

# Evaluating Barriers of Collaboration in South African Construction Supply Chains

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## ABSTRACT

### Purpose

Collaboration in construction has proven to be beneficial in many dimensions of the supply chain, yet in South Africa these models have been hardly explored as a means to execute the contract. The purpose of this article is to explore some of the barriers in the execution of collaborative models in the South African construction industry.

### Design

Literature from different regions around the world was collected to provide a background on integrated construction supply chains. To examine the barriers relating to the application in South African construction supply chains (CSCs) quantitative analysis was used through questionnaires distributed to construction practitioners. Questionnaires were distributed to professionals involved in the construction supply chain (clients, contractors, consultants and suppliers). Descriptive statistics were applied to present and report on the findings.

### Findings

The South African construction industry exists in a very dynamic and volatile environment. Barriers need to be examined and solutions to break down such barriers need to be explored. For supply chain integration to be achieved in South African CSCs collaboration needs to be practiced more skilfully for the industry to make progress.

### Value

The South African construction industry is yet to welcome the use of collaborative models such as alliancing and construction partnering. This research seeks to establish reasons as to why there is resistance to adopt more collaboratively structured construction supply chains. The research will also highlight some of the benefits of using such models with the intention of encouraging an industry shift towards more integrated CSCs.

**Keywords:** Construction Supply Chains, Collaboration, Challenges, Barriers

## 1.1 INTRODUCTION

Inherent problems in the day-to-day running of construction projects have left the industry with some undesirable qualities. Infamous for its non-glamorous, aggressive environment, the construction industry can be very heavy on one's physical and mental well-being. Lueng et al. (2008) goes as

far as saying that over the past 20 years literature has shown that when put up against other professions, construction practitioners indicated high levels of stress. It is clear from literature that relationships in the industry are far complex to contain without difficulties. System integration of construction demand and supply chains requires high levels of role integration between parties. The client takes up the demand role while consultants, the main contractor, sub-contractors and suppliers each take up their respective service/ commodity provider roles as supply integrators. Other stakeholders may include regulatory authorities (environmental, health and safety bodies), trade unions, media, lobby groups and users/tenants. It is the integration of these two roles (demand and supply), between so many different stakeholders that makes construction the unique industry it is.

Collaborative tools relating to South Africa have rarely been studied in academia. Although it is still not clear as to what extent these types of models have been practised in construction supply chains (CSCs) on African soil one thing that is certain is that it is very little when compared to regions such as Australia, United States of America and in continents such as Europe and Asia. In South Africa collaboration has been practiced at it's very basic. The type of collaboration referred to above is that brought about as a result of sub-contracting or joint venturing.

Africa is a continent with an abundance of developing economies. Economies such as South Africa, Ghana and Nigeria are amongst the most thriving and attractive developing economies. Economies such as these provide a desirable breeding-ground for collaboration in projects. Popular collaboration options in Africa include Public-Private Partnerships (PPP). According to Sharma (2011) in developing countries; with a stable and sizable macro-economy such models are very effective at addressing shortcomings in both the public and private sectors.

Working collaboratively is nothing new to the construction industry, the problem comes in when no system is in place to control and regulate interactions between members in the project team and hence the philosophy (of collaboration) is simply given lip service with no great steps taken to employ it into the procurement system. Working collaboratively essentially means every individual from the various organisations making up the project team is committed and offers support towards making the project a success. Partnering in projects works best under such conditions (Briscoe and Dainty, 2005). The salient principle of the various forms of collaboration is to build and sustain an integrated team or entity (virtual or physical) that works simultaneously towards a common goal (Xue et al., 2010). Partnering is the most commonly used teamwork approach in the construction industry. In fact in the UK the term "partnering" is often replaced with collaboration (Hughes et al., 2014). This can be seen as incorrect because even though partnering is collaboration, collaboration is not fixed to partnering alone. There are various collaborative approaches available (Partnering, alliancing, joint venture). All are clearly different but share varying degrees of mutual co-operation and objectives. Therefore, purpose of this article is to explore some of the barriers in the execution of collaborative models in the South African construction industry.

## **1.2 COLLABORATION IN THE CONSTRUCTION INDUSTRY**

Partnering in the construction sense can be seen as a project management technique that seeks to effectively create a nurtured environment where two or more organisations harmoniously co-exist. The emergence of partnering came after a need was seen to better manage particular processes in areas such as those of the construction industry. In the construction industry some of the first countries to introduce and implement partnering as a procurement

approach were Australian, Japan and USA (Rowlinson and Cheung, 2002; Naoum, 2003) with a lot of literature on the subject coming from the same countries. In the USA the approach was first introduced to by the U.S. army corps in the mid- to late 1980s. Literature on the subject suggests that the approach seems most popular in China seeing as extensive research on the topic has been done by authors such as Bayliss et al. (2004) Cheng and Li (2002); Cheung et al. (2003); Chan et al. (2003); Chan et al. (2004). Partnering was introduced in Japan in the mid-90s in the form of a health care facility where the partnering arrangement was adapted through a design and build contract. Popularity in Australia grew in the 1980 while in South Africa very little literature has been recorded on the subject.

