WHAT HAPPENS WHEN WE SEE COLLABORATION FROM DIFFERENT PERSPECTIVES? A MULTI-PERSPECTIVE ON MICRO-PROCESSES IN LARGE CONSTRUCTION PROJECT ORGANISATIONS

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Construction management research lacks individual-level analyses of what happens in practice in large construction projects, especially when basing collaboration on Lean principles. Despite the interest in predicting and controlling project processes, knowledge about the social complexity of Lean-structured projects is missing, just as the practical implications of Lean thinking on project collaboration is unexplored. To fill this gap and learn more about the implications of a Lean approach to construction project collaboration, this single-case ethnographic study of a large EUR 200 million renovation project brings to light important aspects of the social complexity affecting construction project collaboration. The study shows that although Lean fosters a degree of stability in a dynamic environment to the collaboration practices, complete control is not possible as multiple social aspects of project collaboration easily collide, deterring project progress. The study contributes to the project management research field seeing the project as a temporary organisation with a multi-theoretical metaphor approach and shows how the combination of metaphors will provide novel insights into construction project collaboration.

Keywords: ethnography; metaphor analysis; project management; research methods; temporary organisation

INTRODUCTION

Project management (PM) studies have traditionally focused on prediction and control (Geraldi and Söderlund 2017). In large and complex construction project organisations where multidisciplinary subgroups with different work attitudes and behaviours work together to reach project goals (Daboun *et al.,* 2023), this complexity is from a normative perspective largely being addressed and sought controlled through Lean collaboration models or production systems (Lühr *et al.,* 2021). Such predictive approaches to PM are thereby interested in rationalising this complexity from a systems perspective. However, the consequence is that the influence of the social dynamics such as the paradoxes and contradictories which are profound parts of the nature of large project organisations due to the differences among the members is ignored (Gajendran *et al.,* 2012; Geraldi and Söderlund 2017). Knowledge about

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what happens in practice in construction project collaboration processes, especially when plans are deviated, is lacking (Grove *et al.,* 2017), just as individual-level analyses of how members of project organisations interact, and why they act the way they do, is limited (Zhang and Fang 2018). How Lean collaboration models or production systems work on the individual level of analysis and how complexity is dealt with in practice is thereby unexplored, just as the PM challenges related to the social complexity of project collaboration in Lean-based construction projects, for now, are unknown. Rather than focusing on models as in the predictive studies, PM studies seeing the project as a temporary organisation focus on what is being done in practice (Geraldi and Söderlund 2017); a needed perspective to understand the profound PM challenges of contemporary project organisations (Blomquist *et al.,* 2010). This single-case ethnographic study investigates collaboration practices in the construction project organisation of a large Danish construction site basing their collaboration structure on Lean principles. The aim of the study is to gain in-depth understanding of what is going on in practice when basing the collaboration structure on Lean principles. The study thereby contributes to filling the gap of individual-level analysis of construction collaboration as well as to Lean PM research with a practice-oriented perspective on PM challenges in Lean structured projects.

