

SHAPING LEAN CONSTRUCTION IN PROJECT BASED ORGANISATIONS

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ABSTRACT

In this paper Lean Construction is viewed as a management concept and the journey into a construction company is viewed from four perspectives; social shaping, organisational politics, organisation theory and institutionalism. Common in those perspectives is that the management concept is socially constructed and negotiated. The journey of the concepts implies that they (and their surroundings) are changed during the implementation. It can therefore seldom be expected that two different domains would shape a concept in the same way. Also construction is a project-based industry. It has previously been shown how implementation of Lean Construction is a partly project specific process.

This paper will present findings from ongoing empirical work in collaboration with a large Danish contractor. The work is related to the contractor's work with implementing Lean Construction in the company and how to implement it into the construction projects on site.

It is discussed how certain actors have a mediating and communicating role between various communities in the company. We term these actors brokers. Lean Construction is shaped in this process, where also explicit and implicit strategies and cultures of the organization interact with the concept and its brokers. Projects are crucial units in a contractor's organisation, which play a partly independent role in the enterprise organisation. It is analysed how Lean Construction is changed when adapted on construction projects as results of the organisation's implementation strategy(ies), the will and skill of the project managers and other factors.

KEYWORDS

Lean Construction, Brokers, Social Shaping, Project Implementation, Management Concepts

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INTRODUCTION

Lean Construction has received much focus in the Danish construction sector in recent years. Several contractors are working on implementation and many persons and organizations have shown great interest in the possibilities of the concept.

People in the sector get many different inputs from different sources and seek to make their own meaningful idea of what Lean Construction is. This interpretation results in a shaping of the concept.

For analytical reasons it is useful to view construction as four levels – sector, companies, projects and individuals. However on all levels of the construction industry the work of promoting and implementing Lean Construction is carried out by individual innovation brokers (Simonsen, Bonke & Walløe 2004). Different persons and different contexts result in different interpretations of Lean Construction, which gives variations of the concept once it is implemented.

This paper analyses this social shaping of Lean Construction based on empirical work at a large Danish contractor. The burning question is to analyse how and why Lean Construction is socially shaped.

THEORETICAL APPROACH

In this paper we choose to adopt a tentative and open theoretical frame, merely consisting of four juxtaposed theoretical positions labelled social shaping, organisational politics, organisation theory and institutionalism. Each of these positions has recently been mobilized to conceptualise and understand the journey of a management innovation into a sector and its companies. We are aware of epistemological and other differences between the theoretical positions but allow ourselves to use them in an eclectic manner in order to explore their potential.

The social shaping perspective including the sociology of scientific knowledge and social constructivism is often mobilised to conceptualise the phenomenon of management concepts. Management concepts are observed as socially constructed and negotiated. Actors work collectively at stabilising fact through the making of coalitions and negotiation (Koch 2002).

From the point of organizational politics new management ideas are seen as political programmes (Koch et al 1997). The political programme is shaped in the interaction between different actors who build alliances to overcome barriers and resistance. When actors enrol in the alliance the content of the management concept often change to fit their political programmes.

Drawing on organisational theory echoing authors like Galbraith (1977) and Foucault (1975), Bresnen & Marshall (2001) refer to the psychological needs of managers, highlighting the role that popular management ideas play in satisfying a desire for security, stability, or recognition. In an uncertain and ambiguous world, managerial recipes promise stability and certainty, helping managers make sense of their environment (Abrahamson 1991³). Familiarity with a fashionable management idea may also be a badge of status and

³Referred in Bresnen & Marshall (2001)

something which differentiates 'progressive' individuals and organizations from those who are seen to be 'lagging behind' (Abrahamson and Rosenkopf 1997). However, at the same time as satisfying a need for individualism, adherence to popular management ideas is also said to provide a comforting degree of conformity, often based on collective rituals, which affirm a sense of belonging, and possession of shared values (Carson et al 1999)

Røvik (1998), whose work presents an institutional approach, points out that management ideas are different to physical products because there is a greater opportunity for them to be re-interpreted and re-used in ways that depart significantly from what was originally intended. Consequently, managerial recipes do not remain unchanged as they travel. Instead, they are subject to intentional and unintentional modification and interpretation as they are communicated, adopted, and enacted. Furthermore, the implementation of new management ideas is not a simple, straightforward mechanical process, but one which is inevitably subject to the vagaries, influences and problems of any management of change initiative that is concerned with replacing one set of managerial practices with another. (Bresnen, Swan & Hall 2002).

