

LOST AND FOUND IN TRANSLATION: TOP-DOWN DECOUPLING AND BOTTOM-UP RECOUPLING OF STRATEGIES AND PRACTICES IN CONSTRUCTION PRODUCTION

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Researchers have noted an apparent decoupling between construction production strategies formulated at upper management, and their top-down translation into on-site practices. In this paper, we revisit the research question of how and why there is such a decoupling and use that to conceptualise a primarily bottom-up schema of production strategizing, drawing on site managers' perspectives. As such, we conduct a Sweden-specific literature review focusing on (s) lean construction production practice variants, and (b) site managers' dispositions towards production strategy improvements imposed by upper organisational levels - which may not align with hands-on best practices. The findings show that production-oriented lean construction variants aiming at strategy or on-site processes may lack an interface altogether; furthermore, there exists a decoupling between the standardisation logic of the strategic top-down view of production, and site managers' tendency to act in free problem-solving roles. We then use the strategy as process and practice (SAPP) framework to integrate those findings and conceptualise a best practice-informed production strategising schema. This schema favours bottom-up production strategising, but also considers a loop-like collaboration approach - in an effort to integrate the benefits from a top-down production standardisation, with the flexible bottom-up buffer zones allowing for innovations and out-of-box solutions.

Keywords: lean construction; SAPP; site managers; loose coupling; Sweden

INTRODUCTION

Construction production strategies formulated on the upper management levels are apparently decoupled from their top-down translation into on-site practices, as has been increasingly noted in the relevant literature (e.g., Dubois and Gadde 2002, Löwstedt and Sandberg 2020). This phenomenon can affect the diffusion of concepts aiming at, among others, production efficiency and value maximization - and most explicitly, lean construction (LC) (Kifokeris 2021). As such, the following research question arises: How and why does such decoupling manifest within a specific (national) context (which accounts for the institutional forces making each construction sector distinct)? To tackle this question, we conceptualise a best practice-informed production strategy schema, which draws from the site managers'

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perspective in the Swedish construction sector. For this, we initially review the relevant literature on the site managers' disposition towards production improvements imposed by upper management, which can take the form of production-related practical LC variants. Then, we analyse the potential misalignment of such imposed variants with best practices, through the lens of the strategy as process and practice (SAPP) framework. Finally, we sketch the schema itself, an integral part of which is a loop-like approach of collaboration.

Following this introduction, our theoretical basis and research method will be described. Afterwards, the content and analysis of the literature review, the resulting conceptualisations, and a critical discussion, will follow. The paper concludes with some final remarks, limitations, and recommendations for future work.

THEORY

Lean construction (LC)

There is not a universally referable definition of LC, but rather a set of relevant interrelated themes (Koskela 2020). Therefore, we offer an overarching understanding of LC (without claiming that it is exhaustive) by synthesising a collection of fundamental aspects ascribed to reflect LC facets. As such, LC aims at the elimination of waste (i.e., non-value-creating activities), efficient resource use, workflow optimisation, on-time delivery of information and materials to project sites, cost minimisation, and customer value maximisation (Tzortzopoulos *et al.*, 2020). Koskela's (2000) transformation-flow-value framework of production pointed to the transformation of inputs into outputs while materials and information flow through value-adding activities and waste, with end-customer value as the goal. Such transformation can be facilitated with just-in-time (JIT) production flow (Liker 2004), while prefabrication can optimise production efficiency and logistics (Vrijhoef 2020).

