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## INTEGRATING CASE STUDY AND SURVEY RESEARCH METHODS: AN EXAMPLE IN INFORMATION SYSTEMS

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**Abstract:** The case for combining research methods generally, and more specifically that for combining qualitative and quantitative methods, is strong. Yet, research designs that extensively integrate both fieldwork (e.g. case studies) and survey research are rare. Moreover, some journals tend tacitly to specialize by methodology thereby encouraging purity of method. The multi-method model of research while not new, has not been appreciated. In this respect it is useful to articulate and describe its usage through example. By reference to a recently completed study of IS consultant engagement success factors this paper presents an analysis of the benefits of integrating case study and survey research methods. The emphasis is on the qualitative case study method and how it can compliment more quantitative survey research. Benefits are demonstrated through specific examples from the reference study.

### INTRODUCTION

The value of combining research methods in IS research has received significant recent attention. As part of a larger effort to review the state of IS as a field of study, and in an attempt to identify and clarify the role of different research methodologies in the field of IS, a series of colloquia titled, "The Information Systems Research Challenge" (ISRC) was held on qualitative [Cash and Lawrence, 1989], survey [Kraemer, 1991] and experimental [Benbasat, 1989] research methods. One of the four broad issues Kraemer identified from the papers and case studies presented at the survey colloquium was that survey research while very useful, is greatly improved when used in conjunction with other qualitative research methods.

Nonetheless, examples of the multi-method are few. At a 1990, IFIP WG8.2 working conference on the theme of alternative research methods [Nissen et al, 1991a], Smithson observed that "Despite considerable concern over the methodological shortcomings of IS research and the attraction of combining different approaches, the topic is relatively rarely discussed in the IS literature. It would seem that researchers seldom combine approaches or, if they do, the implications are not highlighted in their reports" [1991:368]. Smithson suggests three possible reasons why this is the case: (1) doubts that exist over the legitimacy or feasibility of combining positivist and interpretive approaches; (2) vulnerability stemming from the close correspondence between many researchers' value systems and their single methodology paradigm; and (3) practical concerns over possible contradictory results from multiple methods. Smithson [1991] goes on to maintain that there "remains a need for research discussion within the information systems community, on issues such as: 'Which approaches can be combined usefully?', 'Under what circumstances?', 'When (in the research cycle)?' and 'How?'.

Through reference to a recently completed study of IS consultant engagement success factors, this paper presents an analysis of the integration of case study and survey research methods within a single research design. Data and findings from the reference study have been previously reported in Gable (1990a; 1990b; 1991), Gable and Raman (1992) and Gable & Sharp (1992). The paper assumes that the subject of interest is amenable to the survey approach, thereby precluding entirely exploratory studies (Glassner and Strauss, 1967; Eisenhardt, 1989). [The case study method can be employed for a variety of purposes including: description, exploration, prescription, theory building, Benefits that derive from combining survey research with case studies, are demonstrated through specific examples from the reference study.

The paper proceeds as follows. First, literature on the relative strengths and weaknesses and potential synergies between the case study and survey methods is reviewed. Second, the reference study design and context are described. Third, a model depicting the interfaces between the case study and survey methods, as employed in the reference study, is presented. Fourth, benefits of case study findings from the reference study for subsequent model building and triangulation of results are identified. Lastly, the paper is summarized and several conclusions are drawn.

### THE LITERATURE

Much has been said on the relative merits of qualitative (e.g. case study) versus quantitative (e.g. survey) research methods [Glassner and Moreno, 1989; Merton and Coleman, 1979; Neuman, 1991; Ragin, 1987; Van Maanen, 1983a, 1983b, 1983c; Cook and Reichardt, 1979; Light and Pillemer, 1982; Miles, 1979; Downey and Ireland, 1983]. The discussion has received significant attention in the IS literature as well [Mumford et al, 1985; Goldstein et al, 1986; Cash and Lawrence, 1989; McFarlan, 1984; Benbasat, 1984; Kaplan and Duchon, 1988; Benbasat et al, 1987; Boland

and Hirschheim, 1987; Franz and Robey, 1987; Nissen et al, 1991b; Mumford, 1991; Galliers, 1991; Lee, 1991; Visala, 1991; Orlikowski and Baroudi, 1991; Kraemer and Dutton, 1991].

Lee [1991] makes a cogent distinction between the interpretive (ostensibly qualitative) and positivist (ostensibly quantitative) approaches to research. The interpretive approach requires that "the social scientist must collect facts and data describing not only the purely objective, publicly observable aspects of human behavior, but also the subjective meaning this behavior has for the human subjects themselves" [Lee, 1991:347]. Lee [1991:350] observes that "The positivist approach makes the claim that its methods--the methods of natural science--are the only truly scientific ones, while the interpretive approach makes the counterclaim that the study of people and their institutions calls for methods that are altogether foreign to those of natural science. Thus, the positivist and interpretive approaches would appear to be in opposition."

### The Case Study Method: Strengths And Weaknesses

The case study [Benbasat, Goldstein and Mead, 1987; Lee, 1989; Mumford et al, 1985; Smith, 1990] and survey [Bailey and Pearson, 1983; Baroudi, Olson and Ives, 1986; Robey and Farrow, 1982] methods have seen extensive application in Information Systems (IS). The case study approach refers to a group of methods which emphasize qualitative analysis [Yin, 1984]. Data are collected from a small number of organizations through methods such as participant-observation, in-depth interviews, and longitudinal studies. The case study approach seeks to understand the problem being investigated. It provides the opportunity to ask penetrating questions and to capture the richness of organizational behavior, but the conclusions drawn may be specific to the particular organizations studied and may not be generalizable.

Fervent critics of qualitative methods are many, and hail largely from the physical sciences. More objective criticism has come from the social sciences. Kerlinger [1986:348] identifies three major weaknesses of qualitative research: (1) the inability to manipulate independent variables, (2) the risk of improper interpretation, and (3) the lack of power to randomize. Lee [1989] identifies four corresponding problems with case study research - a lack of: Controllability, Deductibility, Repeatability and Generalizability, where the latter two limitations stem largely from the aforementioned lack of power to randomize. While Lee goes on to defend the case study method suggesting that these problems are not endemic nor insurmountable, they nonetheless remain relative to other research methods.

