

Blending words and numbers, Towards a framework for combining quantitative and qualitative strategies of organization research

Citation for published version (APA):

den Hertog, J. F. (2002). *Blending words and numbers, Towards a framework for combining quantitative and qualitative strategies of organization research*. MERIT. MERIT-Infonomics Research Memorandum Series No. 021 <https://doi.org/10.26481/umamer.2002021>

Document status and date:

Published: 01/01/2002

DOI:

[10.26481/umamer.2002021](https://doi.org/10.26481/umamer.2002021)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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MERIT-Infonomics Research Memorandum series

*Blending Words & Numbers:
Towards a Framework for
Combining Quantitative and
Qualitative Strategies for
Organizational Research*

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2002-021



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Blending Words & Numbers:

Towards a Framework for Combining Quantitative and Qualitative Strategies for Organizational Research

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July 2002

Abstract:

Blending qualitative and quantitative research methods is widely propagated as a strategy for both quality control and enrichment of organization research. This has been recognized in the organization literature for more than twenty years. However, during the last decade the progress in the practice of research has not been altogether impressive. Ambiguity is one of the key problems in this respect. This paper tries to clarify the discussion on blended methods, by (1) clarifying concepts used to describe blended design, (2) inventorizing and categorizing the different forms and objectives of blended design, and (3) developing a provisional framework. The study departs from the research practice, the sequences of action in concrete studies. The focus is on research as a process, rather than on specific methods. Finally, the paper suggest some directions for a development program for blending methods.

Introduction

In the study of organizations, the choice of research method seems to be one between two main roads: either gathering little information about many organizations, or much information about one or a few organizations. The first choice is driven by the quantitative logic which says that large samples are important for making generalizations and that the organizations (or "cases", "subjects") always have to outnumber the variables in order to make multivariate analysis possible. The second choice is based on the qualitative logic that understanding of organizational context requires a redundancy of information or "thick description" (Geertz 1973, p. 5-6): "...wading through clusters upon clusters of symbols by which man confers significance upon his own experience". In this perspective it is the "good story" that counts (Dyer & Wilkins 1991) and that requires a deep insight into the social dynamics of the respective organization. Following the same argument, research in multiple organizations bears the risk that descriptions become too "thin".

Is there one best way for doing social research, or is research a matter of methodological choice, depending upon the objectives and the means available? Are researchers expected to "come out" for their basic methodological disposition? These questions have been a source of almost endless polemics between the adherents of natural science and subjectivistic way of doing research. Browsing through the volumes of leading journals such as the *Academy of Management Journal*, *Accounting Organizations and Society*, *Organization Science* and *Organizational Studies* one gets the impression that the way of looking at organizational phenomena has often become more important than the phenomena themselves. Increasingly, theory development appears to be driven by methodological possibilities, not by fascination, curiosity, amazement and urgency.

The alternative view – that the development of methods has to be driven by the concern to solve practical problems and/or to understand social phenomena – is not new. Illustrative in this respect is the preface of the first and pioneering edition of "Research methods in social relations" (Jahoda et al. 1951, cited in Selltitz et al. 1959, p. v): "Research methods can be presented in many ways. The special emphasis of our presentation arises from a growing concern among social scientists that their work should contribute to the solution of practical problems as they arise in the contemporary world". Another classical example of this view can be found in Alvin Gouldner's pioneering work (1954) on industrial bureaucracy. Gouldner and his team studied the management/workers relations inside a Gypsum plant and in the community outside that plant. His research was driven by his fascination for the phenomenon of industrial bureaucracy. Explaining and understanding that phenomenon was central to his effort: "In short, we sought to take a beachhead, rather than to consolidate a position on it". For taking and holding this beachhead he used almost any method in the book, from participant observations, in-depth interviews to standardized questionnaires and representative samples. To him, the combination of qualitative and quantitative methods was self-evident. Method followed the phenomenon, rather than the other way around.

Since the late 1980s, an increasing number of organization researchers have pleaded for a similar, third way of doing research: combining qualitative and quantitative methods. Most of them (for example: Cobbenhagen 1999, Daft & Lewin 1993, Jick 1979, Larsson 1993a, Lee 1998, Leonard-Barton 1990, Van de Ven & Poole 1991) make their methodological choices on the basis of *pragmatic* arguments. To them, the design of a research project is primarily determined by the objectives of the study, the nature of the phenomena and their context and the available means. They tend to choose almost "any method that works under the given circumstances". Methodology is in this perspective (Homans 1949, p. 33) not a matter of morals, but of strategy. The resulting research approaches have been coined as "dual" (Leonard-Barton 1990), "mixed", "hybrid" (Jick 1979) or "blended" (Lee 1999) research designs. The concept of "triangulation" (Jick 1979) is used (see below) in the same vein. In this paper the term "blended" will be used. Blending is regarded as the craft of combining different "components" in order to reach a specific "taste" or "purpose". Blending refers (cf. Leonard-Barton 1990, p. 248) to a synergy, which offers more than the sum of the components: a new quality of information. The challenge might be to turn this craft and its heuristics into an explicit logic for methodological choice.

A considerable number of organization researchers (Daft & Lewin 1990) do not want to be caught in a methodological straightjacket. However, only few (cf. Grunow 1995) of them would agree with

Feyerabend (1975) that with respect to social science methodology “everything goes”. If we want to capitalize on the advantages of blended designs and avoid their pitfalls, we should be able to accumulate the knowledge and experience of its users. However, this pragmatic perspective poses several problems, at the core of which is the *ambiguity* of the blended research design. Ambiguity originates in the first place from the confusing usage of methodological concepts, which leads to confusing questions like: “Can case studies be based upon quantitative data, and surveys be designed for handling qualitative data?” The second source of ambiguity is the emergence of a variety of forms of blended design. At last, ambiguity can be regarded as the result of the variety of, often implicit, objectives researchers are pursuing in combining qualitative and quantitative methods. More than 20 years ago, Jick (1979, p. 607) stated that there are hardly guidelines for systematically ordering eclectic data. Today, this still seems to hold true. Apparently, there is still a lack of knowledge about the functionality (or “added value”) of such combinations. One might conclude that organization researchers need to work on a conceptual frame of reference in which different types of blended designs can be positioned. Such frameworks have become self-evident tools for designing surveys (Jahoda et al. 1951) and (quasi-) experiments (Campbell & Stanley 1966) and presently also for case studies (Yin 1989).

To advance along this line, it is essential (Jick 1979, p. 605) to articulate and describe the use of blended designs. This implies an inventorization and categorization of the various forms of blended research, which can be found in organization research practice. Such order might help us to find the basic components, which can be used to build a framework for blended research. A condition for that effort is to clarify the language by which we describe our choices and patterns of action. Summarizing, this paper tries to resolve the ambiguity connected with blended design by:

- clarifying concepts used to describe blended design;
- making an inventory of and categorizing the different forms and objectives of blended design;
- developing a provisional framework for blended design.

The emphasis in this paper is on the areas where blending most frequently seems to have taken place: the borderline between case study and survey. The focus is on the process of research (on what researchers actually do) rather than on broad objectives (cf. Greene et al. 1989). Finally, the paper discusses the implications of blended designs for a broader research policy. It is argued in this respect that organizational studies often have to be regarded as small or larger steps in the accumulation of knowledge. They add value in a broader research process. The paper concludes with a plea for a programmatic approach to organization research. This paper is to a large extent based on the experiences gathered during (and in the follow up of) a multidisciplinary research programme, launched by the Dutch government: *Technology, Work and Organization* (1988). The TWO program offered the opportunity for a team of 15 researchers to experiment with a broad variety of research designs for seven years (see: Cobbenhagen 1999, Groen 1995, Den Hertog & Cobbenhagen 2001, Huizenga 2001, Roberts 1993).

