Co-operative case writing:

A new approach for reconciling the debate between theoretical significance and practical relevance in management research.

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Abstract. Co-operative case writing refers to the joint writing of case studies by managers and academics. A concrete application of this approach is discussed, and methodology and strategy literature is reviewed to show that the joint writing approach is beneficial from both theoretical and practical perspectives, suggesting that the criteria of theoretical significance and practical relevance need not necessarily be seen as mutually exclusive. Testable propositions are derived and implications are discussed for reconciling the debate between the two criteria.

Key words. Case study research, validity, reliability, practical relevance, learning organization, knowledge management, organization studies.

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”There is nothing as practical as good theory.”

Kurt Lewin.

Theoretical significance and practical relevance ideally would be two sides of the same coin. Theoretical significance is an important issue in academia, where construct validity, internal validity, generalizability and reliability of the research findings are hallmarks of good quality research (e.g. Tahai and Meyer, 1999; Scandura and Williams, 2000). However, managers often lament that the research results coming forward from the academic community, while perhaps theoretically significant are often obvious, sometimes non-implementable, or simply incomprehensible (e.g. Probst, 2002; Thomas and Tymon, 1982). Recently, Hamel even noted, ”managers simply do not know what to do with all the concepts that tumble from the pages of Harvard Business Review” (Hamel, 1998: 80). Indeed, several authors in academia have voiced their concerns regarding the extent to which management research might evolve into an ivory tower activity, far removed from any practical application (e.g. Sutton and Straw, 1995; Eisenhardt, 1989; Probst and Raub, 1995).

Unfortunately, the two sides of the coin seem largely irreconcilable, suggesting that an increase in theoretical significance tends to lead to a decrease in practical relevance, and vice versa (Thomas and Tymon, 1982). Although, in the quest of developing a theory of the firm (Coase, 1937) these topics have been discussed in print since the early days, the frequency and magnitude of the recent debate of practical relevance versus theoretical significance seems unprecedented (see, e.g. Scandura and Williams, 2000; Rouse and Daellenbach, 2000; Larsson, 1993; Mitchell, 1985; Gerstner and Day, 1997). At the heart of this debate appears to be that notions of theoretical significance have directed energy away from the relevance of research in managerial practice or vice versa (Thomas and Tymon, 1982: 346).

In this paper, we take a closer look at the relationship between practical relevance and theoretical significance. Our present purpose is not to take sides on any of the two camps of the debate, but rather to focus on their similarities, i.e. on the actions that can be taken to reconcile the debate between the two camps. We do this by investigating the promise of a specific research method, which we call 'co-operative case writing' in reconciling the debate. Co-operative case writing refers to the joint writing of case studies by both practitioners *and* academics. The next section elaborates on the logic and approach of co-operative case writing. The sections that follow discuss a set of four quality criteria for management research, and show how co-operative case writing can benefit both theory and practice. The final section provides an appreciation of this paper's limitations and discusses its main conclusions and implications.

WHAT IS CO-OPERATIVE CASE WRITING?

Co-operative case writing has its roots in the systems based approach, and the resource based view.

The *systems based approach* includes research in self-organizing systems and learning organizations, but also perspectives of organizational closure and therewith basic assumptions of the resource-based view (which will be discussed subsequently). The systems based approach is about understanding collective phenomena and mechanisms of control, development and evolution. Self organization is a main phenomenon in systems maintaining their identity, autonomy and learning and developing themselves at the same time (Ulrich and Probst 1984). Our conceptual point of departure is that activities of individuals become meaningful only if they are studied and developed in a systemic context, within the comprehensive social system of which the performing managers and employees are part. Each

research project is considered as a purposeful social system, the result of human action but not of human design and intent. The case-writing teams and the project teams at their basis are systems that can only learn and evolve as operationally closed interacting networks (Malik and Probst 1984).

The systems based approach is thus particularly interested in organizational learning processes, processes that cannot be reduced to simply adding up individual learnings. Based on this approach, it is assumed that co-operative writing of case studies, i.e. the co-operative analyzing of data, the formulating of hypotheses and propositions, as well as the deducing of lessons learned by both academics and practitioners constitutes a very promising way to develop and retain knowledge in a team, department or company as a whole. We therefore followed a method of collective learning by writing cases in teams. These teams go through after action reviews, write as a collective system, reflect while interviewing, discussing and writing and try to make the learning explicit by writing case studies of their own experiences (Probst 2002, Probst and Büchel 1997).

Coming from a systems based approach, it is only a small step to the *resource-based view*. Over the past fifteen years, the focus of much strategy and management research has shifted from an outside perspective on industry structure and dynamics (Porter, 1980, 1985) to an inside perspective in searching for sources of sustainable competitive advantages. Influenced by the resource-based view of the firm, scholars have particularly sought to identify firm-idiosyncratic resources and capabilities that reside *in* the firm, rather than outside the firm (e.g. Barney 1991; Wernerfelt 1984, 1995; Prahalad and Hamel 1990; Eisenhardt and Martin 2000). The ambition to open the 'black box' of the company and develop a 'theory of the firm' (Coase 1937) inspired a wealth of hypotheses-generating research. Two broad approaches stood out here. The first, quantitative, approach focused on collecting, processing,

analyzing and interpreting primary (often survey-based) or secondary data. These were frequently relatively isolated indicators tested for their effect on firm performance. As van Maanen put it, the second approach aimed at ”reclaiming qualitative methods for organizational research” (van Maanen, 1979: 520). In line, research inspired by the qualitative paradigm strives at doing research *in*, rather than *on* organizations and has especially made use of the case study methodology (Rouse & Daellenbach 2000; Mintzberg 1979; Eisenhardt 1989; Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993). Methodology scholars agree that case studies are particularly appropriate for studying contemporary phenomena in a real-life context, and for identifying idiosyncratic firm resources and capabilities in situations of blurred boundaries between context and phenomenon under investigation (Yin, 1994; Stake, 1995). Co-operative case writing is in the spirit of this line of thought. Co-operative case writing constitutes a special form of case writing in that it involves both practitioners and academics, thereby purposefully blurring the boundaries between research subject and research object (Probst, 2002; Reason and Rowan, 1981).