Advocates of qualitative methods have in recent years become more vociferous. Benbasat et al [1987:370] identify three strengths of case study research in information systems: (1) the researcher can study information systems in a natural setting, learn about the state of the art, and generate theories from practice; (2) the method allows the researcher to understand the nature and complexity of the process taking place; and (3) valuable insights can be gained into new topics emerging in the rapidly changing information systems field. Yin [1984] suggests that case studies are appropriate where the objective is to study contemporary events, and where it is not necessary to control behavioral events or variables. Yin further suggests single case studies are appropriate if the objective of the research is to explore a previously un-researched subject, whereas multiple-case designs are desirable when the intent of the research is description, theory building, or theory testing. Benbasat et al [1987] suggest that multiple-case designs allow for cross-case analysis and the extension of theory. Van Maanen [1983b:10] states, "... no matter what the topic of study, qualitative researchers, in contrast to their quantitative colleagues, claim forcefully to know relatively little about what a given piece of observed behavior means until they have developed a description of the context in which the behavior takes place and have attempted to see the behavior from the position of its originator. That such contextual understanding and empathetic objectives are unlikely to be achieved without direct, firsthand, more or less intimate knowledge of a research setting, is a most practical assumption that underlies and guides most qualitative research."

### The Survey Method: Strengths And Weaknesses

The survey approach refers to a group of methods which emphasize quantitative analysis, where data for a large number of organizations are collected through methods such as mail questionnaires, telephone interviews, or from published statistics, and these data are analyzed using statistical techniques. By studying a representative sample of organizations, the survey approach seeks to discover relationships that are common across organizations and hence to provide generalizable statements about the object of study. However, often the survey approach provides only a "snapshot" of the situation at a certain point in time, yielding little information on the underlying meaning of the data. Moreover, some variables of interest to a researcher may not be measurable by this method (e.g. cross-sectional studies offer weak evidence of cause and effect).

While fieldwork and related methods can provide important insights and discoveries during IS research, fieldwork is a poor method for objectively verifying hypotheses. Attewell and Rule suggest that "Traditional survey work is strong in ... areas where field methods are weak" [1991:313]. Surveys can accurately document the norm, identify extreme outcomes, and delineate associations between variables in a sample. Vidich and Shapiro highlight the relatively superior 'deductibility' of the survey method over field methods [1955:31]. They observe that "Without the survey data, the observer could only make reasonable guesses about his area of ignorance in the effort to reduce bias." Jick [1983:138] suggests that survey research may also contribute to greater confidence in the generalizability of the results.

Yet, for a survey to succeed in elucidating causal relationships or even in providing descriptive statistics, it must contain all the right questions asked in the right way. Kaplan and Duchon suggest that "The stripping of context [e.g. reduced 'representability' or model complexity through the use of a closed survey instrument] buys 'objectivity' and testability at the cost of a deeper understanding of what actually is occurring" [1988:572]. Survey research is inflexible to discoveries (relatively poorer 'discoverability') made during data collection. Once the work is underway, there is little one can do upon realizing that some crucial item was omitted from the questionnaire, or upon discovering that a question is ambiguous or is being misunderstood by respondents. Essentially, the researcher should have a very good idea of the answer before starting a survey. Thus, traditional survey research usually serves as a methodology of verification rather than discovery. Ackoff [cited by Locke, 1989] expresses the much stronger view that "Strict adherence to quantitative methods and highly simplified experimentation and the complete neglect of qualitative issues, context and situational complexity, smacks of 'mathematical masturbation' without substantial knowledge of organizations, institutions, or their management" (Russel Ackoff's phrase for operational research in the 1970s).

Table 1 summarizes the 'relative' strengths of the case study and survey methods along the several dimensions discussed. From the discussion and Table 1 it is observed that many of the strengths of one method compensate for weaknesses in the other.

<b>TABLE 1 – Relative Strengths of Case Study and Survey Methods</b>		
	Case Study	Survey
Controllability	Low	Medium
Deductability	Low	Medium
Repeatability	Low	Medium
Generalisability	Low	High
Discoverability (explorability)	High	Medium
Representability (potential model complexity)	High	Medium

### On the Mutual Exclusivity of Case Studies and Surveys

Attewell and Rule highlight the "complementarity between survey and fieldwork approaches to studying information technology", stating that "each is incomplete without the other" [1991:314]. Danziger and Kraemer [1991:367] point out that survey research and fieldwork have always been alternative rather than competing sources of evidence and ideas, and Kling [1991:346], Gutek [1991a:322] and Bikson [1991:323] suggest that it is always best to utilize several methods of data collection to adequately address the impacts of information technology. In business research, any given objective may require multiple research approaches, often in sequence. For example, Frank [1983] describes an extensive approach for repositioning an existing brand of consumer package good, which has five stages: (1) qualitative (focus groups, in-depth interviews); (2) positioning study of the market; (3) study of the potential for alternative positionings; (4) in-home use tests; and (5) advertising testing.

Attewell and Rule suggest that "conventional survey methods, such as mail questionnaires and telephone interviews, are inappropriate for many of the issues we need to address [in IS research], and that a multi-method approach is more effective" [1991:299]. Bikson [1991:327] suggests that this view is desirable in most areas of social research; especially in a newly emerging sub-field such as the study of IS in organizations. He points out that the IS research he has been involved in, whether in cross-sectional or case study designs, has relied on a mix of information gathering approaches including structured interviews, self-administered questionnaires, archival material, and observation. Kaplan and Duchon suggest that "no one approach to information systems research can provide the richness that information systems as a discipline, needs for further advancement" [1988:571].

