HORIZONTAL INTER-ORGANIZATIONAL COLLABORATION: THE CASE OF THIRD-PARTY LOGISTICS

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As a measure to increase performance, improve safety and reduce environmental impact, the use of third-party logistics (TPL) solutions has increased in the construction industry. Other measures are inter-organizational collaborative methods and agreements between different actors. The purpose of this study is to explore how a TPL solution can affect inter-organizational relationships, specifically in the horizontal dimension. Findings are based on a case study of an urban development project with a TPL solution mandatory to use for all construction actors working side by side in parallel and sequential stages. The analysis is based on the industrial network approach, using the ARA-model for identifying and analysing inter-organizational interactions among main contractors. The findings indicate that the contractors do collaborate with each other on both technical and organizational resources, as well as coordinate activities between each other, and that the TPL solution has a vital role in bringing them together and improves collaboration. This nuance the predominant view of the construction industry as being characterized by adversarial relationships and lack of inter-organizational collaboration. It also extends the knowledge of what a TPL solution can contribute with besides improved logistics.

Keywords: horizontal interaction, collaboration, industrial network approach

INTRODUCTION

Several measures have been taken in the construction industry to achieve a more efficient production as well as improving safety and reducing environmental impact. One such measure is supply chain management (SCM) and the implementation of third-party logistics (TPL) solutions (Ekeskär and Rudberg 2016; Sundquist *et al.,* 2018; Janné and Fredriksson 2019). Other measures are the efforts on collaborative methods and agreements between clients and contractors (Bygballe *et al.,* 2010). These examples address the importance of inter-organizational relationships for developing the construction industry, something which is acknowledged in construction management literature (e.g. Tennant and Fernie 2014; Bygballe and Swärd 2019).

Most studies on TPL solutions do, however, focus on logistics, SCM principles and productivity performance (cf. Lindén and Josephson 2013; Ekeskär and Rudberg

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2016; Sundquist *et al.,* 2018; Janné and Fredriksson 2019) and not on inter-organizational relations. This is despite that a TPL provider may induce collaboration both vertically and horizontally in situations when there are no formal contracts. For the purpose of exploring how a TPL solution affect inter-organizational relationships specifically in the horizontal dimension, we explore interactional patterns that take place between main contractors in a multi-project context. When these contractors, that may be considered competitors, initiate interaction it can be interpreted as a mechanism for operating efficiently in multi-project contexts. The following research questions guide the study:

- What kinds of inter-organizational collaborations exist between main contractors in an urban development project?
- What role does a TPL solution have in stimulating inter-organizational collaboration?

For this purpose, we use the industrial network approach, or IMP perspective (Industrial Marketing and Purchasing), which specializes in analysing inter-organizational interaction (Håkansson and Snehota 1995; Håkansson *et al.,* 2009). By using the ARA-model (Activities-Resources-Actors), we have been able to detail the content of horizontal inter-organizational relationships. Based on the findings, we discuss what role a TPL solution can play for this type of inter-organizational collaboration and we provide new insights on the nature of inter-organizational relationships in the construction industry.

The empirical case covers a TPL solution implemented in an urban development project in Sweden called Stockholm Royal Seaport. An urban development project can be considered as an inter-organizational multi-project context (Engwall and Jerbrant 2003), which in each stage includes a multitude of parallel construction projects involving a multitude of developers, contractors and sub-contractors, and that each stage can be considered a multi-project. Consequently, the need for coordination of both resources and activities within, and across, construction projects in the same stage will prompt interaction among these actors.

LITERATURE OVERVIEW

Third-Party Logistics in Construction

Construction activities take place by temporary organizations at unique sites. This induces temporary supply chains and the need of project specific logistics setups (Dubois and Gadde 2002). Traditionally, the contractors managed the handling of materials, but since a decade dedicated construction logistics solution operated by TPL providers challenge this setup (Ekeskär and Rudberg 2016). TPL solutions are often mandatory to use and can be initiated by a developer (Ekeskär and Rudberg 2016; Sundquist *et al.,* 2018) or by a municipality (Janné and Fredriksson 2019). Studies indicate that contractors are reluctant to work with TPL solutions, due to cost (Ekeskär and Rudberg 2016). However, other studies indicate that TPL solutions decrease costs (Lindén and Josephson 2013), improve performance (Ekeskär and Rudberg 2016; Sundquist *et al.,* 2018), increase consolidation and reduce the number of deliveries (Janné and Fredriksson 2019; Dubois *et al.,* 2019).