Røvik (1998) categorizes the translation of popular management ideas into four main forms:

1. *Concretising*: Attempts to transform a managerial recipe from an idea to being embedded in practical routines and activities. Since most popular management ideas are abstractions from context, it is usually necessary to interpret, clarify and adapt them to make them concrete within any given context to maximize their potential applicability.
2. *Partial imitation*: where only selected components of a managerial recipe are chosen, either purposefully or unintentionally, for application.
3. *Combination*: Where two or more recipes or elements of recipes are combined to produce novel hybrid forms.
4. *Re-melting*: a more extreme form of combination where the resulting variant is radically different from the ideas from which it was drawn

The implication of the translation approach to popular management ideas is that there is room for considerable variation in application, even between organizations ostensibly adopting the same management approach.

CONSTRUCTION AS PROJECT BASED

The theoretical explanations of dynamics around management concepts should here be confronted with the dynamics of the project based construction industry. The main dynamics in a project-based organisation can be described as pressures on the following levels (Koch 2004):

- Pressure to deliver on a *structural* level: consulting engineering firms and contractors tend to be squeezed on prices not only by the clients but also by other

knowledge producers. Component manufacturers attempt to add value to their product by offering various services to their “hardcore” product.

- Pressure to deliver on an *organisational level*: consulting engineering firms and contractors are characterised by a strong project orientation, where projects are organisations of resources and tasks (inputs) relating to some kind of output/product demands. In the project teams, multi-disciplinarity and other groups’ dynamics are not only productive but also a challenge and a pressure factor (Beukel & Molleman 2003, Newell et al 2002). At the same time, corporate management attempts to install cross project learning and process and product innovation for long term survival.
- Pressure to deliver on a *professional group level*: in the debate on future engineering competencies and knowledge, engineers are expected to deliver systemic solutions tackling a range of aspects of product and process innovation (Winch 1998, Gann 2000, Gann & Salter 1999). The development of the group is an intertwined local national process encompassing a body of knowledge, work practices, statutory norms and regulations and basic education as well as vocational training (Dent 2002, Dent & Whitehead 2002, Hodgson 2002).
- Pressure to deliver on an *individual level*: Garrick and Clegg (2000, 2001) demonstrate how knowledge workers, like engineers and technicians are exposed to demands relating to cross-disciplinary approaches, and the new competencies required relate to extensive communication, problem-solving and coordination skills. On a more simplistic level lack of time is often mobilised as explanation for insufficient knowledge sharing and registration in IT-systems.

It should thus be expected that project based organisations exhibit different patterns of the journeys of management innovations since the dynamics underline the projects as interpretive, economic and resource arenas which is bounded from the “outside”. Winch (1998) discusses the how the dynamics of the project interplay with the dynamics of the company under influence of the surrounding environment. The many explanations provide useful insights into why particular management ideas align with managerial interests and perspectives, and we can also describe the detailed processes through which they enter organisations and the impact they have on action. The brokering of knowledge becomes one important aspect. On the other hand the perspectives chosen help us avoid a too simple portrayal of managerial recipes as inert commodities, which circulate without undergoing any transformation as they are produced, consumed, and enacted. (Bresnen, Swan & Hall 2002)

METHODOLOGY

The basis for this paper is ongoing empirical work with the large Danish contractor NCC. NCC has agreed to be the case study for our investigations. There are no formal relations between researchers and the company.

The studies are carried out using qualitative interviews at different management levels in NCC’s organization to expose the strategic decisions regarding the implementation of Lean Construction. Furthermore participatory observations on two construction sites have been

carried out during winter and spring 2004. The observations have been on the weekly work planning meetings with the foremen as well as interviews with both foremen and project managers.

Also interviews with persons outside NCC in the Danish construction sector have been used as background information.

CASES

The first case describes the journey of Lean Construction into the main organisation of NCC. In the second case the observations from the two construction sites are presented. The sites are labelled Case A and Case B. The cases and people involved are made anonymous.

LEAN CONSTRUCTION IN NCC'S ORGANISATION

The journey of Lean Construction into NCC's organization has been about one and a half year underway. Lean Construction has been underway in the Danish construction sector since 1999 (Simonsen, Bonke & Walløe 2004). Due to other strategic efforts pursuing Partnering and Time Management as new management ideas, NCC has not entered the world of Lean Construction until the fall of 2002. At this point competitor contractor MT Højgaard had already worked with their version of Lean Construction 'TrimByg' for some years.

