
The Transition from Design-Bid-Build Contracts to Design-Build

Design-Build
Contracts

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Abstract

Purpose – For a number of years, the construction industry has seen an ongoing shift from design-bid-build to design-build contracts. This transition in contract type entails changes for both the organizations and the individuals involved. Consequently, the purpose of this paper is to investigate how the client manages the transition between the different contract types from an organizational change perspective in a project-led organization.

Design/Methodology/Approach – A multiple case study of six infrastructure projects with DB contracts, all managed by the Swedish Transport Administration, was conducted. The major source of data is semi-structured interviews with respondents from both the client and the contractors.

Findings – Results suggest that the transition has resulted in a mix of design-bid-build and design-build as contract type owing to issues when changing in a project-led organization. A change in vision also requires a concomitant change in culture, systems and roles.

Research Limitations/Implications – The study only includes cases from the Swedish transport infrastructure sector, which limits the generalizability. The findings are also indicative owing to the small number of cases.

Practical Implications – The findings further our understanding of managing change in complex projects, which might help practitioners to manage change in a more integrated way.

Originality/Value – The findings enrich our understanding of the systemic change that a switch in contract types can have in inter-organizational complex projects such as transport infrastructure projects. Furthermore, it emphasizes the intricate task of change management in project-led organizations and its effects on roles and responsibilities.

Keywords Strategic change, Design-build, Design-bid-build, Roles, Responsibility, Infrastructure project, Project-led organization

The authors wish to thank Formas and the Swedish Transport Administration for funding this research project.



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Emerald Reach Proceedings Series
Vol. 2
pp. 213-220
Emerald Publishing Limited
2516-2853
DOI 10.1108/S2516-2853201900000264

1. Introduction

In recent decades, design-build (DB) contracts have become more popular in the construction industry than design-bid-build (DBB) contracts (Duggan & Patel, 2014). Although this desire will often be communicated within the client organization that performs the change, it also severely affects other actors within the industry (Taylor and Levitt, 2004). Such a change in contract type is often intended to stimulate innovation and increase the efficiency of construction projects by increasing freedom for the contractor (Nystrom *et al.*, 2017). Despite this, Nyström *et al.* (2016) studied the differences between traditional contracts (such as DBB) and DB contracts and found that the degree of innovation was the same in both contract types despite the intended increase in freedom. Furthermore, they found no significant difference in freedom and concluded that there is no reason to expect more innovation to emerge simply by labelling contracts as DB. This suggests that the labelling of contracts is not enough, and that there is more to the change from DBB to DB than just deciding on contract type. In construction, major changes that lead to systemic changes are perceived as difficult owing to the inter-organizational and complex nature of construction projects (Larsson and Larsson, 2018; Holzer, 2011). However, few studies have emphasized the actual transition or change that occurs between the current and the future contract situation; instead, most studies focus only on the effects of this change process (e.g. Eriksson *et al.*, 2014; Hale *et al.*, 2009).

On an organizational level, a change involves three states: the current state, transition state and future state (Balogun and Hailey, 2004). The literature on change management often focuses on analyzing the current situation and planning for the future situation, thereby broadly ignoring the transition state (*ibid.*). Mintzberg and Westley (1992) point out that change at strategic levels is often incomplete, even if the vision or direction forwards are clearly stated. Change in the organization (culture, structure, systems and people) and change in strategy (vision, positions, programs and facilities) are the components of organized change (Mintzberg and Westley, 1992).

The change in contract type in the construction industry could be described as a systemic change that affects the fundamental structures. The change in roles and responsibilities in the construction industry during the past decades has been studied briefly (Emmitt, 2016; Mills and Glass, 2009). However, the transitional state in which the change actually occurs receives insufficient attention (Balogun and Hailey, 2004), even though this state is intricate and has a long duration. Implementing new role and routines could, on paper, happen overnight, but that would not entail an actual change to the desired future state as the behavior of the people and organizations involved would not have changed.

