

The Case Study Cookbook

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What Defines a Case Study?

The definition of a case study is a topic of disagreement between disciplines, or even between researchers in the same discipline. In this section, we will describe some of the aspects associated with common case study practices, and present a definition for case studies that incorporates elements from multiple sources in order to provide a deeper understanding of the subject.

What is a Case?

John Gerring, a professor of political science at Boston University, defines a case as “a spatially delimited phenomenon (a unit) observed at a single point in time or over some period of time”. Gerring also states that a case must have identifiable boundaries and must comprise the primary object of an inference (Gerring, 2006). For example, if a researcher was studying how employees were spending their work hours at a particular location, the unit or “case” would be an individual employee. If a researcher was studying how a certain type of rejection was being applied during the patent examination process, the case would be an individual office action that featured that type of rejection. A case study can focus on a few or many cases. It is not uncommon for a case study to focus on a single case. In “Preparing a Case Study: A Guide for Designing and Conducting a Case Study for Evaluation Input”, Palena Neale, et al. state that a case can be an individual, an organization, a process, a program, a neighborhood, an institution, and even an event (Neale et al., 2006, p. 3).

What is a Phenomenon?

The topic of study for a case study is entirely dependent on the researcher goals of an investigation. The topic might be a natural disaster, a program, a person or group of people, a law, an allegation, or anything else that could possibly be studied within the boundaries required by an investigation. Throughout this document we will use the word “phenomenon” to refer to the topic the researcher is studying.

What is a Sample?

A sample, as described by Gerring, is made up of cases that have been selected for analysis. N is commonly used to refer to the sample size, where a study with a single case would be $N = 1$. N can also refer to the number of observations made on a particular case. This is usually made clear by the context (Gerring, 2006). In this document, we will not often use N when referring to measurements, but it is important to recognize the use of N as a common practice when conducting case studies.

What is an Observational Study?

Case studies are a type of Observational Study. In the 81st issue of *At Work*, a quarterly publication of the Institute for Work & Health, Observational Study is described as a type of study where a researcher will observe and record information about the subjects but is not allowed to manipulate the study environment in any way (*At Work*, 2015). The same article defines two types of Observational Studies that are common for case studies:

- **Cross-Sectional Study** - This is a form of Observational Study where a “snapshot” is taken to compare different population groups at a single point in time. This allows researchers to compare many different variables at the same time. Because these studies only look at a single point in time, they cannot provide definite information about cause-and-effect relationships (*At Work*, 2015).
- **Longitudinal Study** - This is a form of Observational Study where researchers conduct several observations of the same subjects over a period of time, sometimes lasting years. This form of study allows researchers to detect developments or changes at both the group and individual level. Longitudinal studies can help establish a sequence of events over time (*At Work*, 2015).

What is a Case Study?

The definitions offered above are related to case studies and are, for the most part, not subject to debate about their meaning. The definition of a case study itself is not so clear. On Harvard’s Graduate School website, it is explained that case studies should focus “on gaining an in-depth understanding of a particular entity or event at a specific time” (Harvard). A guide on case studies from Colorado State University states that the focus should be on collecting and presenting detailed information (Becker et al., 2012). John Gerring takes another stance, believing that the purpose of such a study, at least in part, is to use the collected data to generalize the results over a population. These claims and more exist as parts of separate definitions for case studies in scholarly research. It is evident that some differences in definition exist to serve the purpose of the discipline the study is being used for, but this makes it difficult to fully understand what encompasses a case study as a broad idea.

There are common themes among definitions for case studies. If we look at the three perspectives we just discussed, we can see that there is focus on gathering data and using it for some purpose, whether that is to present it to others in detail, use it to gain a deep understanding of a topic,

or use it to generalize something over a population. There is some debate as to how many cases are appropriate for a single case study, but valid studies with larger case samples do not invalidate studies with smaller case samples. In an effort to cover a broad definition for case studies, we will assume there is a valid use for studies with both large and small case sample sizes.

Taking into account everything that we have discussed so far, we will now offer a definition of a case study comprised of elements from the definitions provided by Harvard, Colorado State University, Neale et al., and John Gerring that encompasses a wide range of uses:

A case study is a form of observational study that focuses on the collection of data from a single case or multiple cases of a phenomenon. Case studies are used to gather data from one or more sites and can take place at a single point in time or over a period of time lasting up to several years. The goal of such a study is to increase understanding of the studied phenomenon, either in the context of a specific instance or generalized over a population.