There are some key events that have provoked the people in NCC to take up working with Lean Construction. Apart from rumours of the work and results of MT Højgaard, the first experiences of working with the Last Planner System in coalition with Anders K. Christoffersen from NIRAS, attendance at one of Sven Bertelsen's seminars and participation in the discussion network at Lean Construction-DK have been activities important for the future agenda.

NCC's first experience with Lean Construction was on a student dormitory project. The project was part of a governmental development programme. The client's consultant was NIRAS who proposed that the project be carried out using Lean Construction. From Sven Bertelsen and earlier experiences on projects NIRAS had knowledge of the Last Planner System and introduced it first to the project managers of NCC and then to the foremen of the sub-contractors on site. The construction process on the project was successful and the project managers returned to NCC bearing the news of the success of Lean Construction. At NCC a large programme on implementing a new time management system was ongoing at the time and to gain the best possible result all efforts and resources were allocated to this project. The project managers from the dormitory project kept on preaching about their experiences, but for NCC as a whole, Lean Construction was put on hold.

About one and a half year later when the time management project (rooted in the newly established Centre for Time Management and Planning department (TMP)) had some degree of embedment in the company, the TMP group lead by Lars Blaaberg turned toward Lean Construction. During the next year he studied the principles of Lean Construction and the Last Planner System and also joined the Danish network for discussing the Lean Construction principles. In the fall of 2003 the TMP tried the first implementations of the Last Planner System on construction projects.

Lars Blaaberg from NCC was manager of the time management system programme. At an early stage he enrolled NCC as a member of Lean Construction-DK, The Danish branch of LCI. NCC executives had an introduction to Lean Construction from Pernille Walløe. Blaaberg had joined the Danish Lean Construction Discussion Network and been an active participant as well as enrolling other persons from NCC's TMP.

NCC's corporate strategy was communicated heavily to the employees. Lean Construction was not a direct part of this strategy. NCC management was reluctant to promote Lean Construction as a new major strategic decision and consequently Lean Construction was presented as part of industrialising construction. Lean Construction was formally introduced in NCC in the winter of 2004. From this point all projects at a certain size should use the Last Planner System. Executives in NCC do not have profound understanding of the content of the Lean Construction concept and the details of the implementation are laid in the hands of Blaaberg.

The concept has been promoted within NCC through the work of brokers. Kaj Lorentsen has told the story of the first and successful experiences with the Last Planner System in many different forums in NCC. He has continued to stress the use of Last Planner System on the projects rooted in his department at NCC. Also Blaaberg has caught up on the Lean Construction idea early in development in Denmark. He has followed the Danish activities closely and gained the theoretical knowledge of the concept through own studies. Blaaberg has spoken widely about the theory of Lean Construction and the possibilities in using the concept. Blaaberg and the TMP group have supported and supervised the implementation of the Last Planner System on new projects as well as introduced the system on projects that were critically behind schedule. In NCC Lean Construction activities (mainly the Last Planner System) is only used in the final phases of the construction project – not on the early ground and concrete structural works.

In the winter of 2004 top management at NCC promoted the rather diverse and fragmented work with Lean Construction to an overall company policy in the construction division. Hereby Lean Construction is now formally the principle by which work is structured on NCC projects. Strategically NCC has been focused on three main areas and Lean Construction therefore has been introduced in NCC as part of the process of industrialising construction.

Through this work NCC gained experiences and competence regarding working with the Last Planner System based on both the original writings on these subjects as well as teaching, seminars and discussions featuring persons like Sven Bertelsen, Anders Kirk Christoffersen (NIRAS) and Pernille Walløe of Lean Construction-DK.

TWO DIFFERENT CASES ON SHAPING LEAN CONSTRUCTION IN PROJECTS

In the following we will present two construction projects on which Lean Construction has been used – though very differently. The cases are described through the same template. The cases will be further analysed in the discussion.

Case A

The project followed consists of about 50 apartments in either two storey terrace houses or 2-4 storey tower blocks. The project manager (PMO) has been on the case since start-up. At the

start of the finishing works another project manager (PMT) was assigned to the project and shortly after an assistant project manager (APM) joined them.

