

Efficient Incentive- and Coordination-Mechanisms for Construction Contracts in the Public and Private Construction Sectors

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Summary report of the research project „Efficient Incentive- und Coordination-Mechanisms for Construction Contracts in the Public and Private Construction Sectors“

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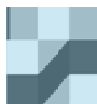
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1 Research objective

Outline of research topic

This research report presents the findings and results of the research project "Efficient Incentive- and Coordination-Mechanisms for Construction Contracts in the Public and Private Construction Sectors" financed by the German Federal Ministry of Transport, Construction and Urban Development as part of the research initiative "Future of Construction". The report analyzes the design of organizational models for construction projects in structural engineering conducted by private and public clients.

In this report organizational models are being evaluated from two interdependent perspectives – the stand-alone and the multi project level. The stand-alone project level covers the analysis of single structural engineering projects, whereas the multi project level deals with consistent long-term strategies regarding the design of organizational models for recurrent construction projects of a single client.

An organizational model on the stand-alone project level is defined by the scope of contractual integration between tasks related to design, construction management and construction as well as the choice of either in-house production or contracting out. In addition to the definition of an organizational model on the stand-alone project level, the multi project level takes the client's strategic decisions concerning the long-term implications of internal and external resources into consideration.

The interdependencies of these two perspectives become obvious when analyzing the significant impact the design of organizational models for stand-alone projects has on the creation of internal resources at the client, which can also be used for future projects on the multi project level. As knowledge of one specific organizational model at the stand-alone project level can also be used in future projects, there is a path dependence between the stand-alone and the multi project level, which has to be taken into account when discussing the long-term strategic decisions regarding organizational models. The link between these two levels of organizational design determines the structure of this report's analysis.

Motivation and relevance

During the last decade some stakeholders have pushed for a shift from the traditional German approach of tendering public construction projects, i.e. applying traditional procurement routes, to organizational models, which allocate the design and build phases to one single prime/main contractor. One of the primary advantages cited in the proposals for an increased usage of organizational models, integrating design and build, is the potential to increase the efficiency in public construction by implementing integrated models and respectively by establishing so called "Guaranteed Maximum Price Models" (GMP Models) to establish incentives for construction companies to contribute with their expertise in the design process at an early project stage. However, the benefits of design and build models as well as GMP models to public sector clients need to be analyzed in detail and the transferability of experiences and results from the private to the public construction sector, considering the distinctive characteristics of public clients, needs to be evaluated.

2 Implementation of research objective

The analyses of organizational models in the German private and public structural engineering sectors in this report are based on the theoretical framework of “New Institutional Economics”, which mainly focuses on the private sector, but, which can also be applied to the public sphere, if the specific characteristics of the public sector are taken into account. In order to use this framework to analyze organizational models for structural engineering projects a thorough understanding of the prevailing characteristics of transactions, actors, markets and institutional frameworks within the German construction sector is essential.

Over the course of this research project specific knowledge regarding the construction sector has been accumulated by the extensive evaluation of literature on construction related topics as well as by 47 case studies conducted with public and private clients in the German construction industry and 15 public clients in the UK and Sweden. Furthermore, additional expertise has been provided by the research partners within the project consortium; Mr. Bernd Kochendörfer (Professor for Construction Management Studies at TU Berlin) as well as Mrs. Mertens and Mr. Goetze (HFK Lawyers).

3 Summary of results

Analysis of organizational models on the stand-alone project level

The analysis of organizational models for stand-alone projects in the German construction sector, presented in this research report, shows that the client's design decision takes place within a complex system of diverse and yet interdependent parameters. In order to make recommendations for the use of a particular organizational model, it is necessary to identify the underlying characteristics of each individual construction project by analyzing the transaction characteristics, the involved actors, the market conditions and the institutional framework as well as evaluating their impact on both production and transaction costs accompanying the specific organizational model. Due to the high complexity and multiple interdependencies of these characteristics, it is impossible to derive any general recommendations for organizational models on the stand-alone project level. Nonetheless it is possible to draw at least preliminary conclusions about the favorable design of the organizational model for each project stage (i.e. design, construction management and construction).

The maturity of the design stage's institutional framework within the German construction sector, e.g. the HOAI or technical standards, facilitates the use of contracting out as well as the division of particular design tasks into lots for different planners or engineers. In contrast, the characteristics of construction management and coordination tasks offer a significant rationality for a client's in-house production.