When to Use a Cross-Case Study Instead of a Case Study?

Basic distinctions between a case study and a cross-case study:

The main difference between case studies and cross-case studies is that case studies are based on one or a few cases that are each closely studied, while cross-case studies are based on multiple cases that are examined together instead of individually (Gerring, 2006, p. 20). Both kinds of studies can be classified as methods that study a “case” that has “identifiable boundaries and comprises the primary objective of an inference” (Gerring, 2006, p. 18). This means that the study is focused on the primary goal of finding the reason *why* something happens within a case.

Deciding which type to use:

	Case Study	Cross-Case Study
Research Goals		
1. Hypothesis	Generating	Testing
2. Validity	Internal	External
3. Causal Insight	Mechanisms	Effects
4. Scope of Proposition	Deep	Broad
Empirical Factors		
5. Population of Cases	Heterogeneous	Homogenous
6. Causal Strength	Strong	Weak
7. Useful Variation	Rare	Common
8. Data Availability	Concentrated	Dispersed
Additional Factors		
9. Causal Complexity	Indeterminate	
10. State of the Field	Indeterminate	

**Figure 1: Case Study and Cross-Case Study Designs
(Gerring, 2006, p. 38)**

When deciding whether to perform a case study or a cross-case study, “The key questions are (a) how many cases are studied and (b) how intensively are they studied—with the understanding that a “case” embodies the unit concern in the central inference” (Gerring, 2006, p. 23). That is, the researcher must consider the needs of the research to see how many cases should be looked at, and how closely each case must be studied. Overall, the more closely a subject needs to be studied, the more likely that the researcher will need to perform a kind of case study (see “Types of Case Studies”). The close

examination offered by a case study gives it an advantage over other studies when it comes to dealing with a new subject or approaching a previously studied subject from a different angle.

The chart in Figure 1 displays the differences between a case study and a cross-case study by listing what each study accomplishes in terms of research goals and by showing the trade-offs that come with choosing one method over the other. This chart is not steadfast, however, as the way a researcher goes about achieving the research goals could potentially change what a case study or a cross-case study can achieve.

Hypothesis:

Case studies are better at generating a hypothesis than testing one. This is due to the “exploratory nature” of case studies and how they involve a deeper investigation of a phenomenon than a cross-case study does. A case study, however, is not as useful for testing a hypothesis because of the same nature that makes it successful at generating a hypothesis; it impedes work that attempts to confirm or deny an assumption (Gerring, 2006, p. 40). A cross-case study encompasses many cases and can test a few hypotheses with a greater degree of confidence (Gerring, 2006, p. 40).

Validity:

When the chart refers to “internal” and “external,” internal means within the population of the study, and external means outside of the population of the study. Because of the large number of cases that comprise cross-case studies, they will always be more externally representative of a population than standard case studies as long as the samples statistically represent the population of the study (via random sampling or normalization). Case studies have an advantage over cross-case studies when looking at causal relationships internally because of the depth of studying each case receives.

Causal Insight:

The chart refers to causal mechanisms and causal effects. Causal mechanism refers to the way something happens from input to output, and causal effects refer to how the output of something was affected by changes in the input. Case studies are more focused in causal mechanisms because it is easier for one to see the pathway from the input to output, but causal effects are better studied with cross-case study research because the larger number of cases allows the researcher to see changes to the input and how it can possibly affect the output.

Scope of Proposition:

Case studies let the researcher look at a population deeply because of the small amount of cases the study possesses. Cross-case studies allow the researcher to look at a population broadly because the amount of cases is large.

Population of Cases:

Case study research can have heterogeneous cases because the small amount of cases being studied means the researcher can look at them closely with the cases' differences being lost in the study. Cross-case study research requires the cases to be homogeneous, in order to avoid a loss of data in the differences that were present in the population.

Causal Strength:

When the input has a strong and consistent effect on the output, it makes the case overall easier to study and more conclusive. Causal strength is weak for cross-case studies because the scope of the population is large and the input could be inconsistent.

Useful Variation:

Useful variation is a temporal or spatial variation on "relevant parameters that might yield clues about a causal relationship" (Gerring p. 45). When a researcher expects there to be a distribution of evidence across the population being studied, the researcher should use a cross case study because there is a higher likelihood that the researcher could find useful variation within the path from input to output. On the other hand, useful variation is rare in case studies because the small amount of cases involved makes any type of variation less likely to appear during the study.