Language Toolkit

The choice for blended designs is mostly argued in the methodology literature in abstract and general terms as a way to bridge qualitative and quantitative research. Larsson (1993a, p. 1515), for example, states that his study is meant to transcend the limitations of both quantitative and qualitative methods and “...thereby bridge the nomothetic-idiographic gap”. In a similar vein, Dunn & Swierczek (1977) advocate an integrative perspective in the research on planned organizational change: for attempts to *match* general knowledge with concrete experiences. Glick et al. (1990, p. 294) describe such a match as a *trade-off*, “... sacrificing some depth in order to gain breadth”. However, when we look at research reports we can observe that the actual meaning of blended design can vary in a far more concrete way, from:

- a form of quantitative (meta) analysis of qualitative data (Larsson 1993),
- a check on external validity (Groen 1995) and
- a method of data collection (Geurts & Roosendaal 2001),

to

- a research design (Cobbenhagen 1999, Leonard-Barton 1990).

The same kind of ambiguity exists with regard to the concept of “triangulation”. Some writers (Jick 1979) primarily view triangulation as a way to grasp process and context in organizations. Others (Scandura & Williams 2000) see triangulation in the first place as a check on internal and external validity. This confusion makes progress in the development of blended research difficult. There appears to be a need for more clarity about the basic concepts of blended research. In this study the following pairs of concepts are elaborated:

- qualitative vs. quantitative data
- qualitative vs. quantitative research
- blended and unblended design
- research design vs. methods of data collection
- survey vs. case study.

It might not be realistic to aim at a set of definitions which is acceptable to the research community as a whole. Definitions often reflect the underlying research philosophy. More important is that the definitions that are actually used are made explicit. This pragmatic approach might not result in a set of final and “true” definitions. Hopefully it offers a useful “language toolkit”.

Qualitative and quantitative data

Data can be defined in a strict sense as the direct consequence of observations. The researcher can only make sense of data if it is transformed into symbols: translated into words (texts) and numbers (scale values). That is where the coding and categorizing begins. The result of this first-order coding is *raw data*: the answer codes of a questionnaire, the transcript of an interview, memos and field notes and frequencies of behavioral responses. The word “data” can also refer to the data as it is used in the analysis. The raw data is usually coded again for that purpose. Strauss & Corbin (1990) argue that in fact the whole process of data analysis is a matter of coding, resulting in scale values and verbal categories. Qualitative data (Strauss & Corbin 1990, p 17-18, Greene et al. 1989, p. 256) refers to data expressed in words, and quantitative data refers to data expressed in numbers. It is important to note that qualitative (raw) data can be transformed into quantitative data. This can be done by coding and counting verbal data, like in content analysis (Krippendorff 1980) or by expressing subjective judgements in scale values. This transformation can also take place in the opposite direction, when numerical indicators are verbalized, for example, when a theory is built upon a factor analysis. Pugh et al. (1969) used a factor analysis in their search for the basic dimensions of organizational structure in an empirical study of 52 English organizations.

Qualitative vs. quantitative research

The discussion about these polarities seems endless. In this respect, the logic presented by Strauss & Corbin (1990) is attractive by its pragmatism, simplicity and clarity. They call a study “quantitative” when the results are based on statistical analysis of the data. This data may have both a qualitative (e.g. Larsson 1993a) and quantitative origin. Qualitative research is research in which the data (qualitative and/or quantitative) are analyzed using non-mathematical means, or “interpretive procedures”. The basic procedure is called “coding”, which refers (Strauss & Corbin 1990) to the “techniques for conceptualizing data”. These definitions are pragmatic in the sense that they do not refer to the traditional epistemological difference between subjective/idiographic and objective/nomeothetic research. These two approaches to knowledge development are not regarded as rival approaches, but as patterns of action which have different functionalities (cf. Hove 1992).

Figures can have special meaning, or can give special meaning to written or spoken texts. A couple of years ago, the author of this paper experienced this in rather painful a way during an open interview with the vice president of a firm which participated in a study about knowledge development strategies. In this project, the interviewees were expected to do their homework well. Part of the homework was studying the financial figures from the company's annual report. On that specific day, however, the figures on the interviewer's mind were those of the firm he was to visit the following day. During the tea break he became aware of his mistake. He suddenly remembered that the company had suffered a deep crisis recently and was facing great difficulties to get out of trouble. During the first part of the discussion the interviewer believed that the firm was doing reasonably well. His opponent was hiding behind platitudes and anecdotes. After the break, the dialogue had to be reset. The second part of the interview had a totally different character. The interviewer had no choice than to admit his mistake and challenge his opponent again. This also meant taking the risk to be shown the door.

Box 1: Figures can give meaning

So far, not everyone agrees with Miles & Huberman (1984) that epistemological purity in this respect does not get research done. A number of researchers (e.g. Sale et al. 2002) have fundamental philosophical objections against blended methods. Their basic argument is that the different methods focus on different phenomena in different realities rather than on different aspects of the same phenomenon. This view is not shared in this paper. Rather, this paper departs from the proposition (Swanborn 1996) that the quality of quantitative and qualitative research can be derived from a common base of regulative ideas.

Blended vs. unblended design

One might argue that studies that are entirely based on qualitative or quantitative arguments might be hard to find in practice. Even the most fanatic quantitative researcher is inspired by what (s)he reads in the newspapers and hears from friends and colleagues about the phenomenon under study. Furthermore, few qualitative hard-liners would ignore "hard facts" which are available about his or her case: "Count the countable" (Lee, 1999, p. 121, box 1). The crucial issue here is that both the qualitative and quantitative components of a design are made explicit both in terms of the research procedures and the functions performed by these components. In a blended design, all components of that design (Swanborn 1996) are subject to scientific quality control.

Research design vs. method of data collection

Most researchers would agree that a plan must be made in order to do research. Even in ethnography the days are past in which graduates students asking their professor for methodological advice are shown the thickest book on the shelf and are told (Hammersley & Atkinson 1990, p. 28): "Go forth and do likewise!" Both qualitative and quantitative researchers need a plan for all kinds of reasons:

- focusing attention
- getting funded and assuring sponsors
- getting access
- relating means and methods to research aims
- getting organized.

The definition by Nachmias & Nachmias (quoted by Yin 1989, pp. 28-29) seems well suited for a broad range of researchers. These authors describe a research design as a plan that: "...guides the investigator in the process of collecting, analyzing, and interpreting observations". Positivists might like to further specify the research design in the vein of Nachmias & Nachias as "a *logical model of proof* that allows the researcher to make inferences concerning causal relations among the variables under investigation" (emphasis added by Yin). Researchers from the subjectivists camp might prefer another specification, by defining the design as (paraphrasing Fetterman 1989, p. 18): "...a roadmap that helps the researcher to conceptualize how each step will follow the one before to build knowledge and understanding". Planning might indeed be harder in ethnographic studies, because the events the participant observers may run into cannot be foreseen. Hammersley and Atkinson (1990) argue that this does not necessarily mean that the behaviour of the researchers in the field is haphazard. Research design in such studies is to be regarded in their view as "a reflective process throughout

every stage of a project". When design choices take place *during* the research process the researcher is expected to make these choices at least explicit *ex post facto*. This enables his or her peers to question the results in terms of method artifacts.