In concluding their contribution to the ISRC survey colloquium, Danziger and Kraemer [1991:367] state that, "Our attempts to analyse and interpret the extensive URBIS database have underscored the value of multiple operationism in developing grounded theory about information technology impacts. The survey research data on the one hand, and our

field interviews and observations on the other hand, have constantly been alternative rather than competing sources of evidence and ideas. Similarly, continuing interaction amongst the URBIS colleagues, each offering somewhat different field experiences and interpretations, has slowed but enriched our individual understandings. To the extent that it is feasible, those undertaking research on information technology impacts should address common questions and hypotheses with multiple modes of data and multiple methods."

Wynekoop [1992] suggests that quantitative 'micro-level' analyses should be integrated with qualitative 'macro-level' analyses, in order that the ways in which individual behavior impacts organizational phenomenon, and the ways in which macro phenomenon have effects through individuals, be explicated.

Visala [1991] proposes a conceptual framework to help overcome the gap between positivist and interpretive research approaches. He cross-references epistemological approaches (causal models, teleological explanations, hermeneutics, dynamic structure models, formal methods, phenomenology) with classes of variables of interest in IS research (adapted from the Information Systems research framework proposed by Ives, Hamilton and Davis [1980]). Visala does not go so far as to examine how specific research methods (e.g. case study and survey) ought to be operationalized in combination.

Jick [1983] observes there is a distinct tradition in the literature on social science research methods that advocates the use of multiple methods. This form of research strategy is usually described as one of convergent methodology, multi-method/multi-trait [Campbell and Fiske, 1959], convergent validation, or what has been called 'triangulation' [Webb et al, 1966]. These various notions share the conception that qualitative and quantitative methods should be viewed as compliments rather than as competitors. Jick underscores the desirability of mixing methods given the strengths and weaknesses found in single method designs (see Table 1). Through the use of multiple methods the robustness of results can be increased; findings can be strengthened through the cross-validation achieved when different kinds and sources of data converge and are found to be congruent or when explanation is developed to account for divergence [Kaplan and Duchon, 1988:575].

Klein et al [1991] make a very useful distinction between five fundamental attitudes when confronted with diverging lines of research rooted in different conceptions of the nature of science: supremacy, contingency, pluralism, eclecticism, and dialectics. Supremacists believe in the universality of 'a' research approach and epistemology. Advocates of contingency in research methods maintain that the choice of method should be a function of the focus or object of the research and the relative strengths and weaknesses of a limited number of accepted and competing research methods. Pluralists believe that different approaches can be brought to bear on the same problem domain and that there exists no single universally valid way to delineate objects of study or to match the strengths and weaknesses of different research approaches with contingent features of the object of study. Eclecticists, like pluralists perceive a diversity of methods, but like advocates of contingency, feel the matching of method to problem should be based on contingencies of the situation or problem being studied. "Dialectics" hold that methods must compete for dominance and that through passionate competition a superior synthesis evolves, which then goes on to compete at a higher level of discourse with a newly emerging opponent.

The author joins with Klein et al [1991] in a call for tolerance of methodological pluralism and recognition of method and personal bias. It is also agreed, that given human limitations, individuals must specialize in a limited number of methods. As observed by Orlikowski and Baroudi [1991], three methods have tended historically to dominate IS research: survey, laboratory experimentation, and case study. The majority of IS researchers are well versed in one or more of these three methods. Given the aforementioned potential benefits of combining research methods within a single research design, it therefore makes sense to leverage this talent by proposing approaches to combining these three methods. This paper proposes one such combination; that of case studies with surveys. The author, in the pluralist stance, recognizes the value of alternative methods (e.g. protocol analysis, hermeneutics, ethnography, futures research, simulation, subjective/argumentative), and proposes further attention to other combinations of not only survey, experimentation and case studies, but also other less well appreciated methods.

Thus, the case for combining methods generally, and more specifically that for combining qualitative and quantitative methods, is strong. Nonetheless, as observed by Diesling [1971:5], research designs that extensively integrate both fieldwork (e.g. case studies) and survey research are rare. Moreover, some journals tend tacitly to specialize by methodology, thereby encouraging purity of method. Also, it is probable that the multi-method approach is embedded in many doctoral theses that, when packaged into articles tend to highlight only the quantitative methods.

The multi-method model is not new. However, this model of research and its advantages have not been appreciated. In this respect it is useful to articulate and describe its usage through example.

## THE REFERENCE STUDY

In order to further explore the ways in which case studies can compliment and be integrated with the survey method, a recently conducted study involving such an integrated design was analyzed. The reference study design includes: (1) a single pilot case study and (2) a multiple case study of five firms, followed by (3) model specification and (4) a survey.

By definition, a research design is the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure [Selltiz, Wrightsman & Cook, 1976]. It is a blueprint for the collection, measurement and analysis of data [Phillips, 1971]. Research designs can be differentiated along a variety of dimensions. Table 2 lists several of the major dimensions [Emory, 1980].

**TABLE 2 – Dimensions of Research Designs**

Exploratory	vs	Explanatory
Case	vs	Statistical
Field	vs	Laboratory vs Simulation
Cross-sectional	vs	Longitudinal
Observational	vs	Survey
Experimental	vs	Ex post facto
Descriptive	vs	Causal

## The Case Study Design

The case study design includes a single, exploratory, in-depth pilot case study followed by a more explanatory, cross-case analysis of five firms. Problems and issues identified in the exploratory pilot case study point to important variables for further investigation. The subsequent multiple case study, though yet exploratory, has the objective of testing a tentative pattern of important variables identified from the pilot case and the literature. Using the classifications of Table 2, it can be stated that the Explanatory survey was preceded by an Exploratory, Longitudinal, Observational single Pilot Case Study, and an Exploratory/Explanatory, Longitudinal, Observational multiple case study of five firms. Table 3 indicates the number of cases, unit of analysis, major objectives, dependent variable, and primary method of analysis for the pilot case study and the subsequent multiple case study.