Data Availability:

In the chart, "concentrated" means that all the data is within a small population, and "dispersed" is spread out over a large population. Case studies can be concentrated or dispersed, but dispersed data is not evenly dispersed. The small amount of cases allows a case study to deeply examine data and explore uneven data, because the study will not be attempting to represent outside of the population studied. Cross-case studies, with the large amount of cases they can include, need the data to be evenly dispersed over the population.

Causal Complexity:

This field is indeterminate because the term "complexity" has a different interpretation depending on the researcher and the population being researched. Case study researchers claim that case studies have a better grasp of complex causes but other researches claim that the more complex a study is, the more it leans toward needing to be a cross-case study.

State of the Field:

This field is referring to the state of maturity of the research in a given field. The chart lists this field as indeterminate because this section is referring to how far a population or problem has already been explored. Both a case study and a cross-case study can have a lot of value at any given state of

maturity; it all depends on the scope of research that has already been performed in that particular field. See Figure 2 on page 18 for the Case Study Maturity Chart.

Types of Case Studies

In this section, we cover six different types of case studies that are used by the Government Accountability Office (GAO): Illustrative, Exploratory, Critical Instance, Program Implementation, Program Effects, and Cumulative Case Studies. Each case study will be defined and provide an explanation of the study's purpose, its design, and any pitfalls associated with the method. Each type of case study is defined in general terms, but it is important to keep in mind that many aspects of a case study such as site samples, case samples, data collection rules, research questions, research goals, number of researchers, length of the study, etc. are dependent on the needs of the researchers and the inquiry the study is looking to address. This section should be considered as a set of guidelines for conducting different types of case studies.

Illustrative Case Study

- Description
 - Illustrative Case Studies are used to describe a situation or a phenomenon, what is happening with it, and why it is happening. This is often helpful when the study is addressing a target audience that is greatly uninformed about the topic. These studies should describe every element involved in a case (the location, people involved, their goals, what they do, etc.) in a way that remains entirely accurate while still focusing on language that will be understandable by the target audience. It may be difficult to hold the audience's attention if too many cases of this type are presented at once that contain an immense amount of in-depth information.
- Purpose
 - Illustrative Case Studies bridge the gap in the understanding of a topic between the researcher and the target audience, providing a common language with which to discuss the topic.
 - These studies are used to inform an audience about a topic of which it was previously uninformed.

- Design
 - Site Selection
 - The researcher must select what locations, or sites, the data will be collected from. In order to develop a useful description of a situation or a phenomenon for the target audience, the researcher should investigate a site that is either typical for the research topic or representative of any important variations in the topic. Best case or worst case sites do not often provide a general description of the situation.
 - Case Sample Selection
 - The number of cases in an Illustrative Case Study should be kept small.
 - Data Collection
 - The data collected for an Illustrative Case Study should be visually descriptive. The researcher should make observations of the environment, the people, what the people do and anything else that may be important to the researcher's topic.
 - Some data may not be visual, but should still be descriptive in nature (the goals of the people involved, the specific times that certain things happened, etc.).
 - Reporting the Results
 - The reports on Illustrative Case Studies should consist of self-contained descriptions of what the researcher observed and narratives about how the individual people or other elements involved in the situation acted during the length of the study.
 - Explanations of any complex information must be provided.
 - The report must be written in a way that is clearly readable and understandable by the target audience and not only by subject matter experts.
 - While the language must be clear and understandable, the researcher should avoid over-simplifying in the report. Over-simplifying may not provide a strong enough description to bridge the understanding gap between the researcher and the target audience.
- Pitfalls
 - Illustrative Case Studies are not made to span over a vast number of cases or to generalize any results. Because the data is based on only one or two cases, the results

may not be sufficiently accurate if a high level of diversity exists in a situation. In such a situation, an Illustrative Case Study may not be the best choice of study.

- o If there are many elements to report on in a situation, the high number of in-depth descriptions of those elements may make it difficult for the report to hold the reader's attention.

