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CASE-STUDIES FOR RESEARCH — STORY-TELLING OR SCIENTIFIC METHOD?

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Working Paper 06/95
November 1995

CASE STUDIES FOR RESEARCH – STORY-TELLING OR SCIENTIFIC METHOD?*

ABSTRACT

This paper argues that case study research is a scientific method. A review of the current literature identifies the strengths and weaknesses of case study research as a scientific method. The strength is the validity arising from the natural setting and therefore the potential fit between theory and reality. The weakness is the difficulty in demonstrating and evaluating validity and reliability of the analysis. The literature review also identifies appropriate criteria for evaluating validity and reliability, enabling a discussion of the implications and lessons for case study researchers.

The controversy about the method relates to its use for explanation and prediction or theory testing rather than generating or discovering theory. Supporters and opponents of case study method argue from explicit or implicit positions in the philosophy of science debate. Case study method is defined as part of the modern empiricism philosophy of science movement (requiring intersubjective certification) as opposed to the relativism movement (science is subjective).[1]

This paper accepts Hunt's (1991) argument that there is no single logic of scientific discovery, but that there is a unifying logic of justification of scientific research. This justification logic can be applied to explanatory case study research. The critical test is the plausible rival hypothesis. But the criteria for evaluating validity and reliability are derived from case study and not other methods, in particular experimental and quasi- experimental designs.

1. INTRODUCTION

The paradox of case study method is that the supposedly "softer" method is in fact much more difficult to do. Establishing the validity and reliability of the results derived from case studies is more contentious than other research designs, in particular experimental and quasi-experimental designs (Yin 1989). However, there is an identifiable method that does enable case studies to transcend anecdotal story-telling and be accepted as scientific research when applied to appropriate problems and contexts. This is not to say that good story telling is not part of good scientific research. But researchers need more that good stories; they need to establish the credibility of the research. Scientific methods provide the means of establishing credibility by evaluating the validity and reliability of the research results.

The fact that case study research is a distinct method does not negate the responsibility of the researcher to demonstrate the validity and reliability of research results. However the criteria for validity and reliability must be appropriate to the method. The purpose of this paper is to identify these criteria from a review of the current literature.

Case studies developed as a distinctive social science research tool in anthropology, sociology, political science and more recently in organisation behaviour, strategic management and marketing. Case studies are argued to be the most appropriate method for studying complex organisational phenomena in their natural setting. Hence the particular appeal of this method in strategic management

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* This paper was originally presented to the Strategic Management Educators' Conference, 7-8 April 1994, Australian Centre for Strategic Management, Queensland University of Technology, Brisbane, Australia.

[1] Based on the classification of the philosophies of science identified by Hunt (1990, Appendix A, Table 1, pp. 408-9).

research. Selznick's 1949 study of leadership, Allison's 1971 study of decision making and Pettigrew's 1973 study of decision making in a British retailer are commonly cited as "classic" case studies.

A major problem in the discussion of this type of research is the confusion surrounding terminology. Case studies, like surveys, are used as both a method (procedure of inquiry or research design) and a technique (instrument of research). The two need to be clearly distinguished. As a method case studies are distinct from experimental, survey designs and histories (Yin 1989). That is, there is a distinct design that is used to link data and logical analysis. But case study method may use various techniques or instruments. For example, surveys, focus groups, observation, archival records may be used to collect both qualitative and quantitative data.

Case study as a research method has been described as naturalistic (Yin 1989), post-positivist (Gove and Fisk 1992), direct (Mintzberg 1979), holistic[2] (Gummesson 1988), qualitative (Strauss and Corbin 1990) and ethnographic (van Maanen in Eisenhardt 1989) method. The objective of this type of research can be either discovery or justification, that is to generate or to test theory (Hunt 1991, p.21). The research is more often based on "grounded theory" (Glaser and Strauss 1967), that is induction from observation, in a natural setting.[3]

In contrast, experimental and quasi-experimental, including survey designs, (Stone 1978), described as positivist methods, are based on empirical hypothesis testing using statistical tests of significance.[4] The hypotheses being tested may have been deduced from theory or induced from observation. Case studies can be an instrument in such experimental and quasi-experimental designs. But in this case the design logic is experimental method for hypothesis testing.