**TABLE 3 – Characteristics of the Pilot and Multiple Case Studies**

	Pilot	Multiple
Number of cases	One	Five
Unit of analysis	Consultant engagement process	Consultant Engagement Process
Study Objectives	Exploration/Description	Exploration/Description/Explanation
Dependent Variable	N/a	Engagement Success
Main Method of Analysis	Description	Pattern Analysis

Case studies differ fundamentally from surveys (and from laboratory experiments, field experiments and field studies) in that the researcher generally has less presumptive knowledge of what the variables of interest will be and how they will be measured. Though the primary unit of analysis of the reference study was identified in advance of the pilot case (the consultant engagement process), the pilot case study, being exploratory and descriptive, did not specify an a priori dependent variable. The multiple case study, on the other hand, had the objective of explaining as far as possible, the relationships between key variables studied. The dependent variable in the multiple case study was "consultant engagement success" and the independent variables of interest were those factors identified from the pilot case study and the literature, which are posited to have a major influence on the level of engagement success clients experience (for a detailed discussion on validated measures of consultant engagement success, see [Gable, 1990a]). Pattern Analysis, the method of analysis indicated for the multiple case study (Table 3), involved identifying a pattern of variables from the literature and the pilot case, and then assessing patterns observed in each of the five cases against that predicted pattern.

## The Survey Design

In the terminology of Table 2, the survey conducted can be described as an Explanatory, Statistical, Cross-sectional, Ex Post Facto, Field Survey of 147 Client companies, the primary intent of which was to test the existence of statistical associations between various factors and the level of consultant engagement success. Descriptive findings were docu-

mented throughout the study. The research can be considered Experimental (a field experiment) to the extent that confounding variables are identified and controlled. A control group of 15 cases was surveyed Longitudinally in order to test for Causality.

## The Research Context

Firms studied are registered clients of the Local Enterprise Computerization Program (LECP). The LECP is a Singapore Government Program to encourage and assist local businesses to become more competitive through the adoption of information technology [Gable and Raman, 1992a]. All LECP projects involve two main players: (1) the client project manager, and (2) the client's chosen consultant. An LECP advisor may also be assigned to the project. The author acted as LECP advisor to the case firms studied.

The consultant's role is to conduct feasibility and system studies, to develop system specifications, to evaluate and select a software house, and (optionally) to supervise implementation of the client's chosen computer based information system (CBIS). The definition of a consultant is implicit in the LECP minimum registration criteria. Approximately half the LECP projects surveyed were handled by "Big 6" consulting firms (the world's largest six audit/consulting firms). All of the case firms studied engaged "Big 6" firms.

A main reason for choosing to study LECP clients, was the existence for this group, of a large number of Natural Controls [Lee, 1989], thus lending greater weight to the variables studied both in the case studies and the survey. By minimizing extraneous factors, one has a higher degree of confidence in the associations identified.

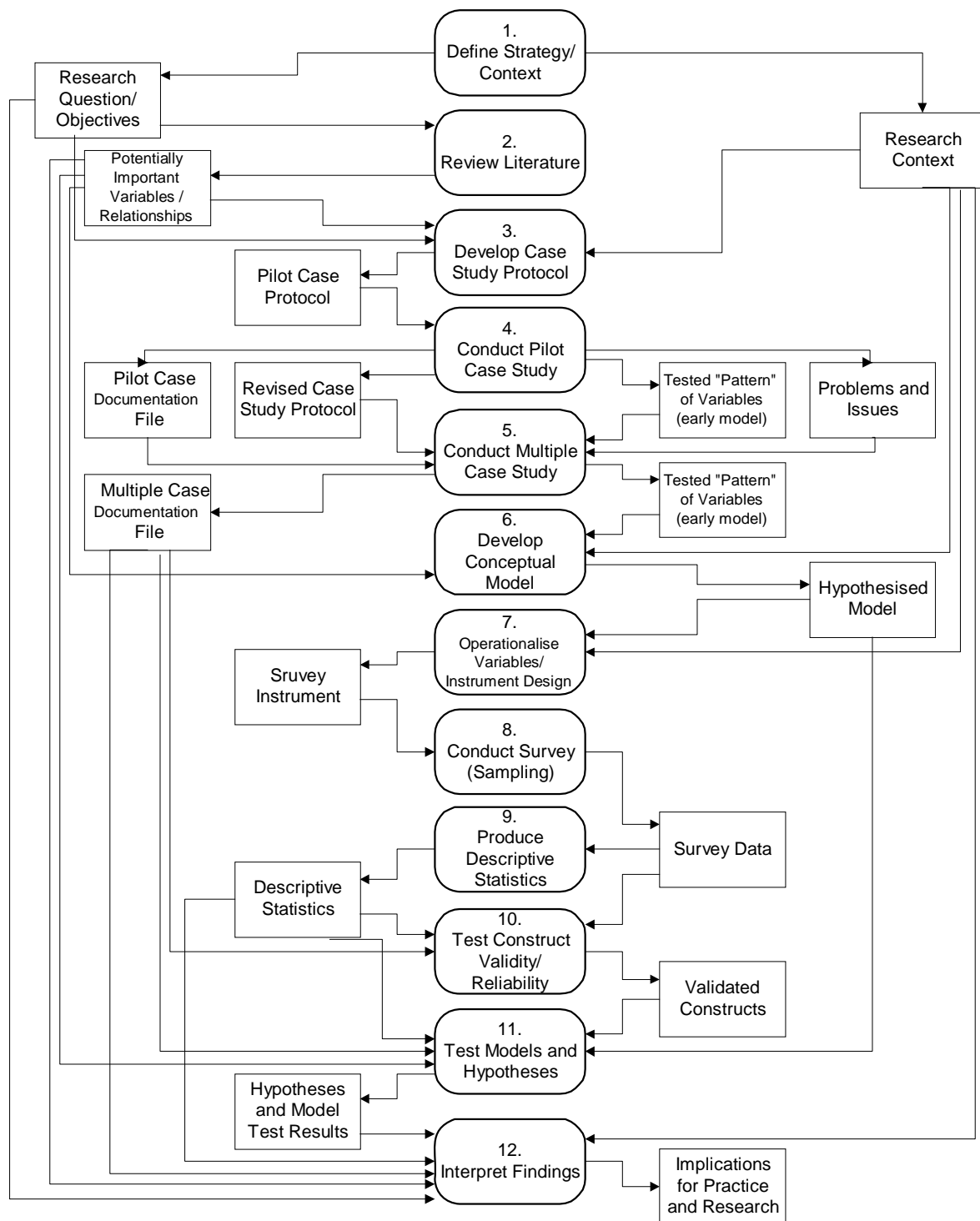
Figure 1 is a flow diagram of the overall reference study methodology. In the diagram, round-cornered black boxes represent processes or stages of the research study. The three stages of the case study phase are highlighted. Information flows are represented by grey squares. The main objective of the diagram is to depict inputs and outputs of the case study stages in order to better understand how the case studies are integrated with the subsequent survey.