In construction, the project-based organization form (PBO) is widespread and is ideally suited for the complexity, cross-functional expertise, innovation and technological uncertainties that infrastructure projects often feature (Hobday, 2000). Any change that occurs in a PBO is executed within the project meaning that, in a pure PBO, the organizational level and project level are effectively the same. How the management of such innovation is handled within PBOs has already been studied (Blindenbach-Driessen and van den Ende, 2006; Keegan and Turner, 2002; Bresnen *et al.*, 2004). Although in the project-led organization there is still some coordination between activities, in the pure PBO the functional organization has become obsolete (Hobday, 2000). The Swedish Transport Administrations (STA), the major public client for transport infrastructure in

Sweden, could be described as more of a project-led organization with a functional organization matrix.

During the past decade, the STA has undertaken an organizational change from using mainly DBB contracts toward a higher number of DB contracts. This has been done in anticipation of better use of supplier competence within government directives regarding stimulating productivity and innovation (SOU 2012:39, 2012). However, the strongly rooted structure and culture that exists in the construction industry means that systemic changes take time, and the STA is still, even after almost a decade, largely in the transition state in this change process. Therefore, the purpose of this paper is to investigate how the client manages the transition between the different contract types from an organizational change perspective. The main source of data is a multiple case study of six public transport infrastructure projects, all managed by the STA.

2. Theoretical background

Major changes within an organization often affect not only the structure of the organization, but also the individuals within the organization. Previous studies of the change process, both at an organizational and at an individual level, agree that change involves several mechanisms, such as strategy, structure, processes and lateral capability, a reward system and people practices (Palmer *et al.*, 2006). Mintzberg's contents of organized change are divided into two different modes: state (which contains culture, structure, systems and people) and direction (which includes vision, position, programs and facilities; Mintzberg & Westley, 1992). These factors increase the complexity of change management, and moving from the current state to the future state does require a transition state, as described by Balogun and Hailey (2004).

Mintzberg and Westley (1992) classify change at different levels in a spiral model, where lower levels involve people or machines and higher levels involve strategic change with long-term impact. However, the higher levels of change are often incomplete (*ibid.*), and therefore, the future state of strategic change is often not reached. Higher levels entail more complexity and are more time-consuming because trying to implement a new vision for an organization is more intricate than, for example, replacing a machine in a factory. The model of organized change is hierarchical and, to some extent, reliant on other levels – a change in vision often requires a change in culture, although people could be recruited without the organization changing facilities (Mintzberg & Westley, 1992).

At the broadest level in an organization, a change in culture or vision means, as Mintzberg and Westley (1992) observe, a rethinking or reconception within the collective mind-set. The next level, they suggest, is a shift in structure or a changing business portfolio or market. The third level is changing systems or programs for planning, budgeting and research. Finally, the lowest level is new employees or moving to new facilities.

Table 1.
Contents of
Organized Change,
From Mintzberg and
Westley (1992)

| | Change in organization (state) | Change in strategy (direction) |
|------------------------|--------------------------------|--------------------------------|
| <i>More conceptual</i> | culture | vision |
| | structure | positions |
| <i>More concrete</i> | systems | programs |
| | people | facilities |

3. Method

The empirical data collected for this study derive from a multiple case study of six transport infrastructure projects conducted within the Swedish context. The projects involve different characteristics in terms of size, contractor and period (Table 2). However, these six projects show similarities in that all involve DB contracts procured and managed by the STA. Moreover, all six projects were procured after the client had taken the decision to increase the rate of DB contracts to stimulate innovation and increase productivity.

Short description of studied cases

- Case A: construction of a tunnel under a large river in an urban environment; the project is part of a mega-project;
- Case B: construction and reconstruction of a railway that entails a tunnel that will increase the capacity for commuter trains in a large city; the project is part of a mega-project;
- Case C: maintenance of 40 km of existing road in the countryside;
- Case D: construction of a new, 8 km road between two highways, including a 120-meter long bridge over a small river;
- Case E: reconstruction of an existing road junction including a new bridge and a roundabout;
- and Case F: construction of two new roads and a bridge crossing a smaller river.

The main data source is 35 semi-structured interviews, with 4-8 respondents from both the client and the contractor from each case. Nineteen interviews were with respondents from the client side, and sixteen from the contractor side. Client side respondents have roles including project manager, procurement officer and in some cases, project director and project engineer. Contractor side respondents were the project manager, the site manager, and the design manager. All interviews were case-specific and with people that possess key roles in each case. The length of each semi-structured interview varies from between 27 to 121 minutes.