Traditionally, case writing is mostly used for teaching purposes in management training (Locke & Brazelton, 1997; Thomas, 1998). As teaching tools case studies are widely used in MBA programs around the world, since they enable students to learn from real life situations that they, as future managers, are likely to encounter. Working with cases gives students an opportunity to compare their own solutions to problems with the actual ones. Discussing and evaluating alternative possibilities helps them to acquire a wider view of realistic management options. In this sense case studies are convenient vehicles for transferring knowledge and experience in the company. In addition to this, due to the typically narrative style of case studies, they are open for discussion and reflection. In fact, their being conducive to discussion and reflection is precisely the rationale for using case studies for teaching purposes. This suggests that case studies are sensitive to the different types of knowledge

contained in a particular business problem. Not only is conceptual, abstract knowledge being collected, but also the practical experience of putting this conceptual knowledge to work is conveyed (Probst, 2002). By virtue of their ability to convey intricate problems and experience cases are therefore uniquely suited for portraying the tacit knowledge and experience acquired over time. The result is that not only does tacit best practices and common experiences become explicit, but new light is also shed on past failures, disclosing important lessons learned. This helps students to become intimately acquainted with a real-life situation in the business world.

Given the benefits of case studies for teaching purposes in an academic context, it is interesting to note that in industry, little use has been made of cases as a method for management training. This is the rationale of co-operative case writing. In this method, companies systematically write their *own* cases, i.e. co-operatively document the knowledge and experience they themselves have acquired over time, under the guidance and scrutiny of academics. As shall be explored shortly, during the co-operative case writing process, knowledge that is implicit and closely linked to experience, can be made explicit and put to work. The narrative style of case studies can make them infinitely more interesting and engaging than the ubiquitous bulleted presentations that pervade corporate life. Finally, and perhaps most importantly, co-operative case writing within a company has the benefit of fostering organizational learning: the collective experience of co-operatively recapping past experience allows for levels of retrospective sense-making hitherto untapped. Lessons learned produced in the process of co-operative case writing forces the group of writers or participating members of the project to make knowledge explicit, to agree on processes, rules, and interdependencies thereby allowing for organizational learning.

After having defined what we mean by co-operative case writing, and having anchored the concept in two well-established theories (the systems approach and the resource-based view), we turn to an explication of the longitudinal field-based research at Siemens, where the co-operative case writing approach was applied.

CO-OPERATIVE CASE WRITING IN PRACTICE

The research reported here is based on a longitudinal, multi-stage, nested design within one corporate setting (e.g. Burgelman, 2002; Yin, 1994; Eisenhardt, 1989). The research setting was the Siemens company. Siemens employs about 450.000 people in 190 countries, and delivers solutions in a wide variety of industries within the overall electrical engineering and electronics industry, including telephony, mobile telephony, household appliances, transportation, medical systems, automation, and business consulting. The primary level of analysis for formulating the propositions was the corporate level; the secondary level of analysis was the business unit level. In line with the recommendations by methodology scholars, the present article has found it useful to concentrate on specific projects within the corporate setting as the units of analysis, rather than simply focusing on the overall organization (Yin, 1994, Stake, 1995; Burgelman, 2002). Discussions with the Siemens company let to the agreement that the company's single-largest knowledge management initiative with its constituent sub-initiatives be chosen as the units of analysis. In line with the approach of 'theoretical sampling' (e.g. Denzin and Lincoln, 1994; Huberman and Miles, 1984) the selection criteria to derive the cases were (a) prominence within the overall corporate context, (b) cases selected constituted 'extreme cases' in that a representative sample of successful and fledgling initiatives was sought, and (c) a representative selection of the industries Siemens was operating in was sought. Thus, in line with the case study methodology, the sub-cases studied constituted the individual units of analysis within the

overall corporate context. This approach enabled extensive within-case and between-case analysis, which Eisenhardt describes as a key ingredient in good quality case study research (Eisenhardt, 1989: 539-540). A total of 18 case studies was analyzed in this manner. Table 1 provides an overview of these case studies in terms of their departmental affiliation, the topic area of each case, and the time period in which the cases were produced.

Table 1 about here.

As Table 1 above shows, the research was carried out continuously over a period of two years, but involved three stages of intensive data collection (spring 2000-fall 2000, spring 2001 until winter 2001, and spring 2002).