In practice, LC can be implemented in variants, which may entail: (a) implementing only certain LC processes and tools, like e.g., target value delivery (Ballard 2020), and/or (b) different levels of integration between aspects of LC and other frameworks and tools, like e.g., BIM (Dave and Sacks 2020). In the Swedish context, Kifokeris (2021) notes, among others, the following production-related variants:

- The production processes variant. It can include a degree of prefabrication, modularisation, standardisation, and mass customisation. Its main LC tenets are vertical integration, making-to-order, pull systems, continuous improvement, JIT, value stream mapping (VSM), Last Planner, increased stakeholder cooperation, and broadening of partnering teams. It requires process mapping, technical analyses, standardised documentation on production processes, and appraising production performance indicators. It can encompass practical integration with BIM, virtual design and construction (VDC), and lean communication platforms.
- The production strategy variant. It entails enterprise resource planning (ERP), production strategy optimisation, value-driven purchasing, a product-offering marketing strategy, and bottom-up organisational changes (e.g., in setting the site management agenda) to accommodate product platforming. Its main lean tenets are vertical integration, continuous improvement, JIT, VSM, increased stakeholder cooperation, and broadening of partnering teams.

While Kifokeris (2021) has identified more practical LC variants, only the above are relevant to the current study.

Strategy as Process and Practice (SAPP)

Originating from the ‘practice turn’ in the social sciences, “strategy as practice” (SAP) treats strategy as a socially influential human activity, both within and outside organisations (Whittington 2006; Weiser *et al.*, 2020). Strategy formation is conceptualised as socially accomplished actions, interactions, negotiations and situated practices of multiple actors (Jarzabkowski and Seidl 2008). Strategising is based on practices that affect both strategy processes and outcomes and is embedded in institutional contexts rather than individualistic decision-making (Vaara and Whittington 2012; Weiser *et al.*, 2020). As such, strategic practice can be measured against social processes leading to the realisation of strategy (Whittington 2006), and therefore spans beyond top management and into all organisational levels (Whittington 2006) - such as, for instance, the site management levels in construction. Important in this respect are socially defined modes of action deployed by the strategising actors, such as workshops, meetings (Jarzabkowski and Seidl, 2008), and material artefacts (Whittington 2006; Jarzabkowski *et al.*, 2013).

Synthesising the above, the interrelated SAP themes are practices (strategising methods, tools, and social routines for thinking, acting and using artefacts), praxis (the actual activities of people in practice), and practitioners (the actors of strategy that both perform the praxis and carry the practices) (Vaara and Whittington 2012; Jarzabkowski *et al.*, 2013; Weiser *et al.*, 2020). The strategising practitioners here are not only top managers (Jarzabkowski *et al.*, 2013) but can also be site managers.

SAP was recently augmented into SAPP, by including strategy process as the last “P” - namely, shaping and implementing strategic decisions, and a dynamically evolving strategic content (Burgelman *et al.*, 2018). As such, practices and praxis are reinforced with strategic antecedents (within contexts, actors, sequences) and outcomes (e.g., organisational performance), while actors are strongly connected with bottom-up praxis and practices (e.g., site managers) (Burgelman *et al.*, 2018; Weiser *et al.*, 2020).

This reinforcement of the SAP themes of practice, praxis and practitioners, results in the following six SAPP interrelated themes: Temporality, actors and agency, cognition and emotionality, materiality and tools, structures and systems, and language and meaning (Burgelman *et al.*, 2018). Temporality understands strategising as incurring incrementally over time; actors and agency consider power and politics related to practitioners; cognition and emotionality explore the ways such traits affect strategising; materiality and tools consider the way technological artefacts (e.g. IT) can enable transparency, participation, and inclusion in strategising; structures and systems are temporary instantiations of ongoing strategic processes; and language and meaning draw the attention beyond the analysis of narratives per se, and into longer-term processes and the emergence of strategic ideas (Burgelman *et al.*, 2018).

METHOD

A systematic literature review was conducted to identify the literature pertaining to the research question, which made use of the concept-centric framework augmented by units of analysis - and could be gauged to resolve when no new relevant concepts could be found (Webster and Watson 2002). The main keywords were “LC practice variants in Sweden”, “site managers’ work practices”, and “production strategy”. The emerged units of analysis included, indicatively, “loose coupling”. These concepts and units of analysis led to the two main themes combined in this paper, namely LC

production practice variants, and site managers' disposition towards production best practices and top-down imposed improvements (both in Sweden). A targeted but comprehensive search (MacLure 2005) was conducted, enhanced by the references-of-references and "snowballing" techniques (Greenhalgh and Peacock 2005).

