



Identification of ambiguity in the case study research typology: what is a unit of analysis?

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Abstract

Purpose – At the moment central concepts relating to the case study strategy are insufficiently understood. This is unfortunate in that the truth value of results inferred from case studies may be questioned. Given the fact that case studies are widely employed in many fields the identified ambiguities represent an imperative dilemma of great consequences to the research community in general. Hence, the objectives are to identify ambiguities, explore further consequences of ambiguities and to propose a rival understanding that will remedy the present inconsistencies.

Design/methodology/approach – An analysis of literature was undertaken. Based on a critical assessment of existing theoretical concepts, modifications and novel conceptual ideas are proposed. The proposed framework is, moreover, thoroughly exemplified by a business-to-business research example, thereby enhancing applicability when future case studies are undertaken.

Findings – The outcome was a string of generic case study characteristics, an elaboration of ambiguity and consequences of the identified ambiguity, a modification of Yins' case study design typology, and finally an integrative theoretical framework that illustrates an alternative conception of the unit of analysis and the case. Accepting the criticisms and ideas presented makes it easier to identify and demarcate units of analysis that are comparable with the original analyzed unit of analysis. This will enhance the probability of authenticity and fittingness of inferred case results.

Originality/value – The contributions of this paper will facilitate a higher level of awareness about the assumptions of the paradigmatic posture researchers hold. This will cause researchers to craft more logical coherent designs and conduct better case studies across fields of theories. Moreover, they will to a higher extent be able to understand rival points of view, enabling them to construct more nuanced and astute discussions and novel insights.

Keywords Quality management, Research methods, Case studies, Transfer processes

Paper type Conceptual paper

Introduction

The case study has been used for several decades but has gained a firmer foothold approximately 35 years ago. Today the case study is used as a qualitative research approach within a large number of disciplines, such as sociology, anthropology, history, psychology, law, medicine, and education, political science, economics, urban planning, public administration, public policy, social work and management (Simons, 1996, p. 227; Yin, 1994).

The growing interest in the case study and its extensive prevalence has led to a need of further conceptualization and clarification of this research approach. This has resulted in numerous articles and books. Nevertheless, as will be demonstrated later more exhaustively, there is still a need for more elaborated conceptual enlightenments. This is because conceptual ambiguity can be identified in the case study approach and there exists a low degree of consensus about what can be understood by a case study



among researchers (Winegardner, 1998, p. 1; Reinhartz, 1992, p. 147). Thus, a critical assessment of central concepts within the case study approach reveals ambiguities which have some unfortunate consequences.

In general, contributors within the case study approach employ a concept that is perceived as being especially important, namely the “unit of analysis” (Yin, 1994, p. 44; Patton, 2002, pp. 228-99). It is, however, a concept that has not yet been sufficiently clarified. A vague understanding of this concept is both related to the authenticity of case study results and their transferability. Moreover, it also has consequences for the meaning of a case study (i.e. an exact definition of the case study). At the moment conceptually stringent guidelines are not available to differentiate between unit of analysis and the case in relation to a number of predetermined premises. This indicates that the present misconception feeds on a lacking distinction between the unit of analysis and the case. The need for knowledge can be specified through questions such as, what is a case and what is a unit of analysis? What are the differences between the unit of analysis and the case? These are fundamental and important questions about epistemological aspects and transferability/fittingness. Based on the preceding discussion the objective of this study is to clarify the meaning of unit of analysis and thus ultimately, to contribute to a more detailed understanding of the case study as a qualitative research approach.

The paper is divided into three main parts. First, generic dimensions are presented based on definitions, disciplines, axioms, etc. Second, ambiguities are listed emphasizing problems and consequences. Third, a rival understanding is presented (Lave and March, 1975, pp. 60-1; Peltó and Peltó, 1978, pp. 25-6; Webb *et al.*, 1981, pp. 46-8) for a good explanation of the role of rivalry in trying to draw inferences’ in qualitative research.

What is a case study?

Based on definitions of the case study one can see that there exists a fuzzy and blurred perception among researchers (Winegardner, 1998, p. 1). It seems that we have an “anything goes” approach as long as it is not static by nature and as long as it cannot be characterized as an experiment, a survey, or a historic study (Merriam, 1998, p. xii).

According to Winegardner (1998, p. 5), a researcher’s epistemological assumptions are central when classifying case studies. I agree although I think that additional aspect needs to be considered to reach a deeper more elaborated understanding. The subsequent discussion is based on Table I, where the point of departure is taken in a number of case study definitions. The table is divided into two columns. The first row comprises case study definitions, the discipline/field that uses the research strategy and finally the study focus in that specific field (i.e. typical research propositions). The second row lists six characteristics to which analyses of the individual case study definitions will be compared. The six characteristics deal with:

- (1) universally recognized truth (i.e. axioms, basic belief system) held by a particular group of researchers and moreover, how they believe reality can be comprehended;
- (2) whether the goal of investigation is to predict or to understand;
- (3) the degree of flexibility tolerated in research designs (i.e. emergent versus a priori structured designs);