- *Phase 1* (spring 2000-fall 2000): After an initial discussion with the Chief Knowledge officer, a provisional set of cases was agreed upon that would give a comprehensive overview of the portfolio of the individual projects (or units of analysis) comprising the overall corporate knowledge management initiative. The initial shortlist of 11 cases was reduced to 8 case studies, in order to avoid overlaps. Thus, the majority the case studies reported here was produced in phase one.
- *Phase 2* (spring 2001-winter 2001): To keep abreast of changes in Siemens portfolio of knowledge management initiatives, 4 of the cases produced in phase one of the field study were updated, and 6 new case studies were added.
- *Phase 3* (spring 2002): The last phase of the research was characterized by consolidation and further examination of the existing cases. In the last phase of the field research, 4 cases were added to the portfolio.

Data collection was done by formal interviews and informal discussions with Siemens managers. Interviews were conducted in part by the authors of this article and in part by the 44 Siemens case writers participating in the study. The formal interviews lasted between 20 minutes and 190 minutes, with most lasting for 60 minutes. Interviews with a 'new' interviewee were semi-structured. Follow-up interviews were structured, for clarification about key events, people and issues identified. A major benefit arising from this approach is that it was possible to interview more people than originally planned, since respondents often mentioned names of relevant actors and were willing to help set up an interview with them. It was thus possible to interview the relevant actors in each unit of analysis, thereby enabling us to record the convergence and divergence in their views on various key problems and critical situations throughout the 18 cases studied for this paper. To arrive at our propositions, we used grounded theorizing (Glaser and Strauss, 1967). Grounded theorizing refers to inductively gaining theoretical insights by comparative analysis in an iterative mode. In the present study, the case evidence was examined, theoretical propositions were revised, and the evidence was once again examined from a new perspective in an iterative mode. To illustrate, interview and archival data were compared, and additional interviews were added until the same information was repeated again and again, suggesting that analysis had reached what Glaser and Strauss referred to as theoretical saturation (Glaser and Strauss, 1967, cited in Burgelman, 1994: 483).

DISCUSSION

A review of the literature reveals that questions of validity, reliability, and objectivity are a contentious issue in the qualitative paradigm of doing field research (Denzin, and Lincoln, 1994, also Miles and Huberman, 1994; Miles, 1979; Numagami, 1998). The basic tenet is that the traditional quality measures, emanating from the positivist; quantitative paradigm

cannot simply be translated to the interpretative, qualitative paradigm. This logic often serves to refute quality measures in the qualitative paradigm altogether (see e.g. Reason and Rowan, 1981 for a radical argument). This paper, however, takes a different stance. We believe that in the qualitative paradigm not everything is mindlessly acceptable. In fact, it would appear that the lack of established procedures and commonly agreed-upon conventions that seem characteristic of the qualitative paradigm, make it even more pertinent to ensure good quality research. Thus, it appears that qualitative researchers need to be even more rigorous to ensure the quality of their work. At the same time, they must ensure the practical relevance of their research findings. We therefore subsequently juxtapose critical quality measures for ensuring theoretical significance with measures for ensuring practical relevance. Based on the method of grounded theorizing, we have inductively derived four measures of *practical relevance*:

- non-obviousness (the degree to which a theory or framework meets or exceeds the complexity of common sense already used by a practitioner),
- goal-relevance (the correspondence of the outcome - or dependent variable - in a theory or framework to the things the practitioner wishes to influence),
- operational validity (the degree to which the practitioner is able to implement action implications of a theory or framework by manipulating its causal - or independent – variables), and
- knowledge explication (the degree to which a given theory or framework helps the practitioner to understand and act previously tacit knowledge, hidden assumptions, and 'ways of doing things around here').

Based on a deductive review of the literature, four measures are most commonly applied to ensure the *theoretical significance* of the research findings (Stake, 1995, 1988; Cooke and

Campbell, 1976, 1979; Scandura and Williams, 2000; Larsson, 1993; Kidder and Judd, 1986)[1]:

- construct validity (the degree to which a study investigates what it claims to investigate),
- internal validity (the degree to which findings correctly map the phenomenon in question),
- generalizability (the extent to which findings can be reproduced in another setting), and
- reliability (the degree to which the study is free of random errors).

The next sections first provide a brief definition of the two sets of quality criteria above. This is followed by a presentation of our first order findings, based on the longitudinal field research (first order findings are provided in *italics*, to facilitate readability). We subsequently discuss propositions based on the first order findings in the light of existing methodology literature.

[1] The interrelationship of validity and reliability is worth noting. The conjecture in the literature is that just because an observation or a conclusion is reliable does not mean that it is also equally valid. To illustrate, say the watch of Frederic Taylor went 7 seconds late. Every time Taylor used this watch in determining the speed of production processes, it would underestimate the time by 7 seconds. Taylor's watch in short provided an invalid indication of time needed to produce a certain product (i.e. its measurement would have been characterized by nonrandom error). However, this nonrandom error would not have affected its reliability, since it would systematically underestimate time required by 7 seconds every time a measurement was made, thereby not leading to inconsistent results in repeated measurements (i.e. its measurement is characterized by the absence of random error). In short, Taylor's watch would have provided a perfectly reliable, but invalid representation of time. Overall, for any conclusions in research to be theoretically significant, they must be based on a measurement process that is both reliable and valid.

1. Construct validity versus non-obviousness

In the literature, construct or concept validity relates to research procedures, and applies to the data collection period. The construct validity of a procedure denotes the quality of the conceptualization or operationalization of the relevant concept (Smaling, 1992; Sutton and Straw, 1995). In essence, construct validity refers to the extent to which a study investigates what it claims to investigate, i.e. to the extent to which a procedure leads to an accurate observation of reality (Denzin and Lincoln, 1994; Huberman and Miles, 1984; Miles and Huberman, 1994). Whereas construct validity is a criterion for enhancing the theoretical significance, non-obviousness of the research findings is a criterion that appertains to practical relevance. Non-obviousness refers to the extent to which a theory or framework meets or exceeds the complexity of common sense already used by a practitioner (e.g. Thomas and Tymon, 1982: 348).

