

Using Case Studies as a Scientific Method: Advantages and Disadvantages

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Abstract: The case study as a scientific method is, and has been for a long time, a subject of heavy discussion in the scientific community. Some scientists disregard the study completely and argue that it's nothing more than story-telling, while others claim that the case study is the most relevant research method there is. As with all scientific methods case studies have both advantages and disadvantages and the aim of this study is to present and discuss these.

Keywords: case studies; scientific method; qualitative; in-depth

Introduction

Cope (2015) states that case study research is often described as a flexible but challenging methodology that is most commonly used in social science research. Of all the social science research methods the case study has the least attention and support, due to its lack of well-defined protocol. Lindvall (2007) argues that the methodological criticism directed towards case studies is also based on that the study cannot provide insights into causality and general conditions. Even though the study is heavily criticized, the method has never lacked advocates and a vast number of case studies are executed and published annually in scientific journals.

Case studies are said to be an *intensive* study, which is defined as an in-depth study of few units with multiple variables. The purpose of intensive studies is to get as complete a picture as possible of a situation, a phenomenon or event (Jacobsen, 2002). In case studies, the focus is on one particular unit. These units can be of different kinds and they can be defined by both space and time. A unit can be an individual, a group, an organization or a local community. The use of case studies is suitable when we want to understand the interaction between a specific context and a phenomenon (Jacobsen, 2002).

When it comes to the definition of a case study there are a few different suggestions. A well-known and used definition comes from Yin (2009) who defines the case study research method as:

An empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (p.18).

Woodside (2010) uses a broader definition:

Case study research is an inquiry that focuses on describing, understanding, predicting and/or controlling the individual (p.1).

Gerring (2004) argues that, even though, much of what we know about the empirical world comes from case studies and the fact that a large number of scientific work is generated by case studies, the method is held in low regard. Verschuren (2003) means that one explanation for this is that the status of the case study as a research method is not quite clear. Even though case studies are common, there is a lack of clarity and no real consensus in what a case study is about, how to concretely conduct that form of research and what results can be obtained from it (Merriam, 1994). Gerring (2004) states that even many of the study's defenders are confused when it comes to the strengths and weaknesses of this ambiguous research method. He says that: "The case study survives in a curious methodological limbo" (p.341). Another explanation of this unclear status is that the case study is often defined as the study of one single case, rather than as a way of doing research (Verschuren, 2003).

Yin (2009) however, stresses that case studies have both advantages and disadvantages as a research method, and that it is important to understand and acknowledge that fact. Case study research, like all other research, complements the strengths and limitations of other types of research. Merriam (1994) agrees and mean that a researcher can choose from several different scientific approaches, that have their own way of illustrating something special about the phenomenon being studied. Whether or not to choose a case study or some other approach depends on what it is that the researcher is looking for and what questions the researcher wants to answer. Reis (n.d.) says that the merits of a particular method depend on if it's the most appropriate way of addressing the research problem that we are facing.

Background

Historically, case study research was marked by periods of use and disuse (Cronin, 2014). In the beginning of the 20th century the university of Columbia in the USA, started to criticize the usage of case studies. They argued that case studies were too descriptive and qualitative to be able to contribute to the scientific research and dismissed the results and findings as lacking validity and reliability (Solberg Søylen & Huber, 2009; Elman, Gerring & Mahoney, 2007). The criticism received a lot of assent and the method was used to little extent, held in low regard or simply ignored, for many years (Solberg Søylen & Huber, 2009).

According to Merriam (2009) it wasn't until the evolution of qualitative research methods, in the 1980's, that case studies received attention from a methodological perspective. Elman, Gerring and Mahoney (2016) and Merriam (2009) all argue that today the case study has gained a multitude of followers even though many scientists are still sceptical as to whether the study can be said to be of scientific value. The study is mainly viewed and used as a qualitative research method, even though it can also include quantitative analysis and historical data. Like all qualitative research the case study searches for meaning and understanding.

