CONDUCTING CASE RESEARCH IN A MULTI-ORGANIZATIONAL PROJECT CONTEXT

BY

Ganesh N. Prabhu

June 1997

Please address all correspondence to:

Ganesh N. Prabhu
Visiting Faculty
Indian Institute of Management
Bannerghatta Road
Bangalore - 560 076
India

Fax: (080) 6644050

Copies of the Working Papers may be obtained from the FPM & Research Office

Conducting Case Research in a Multi-Organizational Project Context

A paper by

GANESH N. PRABHU
Indian Institute of Management at Bangalore, India

Submitted for presentation consideration in the
1997 North American Case Research Association Meeting
to be held in
Cincinatti, Ohio, USA
October 23-25, 1997

Address:
Ganesh N. Prabhu
Visiting Faculty, Corporate Strategy and Policy Area
Indian Institute of Management at Bangalore
Bannerghatta Road, Bangalore 560076 India

Email: gprabhu@iimb.ernet.in
Fax: ++91-80-6644050 , Ph: ++91-80-6632450 Ext. 2047
Web: http://alpha2.iimb.ernet.in/~gprabhu

Biographical Notes Ganesh N. Prabhu is faculty in the strategy area at the Indian Institute of Management at Bangalore where he teaches courses in strategic management and new product development. He has a doctorate in business policy from the Indian Institute of Management at Ahmedabad and a masters in rural management from the Institute of Rural Management, Anand. Ganesh has published four papers in refereed books, two papers in refereed journals and six papers in non-refereed journals. He has presented seven papers in national and international conferences, four of which were published in refereed conference proceedings. He has also written three articles for business newspapers and has developed research or teaching cases on eight organizations. Ganesh has two years of industrial experience in turnaround and consulting assignments and has been on deputations / projects with fifteen organizations.

---

* This paper is based on my experience during my doctoral research at the Indian Institute of Management at Ahmedabad, India under the guidance of Mukund R. Dixit (Chair), Shekhar Chaudhuri and Deepti Bhatnagar. The research was supported by the'*P. D. Agarwal - TCI Award for Doctoral Research in Management*'from the P. D. Agarwal Foundation, Jaipur, India, and my doctoral fellowship contingency grant.I declare that this paper has not been published before nor has it been submitted elsewhere for publication consideration.

Conducting Case Research in a Multi-Organizational Project Context

Abstract

This paper presents the case research methodology developed and adapted while conducting several in-depth process case studies of multi-organizational R&D projects, each of which involved a triad consisting of a diverse set of organizations. This research adapted and improvised upon existing organizational level case research methodologies, while applying them to the multi-organizational project context. The paper covers the research objective, the definitions used, the research questions, the choice of the case study methodology, selection of cases, the process of data collection, and the process of case development and analysis including the improvisations made on existing case research methodology. However, the basic theoretical and contextual rationale for undertaking this research, and its results, are outside the scope of this paper. Teaching cases with decision problems in interesting and new multi-organizational contexts are currently being developed from the research cases developed in this study.

Introduction

This paper presents the case research methodology developed and adapted while conducting several in-depth process case studies (Yin, 1984) of multi-organizational R&D projects, each of which involved a triad consisting of a diverse set of organizations. The research resulted in the development of a description and process model of the initiation and implementation of joint R&D projects between industrial firms and technology institutions[1] (TIs) with the support of a developmental financial institution[2] (DFI). The DFI financially and managerially supported the TI-firm joint R&D projects through a targeted technology development financing program. This financing program itself became the base case study and within it project case studies of twelve joint R&D projects involving six firms and seven TIs were developed. This research adapted and improvised upon existing organizational level case

[1] not-for-profit institutions, including universities, involved in technology research and development.

[2] a private or public institution which provides promotional services and medium and long term finance to public or private development oriented and bankable projects (Pandey, 1990).

research methodologies, while applying them to the multi-organizational project context. The paper covers the research objective, the definitions used, the research questions, the choice of the case study methodology, selection of cases, the process of data collection, and the process of case development and analysis including improvisations made on existing case research methodology. However, the basic theoretical and contextual rationale for undertaking this research, and its results, are outside the scope of this paper.