Table I.
Case study – definitions
and characteristics

(a) Definition	Characteristic based on a-f
(b) Author	(a) Axioms, Constructivism, V. Realism
(c) Field/discipline	(b) Goal of investigation (understanding v. prediction)
(d) Typical study object	(c) Research Design (flexible evolving emergent v. structured)
	(d) Focus of research (quality/quantity)
	(e) Analysis (inductive/deductive)
	(f) Findings (holistic, thick v. Precise, narrow)
(a) "An empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident" ... and ... "copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from prior development of theoretical propositions to guide data collection and analysis"	(a) Reality is real but most be understood probabilistically and thus imperfectly
(b) (Yin, 2003, pp. 13-14)	(b) The goal is to explain, to test and modify existent theory. To generalize findings to other contexts
(c) Discipline: Experimental psychology (individual theories)	(c) The research design is structured from the start but can to some minor extent be altered. Otherwise it is a new study
(d) Study objects: Individual development, personality, learning, interpersonal interactions, cognitive behaviour	(d) Focus is both qualitative and quantitative
(a) "Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances"	(e) Theoretical starting point, where proposition is developed from existent theory, and thus deductive by nature
(b) (Stake, 1995, p. xi)	(f) Findings are precise and narrow
(c) Discipline: Education	Adjacent to a positivistic position
(d) Study objects: individual students, issues & problems of practice, schools, learning, child & adult development	(a) Reality is a humanist construction/perception created on social interactions
	(b) To create an understanding from the case about the investigated phenomenon. To create idiographic knowledge
	(c) Flexible and evolving as the research goes along
	(d) Focus of research is qualitative
	(e) Empirical starting point, theories are emergent and thus inductive by nature
	(f) Findings are holistic and lifelike, constitutes thick descriptions. Focus is on revealing new concepts and new relations or to modify existent concepts/theories; to interpret and to understand (Adjacent to a constructivism position)

(continued)

(a) "The Qualitative case study is an intensive, holistic description and analysis of a bounded phenomenon such as a program, an institution, a person, a process, or a social unit" (b) (Merriam, 1988, p. xiv) (c) Discipline: Education (practice oriented field) (d) Study object: program, an institution, a person, a process, or a social unit	(a) Reality is a humanist construction/perception created on social interactions (b) To create an understanding about the investigated phenomenon. To create idiographic knowledge (c) Flexible and evolving as the research goes along (d) Focus of research is qualitative (e) Empirical starting point, theories are emergent and thus inductive by nature (f) Findings are holistic and lifelike, constitutes thick descriptions. Focus is on revealing new concepts and new relations or to modify existent concepts/theories; to interpret and to understand (adjacent to a constructivism position)
(a) "The case study is a research strategy which focuses on understanding the dynamics present within single settings" (b) (Eisenhardt, 1989, p. 534) (c) Discipline: Organizational Theory (d) Study Objects: Strategic decisions, institutions, organizational structure and functions, organizational performance	(a) Reality is a humanist construction/perception created on social interactions (b) To create an understanding about the investigated phenomenon. To create idiographic knowledge (c) Flexible and evolving as the research goes along (d) Focus of research is qualitative (e) Empirical starting point, theories are emergent and thus inductive by nature (f) Findings are holistic and lifelike, constitutes thick descriptions. Focus is on revealing new concepts and new relations or to modify existent concepts/theories; to interpret and to understand (adjacent to a constructivism position)

Identification of
ambiguity

Table I.

- (4) whether you seek to grasp something quantitative or qualitative, additionally what methods of analysis are considered to be scientifically “correct” which further influences how inferences are made;
- (5) whether analysis is based on inductive or deductive reasoning; and finally
- (6) the type of findings, that is, if they are broad and holistic as opposed to precise and more demarcated.

Take as an example that department X is more effective than department Y due (1) to numerous factors that are interrelated in a non-systematic way but still explainable contrary to (2) a higher level of absence due to illness in department Y compared to X. Note that both answers might be “true” but answer (1) may possibly lead to a deeper understanding. That is, an understanding of why the employees are more sick in department Y.

In addition to the characteristics mentioned in Table I, Yin’s definition is further characterized by trying to divorce similarities with other research designs, for example, experimental and quasi-experimental designs. These are research designs characterized by a distinct separation between what is analyzed and its environment. This is also the case concerning historical studies that are not dealing with present phenomena, but historical ones, and finally from surveys that try to minimize examined variables, as opposed to “Within its real-life context.” Thus, it seems that Yin has emphasized dissimilarity compared to other research designs instead of focusing on the case study’s distinctive features based on its own premises.

Stake, Merriam and Eisenhardt’s definitions are rooted in another paradigmatic position. This paradigmatic posture is based on a relativistic ontology where it is further asserted that knowledge transformation and creation are made possible by the subjective and unique relationship that is emerging during the inquiry process between the inquirer and the inquired. This influences “what” a study is, how a study is organized, the relationship between the investigator and the investigated, typical study objects, etc.