Method

This study is a literature review with the aim of attempting to answer what advantages and disadvantages case studies have as a scientific method. The study exclusively uses secondary sources and is primarily based on previous scientific research in the form of scientific papers, published in several different journals. The papers were found in databases, mainly Web of Science, and reference lists. Books relevant to the subject were also used, as well as a few websites and case studies to get different perspectives on the subject. The different findings and views on the subject in the literature provide the material for both the empirical framework and the discussion and analysis in this paper.

A qualitative method was used to gain and provide a deeper knowledge and understanding of the subject of case studies as a research method and its advantages and disadvantages.

Literature review

As a research model the case study is used in many situations: to contribute to our knowledge of individual, group, organizational, social, political, and related phenomena. The case study is often used as a scientific method in social science disciplines such as psychology, sociology, anthropology, social work, business, education, nursing and community planning. They are even found in the field of economics. The goal is to design good case studies and collect, present, analyse and report data in a fair way (Yin, 2009; Verschuren, 2003).

Soy (1997) argues that the complexity of the case study comes from that they generally involve several sources of data, may include multiple cases within a study, and produce a lot of data for analysis. Researchers use the method to build upon theory, to produce new theory, to dispute or challenge theory, to explain a situation, to explore or to describe a phenomenon or an object.

Solberg Søylen and Huber (2009) states that case studies can be used for both descriptive and empirical research. When used in descriptive research the case study describes a situation that we have observed or been told about. The event has happened before we wrote it down and what is written doesn't affect what happened. Neither have we been able to influence what happened. When case studies are used empirically they are used to start a roleplay between parties, and in that way gain understanding and describe their actions. We are part of what course of action is taken.

Presented below are four different case studies that illustrate what case studies can be used for and how they can be designed and executed.

Case 1.

“Berglunds Mekaniska AB” (Solberg Søylen & Huber, 2004) is a descriptive case study of a small company, in the metal industry, that is facing a lot of the typical problems found in the branch. The case study tells us the story behind the company, how the business works and mainly focuses on its problems with the lack of clear leadership, lack of vision and plans for

the future, and the defective communication with the employees. The study gives us a deep insight into the company and its problems and how the company is trying to fix them.

The study was made from oral interviews with the CEO of the company and a consultant, and from written sources such as the company webpage.

Case 2.

The second case study “Normative control in the pre-school: A Swedish case study” (Riddersporre, 2010) is part of a series of case studies in the project “Normative leadership in the pre-school.” The aim of the project is to clarify how normative leadership is practiced and negotiated in pre-schools, as well as which norms are created by leaders and co-workers.

The case studies were executed through a combination of interviews and observations of the pre-school’s every day practice. The selection of participants was based on experienced leaders with teacher training and field experience. Some of these leaders were pre-school teachers, school teachers, or principals.

In this first case study of the project, a pre-school director was interviewed at two occasions for three hours each. Two half-day observations of the pre-school directors work were also made. This was done to get the leader’s perspective on leadership.

Case 3.

One example of an empirical case study is the Swedish case “Harmony or conflict? - A case study of the conceptual meaning of education for sustainable development” (Öhman & Öhman, 2012). This study was empirically executed by taking notes, doing audio-recordings, video-recordings and reading the test subjects’ texts.

The aim of the study was to investigate how the relations between sustainability aspects, such as economic, ecologic and social, are established in a concrete school practice. The study investigated two classes of upper secondary students, in a Swedish school, that were presenting an assignment, given by the researchers, concerning sustainable urban planning. The authors were present at these presentations, observing how the students used the different sustainability aspects in their presentations.

Case 4.

The fourth case “Evaluation of chemotherapy drug exposure at a veterinary teaching hospital in Michigan” (Couch, Gibbins & Connor, 2013) investigates and evaluates the consequences of chemotherapy drug exposure in a veterinary teaching hospital in Michigan.

The study was conducted by observation of the handling of the drug and by taking sample tests of air and surfaces, that were searched for chemotherapy drug contamination. Confidential interviews were held with 13 randomly selected employees who worked directly with chemotherapy drugs.

