

Short note about Quantitative and Qualitative Research

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Abstract—The main goal of this article is to understand the quantitative and qualitative research method. In the beginning of the article, discussion about the basic background and understanding, then comparison of these two methods and finally how these two methods can run together in a particular research.

Keywords—quantitative, qualitative

I. INTRODUCTION

The expanding use of information system radically improve the functionality with respect to safety, cost and reliability. So in the research world it is very important to indentify the proper research methodologies. We use research methodologies to underpin our work and methods we use in order to collect data.

If we wish to collect quantitative data we are probably measuring variables and verifying existing theories and hypotheses. Quantitative research gives us numerical and statistical data overview. However, often collections of statistics and number crunching are not the answer to understanding meaning, beliefs and experience, which are better understood through qualitative data. So this is carried out that quality research helps us to understand meaning, look at, describe and understand experience, ideas, values and so on.

II. QUANTITATIVE RESEARCH

Quantitative research design is the standard experimental method of most scientific disciplines and it refers to systematic empirical investigation of social phenomena via statistical, mathematical or numerical or computational techniques. Quantitative methods emphasize on objective measurements and numerical analysis of data collected through polls, questionnaires or surveys. Quantitative research focuses on gathering numerical data and generalizing it across groups of people.

So quantitative research is about asking people for their opinion in a structured way so that we can produce hard facts and statistics to guide industries. To get reliable statistical results, it's important to survey people in fairly large numbers and to make sure they are representative sample of our target market.

Quantitative research method benefits mightily from processing large open source software repository data sets. By using this method software industries are able to measure their different aspects like market product value, company size, employees satisfaction and so on. By performing quantitative research, we can determine the relationship between a independent variable and a dependent or outcome variable in a

population. We can say that quantitative research designs are either descriptive or experimental.

A. Characteristics

- The data is usually gathered using more structured research instruments.
- The result of the research based on large sample sizes that are representative of the population.
- The study can be repeated on its high reliability.
- Here we have a clearly defined research question to which objective answer are sought.
- Data are presented in the form of numbers and statistics.
- We use tools, such as questionnaires or equipment to collect numerical data.

B. Advantages

- Quantitative research design is an excellent way of finalizing, results and proving or disproving hypothesis.
- It provides a comprehensive answer.
- Quantitative research also filter out external factors.
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments.

C. Disadvantages

- Quantitative experiments can be difficult and expensive and require a lot of time to perform.
- It must be carefully planned to ensure that there is complete randomization and correct designation of control groups.
- Quantitative studies usually require extensive statistical analysis, which can be difficult, due to most scientists not being statisticians.
- There is usually some ambiguity, which requires retesting.

III. QUALITATIVE RESEARCH

Qualitative research is aimed at gaining a deep understanding of specific organization or event, rather than surface description of large sample of population. It gives us non-numerical data to develop hypothesis for further testing, understand the feelings, values and it also helps to indentify customer needs. So the strength of qualitative research is its

ability to provide complex textual descriptions of how people experience a given research issue.

Basically qualitative research deal with quality attributes like effectiveness, efficiency, usability, reliability and so on. So the word qualitative implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry.

For example, a engineer generating some ideas for a new product might want to study people’s habits and preferences, to make sure that the product is commercially viable. Quantitative research is then used to assess whether the completed design is popular or not. Qualitative research is often regarded as a precursor to quantitative research, in that it is often used to generate possible leads and ideas which can be used to formulate a realistic and testable hypothesis. This hypothesis can then be comprehensively tested and mathematically analyzed, with standard quantitative research methods.

For these reasons, these qualitative methods are often closely allied with interviews, survey design techniques and individual case studies, as a way to reinforce and evaluate findings over a broader scale.

A. Advantages

- Qualitative techniques are extremely useful when a subject is too complex be answered by a simple yes or no hypothesis. These types of designs are much easier to plan carry out.
- This technique also useful when budgetary decisions have to be taken into account.
- Qualitative research methods are not as dependent upon sample sizes as quantitative methods; a case study, for example, can generate meaningful results with a small sample group.

B. Disadvantages

- Qualitative methods require a lot of careful thought and planning, to ensure that the results obtained are as accurate as possible.
- Qualitative data cannot be mathematically analyzed in the same comprehensive way as quantitative results.
- It can only observations rather than results.

IV. COMPARING QUANTITATIVE AND QUALITATIVE RESEARCH

The key difference between qualitative and quantitative methods in their flexibility. Qualitative methods produce information only the particular cases studied, and any more general conclusions are only hypotheses. Quantitative methods can be used to verify which of such hypotheses are true. In table 1, briefly outlines of major difference between these two researches methods [1].

TABLE I. COMPARISON BETWEEN QUANTITATIVE AND QUALITATIVE RESEARCH

	Quantitative	Qualitative
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General Framework	Seek to confirm hypotheses about phenomena. Use highly structured method	Seek to explore phenomena. Use semi-structured method.
Analytical Objectives	To quantify variation. To predict casual relationships. To describe characteristics of a population.	To describe variation. To describe and explain relationships. To
Question Format	Closed-ended	Open-ended
Data Format	Numerical	Textual
Flexibility in design	Study design is stable from beginning to end. Study design is subject to statistical assumptions and conditions.	Study aspects are flexible. Study design is iterative.

V. QUANTITATIVE AND QUALITATIVE RESEARCH TOGETHER

This approach known as a hybrid approach. It helps us to back up one set of findings from one method of data collection underpinned by one methodology, with another very different method underpinned by another methodology - for example, we might give out a questionnaire (normally quantitative) to gather statistical data about responses, and then back this up and research in more depth by interviewing (normally qualitative) selected members of our questionnaire sample. We can also combine quantitative and qualitative research method with a triangulation methodology. Following figure shows us the scenario.

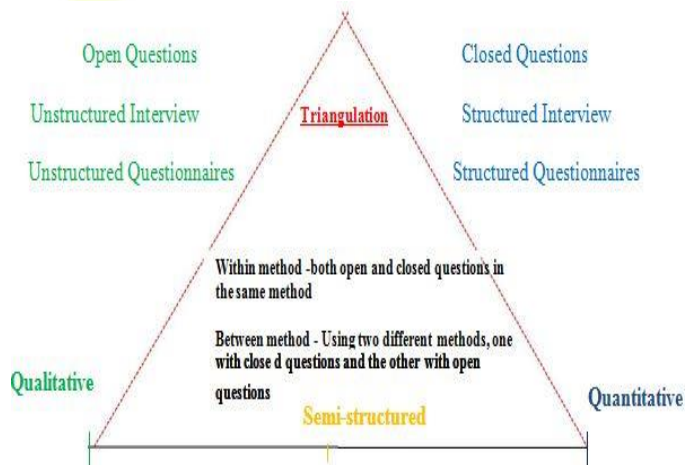


Fig. 1. Triangulation Methodology

CONCLUSION

Finally we can say that these two methods are relate each other and help each other to continue good research.

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