Generic characteristics of the case study

Regardless of differences discussed above, which primarily can be explained by different axioms, generic characteristics can nevertheless be identified across paradigmatic positions. These generic characteristics are interesting because they indicate how a meta understanding of “unit of analysis” and “case” can be conceptualized. First, the study object is always in some way related to people, more specifically, interpretations of the social actors’ perception of a given phenomena or the meaning actors attribute to a phenomena. Moreover, individuals are studied in their natural environment (i.e. social actions and social structures, Bonoma, 1985, p. 204; Yin, 2003, p. 13; Riege, 2003, p. 80). Second, the researcher is interested in a contemporary phenomenon, historical studies are thus excluded (i.e. contemporary dimension, Bonoma, 1985, p. 204; Agranoff and Radin, 1991, p. 204; Yin, 2003, p. 13). Third, one’s perspective is holistic when trying to understand and explain what happens and why it happens (i.e. a holistic dimension, Lincoln and Guba, 1985, p. 376; Merriam, 1988, p. xiv; Punch, 2005, p. 145; Fisher, 2004, p. 52; Yin, 2003, pp. 42-6; Patton, 2002, p. 447; Stake, 2000, p. 440). It thus becomes important to understand and identify contextual factors that surround the unit of analysis. Fourth, case studies are

primarily qualitative and the objective can be descriptive, exploratory and/or explanatory, that is, they can be theory generating or contribute to modifications of theory (i.e. multi research purpose dimension, Eisenhardt, 1989, p. 535; Feagin, *et al.*, 1991, p. 3; Miles and Huberman, 1994, p. 17; Perry, 1998, pp. 788-91; Wesley *et al.*, 1999; Healy and Perry, 2000). Fifth, the researcher has no control of crucial events evolving in the studied context (i.e. controllability dimension, Denzin, 1978; Merriam, 1988, pp. 6-9; Amaratunga and Baldry, 2001, p. 99; Yin, 2003, pp. 7-8). Sixth, the researcher applies numerous data sources in the search of understanding (i.e. triangulation dimension, Bonoma, 1985, p. 203; Merriam, 1988, p. 16; Agranoff and Radin, 1991, p. 204; Parkhe, 1993, p. 259; Stake, 1995; Punch, 2005, p. 145; Robson, 2002, p. 178; Yin, 2003, pp. 97-101; Feagin *et al.*, 1991, p. 2). Seventh, “rich” and contextual accounts are produced based on the case study (i.e. “thick” description dimension, Guba and Lincoln, 1981, p. 375; Lincoln and Guba, 1985; Parkhe, 1993, p. 256; Morris and Wood, 1991; Amaratunga and Baldry, 2001, p. 99; Patton, 2002, p. 46).

Ambiguity – unit of analysis

The main claim that fuels this paper is the existence of ambiguity in the meaning of a “unit of analysis” and the case itself. Furthermore, the distinction between the two concepts is unclear. This is quite problematic as the authenticity/credibility and transferability/fittingness of case results are diminished. In addition, the consistency of found patterns can also be questioned. This further makes it difficult to establish a common understanding of a case (i.e. what is a case?) and hence the meaning of the case study as a research approach. Moreover, the present ambiguity seems to have resulted in a tautological relationship between “case” and “unit of analysis.” In the following I aim to support the claim about ambiguity. As mentioned, the unit of analysis is a central concept in connection with understanding, preparing and implementing a case study (Yin, 2003, pp. 22-6; Patton, 2002, pp. 228-30). Patton (2002, p. 229) formulates it this way:

The key issue in selecting and making decisions about appropriate unit of analysis is to decide what it is you want to be able to say something about at the end of the study.

According to Patton there is no distinction between case and unit of analysis. The case is simply identical with the unit of analysis, “Cases are units of analysis” (Patton, 2002, p. 447). Feagin *et al.* (1991, p. 31), also discusses the meaning of unit of analysis, “What is the proper unit of analysis (a central issue for the case study method)?”

Feagin *et al.*, point out that the question of, “an appropriate unit of analysis” is decisive, and they consider it to be identical with the meaning of a case study (p. 36). They argue that the case study is based on axioms about reality which are incommensurable with a logical deductive approach. In contrast, the case study naturally belongs to a naturalistic approach. Vaughan (1992) argues that the case can be everything, thus also identical with the “unit of analysis”. They state that:

Since, a case is whatever we decide it is (on this the authors in this volume seem to agree), we can vary the organizational settings we select to explore our research questions and systematically assess and compare the findings.

According to Merriam’s definition in Table I, the case study is an analysis of a phenomenon, as example of a phenomenon she clarifies it with, a person, a programme,

an event, etc. (p. 9). As an example of a case, Merriam mentions a “Bounded system” (p. 9), and elaborates further that it is a “instance of some concern” (p. 10). More specifically, Merriam mentions a child, a specific programme, or a school in her clarification of an “instance”. We can apparently, from the preceding discussion, assume that Merriam claim that a “case” is identical with the studied phenomenon. Unfortunately, the argumentation is not consistent, as she later unreservedly, claims that the phenomenon is not identical with the case itself. It is something else which can be realized from the following quotation (p. 11); “The case itself is important for what it reveals about the phenomenon and for what it might represent.”

There seems to be some confusion as to the conceptual relationship between “case” and “unit of analysis.” Nor Berg (2001, p. 231) distinguishes between a unit of analysis and a case. He argues that:

The unit of analysis defines what the case study is focusing on (what the case is), such as an individual, a group, an organisation, a city, and so forth.

In the same vein Miles and Huberman (1994, p. 25) argue that the case is identical with unit of analysis. They state that; “The case is, in effect, your unit of analysis.”