From both perspectives it is clear that research design is not synonymous with "method of data collection". Different methods of data collection can be used in one single study (for example, Leonard-Barton 1990):

- observations
- (group)interviews
- questionnaires
- study of archives, written materials, websites, and so on.

In other words: data collection is a part of the research design.

Surveys vs. case studies

The differentiation between "research design" and "methods of data collection" can be quite confusing because of our language usage. We use, for example, the word "survey" both for a specific method of data collection ("the questionnaire") and a design mode. In the latter sense, the survey can be defined as: "An investigation where:

- (a) systematic measurements are made over a series yielding a rectangular of data;
- (b) the variables in the matrix are analyzed to see if they show any patterns;
- (c) the subject matter is social".

De Vaus (1991, p. 3) simplifies this definition in the following way: "Surveys are characterized by a structured or systematic set of data which I will call a variable by case data matrix. All it means is that we collect information about the same variables or characteristics from at least two (normally far more) cases and end up with a data matrix".

This definition shows that "case" has at least two different meanings:

- as an object, or subject to which a value can be attached ("the unit of analysis", or the row in the survey matrix);
- as a phenomenon, or as a process in which an actor is, or groups of actors are, involved.

A case study can be regarded (Yin 1989, p. 23) as: "...an empirical inquiry that:

- investigates a contemporary phenomenon within its real-life context when,
- the boundaries between phenomenon and context are not clearly evident, and
- multiple sources of evidence are used".

A Provisional Typology of Blended Designs

One reason why typologies are so popular (Doty & Glick 1994, p.230) appears to be that they provide parsimonious frameworks for explaining complex phenomena. At this stage it might be too early to strive for parsimony. Scandura & Williams (2000) conclude, on the basis on their content analysis of three leading journals in management research, that the pleas for multimethod research from the 1980s have not been followed by a shift into this direction in research practice. The use of single-source data in the 1990s has been even greater than in the 1980s. In other words, there is not yet a real tradition of blended research in organization and management science like in educational (Greene et al. 1989) and health research (Sale et al. 2002). Secondly, parsimony is difficult to achieve due to the large variety of designs in terms of perspectives, objectives, means, sequence, and instruments. For these reasons the following typology is provisional. Greene et al. (1989) elaborated a framework for mixed methods in educational research with similar aims. They took broad mixed-method research aims (triangulation, complementarity, development, initiation and expansion) as a point of departure. In contrast, this study is grounded in the process of doing research in organizations. The typology has resulted from alternating between available concepts and design logic and action patterns in the practice of research. No systematic effort is made in this paper to inventory the population of published

blended studies, because its focus is primarily on the range of different designs rather than on their occurrence. A first indication for the application of mixed methods in management research can be derived from Scandura & Williams (2000).

Blended research designs exist in many forms and sizes. The following coding system might be useful to make the basic logic on which the design is built explicit. The idea is inspired by the scheme Campbell & Stanley (1966) used to characterize different forms of “quasi-experimental designs”. The following symbols are proposed:

- W Words (verbal data)
- N Numbers (numeric data)
- [] Within one data set or case
- TT Theory test
- TD Theory development
- O Operationalization (method)
- U Understanding
- D Description
- A Action
- Leads to, results in

The table below shows a number of possible examples.

Code	Design
[W] → TD + O → [N] → TT	Qualitative pilot study serves to build theory and formulate operationalizations. Numeric data are used to test the theory.
[N] → D → W → U + A	Numeric data to describe a population or sample. Qualitative study of contrasting cases within that population or sample is done to build understanding about phenomena and to plan action.
[W + N] → TT	A set of verbal and numeric data from the same case are used to develop theory.
[W x N] → TD	A set of verbal and numeric data, in which both kind of data are linked to the same persons/cases are used to develop theory.
[W → N] → TT	Verbal data are coded and transformed into numeric data. These are used to test theory.
[W] + [N] → TT	Qualitative and quantitative data from different samples, or cases are used to test theory.
[Wn] → [N] → TT	A collection of verbal data sets is coded and transformed in numeric data, which are used to test theory.

Box 1: Coding scheme for blended design

Surveys within case studies

Case studies focus on the phenomenon in its context. Any suitable method of data collection can serve the aims of the researcher. The survey is one of them. Gouldner's (1954) Gypsum plant study is a classical example of a case study in which a survey using standardized questions and a random sample was part of the design. Alvin Goulder's research team conducted 174 interviews with workers and managerial staff in this firm to measure their attitudes regarding the company's rules and regulations. More recently, Leonard-Barton (1990) used a survey measuring the attitudes of programmers towards the use of software development tools. She developed a highly structured interview guide in a pilot study of 25 programmers, which was used in interviews with 145 programmers in the same organization. This survey was part of one case study in a comparison of eight case studies dealing with technology transfer. This survey focused on a single perspective: that of the programmers. Code: [W+N] → TD.

Surveys as a tool to select cases

Surveys can also be used to detect cases with a specific profile. In other words: the survey can be used as a sampling device. The profile might be chosen for theoretical reasons or for practical reasons. This procedure is followed if the population of cases with this specific profile is not well known. An example is a study (Nambisan 2001) on the synergies between product and service sectors in the software industry. A survey among 134 firms in software firms in India, Singapore and the United States was used to characterize the population and select firms for the qualitative part of the study. Open interviews were held in 21 firms in these three countries. Code: N → TD → W → TD. The profile of cases might also be relevant when a larger organization selects units for a special treatment, for

example, organizational measures to reduce absenteeism and labor turnover (*authors personal experience*). Open (group) interviews, site visits and file search might provide a picture of “what really is the case”.

Cases as a tool to develop a survey

In methodology introductions (Selltiz et al. 1951, Neale & Liebert 1986) case studies are traditionally presented as a qualitative tool to prepare the “final” quantitative study testing specific theoretical propositions. Code: $W \rightarrow TD \rightarrow N \rightarrow TT$. The case study serves in this view as a way to explore a new domain, build theory, to identify possible intervening variables and relevant actors, and to construct or select operationalizations. Along this way, Cobbenhagen and his colleagues (1999) designed extensive questionnaires (more than 500 items) about success factors for innovation on the basis of an in-depth case study and a case comparison. Some quantitative hard-liners argue that such “adjunct” research methods might be invaluable (cf. Neale & Liebert 1986, p.31), but are not to be considered as workable methods on their own right.

Meta-case analysis

Generally speaking, meta-analysis can be regarded (cf. Bangert-Drowns 1986, Glass 1976, Larsson 1993a) as a strategy to improve the utilization of prior research, by integrating, or by synthesizing. The basic question is (Bangert-Drowns 1986, p. 388): “Are some regular patterns discernable in a body of studies on a given topic that show divergent outcomes?” Originally, meta-analysis was predominantly applied to quantitative research. These analyses (Bangert-Drowns 1986) may either take the form of a broad “state-of-the-art” review, or of more technical, formal statistical procedures. This approach has inspired qualitative researchers to find ways to get more value out of the diversity of available studies in specific research areas. The synthesis of qualitative studies can be based on qualitative tools, like metaphors (Noblit & Hare 1988). Other researchers try to apply statistical reasoning on previous qualitative case data. Dunn & Swieczek (1977) coin this approach in their pioneering study as “retrospective case analysis”. They used a sample of 67 studies from the organization development literature as a vehicle for theory building. They regarded their approach as a way to develop “grounded theory” (cf. Glaser & Stauss 1967, Strauss & Corbin 1990) in which knowledge is generated from experience from social science research. In a similar vein, Larsson (1993a) elaborated a procedure to generalize from case data. This procedure implies the following steps:

1. The selection of a set of existing case studies relevant to answering the chosen research questions.
2. The design of a coding scheme, which can be used to translate qualitative case descriptions in a set of quantitative variables.
3. The coding by more two or three raters (in order to establish inter-rator reliability).
4. Statistical analysis of the coded data.