Research Objective and Definitions

The objective of this research was *to develop a middle range theory of the process through which firms, TIs and DFIs initiate and implement joint R&D projects.* Middle range theorising involves the development of limited scope multivariate models which focus on explaining observed phenomena in all its complexity without attempting to generalise over all phenomena (Pinder and Moore, 1980). Process questions are essentially of the "how?" nature but they also include the "what?" and "why? questions within the context of the study.

A TI-firm joint R&D project arises when the firm approaches the TI with a technological problem (and the TI accepts it) for which (a) the TI has no ready transferable solution or access to such a solution and (b) the TI and firm both have complementary expertise and/or capabilities required to solve the problem. The joint R&D project involves simultaneous or sequential R&D by both the TI and the firm working either independently (and reporting progress to each other) or together. A DFI-TI-firm joint R&D project arises when the firm approaches the DFI for financing its joint R&D project with a TI and the DFI accepts it and facilitates its implementation. A DFI for the purpose of this study is one financing industrial development. The DFI's essential role is to select the project based on certain financing program criteria, provide low cost partial loan financing for the project to the firm, monitor the project and loan repayment, and write off the loan at its discretion in case of project failure.

Choice of Case Research Methodology

This research started with the identification of inadequacy in our understanding of the process of initiation and implementation of DFI-TI-firm joint R&D projects in particular, and TI-firm joint R&D projects in general. This process was considered to be contextually of major consequence in terms of policy and practice, and therefore important enough to be studied. It was also identified that there was no adequate existing theory or model of this process. Given

the lack of process research in this area, it was considered necessary to conduct a qualitative process study to build an empirical base for theory development. Grounded theory building (Glaser and Strauss, 1967) using the case study method (Smith, 1989; Yin, 1984) is considered an appropriate and valid (Tsoukas, 1989) approach for studying process issues (Parkhe, 1993). Strategy process research (see Box 1) using the longitudinal processual approach (Burgelman, 1983) was adopted for this research as it answered the "what happened?", "why did it happen?" and "how did it happen?" questions together and was therefore appropriate for this research.

Box 1: Strategy Process Research

Strategy process research is organised around five internally consistent guiding assumptions. These are: (a) embeddedness: studying process across a number of levels of analysis, (b) temporal inter-connectedness: studying processes in past, present and future time, (c) a role in explaining context and action, (d) a search for holistic rather than linear explanations of process, and (e) a need to link process to the location and explanation of outcomes (Pettigrew, 1992). Strategy process research can complement strategy content research by (a) preceding it in mapping the phenomena to be examined by it and (b) generating insights into the process behind the results obtained in cross-sectional strategy content research. Strategy process studies are inter-disciplinary in nature and deal with behavioural interactions of individuals, groups and units within and between firms.

Multiple qualitative process case studies of TI-firm joint R&D projects were developed in this research. Multiple cases provide greater scope for attempting analytical generalization (Yin, 1984) compared to a single case. The case studies were designed primarily to trace two types of exploratory questions - *how did it happen?* and *why did it happen?* within the case context. Case studies are appropriate research strategies for exploring such questions (Yin, 1984) and provide a useful vehicle for understanding the complexity and richness of the joint R&D initiation and implementation process considering the paucity of previous work. The broad approach adopted was in the holistic tradition (Chakravarthy & Doz, 1992) of strategy process research in attempting "to track simultaneously over time, multiple contextual factors, strategies, decision processes, administrative systems and outcomes" while focusing on a "narrow strategic problem" (p.8). This approach has not been adopted for research in multi-organizational contexts, but is recommended (Parkhe, 1993).

Eisenhardt (1989) has presented a framework for the process of building theory using case study research. Her framework builds on work by Glaser and Strauss (1967), Yin (1984), Miles and Huberman (1984), Jick (1979) and Mintzberg (1979), and also includes methodological

variations introduced in more recent studies. The framework envisages the use of multiple cases which combine archival data, interviews and observations. This research was set in Eisenhardt's (1989) framework. Steps on selection of cases, crafting data collection instruments, entering the field, analyzing data, shaping hypothesis and reaching both case and research closure basically followed Eisenhardt (1989). As this research was at an early exploratory stage, it stopped after using the empirical base to identify the project process and to conceptually build on it in developing a proposed theory. Further research is required for testing the adequacy of the variables included and the completeness and accuracy of the proposed theory.