The distinguishing characteristic of case study method is the focus on complex social phenomena, studied in their real life context with little or no control of the behavioural events (Yin 1989, p.13). This is both the strength and weakness of the method. In practice case studies have been used to generate theory and to test hypotheses, and have used both inductive and deductive methods to develop hypotheses.

Case study method tends to fall between a rock and a hard place when it comes to evaluating the validity and reliability of the analysis. Case studies are usually characterised by induction and rely on qualitative data collected and analysed in natural settings. Therefore the conventional tests of validity and reliability derived from empirical hypothesis testing are not applicable. However tests are necessary; otherwise, as Miles and Huberman (1984, p.22) argue, "we are left with interesting stories about what happened, of unknown truth and utility".

The controversy in the literature has centred on whether case study research is scientific or not, and how the results should be evaluated. There are two issues:

- the derivation of explanations – induction versus deduction; and
- empirical tests of the hypothesis – statistical versus logical.

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2 Action research or participant observation is a particular form where the researcher is involved in the processes under study (Gummesson 1988).

3 Judd, Smith and Kidder (1991, p.271) refer to three dimensions of "naturalness": natural behaviour, setting and events.

4 Naturalism and positivism in this sense seem to relate to methodology rather than the philosophy of science perspectives identified by Hunt.

Despite this controversy case method is being adopted for masters, doctoral and post doctoral research. Specialist texts providing prescriptive research designs for case studies (Yin 1984; 1989) and qualitative data analysis techniques (Miles and Huberman 1984; Strauss 1987) have obviously assisted the adoption of case study method. More recently research method texts have included case method, usually in the section on research in natural settings.[5]

The debate about case studies as a scientific method relates to the use of case studies to test theory, that is for explanation and prediction rather than description and exploration for discovery (Eisenhardt 1991; Gibb Dyer and Wilkins 1991). There are two issues for researchers. The first is whether case study method is appropriate for the research under consideration. (What is the purpose – to generate or test theory or both?) The second is the design and evaluation of the research to be conducted. (What are the appropriate tests of validity and reliability?) The research will still be judged on the basis of usefulness and validity (Judd, Smith and Kidder 1991).

The next section describes the case study method. This is followed by an evaluation using the criteria for scientific inquiry. Discussion of the threats to validity (construct, internal and external) and reliability illustrates the strengths and weaknesses of the method. Appropriate criteria for evaluating case studies are then identified. The final section discusses the implications for researchers designing and reporting research based on case study method.

2. WHAT IS A CASE STUDY?

A case (or site) is "a bounded context in which one is studying events, processes or outcomes" (Miles and Huberman 1984, p.28). A case cannot be separated from the context or the specified setting. The most comprehensive work on case study research and design methods is by Yin (1989). Yin examines methodological issues and the appropriate context for case studies using examples from a range of disciplines. Yin provides the following technical definition of case study:

> "an empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and context are not clearly evident: and in which multiple sources of evidence are used." (1984, p.23).

The first point to be clearly stated is that case studies are non-experimental designs. The method is not a one-shot post-test only experiment (Campbell and Stanley 1966). Although now accepted by Campbell (1975), this distinction is not always understood by critiques of the method (Yin 1989). Case studies are used to explain causal links in real-life interventions that are too complex for survey or experimental designs (Yin 1984, p.25). Therefore the criteria for evaluating experimental designs are not appropriate for case study designs.

Yin (1989) and Eisenhardt (1989) identify three types of case studies – descriptive, exploratory or explanatory It is the use for explanation that attracts the most criticism. Labels such as "anecdotal", journalism and story-telling are used pejoratively to dismiss explanatory case studies as unscientific. Explanatory case studies are used to generate and test theory using inductive logic. Yin's classification is not based on data collection techniques and measurement methods, but the purpose of the study. Gummesson (based on Glaser and Strauss 1967) distinguishes case studies which seek to generalise from a limited number of cases and case history which seeks to draw a specific conclusion from a single case.

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[5] See for example Judd, Smith and Kidder (1991).