Stake (1995, p. 2), like Miles and Huberman (1994), argues that a case is identical with, “a bounded system.” He argues that a bounded system is more an object than a process. More specifically, Stake mentions a child and a class as examples of cases. It should be noted, that Stake (1995, p. 3) does not employ the terminology “unit of analysis” but a comparable expression namely, “study object.” Stake is quite vague in his account on this specific topic and no clarification as to differences between study object and the case itself, is offered. Stake (p. xi) clearly states his paradigmatic position, which is close to constructivism, where fulfillment of external validity is not in itself considered a research goal. In large parts of his account, Stake is loyal to this vantage point. Unfortunately, the rigidity is not maintained throughout his account. This is especially the case regarding types of cases where he employs “three” types namely, “intrinsic” “instrumental” and “collective.” In the first type of case study (intrinsic), the researcher has no ambition about producing theories having general application. He is simply interested in the case because of what he might learn about that particular case. This type can be compared to Yin’s Type 1 case design where the rationale could be a critical case. Please note that that this type of case study is consistent with the belief system within which Stake operates. In the second type (instrumental), the case functions as a facilitator to gain an understanding of something else. Observe that in this situation the case is utilized to achieve some sort of overall understanding. From the preceding discussion, one can see that there is a conceptual distinction between the case and what you want to understand (i.e. the phenomenon). Nonetheless, the case is exemplified with a teacher (p. 3) and it is apparent that Stake perceives the case and the study object as indistinguishable. This is, however, not logically consistent with Stakes own elaboration on the meaning of “instrumental.” Moreover, it is in conflict with his paradigmatic perspective. The third type of case study (collective) is basically a variation of an instrumental case study even though it is often presented as independent case study type, by other researchers (Punch, 2005, p. 144). According to Stake, this variation of a case study type is necessary when the researcher needs to study more instrumental cases to gain a general understanding of something. The craving for external validity becomes

apparently intrusive in this situation. This is problematic because the goal of producing general knowledge (i.e. generalizations) lies outside the proclaimed domain of Stakes paradigmatic position. Some axioms cannot be confounded in a meaningful way, for example, that we have a “real” reality versus local and constructed realities or objectivity versus subjectivity (Burrell and Morgan, 1980). Stake is in other words trying to assimilate axioms which are not commensurable (Guba and Lincoln, 2000, pp. 169-74).

Yin, one of the more influential contributors of this research approach, is also rather imprecise about a conceptual account of the unit of analysis. Like others, Yin (2003, pp. 22-6) argues that unit of analysis is identical with the case itself. For example, Yin puts forth that, “This third component is related to the fundamental problem of defining what the ‘case’ is –.” He then refers to Platt’s (1992a, b) articles in which the case and the unit of analysis are identical. He argues, that “in each situation, an individual person is the case being the study, and the individual is the primary unit of analysis” (Yin, 2003, p. 22). In the 1994 (p. 44) edition he states that; “A major step in designing and conducting a single case is defining the unit of analysis (or the case itself).”

Yin’s frequently cited typology of case study type designs is not logically consistent as a consequence of the above mentioned ambiguity between the concepts, case and unit of analysis.

In his typology (Yin, 2003, p. 40, Figure 2.4, Table II) he actually in some situations argues for a distinction between the case and the unit of analysis. Unfortunately, this only applies in some situations whereas he in other situations makes no such distinction.

Table III will be utilized to demonstrate the illogical coherence among different system parts in Yin’s typology. Yin (2003, p. 40) applies four types of case study designs systematized by apparently four different constructs, namely the number of cases on the horizontal axis and holism versus embedded on the vertical axis plus number of units of analysis also on the vertical axis. It should be noted that cases and unit of analysis functions as dichotomies contrary to the other two constructs, i.e. holistic and embedded. Table III illustrates specific characteristics of the different types of designs and the rationale behind the individual type.

Based on Tables II and III one can see that the meaning of the unit of analysis changes depending on type of case study (i.e. matrix cell). That is, the meaning of the concept is not consistent even though they are parts of the same theoretical framework. For example, in the Type 1 and 3 matrix cell, Yin argues that the case and the unit of analysis are identical whereas he in the matrix cells 2 and 4 argues that they are not. In addition, it is difficult to understand the appropriateness of the constructs that are used to form the classification. Notice, for instance that matrix cells Type 1 and 3 designs are holistic whereas the designs characterized by Types 2 and 4 are not, but yet

	Single-case designs	Multi-case designs
Holistic (single unit of analysis)	Type 1	Type 3
Embedded (multiple units of analysis)	Type 2	Type 4

Source: Yin (1994, p. 40, Figure 2.4)

Table II.
Yin’s case study designs

Table III.
Case study designs and
their rationale

	Characteristic	Rationale
Type 1	One case, holistic, one unit of analysis, case and unit of analysis is indistinguishable	Critical case Unique case Typical case Revelatory case Longitudinal case
Type 2	One case, embedded units of analysis, not holistic (?), but still context depended, case and unit of analysis is distinguishable	Extensive analysis More focused analysis
Type 3	More cases, holistic, case and unit of analysis is indistinguishable	More robust findings Replication logic (literal/theoretical) Extern validity
Type 4	More cases, embedded unit of analysis, not holistic, yet context depended, case and unit of analysis is distinguishable	More robust findings Replication logic (literal/theoretical) Extern validity Extensive analysis Focused analysis

Source: According to Yin (2003)

contextually dependent. This also is contrary to Yin’s own definition of the case study and of several others’ definition (Table I), where the holistic aspect is one of the more imperative features of the case study. It is basically an aspect that serves as one of the fundamental arguments for the legitimacy of the case study. Another aspect that is problematic, is the apparent similarity in the rationale behind Types 3 and 4 which weaken the reason for having an additionally type. Much in the same vein other authors also seem to have problems with the typology. Typically, the number of cases is used as the only discrimination factor when elaborating about the different design types, contrary to Yin’s own account (Johnsen and Ford, 2006, p. 1008; Howard and Doyle, 2006, p. 268; Alajoutsijärvi *et al.*, 2000, p. 1276; Amaratunga and Baldry, 2001, p. 100; Ghauri and Grønhaug, 2005, pp. 119-20).