In the Rethinking Project Management (RMP) tradition as well as in the Scandinavian School of PM, the project is seen as a temporary organisation in which empirical phenomena are explored (Svejvig and Andersen 2015; Jacobsson *et al.,* 2016). This is different from predictive project studies, referred to as Type 1 project studies by Geraldi and Söderlund, in which focus is on planning and predicting project processes (Geraldi and Söderlund 2017). However, as organisations can be seen as multidimensional and paradoxical consisting of humans interacting and solving tasks through which they constantly develop concepts of the world (Morgan 2011), the normative Type 1 approach is "insubstantial when it comes to understanding what is really occurring in projects" (Blomquist *et al.,* 2010: 6). From the perspective of the project as a temporary organisation, researchers are interested in exploring the complexity fostered by the multiplicity and temporality of the project organisation (Jacobsson *et al.,* 2016). With focus on projects as lived experience and contexts for social interactions, interpretive and emancipatory studies, hence Type 2 and 3 project studies, explore practices and behaviours to understand and challenge how projects are perceived (Geraldi and Söderlund 2017). Taking such an interpretive or emancipatory approach to studying Lean collaboration models in practice can thereby contribute with knowledge of how planning and prediction work in practice, and if working as intended. From the perspective of the project as a temporary organisation, theories are seen as only partial explanations of the complex terrain of project organisations (Svejvig and Andersen 2015). Different interests and levels of analysis provide different perspectives and thus insights into collaboration in construction project organisations (Geraldi and Söderlund 2017) and consequently different solutions to dealing with the problems investigated. For instance, Daboun *et al. (*2023) argue that more focused relationship management is needed in construction projects to navigate through the social complexity and support project success. Cristóbal *et al. (*2018) argue that a complexity theory perspective is needed to help project managers seise the opportunities and diminish the negative effects of complexity. From a culture perspective, Samaraweera *et al. (*2018) argue that understanding the different cultural manifestations in the project organisation will minimise misunderstandings and conflicts and improve the progress of construction projects. Just as observers can tell different stories based on the perspectives and levels of analysis chosen (Martin

1992), a multi-perspective on the same data can furthermore reveal hidden paradoxes of the social life of project organisations (Svejvig and Andersen 2015, Morgan 2006). A multi-perspective can reveal a myriad of forces that "enable, constrain and define project outcomes" (Sage *et al.,* 2014: 545) and thus provide different perspectives end hence more in-depth knowledge to understanding the myriads of forces contributing to the social complexity in construction projects (Gajendran and Brewer 2007; Gajendran *et al.,* 2012). This study builds on the seminal book Images of Organisations by Gareth Morgan, which has "laid the groundwork for an entire research tradition of studying organisational phenomena through metaphorical lenses" (Schoeneborn *et al.,* 2016: 916). Although metaphor theory with its roots in linguistics is a mature research tradition within organisation studies (Schoeneborn *et al.,* 2016), the use of metaphors in PM research as well as construction management research is not that common due to the engineering traditions dominating these fields (Geraldi and Söderlund 2017). However, as organisation theory can extend the theoretical framework of PM theory (Jacobsson *et al.,* 2016; Svejvig and Andersen 2015), this study contributes to the perception of the project as a temporary organisation with a metaphor approach. Derived from organisational research in general and thereby different ways of seeing organisations across metatheoretical perspectives, Morgan defines eight root metaphors for analysing the social life of organisations, meanwhile illustrating the historical development in organisation theory (Oswick and Grant 2016). These metaphors are machine, organism, brain, culture, political systems, psychic prison, flux and transformation, and instrument of dominance, each providing different theoretical lenses for seeing the social life of organisation. This, e.g., by focusing on the learning processes within the organisation visualised by the brain metaphor or focusing on the roles and power relations as visualised by the political systems metaphor (Morgan 2006). However, although providing ways of seeing, metaphors, like theories, are also ways of not seeing, providing limited views on the phenomena under study. From Morgan's perspective, the limitations of each metaphor must be seen as stepping stones for reaching new insights into the phenomena under study (Morgan 2006: 340). This means that by combining metaphors and understanding them in the light of one another will reveal a joint synergy of the theoretical perspectives chosen and thus help to uncover social aspects of organisation which are otherwise difficult to understand and explain (Morgan 2011).

RESEARCH DESIGN

To contribute with an in-depth understanding of what happens in practice in a construction project structured by Lean principles, a single-case ethnographic study of a large EUR 200 million housing association renovation project of 600 homes has been conducted. The project organisation consists of the project owner, the project owner's advisor, the main contracting company, three construction crews from the main contracting company, and 18 subcontracting companies. To control the project progress, the project organisation collaboration is structured using the principles of the Lean construction production system The Last Planner System®. This means in practice that once a week, the foremen, i.e., the last planners, the project managers and the process manager meet at the "LPS meetings" to go through last week's deliveries and investigate the expected deliveries of the coming two weeks. The process manager oversees the weekly project plan and facilitates the meetings, where the role of the foremen and project managers is to contribute with input to the plan to align and coordinate the construction site activities. The LPS meeting structure thereby forms