The act of co-operatively creating a written report made it possible to enhance the accuracy of research findings in capturing phenomena encountered by Siemens managers, since the reports included personal impressions and additional information gained from company visits, interviews and presentations. In the first phase of the research, which started in April 2000, as well as in the second phase of the research, which started in August 2002, representatives from Siemens were assigned to work on a draft outline of the case studies they felt were needed to reflect phenomena deemed important to the company. The authors of this article facilitated this process of new-meaning creation.

To this end the cases were written by young researchers, mostly doctoral students from various universities, in collaboration with Siemens managers. The doctoral students were coaching the process of co-operative sense making in the writing process. It is important to realize that these case 'coaches,' as they were called, did not act as teachers - but as

'teasers.' Whereas teachers typically instruct, and provide information, teasers 'tease' out the accumulated knowledge and experience and facilitate the reflective process necessary to elucidate the merit of this experience in future. During the co-operative writing process, managers described the initial situation regarding the case, the problems they needed to solve, and the challenges faced, and then evaluate the results of the project. The group thereafter discussed questions such as how to assess the 'facts' presented to them, which features of the case are especially noteworthy, and what they hope to convey to the readers. People from different backgrounds, i.e. other managers from the case company, partners, coaches and consultants, provided further input. This helped to not only integrate a wide variety of different viewpoints, the collaborative writing process also provided a final report that differed quite radically from a study written by a single individual (whether academic or practicing manager) in that the collaborative writing process enabled a more unambiguous reflection of reality.

- *Proposition 1.1.* (Practical relevance, non-obviousness): The co-operative writing of a case study by practitioners and academics is conducive meeting or exceeding the complexity of common sense already used by the practitioner.
- *Proposition 1.2.* (Theoretical significance, construct validity): The co-operative writing of a case study by practitioners and academics represents a form of researcher and data triangulation, which enhances the construct validity of the findings.

Discussion. Skepticism regarding the case study method often suggests that case study investigators fail to develop a sufficiently operational set of measures and that 'subjective' judgments are used (Yin, 1994: 41; Denzin and Lincoln, 1994; Stake, 1995). The literature recommends data- and researcher-triangulation to amend this drawback and in order to arrive at an unambiguous reflection of reality (see, e.g. Pettigrew, 1973, 1990; Burgelman, 1994,

2002). The term triangulation originally denotes the surveying of land using trigonometry, and is used in social science research to study the object of research in at least two ways (Smaling, 1992: 88; Bullock and Tubbs, 1987, 1990; Jick, 1979). The basic principle of triangulation can be applied to researcher triangulation (e.g. when two or more researchers are involved in the study), and data triangulation (e.g. when data from different sources is compared, see Smaling, 1992; Denzin, 1989; and Lincoln, 1994). The objective of both forms of triangulation is to validate the data collected through correcting errors of fact. The usual approach thereto is to have key informants and peers reviewing the draft of the case study (see, e.g. Yin, 1994: 143 – 145). Orgland (1995: 200- 201) has highlighted the benefits of not only having the final case study draft reviewed, but to also have all interview transcripts reviewed by the interviewees. Yin emphasized that the objective of using these reviews is not to have reviewers correct the conclusions drawn, but to validate the actual facts of the case study (Yin, 1994: 144).

The corrections made in the process benefit the construct validity of the study in at least two ways. Firstly, the likelihood of reporting false, or commercially sensitive data is minimized. Secondly, in situations where no objective truth may exist, triangulation can be instrumental in portraying the different perspectives and viewpoints that can then be presented in the case study report (e.g. Denzin and Lincoln, 1994). The researcher- and data-triangulation practiced in co-operative case writing exceeds these requirements in that not only data from academic researchers are compared, but also data from practitioners. Thus, rather than just using practitioners to validate a written report, co-operative case writing actively involves practitioners as co-researchers (see also Reason and Rowan, 1981). Such researcher- and data-triangulation is therefore likely to serve as a nonreactive measure of changes in practice or performance (Denzin and Lincoln, 1994; Denzin, 1989; Smaling, 1992). Nonreactive data are historical, archival data that are not influenced by the perceptions or biases of the

individuals providing or gathering the data (Miles and Huberman, 1994; Glaser and Strauss, 1967). This represents the basis of the co-operative case writing approach. In other words, the writing of a case constitutes learning by doing, and knowledge is created through interaction, reflection, and thoughtful documentation by academics and practitioners.

2. Internal validity versus goal relevance

Logical validity, also commonly called 'internal validity' (e.g. by Smaling, 1992; Yin, 1994; Bullock and Tubbs, 1987) is an important second criterion for gauging the theoretical significance of research findings. It refers to the question of whether the reasoning, the 'logic' of the research framework provides arguments that are powerful and compelling enough to defend the research conclusions. Essentially the concern with establishing internal validity is one of establishing causal relationships, whereby certain conditions are shown to lead to specific outcomes, as distinguished from spurious relationships (Yin, 1994: 40). In contrast to the previously discussed measure of construct validity, which mainly applies to the data collection phase of a study, internal validity applies to the data analysis phase (Yin, 1994: 105). The most powerful form of argumentation ensuring internal validity would be a truly experimental research framework, which has the capacity to clearly demonstrate that variable x leads to variable y, and that y was not caused spuriously by a third variable z. However, the non-experimental nature of most qualitative research makes establishing causality exceedingly difficult (Stake, 1995: 242), and therefore proxies for establishing the causality of the findings are often used, as shall be discussed shortly. Whereas internal validity represents a criterion of theoretical significance, goal relevance constitutes a property of practical relevance. Goal relevance refers to the correspondence of the outcome (or dependent variable) in a theory or framework to the things the practitioner wishes to influence (Thomas and Tymon, 1982: 347).

