
Updating and Cleaning Out: The “Make or Buy” Decision in Construction Revisited

Updating and
Cleaning Out

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Abstract

Purpose – Provide explanations to why firms subcontract.

Design/Methodology/Approach – Theoretical analysis based on current and specific conditions of the construction sector and empirical indicators.

Findings – Attributes potentially influencing the subcontracting decision are updated.

Research Limitations/Implications – The paper will only focus on the make-or-buy decision of the main contractor and not the client.

Practical Implications – Contributing to coming analysis on the subcontractor decision.

Originality/Value – Updated transaction cost analysis on the construction industry.

Keywords Subcontracting, Construction industry, Contracting, Transaction cost analysis, Infrastructure, Main contractors

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1. Introduction

The construction industry can be defined by pinpointing a combination of characteristics that differs from other sectors. Work is project-based, production is located at the place of the product and every project has its unique challenges. Another aspect is that the market is fragmented, and it is claimed that this is growing over time, turning traditional construction companies into construction management companies (Winch, 1989). There is a lack of data supporting this claim.

This paper provides some empirical indications from Sweden supporting this claim, but the main contribution of this paper is theoretical and focuses on why construction firms subcontract their work. The question is approached using the transaction cost theory and the make-or-buy question. The contribution is to clear out irrelevant and dated arguments on this topic and provide an updated set of factors to explain the subcontracting decision.

The paper is structured by the following section providing the methodological approach. Then, some empirical substance to the claim that contractors are becoming construction



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managers. Section 4 scrutinizes transaction costs theory to understand why this trend is taking place, which is summed up in Section 5. The final chapter concludes.

The paper will focus on only the make-or-buy decision of the main contractor and not the client.

2. Method and data

This paper is to be seen as a first step to empirically understand what drives the make-or-buy decision in the construction industry. Such analysis is preferably undertaken by statistical analysis, empirically investigating factors that influence construction firms into using subcontractors or not. Such analysis requires data and to find the right kind of data, one has to be specific in what hypothesis to test.

Standard explanations (Eccles, 1981) to the subcontracting decision are scrutinized and updated with the current circumstances of the industry. Current circumstances are found by a board set of data including interviews, statistical indicators, contract documents, legislation to transaction cost theory. The validation of the hypotheses is found in the next step, where the claims are tested.

3. The development of the construction company

The construction industry differs from other sectors because its final product is unique, immobile and of high variety (Gonzalez-Diaz, 2000). In other words, every road or house constructed is project-based. Secondly, on the contrary to manufacturing, the inputs are brought to the location of the final product and not the other way around. Finally, construction projects are heterogeneous, with each product different from the other. These three characteristics define construction industry in contrast to many other industries and they seem stable over time, and not really questioned.

Another characteristic of the construction industry is the fragmentation of firms. There is a discussion that over time, the main contractors are using more subcontractors, thereby turning into construction management firms (e.g. see Kumaraswamy *et al.*, 2000). Data to back up this statement is lacking. Figure 1 shows data from Sweden regarding the number

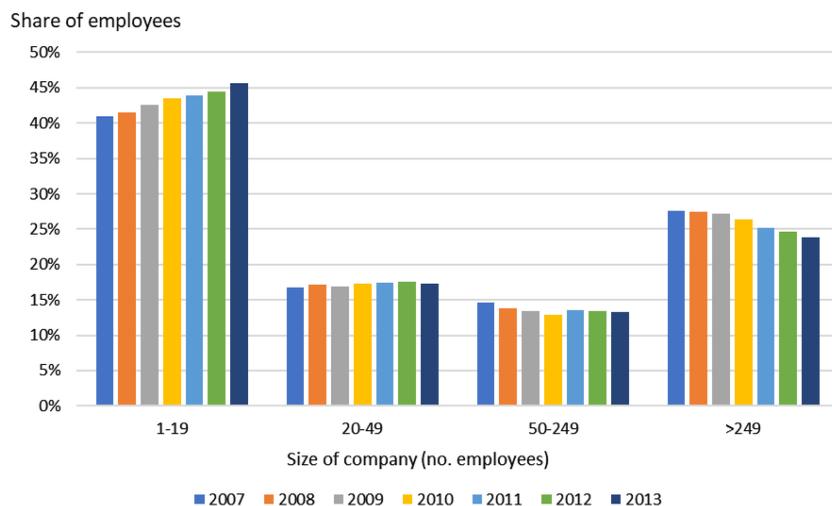


Figure 1.
Growth of Different
Size Companies in
Sweden (Bisnode and
BI, 2018)

of employees on the firm level in the construction industry between 2007 and 2013. The data is taken from the official annual reports regarding firms within NACE 41 and 42, gathered by Bisnode commissioned by The Swedish Construction Federation.

Figure 1 shows that the number of employees within small firms increased between 2007 and 2013, while they decreased in the large companies. This indicates that the small companies are doing more of the work measured as number of employees. At the same time, the large companies have not lost any significant market shares (Nyström *et al.*, 2016). Another indicator is that the four biggest construction companies in Sweden had 36,400 employees in the economic downturn of 2009 and 33,300 in the year of economic boom 2016.