Choice of Cases

Projects were selected for developing case studies from among the joint R&D projects financed under a targeted financing program of the DFI (the chosen research site). At the time of case selection in July 1994, a total of fifty five projects had been sanctioned under the program. These projects (in approximate percentages) were in the fields of: (a) pharmaceutical and chemicals - 34%, (b) electrical, electronics and computers - 22%, (c) food and bio-technology - 18%, (d) material science, metallurgy and foundry - 16%, (e) machine tools - 5% and (f) others - 5%. About 30% of the projects involved government laboratories, another 30% involved the top five premier technology education institutions in the country, another 20% involved other technology educational institutions, and the remaining 20% involved private R&D foundations.

A DFI-TI-firm joint R&D project was taken as the fundamental unit of analysis for developing a case. The case selection process was as follows. The entire list of program supported firms made available by the DFI was examined. At the first level, twelve firms which had projects that were initiated very recently (less than six months since project inception at the time of case selection - July 1994), were eliminated from consideration as they were unlikely to develop into adequately completed cases for tracing the project process within the period of study. Of the remaining forty-three firms, eighteen firms which, in the assessment of their respective DFI co-ordinators, were unlikely to co-operate in data collection due to the highly secretive and sensitive nature of their R&D project, were eliminated from consideration. This was an unavoidable and insurmountable problem, as the technologies were either being developed further or were in the process of being patented. The remaining twenty-five firms were examined in the light of the various selection criteria (given below) and a set of firms was selected such that each criteria had atleast one representation. This gave a first list of six firms

with three more firms being retained as backups. In selecting the first list, consideration was also given to reducing logistical problems so that data collection could be faster and cheaper.

Requests for permission were then sent to the six selected firms. Their respective DFI co-ordinators also introduced the study to the firm over the telephone and requested their co-operation. The firms checked with their respective TIs and four firms responded immediately in August 1994. Data collection was initiated at these four firms and their respective TIs in September 1994. Permission from the remaining two firms were received a month later and data collection was then initiated in these firms also.

In all, twelve such joint R&D projects, undertaken by six firms with seven TIs, were studied. Given that taxonomic samples (Bhave, 1994) could not be identified apriori, the selection attempted to cover a variety of projects (Bhave, 1994; Eisenhardt, 1989; Leonard-Barton, 1990; Van de Ven, and Poole, 1990). The projects were selected to reflect a range of investment quantum and project sizes, a variety of technologies and industrial sectors, differences in technology levels between firms and TIs, types of R&D (basic, commercial, incremental, radical and reverse engineering), types of firms and TIs. Both single location (firm and TI located in one city) and multi-location (firm and TI located in different cities) cases were covered, as proximity is an important variable affecting project process (Mansfield, 1991). A variety of cases were chosen in an effort to develop richer theory and provide an opportunity for replication and comparison, thus building external validity (Eisenhardt, 1989) and expanding the domain of generalization (Yin, 1984). Ongoing projects, which were near completion, were also included to facilitate relatively fresh data collection and allow real time observation of project developments.

Data Collection Process

The data collection was primarily through in-depth semi-structured and open-ended interviews of key project participants in multiple hierarchical levels and departments in all three organizations, who were involved in the joint project. As far as possible all project participants were interviewed. The process questions that were asked or examined in this research both through interviews and background data traced the project process from inception to completion and also covered its process outcome. As the research was exploratory in nature, several of the questions emerged and evolved over the duration of data collection. While some of the questions remained unanswered, they were useful in guiding the interviews and in gaining

insights for analysis and for developing the process model.