Inter-Organizational Relationships in Construction

The development of inter-organizational relationships is related to the temporary character and the high level of specialization across a great number of actors. Organizing by projects lead to short-term relationships in unique constellations rather

than long-term relationships in established networks (Bakker 2010). However, it is primarily the adversarial nature of these short-term relationships and the consequences hereof that has raised the critique of construction lagging behind other industries in terms of productivity and innovativeness (Miozzo and Dewick 2004). One example is the way competitive tendering is practiced in the supply chain (Bygballe *et al.,* 2010). In this regard, although found challenging, partnering has been presented and studied as a possible solution towards more collaborative work practices and new ways of interacting within and across projects (Bresnen 2010; Bygballe and Swärd 2019). Also, it has been indicated that when possible and beneficial, construction firms and professionals can actively create "bridges" between organizations, between projects and the resources and activities they engage in over time (Havenvid *et al.,* 2019). For instance, in terms of the materials and technologies they use within and across projects (Bengtson and Håkansson 2007; Havenvid *et al.,* 2016b), how they learn within and across projects (Håkansson *et al.,* 1999; Håkansson and Ingemansson 2011), and how they develop new solutions within and across projects (Havenvid *et al.,* 2016a; Havenvid *et al.,* 2016b). While these studies provide a more nuanced picture of how construction actors operate and interact, further studies are needed in order to understand the forms of interaction that these firms engage in and what role interaction plays in this specific industry context. For the present study, we identify the industrial network approach suitable for further detailing and analysing how and why construction firms engage in interaction as a result of using a TPL provider. This approach has been used in previous studies on TPL in construction (Sundquist *et al.,* 2018).

THEORETICAL FRAMEWORK

Industrial Network Approach

The industrial network approach emphasizes inter-organizational relationships between organizations; how they relate and interact with each other and as a consequence, how they adapt in relation to each other (Håkansson and Snehota 1995; Håkansson *et al.,* 2009). This approach sprung from studies of long-term business relationships and has as a consequence mostly been applied when studying these kinds of more stable relationships in industry sectors such as the automotive industry (e.g. Dubois and Fredriksson 2008). However, several studies have applied the industrial network approach in the construction industry and interactions in the project-based context studying organizing and productivity (Dubois and Gadde 2002), innovation (Dubois and Gadde 2002; Bygballe and Ingemansson 2014; Havenvid *et al.,* 2016a), fragmentation (Havenvid *et al.,* 2016b) and logistics (Sundquist *et al.,* 2018; Dubois *et al.,* 2019). While the project-based nature of the construction industry creates a loosely coupled system over time (Dubois and Gadde 2002), several studies show that there are active efforts of interconnecting both organizations and projects over time (e.g. Havenvid *et al.,* 2019).

One of the models developed for analysing the content of business relationships is the ARA model which takes its stance in three different but interrelated dimensions of how organizations interact: Actors, resources and activities. Actors can be understood as companies, organizations or individuals representing technical or organizational resources, such as materials, machines and competence. These resources are used in activities such as planning, and production performed by actors. The model reveals how these three dimensions are related to each other. Actors can combine resources (forming ties) or link activities (forming links) across firm boundaries in order to

create new combinations that in turn increase the overall efficiency of both inter-firm and intra-firm operations (Håkansson and Snehota 1995). In such interaction processes, actors form social sentiments towards each other, superficially or more profound depending on the nature of the interaction. As such, actors form specific bonds. From the standpoint that organizations need to cope with and build interdependences to run and develop their operations, interaction is an essential part of the industrial network approach; no actor can control all activities and resources but are dependent on other actors (Håkansson *et al.,* 2009; Gadde *et al.,* 2003; Håkansson and Snehota 1995).