Hence, there are indicators showing that the larger companies are decreasing in terms of employees on behalf of the smaller companies, but without losing their market shares. The following section will disentangle the reasons behind this likely trend.

4. Why do main contractors buy?

A classic question within economics is the boundaries of the firm – the “make-or-buy” decision posed by Williamson (1975). Should a company make on their own or buy inputs from the market. Applied to the section above, why do construction companies subcontract, becoming construction management companies, instead of producing with their own personnel?

The answer to this question is to be found in the transaction costs of using the market. If these costs are larger than the cost of producing in-house, the latter is preferable, and the other way around. The size of the transaction costs is usually defined by the following set of attributes of a transaction: (1-2) the required assets specificity in different versions, (3) the frequency and duration of the transaction, (4) the uncertainty and (5) cost of monitoring (Milgrom and Roberts, 1992). Specific attributes of subcontractor decision in the construction industry mention (6) shortage of capacity, (7) geographical dispersion, (8) passing on risk, (9) specialisation, (10) minimize capital costs and (11) strong unions and labour laws.

By scrutinizing the attributes from a construction sector perspective, 3 of these 11 attributes are considered irrelevant and dated. The reasoning behind this exclusion is presented below. Two relevant but not properly described attributes in a construction industry setting are also clarified.

4.1. Assets specificity is not relevant

Assets specificity and the hold-up problem (Klein *et al.*, 1978) could be described as the classical reason not to “buy”. A specific investment has no residual value outside the project. This entails a risk for a subcontractor not undertaking the investment as the main contractor can renegotiate the price once the investment is in place. The implication is that when asset specific investments are important, the main contractor might be better off using in-house production. Gonzalez-Diaz *et al.* (2000) find that as specificity grows, main contractors subcontract less.

A relevant question is how much asset specificity is present in the construction industry. Lind (2017) and Yik *et al.* (2006) both argue that the hold-up problem is not extensive. There are not many large investments for production that has no value for the next project. Sure, each new project needs some sort of start-up investments for establishing the organisation, but this is unlikely to be a considerable cost.

4.2. Shortage of capacity is a short-term issue

A reason for subcontracting is the shortage of capacity. This is trivial in the sense that any company with temporarily high demand and lack of production capacity would need to hire personnel or subcontract. However, if the demand would settle at a permanent higher level, it would be rational for the company to adjust the capacity. Hence, this is a short-term issue in times of economic booms and is not to be seen as a fundamental concern with the make-or-buy decision.

4.3. Geographical dispersion is not a make-or-buy question

Operating on a geographically spread out market entails additional monitoring cost. Despite new technology, such as video meetings and improved surveillance techniques that mitigate these costs, having knowledge of local legislation, customs and a network of people eases everyday work in the construction industry.

One aspect that differentiates the construction industry from other sectors is that the location of the product decides the place of production and not the other way around. Usually, this means that the construction site is gathered at one location, e.g. the house or road that is to be built. Hence, on project level, there is not a wide geographical spread.

The more relevant question refers to the company level, where the question is how to define the relevant geographical market and where the company should operate. This comes down to the strategic decision on submitting a bid for a project in a new geographical area or not. If yes, the secondary question is whether the new peripheral part or the company's operation area should be subcontracted.

Monitoring costs for geographical dispersion is not primarily a question of make-or-buy but a strategic decision on whether to enter a new geographical market.

4.4. Temporal specificity is relevant

There is, however, one aspect of asset specificity that has bearing on the construction industry. Temporal specificity refers to situations in which scheduling of inputs is vital, where unavailability of a certain input holds up production (Masten *et al.*, 1991).

As construction by nature is a chronological process – where you cannot paint the road until the pavement is done, which cannot be undertaken until the base layer is done – temporal specificity and scheduling is important. This entails that main contractor has an incentive to use in-house competence regarding vital inputs. However, just-in-time and supply chain management could be interpreted as ways to secure delivery regarding vital inputs without using in-house production.

4.5. Frequency and duration could be an explanation

Large infrastructure construction projects are often undertaken by public clients. Public organisations are bound by some form of public procurement act. In Europe, this is regulated by EU directive 2014/24/EU and in the US, by the Federal Acquisition Streamlining act. The regulation obstructs long-term or self-enforcing contracts, when each new project must be procured. Hence, public infrastructure projects are on-off projects.

Each infrastructure project is unique, but there is a continuous flow of projects procured. The Swedish Transport Administration procured 171 road investment and paving projects during 2017, which do not include similar work procured by the municipalities. California Department of Transportation procured 539 road construction and repair contracts per year between 1996 and 2005. Hence, contracts are coming out on a regular basis.

The question at hand is how the frequency will affect transactions costs and incentives to subcontract. Unlike the public client, there is no regulatory institution that bound main

contractors form building a long-term relationship to their subcontractors. In the general literature, frequency of transactions is positively correlated with subcontracting owing to two reasons. Firstly, companies that interact frequently learn each other’s organization and thereby improve ways of working together to lower cost over time. The second reason is often described as a self-enforcing contract (e.g. see Gibbons, 2005), where parties that interact frequently and over a long time finds a common interest to maintain the relationship instead of cheating each other.