Exploratory Case Study

- Description
 - o Exploratory Case Studies should be used to come to an educated initial perception of what is going on in a situation. These studies frequently precede larger-scale investigations, offering insight into a situation and helping to develop analytic strategies, questions, measures, designs, and goals. If substantial information is not required for reporting purposes, then this form of study can be useful for improving confidence about a researcher's understanding of a situation and what has been observed.
- Purpose
 - o Exploratory Case Studies provide guidance for developing a larger study on a topic where considerable uncertainty exists.
 - o This type of study improves confidence about the researcher's understanding of a situation or of observations.
 - o Exploratory Case Studies may be used to justify and design a large-scale investigation by aiding in the design of research goals and questions in an inexpensive way.
- Design
 - o Site Selection
 - Due to the high level of uncertainty involved with the situation in an Exploratory Case Study, a researcher should not attempt to select sites based on research goals alone, nor should site selection simply consist of a convenience sample without consideration. The sample of sites should include at least one site for every meaningful variation in the phenomenon being studied. Convenience sampling is only acceptable if it meets this criterion.
 - o Case Sample Selection
 - The number of cases sampled should be large enough and collected from enough sources to accurately represent the diversity of the phenomenon being

studied. Keeping this in mind, Exploratory Case Studies are meant to be short and small-scale case studies.

- o Data Collection
 - Data should be collected through exploration and observation of the phenomenon at the selected sites. Researchers should investigate the site for potential ways to measure data from the site in a larger-scale investigation in the future. Researchers should also consider potential questions for a future study of the phenomenon at that site, and consider whether or not the answers to those questions could be found through simple observation during the exploratory phase.
 - When an Exploratory Case Study is being conducted, it is possible that the researchers already have research goals in mind. Researchers should collect data to determine whether or not those goals would be useful and sufficient for a larger-scale investigation in the future.
- o Reporting the Results
 - Reports should present all of the observational data collected from the Exploratory Case Study and explain how it was collected.
 - Observational data in Exploratory Case Study reports does not require a strong chain of evidence to support it, as these studies frequently precede a larger study on the same topic.
 - The reports from these studies are often internal, as they are not conclusive and simply serve to improve understanding of a situation. The reports may be made public as part of a larger report on an investigation that followed the Exploratory Case Study.
- Pitfalls
 - o The data collected from an Exploratory Case Study can be quite convincing about the conclusiveness of particular findings. Researchers must be careful to avoid prematurely releasing the results as conclusions, as Exploratory Case Studies are not thorough examinations of a phenomenon.
 - o It is tempting for researchers to spend a long time in the exploratory phase in an attempt to gather more observations. While it is important for researchers to gather a sufficient amount of data and it is sometimes difficult to determine what is sufficient for

the needs of an individual study, Exploratory Case Studies are not meant to be longitudinal. Prolonging these studies reduces their worth as an inexpensive initial investigation.

- Site selection must be appropriately representative. It may be tempting for a researcher to explore a sample of sites out of convenience, but the data found at those sites may not sufficiently represent the phenomenon being studied.

Critical Instance Case Study

- Description
 - Critical Instance Case Studies are ideal for examining a specific event or situation, focusing on only one or very few sites. Because of the focus on a specific event or situation, these studies are used to thoroughly investigate that single instance rather than attempting to generalize.
- Purpose
 - Critical Instance Case Studies allow for a thorough investigation of a specific instance of a phenomenon, rather than a generalization.
 - This type of study can provide answers to questions raised about a highly generalized or universal assertion through a detailed study of a single instance.
 - These studies can be used to find cause-and-effect relationships for the studied subject.
- Design
 - Site Selection
 - In Critical Instance Case Studies, the researcher will be studying a specific situation of interest. Consequently, the site is often predetermined and need not be selected.
 - When more than one site is available, a researcher must select one or very few sites to focus on. Convenience sampling is acceptable for Critical Instance Case Studies.
 - Data Collection
 - The type of data being collected is dependent on the phenomenon being studied and loosely dependent on the researcher's goals. When studying a single instance, there is no need for the researcher to create rules about data

collection across sites. The data sample collected by the researcher should be as exhaustive as the site and the available resources allow.

- When testing a hypothesis about the specific phenomenon, data should be collected both to support the hypothesis and to reject other hypotheses.

○ Reporting the Results

- The researcher should present a complete description of the phenomenon being studied.
- If there was an inquiry being addressed by the case study, the data should be presented in a way that addresses that inquiry when possible.
- All of the data collected during the investigation should be clearly described and explained in the report. If any collected data is excluded from the report or the results, the researcher should provide a detailed explanation as to why that choice was made.
- If the Critical Instance Case Study was testing a hypothesis, that hypothesis should be described and explained. Any data that rules out alternative causes or any evidence that supports the hypothesis should be presented, and any conclusions made from this data should be described and explained.

