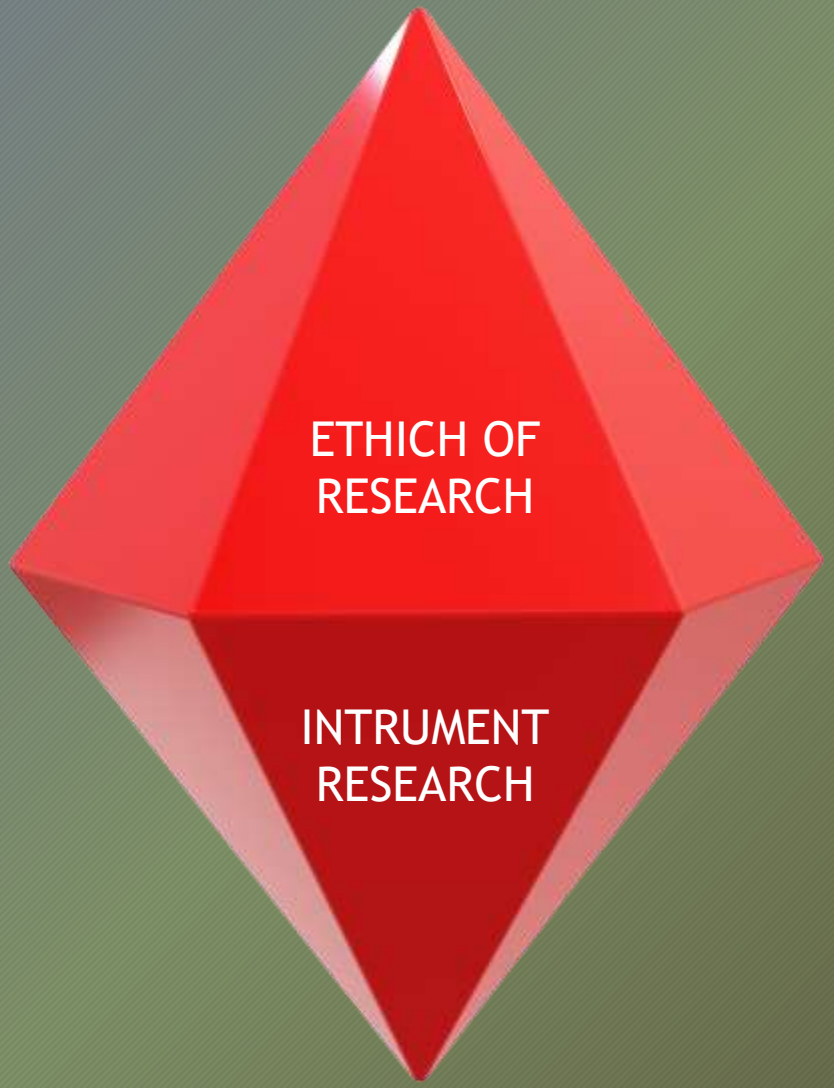
UNIT 4


ETHICH OF
RESEARCH
INTRUMENT
RESEARCH

Ethics of Research

Researchers are bound by a code of ethics that includes the following protections for subjects

- Protected from physical or psychological harm (including loss of dignity, loss of autonomy, and loss of self-esteem)
- Protection of privacy and confidentiality
- Protection against unjustifiable deception
- The subject must give voluntary informed consent to participate in research. Guardians must give consent for minors to participate. In addition to guardian consent, minors over age 7 (the age may vary) must also give their consent to participate.

Informed Consent

- All research participants must give their permission to be part of a study and they must be given pertinent information to make an "informed" consent to participate.
- This means you have provided your research participants with everything they need to know about the study to make an "informed" decision about participating in your research. Researchers must obtain a subject's (and parents' if the subject is a minor) permission before interacting with the subject or if the subject is the focus of the study.

- Generally, this permission is given in writing; however, there are cases where the research participant's completion of a task (such as a survey) constitutes giving informed consent.

INSTRUMENT OF RESEARCH

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UNIT 5


INTRUMENT OF RESEARCH
USABILITY, VALIDITY & REALIBILITY

INSTRUMENT

- Instrument is the generic term that researchers use for a measurement device (survey, test, questionnaire, etc.)

- To help distinguish between instrument and instrumentation, consider that the instrument is the device and instrumentation is the course of action (the process of developing, testing, and using the device).

- Instruments fall into two broad categories, researcher-completed and subject-completed, distinguished by those instruments that researchers administer versus those that are completed by participants.

- Researchers chose which type of instrument, or instruments, to use based on the research question.

Researcher-completed Instruments	Subject-completed Instruments
Rating scales	Questionnaires
Interview schedules/guides	Self-checklists
Tally sheets	Attitude scales
Flowcharts	Personality inventories
Performance checklists	Achievement/aptitude tests
Time-and-motion logs	Projective devices
Observation forms	Sociometric devices

USABILITY

- Usability refers to the ease with which an instrument can be administered, interpreted by the participant, and scored/interpreted by the researcher.
- Example usability problems include:

- Students are asked to rate a lesson immediately after class, but there are only a few minutes before the next class begins (problem with administration).
- Students are asked to keep self-checklists of their after school activities, but the directions are complicated and the item descriptions confusing (problem with interpretation).

VALIDITY

- Validity is the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform.
- It is rare, if nearly impossible, that an instrument be 100% valid, so validity is generally measured in degrees.

- There are numerous statistical tests and measures to assess the validity of quantitative instruments, which generally involves pilot testing.