There is no commonly agreed taxonomy of case study research designs as for experimental, quasi-experimental and survey designs. Mitchell (1983) discusses five designs identified by Eckstein:

(i) configurative ideographic studies that are primarily descriptive;

(ii) disciplined configurative studies tied to a particular theory;

(iii) heuristic cases deliberately chosen to develop theory;

(iv) plausibility probes developed to test established interpretive paradigms; and,

(v) crucial case studies similar to critical experiments in natural science.

Classifications such as these relate to the applications of the design rather than the method. The research design is the logic that links the conclusions from the data collected to the initial question(s) of the study (Yin 1984, p.46). Yin identified four research designs for case studies based on the number of cases and the unit of analysis.

The first distinction is between single and multiple cases. The rationale for a single case is that it represents a critical test of existing theory, a rare or unique event or a revelatory case to observe and analyse a new phenomenon. A major difficulty is selecting a critical, unique or revelatory case. Multiple cases are used for comparative research.

The second distinction made by Yin is between holistic and embedded cases. This reflects the extent to which the focus is on the global case or the sub-units. Yin contrasts a program (holistic) with the projects (sub-units) that comprise the program. However the distinction is not always clear. The problem with holistic designs is the lack of clear measures and data. The problem with embedded designs is that focusing on the sub-units may neglects the holistic aspects of the phenomena being studied. The result may be that the phemomena, for example organisational culture, becomes the context instead of the focus of the study.

Case studies may have loose, emergent structures for exploratory research or tight prestructured designs for explanatory research. The focus is on puzzle-solving from evidence. The designs are not distinguished by a particular type of evidence or particular mode of data collection. Indeed case studies are usually characterised by multiple data sources.

The primary sources of data (evidence) are interviews, observation, documentation, archival records and physical artifacts (Yin 1984). Interviews may be structured and unstructured. Observation may be direct, indirect or by a participant researcher. Data may be qualitative or quantitative or both. Surveys and histories may be used in the analysis. The issue is not the method of data collection but analysis (interpretation). The question is whether the methods of analysis are so subjective as to be unacceptable in science (Gummesson, 1988, p.105).

Analytical techniques for data analysis in case studies are problematic because of the predominance of qualitative data and the lack of tests of significance. This contrasts with the statistical inferences and tests of significance available for quantitative data. Yin (1989) outlines three techniques for analysing case studies – pattern-matching, explanation-building and time series analysis. Miles and Huberman (1984, Chapters IV and V) discuss twelve " tactics" for making valid inferences (drawing conclusions) from qualitative data which are applicable to case studies.

Yin argues that case study method is a separate research strategy with distinct research designs. A research design (1989, p.29 based on Philliber, Scwab and Samsloss) is defined as a "blueprint" that deals with four problems: what question to study; what data are relevant; what data to collect; and how

to analyse the results. Eisenhardt (1989, Table 1) describes the process of theory building from case study research.

The important point about research design is that it provides the criteria for interpreting the findings (Yin 1984, p.33) and therefore evaluation of the research outcomes. A good design facilitates the evaluation of the validity and reliability of research results. The most common arguments against case studies are that they cannot be used to test hypotheses, lack statistical validity and generalisations cannot be made from case studies (Gummesson 1988, p.77). The next section examines these criticisms. There are two issues. The first relates to methodology. What is the logic of scientific inquiry and does case study method satisfy this logic? The second relates to method, that is design and evaluation. How should the validity and reliability be evaluated?

3. CASE STUDY METHOD AND THE LOGIC OF SCIENTIFIC INQUIRY

Lack of control by the researcher and the predominance of qualitative data lead to the criticism that case studies do not qualify as scientific inquiry. The argument rests on false premises about the nature of scientific research and the distinction between method and techniques is critical. Different techniques do not make case study method unscientific. The methodology of science is its logic of justification, that is, the confirmation, validation and corroboration of knowledge (Hunt 1991, p.21).