There seem to be two contributory factors in Yin’s case design typology that causes the postulated illogical coherence. First, more constructs are used on the vertical axis (i.e. holistic and embedded) and second these constructs are not antonyms. Dichotomies are thus not used as one would expect in this kind of typology. In principle, there should be only one concept on each axis with either an increasing progression, as is the case of the horizontal axis, or antonyms (e.g. holistic versus reductionism or idiographic versus nomothetic). This would ensure that differences would be emphasized and thus pure types would appear. A possible solution to the discussed obstacles is to retain the horizontal axis (i.e. number of cases) and to alter the vertical axis to number of unit of analysis. This is shown in Figure 1.

Contrary to Yin’s typology we now have a consistent distinction between the case and the unit of analysis. Dichotomies are now consistently employed where the differences are emphasized via numbers, i.e. few versus many, for instance one case versus *N* cases. Accepting this typology means that several lessons can be conveyed. Observe for instance that the advantages (i.e. high authenticity and transferability, Eisenhardt, 1989; Bonoma, 1985; Wesley *et al.*, 1999) concerning multiple case studies can be achieved although only one case is investigated (i.e. an embedded design). It is

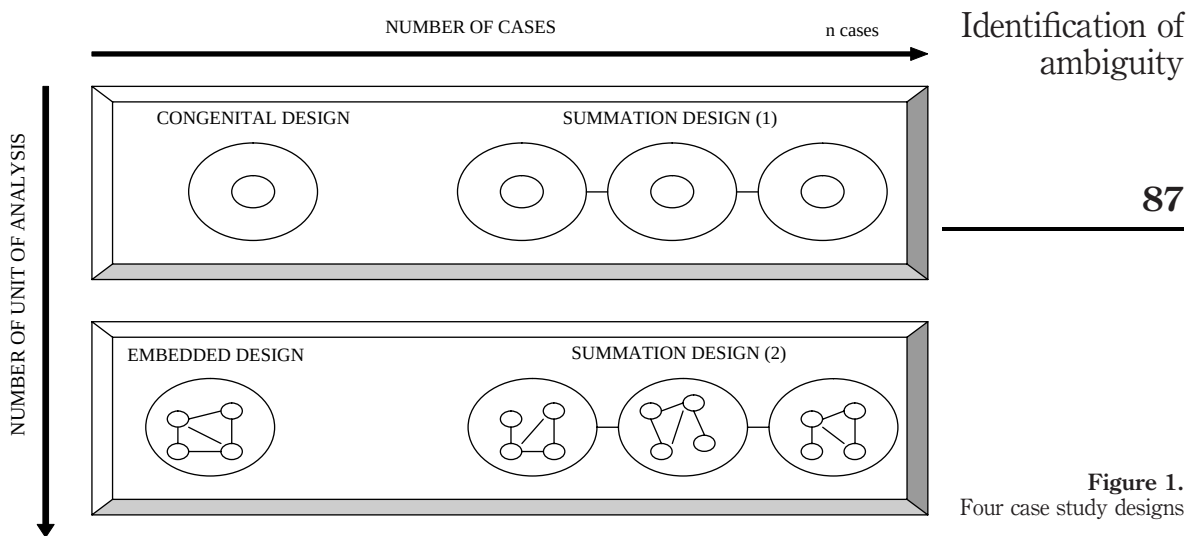


Figure 1.
Four case study designs

in a nutshell possible to transfer results from just one case to other contexts. Additionally, it is now crystallized what it is the researcher wants to transfer because the case and the unit of analysis are clearly detached.

Figure 1 shows that a multiple unit of analysis design can be obtained in three ways. First, you can choose to analyze more cases, but only one unit of analysis in each case. I refer to this design as a first level summation design, because you add together the units of analysis. Second, you can examine more units of analysis in one case, which I label embedded design, because the units of analysis are ingrained in only one case. Third, you can analyze both more cases and more units of analysis, which I label second level summative design, because the researcher adds both the units of analysis and the cases. Finally, you can have one case and one unit of analysis. A design I label a congenital design. The moderations in Figure 1 are elaborated more in section four below.

In summation, the above discussion and Table I illustrate that authors within different paradigmatic positions apparently need some degree of transferability of result even though this might be in conflict with there paradigmatic position. Furthermore, the elaboration about ambiguity causes conceptual problems. If the meaning of a case and a unit of analysis is not clear, and also, if it is not clear how these two central concepts can be separated in a meaningful way, it becomes difficult, if not impossible, to speak of any kind of transferability. In the remaining part I aim to put forth an alternative conception that remedies the problematic relationship between the case and the unit of analysis.

An alternative conception

Perry (1998, p. 785) and Bonoma (1985, p. 204), respectively, make the useful distinction between types of case studies and between the utility of a case, namely cases for teaching purposes and cases for research purposes where the latter utilizes the case for research purposes (i.e. as a research methodology). It should be noted that others

(Easton, 1994; Parkhe, 1993; Tsoukas, 1989; Yin, 1993, 2003; Healy and Perry, 2000; Rowley, 2002; Patton and Appelbaum, 2003) have also argued for the position that the case study should be regarded as a research methodology. Case studies for teaching purposes are opposed to “case research” used to enhance students’ opportunity to get a practical contextual understanding of real life problems (Perry, 1998, p. 785). The distinction is important because the consequences of the ambiguity explained in detail in the preceding section between the case and the unit of analysis only applies in the case where the case study is utilized as a research methodology.