From Figure 1 it is observed that the three main inputs to the case studies are: (1) the research context, (2) the research questions and objectives, and (3) potentially important variables and relationships identified from past research. Several outputs generated in the case study phase are used primarily within that phase to generate other outputs. These include: (1) the pilot case protocol, (2) the revised case study protocol (revised on the basis of findings of the pilot case study, for use in the multiple case study), (3) the pilot case study documentation file, and (4) a tentative pattern of variables for further study in the multiple case study.

The two main outputs of the case study phase are: (1) a tested pattern of variables, and (2) the multiple case study documentation file. The primary purpose of the tested pattern of variables is to serve as the main input to development of the conceptual model to be tested in the survey (Stage 6). The main purpose of the multiple case study documentation file is to supply rich detailed background on the cases, to aid in interpretation (Stage 12) of results from statistical analysis of the survey data (hypothesis and model testing - Stage 11) and to serve as a further test of validity/reliability (Stage 10) through comparison of survey results with case study findings (triangulation). Other stages in which the case studies can also be useful include: Stage 7 - pilot testing of the survey instruments on case study firms; and Stage 11 - ex post identification of alternative models.

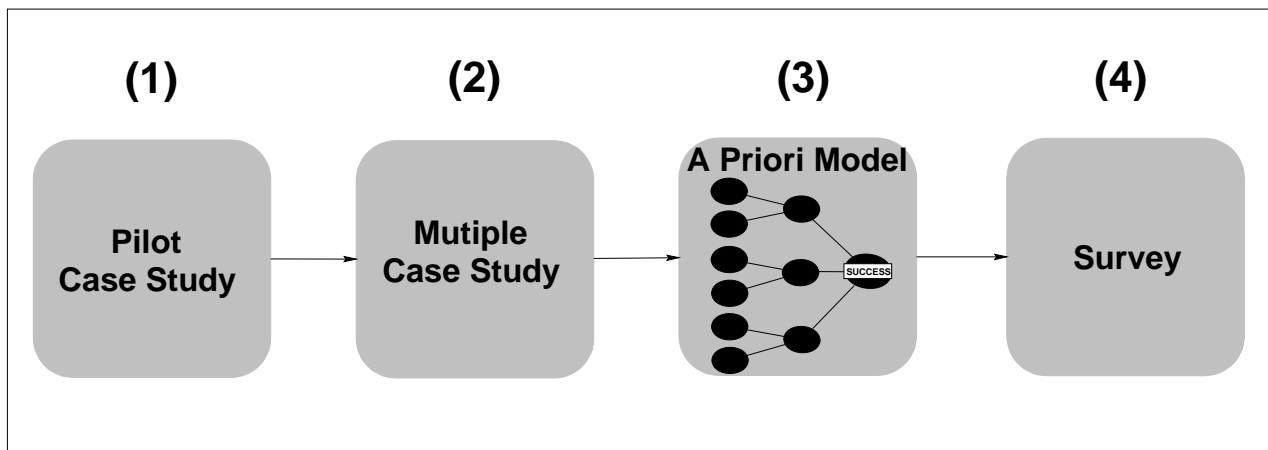
The main disadvantage of conducting the case studies after the survey rather than before as depicted, is that they do not contribute to the model building exercise. Attewell and Rule [1991:314] suggest that it makes sense to do fieldwork first. "Getting close to the phenomenon - gathering insights or discoveries about causal links, motivations, reasons why things happened - should precede verification by more objective techniques, such as surveys. Clearly it is not necessary to carry out fieldwork across an entire sample of firms, but one should study firms across a spectrum - the center and extremes; the least and most successful as well as some typical firms, before launching a survey; indeed before deciding on instruments and questionnaires."

### Appendix A: Integrating Case Study and Survey Methods



The framework in figure 1 has an analogue in Lee's [1991:351] integrated model of the Positivist and Interpretive approaches, in which he identifies three levels of understanding: subjective understanding, interpretive understanding, and positivist understanding. Figure 2 depicts the cyclical nature of these three levels, as proposed by Lee.





The subjective understanding provides the basis on which to develop the interpretive understanding. To test the validity of the interpretive understanding, the researcher may refer back to the subjective understanding.

The interpretive understanding, once judged valid, may then provide the basis on which to develop the positivist understanding. Lee observes that a different reading or interpretation of what the organization means to the human subjects will lead to a different theoretical explanation for how the human subjects behave. In other words, the interpretive understanding will influence the choice of theory and extensions or modifications of the theory in the process of refining the survey model.

Lee suggests that having completed the interpretive case studies and before proceeding with controlled traditional, empirical positivist testing, the propositions must first undergo testing that pertains to an additional, critical feature of social reality that distinguishes it from the physical subject matter of the natural sciences. He suggests that the construction of a positivist understanding (the survey model) without the aid of a careful interpretation of the subjective meanings would invite ethnocentrism or the application of the researchers' own subjective meanings (that exist in his or her own culture or organization) to the phenomenon under observation.

Thus, in the reference study context, we see the synergistic interplay of interpretive and positivist perspectives. The identification of context specific contingencies, and accounting for these by either including them in the model [stage 6] or controlling for them [e.g. through sampling in stage 8], is an interpretive effort to account for these subjective phenomenon. In stages 10, 11 and 12 - construct measurement, testing and interpretation - the richness of the multiple case studies documentation is valuable in ascribing subjective (interpretive) meaning to the objective (positive) phenomenon measured.