One can conclude that infrastructure contracts are being procured on a regular basis, giving main contractors a possibility to build long-term relationships.

5. Results

The above reasoning based on a combination of theory, current and specific conditions of the construction sector plus some empirical indicators provides a new setup for analysing the make-or-buy decision in the construction industry. Table 1 discharges some earlier proclaimed relevant attributes in this decision.

It shows that above the asset specificity, shortage of capacity and geographical dispersion are not relevant issues in the make-or-buy decision of the construction industry. Empirical focus should instead be turned to frequency and duration, uncertainty, monitoring, risk aversion, gains of specialisation, high capital costs, strong unions and labour laws to shed light on the subcontracting decision.

High cost for monitoring has an expected negative impact on the likelihood of using subcontractors. Uncertain and complex projects work in two ways regarding subcontractors. On the one hand, it is hard to contract uncertainty, but on the other hand, complex projects require a lot of different competences. Hence, it is a relevant issue in the decision on subcontracting, but it is an open empirical question of which force is stronger. All the other attributes of a transaction are expected to be positively correlated with subcontracting.

6. Conclusions

Empirical indicators from Sweden support the general claim that traditional contractors are turning into construction management firms. This means that to a larger degree, the main contractors are using subcontractors instead of in-house personnel.

Attribute affecting subcontracting decision	Positive effect	Negative effect	Ambiguous empirical question	Not relevant
1. <i>Asset specificity</i>				×
2. <i>Temporal specificity</i>	×			
3. <i>Frequency and duration</i>	×			
4. <i>Uncertainty</i>			×	
5. <i>Monitoring</i>		×		
6. <i>Shortage of capacity</i>				×
7. <i>Geographical dispersion</i>				×
8. <i>Risk aversion</i>	×			
9. <i>Specialisation</i>	×			
10. <i>Minimize capital costs</i>	×			
11. <i>Strong unions and labour laws</i>	×			

Table 1.
Updated Attributes
on the
Subcontracting
Decision in
Construction

This paper scrutinizes the theory behind the make-or-buy decision applied to the construction industry. Through theoretical reasoning and specific conditions of the sector, attributes of the subcontracting decision are updated. It is concluded that assets specificity and the entailing hold-up problem is not a major issue regarding construction. Further, the shortage of capacity is not a fundamental issue regarding subcontracting. Also, geographical dispersion is mainly a strategic issue around whether to enter a new market.

Attributes relating to the subcontracting decision in the construction industry include temporal specificity, frequency and duration, uncertainty, monitoring, risk aversion, gains of specialisation, high capital costs, strong unions and labour laws. These are aspects to approach with empirical data to enhance understanding of what drives subcontracting in the construction industry.

References

- Eccles, R. (1981), "The Quasifirm in the Construction Industry", *Journal of Economic Behavior and Organization*, Vol. 2, pp. 335–357.
- Gibbons, R. (2005), "Four Formal(izable) Theories of the Firm?", *Journal of Economic Behavior & Organization*, Vol. 58, No. 2, pp. 200–245.
- Gonzalez-Diaz, M., Arrunada, B. and Fernandez, A., (2000), "Causes of Subcontracting: Evidence from Panel Data on Construction Firms", *Journal of Economic Behavior and Organization*, Vol. 42, No. 2, pp. 167–187.
- Klein, B., Crawford, R. and Alchian, A., (1978), "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process", *Journal of Law and Economics*, Vol. 21, pp. 297–326.
- Kumaraswamy, M. and Mathews, J. (2000), "Improved subcontractor selection employing partnering principles", *Journal of Management in Engineering*, Vol. 16, No. 3, pp. 47–57.
- Lind, H. (2017), "Vertical integration in the real estate sector: three Swedish case studies", *Journal of European Real Estate Research*, Vol. 10, No. 2, pp. 195–210.
- Masten, S.E., Meehan, J.W. and Snyder, E.A. (1991), "The costs of organization", *Journal of Law, Economics and Organization*, Vol. 7, pp. 1–25.
- Milgrom, P. and Roberts, J. (1992), *"Economics, Organization and Management"*, Prentice Hall.
- Nyström, J., Ridderstedt, I. and Österström, J. (2016), "Stimulera konkurrensen i anläggningssektorn - Hur behandlas små och medelstora företag i våra grannländer?", VTI-notat 29.
- Yik, F.W.H., Lai, H.K., Chan, K.T. and Yiu, E.C.Y. (2006), "Problems with specialist subcontracting in the construction industry", *Building services engineering research and technology*, Vol. 27, No. 3, pp. 183–193.
- Williamson, O.E. (1975), *"Market and Hierarchies: Analysis and Antitrust Implications"*, The Free Press, New York, NY.
- Winch, G. (1989), "The Construction Firm and the Construction Project: A Transaction Cost Approach", *Construction Management and Economics*, Vol. 7, No. 4, pp. 331–345.
- Winch, G.M., (1998), "Zephyrs of creative destruction: understanding the management of innovation in construction", *Building Research and Information*, Vol. 26, No. 4, pp. 268–79.