An interview guide was established and used to maintain consistency in the data collection and to enable the analysis that followed. The interviews included subjects such as project characteristics, procurement strategy and collaboration, changing from a DBB to a DB-contract and its impact on innovation, project outcomes and organization. The study can be framed as using an abductive approach (Miles & Huberman 1994). An important consideration was that the respondents had the freedom to express opinions outside the initial subjects during the interviews to gain a richer data set and to capture participants' interpretations and reflections. All interviews were recorded and transcribed.

| | Change in organization (state) | Change in strategy (direction) |
|------------------------|---|---|
| <i>More conceptual</i> | Culture | Vision |
| | <i>Collaboration (Cases A, B, D and E)</i> | <i>Increasing innovation and efficiency (all cases)</i> |
| | Structure | Positions |
| | <i>Responsibility</i> | <i>Responsibility</i> |
| <i>More concrete</i> | Systems | Programs |
| | <i>Access to contractor's accountancy system (Case B)</i> | <i>Contract form (all cases)</i> |
| | People | Facilities |
| | <i>New roles (Cases A, B, C and D)</i> | <i>Joint site office (Cases B and D)</i> |

Table 2.
Cross-Case Analysis
Summary

The analysis follows the proposed steps for qualitative research by [Miles & Huberman \(1994\)](#): data reduction, data display and conclusion drawing and verification. Data reduction was done by first transcribing the interviews and transferring the relevant data concerning the transition into a document. This was followed by a single case analysis where, based on the theory by [Mintzberg and Westley \(1992\)](#), the empirical data on the change process was coded into more detailed categories that were then put into a cross-case analysis within the studied context. During the data analysis, iterations between emerging results, theory, and empirical data for the study were conducted in the form of discussions between the researchers to strengthen the developed conclusions, a method suggested by [Yin \(2013\)](#). In the section below, only the cross-case analysis are presented to save space (word count).

4. Cross-case analysis and discussion

Two major aspects that cause issues during the change process emerged from the study. The first aspect relates to how the transition from DBB to DB-contracts has been carried out, and the second is how the change mode has affected the responsibilities and roles of the actors involved.

The change from DBB to DB-contracts is intended to improve innovation and effectiveness, meaning that it could be viewed as a new *vision* ([Mintzberg and Westley, 1992](#)) that sets out a new direction for the client. This strategic decision is decided upon at the functional level of the organization ([Hobday, 2000](#)) but carried out in the projects themselves. The decision to procure according to DB-contracts instead of DBB-contracts is, therefore, expected to have an impact on both the entire client organization and the contractor organization. A part of the new vision of increasing the innovation rate is collaboration, a forum for the client and the contractor to discuss, analyze and together formulate a solution.

The respondents in all six cases discussed a change in the *culture* ([Mintzberg and Westley, 1992](#)) for the project. In Cases A and B, both the client and contractor were in accordance with the changed *vision*, which can be described as a cultural change. In the other cases, a culture change had not occurred; rather, the client managed the project as before (i.e. more like a DBB-contract), as if the contract type had not changed. The contractor respondents in cases C, D, E and F also observed that the client had used the same control mechanisms and approval systems (for drawings and other documents) as in a DBB-contract, resulting in a conflict with the DB-contract form. Another way of viewing cultural change could be the use of collaboration. A more in-depth collaboration has been used in four of the cases (Cases A, B, D and E).

Changes in *structure* and *positions* ([Mintzberg and Westley, 1992](#)) were identified in all of the cases. The change in contract type showed both a structural and positional change through the shift in responsibilities among the actors, moving from a more traditional approach in DBB-contracts to procurement to a DB-contract. Although a change in responsibilities between the two types of contract is clear, with the design responsibility lying with the client in a DBB contract and with the contractor in DB contracts, issues in the transfer of responsibility are mentioned by both parties in all the studied cases. The contractor reflects on the client's problems with working as intended with DB when it comes to responsibilities. The client is often described as wanting to control, check and decide on aspects that the contractor perceives as being within their responsibility in accordance with a DB set-up, meaning that the client is still acting as before (as in DBB contracts). The inability of the client to change entirely to DB caused some practical problems such as time delays owing to the checking of documents before execution, a form of control that is not consistent with the client's responsibility in this type of contract. The client, on the other