The framework of Figure 1, while depicted as a linear process, can be highly iterative. Whereas the diagram depicts pre-assembled case documentation feeding stages 10, 11 and 12, it is possible that the researcher may deem it necessary to go back to the case firms for additional data to assist in construct validation, model testing, modification and extension, and interpretation of findings.

Across multiple studies, the process becomes clearly cyclical, with positivist test results feeding new interpretive understandings and further interpretive studies feeding further positivist testing. Nonetheless, in a single study reported in the literature, the linear nature of the proposed framework is more realistic as few researchers have the time or resources to iterate through multiple surveys and multiple sets of case studies before publishing "final" results. Thus, while case study findings are again useful in later stages of the framework, the linear sequence depicted prevails and is useful.

Three concluding points made by Lee [1991] are equally relevant to the framework proposed in this paper. As stated by Lee with respect to his more general model, the more specific framework proposed herein is not advocated as the best or only one that should be employed for IS organizational research. Neither is it advocated that the case study and survey methods when integrated in a single research design, be applied with equal emphasis. The two methods will almost always be complimentary, but in light of specifics of the research problem, issues of economy, etc., one or the other of the methods make take precedence. Lastly, Lee [1991:363] indicates that a goal of his work, was "to open up the possibility for additional (and more daring) integrated frameworks to be developed and advocated." It is hoped that the framework presented herein, while not especially daring, makes a contribution toward this goal.

From the literature and the model presented in the previous section, two main reasons identified for supplementing quantitative survey data with qualitative case study data are: (1) to develop contextual richness that is valuable in model building, and (2) to improve internal validity and interpretation of quantitative findings through triangulation. Following are related several examples of these benefits from the reference study.

The case studies had significant influence on the model ultimately measured and tested. Following are discussed examples of this influence.

The pilot case: Though the pilot computer system selection project was a financial success with a pay-back period of less than one year based solely on labor savings, Low, the client project manager was not comfortable with the chosen solution (see [Gable, 1991] for a detailed discussion of the pilot case study findings). Because she had not witnessed a thorough canvassing of the market-place for alternative solutions and the systematic narrowing of alternatives based on well defined criteria, Low could not say that her firm did or did not have the best solution then available in Singapore given their unique requirements and constraints. Neither was she satisfied with vendor support. Low's lack of confidence in the chosen solution and the process of selection, was at least partially attributable to poor consultant performance in several areas: (1) lack of commitment to implementation success, (2) lack of expertise, (3) lack of a methodical approach, and (4) inadequate vendor appraisal.

Table 4 is a summary of these problems, the symptoms from the case which led to their recognition, where the problems originated, and recommendations on how the problems might have been avoided. These problems and issues pointed to important variables and relationships for consideration in the cross-case analysis and the design of the survey research model. An important point to note is that, except for the consultant's lack of commitment to implementation success, all problems identified stemmed from both poor consultant and poor client performance in continuing review and follow-up.

Cross-case analysis: As compared to the single pilot case, the cross-case analysis offers greater potential for explanation. Whereas in the pilot case the objective was simply to describe the situation and identify problems and issues, in the cross-case analysis experiences of the five case firms are compared against a rough model or pattern of variables derived from the literature and the pilot case. Also, in the multiple case study, greater emphasis is placed on the client role, as suggested from the pilot case findings.

Five main variables were analyzed in the cross-case analysis (see [Gable, 1991] for details of the cross-case analysis). The importance of (1) client involvement and (2) the implications of misconceived views of the client/consultant relationship were identified. Also, three main activities the client can pursue in order to engage consultants more effectively were suggested: (3) assess client and consultant compatibility, (4) identify and address specific organizational goals, and (5) accommodate evolving project objectives. Together, these five variables represent a predicted pattern derived from the literature. As discussed previously, if empirically observed patterns coincide with the pattern predicted, the case study findings have greater internal validity. Table 5 summarizes the performance of the case companies along the five dimensions identified and indicates outcomes of the computer system selection projects. Analysis of the pattern of variables observed for the five cases (Table 5) suggested a reasonably good fit with the predicted pattern.

In addition to facilitating the development and testing of a tentative pattern of variables, the case studies also facilitate the identification of both relevant and irrelevant variables, taking account of the research context. Several authors have suggested the use of idiographic rather than nomothetic research strategies in IS [Franz and Robey, 1984; Kaplan and Duchon, 1988]. Idiographic research attempts to understand a phenomenon in its context.

Factors considered in the cross-case analysis to potentially influence engagement success, but excluded from the survey model are: client goal specificity and client goal flexibility. Four of the five case firms specified their project goals adequately (see Table 5). All of the five did a reasonable job of specifying their "tangible" hardware and software expectations. None of the five did a good job of specifying their less tangible goals. Only case 3 did a poor job of specifying goals overall, because they had a hidden agenda which was not made apparent to the Consultant or Advisor. A major role of the LECP is to assist the Client and Consultant in defining project goals (through seminars, guidelines, and the Advisor). These LECP mechanisms also contribute to the relative uniformity of goal specificity observed in the case studies. It would thus appear that goal specificity, in the context of this study, though probably important to engagement success, is not a useful variable for distinguishing successful from unsuccessful engagements except in unusual circumstances. With the objective of parsimony, goal specificity was excluded from the survey model.

Neither was goal flexibility found to be a critical variable from the cross-case analysis. LECP projects tend to be reasonably well defined, thus, in three of the five cases there was little need for goal flexibility. In the two cases where the project was required to take a significant change in direction, goal flexibility was good. Here again, goal flexibility is of little use in distinguishing a successful engagement from an unsuccessful engagement.

A measure not identified from the case studies, which may have a significant moderating effect on Client satisfaction with the engagement, is Client expectations. A Client may have reasonable or unreasonable expectations of the engagement. These expectations will influence the Client's evaluation of engagement success. Ideally, expectations should be measured at the beginning and end of the project and possibly at several points in between. Clients registered with the LECP undergo thorough orientation. A primary objective of the orientation process is to condition the expectations of registrants. Where a Client has unreasonable expectations, there are three possible outcomes of orientation: (1) the Client modifies their expectations (to be more reasonable), (2) they withdraw from the program, or (3) they are asked to leave the program (registration is not approved). Consequently, expectations are largely controlled and thus were excluded from the survey model for this reason.