The considerable debate on this issue in the 1980s centred around the positivism versus naturalism view of theory generation (for example: Lee 1985; Thomas and Tyman 1982; Campbell 1975; Yin 1984). Hunt (1991) distinguishes the discovery of scientific knowledge from its justification.[6] The debate about case study as a scientific method relates to justification rather than discovery. Discovery results in empirical generalisations (that is hypotheses, laws or theories) that can be justified. Scientific method relates to these justification procedures. Different methodologies have different procedures and tests.

Lee's (1985) contrast between positivist and naturalist views of science is common in discussions of case method. Positivism, adopting mathematics as the model for objective knowledge, insists that observation be the source of empirical meaning in all scientific theories. This view requires observations to be independent of theories and maintains the existence of general laws (unity of science thesis) applicable to all sciences (Lee 1985).

In contrast, naturalism argues that observations cannot be made independently of theory. The verification of meaning pertains to deductive not inductive logic, that is, begins from theory rather than empirical observation. The argument is that the values, ideology and professional culture of the scientific group influence scientific inquiry (Lee 1985). Naturalists point to chance discovery (serendipity) in scientific research to support the deductive approach i.e. discoveries by chance from unexpected data that exert pressure on the investigator for a new direction (Rosenthal and Rosnow 1975).

Hunt (1991, p.26) argues that there is no single method of scientific discovery, but that there is a unified scientific method that is the logic of justification. This applies to both positivism and naturalism when used to test theory. Theories should be testable, measures should be valid and reliable, and the data should not be fabricated or fraudulently collected (Hunt 1991, p.409).

Lee (1985) identified four criteria of logic that case studies must satisfy to be considered scientific. First, the explanation must rely on deductive inference (testing hypotheses or predictions that follow

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[6] Four procedures for generating (discovering) empirical generalisations, laws, theories are: dreams; eureka (serindipity); speculation (deduction); and observation (induction). See Figure 1.1, p.24.

from the explanation) not inductive inference (gathering supporting examples as a premise for generalising).[7] Second, while falsifiable, the explanations must survive attempts at falsification. Third, the explanations must be internally consistent. Fourth, the explanations must explain at least as much as rivals or predecessors. These criteria in Hunt's terms relate to theory testing (justification) rather than discovery (generating theory). Each of these are examined.

Deduction, Induction or Inference

The distinction between ideographic (unique, specific or single case) and nomothetic (general law making on the basis of comparative work) does not distinguish scientific and unscientific inquiry (Hofstede 1984). Theory testing of empirical generalisations not theory generation is the issue. The problem is case studies often do both simultaneously by nature of the method. Theory testing proceeds via reasoning based on inference. Mitchell (1983) distinguished statistical and logical or analytical inference. Logical inference, by analytic induction, leads to conclusions based on theoretical propositions. In contrast, statistical inference, by generalisation on the basis of statistical classes and probability theory, leads to conclusions about the characteristics of a population from a sample. These are clearly different methods, but the argument is that both are scientific.

Case study method is not appropriate for statistical inference, but it is suitable for logical inferences about complex social phenomena. The inferences about relationships are not based on the representativeness of the case, but on the plausibility of logic in the relationship (Mitchell 1983). The test of scientific method is a plausible rival hypothesis, not statistical significance. Therefore the argument that case studies are not appropriate for hypothesis testing (Stone 1978, p.137) is rejected.

Falsification

The second basis for arguing that case studies are unscientific is the lack of control of the research. The underlying premise is that causality can only be established by experimental design (Stone 1978). Campbell points out that "the core of the scientific method is not experimentation per se, but a plausible rival hypothesis" (foreword, Yin 1984). The research process is puzzle solving that may begin with evidence or a hypothesis. Campbell distinguishes two basic paradigms of the plausible rival hypothesis. The random assignment to treatments model relies on statistical models and tests to eliminate rival hypotheses as implausible. The experimental isolation model relies on control to eliminate rival hypotheses. The case study method, according to Campbell, is more similar to the experimental isolation paradigm.

Experimental designs divorce a phenomena from its context (Yin 1984, p.23) to allow manipulation of independent variables in order to observe the effect on dependent variables. Quasi-experimental designs enable the researcher to control the measurement group and the timing of the measurement. Case study designs are non-experimental in the sense that the researcher has no control of the measurement group or timing (Stone 1978). However, whilst the researcher has no control of the events or group subject to the treatment, a degree of control is exercised in the choice of the case. The question is control for what purpose? The purpose of control in a case study is not to impose a treatment and isolate causality, but to select an appropriate context to study interdependency.

