SOCIAL PERSPECTIVE OF PLANNING IN CONSTRUCTION: THE UK EXPERIENCE

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The demand for improvement in the UK construction industry and the dissatisfaction from end users has been a subject of debate over many years. These challenges have been attributed to the industry's fragmentation and the use of rational approach in the planning and execution of construction projects. However, in recent times, the need to replace the rational approach in planning of construction projects with a more social approach has been emphasised. The aim of this study is to establish the basis of the current rational or technical approach to planning in construction and to evaluate how it can be improved through social conversations such as the Last Planner System (LPS) of production control and collaborative planning (CP). Based on extensive critical literature review, in addition to demonstration project review, the findings indicate that the current rational approach to planning in the construction industry is based on the Rational Comprehensive Model (RCM); which is responsible for the unimpressive performance of the industry. The study went further to evaluate the potentials of the five elements of the LPS in improving the current approach to planning. This was further supported with the UK experience from the Construction Lean Improvement Programme (CLIP) demonstration project reports. The study reveals varied practices with regard to the use of LPS and collaborative planning in the UK. In view of this, the study recommended that further empirical study should be conducted in order to expose the current practice to enable improvement, such as developing a framework for implementing the LPS and CP in the UK construction industry. The study concludes that the practical application of these social conversations will assist construction organisations in delivering more predictable and reliable projects with improved value for the client.

Keywords: collaborative planning, Last Planner®, lean construction.

INTRODUCTION

Government in its effort to keep the construction industry in the firing line has not reneged on reviewing the performance of the industry in order to identify areas for improvement. With the commissioning in 1929 of the first construction industry report that reviewed the UK construction industry performance (Cain, 2004), several reports such as Simon Banwell, Latham and Egan have been commissioned by the UK government since then to improve on the performance of the construction industry. The Egan report of 1998, challenged the lack of collaboration in design, planning, and execution of work in the industry, and recommended the adoption of lean principles

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for efficiency in the industry (Egan, 1998). In response to Egan's recommendations, the Construction Lean Improvement Programme (CLIP) was formed by the Building Research Establishment (BRE) in 2003 to drive lean in the industry.

Unfortunately, the current traditional approach to planning and execution of construction work does not support lean principles. According to Ballard and Howell, (1998) the traditional approach to planning is activity to activity centred, thus ignoring the need for flow in the production process and making planned task unachievable. In reality, the traditional approach to planning which is based on the Rational Comprehensive Model (RCM), views planning as a technical scientific discipline that can only be performed by the expert without any form of input from the stakeholders (Guton *et al*, 2003). Although this view has been criticised, its effect on construction process improvement is enormous. For instance, it has been reported that only 54% of planned tasks on construction projects are completed as planned due to the traditional approach to planning and execution of work on site (Ballard, 2000). There is also evidence that 50% of construction projects in the UK experience cost and time overrun or even both (Crotty, 2012). No wonder productivity within the sector is still pegged around 40-45 % on the average (Nasir *et al*, 2013).

The need to replace the RCM in planning and execution of construction projects with CP has become essential. The generally used lean philosophy for CP is the LPS, and its goal is to deliver a more reliable and predictable construction project (Kalsaas, 2012). More importantly, it is a social approach to planning, as against the technical approach to planning. The need for collaboration among construction project stakeholders has been emphasised in literature with focus on collaborative working (Xue *et al*, 2010; Yeomans *et al*, 2006), and modelling collaborative information process system (Baiyi *et al*, 2006). However, none of these studies addressed the inefficiency associated with construction planning from a social perspective (human relation) based on production planning, since the technical approach to planning based on logic diagrams, critical path, and contract has failed over time.

In view of these, this study critically reviews the rational approach to construction planning, underscores the 'magic' of CP in construction planning and provides an evaluative approach for addressing the rational approach to planning based on LPS.