The second main area in which case study findings and especially the detailed case study documentation file can be useful, is in triangulation of results to improve internal validity and interpretation of quantitative findings. Following are several examples from the reference study.

Construct validation: Difficulties were encountered in validating the Client Involvement construct, a key variable in the survey model. It, and several other variables, were measured from both the client's and the consultant's perspectives. Jick [1983:144] suggests that the process of compiling research material based on multi-methods is useful whether there is convergence or not. Where there is convergence, confidence in the results grows considerably; findings are no longer attributable to a method artifact. Also, "in seeking explanation for divergent results, the researcher may uncover unexpected results or unseen contextual factors" [Jick, 1983:144]. Thus, "Triangulation may be used not only to examine the same phenomenon from multiple perspectives, but also to enrich our understanding by allowing new or deeper dimensions to emerge" [Jick, 1983:138].

The observed lack of correlation between the client and consultant measures of the Client Involvement construct, was ultimately resolved through reference to one of the preliminary cases in which there were problems between the client and consultant who "pointed fingers" at each other; the client suggesting that they were heavily involved and the consultant suggesting that the client was inadequately involved. This phenomenon suggested the possible existence of two categories of cases - problem cases and no-problem cases. By assuming that consultants would be highly reluctant to score the client poorly on Involvement unless problems existed, then sorting the cases in ascending sequence on the consultant's score of client involvement, two groups of cases were identified, where the "no problems" group showed a significant, positive correlation between client and consultant scores and the "problems" group showed a significant negative correlation, or "divergent bias". The identification of these two groups offered justification for averaging the client and consultant scores in order to "compensate" for the observed bias, thereby yielding what was ultimately found to be a strong, and valid measure. The early observation of "finger pointing" in the preliminary case study also strengthened the researcher's resolve to elicit the views of consultants as well as clients. The reconciliation of these views was difficult and tedious, but ultimately proved to be a main strength of the study.

Interpretation of observed relationships: Table 6 is a summary of hypothesis test results from the survey data [Gable, 1992b]. The data were analyzed using multiple regression and path analysis.

The hypothesized direct relationship between Client Involvement and Success (one of the main hypotheses driving the study) was found not to exist. Reflecting on the case studies it was recalled that the client in case 5, though highly involved, had a "medium" level of compatibility with the consultant and a misconceived "informant/recipient" [Tilles, 1961] view of their role in the process [Gable, 1991]. This "hands-off" or "arms-length" view on roles and the relationship essentially obviated any potentially beneficial effect of Involvement on Relations. Thus, a possible explanation for the non-existence of the direct path between Involvement and Success was that Involvement increases the likelihood of success only to the extent that it leads to improved client/consultant relations, and latterly, good relations yield improved cooperation, communication, compromise and understanding.

In most respects, statistical relationships observed were as hypothesized and were supported by case study findings. This suggests, that following case study analysis the model was well specified, thereby further demonstrating the value of case studies to the model building exercise.

In the paper the potential benefits of integrating case studies with survey research were illustrated through specific examples from the reference study; thus the paper is not entirely epistemological or methodological. While other

authors have argued for the combining of research methods, little prior attention has been addressed to details of how to achieve the implied benefits.

It was demonstrated how case studies, when integrated with a survey in a larger, more complex research design, can be useful: (1) As a source of rich detail to aid in the interpretation of quantitative findings from the survey (e.g. construct validation/internal validity and interpretation of observed associations); (2) As a further means of triangulation, by testing the propositions or patterns with the case sample as well as with the quantitative survey data (i.e. as a "repeated experiment"); (3) To develop a close relationship with a few firms who may serve as the sample for pilot testing the survey instruments and as a cross-check against questionnaire responses to aid in validating the survey instruments; (4) As a test of the contextual relevance of variables of interest where an idiographic research strategy is pursued; and (5) As an aid in identifying alternative ex poste models (e.g. justification for dropping the path between Involvement and Success).

The combined methodology employed in the reference study is of course not always appropriate. Practical issues of access, availability of secondary data, budgets, time pressures, and the experience of the potential users must also be considered in research design. Furthermore, to a lesser extent several of the benefits of case studies can be realized through open-ended survey questions, semi-structured interviews and other methods of survey data collection which elicit qualitative as well as quantitative data. Bikson [1991:329] suggests, "Whether a researcher collects quantitative or qualitative data is independent of whether survey or interview methods are used and whether cross-sectional or case-study designs are involved. Rather, it depends on how structured the data gathering method is and whether the data gathered can be represented by variables that take numeric values." Thus, a researcher's decision to undertake case studies in conjunction with planned survey work, will depend upon the perceived magnitude of the benefits suggested in this paper, and the perceived magnitude of weaknesses in the survey design.

Though the paper has emphasized the case study method, it is observed that both surveys and case studies can often be further strengthened through integration with experimentation. Kerlinger [1986:360] points out that replication is always desirable and where possible, one should look for non-experimental evidence of the empirical validity of one's hypotheses proven through experimentation. While it is easier to extend research from the laboratory to the field, an attempt should also be made to experimentally test propositions arrived at non-experimentally. Gutek [1991a:321] indicates a desire to see more survey research combined with experimental design. She observes that in psychology there is an unfortunate division between survey and experimental researchers; only rarely do psychologists thoroughly understand both methods, and each 'side' tends to denigrate the other. Unlike Sociology, which often employs survey methods for verification, psychology tends to view surveys as descriptive (hence, inferior) and experimentation as hypothesis-testing (hence, superior)."

Gutek [1991b:322] suggests there is no reason an experimental manipulation cannot be embedded in a survey (e.g. identification of "natural controls", strategic sampling, longitudinal control samples). Researchers can more easily learn to combine the strengths of various methods in a new field like IS in which the reputations of particular methods have not already been established as inferior or superior. Combining the main strength of survey research (generalizability/external validity) with the main strength of experimentation (internal validity through random assignment to conditions) and with case studies (model complexity and discoverability) can yield a superior piece of research. Cook and Campbell [1979] suggest that "Field experimentation should always include qualitative research to describe and illuminate the context and conditions under which research is conducted." In general, using multiple methods, including survey, case study and experimentation, provides evidence that results are not method specific, therefore using multiple methods everywhere appropriate is a good idea.