The essence of this procedure is converting a set of qualitative case studies into a formal data matrix, which can be analyzed as a survey. This procedure can be viewed (Dunn & Swieczek 1977, Larsson 1993a) as a form of content analysis (Klippenberg 1980). Examples of this approach concern issues like: mergers and acquisitions (Larsson 1993b), technological service innovations (Yin et al., 1977) and design of production technology (Lewis 1998). Code: $W \rightarrow N \rightarrow TT (+TD)$.

Case survey

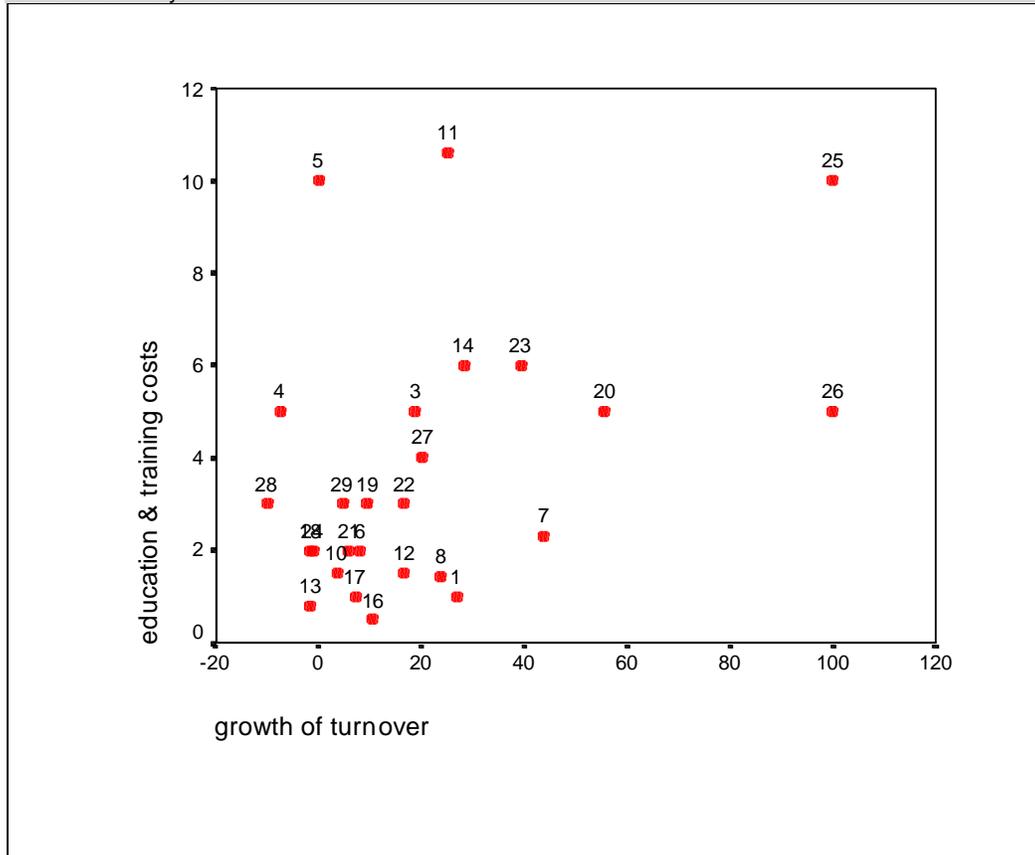
In this design the researcher selects a sample of organizational entities (or “events”), like in a traditional survey. He or she does not rely on existing case studies (“secondary data”), but gathers qualitative information to construct a new set of case studies or “stories”. In other words: the researchers do the data collection. In this perspective, the Larsson’s paper (1993a) would better have been called: “a meta-case analysis”. The combination with qualitative data can take two forms. One option is to code the qualitative data and convert them to scale values in a “survey-like” matrix. The advantage above the meta-case analysis is that the researcher has control over the sampling of cases and over the way in which the data are collected. The disadvantage is the huge manpower needed to gather the data. An example is the field research within the framework of the CODE program (Glick et al. 1993). A research team from a group of American universities gathered data in over 100 firms. The researchers interviewed managers in each firm four times at the end of six-month intervals. These interviews served to inventory and describe the major changes that took place in the preceding six

months. They asked managers to describe two sorts of changes: design changes and non-design changes. The next step in this program was the coding of this qualitative material in formal categories. The resulting set of quantitative data matrices was the ground for the final analysis. Code: [WxN]t1-tn→U+TD+TT.

The second option is to combine open interviews with precoded questionnaires on a one-to-one basis. This design was used in the frontrunners studies of the TWO Program. The basic objective of these studies (Cobbenhagen 1999, Huizenga 2001, Den Hertog & Cobbenhagen 2001) was to identify crucial management competencies for innovation. The first (cross-sector) study involved 62 firms in a paired comparison; 31 software firms participated in the second study. Three to four managers were interviewed in each company: the general manager, the marketing manager and the development manager. The interviews consisted of two parts: an open interview and a precoded questionnaire. The open interviews were the tool to construct a database of 62 case stories. The case stories (see also box 1) were used in this study to:

- illustrate the practical meaning of expected findings.
- cross-check expected findings
- explain unexpected findings and build new theory.

Innovation and improvement of tools, procedures and concepts are to a large extent an outcome of practical experience. The second frontrunner study (Huizenga 2001) offers a good example, showing how qualitative and quantitative data might be linked to develop new theory. The heuristics used were developed in the course of the data analysis. The following scatter diagram resulted from plotting 30 software firms (product developers and service providers) against two axes: (1) investment in professional training and (2) growth of annual turnover. During the study the market for software and software services was growing rapidly and the labor market was extremely tight. The availability of a skilled workforce seems to be a more important condition for growth than the market itself. This led to the strong expectation of a close relationship between investments in training and mean annual growth in 5 successive years.



The data (see graph above) clearly tells another story. The correlation between the two variables is no more than modest. To find a pattern that might explain this outcome the researcher added the names of the companies involved in the scatter diagram. He knew most of the “stories” behind the company names, which enabled him to see a clarifying pattern. Firm 20, for example, was a company which behaved very aggressive in the market. Fast growth and fast employment of new recruits were high on the policy agenda of the firm. The training objectives focused on the short term: making people employable as soon as possible. Firm 14 followed another policy. The objective of the training was more long term and aimed at building a basis for a longer career within the firm. As shown by the other quantitative data, this second firm was far more knowledge- and technology-oriented. The effect was a far slower growth in turnover. At last, the development of firm 28 had stagnated, while the whole market was in a phase of fast growth. The management established that the knowledge basis of the firm had been neglected for many years. To remedy this problem, it decided to invest heavily in a firm-wide training program. The cost of this became directly visible: decrease in profits and a negative growth. This analysis indicated that “training policy” and “firm strategy” are strong intermediating factors. The methodological discovery was that scatter diagrams based on strong quantitative data are an interesting mean to plot case studies in a two-dimensional space. Each point in the diagram represents a “real story”. In case the scatter diagram shows a statistically significant pattern, it becomes possible to test the observed relationship for possible alternative relations, because the researcher knows so much about each point in the diagram. This might outweigh the limited possibility for multivariate analysis in such small samples. Code: [WxN]→TD+TT.