Each interview covered as many process questions as possible which were relevant to the project participant concerned. Apart from questions related to the project process, information was sought on the organizations, the relevant industry and the environment faced by them. Topics covered were the importance of the product category, governance structure of the project, characteristics of the project and technology which affected project implementation, problems encountered and their resolution, monitoring of projects, meetings, co-ordination, communication, capability development and changes over the project duration. The interview schedules covered the non-project routine activities of project participants and their impact on their involvement in the project. Participants mentioned their background and experience, areas of professional interest, the history and experience of their interaction with firms or TIs and its importance. They were also asked to describe and evaluate their individual role in the project, formal and informal relationships, help given and received, technology transfer and training, uniqueness of the project, learning from the project, and the project's likely impact on their organizations, in both technical and managerial spheres. Based on the respondent's answers, and if additional information was necessary, probing questions were asked. The open ended questions gave respondents considerable leeway in giving answers. Participants were also asked their assessment on the degree of success and failure in the project, their opinion on the reasons for the same and suggestions on possible improvements. They were also requested for suggestions about what firms, TIs and DFIs could do to facilitate such projects and to develop long term impacts. Apart from their content, these suggestions and opinions also gave useful insights into aspects of the project process which were not elicited through direct questions.

Forty project participants and administrators were interviewed in multiple rounds spread over a period of thirteen months in 1994-1995. Except for four short interviews, all interviews including repeat interviews ranged in duration from about an hour to about two and a half hours. Repeat interviews were conducted with some participants to cover areas missed in earlier interview rounds. As the attempt was to gather as much of the richness of the project process as possible, new areas which emerged during interviews were opportunistically explored, and new questions were added for subsequent interviews (Eisenhardt, 1989). Through the multiple cases, themes and issues gradually re-occurred and over the set of projects there was repetition of process details. Once theoretical saturation was reached and sufficient repetitions occurred to ensure external validity (Eisenhardt, 1989) further projects were not studied. The interview data

was supplemented by observations, communications, records and reports (Yin, 1984).

The data collection procedure adopted emerged from the exploratory nature of the study. Considering the diversity of the cases, the option of first doing a complete pilot case study (Yin, 1984) before commencing on other cases, was rejected as a pilot was not likely to give the reasonably broad structure required for the study of subsequent, possibly dissimilar, cases. A more useful alternative which adapted the pilot study concept was developed. "Pilot interviews" were made at each of the firms to draw the basic structure of the study and list the range of issues. These were then examined in detail in the subsequent interviews. In the first "pilot interview" round only one project participant, preferably the most senior in the project organization, was interviewed. In this interview, the participant was requested through open-ended questions to describe in as much detail as possible the initiation and developmental history of the project. Supplementary questions were raised on the spot to seek clarifications and details as required. Some prepared questions were also asked on content variables identified from the existing literature on firm to firm and firm to TI joint R&D projects. Questions on the history and background of the TI, the firm and its industrial environment, their earlier interaction (if any) and the project organizational structure were posed. The respondents were also asked to name all the persons who were formally or informally involved in the project.

Once transcripts were prepared for the "pilot interviews" they were sent to the interviewed persons for making factual corrections and clarifications. This supported the construct validity (Yin, 1984) and reliability of the data. A list of all variables mentioned in all these transcripts was then prepared and used to develop new questions for the interview schedule used in the next round of interviews. In the second round, project participants not interviewed in the first round were interviewed with upgraded interview schedules. Interview schedules from this round onwards were specifically prepared for each project participant. This was essential as, apart from the common questions asked to all participants, the schedules also contained questions specific to the participant's unique role in the project as emerging from earlier interviews. Questions which could cross-check information provided by other participants were also included to ensure construct validity (Yin, 1984).

The third round of interviews again followed the same transcript and interview schedule preparation route given above. In the fourth round, participants interviewed in the first round were interviewed again with a revised and extended interview schedule to fill in gaps left by their earlier interview. Similarly fresh questions were raised with participants interviewed in

earlier rounds wherever required. Participants also introduced other persons who were formally or informally involved in the project (Burgelman, 1983). As the interviews relied largely on open ended questions requiring descriptive answers from project participants, there were differences in both the quality and quantity of these responses due to individual differences in the ability and willingness of respondents to patiently articulate their project experiences.