● Pitfalls

- This type of study cannot be used for generalization, as any evidence collected from a single instance is not guaranteed to exist in another instance.
- A researcher must make sure to thoroughly collect data from all of the available resources in a Critical Instance Case Study. It may be tempting for a researcher to prematurely conclude the investigation due to the collection of a seemingly sufficient amount of data, even if there are still data sources that have gone unexamined. However, such a premature conclusion is not guaranteed to accurately represent the phenomenon.
- A researcher must be absolutely sure about the research goals of a study before conducting a Critical Instance Case Study, especially if the study was requested by another party that may plan to use the results for some other means. If the data collected by the study needs to be generalized at any point, it is not acceptable to use a Critical Instance Case Study.

Program Implementation Case Study

- Description
 - Program Implementation Case Studies focus on identifying whether or not a program has been successfully implemented, and what difficulties the program faced or is currently facing during the implementation process. These are long and thorough longitudinal studies that generally require a fairly large sample of cases due to the need to generalize the results over the population involved. Program Implementation Case Studies can also be used to address concerns about whether or not a program is in compliance with congressional intent. These studies usually require more people to work with the large amount of resources and data, and therefore they are often more costly to conduct.
- Purpose
 - Program Implementation Case Studies provide a large scale generalization about the difficulties being faced by a particular program during implementation. These difficulties could be a result of basic structural problems with the program or simply indications that the program needs more time for installation adaptations to occur.
 - This type of study provides answers about whether or not a program has been successfully implemented.
 - These studies are also used to provide answers about a program's consistency with legislation and compliance with congressional intent. This is particularly useful when the associated legislation offers considerable flexibility.
- Design
 - Site Selection
 - The researcher must select what locations, or sites, the data will be collected from. Site selection for this kind of study depends on the diversity of the program the researcher wants to study. A sample of sites could be, but is not required to be, a representative sample of all of the locations where the program exists. The researcher may instead choose to sample sites that represent the best cases or the worst cases to focus on what went right or wrong at those sites. The researcher may also choose to sample from sites that seem typical in an effort to examine the general state of a program's implementation.

- For an accurate generalization, a large sample of sites should be investigated. For this reason, convenience sampling for Program Implementation Case Studies should be often be avoided as the number of cases in such a sample will likely be too small.
 - Data Collection
 - Program Implementation Case Studies frequently collect both qualitative and quantitative data. Data should be collected on-site using any available resources such as recorded statistics related to the program, previously conducted research and published documents on the program, as well as researcher observation.
 - Rules for data collection at each site should be established and consistent across sites. This ensures that each site is represented using the same criteria in order to avoid skewing the data for generalization.
 - Reporting the Results
 - Reports on Program Implementation Case Studies should be presented in a way that addresses the inquiry of the study (whether or not the program has been implemented, what difficulties the program faced or is facing during implementation, whether or not the program is consistent with the legislation, etc.).
 - Reports should specify the dates that information was collected at each site, and describe the differences between each site. Any findings such as trends or notable observations should be reported based on the time and the site at which they were found, and separated by theme if necessary.
 - Any rules used for data collection across sites should be clearly defined and explained in the report.
- Pitfalls
 - Rules used for collecting data across sites may be bias or inadequate. The researchers must consider the possible existence of a diverse range of opinions about a program's implementation from site to site and from person to person.
 - Due to the immense amount of data that can be collected from the large sample of sites, Program Implementation Case Studies require a large number of researchers for data management and quality control. This can make it difficult to ensure that each

researcher is conducting the same quality of research. The high demand for researchers also makes Program Implementation Case Studies costly to conduct.

Program Effects Case Study

- Description
 - Program Effects Case Studies are used to determine the effects of specific programs, whether the programs are failing or succeeding and why. These case studies are best used in conjunction with prior reports or data collections and surveys conducted with people involved in the studied situation either just before or just after the case study. This allows the researcher to maximize their understanding of the failures or successes of a specific program.
- Purpose
 - Program Effects Case Studies determine the effects and the impact of a program, as well as the reasons for the program's successes and/or failures.
- Design
 - Site Selection
 - The researcher must select what locations, or sites, the data will be collected from. Site selection for this kind of study depends on the diversity of the program the researcher wants to study. A sample of sites could be, but is not required to be, a representative sample of all of the locations where the program exists. The researcher may instead choose to sample sites that represent the best cases or the worst cases to focus on what went right or wrong at those sites. The researcher may also choose to sample from sites that seem typical in an effort to examine the general effects of the program.
 - Data Collection
 - Program Effects Case Studies frequently collect both qualitative and quantitative data from the examined sites. The researcher should predetermine some sources from which they plan to collect data on site (measurements recorded on computers or machines, word of mouth information from employees and/or clients, etc.), but should also be aware of and open to emergent themes (unexpected findings, trends or data sources) that may present themselves during observation of the site.