Our review spanned the period from the first studies on LC in the Swedish context (1997), until the time of the final revision of this paper (June 2021). 37 search engines featuring engineering and/or managerial content were initially tested. After omitting 28 engines that returned no results or results already included in other engines, the remaining nine (each returning at least one unique result) were utilised: Chalmers Library, Chalmers Open Digital Repository, Taylor and Francis Online, Google Scholar, BASE, Semantic Scholar, WorldWideScience, Mendeley, and Scopus. The searched terms were sought in all parts of each publication, via the use of operators.

The review was conducted iteratively, resulting in a large number of aggregated hits per research engine and year. By refining these initial results, the unique studies pertaining to the aforementioned criteria were singled out. When entire papers were featured in collective works (e.g., "kappa" theses), only the collective works were included here. This process resulted in the final collection and analysis of 13 studies. This iterative review followed the abductive reasoning of qualitative research, where observations and explanations are developed by working cyclically between concepts and data (Bell *et al.*, 2019) - in the current case, data as research content.

ANALYSIS, RESULTS AND CONCEPTUALISATION

The reviewed research efforts (spanning 16 years of empirical studies) can be discretised into two broad categories, namely the ones focusing more on vertical integration (or its lack thereof), and the ones focusing more on (loose) coupling.

When it comes to vertical integration, Björnfort (2006) draws on anecdotal interview evidence to argue that even when the imposition of the LC variants is justified due to lacking production coordination and task control, there can be resistance from site personnel due to established practices. Unger (2006) points to a certain way of understanding LC in production practice, where it is not upper management, but mainly site managers that decide about such things as construction methods, which subcontractors and suppliers then use. Moreover, even though good examples of top-down imposed LC production strategies can trigger a self-spreading mechanism, it would take long before most site managers are on board (Unger 2006). Höök (2008) documents poor shared perceptions between organisational levels due to the lack of communication and goal sharing, which can lead to site managers not understanding the company's upper management philosophy and impositions. There is also a culture where site employees working in flexible teams take responsibility for their own tasks, thus solving problems directly, but also limiting the diffusion of experience (Höök 2008). In a survey with site managers in Meiling (2010), more than half of the respondents meticulously collected inspection data on construction quality defects, but then revealed that this bottom-up sourced data was rarely used by upper management in continuous improvement processes. Eriksson (2009) notes that site managers often believe they do not have sufficient opportunity to state their opinions, offer improvement ideas and initiate on-site problem-solving within LC. On a complementary note, Gerth *et al.*, (2013) shows that site managers can prefer a bottom-up delegation of responsibility to the corresponding craftsmen performing certain operations, thus limiting a top-down intervention on the control and improvement of production processes. Finally, Löwstedt *et al.*, (2018) highlight a

more social perspective of the vertical integration between organisational strategy and construction production, showing the way bottom-up production perspectives are diffused as best practices also in the parent organization. Therefore, a collective and multi-level professional ideal related to ad-hoc and practical problem solving seems to hinder the operationalisation of top-down strategic initiatives for production improvements (Löwstedt *et al.*, 2018), like the LC production variants.