Co-operative case writing at Siemens was characterized by four interrelated, but distinct approaches: (a) All those who took part in a project were questioned not only about what happened, but also about how *it happened. (b) The group of case writers comprised case coaches, or outsiders, as well as members of the case company (involving as many members as possible from different functional groups that participated in the project). This added an important dimension, because the outsiders played devil's advocate, questioning and challenging the inside view of the project, thereby 'teasing out' valuable insights that would otherwise not surface. (c) Since the case coaches did not participate in the project, they were expected to research the details and to try to understand how things worked in the 'foreign' company. This obliged the insiders to carefully explain details they would otherwise take for granted. The outsiders, in turn, contributed an additional perspective as they brought their own mental models of how things worked in their research with other companies to the group. (d) During the 'teasing' process, managers became aware of tacit assumptions, rules and prevalent behavioral codes that were new to them, and also caused them to question these assumptions. Differences that would not otherwise have been obvious were thus revealed in the case company. Discussion of these differences during the case-writing process also created a new awareness of certain rules, habits and behaviors in the case organization itself that were usually hidden below the surface.*

- *Proposition 2.1.* (Practical relevance, goal relevance): Discussions between managers and academics helps to enhance the correspondence of the outcome (or dependent variable) in a theory to the things the practitioner wishes to influence.
- *Proposition 2.2.* (Theoretical significance, internal validity): Discussions between managers and researchers help in ruling out spurious relationships between independent and dependent variables.

Discussion. Two tactics are commonly used to ensure internal validity in case studies (Denzin and Lincoln, 1994; Denzin, 1989): pattern matching, and convergent validity. *Pattern matching* has been emphasized as the most opportune strategy for ensuring internal validity of case studies. Pattern matching compares an empirically-based framework with a predicted, theoretical one. If the patterns coincide, or match, the results strengthen internal validity (Yin, 1994: 109). Pattern matching can be particularly powerful if patterns coincide across previous studies (Eisenhardt, 1989). This form of pattern matching has also been referred to as *convergent validity* (Denzin and Lincoln, 1994; Bullock and Tubbst, 1987, 1990) to denote that the validity of findings can be greatly enhanced if they can be shown to be consistent with similar findings in other contexts. Pattern matching and convergent validity as a strategy for ensuring internal validity was widely observed in the present research. To illustrate, the case coaches consistently compared existing patterns (i.e. the patterns based on their knowledge of previous research) with empirically based patterns (i.e. the issues of importance to managers). In comparing known theoretical patterns with empirically based ones, it was also made possible that rival or contrary evidence and thinking were accommodated in the data analysis phase, thereby enhancing the probability of ruling out spurious relationships between dependent and independent variables.

3. Generalizability versus operational validity

External validity or generalizability refers to the extent to which findings apply to contexts other than the one researched. Case studies make generalizability of the empirical findings difficult, because of the characteristically small sample size used (Sutton and Straw, 1995; Weick, 1995; Yin, 1994: 38 – 40; Eisenhardt, 1989). As a consequence, case study authors often walk a thin line between acknowledging the specific contexts of their case study work,

and seeking wider applicability or external validity (i.e., generalizability) of their findings (Ruigrok et al., 2002). However, theoretical significance depends critically on the generalizability of findings (see, e.g. Sutton and Straw, 1995; Wacker, 1998; Weick, 1995). Operational validity is a property of practical relevance and refers to the ability of the practitioner to implement action implications of a theory or framework by manipulating its causal (or independent) variables (e.g. Thomas and Tymon, 1982: 348).

The field research involved cases from various levels and functional groups within Siemens. The research specifically focused on two groups: the group of case writers, and the project group interviewed for the purposes of the case study. We found that in the case-writing group, new knowledge was created through intensive and thoughtful discussions in the group that sought to establish 'how' a certain outcome materialized. Especially the case coaches in their roles as devil's advocates played an important role in stimulating discussion and ensuring that common ground did not emerge prematurely. In this process it was critical that individual views and perspectives were influenced and broadened by the group. This mutual challenging of viewpoints in discussions and the new knowledge that the process yielded made learning at group level more than just some aggregate of individual learning.

The research further showed that participants profited in three ways. First, at the individual level, the procedure gave each member of the group a chance to reflect on the project, reinforcing individual learning. There was usually no other such opportunity to reflect on the meaning of past events, projects, and business assignments, as members of the project team were often immediately assigned to new groups and had new tasks to perform, once a project ended. Second, at group level, the project group received feedback on the comments they made during the interviews, since the finished case report was made available and circulated for further discussion. That approach enabled the group members to see how their points of

view had been incorporated into the case study and what they added to the final picture. In addition to this, each member of the project group was also able to read other group members' complementary views. Third, a similar process evolved at company level. Here, the field research showed that the co-operative writing and use of cases contributed to the evolution of the shared knowledge base, since the different case writing groups in the different departments that participated in the study were keen to learn "how their colleagues were doing." The process of feeding the written cases back into the company represented an institutional arrangement for collecting, storing and disseminating information. When the case report was presented and distributed throughout the organization, and later made available for a general audience, it increased Siemens' ability to reflect on its past, thus creating an environment conducive to collective learning.