RESEARCH METHOD

Dainty, (2008) identified four commonly used research methods in construction management; quantitative, qualitative, mixed methods and reviews. The review approach was adopted as it allows the researcher to gain sufficient insight and good foundation in order to further conceptualise the study (Gameson, 2008; Burgess *et al*, 2006). A critical literature review on the rational approach to planning in construction, and an evaluation on how this approach can be improved through social conversations based on the LPS was evaluated. 30 CLIP demonstration project reports were accessed and reviewed to examine CP practices in the UK. This was compared with global CP practices based on LPS, as reported in proceedings from the International Group for Lean Construction (IGLC) conferences.

Evaluation of the Rational Comprehensive Models and its Practice in Construction Planning

The use of (RCM) also known as technocratic planning dates back to the end of the Second World War, in the 1950s in North America. This model was commonly used by the Urban and Regional Planning (URP) department in the planning of spaces and

cities. According to Susskind *et al* (2000) RCM views planning as the singular responsibility of the manager who is seen to be the expert in making major decisions on assignments to be executed. Champions of the RCM believe that planning is a technical undertaking that uses scientific principles, thus, decisions should be left in the hands of the planning experts (Gunton *et al*, 2003). Similarly, Susskind *et al* (2000) observed that the model assumed only planners have the knowledge required for planning while the planning agencies have autonomy over planning decisions.

The model depicts the planning approach used in the construction industry in which the construction planner, plans activities to be executed on site and imposes it on the team without any form of input from the constructors. As clearly identified in Ballard, (2000), and Koskela and Howell, (2002) the traditional approach to planning in the construction industry is based on RCM. For instance, in the traditional project management approach, construction programmes are usually planned by the professional construction planner or the project manager who is believed to have a technical knowledge in planning (Mossman, 2013; Hass, 2007). However, such approach to construction programming or planning has been criticised in the literature. Kastalli and Neely, (2006) and Hayek, (1945) argued that the knowledge needed for holistic planning is not at the disposal of the planner alone, as most times it is disperse in separate individuals required to execute the task. In addition, the traditional approach to construction programming focuses on sequencing of activities, developing schedules, and budgets by the project manager or the planner which is usually based on assumptions; thus making planned task uncertain (Crotty, 2012, Hass, 2007, Ballard and Howell, 1998). Since the programmes are usually imposed on the personnel doing the work, this results in delay and non-completion of planned task, due to breakage in flow of activities in the execution phase (Hass, 2007; Ballard 2000).

In fact, the present technical approach to planning is not only subjective but also project specific and conveys mostly the experience of the planner; thus hindering learning and innovation (Crotty, 2012, Kastalli and Neely, 2006). Howell and Ballard (1998) further argued that the current traditional approach to planning leads to 'push' of planned activities due to lack of flow in the production process owing to variability in the production process. The traditional project management approach tends to assume what site operatives should do, but in reality, such anticipated tasks may not be achievable by the team on site because of uncertainties that could surface due to lack of collaboration in planning (Mossman, 2013; Koskela, 2002). However, the LPS has been identified as a magical instrument to effectively control and reduce variability through its social conversation processes in ensuring planned tasks are predictable and reliable through CP (Daniel, *et al*, 2014; Koskela, 2002).

The Evolution of Social Perspective of Planning

The concept of CP came into the planning system due to the demerits of the RCM. In the 1960s, the RCM approach was greatly challenged because of its shortfalls, especially, the lack of representation of stakeholders' views in the decision making process (Guton *et al*., 2003). In response to this, the planning bodies (i.e. Regional planning council and Metropolitan planning organisation) recognised the need for collective involvement of stakeholders in the planning process as a criteria for delivering value to the community and adopted it the model for all planning decisions (Guton *et al*, 2003). More importantly, this led to the development of the CP process, which occurs in various forms, such as workshops, public planning meeting, task

force, and adversary committee among others. Indeed, this approach views planning from a social perspective and also as a conversation.