The conceptual separation of the case from the unit of analysis has not been given much attention so far. Ragin and Becker (1992) and Bonoma (1985), albeit, have tried to clarify what a case is. This was nevertheless done independently of the unit of analysis. It is in this paper argued that the case can be divided into layers that surround the unit of analysis or the “heart” of the case. A unit of analysis must in any study always be identified as this process will intensify the purpose of the study. The unit of analysis will be on a lower abstraction level than the case layers, and will constitute specific information about the unknown that the research wants to enlighten. It thus becomes imperative to understand how a unit of analysis can be understood and how it can be identified in a given study.

The purpose of a study is basically what determines the unit of analysis and how it can be understood. That is the process of identifying a gap in literature, to develop an interesting problem, to craft a research design, etc. (Maxwell, 1996; Fisher, 2004). Moreover, it will also lead to a crystallization of the unit of analysis. This also means that the unit of analysis is something else than the study purpose. More specifically, a research purpose will necessarily lead to a need for information. This information can be found among specific individuals, for instance individuals in an organization, in a buying center, in a class room, etc. The unit of analysis can be identified via the particular individuals (i.e. key informants, Campbell, 1955, p. 339; John and Reve, 1982, p. 519) that have been purposeful selected (Light *et al.*, 1990) because they possess knowledge that can shed light on the problem at hand. This further means that the unit of analysis is demarcated to be individuals and or actions of individuals. My point thus is that the unit of analysis is identical with the knowledge that key informants can provide the researcher with. Furthermore, the information provided will be on a concrete level closely connected to the study protocol and hence the study purpose. After the collection of information the data analysis aims to facilitate a knowledge transformation (i.e. the purpose and nature of the qualitative data analysis are well explained in Schatzman and Strauss (1973), Marshall and Rossman (1989) and Vaughan (1992)). This mental exercise is accomplished through a search for matching patterns (Yin, 1994, pp. 106-8; Miles and Huberman, 1994, pp. 69-72; Patton, 1990, pp. 385-7), explanations, etc. on a higher abstraction level (i.e. the case), that is closely connected or even interconnected with the unit of analysis (i.e. the informants).

The idea is that key informants always will be embedded in case layers that inevitable will influence their perception of reality, of what is important, why it is important, when it is important and so forth. Much in the same way as a researcher more or less consciously (hopefully consciously) is influenced by the assumptions upon which his paradigmatic posture is based. Hence, the researcher needs to understand the case layers (i.e. the case) to be able to create a valuable knowledge transformation that is authentic and transferable (if that is a research goal). Each case layer is assumed to

be on a higher level of abstraction than the previous. The case thus is unique and holistic. The case is interconnected in a non-causal way conveying that goals about producing generalizations are problematic if not impossible. We can escape this conflicting axiomatic cul-de-sac by accepting the idea put forth about separating the unit of analysis and the case. In addition, what the unit of analysis and the case are and how they are interconnected. Figure 2 shows the elaborated relationship between the unit of analysis and the case.

Another characteristic of Figure 2 is the distinction between macro and micro analytical levels where the unit of analysis constitutes the micro level and the case constitutes something that is closely and logically connected with the unit of analysis. These contextual bonds (i.e. the case layers) that palpably influence the understanding of the unit of analysis become more apparent. This ensures that researchers' undertaking future research does not assimilate different analytical levels. It is, nevertheless, possible to move meaningful from one level of analysis to another. This can more interestingly be understood as an abstraction ladder that the researcher can move on when trying to advance and refine case results. The idea and logic of a ladder of abstraction is to enhance the vital transformation of empirical data into novel explanatory knowledge. This is essentially similar with assumptions about science that is suggested by many researchers' (Burrell and Morgan, 1980; Guba and Lincoln, 1994, 2000). Burrell and Morgan (1980), for example, advocate a typology constituting interconnected sets of assumptions about reality, the social world, and the individuals imbedded in the social world, namely, ontology, epistemology, human nature and lastly the consequences that these sets of assumptions have on methodology.

Accepting the idea shown in Figure 2 makes it easier to identify and demarcate unit of analysis that are comparable with the originally analyzed unit of analysis. This will enhance the probability of authenticity and fittingness of inferred case results.