- *Proposition 3.1.* (Practical relevance, operational validity): The usage of multiple case studies from one organization within this organizational setting is conducive to knowledge sharing across departments and units.
- *Proposition 3.2.* (Theoretical significance, generalizability): The usage of multiple case studies emanating from one organizational setting enhances external validity, particularly if different industries in the form of different business units participate in the study.

Discussion. Lack of generalizability constitutes perhaps the single-most important challenge to the theoretical significance of the case study method. In this stream of inquiry, researchers have commented that the study of a single case is not as important as the study of a larger sample of cases in order to obtain generalizations pertaining to an even bigger population of cases (Denzin, 1989; Herriott and Firestone, 1983; Yin, 1994). In her widely cited paper, Eisenhardt (1989) argues that case studies can nonetheless be a starting point for theory development and suggests that four to ten case studies may provide a good basis for

generalization. In the situation of a single case study, a case study that makes use of different units of analysis within one corporate context may be a ”small step toward grand generalization” (Stake, 1995: 238). However, some authors have argued that generalization cannot, and should not, be emphasized in all research, because of the perils of overgeneralization (Mir and Watson, 2000), or because it may draw researchers' attention away from understanding the case itself (Stake, 1995; also Mintzberg, 1979). Ruigrok et al. have argued that to the extent to which units of analysis within a case study can be seen as subcases, analysis of single embedded case studies would be structurally similar to cross case analysis (Ruigrok, Gibbert and Kaes, 2002). This suggests that generalizability of single case studies, which focus on various sub-cases within the corporate context, would equal that of multiple case studies, and hence enhance the generalizability of the research findings. This seems particularly appropriate in the case where several industries in the form of different business units are included in a given study.

4. Reliability versus knowledge explication

Reliability refers to the extent to which later researchers can arrive at the same insights as previous researchers, if the former were to conduct the same study again (Smaling, 1992; Denzin and Lincoln, 1994). Reliability is often used as a methodological requirement for the results of the research study, such as collected data, interim findings, and final conclusions (see, e.g. Denzin and Lincoln, 1994; Yin, 1994; Smaling, 1992). By contrast, knowledge explication appertains to practical relevance, and refers to the degree to which a given theory or framework helps the practitioner to understand and act previously tacit knowledge, hidden assumptions, and ‘ways of doing things around here’ (e.g. Eisenhardt, 1989; Probst et. al, 1999; Thomas and Tymon, 1982).

Within the case writing groups, as well as in the final reports, narratives featured strongly. To illustrate: the labels, images and expressions used in the case studies were the outcomes of a process of constructing shared meanings. The final report, due to its narrative style, conveyed case writers' assumptions about how to describe aspects of a given project. The writers discussed ways of evaluating the results of the project, and of making sense of their own impressions, together with all the information gathered from documents, interviews and other sources. Members of the company used narratives in their planning processes, in order to clarify to others the thinking behind their plans, and also in order to capture the imagination and in order to stimulate the enthusiasm of other employees. This technique was based on the recognition that a story defined a set of relationships and a sequence of events, and identifies causes and effects. The story, with its narrative approach, weaved all these elements into a complex whole that is likely to be remembered.

Furthermore, the field research presented here showed that three types of knowledge, which differed in scope, level of specificity, and degree of explicitness emerged in the case writing groups. First, task-related knowledge. This was factual knowledge that told managers how to accomplish a given task. This type of knowledge was highly specific, limited in scope and application, and tended to be relatively implicit. An example was an engineer's knowledge of how to build or repair a particular technical device. Conceptual knowledge, the second type of knowledge, had a wider scope, but was less specific. It was concerned with ways of approaching a problem or a project. Examples of conceptual knowledge included procedures for launching a product, or for implementing a research and development project. In its broadest form, conceptual knowledge represented knowledge about methods for solving problems. It was usually explicit, and provided a framework within which specific tasks can be approached. Relational knowledge, the third type of knowledge was mostly implicit, and related to particular persons, habits, rules of the game and hidden rules within an

organization. Elements of relational knowledge were found, for example, in descriptions of the management interfaces between different divisions or geographically divided teams, or in the characteristics attributed to persons who played an important part in the projects investigated. The use of images, metaphors and associations also conveyed relational knowledge. Discussion of the case also lead to development of the collective knowledge base, since participants contributed their personal insights, recall their own work experience, and add the impressions they have gained during visits to the company.

- *Proposition 4.1.* (Practical relevance, knowledge explication): The narrative approach of case studies is conducive to making tacit knowledge explicit.
- *Proposition 4.2.* (Theoretical significance, reliability): Capturing narratives in the form of case studies, e.g. in a case study database or a case study protocol enhances the reliability of the research findings.

Discussion. The reliability of a study demands the absence of random errors (Smaling, 1992: 79; Yin, 1994: 45). According to Yin, the objective is to ensure that the results of a given study can be achieved a second time, when the original methods and procedures are followed closely (Yin, 1994: 45). To enhance reliability of research findings, it is often suggested that research procedures be documented as closely as possible in order to make the process by which the results were found as transparent and replicable as possible (Smaling, 1992; Huberman and Miles, 1984). This requirement becomes even more imperative in qualitative studies where procedures are often emergent, rather than planned (Denzin and Lincoln, 1994; Reason and Rowan, 1981).