The option of recording interviews on magnetic tape was not used as the researcher's previous experience indicated that the recording device tended to disturb and distract the person interviewed and also inhibit the interview. Detailed notes were however taken of all statements made by the respondent in a form of shorthand during the interview and the gaps were filled in immediately after the interview was over. These notes were also converted into complete hand written verbatim transcripts within twenty four hours of the interview. This was important to ensure that interview statements remained fresh in the researcher's mind and could be recalled if there were gaps in the interview notes. To the extent possible, to maintain this condition of freshness and prevent overlap, no more than one interview was taken in a day. Interviewed persons who were requested to verify the transcripts of their interviews, agreed that they were verbatim, fairly accurate and complete, thus raising confidence on the reliability and the construct validity (Yin, 1984) of the transcripted interview data. The hand-written notes were later typewritten. About 167 pages of typewritten transcripts were eventually prepared from these interviews.

The six firms and seven TIs required travel and stay at eight places spread over the southern and western parts of the country for varying periods for a total of ninety six days spread over a period of thirteen months in 1994-95. The offices, plants and R&D centres of the six firms are given in Box 2. The locations of the TIs are given in Box 3. Permission was refused for visiting the R&D centre of one of the firms. Two major cities in the west (City A - the researcher's business school location) and south (City G - the researcher's residence location) of the country, were used as home bases for travel in the western and southern regions respectively. Seven rounds of interviews were made from these two home bases in the southern and western regions of the country as shown in Box 4. Multiple visits were required to cover various contingencies, including non-availability of the concerned persons even with prior appointments. Prior to these interview rounds, two visits were made to the DFI based in City B for background information on the targeted financing program, to seek permissions for the study and to conduct interviews with the DFI project co-ordinators regarding the overall program implementation process.

Box 2: Locations of Offices, Plants and R&D Centres of Firms Covered

(1) City M (south)	(three headquarters, one plant and one R&D centre)
(2) Town R (south)	(one plant and R&D centre)
(3) City P (west)	(one headquarter, one plant and one R&D centre)
(4) City B (west)	(one headquarter, one plant and one R&D centre)
(5) City V (west)	(one headquarter and R&D centre)

Box 3: Locations of TIs Covered

(1) City M (south)	(one)
(2) City G (south)	(two - including one branch)
(3) Town O (south)	(one)
(4) City H (south)	(one - common for two firms)
(5) City P (west)	(one)
(6) City B (west)	(two)
(7) City Y (south)	(one)

Box 4: Interview Rounds

(1) City M, City G, City P, City B	(total six interviews)
(2) City G, City Y, Town O and City B	(total three interviews)
(3) City V	(one interview)
(4) City H, City G, City M, City P, City B	(total fifteen interviews)
(5) City V	(three interviews)
(6) City G, City M, Town R, City P, City B	(total twelve interviews)
(7) City B	(three interviews)

Developing Case Studies

While the data collection was in progress, the interview and background data were concurrently developed into cases (Eisenhardt, 1989). Though the joint R&D project was taken as the fundamental unit of analysis for developing the cases, the project case write-ups were developed together for each firm. In other words, all projects by a firm were placed within a single case write-up to avoid duplication of common background data. Six such case write-ups were developed for the six firms covered. However each project was analysed separately. The project case studies (Yin, 1984) traced the life of the projects from conception to completion. The focus of the case studies was on understanding the project initiation and implementation process and their evolution both in technology terms and in interaction terms.

The cases were developed by first classifying the background data and the interview statements in each transcript. Based on this classification, a common case writing format was developed with a logical and chronological sequence for presenting the data. All transcripts related to a firm were then combined within this common format. The Miles and Huberman

(1984) "categorization and theme analysis" technique was used. While structuring the cases, the focus was on the development of patterns over time within each case, and the development of causal patterns across cases. This analysis served as inputs to the development of the process model. The common format ensured reliability in the data collected and provided within case analysis. The various sections were then logically connected and edited to facilitate readability.