The project got off to a bad start with a lot of problems regarding the concrete elements. This has caused some delay in the time schedule as well as some less perfect construction.

PMO decided to use the principles of Lean Construction on the project although her perception of the content of the concept was vague. The activities initiated were weekly meeting with foremen and checking for the 7 flows in the time schedule. On the project they had two weekly meetings with the foremen – one for the outdoor activities and one for the indoor activities. Each weekly meeting lasted for 30 minutes. The meetings were run by PMT and APM and used for dealing with different problems on site. Typically the project manager handled the problems with each foreman at a time. Also the time schedule was looked over. In two periods the time schedule was checked if up-coming activities were sound according to the 7 prerequisite flows. NCC uses a self-developed Time Management program, which includes space for checking off the 7 prerequisites for sound activities. In the first period they quickly dropped it, as it was too time consuming clearing all 7 flows on all activities. After two months they tried again but once more it was found too heavy to manage. PMT and APM discussed the use of the 7 flows and decided that only 4 flows were necessary as PMT had the overview of the remaining 3 anyway. But after a few weekly meetings the use of the 4 flows was also dropped.

The knowledge of Lean Construction on the project comes from different places. The project manager PMO who originally requested the use of Lean Construction on the project referred to experience with Lean Construction on an earlier project as part of a development programme. Along with this she had heard some stories from the NCC as well as discovering the 7 flows-check boxes in the time schedule. The other project manager, PMT, had not been in NCC for long and had only heard of Lean Construction but had no experience. The assistant project manager, APM, had heard stories from another project where Lean Construction was successfully implemented.

Case B

The project objective is to build 60 apartments in two-storey houses for elderly (some with dementia) including service centres.

On this case the project management team (consisting of two project managers and 2 assistants) has used several of the Lean Construction tools. A phase schedule was produced by the foremen of the subcontractors at the starting point of the completing works. Weekly Last Planner meetings are held with all foremen on the site every Friday morning 9am with Danish pastry. On the meetings the list of constraints is updated, the time schedule is looked over and the tasks in the look-ahead window are estimated sound or not in reference to the 7 flows, that are checked off in the time schedule. Each contractor present his tasks for the previous week and briefly hold it against what he planned. PPC is measured, but not used at the weekly meetings. The project manager finds the PPC good for competition, but not for exact measurement as the foremen will speculate on getting high PPC rather than trying to do realistic planning. At the end of the meeting the weekly work plans for the following week are produced

The project management team has received training from NCC's Time Management and Planning department (TMP), who have the formal ownership of Lean Construction activities in the company. This means that they have been introduced to the ideas behind the Lean Construction tools. At first the TMP consultants facilitated the Last Planner meetings but after a month the responsibility were handed over to the Project management team. During the process the TMP consultants have been available to the project management team. The project managers are very open and very positive towards the Last Planner System and have fully given the responsibility for the work planning to the foremen on the site. To begin with they kept the time schedule produced by TMP to check with the phase/time schedule produced by the foremen, but quickly realized, that this wasn't necessary. The foremen on the site are also very positive toward the system and hope that this kind of planning work will be dominant in the future.

DISCUSSION

We first discuss the emergence of Lean Construction in NCC, then the two construction project cases.

LEAN CONSTRUCTION EMERGES IN NCC'S ORGANISATION

The case illustrates how few persons (the (management innovation) brokers) are responsible for shaping Lean Construction to fit into NCC's organisation. In order to create support from top management the concept has been presented as something that would fit into the corporate strategy. Furthermore the work of the innovation brokers has been carried out for some time on an unofficial level – thereby gaining experiences and coalitions to strengthen the concept before pushing the top managers for a formal adoption and implementation of Lean Construction. Coalitions with the project organisation are necessary in order to obtain success stories that can promote the idea to top management. After some time where Lean Construction were used on trial basis giving the coalition the experiences to make a implementation plan to present to top management. The TMP department and Blaaberg were put in charge of the implementation as a continuation of his prior work and understanding of the concept.

In the main organisation the role of the broker is that of change agent. The launching of the new management concept is a political process strengthening the coalition and the concept in relation to existing concepts (and coalitions) and corporate strategy. The implementation of Lean Construction in NCC becomes a political programme for the brokers who promote it and to the top management. On the individual level of the main brokers there may lay more or less hidden motives for entering this political process. Personal ambitions regarding career or financial success for the different sections at NCC may be factors behind these actions.