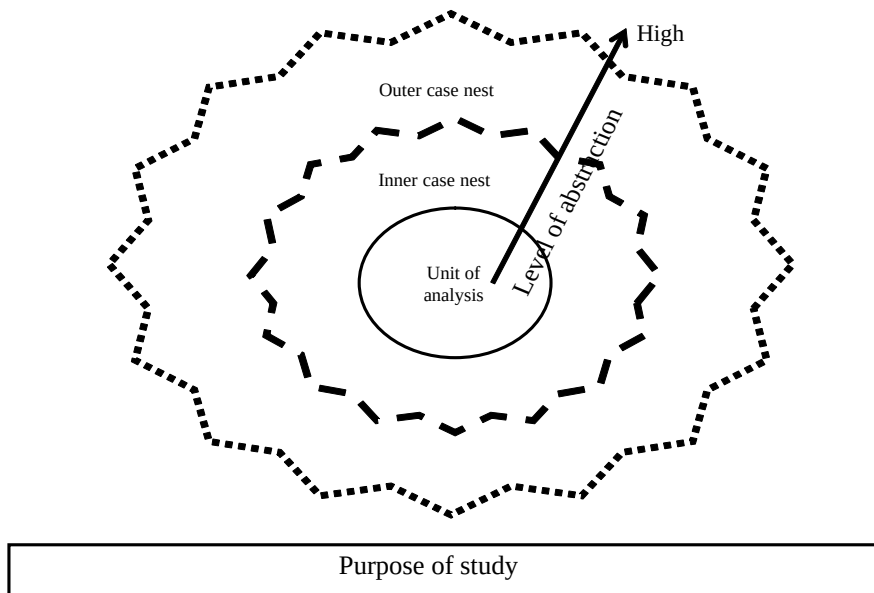


Figure 2.
A conceptual
understanding of unit of
analysis and the case

Notice, that this would not be the case if the goal was to select comparable cases because cases by nature are perceived to be contextual dependent and comprising numerous data points that cannot be understood in a causal way (Table I).

A clarification of Figures 1 and 2 convey by a research example

In this subsection I aim to elaborate on Yin's modified case study design typology (Figure 1) and the presented conceptual framework (Figure 2) through case studies that were undertaken in three manufacturing companies. To begin with, however, I introduce some constitutional theoretical information and methodological considerations. A review of the literature on satisfaction would reveal the following characteristics. First, that an overwhelming part of satisfaction research is based on a positivistic position (Szymanski and Henard, 2001). Second, most studies have been undertaken in the end-user market (Muhmin, 2002; Swan and Trawick, 1993). Third the research has been dominated by the disconfirmation of expectations paradigm (Eggert and Ulaga, 2002; Patterson *et al.*, 1997; Yi, 1990, to mention a few).

The above cited characteristics, paradigm rigidity, business to consumer focus and disconfirmation dominance justified a study based on:

- (1) A different paradigmatic position (i.e. in this case what some would label post positivistic (Denzin and Lincoln, 1994)).
- (2) Point of departure was a business to business context.
- (3) Focusing on the formation of satisfaction to study if industrial actors construct their satisfaction judgments based on the disconfirmation of expectations paradigm as we would expect them to.

Based on (1)-(3) above numerous decisions regarding belief systems had to be made, that is, ontological, epistemological and methodological decisions. It was decided to apply a subjectivist epistemology and a hermeneutic methodology. More specifically, the companies and the key informants were selected on the basis of a string of selection criteria. The selection criteria were based on the literature review characteristics, and thereby implicitly on the purpose of the study. Notice that this was facilitated by the choice of research belief system (i.e. a qualitative posture). It was decided to apply a case study as a research strategy because it is particularly suitable for a business-to-business context (Wesley *et al.*, 1999; Halinen and Törnroos, 2005).

In reference to the models shown in Figures 1 and 2 and the applied terminology, the unit of analysis in this study was the buying center consisting of the individual buying center members, because the purpose of the study, as mentioned, was to create a more nuanced understanding of B2B satisfaction formation. The buying centers comprised two to five members displaying up to seven different roles (Webster and Wind, 1972; Sheth, 1973). Since, only one buying center per company was involved in the investigated new buy situations of production equipment, we had a situation with one unit of analysis (namely the buying center) in each of the three companies. This is according to Figure 1, a summation design (1), a design that albeit shifted from a summation (2) design during the study. Why this shift one might pose, because the demarcation of the unit of analysis emerged in an almost literal creation between the researcher and the individual members of the buying center. That is, I believed from the outset of the study that the unit of analysis would be the individual buying member (i.e. multiple unit of analysis and multiple cases) but realized that the formation of

satisfaction judgments both regarding episode/specific satisfaction and overall satisfaction (for a discussion of the two types, see for example, Yi (1990) and Parker and Mathews (2001)) in all buying centers across companies reflected all the members beliefs. This consensus phenomenon among the members of the buying center made it possible to define the unit of analysis at a group level contrary to an individual level (i.e. the individual buying member). This caused the case study design to shift from a summation design (2) (i.e. lower right cell in Figure 1) to a summation design (1) (i.e. upper right cell). Bear in mind that this shift leads to a simpler design which is an advantage because it is more manageable and thus less resource demanding. Furthermore, in this case, the more simple design did not have a negative effect on the authenticity, fittingness or transferability of the findings.

Pertinent with this exemplification of the modified case study design typology, speculations about fittingness between ontological beliefs and case study designs can aptly be put forth here. If a researcher belongs to a community that has a paradigmatic position that is adjacent to a constructivist perspective, they are likely to formulate study purposes and focus on study objects that are closely connected to their belief systems (Morgan and Smircich, 1980, p. 491-2). This means that the congenital case study design (i.e. upper left cell in Figure 1) or the embedded case study design (i.e. the lower left cell) will be designs that can be utilized without getting into conflict with the belief system that guides research within this paradigmatic posture. Researchers holding a post positivistic position will inevitably craft research designs in accordance with their belief systems. They will, however, be more likely to utilize a summation design (1) or a summation design (2). Why, simply because the rationales behind particularly summation design (1) and (2), are adjacent to aims and belief of the post positivistic paradigm. For example, that findings (i.e. theories) will be more robust and thus transferable (to some extent) if they can be established across somewhat independent unit of analysis and ultimately also across independent cases. Robustness is achieved through replication logic (Yin, 2003, pp. 46-53). The rationale behind replication logic is that patterns and connections, if they correspond to predictions from a pre-determined set of theoretical propositions, established across somewhat independent cases, will lead to more robust, authentic and transferable findings. The notation of replication logic has found considerable support among researchers in many fields (Patton, 2002; Yin, 2003; Ragin, 2000; Amaratunga and Baldry, 2001, p. 100; Miles and Huberman, 1994, p. 172; Schofield, 1990; Eisenhardt, 1989; Herriot and Firestone, 1983).