RESEARCH DESIGN

Research Approach

A case study approach according to the principles described by Yin (2014) have been performed. The case study covers a particular stage in the urban development project Stockholm Royal Seaport (SRS) that utilized a TPL provider. A case study approach is appropriate when striving to understand interactions in complex organizational contexts (Flyvbjerg 2006) and is also a recommended approach when studying inter-organizational relationships in industrial networks (Easton 2010). The primary data includes semi-structured interviews and participatory observations between November 2018 and June 2019. The ARA model was used to formulate interview questions specifically in tracing what ties, links, and/or bonds that arose between contractors. A total of ten semi-structured interviews with managers from contractors (four interviews) and representatives from the TPL provider (six interviews), and 21 sequential participatory observations of coordination meetings with representatives from the contractors, the TPL provider and the city, are included. Additional data sources are informal observations and conversations on the construction site, documents and reports. The empirics is analysed using the ARA-model described by Håkansson and Snehota (1995).

Case Description

SRS is an ongoing urban development project in Stockholm, Sweden. The city of Stockholm is developing 12,000 apartments and 35,000 workplaces between 2011 and 2030. In each stage of SRS there are multiple construction projects, with typically five to ten different developers and numerous contractors and subcontractors in each stage. This case study focuses on the stage called Brofästet, which includes nine housing developments and seven different main contractors (some developers use the same main contractor, although with different site organizations).

Early on in the planning of SRS the city of Stockholm decided to use a dedicated logistics solution called construction logistics centre (CLC) operated by a public procured TPL provider. The aim is to reduce impact on third parties and increase environmental sustainability of urban development projects. The CLC is mandatory to use for all construction actors in SRS and is setup with a terminal for short term material storage; no construction materials are allowed to be stored around the building. When contractors need material, they make a request from the CLC who deliver it to the contractors for a symbolic fee. Certain deliveries can be transferred directly to the construction sites but have to meet certain regulations and needs to be coordinated with the CLC. The CLC is also responsible for collection of waste materials for recycling, gates and fences, snow clearing, surveillance, etc. There are

also some additional services such as providing certain machines, logistics consultants, inward transport of materials, etc.

The CLC has five stage coordinators responsible for coordinating the activities within each stage of SRS. In order to do so the coordinators arrange weekly as well as monthly coordination meetings mandatory for the contractors to attend. The meetings allow the contractors to coordinate and inform each other about upcoming construction activities such as large deliveries or the use of mobile cranes obstructing road access within the stage. The meetings have also become a forum for all contractors to regularly meet and to discuss both formal and informal matters.

FINDINGS

Despite belonging to different firms and being contracted by different developers the contractors in the same stage do not seem to view each other as competitors. On the contrary, they seek help from each other, and they provide each other support in terms of information and experience in situations, for example on what subcontractor to use and not. They also actively coordinate their construction activities and their scheduled deliveries in a way to minimize disturbances for each other. Another example of their interaction is the sharing of resources such as subcontractors, cranes and storage spaces.

"If I want to book a mobile crane, that might block [Contractor 6] further away. Then it is my role to contact him and ask him 'next week on Monday, do you have something big that needs to pass, or can we set it up on Monday for half a day?' Then we discuss it; 'it is better if we do it on Tuesday' or 'we can move our delivery so that we take it straight in the morning.'" - Site manager of Contractor 4

The contractors are not the only actor initiating interaction among actors; the city, the developers and the CLC also initiate interaction. For example, the city has procured the CLC and support staff in order to act as integrators, competence pool and service support for a smooth and efficient construction of SRS. The developers have also initiated interaction, for example by planning for a joint main contractor in two different, but neighbouring, projects. Also, the developers have arranged for and procured their joint contractors for joint facilities. The CLC as such has also initiated interaction by arranging meetings and taking daily site tours, enabling actors to link projects together. Hence, the CLC has become a widely appreciated resource for coordinating the activities between the different construction projects and contributed to an overall feeling among the main contractors of being part of the same multi-project context.

"Sometimes I do not believe the content of the coordination meetings necessarily is the most important thing, but to have a forum where everyone meets and says hello. It becomes a little easier to pick up the phone when you need something or if something hassles. So, I believe they have been very important to create a team spirit within the stage." - Site manager of Contractor 2a

For the contractors the CLC represents a combination of resources with ties to the city, all developers, main contractors as well as subcontractors, working in the same stage. The CLC represents a resource that can be utilized in several different ways, both technical (e.g. as short-term storage of materials, machine pool, etc.) and organizational (e.g. for coordination of construction activities and incoming delivers, coordination meetings, service activities, etc.).