They employees were asked about their work history, health concerns, and medical history. They were also asked about their thoughts of the safety policies and procedures, their

knowledge about recommended disposal methods for chemotherapy drugs and supplies, and how satisfied they were with the veterinary hospital's health and safety program.

Cyclophosphamide and ifosfamide, two chemotherapy drug chemicals, were detected on a few surface wipe samples, primarily in and drug preparation room. The drugs were not detected in the air. It could not be determined if the health symptoms reported by employees were related to the exposure of chemotherapy drugs in the workplace.

Advantages of case studies as a research method

According to Cronin (2014) case study research is a highly legitimate research method appropriate for both qualitative and quantitative research, mainly dealing with "the understanding and change of interwoven complexities associated with interpersonal processes that emerge in a wider social context" (p. 20). Many scientists agree with Cronin and stresses the advantages of the case study research method:

Flyvbjerg (2006) states that: "The advantage of the case study is that it can "close in" on real-life situations and test views directly in relation to phenomena as they unfold in practice" (p.235). Lindvall (2007) agrees and states that the most obvious advantage is that the case study provides a detailed analysis in the individual case.

Jacobsen (2002) argues that intensive study methods have their strength in obtaining detailed and relevant data. The information will not be taken out of context and the study includes multiple variables and runs deep. The internal validity is therefore high, which makes these studies very valuable.

One of the advantages of studying individual cases in-depth is that we can find information we did not anticipate to find from the start. Because of this, case study research is a very good method for creating hypotheses (Jacobsen, 2002). These hypotheses help structure future research, and case studies therefore plays an important part in advancing a field's knowledge base (Merriam, 2009).

Case studies can also offer important evidence to complement experiments. They are very well suited to help explain the how and why questions by investigating and they are also highly useable when the investigator has little control over events (Yin, 2009; Schell, 1992). Case studies are preferable when investigating current or contemporary events when it's not possible to manipulate relevant variables (Merriam, 1994).

Yin (2009) argues that in all of the fields, the need for case studies comes from the desire of understanding complex social phenomena. The case study research provides great strength in investigating units consisting of multiple variables of potential importance (Reis, n.d.) and it allows investigators to retain a holistic view of real-life events, such as individual life cycles, small group behaviour, organizational and managerial processes, neighbourhood change, school performance, international relations and the maturation of industries (Yin, 2009). It also provides insight and illuminates meaning that expand the readers' experiences. (Merriam, 2009). According to Stake (1978) the best use of case studies is for adding to existing experience and improving humanistic understanding.

Merriam (1994) argues that case studies allow one to get as close to one's area of interest as possible, both through direct observation in the natural environment but also because one

gets access to the subjective factors, while experiments and surveys often use derived information. Gomm, Hammersley and Foster (2000) argue that case study research, opposed to experiments, can investigate casual processes “in the real world” rather than in artificially created settings. Also, case studies tend to have a wider web to catch information, while experiments and surveys usually have a narrower focus (Merriam, 1994).

Eisenhardt (1989) and Merriam (1994) stress the unique strength of case studies: their ability to handle and combine multiple kinds of data collection methods (documents, interviews, questionnaires, objects and observations). Murphy (2014) explains this strength by saying that case studies as a research method is non-prejudicial. Focus groups are just as valued as questionnaires and participant observation.

Disadvantages of case studies as a research method

Flyvbjerg (2006) argues that most critics indicate that it is the case study’s theory, reliability, and validity that are at issue; thus, the very status of the case study as a scientific method is questioned. Murphy (2014) concludes that the findings and recommendations that case studies provide can be neither confirmed or denied in terms of utility and veracity, because of the nature of the case study. He therefore questions if the case study might not just be able to provide a story to tell and little else. Several scientists express the disadvantages of the case study as a research method:

Flyvbjerg (2006) argues that there are five commonly discussed disadvantages concerning case study research:

- One cannot generalize from a single case
- Theoretical knowledge is more valuable than practical knowledge
- The case study is most useful for generating hypotheses, whereas other methods are more suitable for hypotheses testing and theory building
- It is often difficult to summarize specific case studies
- The case study contains a bias toward verification