Basically, the main target of CP is to create participation platforms for stakeholders before decisions are made. This approach to planning has been criticised by some; that it tends to take away power from those it has been vested with (Hearley, 2003). However, research has shown that the participation of the public or stakeholders in the planning process will give legitimacy to the planned task, and also motivate the stakeholders to be fully committed to the task (Mossman, 2013). This planning philosophy negates the traditional approach to planning that tends to be imposed. It is worth stressing that this concept of CP has diffused into the construction sector.

Social Perspective of Planning in Construction

The origin of CP in construction can be traced to the research work carried out in the 1980s on construction productivity improvement by Glenn Ballard and Greg Howell (Mossman, 2013). The principal outcome of the research was the development of the LPS of production control. The goal of the LPS is to deliver a more reliable and predictable construction project by identifying relationships and matching it with plans, while ensuring cooperation and commitment from all project participants in other to deliver value for the client (Kalsaas, 2012). This implies that CP is not a standalone concept but it is solely based on the LPS philosophy.

Mossman, (2013) argued that the concept of CP has been in use in engineering and construction for over two decades and provides a unique approach to planning. In essence, it is a planning concept that involves group of people, teams, and partners all working and learning from the planning process with a view of identifying and agreeing on the best options to address problems and opportunities inherent on the project (Cardwell and Redican, 2009; HA, 2010). Indeed, this approach contravenes the traditional approach to planning. Dua, (2006) opined that the philosophy of CP is to create a forum that will accommodate the client, contractors, consultants, sub-contractors, and vendors into a team with a view of creating a structure that will allow all members to work together in other to achieve the agreed common goals of the project. However, Rix, (2004) cautioned that the common goal must be based on the business need, which must be fully aligned in other to create a win-win situation for all members. This suggests that CP is quite different from cooperation between people or organisations without any common business goals or intentions.

Mossman, (2013) further emphasised that CP is a short-term planning ideology that is used in managing construction based production activities with a view of improving project program, safety, predictability, productivity, speed of delivery, profits, and wellbeing of team members. CP is unique in its own way as its characteristics differentiate it from all other forms of planning approach used in construction. Koskela and Howell, (2002) opined that organisations could build on their capacity with other members of the project team through collaboration which helps in reducing fragmentation, waste and mistrust among the team. This implies that CP does not only keep the project team focused on the goal of the project, but it also creates a sense of ownership of the project among the team. This approach has being implemented on construction projects with tangible improvement in construction process in USA, UK, Chile, and Denmark among others.

The UK Experience of Social Perspective of Planning

The Latham and Egan reports led to various initiatives in the UK and challenged the construction industry to improve its image and performance. One of such initiatives was the formation of Construction Lean Improvement Programme (CLIP) initiated by Building Research Establishment (BRE) in 2003. CP was among the key approach used in CLIP. The CLIP programme was implemented on over 50 demonstration projects based in the UK (BRE report, 2006). Thirty reports on the demonstration projects were accessed online and reviewed to determine the CP approach used, its impacts on construction process improvement, and to finally compare it with the global practices of collaborative conversations as reported in IGLC conferences. The review identified some key social conversations used as presented in Table 1.

Table 1: Social conversations used in CLIP demonstration project report

Forms of Social conversations used in CLIP	Rate of use in case study
Using a master programme	Very frequently
Developing collaborative programme or Phase scheduling	Very frequently
4-8 weeks lookahead planning	Sometimes
Weekly site meeting/ review	Sometimes
Detailed production planning including make ready process	Inadequate
Measurement of Percentage of Planned activities completed (PPC) in order to learn	Not at all
Detailed identification of reasons for non-completion with follow-up actions	Inadequate
Use of visual display board for communication to team	Very frequently
Use of external facilitator	Very frequently