During the journey into the Danish construction sector and NCC Lean Construction as well as the context in which it is emerging has changed. In the first few years Lean Construction was almost exclusively looked at by MT Højgaard. MT Højgaard came from working with construction logistics and construction processes and the discovery of Lean Construction by Sven Bertelsen came as a natural continuation. Therefore the Danish form of

Lean Construction and in particular MT Højgaard's TrimByg variation is blended with the history and results of the Danish development programmes of the 1990s (see also Simonsen et al 2004). Also the main focus in Denmark has been the Last Planner System and 'Lean Construction' and in particular the Danish translation 'Trimmet Byggeri' actually covers the Last Planner System in the mind of many Danish actors. This exemplifies the shaping of a new and not yet institutionalised concept. Social constructivism sets the broad understanding of Lean Construction which is only recently beginning to widen and grasp some of the more fundamental issues from the "original" Lean Construction.

THE TWO CASES

The two construction projects at NCC are very similar in relation to the buildings but in relation to the implementation and handling of Lean Construction they are very different. In Case A the project managers had no formal training in Lean Construction. They took up the concept on their own. In Case B Lean Construction was suggested from the department manager and supervised by the TMP consultants. Findings from MT Højgaard also suggest that Lean Construction is used quite differently on different projects (Thomassen et al 2003).

In Case A the actors had very limited knowledge of Lean Construction. The project manager had a vague idea of the concept, but it was not very precise. The main Lean Construction tools used were weekly meetings with the foremen (which might also be done without labelling it Lean Construction) and the checking of the 7 flows on upcoming activities. Yet the project management firmly believed that they were using Lean Construction. During the project the use of the 7 flows was first reduced in order to be more user friendly and later omitted completely. The concept is transformed to a shape that the project managers feel fits into their world.

In case A the project manager (PMT) and project manager assistant (PMA) who ran the weekly meetings with the foremen discussed the use of the 7 flows and decided to skip them but hang on to the weekly meeting which they felt was useful. The project manager who first wanted to use Lean Construction on the case still advertises that they use Lean Construction although the weekly meeting is the only activity remotely close to Lean Construction ideas.

Realising that (their version of) Lean Construction did not work for them, PMT and APM have come to the conclusion that it must be the project that is not suited for Lean Construction. Thus Lean Construction has in this situation been shaped to be a concept unsuited to building housing projects. The reason their version of Lean Construction has ended here is basically that they were given a concept that they had to shape themselves based on a few artefacts. The actors work together negotiating the concept in this two-person coalition resulting in a stabilised understanding of Lean Construction and how it should be used.

It seems that project manager PMO chose to use Lean Construction on the project as she had heard of it as the new way of working and therefore wanted to express that she is capable of using Lean Construction. As Bresnen and Marshall (2001) points out, this could be a wish to demonstrate to her peers and superiors that she progressively handles this new management concept. From a political view, the lack of a strong coalition may have been the reason for the failed success with the concept. Why there has not been a coalition with the TMP department can have several causes that we have yet to examine. Is it a need for work

autonomy, a dislike toward the TMP department or perhaps a wish to control the changing role of the project manager?

However a consequence of this is that the other project managers involved as well as the foremen will leave this project with a negative feeling towards Lean Construction and the concept may be associated with a story of a project which didn't manage to keep time, budget or quality level although Lean Construction was not really involved.

On the project level the objective of the broker is to show project management that the concept works and is easy to handle. In case A the project manager tried to be the broker, but had no coalition, little formal power and no practical experience or knowledge of the concept. And it failed!

Although in the same company, case B appears to be very different. Using Lean Construction was suggested by the department manager and is accepted by the project management team. The thorough teaching of the Lean ideas and the possibility to ask questions and be advised throughout the implementation phase has left the project management team with a competence to manage a project according to the Last Planner System. Also the foremen seem pleased with their increased responsibility regarding the work planning and the fact that the collaborations with the other foremen run smoothly. The project is well underway and looks to be on budget and ahead of schedule.

From the beginning there has been a strong coalition between the project management team and the people from the TMP department. The use of the Lean Construction tools has been monitored and there has been very little option for the project managers to shape the concept themselves. This has led to very few misunderstandings and the Last Planner System have been used closely to the way it is intended.

The project management team have decided to use the Last Planner System on their next project as well and the foremen seem keen to carry on this way of working on their future jobs.

