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Action research in the UK construction industry – the B-Hive Project

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Abstract

This paper describes the B-Hive project, a publicly funded action research project in the UK construction industry which involved multiple partners with competing goals. The paper gives the background to the project and its aims. It then analyses the issues of control and legitimacy of the project. The paper gives an account of the processes involved in defining the issues to be studied and the action research undertaken. It concludes with a description of how an action research approach developed an innovative business process, the Cross Organizational Learning Approach that embedded problem structuring methods and a contribution to understanding of inter-organizational partnerships.

Background

The Building a High Value Construction Environment (B-Hive) project[1] was a two year joint industry/academic initiative funded by the UK Department of Environment Transport and the Regions (DETR) and the Engineering and Physical Sciences Research Council (EPSRC) involving five construction companies and two universities (including two divisions of one company and two departments from one of the universities) a total of 11 direct participants in the project team plus companies and consultants employed by the funders to monitor and advise the project. This of course did not exhaust the stakeholders: the industry representatives on the project were responsible to their managers; the university representatives to their departments and research committees; there were also construction industry bodies such as CIRIA (the Construction Industry Research and Information Association) and the Construction productivity Network represented on the project's focus group.

The project was committed to an action research methodology, an approach which has been attracting increasing attention as a framework for IS research (Baskerville and Wood-Harper 1998, Kock and Lau 2001, Lau 1997). This project highlights some of the advantages that this approach allows as well as some of the difficulties.

The project was part of a wider programme of research sponsored by the DETR and the EPSRC most of which, unlike B-Hive, involved established Construction Management Departments in a limited number of universities and few, if any, adopted an action research approach. The main B-Hive partners were:

- ?? The London School of Economics (LSE) Departments of Information Systems and Operational Research

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[1] EPSRC/DETR Link IDAC project no*: IMI/c/02/013.*

- Leeds Metropolitan University (LMU) Department of Information Systems

- Taylor Woodrow Construction (construction company – building and civil engineering)

- Thames Water Utilities (civil engineering client)

- Whitbread Hotel Company (building client)

- Davis Langdon Consulting (construction management and research consultants)

- Ove Arup and Partners (consulting engineers and designers)

Project management was undertaken by one of the industry partners. The universities were funded for 100% of their costs by the EPSRC, the industrial partners could reclaim 50% of their costs from the DETR

The negotiation of the initial objectives between such diverse partners was tortuous; they were stated in the original research contract as:

i) Analyse the business, technical, human and organisational issues associated with adding value to construction projects through teams co-operating within Temporary Multiple Organisations.

ii) Identify the required and desired changes in work processes and information management in order to deliver value to all investing parties.

iii) Demonstrate by application on selected live projects, how emerging information and communication technologies can support re-structured project organisations that are committed to continuous value improvement.

iv) Disseminate the performance benefits of these new value added enablers as a full report and practitioners' guide to adding value to winning project teams through the exploitation of technology.

The initial brief identified four stages: Exploration; Definition and Directions; Action Research; and Consolidation and Dissemination with specified deliverables for each stage.

The key deliverables for the project were to be:

- Identification of suitable contract conditions for a new enabling strategy

- Specifications for integrated information and communication systems

- Improved project performance through innovative technologies and work processes

- Evaluation of selected technologies and process innovations

- Documented accounts of projects with validation of business improvements in construction management

- Application guide for practitioners

The action research literature uses different terminology for the participants in a project: researcher and client; researcher and organization; researcher and problem owner. The B-Hive project adopted the terminology of academic and industrial partners, this in part derives from the nature of the bidding process for research funds and in part because the domain of study was increasingly characterised by partnering arrangements for the delivery of construction projects (Bennett and Jayes 1995). The terminology was however used by the academic researchers to emphasise that everyone was a researcher, not just the university staff. It underlined that the academics were not doing research upon the firms involved but that we were jointly taking action and researching, even if the final products for the firms were to be greater understanding of how they operated and usable methods and tools; and, for the university staff, greater

understanding of how change could be fostered and academic papers reflecting this understanding.