These social conversation approach employed by CLIP was claimed to encourage learning, prompt feedback on performance for participating organisation, develop and sustain skills for site operatives (Constructing Excellence, 2007). The claim in the report suggests that the implementing organisations recorded measurable progress in process improvement. Specifically, 40% improvement in productivity; 50% reduction in project lead time; 65% reduction in defect rate and 30% reduction in terms of project duration were achieved through the use of CP (Constructing Excellence, 2007; BRE report, 2006). Although, this result could be subjective since it was based on demonstration projects with likelihood of bias, its demonstrates the potential of CP in a social conversation process for construction process improvement, which is contrary to what is obtainable in the traditional approach to planning. Ballard (2000) and Kalsaas, (2012) argued that CP makes the implementation phase of the project easy. It is worth stressing that some key elements of the LPS are missing in the current practice. This includes the MakeReady process with clear consideration flow requirements and constraint removal before production; production evaluation and planning; measuring of Percentage Planned Completed (PPC); and learning. The danger with partial implementation of the LPS in the social conversation process is that, full benefits of the system will not be enjoyed by the organisation.

Social Conversations: Antidote to Rational Approach to Planning

The LPS is increasingly been used in the construction industry. It is a production planning control tool that uses a social conversation approach in delivering reliable and predictable projects (Kalsaas, 2012, Ballard and Howell, 1998). According to Ballard and Howell, (2004), Koskela, (2002) LPS provides the missing component in the traditional project management toolkit. Ballard and Howell (2004) stated the missing component in the traditional project management toolkit as production control; this is responsible for poor project performance in the traditional approach to planning. This suggests that collaborative conversations in the LPS could address the inherent problem in the traditional approach to planning. The collaborative conversation is based on the five key components of LPS as presented in figure 1.

A critical evaluation of these components indicates that they work effectively on any project that requires coordination of human elements. In reality, it is a progressive process that yields enormous benefits. The next section provides an evaluation on how these conversations could be used to address the rational approach to planning in construction.

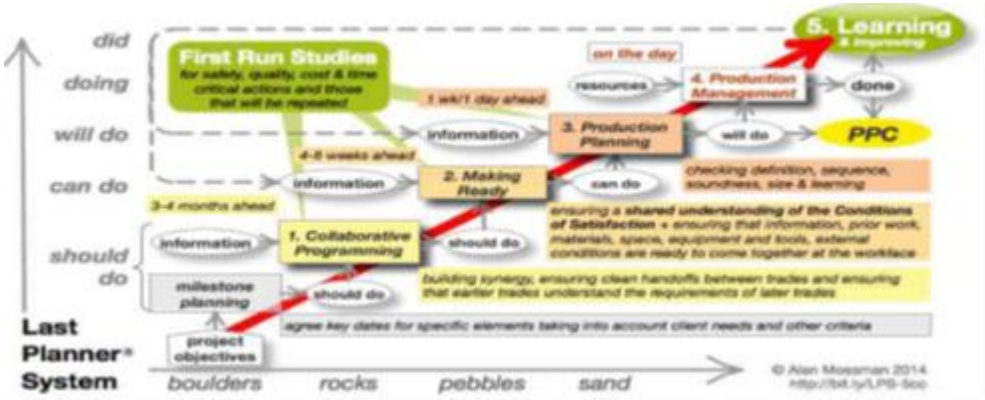

Figure 1: Last Planner System key conversations. [Used by permission: Mossman, (2013)]

Collaborative Programming

The first step in any collaborative conversation is collaborative programming. This process is used in developing a reliable programme from the master programme by direct involvement of the subcontractors, contractors, suppliers, designers and other stakeholders on the project at the early stage of project planning. This is done by presenting logical arguments to agree and develop the construction programme (Mossman, 2013; Anderson *et al*, 2011; Ballard, 2000). This increases transparency and builds trust among the project team. However, this approach has been viewed to be non-existent in the traditional approach of project planning which is characterised by lack of trust and collaboratively agreed procedure for delivering projects (Zaghloul and Hartman, 2003). Ballard and Howell, (1998) argued that the non-existence of collaborative programming in developing construction task and activities is one of the major causes of construction project failures.