the formal collaboration practice in the project organisation. The author has followed the project over a six-month period by doing participant observations and has thereby engaged in the organisational life by studying "meanings, social processes, continuities, and discontinuities across the past and present" (Cunliffe 2010: 229). In this way, the author has gained thorough understanding of the complex and diverse practices that characterise the organisational activities to learn about the collaboration practices of the project in their natural setting (Kawulich 2005). The construction project under scrutiny is divided into five building stages in which the author entered the field between stage one and two, one year into the project. During the six months of observation, the author has observed 19 different meetings in the project organisation, mainly LPS meetings. Furthermore, the author has taken part in the daily work of the company's three own construction crews, learning about their work practices and perspectives on project collaboration. The author had several conversations with both managers and workers about e.g., their experience with the project and their work in general, and how the project had changed from the beginning until now. Furthermore, by following the LPS meetings, the author has been able to follow the changes in the project based on the information provided by the foremen and project managers, gaining insight in the various tasks, challenges, and interdependencies in the project process. 53.000 words of field notes have been written during the observation period, and these have been coded in NVivo in line with the recipe of Images of Organisations (Morgan 2006) consisting of two steps: The first step consisted of a diagnostic reading of the data, in which the author detected and coded the characteristics of the eight different root metaphors in the entire data set. The data was coded metaphor by metaphor through several readings to "open avenues for creative interpretation" (Morgan 2006: 351). In the second step, the author performed the critical evaluation (ibid.), evaluating the diagnostic reading through abductive reasoning, in which the combination of perspectives revealed interesting insights into collaboration in the project organisation under scrutiny. Based on the critical evaluation and the story unfolding to the author in the case of project organisation collaboration in a Lean structured construction project, the narrative storyline of this study builds upon the metaphors of Flux and Transformation, Brain, and Political Systems (Figure 1).

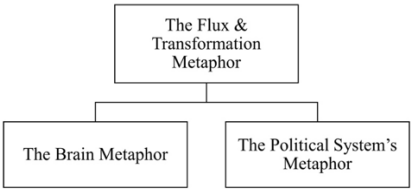

Figure 1: Storyline

In the analysis, the Flux and Transformation metaphor is used as dominant frame providing the baseline for the story examined. Focus is thereby on project collaboration as a process of change, as this perspective provides insights into the dynamics forming the collaboration practices. The Brain metaphor and the Political System's metaphor as supporting frames expand and challenge the insights of dominant frame (ibid.) by exploring how information flows and project learning are handled and challenged by the meeting structure, and how the piecework remuneration system affects project learning as well as the project progress. As the analysis shows, these images provide different and opposing explanations to the social consequences of the flux, thereby providing interesting insights into how the flux is handled by members of the project organisation.