“It is widely believed that case studies are useful in the study of human affairs because they are down-to-earth and attention-holding but that they are not a suitable basis for generalization” (Stake, 1978). This is one of the biggest concerns and most common critiques against case studies, its lack of scientific generalizability. The major problem is that the studies are highly specific, that is, that they only relate to a particular context or a few units. The question that arises is if it is possible to generalize from the result, to say that what applies to the few also apply to all others (Jacobsen, 2002; Yin, 2009). Critics believe that, in fact, the study of a small number of cases cannot offer any grounds for establishing reliability or generality of findings (Soy, 1997). The area that is studied in case studies are often too narrow to be able to draw scientific conclusions from (Solberg Søylen & Huber, 2006). Case studies, and intensive studies as a whole, are therefore said to have low external validity (Jacobsen, 2002).

Few would think to question the relevance of the case study as a basis for creating hypotheses for further research, but quite a few would argue that research based on case studies is unlikely to be anything more than story-telling (Schell, 1992). Critics of case study research believe that the study's usefulness is limited to, and only appropriate for, the exploratory phase of an investigation and that experiments are the only justified way of doing explanatory and casual inquiries. Case studies are seen as only a preliminary research method and cannot be used to describe or test propositions (Yin, 2009)

Miles (1979) argues that the process of analysis during case-writing is intuitive, primitive and unmanageable in any rational sense which lead to unreliable and invalid conclusions. These invalid conclusions also stem from the fact that people participating in a case study often feel that they are not anonym and therefore give self-protective responses and self-aggrandizing responses that are not true.

Miles (1979) also critique case research because collecting and analysing the data is a highly labour-intensive activity, often causing much stress, even for skilled research staff. Merriam (2009) agree that although rich, thick description and analysis of a phenomenon may be desired, a researcher may not have the time or money to devote to such an undertaking. Usually the studies take a long time to execute (Yin, 2009) and the product may be too lengthy, too detailed, or too involved for busy policymakers and practitioners to read and use (Merriam, 2009).

The greatest concern with the case study, according to Yin (2009), is its lack of rigor. Yin (2009) means that all too often the case study investigator has so much freedom that he becomes sloppy and does not follow the systematic procedures, or allows dubious evidence or biased views to influence the directions of the findings and conclusions. He states that this lack of rigor is less likely to be present when using other methods because of the existence of numerous methodological texts providing investigators with specific procedures to be followed, which is limited in the case study method.

The researcher's independence from the results of the case study is often questioned, because in some types of case studies the researcher plays an interactive role instead of acting at a distance. Garger (2013) means that the researcher essentially becomes a part of the research itself and, knowing the expected results, the researcher may subconsciously guide the subjects towards those results, thereby confirming the expected results. This is what is known as the self-fulfilling prophecy and this is why the study becomes of doubtful scientific value (Flyvbjerg, 2006).

Analysis

Even though the case study as a research method is faced with a lot of criticism and disadvantages, researchers continue to use the case study research method with success in carefully planned studies of real-life situations, issues, and problems (Soy, 1997). Some researcher argue that the disadvantages are not, in fact, always entitled:

According to Siggelkow (2007) a small sample doesn't have to be something negative. He uses an example to explain it: If you walk into my house with a pig and tells me it can talk; I

will ask you to prove it. You snap your fingers and the pig starts talking. After that you write a case report and send it to a journal. Will the editors tell you that it's an interesting finding but that they want you to show that more than just one pig can speak to make it relevant? Probably not. Sometimes one case is enough to make a powerful example.

Case researchers are often critiqued for being biased when choosing samples. But if you want to study a particular company or a very rare disease you can't choose a person or company randomly (Siggelkow, 2007). Garger (2013) argues, in line with Siggelkow, that the case study can be an excellent research method when the sample size is known ahead of the research to be small. He gives an example where a professor wants to study the abnormal psychology of serial killers. In this case there is only a small sample of people who could be subjects to the study. However, Siggelkow (2007) also stresses the importance of that you have to be aware, that in studying something "special" you have to be careful with the kinds of conclusions that can be drawn.