When it comes to (loose) coupling, Styhre (2012) argues that construction production requires from site managers detailed plans for scheduled activities, but also ad hoc solutions for a never-ending stream of unanticipated problems. The characteristics of this work (“muddling through”) reflect the tight couplings between in-project processes, and the loose couplings between the various actors in the broader project network; thus, the work of site managers is generally separated from upper managerial strategising, while having an acute responsibility at the construction frontlines (Styhre 2012). Ivina and Olsson (2020) note a decoupled communication between site and upper management, possibly disturbing the performance of preventive maintenance according to LC production tenets. Jimenez *et al.*, (2020) describe different perceptions of productivity between upper managers and site managers, thus creating a decoupling tension; the former perceive productivity as competitiveness and resource management, while the latter perceive it as how much one can complete and how well one performs in transforming resources into an output in a certain amount of time. Löwstedt and Sandberg (2020) frame the ongoing transformation towards standardisation of construction production processes informed by, among others, LC, as a number of interrelated social dimensions of professional work; as such, the site managers’ scepticism and resistance towards top-down production strategising can be ascribed to a collective tendency for free and independent work, characterised by professional identity and expertise. Finally, Sandberg *et al.*, (2021) note the ongoing challenge to tighten the coupling between the parent organisation and the construction production process, through the daily “coupling work” of the site managers. Their findings show that site managers not only constantly couple a stream of production processes tighter to each other, but also to themselves; as such, their work is charged with an emotional capital that seems to explain their active strive to remain “loosely coupled” to the parent organization - altogether resisting top-down initiatives (like the two practical LC production variants) intended to tighten the coupling between operations strategising and construction production (Sandberg *et al.*, 2021).

The results in both focal groups of our literature review show that the observed violation of related tenets of the two LC production practice variants (i.e., production strategy and production processes) - tenets like vertical integration and bottom-up platform accommodation - threatens their practical realisation. Moreover, while there can be a top-down imposition of a blend of the two variants, those can be disintegrated and decoupled with on-site (best) practices, due to the site managers’ own disposition towards production improvement, problem solving, work identity and work content, as well as conflicts and tensions with upper management. Moreover, this particular disintegration and loose coupling configuration is not anything the site manager are trying to influence, but rather actively work to sustain by taking on responsibilities and contextualising their production-related work practices; this can be deduced from the empirical evidence in largely all reviewed studies, but even more so in Unger (2006), Höök (2008), Styhre (2012), Gerth *et al.*, (2013), Löwstedt and Sandberg (2020), and Sandberg *et al.*, (2021). Such a disposition from the site managers can be understood as a certain professional identity grounded in a tendency for free and

independent work (Styhre 2012; Löwstedt and Sandberg 2020; Sandberg *et al.*, 2021), which is underlined by the aspects of “identity” (who they are), “expertise” (what they know), and “work” (what they do) (Löwstedt and Sandberg 2020).

Altogether, the empirical evidence found in the reviewed studies seems to confirm that site managers possess a substantial degree of agency and influence over operational strategising in construction companies, regardless of whether the initiatives are directed top-down, or bottom-up (Koch *et al.*, 2015). This can be coupled with the SAPP argument in Burgelman *et al.*, (2018), where top-down/bottom-up strategising and integration are not only a matter of aligning processes, but also considering current work practices. In that sense, transforming production processes through strategising, requires transforming the professional work itself - and therefore, the implementation of the practical LC production variants should not only consider the related LC tenets, but also the corresponding work roles and how they are embedded in the realities unfolding at the construction production levels.

As such, considering the results of our literature review, along with the added dimension of the practical LC variants of production strategy and production processes, as well as the six interrelated themes of the SAPP framework, we propose a bottom-up, best practice-informed production strategising schema depicted in Fig 1. This schema aims to offer a concept of understanding the above-mentioned disintegration and decoupling within the Swedish context, as well as reinforce production by taking on board both top-down standardisation through LC, and the flexible bottom-up buffer zones allowing for innovations and out-of-box solutions.