During these case studies some paradoxes emerged. The conceptual idea shown in Figure 2 facilitated useful understanding of the identified paradoxes. As mentioned above the focus of the study was to enlighten the satisfaction formation in a context with distinctive characteristics (i.e. a B2B context). According to the disconfirmation of expectation paradigm, we would expect industrial buyers to be satisfied if the pre-buy expectations were met or succeeded (Cardozo, 1965; Oliver, 1980). Nonetheless, in one of the investigated buying centers any deviations from the pre-buy expectations lead to strong feelings of dissatisfaction. This is contrary to what we would expect, that is, that a better than expected performance should convey strong feelings of dissatisfaction. The abnormal result could be explained based on an understanding of the particular contextual situation (i.e. case layers), the unit of analysis was embedded in. This specific company had accomplished a very high growth rate.

Since, 1980 were it employed five people it has expanded its physical facilities 13 times and is today a global player, represented in 31 countries employing approximately 1,400 people in 2006. The rapid and accelerating growth rate resulted in a situation characterized by a constant lack of time and lack of company and market experienced employees. Furthermore, the company had, based on prior experience and the type of production technology they acquire, decided that the best “new” buy results was obtained by drawing up a highly detailed specification list that should be followed carefully by the chosen supplier. When the purchased machinery was delivered, installed, etc. employees from the buying organization would examine all aspects in the pre-made specification report. If they found a deviation they would have to use extra time to describe and estimate the consequences of the detected deviation. This means use of time and keeping key staff members away from the next scheduled buying process. Thus, the growth situation and high level of specification are two main explanatory factors concerning interpretation of the abnormal result.

The difficult task in this case trying to explain why better than expected performance leads to feelings of dissatisfaction is to ascertain were to look for answers in an often staggering amount of empirical data, the framework shown in Figure 2 is a kind of transcending structure that promotes this process. It makes it possible to make parsimonious and logically coherent theoretical inferences. Features that according to Pfeffer (1982) are essential characteristics of good theory.

Sphere of application

The application of the proposed framework shown in Figures 1 and 2 is not dictated by national borders (i.e. culture). It can be applied both across fields (Table I), and numerous purposes of research. For example, Amaratunga and Baldry (2001), use a multiple case study (i.e. referring to Yin, 1994) as a research strategy to study performance measurement in UK facilities management organizations (i.e. the practice of co-ordinating the physical work place with the people and work of the organization ... integrating the principles of business administration, architecture and the behavioural and engineering sciences, p. 97). Howard and Doyle investigate the intricacies of organizational buying behavior with point of departure in the Irish biotechnology, also utilizing multiple cases (i.e. also referring to Yin, 1994). Tidström and Åhman (2006) in like manner apply a case study (Yin, 1993) when investigating the underlying reasons for ending inter-organizational cooperation in the construction industry in the region of Ostrobothnia in Finland. Johnsen and Ford (2006) examine the interaction capabilities small suppliers develop when engaging in relationships with large customers applying a multiple case study strategy (Yin, 2003), i.e. suppliers of the UK textile industry where targeted selling their products both on the UK market and exporting to the USA, Europe and the Asian-Pacific region. Chan and Swatman (2000, p. 74), also used a case study approach (Yin, 1989) trying to create new knowledge about the process of e-commerce implementation within Australian organizations.

Perhaps more interestingly, none of the aforementioned authors elaborates or even mentions anything about case study designs, unit of analysis or discusses the nature of a case. All the studies could have applied the case study design typology and the integrative theoretical framework introduced in this paper. Accepting that is in essence the core contribution of this paper.

Conclusions

The purpose of this paper has been to provide a more varied understanding of the case study as a research approach. A substantial pattern of ambiguities across fields and authors was revealed. It was, moreover, argued that the source of ambiguity was an inappropriate mix of incommensurable paradigmatic axioms. The outcome of the study was a string of generic case study characteristics, an elaboration of ambiguity and consequences of the identified ambiguity, a modification of Yin's case study design typology, and finally an integrative theoretical framework that illustrates an alternative conception of the unit of analysis and the case. It is hoped that the contributions in this paper will facilitate a more consistent identification and demarcation of the unit of analysis and a more consistent qualitative data analysis when future case studies are undertaken.

Further problems

Based on this paper some questions evolve that need to be contemplated more carefully. The scope of the conceptual framework is quite broad regarding disciplines. This bears the risk of becoming mundane and raises the question about field specific adaptation. More specifically, can there be only one case research strategy or do we need several adaptations? The notation of case layers also raises some issues, namely how it is possible to determine the number of case layers and how it is possible to separate the layers from each other. More interestingly, to determine in which situations it is recommendable to operate with numerous case layers and in which situations it is not possible let alone desirable.

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Further reading

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Identification of ambiguity

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