ANALYSIS

Dominant Frame: Flux and Transformation

The Flux and Transformation metaphor focuses on how the universe is in a constant flux of change and stability (Morgan 2006). This is characteristic to construction projects as the project organisation is temporary, facing several redesign processes throughout the project (Son 2022). To control this flux, in the project organisation under scrutiny the LPS meetings were a stabile structure in navigating through the dynamic process. These meetings followed the same pattern and were very structured (Lühr *et al.,* 2021), in which the process manager went through the work plan on the meeting room screen while the foremen each commented on the time schedule of the different tasks, either accepting the time frame or providing suggestions for change. The meeting structure made micro changes of the project execution visible to all meeting attendants, and this led to constant situations of coordination among the foremen whose work was interdependent. As explained by the tiler foreman in a conversation while observing his work: "If we didn't have the LPS meetings, I would be empty. I wouldn't know what to do". From the observations it was clear that the work environment was extremely dynamic with constant changes to the project planning. In this world of constant change, stability was very important to especially the construction workers followed. They all spoke about the importance of a good workflow. First, a good workflow and thereby being able to finish tasks efficiently meant that they would be able to earn more money, as they were on piecework remuneration. Second, as workers in all three gangs followed explained, a good workflow meant that they did not have to think that much, just work, which was very motivational to them in this part of the project process. As articulated by two workers in different gangs independently of each other: "We are just robots!", signalling that they are "programmed" to act, not to think. Another argument used across the gangs was that construction work is about being "lazy" and prepare the work in the beginning of the day, e.g., find the right tools and place materials the right places, so they could stay the same place and focus on their output. In this way, creating stability around them, whether thinking of it as being lazy or working smart, as it could also have been framed, to be able to increase production speed was of high priority. This need for stability in the dynamic environment also appeared from the division of work, as the construction workers mainly had one task each, for instance putting up cast or install fittings, and performed the same task throughout the entire project to become an expert on this task and be able to optimise the work process as much as possible. This need for stability also meant that when facing obstacles in their work process, which happened often for instance when having to wait for the other professions in the project or having to change practice, this caused a lot of frustration. This appeared from both the observations and conversations on the site and during the coordination at the LPS meetings. However, the frustration was most evident at times when the project was behind schedule, where direct language was often used in the confrontations. Contrarily, when being on time, a different behavioural pattern was activated in which the tone of voice was more indulgent with the different parties expressing understanding of each other or of the situation and showing more willingness to help each other. The collaboration in the project organisation thereby constantly moved on a dialectic continuum of stability and change, which caused frustrations and interruptions in the project process when these poles clashed if one party focused on change while the other focused on stability.

Supporting Frame: Brain

While the LPS meetings from the flux and transformation metaphor can be seen as a stabile structure in the dynamic process, applying the brain metaphor invites observers to see the meetings as learning forums in which members of the project organisation share information and learn from each other's realities to optimise the project process. Change is in this perspective a prerequisite for learning, and the brain metaphor focuses on the organisation as a system of information processes with specialised units and how the relations among these units cause the system to learn (Morgan 2006). The project can thus be described as a process of knowledge development (Hällgren *et al.,* 2012). With the many specialised professions working together and having to coordinate their work, the LPS meetings can be regarded an organisational structure or learning arena which makes information sharing and learning possible as the project evolves (Kalsaas 2011). As explained by several construction workers in the case, "Construction projects always change; that's just the way it is". A construction project is thereby a learning process in which the first building stage is used as a 'learning by doing' platform establishing work practices for the rest of the project. By having established as many work practices as possible early in the project process, the construction workers could focus their energy throughout the rest of the project on improving their work pace. However, with constant focus on optimisation in all the specialised units, a lot of information had to be passed through the system to make sure that these micro changes did not challenge the work of the other specialised units. In a conversation with a project manager, he frustratedly explained how they had rebuilt parts of the scaffolding several times but no matter what they did, the scaffolding platforms were blocking the work of someone else causing frustration for the construction workers affected. Instead of sharing the problem with the construction workers and finding a joint solution, or at least a shared understanding of the situation, before changing the scaffolding construction, the project manager had instructed the scaffolding crew on which hight to place the platforms. When that did not work either, he had given them new instructions, and so it had continued, interrupting the workflow of the different professions several times causing irritations as flow was disrupted. As problems like this had to be fixed instantly, there was no time to wait for the weekly LPS meetings to plan this together, so despite of having the LPS as an information processing system to control the flux, this system was not enough to be able to share all the information needed in the right tempo to generate the necessary learning outcome. Expanding the system by introducing more meetings was difficult in this stage of the project, as the construction workers' focus was on optimising the work pace, which meant that spending further time on knowledge sharing or cross-contractor planning would prevent them from executing own tasks and thereby enhance earnings. Instead, the focus on optimising own tasks triggered a mechanism of autonomy among the construction workers. Although the workers described how they constantly focused on learning to optimise their process, when having established their routines, they were not that willing to adapt to new knowledge or procedures and thereby change anymore, as change would interrupt their workflow. Though knowledge was shared at the LPS meetings among last planners and construction managers, this behaviour and shared focus on the overall project goals were not mirrored in the daily work practices. From the Brain Metaphor perspective, to make a project process run as smoothly as possible all parts of the project organisation need to coordinate organically and share the interest of succeeding with the overall project goals (Morgan 2006). However, in the case of this study, although structuring the collaboration based on lean principles to share