Case study researchers argue that it is the only method that enables the study of complex phenomena in natural settings. Mintzberg (1979, p.584) argues that the appropriate test is not falsification but rather more or less useful theories; and that case studies are likely to provide more useful theories where the purpose is to study "dynamic systems in rich contexts". Case studies method has developed in response

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[7] This would seem to be consistent with Hunt's criteria for modern empiricsm as distinct from relativistic/constructionist philosophy of science (1990, Appendix A, Table 1, p.409).

to the desire to study complex social phenomena in the context of the natural setting (Yin 1984). Experimental and quasi-experimental designs cannot be used because of the complexity of the constructs, interdependencies between variables and the desire to study events as these occur.

Empirical testing in case study method is quite distinct from experimental and quasi-experimental design. The difficulty of the method is measurement procedures and linking data to propositions. Data analysis is not as precise as in experimental and quasi-experimental designs. Statistical tests have very limited application to qualitative data.

Internally Consistent Explanations

Case method has also been criticised because of the effect of the lack of control on the validity and reliability of the explanations derived from the case. Scientific research is evaluated on the basis of validity and reliability of the results. Construct and internal validity are the tests for internally consistent explanations. External validity and reliability are the tests for generalisation. Yin (1984, Table 2.1, p.36) discusses each of these and recommends tactics for case study research design.

Constructs are used to define or operationalise the intangible variables or phenomena being studied (Hofstede 1984). Construct validity is dependent on good theory and good measurement. This is problematic in case studies because of the complexity of the phenomena being studied and therefore the constructs to be operationalised and measured. This leads to the criticism that data collection is based on subjective judgements. However, case study designs have been developed precisely for the purpose of studying complex concepts because of the limitations of other methodologies. The natural setting and ability to focus on complex configurations is argued to increase construct validity. However the difficulty of operationalising and measuring the phenomena is a threat to construct validity.

Yin (1989) recommends three tactics to increase construct validity - using multiple sources of evidence, establishing a chain of evidence and having key informants review draft reports. Yin argues that arraying events in chronological order permits the researcher to determine causality because the sequence of cause and effect cannot be inverted. But the fact that one event precedes another is a necessary but not sufficient condition for causality.[8] The relationship may be determined by another unobserved cause or be spurious. The explanations produced from case studies rely on strong association and compelling evidence rather than cause and effect (Rosenthal and Rosnow 1975).[9]

Validation through feedback from individuals involved in the processes or events under study is not precise as it is difficult to separate facts from interpretations with qualitative data (Miles 1979). Case study researchers argue the appropriate test is whether additional evidence corroborates not contradicts the explanations (Yin 1984, p.81).

The tactic often recommended for construct validity is triangulation (Jick 1979; Miles and Huberman 1984; Gove and Fisk 1992) which refers to the gathering of additional information to cross check validity. The objective is to make the process as explicit as possible to allow the validity of the explanations to be evaluated by other researchers.

Internal validity is essential for explanatory or causal inferences to be made from case studies. Case studies rely on inferences about events that cannot be directly observed. These are not valid if there are

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[8] There are four conditions: temporal sequentiality; associative variance; non-spurious association; and theoretical support.

[9] Associative variance is determined by analytical rather than statistical inference for case study methodology.

rival explanations or if the observed relationships are spurious. The aim is "to produce compelling analytical conclusions and rule out alternative interpretations" (Yin 1984, p.100). Hypothesis testing is used to demonstrate internal validity of deductive research methods. The tactics and tests for internal validity are analytical for case study research. Pattern matching, explanation building and time series are three tactics suggested by Yin.

The threats to construct and internal validity are the lack of conformity in techniques for data collection and analysis as a result of the reliance on qualitative data. Miles and Huberman (1984) suggest twelve specific tactics for verifying conclusions from qualitative data, including triangulation and looking for negative evidence. Strauss and Corbin (1990) discuss open, axial and selective coding and the use of inductive and deductive thinking to check hypotheses about possible relationships.