Table 1 is reproduced as Table 7 with the addition of a column on experimentation. From Table 7 it is observed that experimentation compliments both case study and survey methods and that each of the three methods is stronger than the others along at least one dimension. Thus, while case study and survey methods are synergistic, are complimented by experimentation.

<b>TABLE 7 – Relative Strengths of Case Study, Survey and Experimentation</b>			
	Case Study	Survey	Experiment
Controllability	Low	Medium	High
Deductability	Low	Medium	High
Repeatability	Low	Medium	High
Generalisability	Low	High	Medium
Discoverability (explorability)	High	Medium	Low
Representability (potential model complexity)	High	Medium	Low

In closing, it is suggested that journal editors and reviewers of papers should be sensitized to the relative superiority of multi-method designs and that junior researchers and doctoral students should be encouraged to combine methods as far as is feasible. Bikson [1991] suggests that involvement in a collaborative team of investigators with different formal backgrounds and research strengths is perhaps the best way to put this into practice. We are in full agreement with Attewell and Rule who state, "What we hope to see avoided in IS research is the pernicious tendency of some other areas of social research to view surveys, fieldwork, archival and field methods as competitors, and all but surveys as soft, pre-scientific, and dated ... we are neither recommending for IS or IT impact research a simple methodological pluralism, nor arguing that anything goes. Rather, we suggest that a carefully chosen mix of methods be combined for a single research project. The combination should be designed to meet the needs of discovery and verification, plus the need to understand actors' meanings and intentions while measuring 'objective' and quantitative distributions of outcomes" [1991:314].

#### Footnotes

3 It is appreciated that case studies are not entirely qualitative and can in fact employ an embedded quantitative survey. This suggests an alternative approach to combining case study and survey methods, in which the unit of analysis may differ between the case study and the survey (e.g. may be the organization at the case study level and individuals or projects at the survey level).

4 Where the word 'understand' is used in the phenomenological or hermeneutic sense, and where 'understanding' the meaning held by a subject or group is contrasted with the 'explanation' produced by a scientific observation. - Credit for this concise distinction goes to an anonymous EJIS reviewer.

5 It is emphasized that the relative strengths indicated in Table 1 are generalizations, and that the actual strengths and weaknesses of any method will depend upon specifics of the research design and the nature of the knowledge being sought.

6 The consultant must have: (1) a tertiary or professional qualification in an IT related field; (2) a minimum of 8 years work experience in executing or managing feasibility study, planning, analysis, design, development or implementation of information systems; and (3) detailed references for at least three recent consulting projects in these experience areas. The consulting team may include but may not be limited to junior consultants with a minimum of three years relevant work experience, and who satisfy the other two criteria.

7 Big6 firms represented in the survey sample include: Arthur Andersen & Co., Coopers & Lybrand Associates Pte Ltd, Deloitte Haskins + Sells, Ernst & Young Consultants Pte Ltd, and Price Waterhouse.

8 By using LECP firms, certain potentially confounding variables have implicitly been controlled for (e.g. firm size, consultant minimum experience, client expectations) thereby increasing the internal validity of the study. In addition, other factors, important to the study, are also beneficially homogenous (e.g. all projects are computer system selection projects, all projects involve an external consultant).

9 The stages of the framework represent a highly summarized conception of the work to be done. For example, though the case study protocol is a major and important research mechanism as reflected in Figure 1, other mechanisms not reflected may include case study narratives, chronology of events, workshops, etc.

10 The stages of the framework represent a highly summarized conception of the work to be done. For example, though the case study protocol is a major and important research mechanism as reflected in Figure 1, other mechanisms not reflected may include case study narratives, chronology of events, workshops, etc.

11 In this sense the survey data and the case study data are highly integrated rather than the case data simply yielding a crude early version of the more refined survey data. To the extent the researcher: has compiled a rich database of case information (including hard-copy, soft-copy as well as mind-copy); is able to return to the case situations to collect additional data and test new ideas; or is able to conduct further case studies following the survey, s/he is better able to supplement the cross-sectional survey data with the richer interpretive data from the case studies.

12 For example, the hypothesized direct path between Relations and Success was found to be robust and persistent. The potential importance of good relations was highlighted in the pilot case (Case 1). That particular project had significant potential to fail, yet an acceptable solution was identified. In fact, Case 1 realized the highest level of success of the five case firms studied; their success being largely attributed to the good personal relationship that developed and continued between the Client and the Consultant. As a result of their good Relations, both were willing

to compromise, to accommodate, and to adapt to the realities of the project process. Alternately, both Cases 4 and 5, had relatively poorer Relations and were observed to have realized lower levels of success (see Table 5).

13 Note that these perceived benefits also equal the opportunity costs of not doing the case studies.

Hypothesis		Sign	DIRECT EFFECT Posited?	Significant?	TOTAL EFFECT Sign
		(1)	(2)	(3)	(4)
H1	Client involvement is higher, the stronger the client's intention to be involved	+	Yes	Yes	+
H2	Client involvement is higher, the stronger the consultant's intention to facilitate the client's involvement.	+	Yes	Yes	+
H3	Client involvement is lower where barriers to client involvement exist.	+	Yes	Yes	+
H4	Client/Consultant relations are better, the higher the level of client involvement	+	Yes	Yes	+
H5	The level of Engagement success is higher, the more the client is involved.	-	No	No	+
H6	The level of Engagement success is higher, the better are client/consultant relations.	+	Yes	Yes	+

1) The observed sign of the relationship from regression analysis. (source [Gable, 1992b])

2) "Yes" if the observed sign was the posited sign.

3) "Yes" if the T statistic in the regression analysis was significant at the .05 level.

4) The observed sign of the Total Effect (based on significant paths).

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