knowledge to enhance project progress, the crews acted more as autonomous subunits rather than an organic whole. What triggered this behaviour can be explained by applying the political systems' metaphor.

Supporting Frame: Political Systems

When seeing the organisation through the political systems' metaphor, focus is on understanding the different agendas, power structures, rules etc. in an organisation which contribute to the norms of how to behave (Morgan 2006). The project organisation is thus seen as an arena for political negotiation (Hällgren *et al.,* 2012), which is an interesting perspective in this case, as the workers were remunerated by piecework causing ongoing bargaining pressures. The relationship between the crews followed and the management was not only a matter of shared learning in the process of reaching project goals as explained by the Brain metaphor, but also a matter of negotiation battles activating power structures within the project organisation. As mentioned by all construction workers observed, piecework and thereby optimising earnings was the main job motivational factor, arguing that: "Everybody needs a carrot to run for", adding that if they were remunerated by time rates they would not work as hard. In a conversation with the carpenter installing different coloured windows, he explained that, e.g., if the ones delivering the materials for the different apartments had mistakenly placed a white window instead of a green, his job was not to check if the window had the right colour; his job was just to install windows. "When I go to work, I take out my brain and hang it here", he said while gesticulating taking out his brain and hanging it on a coat hanger. "When I am on piecework remuneration, I am not paid to think", he explained while describing that the piecework agreement specifies his tasks and if having to perform tasks beyond that agreement, he is entitled to further payment. In situations where mistakes had been made somewhere else in the value chain or if every little detail had not been planned and described in the remuneration agreements, this led to constant ongoing bargaining situations. In these situations, the foremen played a central role in the collaboration as they were the ones negotiating with the management.

As the tiler foreman explained, one of his most important tasks was to negotiate good piece-rates, or else he would not be able to keep the most skilled workers in his crew - and hence optimise the crew's overall efficiency and thereby optimise earnings. Furthermore, as foremen are elected by the crew members, they must prove to their crews that they look after their interests both when negotiating piece-rates and when affecting the weekly work plan as 'last planners'. This perspective sheds new light on the LPS as a project planning structure, where instead of a learning forum, as analysed through the brain metaphor, the LPS meetings can be seen as a negotiation arena where each party focuses on their own process. In a conversation with one of the construction managers, he said that the problem with the LPS meetings is that the foremen, both from the company's own crews and from the subcontracting companies, share as little information as possible to, e.g., buy themselves time if there is something they are not done with. In the negotiation arena, the different planners contribute with the knowledge that will benefit their own process. Although the Lean collaboration system would reveal later in the process if someone had not provided correct or sufficient information at the LPS meetings, the political systems' metaphor shows that the meetings in situ did not work as planned but failed to meet the purpose of improving the overall project process. Instead of focusing on the project process, as was the focus of the project management, the piecework remuneration system triggered a mechanism among the construction workers in which the different crews

acted as autonomous systems, only willing to share knowledge and seek further information if it was for their own (financial) good. This also appeared in a conversation with one of the façade carpenters who complained: "All the meetings I have to attend! One time when a meeting had just finished, I told the managers that this meeting had just cost me DKK 6.500 (£745)!" The carpenter's argument was based on the understanding that whenever he was not able to perform his tasks on the site, although such meetings were important for the project progress, he was financially punished as he could not contribute to the work and thereby optimise his wage. Among the construction workers, there was a shared understanding that attending meetings and sharing information was only relevant if it would benefit them financially. Different scales of and motivations for learning thereby affected the project process. While the project management was oriented towards developing and running the overall project, despite being part of the contracting company the observed crews were mainly interested in maximising their own salary. When seeing the case project through the lens of the political systems metaphor, the project can be regarded as an ongoing bargaining process between subunits coordinating financial interests, which contrasts with the brain metaphor through which shared learning and focus on common goals are seen as key drivers for organisational development (Morgan 2006).

