AN EVALUATION OF COLLABORATIVE PRACTICES IN CONSTRUCTION CONTRACTING IN SOUTH AFRICA

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ABSTRACT

The purpose of this paper is to advance ways of promoting collaborative cooperation between contractors and their supply chain in South Africa. The research approach is qualitative, and the design is based on multiple case studies. It was found that collaboration in South African construction sites has taken a different form from that of the international construction community. The nature of collaboration in South African construction is one of mutual dependency as well as antagonistic relations within teams on-site. Industry professionals apply collaboration by means of incentive programmes and standard contracts. This paper reinforces the idea that supply chain management collaborative practice can be identified within the existing structures of site practices, thus showing that collaborative practices are an integrative management approach. There is a need to develop and implement alternative forms of contracts, such as negotiated and strategic alliancing contracts which are tailored to South African construction. Collaboration enablers, such as regular communication, frequent meetings, incentives, and reward programmes, can improve the morale of the construction team. Opportunities thus exist for eliminating non-collaborative tailored practices between contractors and their supply chain in South Africa.

Keywords: collaborative practice, contracting, supply chain management, subcontracting, South Africa

1. INTRODUCTION

The nature of supply chain management (SCM) is that of coordinated decisions and activities used to efficiently assimilate suppliers, manufacturers, transporters, retailers, and customers, in order to ensure that the right product or service is distributed in the right quantities, to the right location, at the right time, with the objective of reducing system-wide costs in the process of satisfying end-user or customer-level requirements (Singh et al., 2013). SCM is considered to be a process-orientated, or cross-functional, model which consists of planning, sourcing, production, and distribution that is not exclusively focused in one of these areas (Brandenburg et al., 2014). Thus, SCM focuses on understanding and subsequently improving the multiple systems and networks within a supply chain (Balwani et al., 2015). It is considered a broad spectrum that embodies a variety of characteristics, which requires understanding of the entire spectrum in order to enable managers to

implement the concept of SCM in business. In the construction context, SCM encompasses a network of organisations that are involved in varying processes and activities, which produce the materials, components and services that are integrated into procurement in order to deliver a building. According to Mamter et al. (2014), SCM in construction is concerned with the coordination of isolated quantities of materials, and is associated with specialised engineering services and installation which are delivered to specific construction projects.

Construction supply chain (CSC) is a supply chain (SC) according to the make-to-order system. Chunyu (2013) links this element to the structure and function of CSC, which is characterised by irreconcilable facets, such as it being concentrated, temporary, and complex. The fragmented nature of construction projects makes it difficult to adapt, not only for SCM, but also for developing lean supply (LS), even with the constant exhortation to learn from the manufacturing industry (Davis et al., 2010). Pryke (2012) adds that issues such as an increase in transaction volumes at lower-than-average values and higher levels of opportunism in the context of low barriers to entry have resulted in the industry having various interfaces (SC contributors), which hinders application of construction SCM (CSCM). Pryke (2012) thus summarises critical features of SCM for successful adaptation in construction. SCM in construction should focus on (i) the impact of the SC on construction site activities, and should aim to reduce the cost and duration of those activities (the primary concern, therefore, is to establish a reliable flow of materials and labour on-site), (ii) the SC itself, and aiming to reduce costs, especially those related to logistics, lead time, and inventory, (iii) transferring activities from the site to earlier stages of the SC, and (iv) integrated management and improvement of the SC and site production, that is, site production that is subsumed by SCM (Pryke, 2012).

As asserted by Egbu et al. (2004, cited in Emuze, 2009), implementation of CSC depends on the ability to create, manage and restructure relationships between individuals, firms, and networks within the supply chain. Cognisant of the effort required in the application of SCM in construction, Pryke (2012) recommends development of vertical integration in the design and production process and operations, so as to link the process into a chain, focusing on maximising opportunities to add value while minimising total cost. Such application requires a significant shift in the mindset of SC participants towards collaboration, teamwork, and mutual benefits (Pryke, 2012).

Chunyu (2013) defines a stricter model of CSC structure as one which explains the concept of SCM in construction from the angle of the participants in the building process. The CSC model promotes the need for collaboration among SC participants, so as to establish a high-trust environment and constraint mechanisms and information-sharing mechanisms, and for participants to share common objectives. Thus, SCM in the construction context is an innovative tool that is utilised in organising and managing resources. According to Myerson (2012), it is a performance-enhancement tool that is primarily a financial-control initiative, due to the fact that supply chains in construction are a major cost centre in a project.