Data selection is also problematic in case studies and the broader the boundaries the greater the problem. Where does the researcher start? Case study research designs are less specific in terms of what evidence to gather. The requirements are dictated by the particular study. This flexibility, necessary in research of complex phenomena, is both a strength and a weakness of the method.

Case studies enable the researcher to deal with the full variety of evidence rather than restricting observations to particular operational measures (Yin 1989). The "ceteris paribus" assumptions of experimental designs can be relaxed (O'Connell in Thomas and Tymon 1982, p.349). The advantage is greater understanding of the problem. The disadvantage is difficulty in establishing validity.

Another threat to validity is the possibility of the data collection interfering with the setting of the case study: for example, where more than one field worker is utilised to collect and code qualitative data. Field workers are interpreting the data during collection and variations in interpretations may threaten validity (Miles 1979).

Explaining At Least As Much As Rivals

External validity determines the generalisation of the findings beyond the immediate case. As for internal validity, this is a requirement for explanatory rather than exploratory or descriptive research. The criticism that case study results cannot be generalised because the study represents a single observation assumes that a case study is a sample and that statistical inference is the object. Case studies rely on analytical generalisation from a particular result to a broader theory. The test of scientific method is empirical generalisation, which may be statistical or analytical. Statistical generalisation is easier to demonstrate, but is limited to random sampling.

Jick(1979) argues that between-methods triangulation provides a test of external validity. The case study then becomes part of a larger research strategy. Researchers have argued that increasing the scope of the study (the number of cases or sites) may increase the external validity (Miles and Huberman 1984; Yin 1989; Campbell 1975; Eisenhardt 1989). However the problem of testing the validity of the original cases remains. Yin (1989, p.38) argues that cases are not sampling units chosen for representativeness. The appropriate analogy is chosing the topic of an experiment rather than the groups.

Reliability is necessary for scientific inquiry to minimise the biases and errors in the study. Gummesson (1988, p.81) identifies three functions of reliability: the "police function" to curb dishonest researchers; the "intelligence test" for logical reasoning; and the "validity crutch" which uses reliability to impute validity. But the test for case study designs is whether another researcher would arrive at the same conclusions by doing the same case again, not replication by doing another case (Yin 1989).

The problem with replication as a reliability test is objective analysis. Researchers are not objective in the sense of being free of value judgements, but are "guided by the value systems, ideology, conventions and styles of explanation current in the particular discipline" (Lee 1985, p.322). Whilst other methodologies may also be influenced by value judgements of the researcher (Yin 1989), the inability to replicate the study (as opposed to the analysis) makes it more difficult to test the reliability of case studies.

Case studies are argued to be unreliable because of the non-systematic collection, condensation and interpretation of the data (Stone 1978). This criticism results from poorly documented procedures in past case studies. A case study protocol (Yin 1989; Eisenhardt 1989) enables reliability to be established. The study must be documented so that the procedures and evidence can be evaluated. A further criticism of case method is that the research takes too long and results in massive, unreadable documents. These are criticisms of the methods of data collection and reporting rather than the methodology (Yin 1989). However, the criticism recognises the difficulty of conducting "exemplary" case studies.

4. WHEN IS CASE METHOD APPROPRIATE?

Case studies recognise the interaction of theory and data in elaboration of theory or understanding of a complex phenomenon (Rosenthal and Rosnow 1975). The choice of method depends on the research question, the control over behavioural events and the focus on contemporary versus historical events (Yin 1989). Case studies have a distinct advantage in explaining contemporary events over which the researcher has little or no control. The focus of the research is on complex social phenomena within some real life context.

The idiographic orientation of case studies enables the study of complex configurations of forces in some applied context. This contrasts with a nomothetic orientation of research that abstracts from reality to establish universal laws based on causal inferences. Miles and Huberman (1984, p.20) argue that the idiographic/nomothetic distinction is an arbitrary conceptual line. Clearly the strength of the method is in applications where the phenomenon of interest cannot be separated from the environment.