- External validity is the extent to which the results of a study can be generalized from a sample to a population. Establishing eternal validity for an instrument, depends directly on sampling.
- An instrument that is externally valid helps obtain population generalizability, or the degree to which a sample represents the population.

- Content validity refers to the appropriateness of the content of an instrument. In other words, do the measures (questions, observation logs, etc.) accurately assess what you want to know?
- This is particularly important with achievement tests.

RELIABILITY

- A test is reliable to the extent that whatever it measures, it measures it consistently.
- Does the instrument consistently measure what it is intended to measure?
- There are 4 estimators to gauge reliability:
- Inter-Rater/Observer Reliability: The degree to which different raters/observers give consistent answers or estimates.
- Test-Retest Reliability: The consistency of a measure evaluated over time.
- Parallel-Forms Reliability: The reliability of two tests constructed the same way, from the same content.
- Internal Consistency Reliability: The consistency of results across items.

CONCLUSION

- Using quantitative methods and tools in Human Resource is a great way to use datagathered through focus groups, surveys, trend analysis, and case studies to ensure a strongerfoundation within your organization through a deeper understanding of strengths andweaknesses.This information is then used to formulate new marketing ideas, changing ideasthat don't work, capitalizing on ideas that are working, and allowing the organization to betterunderstand what the customer and employee hope to achieve from their intertwined relationshipswith your organization.This is something that can save time, staffing hours, profits, andmarketing research, allowing the company to better utilize those areas for future endeavors basedon data found through the quantitative research.

LESSONS LEARNED

- Quantitative research can be seen as explaining phenomena by collecting numerical data that are analysed using mathematically based methods; this method reduces the data into numbers, the researcher helps to analyse the data with the help of statistics. The researcher knows in advance what he/she is looking for and all aspects of the study are carefully designed before the data is collected. Its objective is to develop and employ mathematical models, theories or hypotheses pertaining to phenomena.

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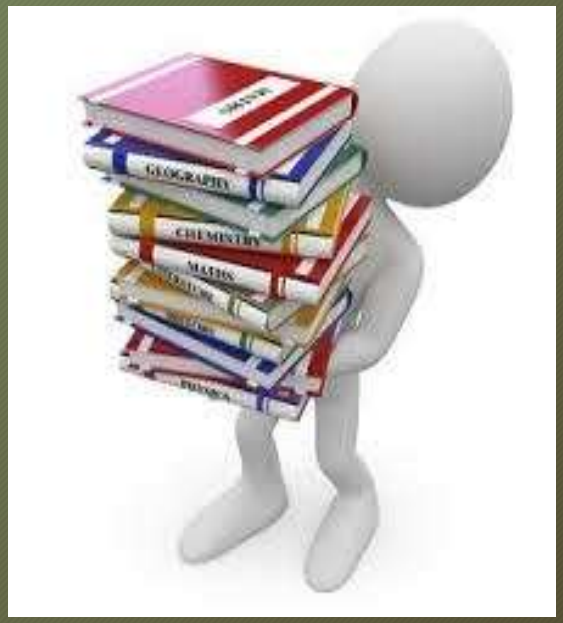

About the Author

MG Dr. Budi Pramono, SIP., M.M., M.A., (GSC)., CIQar., CIQnR., MOS., MCE., CIMMR. Born in Sidoarjo in 1967. He holds two Masters degrees, at Hull University UK in the Field of Security and Strategic Studies (1998) and the University of National Development Veterans Jakarta (2005). When he was a colonel, he was awarded a doctorate degree in Political Science with a very good predicate.

After graduating from the Magelang Military Academy in 1988, he served in the Indonesian Army Strategic Forces (KOSTRAD) for ten years, then took part in the intelligence world (BAIS).

The author has a lot of experience taking various Military Education courses, some of which are: Austfamil Course (SUSLAPA II-ART) Australia (1996), National Security Intelligence Training Course in Taiwan (1999), Command and General Staff College, School of General Staff and Command in Manila (2001), best graduate with awards (Honor Graduate): United Nations logistics Course at Port Dickson (2002), Austfamil Course at Lavertoon Australia (2003), and Emergency Management in Australia, UN Military Observer Course, Port Dickson (2004).

In addition to being a frequent speaker at national and international conferences, as well as conducting scientific research, the author has also been actively writing many books, including: "Transformation of Indonesia Counter-Terrorism". (Terrorism and Disaster, Rajawali Pers, 2018), “The Role of Indonesia in Asean Security”, (Terrorism and Disaster, Rajawali Pers, 2018), “Without Weapons, Concepts and Practices of Military Operations other than War in Indonesia” (Unhan Press, 2021), “Politics & National Defense” (Global Aksara Akademia, 2021). “Indonesian Politics” (Aksara Global Akademia, 2021).

Currently the author works as a Permanent Lecturer at the Republic of Indonesia Defense University and continues to take part in carrying out the *Tri Dharma* of Higher Education.***

SYNOPSIS

Quantitativeresearch is the process of collecting and analyzing numerical data It can be used to findpatterns and averages, make predictions, test causal relationships and generalize results to widerpopulations Quantitative research is the opposite of qualitative research, which involves collecting andanalyzing non numerical data (e g text, video, or audio Quantitative research is widely used in thenatural and social sciences biology, chemistry, psychology, economics, sociology, marketing, etc

The aim of this study is to explicate the quantitative methodology The study established that quantitative research deals with quantifying and analyzing variables in order to get results It involves the utilization and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how It also describes the methods of explaining an issue or phenomenon through gathering data in numerical form The study further reveals that quantitative methods can be categorized into survey research, correlational research, experimental research and causal comparative research

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