Box 2: Stories in a quantitative space

Objectives

The starting point in this paper has been the view that the objectives of a study drive the choice of methods rather than the other way around. Which objectives can make researchers choose for blended methods? Two main categories of objectives can be found in the literature (e.g. Greene et al. 1989, Jick 1979, Swanborn 1996). The first category is concerned with the different possibilities that various qualitative and quantitative methods offer in terms of content. In other words, complementary functionality. The second category focuses on the improvement of the instrumental quality of a study: improving validity or intersubjective agreement and triangulation.

Complementary functionality

The argument here is that both designs and methods of data collection have a different functionality. For example, when studying absenteeism or service quality, the survey design might be very effective in establishing the frequency with which and the location where problems become manifest. In-depth interviews and case studies might be more effective in showing how problems emerge and how they can be remedied. Yin (table 1) uses Kipling's famous questions to categorize the strengths of the main research designs.

Table 1: When to use which research strategy? (Taken from: Yin 1989)

Strategy	Form of research question
experiment	how, why
survey	who, what, where, how many, how much
archival analysis (e.g. economic study)	who, what, where, how many, how much
history	how, why
case study	how, why

From this perspective, the blending of designs offers a possibility to extend the functionality of a study, enabling the researcher to answer both how, why and who, what, where and when questions. The *content* of the required information is the primary criterion. Closely related is Mohr's (1981) distinction between *factor* and *process theories*. Factor theories are built on the presupposition that output effects (dependent variables) are caused by changes in input factors, for example that worker satisfaction,

labor turnover and absenteeism are determined by leadership style (Silverstone & Wang 2001) and boredom (Kass et al. 2001). The test of factor theories presupposes reliable measurement of covariance, control over sampling and the possibility to exclude alternative explanations. Process theories are aimed at the explanation of output effects as outcomes of sequences of action, mediated by the characteristics of the context in which the change process takes place. The present paper is meant in this way. Development and testing of process theories requires the possibility to trace action patterns by longitudinal research (Pettigrew 1990) or retrospective analysis (Dunn & Swierczek 1977).

From an action perspective it seems only common sense to choose methods which make it possible to find the right answers, required to solve problems. When, for example it is our objective to reduce absenteeism in an organization, it only makes sense first to study the absenteeism data to localize the most problematic departments and worker categories (who, where, how often and how long). Later visits to these departments might give an insight into the reasons *why* the problems arose and how the problems might be remedied. How relevant the choice between factor and process theory is to the research design is illustrated in box 2.

A large American cleaning company was facing serious problems related to the presence of part-time employees, who often failed to show up at the firm that needed to be cleaned. The occupancy of cleaning team was barely controllable. As a result, the cleaning company was unable to guarantee its services to the customers. This problem offered Lawler & Hackman the possibility to carry out a field experiment. The company wanted to experiment with a system which would provide financial rewards for presence. The researchers suggested to choose a set-up in which the reward system was to come about and be introduced along a participative avenue. It was Lawler & Hackman's intention to establish the impact of such a participative decision making (PDM) on presence. They chose to apply a design in which nine existing, relatively autonomous groups of part-time workers were divided over the diverse conditions. The choice for a field experiment was made because that made it possible to measure causal impact of PDM in a realistic context. There were no apparent differences among the groups assigned to the different treatment conditions. The groups all worked in comparable buildings and the members of the different groups were similar demographically (e.g., age, education, experience, and social class). (Lawler & Hackman, 1969). The results of the research showed that absenteeism decreased in the condition where employees had been actively involved in shaping and introducing the reward system. The results were in line with the expectations: participative decision making leads to more confidence, involvement and more knowledge of the system. In turn, these factors lead to a better performance of the organization.

After the positive effects of participative decision making and the introduction of a new reward system had been convincingly demonstrated, a follow-up study in five groups was initiated (Schefflen, Lawler & Hackman, 1971). The new study enabled researchers to study the effects of the fact that the management had suddenly discontinued the plan in two out of three participative groups. In the one remaining participative group, the presence percentage was comparably high (93%) with the period shortly after the first experiment. The two participative groups for which the management had withdrawn the reward system showed a clear drop in presence percentage (from 92% before the discontinuation to 82% afterwards). The last two groups on which the new system had been imposed showed a slight increase in presence percentage (from 83% to 87%).

This led the researchers to conclude that they had overlooked an important factor in the original experiment, namely management participation. It was not their own system, and they took the first opportunity available to cancel the plan. To use the words of the researchers themselves: "long-lasting change can be introduced effectively in organizations only when the changes are accepted and owned by all levels — employees and managers alike — who are or will be involved in the new program". (Schefflen Lawler & Hackman, 1971, p. 186). Code: Nt1→TT→Nt2→TT→W→TD.

Box 2. Important factors overlooked

Originally, the study was designed to test a factor theory. The study appeared to give a simple answer to a simple question: "participation in decision making works!" The follow-up study showed that the effects of the intervention did not last in part of the groups. Only the reflection on the change process revealed a possible explanation for the unintended consequences of the intervention. Apparently, a process theory was needed to detect "where the process went wrong".

The differences in functionality are also related to the *phasing* of the knowledge creation process. The usual argument is that qualitative methods are specially suited for the explorative phase (quadrant 1) of

a study. In that phase the researchers are not yet able to unravel the tangle of interacting variables and to properly operationalize these variables. They use combinations of qualitative methods to draw a cognitive map of the phenomenon under investigation. Once theoretical ideas have taken shape, quantitative methods are used to test the hypotheses derived from theory. When researchers aim both to develop and test a theory they might be expected to rely both on qualitative and quantitative data. The same applies to the case in which the researcher is confronted with unexpected outcomes of his quantitative testing. In-depth interviews, site visits and case studies might help to find new explanations for the phenomena under study. In that case the researcher is moving to the next phase (from quadrant 3 to 4) in the empirical cycle (figure 1).

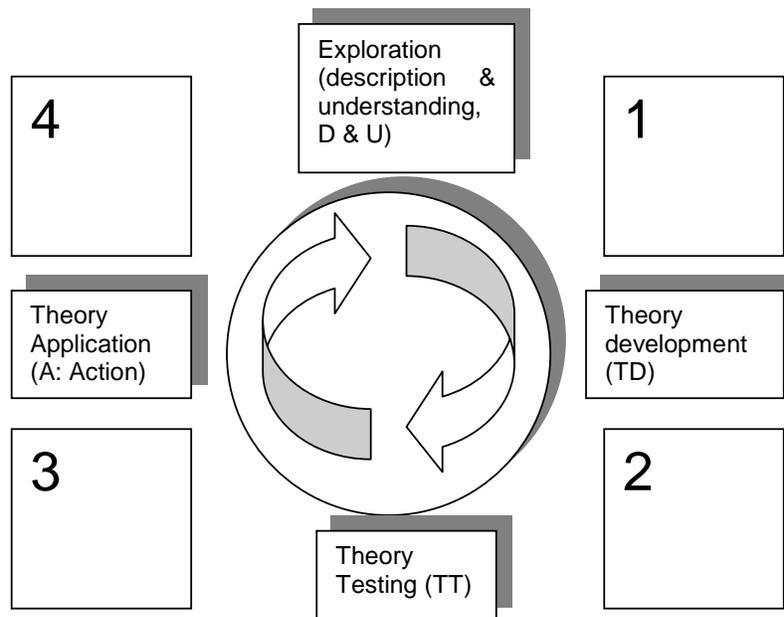


Figure 1. The empirical cycle (from: Den Hertog & Van Sluijs 1995)

However, a variety of other sequences is also feasible. As in the absenteeism example, it is also possible to do the exploration (quadrant 1) by means of a survey and to test theory on basis of case studies in which different treatments for the problem are applied. In that case, the testing occurs (quadrant 4) in the application phase. This line of reasoning was followed in the study in management accounting in box 3.