Table 1: Inter and intra-organizational effects across projects among the main contractors

Actors bonds	Resource ties	Activity links
Contractor 1a - Contractor 1b	Sharing subcontractor	Coordination meetings
(intra-organizational)	Sharing of construction workers	Collaborate about time plans
	Sharing crane	Joint procurement of construction materials
		Joint/coordinated procurement of subcontractor for civil works
Contractor 1a - Contractor 2a	Sharing subcontractor	Coordination meetings
		Coordinating and transfer of responsibility for construction work environment of shared courtyard
		Joint/coordinated procurement of subcontractor for civil works
Contractor 1b - Contractor 2a	Sharing crane	Coordination meetings.
	Sharing subcontractor	Joint/coordinated procurement of subcontractor for civil works
Contractor 2a - Contractor 2b	Sharing of construction workers	Sharing experience on technical solutions
(intra-organizational)	Sharing construction site office	
	Procured same subcontractor	
Contractor 3 - Contractor 2a	Sharing boom lift	Coordinating construction activities
Contractor 3 - Contractor 1a		Coordinating construction works
Contractor 3 - Contractor 5		Coordinating construction activities
		Coordination meetings
Contractor 3 - Contractor 6		Coordination meetings
Contractor 3 - Contractor 2b		Coordination meetings
Contractor 4 - Contractor 6	Sharing subcontractor	Performing minor construction works
		Coordination meetings
Contractor 4 - Contractor 3		Coordinating construction works
		Coordination meetings
Contractor 4 - Contractor 2b	Sharing subcontractor	Coordination meetings of construction of shared garage
Contractor 4 - Contractor 5		Coordination meetings
Contractor 5 - Contractor 6		Coordination meetings
Contractor 5 - Contractor 7		Coordinating construction activities
Contractor 6 - Contractor 2b	Sharing subcontractor	Coordination meetings of construction of shared garage
Contractor 7 - Contractor 3	Taking over lease of construction site office	Coordinating construction activities

Even though the CLC is mandatory to use, the contractors do not perceive the CLC to be forced upon them, but rather as a project precondition and in some *respects*, they view it as a necessity in multi-project contexts. In Table 1 both inter- and intra-organizational as well as inter-project effects of interactions are listed for the three ARA-dimensions (actors, resources and activities).

Bonds, Ties and Links

The resource ties include both technical (e.g. machines) and organizational (e.g. subcontractors) resources, and in certain cases (e.g. joint procurement of subcontractor) also involve interaction on several organizational levels between the contractors (procurement division, site managers and supervisors). This means that benefits of collaboration involve different kinds of resources as well as functions within the actors' organizations.

The activity links tend to be about coordination of different resources connected to either shared production activities (e.g. shared garage or shared courtyard) or the use of shared space or transports, exemplified by e.g. coordination meetings in Table 1. These coordination meetings are initiated by the contractors in order to coordinate specific activities between the involved projects and are not to be confused with the mandatory coordination meetings held by the CLC that involved all main contractors from all developments. Location and timing thus seem to be central aspects for both resource ties and activity links; it is easier for contractors to collaborate if the projects are located nearby. Space is also an important aspect of collaboration; generally, the coordination or collaboration occurred when it involved construction activities outside the buildings such as courtyards or deliveries that potentially blocks other construction projects. The examples of collaboration that has gone furthest and involved actors on different levels within both contractors' organizations are examples of that. Furthermore, the utilization of established resources such as subcontractors or cranes is of essence; the contractors perceive benefits of using each other's access to and experience of specific resources.

According to the contractors, seeking collaboration with other contractors in other projects is not the normal thing to do. There are no clear incentives and first focus is often to collaborate within their own project with their own subcontractors (vertically). Therefore, much of the common way of cooperating is based on a reactive mode, i.e. they adapt to others. However, when trying to be proactive it is usually in favour of themselves. An example is when Contractor 2a needed an additional crane and contacted Contractor 1b early on in order to use their crane. The coordination meetings held by the CLC were very important for this type of interactions by introducing the contractors to each other and learn about other projects' resources and activities. Another example is when Contractor 5 who needed additional barracks for their site office and learned that Contractor 3 was about to return some of theirs to the renter in a few days; Contractor 5 asked Contractor 3 if they could take over the lease of the barracks, but that was not possible due to the short time frame. However, Contractor 5 had not attended previous coordination meetings and had therefore missed this information and therefore missed out on the opportunity to act upon it.