Anderson *et al* (2011) opined that CP in construction reduces issues such as changed orders, delays, rework, non-value adding activities, and litigation during the construction phase. This is so, since the process allows the team to develop a better understanding of the task and the process to be adopted in executing the task. However, this has remained an illusion on many construction projects due to the complex nature of relationship that exist among stakeholders associated with construction projects. This is even made worse with the use of rational approach in planning. Pasquire, (2012) argued that the non-existence of common understanding among project stakeholders is responsible for higher tenders, conflicts, projects running over time and budgets; and subsequently challenged the industry to adopt collaboration in planning in order to address the anomalies in the industry.

Make-Ready Process

The Make-Ready process is used in eliminating constraints to planned activities before the production or implementation stage on construction site. According to Ballard and Howell, (1998), and Ballard, (2000), the process is focussed on matching the available resources with the present realities on the construction site, such that production can proceed at an optimal level. The process is aimed at encouraging all the stakeholders to collaboratively identify and remove all the likely constraints that

could show up at the work phase before the actual commencement of work (HA, 2010, Mossman, 2013). This approach is used in controlling the production system. However, Ballard, (2000) observed that most scheduled activities in traditional approach to planning are not completed as planned because they were not 'Make-Ready' prior to the production phase. This further magnifies the need for removing constraints from the production process in order to create flow in the entire process. Lindhard and Wandahl, (2012) and Koskela, (2002) argued that the lack of flow and the failure in removing constraints from the construction process contributes to non-value adding activities in the construction phase.

The goal of the Make-Ready process is to develop sound activities and assignments from the Lookahead activities which will subsequently be moved into the backlog of sound assignment for use in the Weekly Work Plan (Mossman, 2013; Lindhard and Wandahl, 2012; Ballard, 2000). The Make-Ready process improves construction planning reliability even on complex projects, using systematic approaches (Ballard and Howell, 1998).

Production Management, Measurement, and Learning

Production management is the approach used in controlling material and human resources deployed into the production system from the *"Make-Ready process"*. This approach is used in maintaining the entire production system to ensure the designed or intended output is achieved at the end of the production. Production management can therefore be viewed as production control, which entails the coordination of production planning, material coordination, and the control of planned tasks and production units (Ballard, 2000). However, unlike the traditional approach of project control, production management refers to the shaping and deployment of workable backlog into the production system while also ensuring these workable backlogs are delivered as specified (Ballard and Howell, 1998). Koskela, (2002) argued that the traditional approach of project control on site is based on assumptions and most times this leads to shifting of activities during production on site due to inherent variability in construction. It has been argued that the 'model' of control used in the construction industry is based on project control rather than production control (Koskela, 2002, Ballard and Howell, 1998). This implies that the production management in CP is not based on project control that emphasises conformity to plan not minding the overall effect of such changes on the production system as shown in Figure 2. However, project control rather than production control has been identified as a common occurrence or norm in the traditional project management approach (Koskela, 2002; Ballard and Howell, 1998). It is worth noting that in CP social conversation, these inadequacies are addressed since production control or management is done collaboratively with project stakeholders such as foremen, site managers, and subcontractors who are the responsible persons to deploy and manage resource in the production system on site.

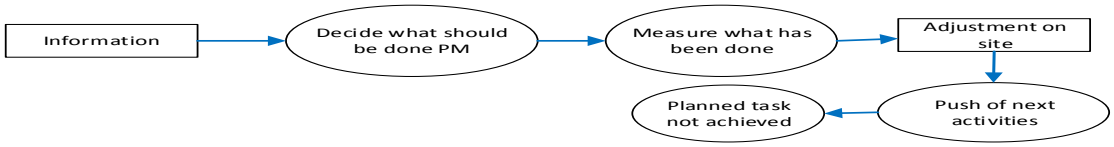

Figure 2: Rational Comprehensive Model approach to planning on site

Furthermore, production management entails recording of Percentage Plan Completed (PPC), while also identifying reasons for non-compliance. The reasons for non-compliance or late completion are recorded on a Pareto chart which will guide the team in making more reliable and predictable plans in the weeks ahead. PPC