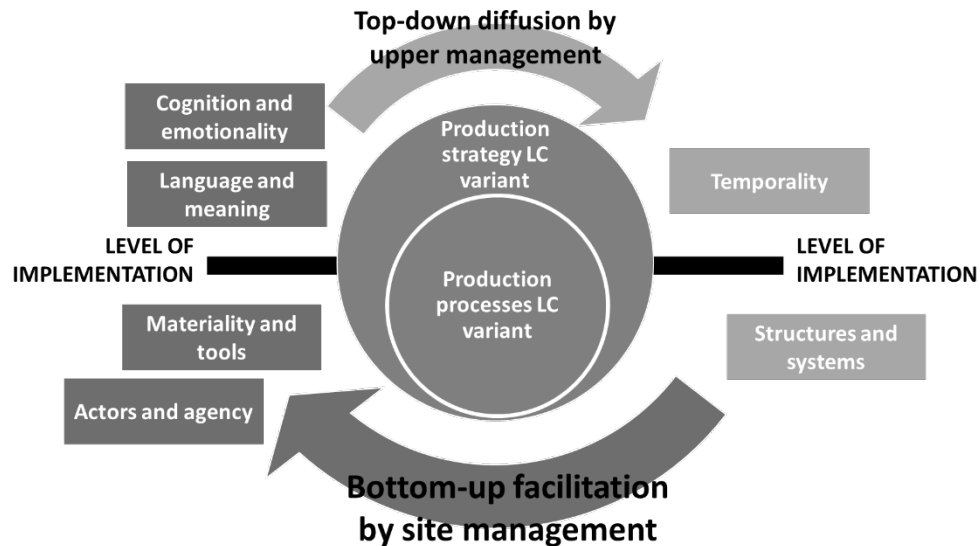


Fig 1: Bottom-up best practice-informed production strategising schema

In this schema, the two practical LC production variants are not only blended on the implementation level, but the processes variant is embedded as a constituent in the strategy variant. This points to the fact that, according to SAPP, processes should be practically considered as an integral part of strategizing. Moreover, the LC tenets and entailments of the production processes variant can already be understood as a subset of the ones in the production strategy variant - as also shown in the respective variants’ description by Kifokeris (2021) (see Theory). The implementation of these nested LC production variants is informed by a cyclic, iterative process, in which

upper management brings in the diffusion of the variants mainly through the SAPP themes of temporality and structures and systems, while site management facilitates and informs (through performed work and best practices) such an implementation mainly through the SAPP themes of cognition and emotionality, language and meaning, materiality and tools, and actors and agency.

In more detail, for upper management, temporality can be reflected in the longer processes of strategising within the Swedish construction context. Moreover, structures and systems can be connected to the structural and systemic changes impacting the construction companies, and can form ongoing process currently passing through, among others, investments for digital innovation, the expansion IT infrastructure, and institutional shifts brought about by the COVID-19 pandemic crisis. For site management, actors and agency taps into the site managers' role, tendencies and work identities, as well as the resolving of the tensions in the powerplay with upper management; materiality and tools regards the hands-on practical problem solving on site, with what the site managers' themselves have established as best practices and handling; language and meaning, with their attention to the formation of strategic ideas as a longer-term process, revolve around clarifying business, strategy, management, collaboration and communication, via the collection and dissemination of site managers' field data, experiences, and work practices; and cognition and emotionality consider the emotional capital imbued in the site managers' work, as well as their self-image on their identity and expertise.

The darker colouring, bigger arrow size, and larger number of associated SAPP themes (four out of six) pertaining to the site managers' part of the schema, reflects our understanding that on the implementational level, the bottom-up facilitation of the practical LC production variants holds more weight than the top-down diffusion. However, despite this heterogeneity, the depicted cyclic process, as well as the SAPP themes moving from upper to site management and vice versa, also show that bottom-up facilitation cannot operate in a vacuum and without top-down diffusion - but rather, that one constantly feeds into the other. Therefore, the cycle reflects an approach of collaboration in construction management and features a constant feedback loop. According to this approach, decision-making is consensus-based, democratic, and characterised by a flat organisational structure and culture. We therefore argue in favour of both the heterogeneity of our schema, but also for the consensus exemplified by its cyclic collaboration approach. The latter is much less vertical than corresponding approaches in different construction management contexts - even if, curiously, the evidence from the studies in our literature review largely shows that, in practice, such an approach has not always been the case so far, even in the context of the Swedish construction sector.