It seems that guiding the project managers through all questions and the strong coalition with the TMP department has resulted in little need to shape Lean Construction. Also they seem successful in the way they have implemented the concept.

In case B the brokers (the TMP department) had formal power, a strong coalition (with the department manager) and the practical experience of how to use Lean Construction. This left little room for interpreting the concept but implementation was a success, and the project management team will most likely use Lean Construction in the future.

Where the psychological factors of the project manager in case A worked around the need for individualism and a need to prove herself progressive and on top of the new concept, the project team in case B has chosen to take on the help of the TMP department. This may be another way to show that the project management team is progressive and open toward change and new methods and by making a coalition with the TMP department they get more focus on their project. In both cases the project managers display a kind of adventurous attitude toward their work seeking new dimensions of their field.

TRANSLATIONS

As the roles of the innovation brokers differ on the different levels and parts of the cases so does the translation or shaping of lean construction. Røvik points to four different types of translations.

In the case of Lean Construction entering NCC on the more strategic level the concept is undergoing a translation of partial imitation, where the parts that fit into the corporate strategy is emphasized to convince top managers. Also Lean Construction is presented in relation to other parts of the corporate strategy; i.e., how it complements Partnering.

In case A the content of Lean Construction is rather vague and the translation could be seen as a kind of combination where Lean Construction is combined with traditional project management as well as re-melting where the interpretation of Lean Construction by the participants has very little to do with the common NCC version.

In case B the translation is basically trying to concretise Lean Construction onto the project and find out how to use the tools of Lean Construction and Last Planner System in the daily work routine.

IN A PROJECT BASED WORLD

The different explanations for the actions of the different project managers can be related to the project based context in which they operate. The project based construction industry impose pressure on the different levels:

On the structural level NCC is pressured by the evolution and trends in the Danish construction world around them. Modern organisations relate to new impulses, sort them and react to them. On a strategic level NCC chose not to engage in Lean Construction activities when it first emerged in Denmark but put faith into other directions in order to gain competitive advantage.

In the organisation of NCC Lean Construction emerged by incremental steps through different events. The main brokers may have had different motives for choosing to promote the concept. Apart from believing that Lean Construction could be the answer to some of the challengers NCC was facing, personal reasons may also be used to explain their actions. Blaaberg had finished the work with implementing the time management programme and may have needed to engage in a new concept, in order to promote his abilities as a change agent.

On a professional and individual level the project managers are pressured to display competencies regarding process innovations and at the same time manage communication, information, project time and budgets. The project managers may seek concepts and tools that may assist them in these areas. The cases imply these results, as the project managers seem to seek some kind of security in the use of Lean Construction. Displaying professional project management may be the step-stone for a career-lift and more challenging projects.

CONCLUSIONS

Using the four perspectives of social shaping, organisational politics, organisation theory and institutionalism, Lean Construction is analysed as a socially constructed and negotiated management concept. We have observed the following elements:

Lean Construction as a management concept is socially shaped on different levels of the organisation. Different motives drive the actors/brokers on the different levels and the concept is shaped by change agents to fit corporate strategies on the level of the organisation and by managers on the projects to fit the needs of the project and the personal needs of the manager.

The analysis based on organisational politics shows that coalitions are formed to back the concept – both on projects and in the main organisation. Also coalitions across the boundary between the main organisation and the projects can be important for both parts in order to succeed.

Along with the mechanisms of political processes, the individual strategies of the project managers result in different shapings of a concept. Fear of change or top management control or a wish to control one's own work and career may be central factors along with a need to have an adventurous aspect in the work exploring new grounds.

In relation to the institutional approach we have worked with, Lean Construction is translated and institutionalised differently in the different cases depending on the context of the concept; the frame of the project or organisation and the people involved.

All these factors may also be seen as part of the pressure on different levels of the project organisation in construction. Contextual pressure could be used as an explanation for many of our observations. Also we have observed that Lean Construction have been shaped both in NCC and on the project to differ from the versions known in the rest of the Danish construction sector.

In the processes of the journey the concept and its proponents cross the analytical levels we introduced in the beginning. In understanding the dynamics of the travelling, it is therefore important not to maintain the analytical levels as distinctions. The very notion of brokers underlines the importance of boundary spanning. As we have seen various types of boundary spanning seems to give different results.

Further research in this area and the continuous work with the contractor and on the cases will expose further details in our work in the future.

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