measurement also enhances learning across the team which is a key goal of the social perspective to planning. In reality, PPC measurement does not only encourage learning but could also be used to determine productivity. For instance, Liu and Ballard, (2008) confirmed a strong correlation between PPC and productivity on engineering construction projects. The uniqueness of social conversation is the learning curve which is subsequently deployed into the production system as shown in Figure 3. This is contrary to the traditional approach used in managing projects, which focuses on 'push' and adjustments, all at the system expense thus hindering learning.

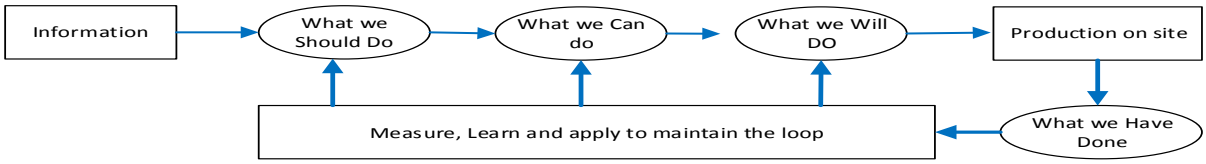

Figure 3: The social Perspectives to planning loop

The key element of the CP conversation is learning, which obviously is absent in traditional approach to planning (Kalaas, 2012).

SUMMARY FINDINGS

The aim of this study is to establish the rationale and implications of the use of traditional or technical approach to planning in construction, and to evaluate how this can be improved through LPS. Findings from the comprehensive literature reviews reveal that:

- The technical approach to planning in construction is based on the RCM which view planning as scientific and technical discipline and thus believed that the knowledge needed for planning lies in the hand of the planner and the planning authority alone.
- The finding indicate that only 54% of planned task are achievable on site via traditional planning approach, because of uncertainties and variability that will usually show-up on site due to lack of collaborative conversation in the planning process; a major contributing factor to construction project failures.
- The study identified the LPS of production control as a *"magical"* instrument with enormous potential to reduce uncertainties and variability in the traditional planning approach via its social conversations to make planned task predictable and reliable.
- The review indicates that the application of the social conversation (LPS) in the UK seems to be at variance with global practices as reported at the IGLC conferences. However, it showed some benefits in terms of time, cost, productivity, and construction process improvement.

CONCLUSION

This study established that the technical approach to planning in construction is derived from the principles of RCM which originates from URP since World War II. Although, URP has replaced this approach with collaborative planning, its use is prevalent in the construction industry with detrimental effects on project outcomes. Again, since the proponents believe that the knowledge needed for planning lies in the hand of the construction planner alone, other stakeholders on the project will not have input in the planning process; this implies planned tasks will not be achieved, thus resulting in project failure.

However, it is encouraging to know that the study has revealed the potential of the LPS in improving the current rational approach to planning in construction through its five key social conversation process as indicated in figure 1 and subsequently discussed. The LPS collaborative conversation achieve this, by identifying relationships and matching it with plan, while conversing for collaborative commitment from all the stakeholder on the project in a systematic way, thus reducing uncertainty and delivering a reliable and predictable construction project for the client. Since collaborative conversation in the LPS brings all the team together, it will not only lead to learning but also innovation and creativity as team members will benefit from each other's know-how.

The study observed that the application of the social conversation based on LPS in the UK construction industry is at variance with that commonly reported in the IGLC conferences. Since these claims cannot be substantiated, as the findings are only based on the review of 30 demonstration projects in the UK, an empirical study is required to expose the current CP and LPS practices in the UK to enable improvement. The empirical investigation of CP and LPS practices in the UK and a critical evaluation to development of an implementation framework for it in the UK will form the next stage of an on-going research by the authors. The study concludes that the practical application of these social conversations will assist construction organisations in delivering predictable and reliable projects with improved value for the client.

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