DISCUSSION

The studied case is a special case; there are several contractors simultaneously working tightly within a limited shared space, contracted by different developers. In this context this means that they have context specific mandatory regulations on how to plan and execute activities with regard to for example a dedicated construction logistics solution. However, urbanization is a global trend and urban development projects will develop further.

Collaboration in the multi-project context

The contractor's express unfamiliarity with the context dependent regulations, in relation to their normal ways of working. Traditionally, they focus on their specific projects but here they have to include also other projects in their planning and execution. However, working in a multi-project context characterized by several simultaneously ongoing construction projects within the tight space of the stage boundaries was also considered unusual by the contractors. Based on these preconditions it became a necessity to collaborate in order to work efficiently. This collaboration was both inter-organizational as well as inter-project. The TPL provider also had a large role in stimulating collaboration by introducing projects and actors to each other in the mandatory coordination meetings.

As Table 1 shows, there are several instances of collaboration between a number of different contractors, even though it remains on a rather basic level. Due to their internal policies and regulations; as well as framework agreements with e.g. suppliers, deeper collaboration is considered difficult by the contractors. When for instance joint procurement occurred, it was either intra-organizational or it involved the sharing of space.

Deep collaboration often requires long-term perspectives. When compared with partnering, long-term perspectives such as strategic partnering extends beyond the specific project (Bygballe *et al.,* 2010). However, the interviews indicate that also separate projects are viewed as long-term by the contractors. Consequently, contractors have another view on what long-term perspective is; for them working two to three years on a project is working long-term.

In the project management literature projects are said to be constituted by four main concepts - time, team, task and context (Bakker 2010). Time in the meaning that they are temporary; team in the sense that the project needs to acquire the necessary members in order to fulfil the task, e.g. construct a building; context refers to the project and its permanent environment. In this study it is found that location is a dimension that affect how the actors in a project plan and perform their work. The contractors are dependent on their location in order to perform certain tasks and to which team members they collaborate with.

CLC as a combination of resources

The study focuses on the contractors and how they interact; for them the CLC is a combination of resources providing both technical and organizational resources. This is in line with the conclusion in Ekeskär and Rudberg (2016) that a CLC is a service function to the contractors, and in a wider perspective also to the urban development project and has therefore not a purpose of its own. This study shows that the CLC does more than coordinate the contractors incoming deliveries and other logistics related issues (Janné and Fredriksson 2019). It also positively influences coordination of activities between the contractors. The contractors express that if the CLC would not have existed, the contractors probably would have had coordination meetings of their own, but they would have been affected by the contractors' adversarial relationships. In fact, the contractors did have several coordination meetings of their own, however they focused on issues concerning only two or a small number of actors and projects. A CLC can therefore be a mitigating factor in overcoming adversarial relationships among contractors, and also bring different projects together as a team in the multi-project context.

CONCLUSIONS

The purpose is to explore how a TPL solution affects inter-organizational relationships in the horizontal dimension. Given these factors and findings from previous research, there should be a lot of controversies and conflicts due to fragmentation and adversarial relationships (cf. Miozzo and Dewick 2004). However, the findings indicate that the contractors do collaborate with each other regarding both technical and organizational resources, as well as coordinate activities between each other; within the timeframe of the projects, they develop bonds, ties and links. Some collaboration goes deeper than other, even though much of the collaboration is on a rather basic level.

Deep collaboration is found in long-term relationships. However, in this case study the contractors view their separate projects as long-term, a view which includes the inter-organizational relationships with other actors. This calls for a broader definition and a need to contextualize what long-term perspective means, especially in a loosely coupled network (Dubois and Gadde 2002) such as the construction industry. In addition, the interactions found nuance the predominant view of the construction industry as just adversarial.

Furthermore, this study extends the notion of what a dedicated TPL solution can contribute with besides improving logistics. By holding coordination meetings and having employed personnel responsible of coordinating construction activities, it can improve collaboration between actors in a multi-project context and thereby mitigate adversarial relationships. A TPL solution can therefore have an important role to fulfil by creating the team in the multi-project context.

This is an ongoing case study, the findings and the conclusions should be seen as tentative, however indicating the need for further studies of horizontal inter-organizational relationships in multi-project contexts.

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