Several measures to enhance the reliability of the empirical results of a qualitative research study can be found in the literature (see, e.g. Denzin and Lincoln, 1994). For case studies, the

most widely used approach to enhance reliability is that of Yin (1994). According to this author, reliability can be approached in conducting the research ”as if someone were always looking over your shoulder” (Yin, 1994: 45; cited in Orgland, 1995: 203). The problem of reliability in case studies then becomes a function of documentation. In other words, reliability can be enhanced through meticulous documentation and elucidation of the research procedures taken. One way to do this is through a case study protocol. The case study protocol can be complemented by a case study database (Yin, 1994; Stake, 1995).

The present field research has shown that the narrative structure of case studies is particularly well suited to making tacit forms of knowledge explicit in order to capture them in a case study protocol. As Yin emphasizes, an encompassing case study protocol is the most important approach to ensure reliability (Yin, 1994: 45, 67 – 76). The present research showed results similar to Eisenhardt, (1989), who argues that stories are a good way to make tacit knowledge explicit and to ensure the readability and accessibility of the research findings. Extending, Yin, who mentions that the compilation of a case study database can also enhance the reliability of a given study (Yin, 1994: 45; 98 – 102), the present research has shown that the narrative structure of case studies not only enhances the readability of case studies, but also helps create a comprehensive case study database that captures a wealth of tacit knowledge previously inaccessible, thereby benefiting both the practical relevance as well as the theoretical significance of the research findings.

LIMITATIONS OF THE STUDY

Although the propositions provide rich insights into the interface of theory and practice, the specific context within which these propositions were developed has to be appreciated, in order to explicate the limitations of this study. This study is subject to the general limitations

associated with field research in one organization (see Burgelman, 1994, as well as Eisenhardt, 1989 for a description of these general limitations). In addition to these general limitations, the empirical study has at least three specific drawbacks that are related to the context of the field research. First of all, a specific type of firm was analyzed, namely the diversified type. Second, this firm operated in a wide variety of industries within the broad electrical engineering and electronics industry. Third, this paper deliberately focused on a specific research methodology.

First, the Siemens corporation represents a major multinational firm of the diversified type, i.e. a large corporation that is active in various, if related, industries (see Chandler, 1962). Several authors have mentioned that firms of this type are susceptible to specific challenges that are quite distinct from challenges of smaller firms operating in only one industry. One, important, such challenge is the sharing of relevant knowledge within the firm (e.g. Davenport and Probst, 2002; Probst et al., 1999; Davenport and Prusak, 1998). Authors are in agreement that while a discrete, functional and departmentalized division of labor may encourage local innovation, it tends to encourage the formation of localized codes of conduct and procedures as well, thereby making sharing knowledge across functional boundaries difficult (e.g. Grant, 1996; Spender, 1996). In this view, the internal replication of knowledge can be handicapped by traditions of intra-organizational groupings, many of which may be tacitly present. This tendency was also observed in the present organizational setting and may account for our emphasis on knowledge sharing as being a very important aspect of practical relevance.

Second, the firm we studied operated in a wide variety of industries, including telephony, mobile telephony, household appliances, transportation, medical systems, automation, and business consulting. Furthermore, it was involved in all the activities associated with a large

manufacturing firm (research, product development, manufacturing, marketing and sales). This introduced levels of complexity in the data that are not typically available in other in-depth studies, which typically focus exclusively on one industry (see, e.g. Burgelman, 1994, Lovas and Goshal, 2000, Eisenhardt and Brown, 1998). This is highly advantageous, because it is conducive to the generalizability of the research findings (Eisenhardt, 1989; Stake, 1988; Denzin and Lincoln, 1994). However, it must still be acknowledged that the propositions as they are presented here can lay claim only to being a tentative framework, in need of further research and validation in a wider variety of contextual settings.

Third, this paper focused on a specific qualitative research methodology, the co-operative case writing method. Clearly there are other research methodologies both qualitative and quantitative that could be scrutinized in terms of the practical relevance and theoretical significance of the research findings they yield. Thomas and Tymon (1982), based on an extensive review of organizational behavior, organization theory, and organization development literature have provided a generic set of necessary properties of practically relevant research that could guide such further work.

CONCLUSIONS AND IMPLCIATIONS

The present paper developed a set of propositions for moving beyond the dichotomy of theoretical significance versus practical relevance of the research findings, based on a specific research methodology, which was called 'co-operative case writing' (i.e. the joint writing of case studies by practitioners and academics). The primary level of analysis for formulating the propositions was the corporate level, the secondary level of analysis was the business unit level. The overall contribution of the present research can be assessed in terms of these two levels of analysis. On the corporate level, the present research constitutes an in-depth case

study of how one diversified, major transnational firm utilized the co-operative case writing method for purposes of organizational learning. On the business unit level, the present research allowed for the identification of steps and their associated key activities for enhancing practical relevance of research findings in six carefully sampled industrial settings (telephony, mobile telephony, household appliances, transportation, medical systems, automation, and business consulting). Activities and levels of complexity can be found in our data that are not typically available in other case studies, which typically focus exclusively on one industry (see, e.g. Burgelman, 2002, Lovas and Goshal, 2000, Eisenhardt and Brown, 1998). Our study also provided insights into practically relevant knowledge sharing processes between the different units.