hand, seems aware of their somewhat unusual perspective on controlling the execution of the construction project, but points to their role as a public authority and the need to ensure that the interests of the society are secured and that no one, for instance, is injured during the use of temporary structures (e.g. bridges). The client emphasizes the importance in DB contracts of the role of a public authority, and therefore, the project managers for the client see their controlling behavior before execution as legitimate (Case E). The client project manager is not willing to take responsibility for new and untested materials and methods suggested by the contractor in Case B. The contractor, however, emphasizes that the client should take responsibility for the suggested construction as the client has checked and approved the documents. Formally, the contractor is responsible for these kinds of innovations, but as the client approved them, the contractor is not willing to try them as they are the risk-takers. This indicates that both the client and the contractor in the studied cases have not fulfilled the necessary change process between the current (DBB) and the future (DB) when studying responsibilities between the parties.

This also affected the next change level of *systems* and *programs* (Mintzberg and Westley, 1992), where documentation was adapted to fit the requirements of a DB-contract. Change in *programs* could be seen in the form of the new legal documents that the client uses. These contract forms have been distributed to the projects as a part of the change from DBB-contracts to DB-contracts. *System* change is discussed in one case (B), where the client has access to the contractor's accountancy system for the control of actual costs connected to the specific project.

Only one case saw a change in *facilities*. In case B, a joint site office was used, with the client organization and the contractor organization sharing the same office building on site. This was a demand from the client to facilitate collaboration.

The change regarding *people* in respect of new and changed roles (Mintzberg and Westley, 1992) was emphasized and described in Cases B, C, D and E. These changing roles are identified in DB contracts on both sides of the contract. Some of the roles have shifted sideways (e.g. while the design manager in DBB contracts is employed by the client, DB contracts see the design manager employed by the contractor instead as the contractor does the design). Some of the new roles were owing to the change being seen as both confusing and ill-defined, and they even seem to be described differently in different projects. In terms of the change process, two new or changed roles (design manager and site controller) were identified in this study.

Table 2 shows the summary of the changed contents from the cases with examples of change in the empirical data.

The design manager at the contractor (described briefly above) is the person who coordinates and communicates with the client and any consultant involved regarding design work. The design is usually not performed in-house at the contractor, but, instead, a consultant is procured to do the design. This role also coordinates between the designer, the contractor project manager and the client organization during project execution. The design manager must act as a coordinator between the designer and the project managers because the designer is not always familiar with the practical aspects of the design when it is executed, and the capabilities of the contractor could have constraints resulting in the need to change the design.

The site controller in DB contracts should follow up on its own pre-design work (conducted on behalf of the client before the contractor is procured), and not control and take decisions on site as in DBB contracts. The consultant firm that performed the pre-design and tendering documents for the client should have this role. The client initiated this role in an attempt to increase the understanding of the consequences of early decisions and facilitate

feedback on experiences. However, in the studied cases, the site controller is described as having difficulties with taking decisions, as the controller employed by the client did in DBB contracts when the design responsibility was with the client. In addition, the contractor tends to want the site controller to make decisions for them instead of following up on the on-going execution of the project. This reflects the problems for the contractor taking responsibility in DB contracts when they want to perform this role as in DBB contracts.

The change from DBB contracts to DB contracts in relation to the model of organized change by [Mintzberg and Westley \(1992\)](#) indicates that two of the cases (Cases A and B) have identified changes at the different levels, most of which have resulted in successful projects. These cases made changes at all different levels, resulting in a more complete change process compared to those cases where culture change was not well handled.

5. Conclusion

This paper's practical contribution is to the management of complex inter-organizational projects where systemic changes are to be implemented. Being aware of the change levels and the impact they have, on both organizational setups and individuals, before an actual change has happened seems to be of utmost importance.

The theoretical contribution to the construction management literature is that the change in project-led organizations could differ in relation to the change made in project-based organizations owing to the matrix structure of the former.

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