Hammersley (2012) states that the question of whether or not case study research can produce valid generalizations is a matter that has been in dispute for a long time. Woodside (2010) defends case studies by arguing that the objective of case study research is not to generalize findings to a population but to prove theory. Ritzén, Sagen, Sjöberg & Thunstedt (2016) also claim that case studies are generalizable to theoretical claims but not to populations or universes. The goal of the case study is to extend and generalize theories (analytical generalization) and not to count frequencies (statistical generalization).

Not being able to summarize into theories and general propositions is another thing that tends to be seen by critics of the case study as a drawback. Flyvbjerg (2006) however, states that to the case study researcher a thick and hard-to-summarize report is not a problem. Rather, it is often a sign that the study has encountered an especially interesting and detailed problem. One may therefore ask if the summarizing and generalization, which the critics see as ideal, is always desirable. It is simply that the very value of the case study, its deep analysis of details, is lost when one tries to sum it up (Flyvbjerg, 2006).

Flyvbjerg (2006) also states that the critique against the rigor of case studies is fallacious, because the case study has its own rigor. It's different, but no less strict than the rigor of quantitative methods. In fact, researchers who have conducted intensive case studies often report that their preconceived views, assumptions, and hypotheses were wrong and that the case material made them revise their hypotheses.

Flyvbjerg (2006) draws the conclusion that if people were only trained in context-independent knowledge and rules, i.e. the knowledge that forms the basis of textbooks, they would remain at the beginner's level in the learning process. He means that this is the limitation of analytical rationality: it's inadequate for the best results in the exercise of a profession, as a student, researcher or practitioner. "It is only because of experience with cases that one can at all move from being a beginner to being an expert" (p. 222).

Case study researchers tend to find the use of one-shot interviews with one person from 50-300 organizations to be too low-grade in accuracy to be acceptable. Too much nuance is missing, too much reality remains unknown. Woodside (2010) also critiques large sample surveys by arguing that they fail to collect the necessary detail for gaining deep understanding of the mechanics and reasons behind the processes examined.

Yin (2013) concludes that:

The ability to address the complexity and contextual conditions nevertheless establishes case study methods as a viable alternative among the other methodological choices, such as survey, experimental, or economic research. The conditions appear especially relevant in efforts to evaluate highly broad and complex initiatives; for example, systems reforms, service delivery integration, community and economic development projects, and international development (p. 322).

Stake (1978) believes that it's probable that the case study will continue to be a popular research method because of its style and because of its usefulness for exploration for those who search for explanatory laws. Its most valuable characteristic, though, is its universality and importance for experiential understanding. Therefore, he argues that case studies can be expected to continue to have an "epistemological advantage over other inquiry methods as a basis for naturalistic generalization" (p.7).

Conclusion

Case studies are, and have always been, a hot topic for discussion when it comes to its use as a scientific method. Most agree that the case study method is relevant for formulating hypotheses for further research, but that is as far as the consensus goes.

The advantages of using the case study method are that it's grounded in, and applicable to, real-life, contemporary human situations and provide in-depth relevant data. Case studies relate directly to the common reader's everyday experience and promote an understanding of complex real-life situations. Its detailed and in-depth results are not taken out of context and help create new theories as well as add strength to previous research.

The biggest concerns about case studies are their limited generalizability and its rigor. The research is often questioned as to whether it can be seen as scientific because of the researcher's close involvement and influence on the study which may bias the findings. Critics also argue that the study of a single case can offer no basis for reliability or generality of the results.

Some researcher argue that case studies are great for the development of explanatory theories while others states that they can only be used as an exploratory method. Some believe that surveys and experiments is the way to go while others argue that they offer little accuracy and relevance. The overall conclusion that can be drawn is that case studies tend to have higher internal validity and lower external validity.

Finally, case studies as a scientific method is highly disputed but even so it is a well-used method. Simply put, the case study as a scientific method has both advantages and disadvantages, like all research methods, and should be used when it's the most appropriate plan for addressing the research problem at hand.

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