This description of SCM suggests that it is not an emergent concept, as the construction industry has relied on knowledge of the manufacturing industry to implement it adequately (Chunyu, 2013). Azambuja and O'Brien (2009) state that construction has transferred key concepts of SCM from manufacturing to construction projects, in an effort to improve productivity and reduce project costs. In the tradition of SCM, the following key approaches have characterised construction supply chain (CSC) modelling (Azambuja and O'Brien, 2009): structure, information flow, collaboration, product demand, production variability, buffering, and capacity planning. In modern construction projects, these characteristics can be reflected either collectively or independently. This paper addresses collaboration as one of the key elements of CSC, as it possesses special characteristics that are included in the diversity of the end product as well as the composition of the team (Bouchlaghem and Shelbourn, 2012). Collaborative practice (CP), as a feature of SCM in construction, along with concurrent engineering and lean production, is becoming a core part of management paradigms in order for the industry to remain in the global market and fulfil the growing demand for better performance from clients (Bouchlaghem and Shelbourn, 2012). Despite its suggested benefits, there is little knowledge of the nature, viability and limitations of CP when adopted in a construction project (Bouchlaghem and Shelbourn, 2012), particularly in South African construction.

Collaboration in a supply chain relates to the capability of two or more independent firms working together, planning and implementing SC operations with common goals in mind (Scholten and Schilder, 2015). Lavikka et al. (2015) portray collaborative practice as a process that requires planning and synchronisation, which in the course of working together could potentially lead to spontaneous development of relationships between the parties involved. Collaboration as a core principle has multiple advantages, including the potential to encourage real-time information exchange, which is required to prepare for, respond to and recover from supply chain disruptions, while reducing their impacts (Scholten and Schilder, 2015).

The purpose of this paper is to identify ways of promoting collaborative working arrangements between contractors and their SC in South Africa. This is significant because the traditional procurement method that predominates in South Africa has contributed in no small way to the pervasiveness of antagonistic relationships, and their consequent problems in construction (Emuze, 2012). This paper begins with an explanation of collaborative practices, and how leading international construction communities have shaped the application thereof. It further sets the foundation for evaluating South African construction contracting. This is guided by three objectives, namely to determine the nature of CP in construction, to determine how contractors could apply CP in a supply chain, and to determine the key drivers of CP in a supply chain. This paper thus endeavours to suggest advantages of collaboration and the nature of CP as applied in construction, particularly in South Africa.

2. COLLABORATIVE PRACTICE IN CONSTRUCTION

Emuze and Smallwood (2014) describe collaborative practice in construction as the ability of firms or entities, project teams, and individuals to agree upon mutual goals, decision-making processes, and troubleshooting systems, while focusing on specific improvement to their normal performance objectives in a project undertaking. Collaborative practice has generated more attention in contracting firms as a result of a shift in responsibilities among contracting partners. Bemelmans et al. (2012:343) explain the increased focus on collaborative practice by pointing out the fact that the coordinating role previously held by the client has, in recent years, fallen upon the main contractor. This recent development has resulted in benefits and challenges that require careful examination.

2.1 Categories of collaborative practices

According to Anumba et al. (2002, cited in Shelbourn et al., 2012), there are four different modes of collaboration, which relate to types of interactions found among participants and the pattern of communication adopted in the project, namely

1. Face-to-face collaboration, which normally involves physical meetings in real time,

2. Asynchronous collaboration, which is conducted in a shared location but not necessarily in real time (e.g. electronic media, such as notice boards/memos),

3. Synchronous distributed collaboration, which is real-time interactions among participants from various locations (e.g. video conferencing), and

4. Asynchronous distributed collaboration, which is participant interaction from dispersed locations but not in real time (e.g. electronic mail systems).

It is common for SC contributors to assume one mode of collaboration, as outlined above. Construction projects as a whole are expected to consist of numerous subcontractors. According to Xue et al. (2010), collaboration has advantages that appeal to organisations, namely the following: increased probability of winning bids; faster, better, or cheaper development or delivery of products or services or markets; in-depth learning; meeting an external requirement; and saving costs. Collaboration is said to have a substantial positive impact on project performance, not only with regard to time, cost, and quality objectives, but also for more general outcomes, such as greater innovation and client satisfaction (Akintoye and Main, 2007).

Douma et al. (2000, cited in Akintoye and Main, 2007) explain that the need to collaborate is determined by a number of factors, namely market opportunities, time pressures, and the number of alternative options available. They list the following key drivers for strategic fit in collaboration: (i) collaboration is only advisable when participants have a shared vision of future developments and of the impact that these developments will have on their individual positions; (ii) a precondition for strategic fit is compatibility of strategies; (iii) alliance partners will only be prepared to make concessions when the alliance is of strategic importance to them; (iv) a successful union requires mutual dependency; (v) any alliance should have added value for the partners and/or their customers; and (vi) partners must

carefully consider whether the market will accept the alliance (Douma et al., 2000, cited in Akintoye and Main, 2007).