Roberts (1993) performed a small-scale survey (partly open and partly standardized interviews among managers of 22 small sized firms) as a preparation for his main study: a comparative case analysis. His research plan was inspired by Johnson & Kaplan's provoking thesis (1987) that management accounting has lost its relevance. In the view of these writers, one of the main reasons has been that the discipline paid no attention to the rapidly changing production technology. On the basis of Kaplan's arguments, Roberts expected to find a lot of managers in high-tech production firms to be struggling with accounting problems. The explorative survey was meant as an instrument to develop a cooperation with a few firms in different technological areas and select sites for in-depth case studies. This survey did not, however, confirm his expectations. Management accounting was not viewed at all as a pressing problem by the managers involved. Most of them were struggling with a different kind of problem: the difficulty to deal with technological and market changes within their traditional functionally oriented organizations. A substantial group of managers argued that they had to move towards a flow-oriented, team-based and simplified organization in order to get a better control over production processes. As a result of this finding, the author chose to change the focus of his study. He reformulated his basic hypothesis in the following way: "Simplification of the organization creates the possibility to resimplification of management accounting systems". This proposition was confirmed in a first organizational redesign case. Two other cases served as replications. Code: N→TT+TD→W→TD→W→TT.

Box 3. A survey as a preparation for case studies

The value of the empirical cycle is not so much in the prescriptive sequence of actions. More important is its function as a point of reference for researchers who want to explain their basic research logic.

Quality control

Quality control is a major concern within almost any paradigm of social science. Intersubjective agreement can be regarded (Swanborn 1996) as the key criterion. The blending of research methods or triangulation (Scandura & Williams 2000) is in this respect to be of crucial importance for the future of management research. The ultimate criterion here is *validity*: Do our propositions describe and correctly explain the empirical world?

Triangulation

No one method is perfect and each method has its own flaw(s). For this reason it is necessary to gather corroborating evidence from using a variety of methods. That is in short the way triangulation has been (McGrath 1982) propagated in the mainstream literature. The word refers to the navigation method for determining the position of a vessel, whereby multiple reference points (Jick 1979) enable someone to locate an object's position more precisely. Internal validity is enhanced when two or more different and independent measures point to the same conclusions. The idea of triangulation is strongly related to the multipartite-multi method approach of Campbell & Fiske (1959). Although the concept has part of its roots in a quantitative tradition, it has become most popular in qualitative research (cf. Jick 1979, Lewis 1998). In qualitative research, triangulation is also associated with (Jick 1979, p. 503): "...more complete, *holistic*, and contextual portrayal of the unit(s) under study" (*italics* Jick). It seems that this meaning is more closely related to the functionality of the method than to quality control. In this paper it is suggested to reserve the concept of "triangulation" for the last purpose. Swanborn (1996) argues that internal validity is a basic concern for all researchers, both for those who work from a quantitative and for those working from a qualitative perspective. The basic demand is, in Swanborn's view, the consensus within the scientific community regarding research results (Swanborn 1996, p. 20) "...whether these results concern so-called objective facts or whether they take the form of subjective constructs of people". Some researchers have fundamental philosophical objections against this argument and argue (Sale et al. 2002) that triangulation by combining quantitative and qualitative methods is a viable option, because both methods do not study the same phenomena in the same reality. A recent methodological meta-study (Sandura & Williams 2000) indicates that, despite the many supportive publications in the 1980s (see: Jick 1979, McGrath 1982), the actual practice of triangulation is disappointing. The comparison of articles in three top-tier journals in the field of management and organization showed that the use of single-source data was greater in the 1990s than in the 1980s. Triangulation was practiced in the frontrunner studies (Cobbenhagen 1999, Huizenga 2001 & Den Hertog & Cobbenhagen 2001, box 2). The results of the quantitative analyses were continuously checked in these studies with data from other sources: the case studies, newspaper archives and the Internet.

Statistical generalization

The lack of external validity of case studies has been a concern of many critics of the case study (see for example Scandura & Williams 2000). The basic question is: what assurance do we have that the findings from one particular case study really holds for other possible cases in a wider population? The case is to be regarded as a "sampling unit" here. Pooling relevant case studies into data sets large enough for statistical testing makes it possible to find a basis for the generalization of results. These sets of coded data (c.f. Larsson 1993a) allow for cross-sectional analyses, or any other procedure of meta-analysis. The statistical argument is also used in "surveys within case studies" (cf. Gouldner 1954, Leonard-Barton 1990), where the aim of the survey is to make valid statements about populations that play an important role within the case, such as the miners in Gouldner's and the programmers in Leonard-Barton's study.

Replication

Robert Yin (1989) argues that generalization of case studies outcomes should not be based on a statistical logic, but on analytical grounds. He compares the case study with a natural science

experiment: case studies are used to test theoretical notions, which are to be made explicit before the start of the case study. The empirical data from the case study are then used to falsify the theoretical expectations. The findings can be subjected to further tests by doing new case studies on the same kind of phenomena. This is what natural scientists do when they replicate an experiment. Roberts (1993) followed this procedure in his study on the relations between management accounting and organization design. He performed three case analysis: the first one to develop theory, the second to test theory, and a third to replicate the results of the test. The failure to replicate the outcomes of a study can be painful, because the quality of the research design is questioned. However, it can also mean that one or more new factors have been overlooked in the research design. The replication(s) can serve in that case as a way to uncover these hidden factors. A basic problem connected with Yin's argumentation is the foreknowledge of the researcher in his or her choice for a specific case. In actual practice, researchers do not make 'blank' choices for their cases. They choose a specific case, because they expect it to make "sense". They have conjectures about the outcomes, which creates the danger that they tend to select cases that match their theories. Unexpected outcomes or even falsifications can be more valuable in this respect, because they emerge despite the theoretical bias of the researcher.

Pattern matching

Pattern matching (Yin 1989) is a strategy to link data to propositions. Different pieces of information from the same case are related to theoretical propositions. Time-series are one way to serve this purpose. In this approach, the researcher sketches his theoretical expectations about the impacts of certain incidents or interventions in an organization in a graphical form. The propositions are tested by comparing the expected and actual patterns. In the frontrunner studies (Cobbenhagen 1999, den Hertog & Cobbenhagen 2001 and Huizenga 2001), budgets for education and product development for five subsequent years were used in this manner.

Translatability

Case material is used to illustrate the practical or theoretical meaning of outcomes of a survey-type study. In other words: qualitative illustrations can give a study "face validity". The practical example helps the reader to understand the interpretation of the quantitative analysis, either as an explanation of the observed phenomenon or as a clarification of a preferred (normative) action pattern. The case material is used as a communication tool. The "best-practice case" is a good example of such an approach. It is meant to convince actors to follow an action pattern, which does not belong to their action repertoire. In this perspective, Dunn & Swierczek (1977, p. 137) define translatability as: "...improvements in two-way or multidirectional communications among groups with conflicting frames of reference".