According to Chueng et al. (2003) the goal of partnering is to improve relations between stakeholders on both a short term basis (single project) and a long term basis (multi projects). It is regarded as an effective way for management to improving quality, programming and reducing clashes. Individuals are required to provide support to their fellow associates creating an environment of commitment and mutual support, necessitating the abandonment of traditional procurement habits (Briscoe and Dainty, 2005). Exercising this will leave very little room for beyond traditional client and contractor relations allowing for total organisational involvement. The success of the relationships within a partnering arrangement is determined by the manner in which the organisations treat each other. In order to enforce a successful partnering relationship objectives and goals of the project must be mutually agreed upon, problem solving mechanisms must be determined, inter-firm trust established and maintained, and benchmarking exercises and continuous and measurable improvement initiatives incorporated into the team culture (Rowlinson and Cheung, 2002; Naoum, 2003).

Definitions for partnering are many, although the underlying themes correspond. Partnering is about looking out for your own interests and equally doing so for those of other stakeholders making up the team (Bygballe et al., 2010). It is very difficult to work and think collaboratively when individuals in the team look to gain at the expense of others. The notion is that when everyone works together to help share pain-gain the team is placed at a competitive advantage to achieve set project targets. Rowlinson and Cheung (2002:10) define partnering as "a structured management approach to facilitate team working across contractual boundaries". The creation of a "virtual" organisation comes about by the coming together of a multitude of individual organisations forming an inter-organisation with unlimited collaborative lines

The complexities that come with the concept of partnering are often misunderstood and as a result what partnering is and what it is intended to achieve can be somewhat confused. In literature the concept is interrupted in different ways. Partnering may be seen from a philosophical outlook, with a particular set of beliefs (Naoum, 2003). From a SCM point-of-view partnering is taken as relationship model (Chueng et al., 2003). Although it is conventionally looked at from a functional point-of-view such as Chan et al. (2004) who explain partnering to be the formation of good relationships between parties to a construction contract, with the goal of minimizing job costs and schedule overruns. The most often cited definition of partnering is that of the Construction Industry Institute (CII). The CII's (1991:5) definition of partnering is: "A long-term commitment by two or more organisations for the purpose of achieving specific business objectives by maximising the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organisation

boundaries. The relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost-effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services."

### **1.3 PARTNERING ALLIANCING**

Partnering and alliancing are regarded as two commonly used ways of doing business collaboratively in the construction industry. Subsequently confusion between the two is common as a result the terms are often misused in literature and practice. The main similarity between partnering and alliancing is that they both seek to do business in a collaborative environment implemented through integrated supply chains. The major difference is the manner in which the contracts are executed. The latter is inherently complex with the contract being executed formally, therefore arrangements are expressed in the form of binding contractual obligations (Xue et al., 2010; Davis and Love, 2011). Unlike in partnering where the principal contract between stakeholders gives the client the advantage of reverting back to the contract should the partnering agreement fail; alliancing is seen as a formal approach to collaboration in business (Anvuur and Kumaraswamy, 2007). Partnering is therefore not a contract as such but rather a commitment and open communication endeavour to establish and sustain non-adversarial relations (Cheung et al., 2003). Walker and Hampson (2003) state that the two concepts can be distinguished by certain components that make-up the relationships which exist in each, under the following categories:

- The amount of trust and commitment
- The extent to which the relationship is looked after and not forced upon the stakeholders by the conditions of contract
- The manner in which the relationship is development, taken care of and maintained as a good part of the overall contract
- The extent to which openness/ transparency is maintained throughout the duration of the project
- The manner in which "gain and pain" shared

In a report by the Auditor General of the Australian National Audit Office (AGANO) (2000) Alliancing is suggested as a form of contracting process that delivers, within a guarded time frame, a cost-effective way of sharing project risks and rewards. The report goes on to explain that the process uses an integrated team employing the services of key stakeholders (i.e. the architect, the project manager, building and services contractors, and other parties) most likely to have an effect the outcome of the project.