Over and above having a shared vision, there are five more critical factors that contribute to effective collaboration, namely (Shelbourn et al., 2012)

1. Stakeholder engagement, which implies that collaboration leaders need to ensure that all key participants are consulted on the practices to be employed during the collaboration,

2. Trust, which implies that time and resources are needed to enable all participants to build trusting relationships,

3. Communication, which implies that a common means of communication should be established and agreed upon by all participants in the collaboration,

4. Process, which implies that the outworking of the collaboration in relation to both business and project should be known by all key participants, and

5. Technologies, which implies that an agreement on those technologies to be used is required to ensure that the collaboration is easily implemented and managed.

Collaboration therefore requires trust between partners, clearly defined processes, and efficient communication infrastructures supported by appropriate technologies (Shelbourn et al., 2012). Trust between collaborators can never be overemphasised, reason Ochieng et al. (2013), who believe that without an appropriate level of trust, true collaboration would simply not take place, even if the other factors mentioned above are present.

2.2 Enablers and barriers to collaborative practice in construction

Collaborative practices provide a unique cultural environment which is not limited by boundaries, while other forms of relationships between entities are limited to synchronisation of decisions and processes (Kumar and Banerjee, 2014). Ideally, the relationships forged by collaborative practice are long-term partnerships; however, owing to the character of construction projects, one-time alliances are much more common (Lönngren et al., 2010). Love et al. (2004, cited in Lönngren et al., 2010) caution organisations that enter into one-time partnerships to be cognisant of possible repercussions and effects relating to self-governance (understanding their own capabilities relative to demand), responsiveness (the ability to immediately recognise the changes in demands that will have an adverse effect on operations), and flexibility (the ability to respond to changes in client needs and demands).

Further benefits of collaboration include added value to a project, increased revenues and profits, improved business efficiency, improved productivity of individuals as a result of being part of a team, improved customer/end user satisfaction, and an enhanced collective image of the groups within the collaboration partnership (Shelbourn et al., 2012). Scholten and Schilder (2015) argue that while collaborative practice results in benefits such as higher visibility, flexibility, and reduced lead times, they are mindful of the fact that such practice might not always be possible or be wanted by SC contributors.

Shelbourn et al. (2012) summarise the following requirements for collaborative practice. It is imperative to strike a balance between the enablers and the barriers of collaboration, and to further explore ways in which this can achieved. As indicated by Akintoye and Main (2007), for any collaboration to be successful, relationships between participants need to be exceptional, and teambuilding (coordination and integration of project organisations, so as to increase productivity, efficiency, motivation, goal attainment, group dynamics, and dispute minimisation) should be considered within contracting firms.

3. RESEARCH METHODOLOGY

The methodology adopted for this study is the inductive approach of conducting research. The rationale for selecting this design stems from the fact that an exploration of the research topic indicated that case study was the most favourable strategy to use, especially when conducting preliminary studies, as is the case with this study. Fellows and Liu (2015) confirm this choice of design, by alluding to the fact that research in construction is relatively 'nascent' and intermediate in maturity and its matching of the fieldwork context. An evaluative study using the inductive approach is appropriate to foster development of construction knowledge (Fellows and Liu, 2015).

The research study was carried out in five provinces of South Africa, namely Free State, Gauteng, North West, Limpopo, and Mpumalanga. Eight construction projects were investigated, of which three construction sites (case studies) were explored more extensively. The provinces were selected for the study because of the willingness of the respondents to participate in the study. The data-collection instrument used for the study consisted of an interview protocol. The protocol for individual professional interviews and the case study interviews consisted of 18 and 14 questions. The data-collection process produced two streams of respondents. Although a main interview template was developed, a second interview template, which was loosely based on the main template, was used for the case study respondents. As explained by Hair Jr. et al. (2011), respondents are chosen based on their specialised insight on the subject under investigation. Due to the varying involvement of the respondents, due partly to their job title and role, the scope and capacity of their activity on the project, their duration on the project, and the duration of their affiliation with the main collaborators (the client and the main contractor), the interview had to be structured with these circumstances taken into account.