The overall conclusion of this paper is that the activities associated with co-operative case writing cater for both theoretical significance as well as practical relevance, suggesting that the two criteria need not be viewed as mutually exclusive. The present paper has highlighted four critical dichotomies associated with the two criteria. Each of these dichotomies, in principal, can be reconciled by applying the co-operative case writing method. Consider, for example, a case study on organizational change. Practitioners and academics discuss rival perspectives when drafting the case study, which ensures both non-obviousness (proposition 1.1.) of the research findings, and also enhances construct validity by researcher triangulation (proposition 1.2.). Similarly, the discussions between managers and academics during the writing process are likely to benefit goal relevance by enhancing the correspondence between the contemplated measures to be implemented, and their effect on strategic change (proposition 2.1). Likewise, such discussions help to rule our spurious relationships between independent and dependent variable, thereby enhancing internal validity (proposition 2.2.). Writing and comparing several case studies of different aspects of the change initiative, can benefit the generalizability of the research findings (proposition 3.2.), and seems conducive to

the sharing of knowledge between departments or organizational units where such change initiatives evolve (proposition 3.1.). Finally, the narrative approach central to co-operative case writing helps making tacit knowledge explicit (proposition 4.1.), and also benefits the reliability of the research findings by making it possible to capture this previously tacit knowledge in the case study protocol and the case study database (proposition 4.2.).

It will remain for future research to refine and operationalize the propositions, particularly in other organizational settings. Such research would help to establish whether and to what extend the findings presented here are generalizable to other organizations, or if, indeed, they should be idiosyncratic to the organization researched. At this point, however, our propositions suggest three key implications for management practice.

First, collaboration between company 'insiders' and 'outsiders' in a case-writing group is important, because it is through the interplay of questions and discussion within the case-writing group that knowledge becomes conscious, and non-obvious behaviors and insights can be fostered. This reinforces conclusions drawn by strategy and organization science scholars (e.g. Leonard-Barton, 1992, 1995; Spender, 1996), who assert that a mutual challenging of concepts held in an organization can be helpful in ensuring that core competencies do not inadvertently turn into 'core incompetencies.'

Second, a narrative style should not only be permitted, but also actively encouraged, since it is critical in making tacit knowledge explicit. Managers who are used to writing reports or executive summaries in an objective style may need encouragement to adopt this style. The resulting process of 'sense-making' (Weick, 1995) depends on the use of language to convey and communicate the meanings assigned to various aspects of the case. Viewing the case study as a narrative, can help explore the construction of the shared meanings that appear in

the stories (Czarniawska, 1997). Without the narrative element, the benefits of co-operative case writing in making tacit knowledge explicit are seriously compromised. Indeed, the narrative style goes beyond making tacit knowledge explicit; it can also give rise to new knowledge. The interplay between tacit and explicit knowledge during discussion can lead to what Nonaka calls 'genuine knowledge creation' (Nonaka and Takeuchi, 1995).

Third, co-operative case writing requires collaboration not only amongst individuals in the different functional groups, but also at corporate level. Companies must be prepared to disclose, publicly broadcast and openly discuss the challenges and experiences of the past if they are to learn from them. The case-writing method can only achieve its full potential in companies where this tolerance is present, and where there is a genuine desire to profit from experience. This extends findings by other authors, who argue that case writing may prove a useful tool for promoting learning at different levels in the organization (Argyris, 1982, 1997; Daft & Huber, 1987). In a co-operative case writing approach as shown here we can find a multi-dimensional learning model that allows the observation of an organizational phenomenon on various organizational levels. As such, a social system, i.e. a project team, a corporate unit, or an entire organization can learn, by interaction, reflection and experimenting between researchers and practitioners, by investigating processes, behavior and results (in the sense of 'after action reviews,' Garvin 2001).

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TABLES

Table 1: Overview of case studies examined within the overall context.

Area	Topic of case study	Time schedule of research
Corporate		
	1. Knowledge management in the strategy process	Spring 2002
	2. Building a community of knowledge managers	Spring 2001-winter 2001
	3. Best practice marketplace	Spring 2001-winter 2001
Telecommunications		
	1. Intra-net based knowledge sharing platform for sales personnel	Spring 2000-winter 2000
	2. Yellow-pages approach for sales personnel	Spring 2000-winter 2000
	3. Development of a 'miles and more' system for rewarding knowledge sharing	Spring 2001-winter 2001
	4. Knowledge management and organizational change	Spring 2000-winter 2002
E-business transformation		
	1. Managing online knowledge exchange with customers	Spring 2001-winter 2001
	2. The role of knowledge management in e-business transformation	Spring 2002
Business consulting		
	1. Knowledge management in consulting industry	Spring 2000-winter 2000
	2. Selling in-house knowledge management solutions as a service to corporate clients	Spring 2002
Education and training		
	1. E-learning	Spring 2001-winter 2001
	2. Management learning and knowledge management	Spring 2002
	3. A university-based degree in knowledge management expertise	Spring 2000-winter 2000
Medical systems		
	1. Creating a filmless hospital through knowledge management	Spring 2000-winter 2000
	2. Knowledge management in tending to patients	Spring 2001-winter 2001
Semi-conductor		
	1. Sharing of knowledge in the chip development process	Spring 2000-winter 2000
Mergers and Acquisitions		
	1. Knowledge exchange in post-merger integration	Spring 2000-winter 2000