Project control

Action research literature often refers to the tension (or conflict) between the needs of the researcher and the needs of the client. However the B-Hive project had the additional tension that the client was a coalition of firms. The action-research literature tends to refer to the client in the singular and that the definition of the client's aims is a straight-forward, if painstaking, process, even when allowing for the difficulty of understanding managers' interpretation of the complex situations. In B-Hive the three major industrial partners had very different views of the aims of the project. Resolution of these conflicts became a major concern throughout the project in order to agree on next steps.

It is useful to look at the history of the B-Hive project through the framework suggested in Avison, Baskerville and Myer's (2001) recent paper as issues of control and legitimacy loomed large in the life of the project.

1. Initiation

The project was initiated by the construction company industrial partner (Taylor Woodrow). Two divisions of the firm had proposed similar projects and the EPSRC suggested that they combine the projects and seek to strengthen the academic input. The construction company recruited construction client firms and consultancies to the project and LSE. The company approached the Operational Research and the Information Systems departments of LSE. The negotiations with LSE led to the related decisions to use Problem Structuring Methods (Rosenhead and Mingers 2001) to identify the research focus (in particular SSM was identified at this early stage) and an action research approach.

The impetus for the project from the two divisions of the construction company differed. The staff from one division were champions of developing IT use in the company and had collaborated previously with the IS department of Leeds Metropolitan University (LMU) on smaller scale projects. The key member of staff from the other division had a brief for researching new business methods and wished to have a BPR related project. The common ground was a focus on improving project delivery in a industry where projects are managed through temporary multiple organizations (TMOs) (Cherns and Bryant 1984) that come together for a single project.

The construction company was among the larger UK construction firms operating across a wide range of building and civil engineering fields. Like many UK construction companies its property activities were more profitable than its construction activities. The construction clients are both seen as sophisticated clients with professional expertise in construction procurement and, in the case of Thames Water the civil engineering client, a large engineering design capability of their own. The two consultancy firms wished to have access to current research to strengthen their own service provision.

What is clear is that the project started with an area of concern, rather that a specific problem to be addressed, and that extensive work had to be carried out in the early stages of the project in order to identify action research opportunities.

2. Determination of Authority

Authority within the project was a continuously contested arena, with so many stakeholders involved. A degree of authority was held by the project manager, one the initiators from the construction company. The locus for the negotiation of power was the regular meetings of academic and industrial partners. The industrial partners each held a different level of authority

within their organizations, but, subject to confirmation, they were generally able to commit their organizations. However it was the complicated interplay between the individuals at the meeting that determined the location of authority. Halfway through the project there was a key change in the membership of the academic team to include a researcher with less research experience but with greater experience of managing in a complex and often confrontational environment.

As the research was publicly funded the industrial partners could not simply terminate the project if they did not feel it was meeting their objectives, they had contractual obligations to the funding bodies. Each of the participants was dependent upon the others to meet their obligations; for the academic partners this included achieving outputs that enhanced (or at minimum did not prejudice) prospects of future research funding.

3. *Formalisation*

There were formal project management procedures laid down in the initial agreement between the partners and the funding agency. As a part of the industry/DETR agreement the firms agreed to commit staff time and resources, and this resources could not be withdrawn. Regular progress reports were required by the EPSRC and the DETR and their representatives attended project meetings on a regular basis.

Identifying the issues

The early part of the research was occupied with a literature review and a series of interviews with members of the construction industry firms and followed conventional research methodologies.

The initial investigation was through a literature review and interviews with 33 staff of the industrial partners and their contractors. In terms of the description of the industry this largely confirmed the conventional descriptions: confrontational, low value added and IT use becoming standard but limited. However discussions at project meetings on the findings from these explorations were less clear-cut and the development of a consensus on the priorities for action research difficult. This was for a number of reasons:

- ?? Each of the companies had different needs
- ?? The roles of the individual organization representatives within their organization were different
- ?? There were different expectations between the industry and the academic partners

There was a mismatch between the expertise of the academic departments and the demands of the industry representatives

However the most significant activity of this period was an attempt to produce a common language and set of understandings for the participants. As there was no clearly identified problem-solving task around which the discourse could develop problems of definition loomed large. Concepts such as value, evaluation and stakeholder became hotly contested as did the appropriateness of metrics and forms of measurement. This was not just because engineers and social scientists interpreted them differently (as is inevitable) but also because, in the contest for authority, control of definition became a source of power. Alliances were formed around definitions (or the process for fixing definitions) that more reflected coalitions of interest than intellectual traditions.