- Surveys of the people involved with the studied program, taken either before or after the case study, can be used to confirm the generalizability of the case study findings. Prior reports or previously collected data can be used to confirm the findings as well, but these sources should not be outdated.
 - Reporting the Results
 - Reports should document the predetermined data sources that the researcher planned to collect from, as well as any themes that emerged during investigation.
 - A list of the selected sites should be included, and reasons should be clearly presented to explain why the sites were chosen as the sample. Any differences between the sites should be described and explained.
 - The results of the findings should be presented in a form that addresses the inquiry of the study either by describing the effects of the program or explaining the reasons for the program's successes and/or failures. Any difference in the findings between sites should be clearly presented and explained, if possible.
- Pitfalls
 - The need for a researcher to be aware of emergent themes creates the possibility of introducing bias, where a researcher will identify a trend that may have insufficient evidence to support it simply because the trend fits the researcher's goal. While this may be prevented by a more strict set of rules about data collection, restricting the researcher could result in an incomplete representation of the available data. Another way to prevent this is to increase the number of researchers on the team and encourage or require researchers to consult one another before introducing a new theme into the research.
 - Insufficient data collection or an insufficient sample of sites can result in an insufficient representation of the program and its effects.

Cumulative Case Study

- Description
 - Unlike many types of case studies, a Cumulative Case Study does not focus on one site over an extended period of time (longitudinal) nor does it take a snapshot of the data from multiple sites collected at the same time (cross-sectional). Instead, Cumulative

Case Studies aggregate data from numerous resources that have been collected from several sites and at different times. The data used in Cumulative Case Studies is usually in the form of previously conducted case studies and contain information that can be sufficiently compared and aggregated into a single study for a useful purpose.

Cumulative Case Studies can focus on case studies that have been completed in the past (retrospective), or they can be planned to focus on a series of case studies that will be conducted in the future (prospective).

- Purpose
 - Cumulative Case Studies provide a greater generalization of the results of multiple case studies that have been conducted at different times and locations.
 - This type of study allows for a larger collection of data without the need to conduct an unmanageable amount of case studies at the same time.
 - These studies save the researcher time and resources, as the data that will be worked with has already been collected and the previous studies have already been completed.
- Design
 - Site Selection
 - The researcher must select what locations, or sites, the data will be collected from. This selection will depend on the purpose of the researcher's study, but each site must have previously conducted research that will be relevant to the study. The researcher should use caution when selecting sites to avoid bias and skewed results.
 - Case Sample Selection
 - The research must select a sample of cases from each site that will be aggregated together for the Cumulative Case Study. Suggestions on how to select cases can be found in the Case Survey Method below.
 - Cumulate Findings
 - Cumulative Case Studies use the Case Survey Method (found below) to analyze and aggregate the findings from the selected case sample.
 - Reporting the Results
 - The rules for sample selection and the checklist for aggregating the data during the Case Survey Method (found below) should be clearly presented, and the

answers to the questions on the checklist should be provided for each included case.

- Detailed reasons for excluding sites or cases should be provided to inform the reader that research was not insufficient and information was not withheld due to bias.
- The final generalization of the results should be presented in a form that honestly addresses the purpose of the Cumulative Case Study.

- Pitfalls

- The necessity for the researcher to select sites and cases from those sites as well as the researcher's ability to make the decision to exclude research literature presents a lot of opportunity for bias to be introduced into the study. The researcher must use caution and correct practices when making selections and exclusions, providing written descriptions of why such decisions were made and consulting other researchers when possible to avoid bias.
- Due to the fact that the research used in a Cumulative Case Study has already been conducted, the researcher may encounter a variation in the quality of research between cases. While a researcher must be cautious when excluding research literature, it is just as important to avoid including research with heavy bias or uncertain quality.
- Changes in contextual factors that have occurred over time at the selected sites may affect the results of the research, even if they are not directly related to the topic being studied.

Case Survey Method

- Purpose

- The Case Survey Method provides an inexpensive way to aggregate existing research.