The case writing was kept as objective and close to the data as possible. Data interpretations were kept to the minimum. As far as possible, only factual statements were converted to third person. Wherever they could stand independent of their context in the interview, direct quotations of statements and opinions made by project participants were presented without interpretation. Where the context was important, it was mentioned along with the statement. The extensive use of quotations in the cases was essential as, apart from factual "hard data", the statements of projects participants contained "soft data" on their thoughts, opinions, beliefs and assessments about themselves, their partners and the projects. This "soft data" was considered equally important and valid in this research, as apart from technological capabilities, these play an equal if not more important role in the selection and assessment of a potential partners, in the initiation and implementation of the joint activity, and in the development of a propensity to interact in future. Draft cases were read, corrected and cleared by the firm in consultation with the TI (Yin, 1984).

Minor variations were made in the common format to accommodate unique features of each case. In some cases, parts of the common format were not relevant and these were removed. All cases could not be equally well developed due to differences in the background and interview information made available to the researcher. Therefore in the analysis, some cases developed into central cases contributing to the development of project descriptions while other less developed cases supported the generalizations built from the central cases.

Conclusions

This paper has presented the case research methodology developed and adapted while conducting several in-depth case studies of multi-organizational R&D projects, each of which involved a triad consisting of a diverse set of organizations. This research adapted and improvised on existing organizational level case study research methodologies while applying them to the multi-organizational project context. The paper gives a direction for adapting case study methodology for future studies of multi-organizational processes. A new process model

and framework eventually emerged in this research from the process of iteratively analyzing and synthesising the transcripts data and cases, indicating the usefulness of grounded qualitative case based methodologies for exploring new research grounds and identifying new variables and processes. Finally, emerging from this research, new teaching cases with decision problems involving interesting and new multi-organizational contexts are currently being developed.

References

Bhave, M. (1994) "A Process Model of Entrepreneurial Venture Creation", *Journal of Business Venturing*, Vol. 9, p. 223-242.

Burgelman, R. A. (1983) "A Process Model of Internal Corporate Venturing in the Diversified Major Firm", *Administrative Science Quarterly*, Vol. 28, p. 223-244.

Chakravarthy, B. S. and Doz Y. (1992) "Strategy Process Research: Focusing on Corporate Self Renewal", *Strategic Management Journal*, Summer Special Issue, Vol. 13, p..5-14.

Eisenhardt, K. M. (1989) "Building Theories from Case Study Research", *Academy of Management Review*, Vol. 14, p. 532-550.

Glaser, B. and Strauss A. (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*, London: Wiedenfeld & Nicholson.

Jick, T. (1979) "Mixing Qualitative and Quantitative Methods: Triangulation in Action", *Administrative Science Quarterly*, Vol. 24, p. 602-611.

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. 3, p. 248-266.

Mansfield, E. (1991) "Academic Research and Industrial Innovation", *Research Policy*, Vol. 19, p. 237-249.

Miles, M. B. and Huberman M. A. (1984) *Qualitative Data Analysis*, Beverly Hills, California: Sage.

Mintzberg, H. (1979) "An Emerging Strategy of Direct Research", *Administrative Science Quarterly*, Vol. 24, p. 587-589.

Pandey, I. M. (1990) "Development Finance Management in LDCs: The Indian Experience", *Research in Third World Accounting*, Vol. 1, p. 171-194.

Parkhe, A. (1993) "Messy Research, Methodological Predispositions and Theory Development in International Joint Ventures" *Academy of Management Review*, Vol. 18, No. 2, p. 227-268.

Pettigrew, A. M. (1992) "The Character and Significance of Strategy Process Research", *Strategic Management Journal*, Vol. 13, Winter, p. 5-16.

Pinder, C.C. and Moore, L. F. (1980) *Middle Range Theory and the Study of Organizations*, Martinis Nijhoff Publishing.

Smith, N. C. (1989) "The Case Study: A Vital Yet Misunderstood Research Method for Management" in Mansfield R. (Ed.) *Frontiers of Management Research and Practice*, London: Routledge, p. 50-64.

Tsoukas, H. (1989) "The Validity of Idiographic Research Explanations", *Academy of Management Review*, Vol. 14, p. 551-561.

Van de Ven, A. H. and Poole, M. S. (1990) "Methods for Studying Innovation in the Minnesota Innovation Research Program", *Organization Science*, Vol. 1, No. 3, p. 313-335.

Yin, R. K. (1984) *Case Study Research: Design and Methods*, Beverly Hills, California: Sage.

***