In general, the characteristics of the existing institutional framework and the market structure of the German construction sector are beneficial for the use of single tender contracting in case of structural engineering projects of limited complexity. However both single tender contracting as well as design and build go along with advantages and disadvantages for the client. One opportunity to combine the most beneficial characteristics of both organizational models could be a model, which bundles lots

technically and chronologically close to each other and awards these bundles to a limited number of contractors. By using such a model potential benefits from synergies by bundling could be gained and at the same time the risk of a hold-up problem with only one prime/main contractor could be reduced.

Organizational models, which award the construction tasks to one prime contractor at an early project stage, before the detailed design of the actual construction process has been conducted, are generally claimed to offer better opportunities for value optimization, as the prime contractor gains incentives to implement its construction knowledge during the design stage. However, this assumption on the potential for optimization suggests that the construction knowledge is very specific and therefore not available to any other designers or engineers and can only be provided by the prime contractor. The possibility for value optimization by the use of construction knowledge in the design stage is especially relevant in structural engineering projects with a high technical complexity and a large share of not standardized technical processes. However, the potential benefits of contractually integrating the design and construction stages need to be weighed against the increased dependence of the client on the prime contractor. This dependence normally increases due to the low contractability of construction tasks awarded at an early project stage and the large contract scope. Compared to their smaller counterparts, large size clients can use significant future construction volumes when dealing with different contractors and therefore have better opportunities to implement implicit agreements with these contractors. Large clients also, in general, have sufficient internal resources for procurement and monitoring, which reduce the disadvantages of organizational models tendered at an early design stage.

GMP models present a potential combination of advantages for the client due to the large contract scope of contracting out and the flexibility of in-house production. However, these potentially advantageous effects require certain client's characteristics. Hence GMP models are particularly suitable for large clients with sufficient internal resources for design, coordination and the use of implicit agreements. For small clients, lacking these characteristics, GMP models pose significant risks without offering major advantages compared to other organizational models.

Even though the evaluation of the different organizational models' benefits on the stand-alone project level in the public structural engineering sector depends on the characteristics of each individual case and general recommendations about the models' design cannot be provided, certain distinctive findings can be derived with respect to the specifics of the public sector. Due to public clients' limitations to comply with implicit agreements as well as the importance of transparency and third party observability, organizational models, awarding the actual construction contract after the detailed construction design, generally provide better contractability and therefore more advantages for public than for private clients.

The benefits of applying GMP models within public structural engineering in Germany need to be questioned. Due to the public clients' specific characteristics resulting in a high importance of transparency and the often general lack of internal resources at public clients, it can be concluded that GMP models are in general less suitable in the public than the private construction sector. Furthermore, the impact of GMP models on transparency and third party observability needs to be considered, because of the often negative effects implied in comparison to traditional procurement routes.

Considering the public sector's limitations on recurrent contracting with single contractors in Germany, regulated by the procurement law, in general in-house production offers more benefits for public than for private clients. This especially applies to construction management and coordination tasks, which require close cooperation of clients and contractors due to their importance for the project as well as their generally poor contractability and third party observability.

Analysis of organizational models on the multi project level

On the multi project level the use of one or a limited number of standardized organizational models is beneficial for clients in the public structural engineering sector. The advantages arise from the opportunities presented by standardized organizational models to compose and preserve internal resources for efficient project implementation as well as to increase third party observability and transparency.

Based on the generally large heterogeneity of the public clients' project portfolio, their limited opportunities to reduce the dependence on the contractor during the construction stage, the importance of third party observability as well as the current characteristics of the market and the institutional framework in Germany, the use of single tender contracting or design and build, which does not integrate the design stage, as a standardized model can be considered beneficial for German public clients.

However, the long-term consistency of standardized organizational models in the public sector requires sufficient internal resources to secure efficient construction management and coordination. The findings of the case studies conducted over the course of this research project as well as publications of the German National Audit Office show a significant reduction of internal resources in many public entities in Germany within the last years, which have resulted in inefficiencies within the public structural engineering sector.

The conclusions drawn from the analyses presented in this research report show that public clients benefit from internal resources for in-house construction management and coordination activities due to the specifics of the public sector. Based on these results it is necessary to point out that the political intent to reduce the public clients' internal resources for construction related services, which has been identified in many of the project's case studies, must not compromise the long-term consistency of the public client's organizational model on the multi project level. Otherwise short-term savings in labor costs could result in cumulative higher long-term costs for public structural engineering projects. Especially facing the requirement of fiscal cuts to public budgets, there is a need to develop a sustainable long-term perspective on organizational models for public clients in Germany. This long-term perspective must go beyond the stand-alone project level and rather develop consistent strategies on the multi project level, providing the public client with the needed internal resources in order to guarantee a long-term efficiency in public structural engineering projects.