- Collecting Data to Aggregate

- Many case studies are conducted on nonrandom samples for the purpose of observing a particular group, environment or phenomenon. With this in mind, a reviewer intending to aggregate data from different case studies should take note of the samples that were used in those studies and consider whether or not those samples cover the range of diversity that is necessary to study the desired topic, and have not been collected in a bias way. It is best for the reviewer to create a set of explicit rules that must be followed

when collecting a sample of case studies to make sure that the aggregated data will provide thorough coverage within the boundaries required for the reviewer's research. Once a sample of case studies is selected using these rules, the sample should then be reviewed in order to make sure that the reviewer's own bias is not reflected in the selected materials.

- Aggregating the Data

- Unit of Analysis

- Case studies are observational studies and, because of this, case study reports contain a sample of observations made by the researchers who conducted those studies. There are many different methods that can be used to obtain observational data, and it is not uncommon for several researchers to conduct case studies on a single phenomenon. If more than one researcher conducts a case study on the same phenomenon at the same place and the same time, those two studies may contain different observational data and it may be tempting for a reviewer to collect both studies using the Case Survey Method. However, while the data may be different, the "case" (the same phenomenon at the same place and the same time) is identical for both studies. If it is the reviewer's intent to use the Case Survey Method to cumulate data from many different cases, then a single case is the unit of analysis. Only one report should be included per case to avoid double counting that case and skewing the results.

- Rules for Aggregating

- Different types of case studies with different goals and different focuses will most likely require different information. Therefore, it is not possible to come up with an exhaustive set of rules for aggregating data over all case studies. The reviewers conducting the study must carefully think about the details relating to the sample of cases they are choosing. For example, if a study will be dealing with frequent patent filers, it is important to consider whether or not the term "frequent" is too non-specific. If the number of patents filed is relevant to the study, cases may need to be aggregated into groups based on that measure: 6-10 filed in the last year, 10-15 filed in the last year, etc. Factors such as the dates that patents were filed or the technology center that the filer belonged to may be considered as well.

- A single checklist of questions should be created by the reviewers that can be used to inspect each case for relevant data. This checklist should be multiple choice to allow for the inclusion of a range of data such as the different numbers of patents filed, mentioned above. It is vital that each question on the checklist includes the option to state that the inspected case did not provide the information necessary to answer that question. This helps to prevent researchers from making guesses about the data in order to answer the questions.
- Pitfalls
 - When selecting a sample of case studies to aggregate or when studying and reporting on research material, it is tempting for a reviewer to treat the research conducted in those studies as a perfectly representative sample of the subject that was studied. In reality, it is rare for any individual research piece to fully encompass all of the available knowledge on a particular subject and to present it in a non-biased way. It is important for the reviewer to be aware that there are likely aspects of the subject matter that are not represented in the report and that the findings may have been shaped by the original researcher's methods and goals.
 - Occasionally, the reviewer that is using the Case Survey Method to aggregate case studies will encounter a study that appears to have been poorly conducted or heavily biased. Excluding these studies may be the correct choice, but the reviewer should take consideration and, if possible, consult another reviewer before making this choice. If the choice is made to exclude any research literature, it may be tempting for the reviewer to ignore that literature in the final report. However, it is possible that someone who is aware of the excluded literature will read the final report and suspect that the reviewer used insufficient or biased methods to collect data for the research. To avoid this, all excluded research literature should be mentioned in the reports and accompanied by the reviewers reasoning for exclusion. This provides the reader with more understanding of the reviewer's methods.

When to Conduct Each Type of Case Study

When choosing what type of case study to conduct, it is important for the researcher to consider the situation’s maturity. Maturity, in this context, can mean either how long the studied topic has existed or how deeply the subject has already been studied. These meanings depend on the topic of study and how the researcher is planning to study the topic. For example, when an office replaces an old procedure with a new procedure, that new procedure is “young” because it has just come into existence in that situation. This young state would make it difficult to determine the effects the program has on a typical population of employees at the office, because they have not had any time to adjust to the program and thus there is no frame of reference for what is a typical effect. A topic that has existed for a long time can also be considered young in maturity if there has been little to no research conducted on that topic. The following chart shows the different types of case studies and ranks them from “very low” value to “high” value at different levels of maturity:

Type of Study	Young	Middle	Old
Cross Case	Low	High	High
Critical Instance	Mid	High	Mid
Cumulative Prospective	Low	Mid	Low
Cumulative Retrospective	Very Low	Mid	High
Exploratory	High	Mid	Low
Illustrative	High	Mid	Low
Program Effects	Mid	High	Low
Program Implementation	Low	High	Low

Figure 2: Value of Different Case Studies by the Maturity of the Investigation

The reasons behind the values in Figure 2, and the reasons why a researcher should or should not conduct certain case study types at certain investigation maturities are described in the following list. It should be noted that these are simply guidelines and not rules for selecting case studies.