The name of the project brought the term value into great prominence and it is worthy of note that there was never any consistent agreement on the meaning to be attributed to this for the purposes of the project.

This process of issue identification did not produce any easy agreement on the issues to be studied. Two project workshops were held and the workshop discussions were analysed using cognitive mapping (Eden and Ackermann 1998) rather than SSM as originally envisaged. The negotiations that followed these workshops produced an agreement that there should be a focus on the management of project changes for the civil engineering projects and project review for the building projects, reflecting the different immediate needs of the two clients. This step meant a turn towards feasible outcomes and away from the somewhat grand original objectives.

Action research phase

It was at this stage that the project moved from exploration to action research. Whitbread had identified the lack of feedback as a major barrier to improving the effectiveness of its partnering arrangements. Their representative on the project was experienced in holding value management workshops (Connaughton and Green 1996) and ran two post-completion reviews which were observed by the academic partners.

Concurrently the academic partners held a series of interviews to identify the impact of changes on one civil engineering project. At the same time the civil engineering client representative asked the B-Hive team to explore the history of another of his projects that had run into serious trouble and was becoming a major financial and political embarrassment. The team was given a warrant to explore the project and to hold a workshop that would find a way forward. The workshop was held but failed to find a way forward for the project.

As a result of these workshop experiences the academic team was able to produce a conceptual model of the elements of a project review process that could either be applied for management of change or for project review. This model of review was named COLA (the Cross-Organizational Learning Approach) (Cushman, *et al.* 2001).

This model (see appendix 1) was presented graphically to the whole project team and almost immediately became identified as a way forward for the project. Although the model was ambiguous and individuals interpreted the elements of the model differently, the seeming completeness of the model became a focus for unity and the disagreements on meaning were contained within the framework of the model.

The reflection on the early workshops identified the need for both a review process and a new form of review workshop. The workshop form was based upon Strategic Choice (Friend and Hickling 1997), but heavily adapted it to focus upon reflection and learning rather than on planning future action. COLA also required an information system to manage the information required by the review process and the outputs of the review. The development of an application to perform these functions allowed the project to meet its requirement for an IT output (Orange, *et al.* 1999).

COLA was used in five reviews and workshops in differing environments during the remainder of the project. The approach was reviewed and amended after each workshop in negotiation between the academic and industrial partners. During this phase of the project authority, once access had been granted to a project, passed more clearly to the academic researchers to define the action to be taken. However involvement was maintained by having each workshop co-facilitated by an industrial and an academic team member. This was to ensure legitimacy in the eyes of the workshop participants, to gain the insights of an experience industry facilitator and to train industry members in the application of the approach.

Summary

The project was a success in that it devised a new business process that has become established in a least one of the partners as the method for undertaking project review. In doing that it filled the need identified by Bennett (1998) for a feedback mechanism for partnering arrangements. It

also embedded a problem structuring method within an on-going business process, rather that being an occasional external intervention. It also generated insights into the role of project managers in knowledge creation and into the ways in which organizations can learn with and from each other (Cushman, *et al.* 2001, Franco and Rosenhead 2001). While it is possible to see other ways in which these insights could have been developed they would not have been grounded so firmly in the day-to-day life of projects except for the action research approach and the business process that incorporates these insights could only have been achieved through the close collaboration that the approach demanded.

It is clear however that entering into a project with so many partners and with such an uncertain description of the problem to be studied increases the risks enormously. The early parts of the project were very task oriented, when in hindsight the process and team issues required far more attention than they received. Because of the complexity of relationships in such projects, managing the relationship risk requires more attention that it received in this project.

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Appendix 1

The COLA Review Process