The analysis of the interviews followed simplified guidelines for analysing textual data developed by Taylor-Powell and Renner (2003). The analysis process followed a five-step plan for analysing and interpreting narrative data. The five steps were (i) get to know your data by reading and re-reading the recorded texts, (ii) focus the analysis by questions or topic, time period, or event, (iii) categorise information by identifying themes and patterns and organising them into coherent categories, (iv) identify patterns and connections within and between categories, (v) and interpret, by bringing it all together. The themes were colour-coded so as to facilitate allocation of similar themes across each participant response.

4. RESEARCH FINDINGS AND DISCUSSION

The participants were unanimous in describing the nature of their relationship as one of mutual dependency, and adversarial when challenges arose. The majority of the participants perceived that the environment they worked in afforded them a measure of transparency and gave them the freedom to express themselves. Main contractor representatives complied with an open-door policy that encouraged subcontractors to propose innovative solutions for problems they encountered on-site. However, one project manager cautioned against being too transparent, and preferred sharing information on a need-to-know basis. Some supply and installation subcontractors were given a measure of independence. This, however, did not reassure them of trust on the main contractor's part, but was perceived as a nonchalant attitude towards their presence on-site. Numerous factors impacted the type of relationship between project participants, which centred on communication and frequency of project collaborations.

The most preferred modes of communication were face-to-face and asynchronous collaboration and synchronous distributed collaboration. The frequency of communication, however, was determined by two factors, namely familiarity of the team leaders (the relationship between the foremen and the subcontractors) and the duration of participants in the current project collaboration. A main contractor representative stated that subcontractors and suppliers whom they had worked with before on other projects were trusted, and therefore did not require constant communication or supervision, as both sides were familiar with the required standards of quality and efficiency. This proved successful, as some of the subcontractors were given additional tasks to complete on behalf of the main contractor. Subcontractors who had occupied the construction site the longest seem to have developed an understanding of the work ethics and cultures that persisted on-site, while participants who had joined the construction site at a later time struggled to establish a working system. This was true on both sides of the collaboration (on the side of the main contractor representatives, and that of the subcontractors). For example, one main contractor representative had been on his current project for only a week (20 months into a 36-month project). He had an authoritarian manner, which most of the subcontractors did not approve of, which led to a troubled relationship plagued by constant communication characterised by a hostile and unforgiving nature. On one project, the subcontractors perceived that they were sidelined by the main contractor and their representatives. The modes of communication did not seem to produce the desired outcomes, thus making both sides less trusting and respectful of each other. A commonality raised among all the participants was the fact that the main contractor's decision to act in "good faith" was welcomed by all parties involved, as it allowed integrity to develop among the construction team. Information sharing by the main contractor representatives encouraged a relaxed, favourable environment, as participants were assured that work assigned was completed according to the instructions.

Application of collaboration in an SC is guided by standard forms of contract, which include the JBCC Series 2000 and the NEC3 family contract. Both these forms of contract include provisions for subcontracting work. The main contractor would organise their

relationship with the subcontractor (domestic or nominated) as if they had not subcontracted. Thus, main contractor representatives maintained managerial roles, while the subcontractors were in charge of production.

The manner in which subcontractors/suppliers were appointed influenced how subcontractors were assigned to tasks, and whether they could occupy and maintain leadership structures. Two of the construction projects investigated had additional clauses imposed upon the main contractor, with an addition of three individual professionals who operated sites under the same clause. These client-imposed clauses required the main contractor to allocate 30% of the contract sum to appointment of local SMMEs (subcontractors and suppliers). While this was a much-needed intervention to improve the community, it meant, however, that new entrants were included in the collaboration, thereby tasking the main contractor with additional responsibilities. To alleviate these responsibilities, designated roles and project-tailored responsibilities were assigned to members of the SC. Subcontractors who had a longstanding relationship with the main contractor were allocated additional relationships of managing new subcontractors who had little or no experience in the trade.

The simple nature of material and equipment suppliers meant that no formal agreement was required to govern the partnership. As such, main contractors appointed suppliers on a negotiated quotation system. This relationship was easy to maintain, as suppliers engaged with a specific buying department from the main contractor.

The majority of subcontracted work included wet trades (labour only) and supply and installation subcontractors. For this reason, main contractor representatives served on supervisory capacities, enabling subcontractors to coordinate their employees free from interruptions from the main contractor. Subcontractors who lacked adequate understanding of basic site practices were allocated to work on tasks that would later be finished by subcontractors with more experience. Therefore, one trade consisted of a number of subcontractors undertaking the same work. This reassured the main contractor of quality in work executed. This also allowed subcontractors to work as a team in a favourable environment.