Conclusions

Development of new research methods in organization science is not only important for quality control in organization research. New and better research methods also create new options and more freedom for development of the discipline. That freedom is needed when one looks (Daft & Lewin 1993, Den Hertog & Cobbenhagen 2001) at the rapidly changing organizational landscape. The development of blended research methods can be crucial here, but it is not self-evident. Progress has not been impressive during the last decade.

Blended or pure malt?

The methodological meta-analysis of Scandura & Williams (2000) indicates that the use of multiple methods has not become a popular research option in the study of management and organization. The use of more than one data source in articles in top-tier journals even declined between the 1980s and the 1990s. Intriguing is the observation (Scandura & Williams 2000) that while more and more field studies are published in top-tier journals, the practice of triangulation has declined. This is remarkable when we look at the many pleas for triangulation and multi-method studies in the late 1970s, 1980s, and early 1990s. One reason might be that many researchers (Sale et al. 2002) prefer "pure malt" to the blend. They reject blends, because they fear losing the quality of the "real" qualitative or quantitative analysis. The reason for this might be that samples become too small to do a decent

multivariate analysis, or because description becomes too “thin” (Dyer & Wilkins 1991) for a real good understanding of the context and process. In this context, blended research might be regarded as a risky business, requiring a lot of effort and high risk of failure. This does not, however, explain the more frequent use of blended designs in such neighboring research domains as health research and educational research. Institutional factors (for example: position of research within the sector) may account for that.

Purity in research design might offer a relatively safe position, but does not solve the basic problem of social research. It remains difficult (or it is even impossible) to combine realism, precision and generalizability in one study. McGrath (1982) speaks in this respect of the three-horned dilemma of research. He argues that the researcher can meet only two of these three criteria, leaving him or her vulnerable to critique for not meeting the third criterion. In terms of quality control (precision and generalizability), the analysis of Scandura & Williams (2000) is quite disturbing. Qualitative research appears to have gained ground, raising the expectation that more and more effort is done to improve the quality of the design: a clear logic, connecting research question, methods and answers and a well-documented description of the actual course of action. Too often the reader is left with a short text with dutiful references to the icons of qualitative research and blended research (Jick 1979, McGrath 1982, Glaser & Strauss 1967, and Yin 1989). Realism still appears to be a basic problem in mainstream organization research, either in terms of usefulness (Mohrman et al. 2001) or in terms of theoretical relevance (Daft & Lewin 1993, Sutton & Staw 1995, Weick 1995). The sharp focus on precision and generalizability appears to limit the view of the researchers automatically. These observations support the argument for the further development of blended methods. The lessons learned from the Dutch TWO research program indicate that the development of blended methods is more embracing than the improvement and innovation of techniques. Innovation of research is in the doing (Hackman 1985). The following program is meant as an effort to indicate how inverted research patterns might be changed.

A development program for blended research

The development of blend methods is essentially a matter of doing. That effort can be very risky. For PhD students, the risk might be too high given the limited time available for accomplishing their study. Nor does the high pressure to produce in high-ranked refereed journals make blended research an attractive option for many regular staff members. The development of blended methods seems to flourish in a special research environment: the multidisciplinary research program. Examples are the CODE program (Glick et al. 1990), the MIRP program (Van de Ven & Poole 1991) and the TWO program (TWO 1988). Such programs offer a fertile ground for the development of communities of practice. Programs can be considered in this view as a workshop for experimenting with a variety of methods. In individual studies researchers do not have to follow the whole empirical cycle. Within the broader frame of the program, they can focus on each quadrant of the cycle. They might opt for the exploration and theory development, or for testing and application, or for any other combination of objectives. Within the context of the program, the following guidelines might be relevant:

Make methods development an explicit objective

In the design research programs there is a tendency to convince the funding organization that the promised outcomes are assured by the use of proven methods. As a result, the room for methodological experimenting often remains limited. This argument leads to a plea for the definition of methodological objectives in research programs. Not as separate activities, but rather as transfer of learning grounded in the studies of the program. This effort should focus on the research as an action pattern or process. Making use of experiences of neighboring research (Greene et al. 1989, Sale et al. 2002) domains might be also useful in this respect.

Avoid methodological platitudes

Research students are raised with general statements like: ethnography is useful for exploration, the case study is suited for theory development, and the survey for testing. The various methods certainly have their own functionality. Finally, the basic logic of the research design determines which method is used for what purpose. The functionality of the methods is important in this respect. However, it is also argued in this article, that in special conditions each method can potentially fulfill any function within the

empirical cycle. Case studies can be used for testing (Yin 1989) and surveys (cf. Roberts 1993, box 3) for exploration. Sometimes numbers (box 1) might be more suited than words are for understanding a social system.

Focus on research questions

The core of a research design is the logic which (cf. Yin 1989) connects research questions with the potential answers. The set of initial research questions determines (Strauss & Corbin 1990) the choice of concrete methods in the first place, rather than broad aims and perspectives. This view forces the researcher to make his or her aims, perspectives and final choices explicit. Research questions can change (cf. box 3) in the course of a study when the researcher is confronted with unforeseen outcomes and unforeseen conditions.

This article is meant as a step in the development of blended methods. This contribution is not defined as a hand- or cookbook, or final framework. The intention was to offer a practical language toolkit for the extensive development effort needed to establish blended research as a substantial research approach. The survey and case study were starting points in developing this language toolkit. A next step is to equip the tool kit for policy research and action research.

REFERENCES

- Bangert-Drowns, R.L. (1986). Review of developments in meta-analytical method. *Psychological Bulletin*, vol.99, no. 3, 388-399.
- Bate, S.P. (1997). Whatever happened to organizational anthropology? A review of the field of organizational ethnography and anthropological studies. *Human Relations*, vol. 50, no. 9, 1147-1175.
- Campbell, D.T. & Fiske, D.W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, vol. 56, no., 81-105.
- Campbell, D.T. & Stanley, J.C. (1966). *Experimental and quasi experimental designs for research*. Skokie: Rand McNally.
- Cobbenhagen, J. (1999). *Managing innovation at the company level: A study on non-sector-specific success factors*. Maastricht: Maastricht University Press.
- Daft, R.I. & Lewin, A.Y. (1990). Can organization studies begin to break out of the normal science straitjacket? An editorial essay. *Organization Science*, vol.1, no. 1, 1-9.
- Den Hertog, J.F. & Van der Sluijs, E. (1995). *Onderzoek in organizations: Een methodologische reisgids*. Assen: Van Gorcum. (Research in organizations: A methodological travel guide).
- Den Hertog, J.F. & Cobbenhagen, J. (2001). *Winnen door waarde*. Maastricht: Merit.
- De Vaus, A. de (1993). *Survey in social research (3rd ed.)* London: UCL Press.
- Doty, D.H. & Glick, W.H. (1994). Typologies as a unique form of theory building: Towards improved understanding and modeling. *Academy of Management Review*, vol. 19, no. 2, 230-251.
- Dunn, W.N. & Swierczek, F.W. (1977). Planned organizational change: Toward grounded theory. *Journal of Applied Behavioral Science*, vol. 13, no. 2, 135-157.
- Dyer, W.G. & Wilkins, A.L. (1991). Better stories, not better constructs, to generate better theory: A rejoinder to Eisenhardt. *Academy of Management*, vol. 16, no.3, 613-619.
- Eisenhardt, K.M. (1989). Building theories from case study research. *Academy of Management Review*, vol. 14, no. 4, 532-550.
- Fetterman, D. M. (1989). *Ethnography, Step by step*. Newbury park: Sage.
- Feyerabend, P. (1975). *Against method*. London: New Left Books.
- Geerts, C. (1973). *The interpretation of culture*, New York: Basic Books.
- Geurts, P.A. & Roosendaal, H.E. (2001). Estimating the direction of change based on theory and mixed methods. *Quality & Quantity*, vol. 35, 407-427.
- Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory: Strategies of qualitative research*. London: Wiedenfeld & Nicholson.
- Glass, G.V. (1976). Primary, secondary, and meta-analysis. *Educational Researcher*, vol. 5, no.1. 12-14.