DISCUSSION

From a management perspective, Lean principles can help navigating complex construction projects by creating stabile structures in a dynamic environment. However, as shown above, when conducting individual-level analyses of collaboration practices in the project organisation from multiple perspectives, these different lenses provide different interpretations of the social consequences of the project flux and hence different explanations of what is going on in practice. However, most importantly in the case of this study, using the metaphors together reveals and explains an inherent paradox within the Lean project frame: Working for project interests vs. working for own interests. As the analysis shows, some members of the project organisation focus on project interests whereas others focus on own interests, which devalues the formal frame of the project collaboration provided by the Lean production system. This shows a lack of reciprocity in which behaviour is not aligned (Klitgaard and Gottlieb 2024). Although a construction project is a learning process for all members of the project organisation, multiple learning processes are present at the same time, as the project management focuses on learning with the aim of optimising the project process whereas the construction workers followed focus on their own learning process to optimise own wages. The workers followed do not care for project learning as much as they care for themselves. Instead, they see the changes that the project learning process provides as interruptions, although these changes and hence interruptions are needed to improve the overall project. Different motivational factors for learning are thereby present, causing the different learning processes to collide when the higher goal of the project process and the individual goal of increasing earnings are not aligned. This shows that despite establishing a formal collaboration frame through Lean, this does not control ways of thinking about the project among construction workers and does not necessarily create a shared interest in doing what is best for the overall project, which thereby affects construction worker behaviour in the project. Other forces such as political structures like the piecework remuneration system also affect behaviour and ways of thinking, adding to the social complexity in the project organisation. Elaborating on these findings just as adding

more metaphorical perspectives will only enrichen the insights in the social complexity of the project organisation. As shown in this study, focusing on control only when managing a project will ignore important social aspects of the project. The technical interest of Type 1 project studies alone is thereby not sufficient for managing large construction projects. Managers - and researchers - need to focus on understanding the nature of the social systems also, as is the interest of Type 2 project studies to obtain a comprehensive understanding of the practical reality of the projects to be managed. However, rather than disconnecting completely from Type 1 by criticising these project studies for being too rationalistic, as Type 2 project studies usually do (Geraldi and Söderlund 2017), it is important to acknowledge that both perspectives are built on important interests when it comes to managing and understanding the management of complex projects. The dynamic nature of large construction projects calls for some degree of control in the project management, and more knowledge about the practical consequences to the social life of the project organisation will provide important explanations of, e.g., what happens when things do not go as planned and why. A multi-perspective on PM will thus contribute with important novel in-depth insight important to research as well as to practice.

CONCLUSIONS

This study addresses the complexity of construction project organisations through the perspective of the project as a temporary organisation. Through a participant observation approach, this study has investigated collaboration practices of every-day life in a Danish project organisation structuring the formal collaboration by Lean principles. This case shows how flux in a large construction project affects the work practices of construction workers and managers in different ways, challenging the collaboration when the needs for change and stability collide despite trying to predict and control collaboration. The case furthermore shows that while sharing knowledge is a premise in a Lean structure, in practice political aspects such as the remuneration system used challenge this premise. The study thereby shows that although Lean fosters a degree of stability in a dynamic collaboration environment, complete control is not possible. While researchers can provide multiple perspectives to understand what is going on in projects, this study has shown that relating different perspectives and understanding the perspectives in the light of one another will provide new insights into the complexity of everyday life in large project organisations. Furthermore, by introducing metaphor theory and thereby borrowing theory from organisation studies, this study contributes theoretically to the perspective of projects as temporary organisations in search for emancipation.

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