Worth noting is that one contracts manager opted to use a custom-made contract form, which incorporated some of the conventional contracts but omitted some clauses that he deemed were unnecessary for the project undertaken. The contracts manager justified this approach by alluding to the unrealistic nature of standard forms of contracts, which bound the main contractor in a partnership he was not satisfied with. The participants also preferred to use the guidelines of another regulatory body as binding obligations between them and the subcontractor, as this council was tasked with signing off on subcontracted work on behalf of the client.

Client representatives were also incorporated into the SC, especially on specialist trades, to ensure accuracy in the installation and operation of equipment. Subcontractors were then provided with first-hand instructions and advice from stakeholders who represented the client, enabling successful execution of work and trust among the SC contributors.

The key drivers for collaborative practice in a SC concern beneficial outcomes for the project and the participants. Subcontractors ranked job security as a motivating factor to collaborate with main contractors. The prospect of performing on the current project ensured that subcontractors had a continued working relationship in other future projects. Risk allocation and sharing was the driving force behind main contractor representative participation in the partnership. As pointed out by one professional, subcontracted work ensures minimum waste, and it reduces theft of materials and other resources, as they are the sole responsibility of the subcontractor. Subcontractors indicated that association with a reputable contractor enhanced their qualifications and raised their business ranking in the cidb database. Job satisfaction and successful project execution were other key drivers among SC contributors. The majority of participants stated that they love their job and they enjoy the satisfaction of being part of a large group of individuals and witnessing it come together and produce a structure or building that the client and the community at large can be proud of.

Social responsibility affected the attitudes of project participants. The mere thought of enriching a community surpassed any problems experienced by main contractor representatives when dealing with local SMMEs as part of the client requirement. The main contractor's willingness to subsidise financial and material resources on behalf of the subcontractors enabled the subcontractors to thrive and improve their performance on the project.

Contractor-led incentives programmes and innovation platforms developed an appreciative attitude among the subcontractors. In one such project, trophies were awarded to best-performing subcontractors as a way of motivating them to continually improve their skills. Delegating responsibilities to more than one subcontractor encouraged an environment free from pressure to complete a task in unrealistic time frames, thus giving subcontractors the confidence needed to complete the job.

Innovative forms of communication contributed to a successful relationship. In one project, besides the use of radios, notice boards, and site meetings, main contractors introduced the use of social media as a communication platform. The use of WhatsApp groups to communicate with various members of the construction team ensured information sharing and technical support when issues arose.

The establishment of business forums afforded the local SMMEs a platform to express and discuss issues they encountered on-site. These forums gave the subcontractor the opportunity to engage with the main contractor, thus building confidence in the participants that the project could produce better business outcomes.

5. CONCLUSION

This paper started by identifying three objectives that were explored in the reported study. The objectives included determining the nature of collaborative practice (CP) in construction, determining how contractors could apply CP in a supply chain, and

determining the key drivers of CP in a supply chain. The findings from the triangulated data sources showed that collaboration between partners was of a mutual nature. Collaborating partners shared the same responsibilities with labour-only subcontractors, but they had exclusive responsibilities in their relationship with supply and installation subcontractors, who were assigned different tasks but occasionally interacted with each other to coordinate tasks. Face-to-face and asynchronous collaboration characterised the nature of the relationship between the main contractor and subcontractors. Collaborations existed under at least three collaboration arrangements, as separate organisations that maintained their independence, large national organisations working with a small local group, and group structures where a parent organisation governed a group of subsidiary organisations.

All members of the SC were under legal obligations, as standard forms of contracts (JBCC and NEC3) were signed prior to commencement of work. In the three kinds of collaboration, the main contractor maintained a managerial role, while the subcontractor undertook the role of supervisor of works. The main findings suggest that job security, successful work execution, and client satisfaction are the key drivers for members of the construction team. Sharing of risks and having specialists complete various facets of the project encouraged main contractors to continue pursuing a collaborative relationship with their subcontractors. Incentive programmes, training, and induction programmes enabled smooth running of processes, trust, and open communication.

Given the fragmented nature of this project-based industry, SCM principles such as CP provide practical leeway to address some of the challenges faced by the industry as it strives to improve its productivity and competitiveness. This requires early participation of every member of the SC network, including subcontractors and suppliers on the project. It is necessary to redefine the roles of the multidisciplinary project team and allocate responsibilities according to each member's impact in the supply chain model adopted in the project. While the principle of collaboration is a predominant feature of SCM, other features need to be studied alongside this principle to ensure successful application of SCM in South African construction. Future studies should therefore seek to establish core principles of SCM within construction projects, and should ultimately move to develop a model for implementing various aspects of SCM seamlessly in South African construction.

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