Miles (1979) argued that case studies can be used to generate theory, test hypotheses and evaluate programs (for example, applied research in public policy). Applications identified by Yin (1989) include describing real life contexts in which interventions occur, explaining causal links in these interventions that are too complex for survey or experimental methods and exploring interventions that have no clear, single set of outcomes.

5. HOW SHOULD CASE STUDIES BE EVALUATED?

The argument above is that case study is a scientific method. Therefore the validity and reliability of research results using the case study method should be evaluated. However, the tests must be appropriate to the method. Yin (1984, pp.140-145) identifies the criteria for an "exemplary" case study. The case must be significant, complete, consider alternative perspectives, display sufficient evidence and be interesting to read! Completeness, considering alternative perspectives and displaying sufficient evidence mean satisfying validity and reliability tests.

Eisenhardt (1989, p.548) recommends three questions for evaluating theory-building (explanatory) case study research:

(i) Is the theory developed "good theory"? Is it parsimonious, testable and logically coherent? (That is, does it satisfy the conditions of causality?)

(ii) Does the evidence support the theory? (Are the results valid and reliable?)

(iii) Does it reveal new insights? Is it important or trivial? (Is it useful?).

Gove and Fisk (1992) identify five criteria for evaluating the "trustworthiness of naturalistic research results":

(i) Credibility rather than criterion validity: are the representations of the constructs believable?

(ii) Transferability rather than external validity: can the observations be applied to other similar contexts?

(iii) Dependability rather than reliability: are the research findings reasonably stable?

(iv) Confirmability or objectivity: are the researcher's conclusions reasonable given the data collected?

(v) Integrity, which applies particularly to observation data collection methods: are the data devoid of lies, misinformation or misrepresentation by the participants?

The complexity and relevance of case study methodology to contemporary social science demands that researchers be accountable for their results. Whilst the tests of validity and reliability are different from those for other research methods the process of scientific research design is not. Good case study design is good scientific research. However the design is very different from experimentation.

6. LESSONS FOR CASE STUDY RESEARCHERS – GOOD TECHNIQUE IS A NECESSARY BUT NOT SUFFICIENT CONDITION

Creative insight and serendipity may lead to discovery but do not validate social science theory. Testing empirical generalisations requires logic, analysis and reasoning. Case study research design provides the method for testing empirical generalisations derived from research in natural settings. Given that the argument is now more about the evaluation of explanatory case study method, researchers should be proactive in developing appropriate criteria.

Miles and Huberman's recommendation (1984, p.19) is that case study researchers clearly identify their stance. The question is really which philosophy of science methodology should guide the evaluation of the research. Miles and Huberman distinguish logical positivism, symbolic interactionism and social phenomenology, but go on to classify qualitative research as "soft-nosed logical positivism"! Hunt's (1991, pp.408-9) distinction between positivist/empiricist (science is objective), modern empiricism (science is more objective than subjective) and relativism/constructionism (science is subjective) seems less ambiguous. The important point is the implications of the stance for evaluation.

The argument here is that explanatory case study method is part of modern empiricism and therefore theories should be testable (rather than falsifiable), measures should be valid and reliable and data should not be fabricated. But the tests applied to experimental and quasi-experimental designs are not appropriate.

The requirement for any scientific researcher to establish the credibility of a study is not in question. Therefore the appropriateness of the research design for the purpose should be established and protocol should be clearly identified. What is the case study being used for? – description (case history), exploration (induction of grounded theory to be tested) or explanation (testing inductive theory and generalisation)? The research protocol needs to provide clear documentation not only of the sources of evidence, but also of the processes of data collection and analysis. Action research, which combines the roles of researcher (Gummesson 1988) and consultant, particularly demands this type of accountability.

Finally, the case study researcher should provide an evaluation of the strengths and weaknesses of the study. The criteria proposed by Eisenhardt and Gove and Fisk and the tactics recommended by Yin, Miles and Huberman and Strauss and Corbin would all assist the evaluation of the validity and reliability of the results. This is necessary to establish the credibility of the case study.

In answer to the question posed at the beginning, compelling case studies transcend art and social science by telling a good story based on good technique!

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