Young Maturity

- Cross-Case – Low Value
 - There is not often a sufficient amount of cases to cross-study at this point.
- Critical Instance – Mid Value
 - Many instances of interest may exist in a new situation, but it could be difficult to tell which ones are critical and worth studying at this stage.
- Cumulative (Prospective) – Low Value
 - It is expensive to conduct a series of case studies prior to a cumulative study, and it is unlikely that there will be a clear subject that needs studying at this point.
- Cumulative (Retrospective) – Very Low Value
 - There is not often a sufficient amount of cases to cumulate at this point.
- Exploratory – High Value
 - This will help define research goals and questions, and help the researcher understand the situation better at an early stage.
- Illustrative – High Value
 - This will help inform an audience about a situation at an early stage so that they can better understand and/or communicate with the researcher.
- Program Effects – Mid Value
 - It could be helpful to study the effects a new program has on a situation, but it is good to be mindful that some effects may be the result of the situation adjusting to the new program and may only be temporary.
- Program Implementation – Low Value
 - At this stage, a program will generally be in the implementation phase, so attempting to study whether or not it has successfully been implemented and why may be a bit premature.

Middle Maturity

- Cross-Case – High Value
 - At this stage, it can be helpful to examine a number of cases that span over the population of the studied topic to develop generalizations that may help the researcher to better understand the topic overall and may even guide future investigations.
- Critical Instance – High Value
 - At this stage, situations of interest are likely to become visible and can be more easily distinguished from the typical situations than they could have been during the early stage.
- Cumulative (prospective) – Mid Value
 - Research goals for a cumulative case study may become evident at this stage, especially after an exploratory case study. This should be used instead of the retrospective cumulative case study only if insufficient cases currently exist for the research goals.
- Cumulative (retrospective) – Mid Value
 - Research goals for a cumulative case study may become evident at this stage, especially after an exploratory case study. These should be used instead of retrospective cumulative case studies if a sufficient amount of cases exist for study.
- Exploratory – Mid Value
 - This type of study will help define research goals and questions, justifying a larger-scale investigation at this phase.
- Illustrative – Mid Value
 - If at this point it appears that an audience knows too little about the situation, this type of study can be used to create a common language between that audience and the researchers.
- Program Effects – High Value
 - This stage is best for examining the effects a program has had on a situation because the situation has had some time to adjust to the program and the long term effects start to become visible.
- Program Implementation – High Value
 - This stage is best for examining whether or not a program has been successfully implemented because the implementation phase should have been completed by this

point, but should still have been recent enough that the reasons for successes or failures can be studied clearly.

Old Maturity

- Cross-Case – High Value
 - At this stage, it is much more likely that a large sample of research literature will exist for a Cross-Case study. Conducting one of these studies can provide valuable information that can be generalized over the population of the studied topic.
- Critical Instance – Mid Value
 - It is possible for a situation of interest to arise even in a more mature stage. This study can be used to understand what caused that situation of interest.
- Cumulative (prospective) – Low Value
 - This study is only reasonable at this stage if the research goals require information that has not been collected by a previous study. Otherwise, retrospective cumulative studies are more affordable
- Cumulative (retrospective) – High Value
 - At this stage, it is likely that a lot of information already exists about the topic of study. Using the available information, rather than new studies, allows for a large-scale investigation that is much less expensive than the prospective counterpart.
- Exploratory – Low Value
 - It is unlikely that this kind of study will be necessary to determine research goals or help to understand a situation at this stage of maturity. These can still be used to justify a larger-scale investigation if necessary.
- Illustrative – Low Value
 - It is unlikely that an audience will not understand a situation at this stage of maturity. However, this form of study should still be used if a large gap in understanding exists between a researcher and the target audience.
- Program Effects – Low Value
 - At this stage, it may be difficult to determine what the effects of a program are and what effects are caused by outside factors. It is still possible to do this by collecting data through surveys and quantifiable data that has been stored over time.

- Program Implementation – Low Value
 - At this stage, the state of a program’s implementation should be clear and reasons why it succeeded or failed will likely have been previously investigated to some degree. This kind of study can be used when this is not the case.

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