- Glick, W.H., Huber, G.P., Miller, C.Ch., Doty, & Sutcliffe, K.M. (1990). Studying changes in organization design and effectiveness: Retrospective event histories and periodic assessments. *Organization Science*, vol.1, no.1,293-312.
- Gouldner, A.W. (1954). *Patterns of industrial bureaucracy: A case study of modern factory management*. New York: The Free Press.
- Greene, J.C., Caracelli, V.J. & Graham, W.F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, vol. 11, no. 3, 255-274.
- Groen, M. (1995). *Technology, work & organization: A study of the nursing process in intensive care units*. Maastricht: University Press Maastricht.
- Grunow, D. (1995). The research design in organization studies: Problems and prospects. *Organization Science*, vol. 6, no. 1, 93-103.
- Hackman, J.R. (1985). Doing research: That makes the difference. In: E.E. Lawler III, A.M. Mohrman, Jr., S.A. Mohrman, Th.G. Cummings and Associates (eds.). *Doing research that is useful for theory and practice*. San Francisco: Jossey Bass.
- Hammersley, M. & Atkinson, P. (1990). *Ethnography: Principles in practice*. London/New York: Routledge.
- Homans (1949). *The human group*. New York: Harcourt.
- Hove, K.R. (1992). Getting over the quantitative-qualitative debate. *American Journal of Education*, vol. 100, 237-257.
- Huizenga, E. I. (2001). *Innovation management: How frontrunners stay ahead*. Maastricht: Maastricht University Press.
- Jahoda, M., Deutch, M. & Cook, S.W. (1951). *Research methods in social relations*, New York: Holt, Rinehart and Winston.
- Jick, T.D. Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, vol. 24, no. 4, 602-611.
- Johnson, H.T. & Kaplan, R.S. (1987). *Relevance lost: The rise and fall of management accounting*. Boston: Harvard Business School Press.
- Kass, S.J., Vodanovich, S.J. & Callender, A. (2001). State-trait boredom: Relationship to absenteeism, tenure and job satisfaction. *Journal of Business Psychology*, vol. 16, no.2, 317-327.
- Krippendorff, K.(1980). *Content analysis: An introduction to its methodology*. Newbury Park: Sage.
- Larsson, R. (1993a). Case survey methodology: Quantitative analysis of patterns across case studies, *Academy of Management Journal*, vol. 36, no. 6, 1515-1546.
- Larsson, R. (1993b). Barriers to acculturation in mergers and acquisitions: Strategic human resource implications. *Journal of European Business Education*, vol.2, no.2, 1-18.
- Lawler, E.E. III & Hackman, J.R. (1969). Impact of employee participation in the development of pay incentive plans: Afield experiment. *Journal of Applied Psychology*, vol. 53, no. 6, 467-471.
- Lee, Th.W. (1999). *Using qualitative methods in organizational research*. Thousand Oaks: Sage.
- Leonard-Barton, D. (1990). A dual methodology for case studies: Synergistic use of a longitudinal single site with replicated multiple sites. *Organization Science*, vol. 1, no.1, 248-266.
- Lewis, M.W. (1998). Iterative triangulation: A theory development process using existing case studies. *Journal of Operations Management*, vol. 16, no. , 455-469.
- MacGrath, J. (1982). Dilemmatics: The study of research choices and dilemmas. In: J.E. McGrath, J. Martin, & R.A. Kulka (Eds.), *Judgement calls in research*. Newbury Park: Sage.
- Miles, M.B. & Huberman, A.M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Newbury Park: Sage.
- Mohr, L.E. (1982). *Explaining social behavior" The limits and possibilities of theory and research*. San Francisco: Jossey Bass.
- Nambisan, S. (2001). Why service businesses are not product businesses. *MIT Sloan Management Review*, vol. , no.2, 72-80.
- Neale, J.M. & Liebert, R.M. (1986). *Science and behavior: An introduction to methods of research*. Englewood Cliffs, Prentice-Hall.
- Noblit, G.W. & Hare, R.D. (1988). *Meta-ethnography: Synthesizing qualitative studies*. Newbury Park: Sage.
- Pettigrew, A.M. (1990). Longitudinal field research on change: Theory and practice. *Organization Science*, vol. 1, no. 3, 267-292.
- Pugh, D.S., Hickson, D.J. & Hinings, C.R. & Turner (1968). Dimensions of organizational structure. *Administrative Science Quarterly*, vol.13, 65-105.

- Roberts, H.J.E. (1993). *Accountability and responsibility: The influence of organization design on management accounting*. Maastricht: University Press.
- Sale, J.E.M., Lohfeld, L.H. & Brazil, K. (2002). Revisiting the quantitative-qualitative debate: Implications for mixed-methods research. *Quality & Quantity*, vol. 36, no.1, 43-53.
- Scandura, T.A. & Williams, E.A. (2000). Research methodology in management: Current practices, trends, and implications for future research. *Academy of Management Journal*, vol. 43, no. 6, 1248-1264.
- Schefflen, K.C., Lawler, E.E. III & Hackman, J.R. (1971). Long-term impact of employee participation in the development of pay incentive plans: A field experiment revisited. *Journal of Applied Psychology*, vol. 55, no. 3, 182-186.
- Selltiz, C., Jahoda, M., Deutsch, M. & Cook, S.W. (1959). *Research methods in social relations*. New York: Holt, Rinehart and Winston.
- Silverstone, C. & Wang, T.H. (2001). Situational leadership style as a predictor of success and productivity among Taiwanese business organizations. *The Journal of Psychology*, vol. 135, no. 4, 399-412.
- Strauss, A. & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park: Sage.
- Sutton, R.I. & Staw, B.M. (1995). What theory is *not*. *Administrative Science Quarterly*, vol. 40, 371-384.
- Swanborn, P.G. (1996). A common base for quality control criteria in quantitative and qualitative research. *Quality & Quantity*, vol. 30, no. 1, 19-35.
- Technology, Work and Organization* (1988). Zoetermeer: Dutch Ministry of Education & Science.
- Van deVen, A.H. & Poole, M.S. (1991). Methods for studying Novato development in the Minnesota Innovation Research Program. *Organization Science*, vol.1, no.3, 313-335.
- Weick, K.E. (1995). What theory is not, Theorizing is. *Administrative Science Quarterly*, vol. 40, 385-390.
- Wenger, E.(1998). *Communities of practice*. Oxford: Oxford University Press.
- Yin, R.K., Heald, K.A. & Vogel, M.E. (1977). *Tinkering with the system*. Lexington: Lexington Books.
- Yin, R.K. (1989). *Case study research: Design and methods*. Newbury Park: Sage.