DISCUSSION

Practical LC production variants emphasise vertical integration and standardised production processes that span the organisation-project boundaries. However, reviewing the literature on site managers' work, shows a central tension for such multi-level strategising patterns. While it can be claimed that construction projects are inextricably conditioned by the norms, values, strategic plans and routines of the organisations in which they are embedded (Engwall 2003), it is also something in the professional work of the site managers that seems to sustain the "loose couplings" between the organisation and the projects (Sandberg *et al.*, 2021).

As such, a way to reflect upon the SAPP conceptualisation of the previous section is align it with documented related best practices - however, detailed examples of such practices are hard to find. Nonetheless, drawing on the general argument that site managers are devoted to and responsible of delivering the best possible practices in each project, as well as carry this knowledge with them to the next project, it can be understood that there potentially exist loads of information on best practices within the respective companies - and yet there has largely been a failure to collect, compile, and translate this to any usable knowledge or general guidelines for more efficient production strategy and processes (also under the auspices of LC). This missing link may also explain the reliance of construction companies on the individual expertise of site managers (as described in Löwstedt and Sandberg (2020)), even when there are top-down efforts of streamlining production through LC (and even other concepts and frameworks). There is a lot of pressure on site managers and their responsibility to deliver, and it seems that site managers themselves only accept this as long as they are allowed to manage production in their own way. Site managers are deeply invested in best practices, overview, and responsibility on the individual project level. Our review highlights that if top managers want to standardise production processes, they have to consider the redistribution of responsibility for production performance up their own organisational levels, and not only the consequences of this on professional work.

In our conceptualisation, we considered these problematisations by exemplifying both the cycle of a collaborative, consensus-based approach in production decision-making, but also favoured its bottom-up, rather than top-down, aspect. We thus tried to avoid what we consider a “horseshoe theory” trap in the context of our research, which could lead to ascribing equal weights to upper and site management. In practice, upper and site management are not really on the opposite sides of a horseshoe, gravitating to or away from each other with equal force; on the implementational level, the “truth” of production rarely lies in the middle.

CONCLUSIONS

The site managers’ actual work practices can be decoupled from prospective production improvements imposed by upper management (which can take the form of practical production-related lean construction variants). Through a schema utilising the strategy as process and practice (SAPP) framework and analysing such a potential misalignment, we offer a best practice-informed production strategising concept. This schema shows that on the implementational level, LC production processes should be embedded as a subset of LC production strategy. Moreover, the schema is heterogeneous in favour of bottom-up facilitation by site managers (mainly bringing in the themes of cognition and emotionality, language and meaning, materiality and tools, and actors and agency), rather than top-down diffusion by upper management (mainly bringing in the themes of temporality, and structures and systems). However, the cyclic processes of a collaborative, consensus-based approach on decision-making in construction management, is also an important aspect of our schema, showing that the bottom-up and top-down dimensions should be integrated and feed into each other.

A limitation in our study concerns the schema being highly contextualized in the Swedish construction sector; as such, while the methodology followed for the conceptualization is replicable, the schema itself cannot be easily considered generalizable in other contexts. Another limitation is our use of second-hand empirical evidence found in the literature, where the richness of the actual practical

data has already been processed through the lenses of the respective studies. Therefore, our recommendations for future work have mainly to do with the conduct of far-reaching qualitative field studies (e.g. interviews with site managers) in the Swedish and other contexts, in order to capture “raw” data which can then be processed through the theoretical lenses of the LC production variants and the SAPP framework - and in turn update and inform our Sweden-specific schema and/or be respectively used to sketch schemas in other contexts.

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