In literature the approach appears to be most popular in Australia. While partnering seems more popular in the Northern Hemisphere (USA, UK and Japan). Much like the application of SCM principles the first recorded business alliances were in the manufacturing and automotive industries (Walker and Hampson, 2003). By forming alliances what organisations are essentially doing is creating a project team extending beyond traditional organisational boundaries – sharing all losses and profits, risk and rewards – in a "supreme" collaborative manner. In doing so, individually the very same organisations establish a competitive advantage of furthering their business with clients and customers. Alliancing is especially beneficial in projects that appear to be extreme in terms of complexity, in situations where a mix of traditional construction and non-construction related professions are

required to achieve common ground. This is because alliancing provides a platform for high levels of performance across a wide range of expertise in various construction and engineering related fields (Walker and Hampson, 2003).

## **1.4 RESEARCH METHODOLOGY**

To facilitate the data collection process for the study self-administered questionnaires were distributed to construction practitioners ranging from contractors, consultants and clients involved in private and public section CSCs. The questionnaires were designed to ascertain the challenges that practitioners are exposed to in the CSCs with reference to their most recent projects and to establish what barriers exist in implementing collaborative models in CSCs.

Respondents were identified by gathering information from current projects and taking names from the professional project lists of projects with values of over ZAR 150 million. A total of 378 questionnaires were distributed to potential respondents between November 2014 and April 2015. Most of the questionnaires were distributed by electronic mail while some were hand delivered. A total 107 questionnaires were returned, signifying a response rate of 28%. Of the 104 questionnaires received 23 of them were compromised to the degree that they could not be used for analysis bringing the total of usable questionnaires to 84, therefore the response rate was in actual fact 22%. This is in line with "the norm of 20- 30% which pertains to most questionnaire surveys in the construction industry" as suggested by Yang et al. (2011:905).

From the 84 respondents used for this survey 48% came from contractor organisations. In total client made up 29% of the respondents; 24% were clients in the private sector, 5 % were clients in the public sector. Consultants that made up at percentile total of 11% were consulting engineers, 2% were consulting architects, 3% were consulting quantity surveyors while only 1% was project management consultants. The remaining 6% came from other organisations, namely building suppliers (see Figure 1.0).

The respondents were instructed to choose which sector they worked in and were not restricted to select one. 82.1% of the respondents were involved in the building sector of construction, 23.8% were involved in the civil construction sector, 16.7% were involved in roads and earthworks, 2% were involved in the specialist engineering sector of construction. A total percentage of 6% were in other sectors of the construction industry and also play an instrumental role in the construction supply chain. These respondents were involved in sectors such as building renovations, electrical and instrumental and railway construction and maintenance (see Figure 2.0).

### **1.4.1 Collaboration in the South African Construction industry**

When stakeholders from different organisations commit to work jointly towards shared goals and maximise efficiencies to the benefit of all affected then integration is easily realised. This is the essence of collaborative working. A climate of collaboration is one where the team is based on a non-adversarial interactions, with early warning signs in the contract where roles and responsibilities are understood by all stakeholders. Such an ambience is created by managing relationships through the help of regular meetings, open dialogue and risk sharing to produce an atmosphere of mutual trust,

where information is shared, problems can be solved together and everyone contributes towards a common aim motivated by fair methods of pain share gain share, so that the client and the supply chain achieve a reasonable profit (Hughes et al., 2014).

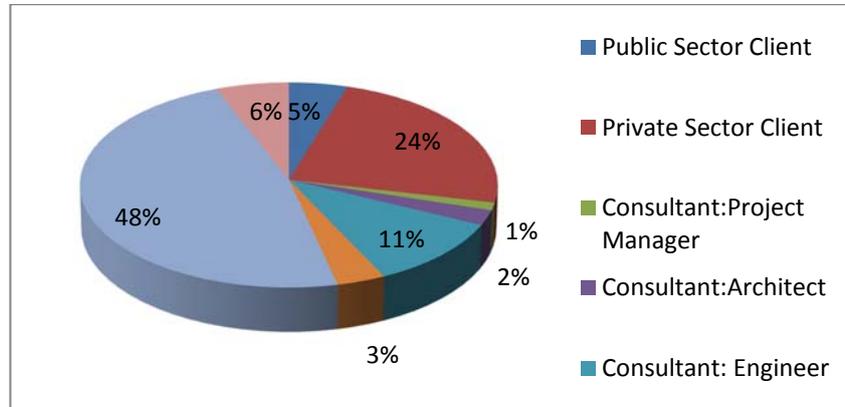


Figure 1.0 Respondents' organisational profile  
Source: Author's Questionnaire survey

Emuze and Smallwood (2014) advise that South African CSCs show signs of fragmentation and disjointed behaviour resulting in many of the problem experienced. This view is also expressed by interactions Van Der Merwe and Basson (2007) stating that contracts are traditionally fragmented in South African CSCs resulting in adversarial interactions and low trust. Collaborative models are not practised enough to assist in eradicating some of the industry's ills.

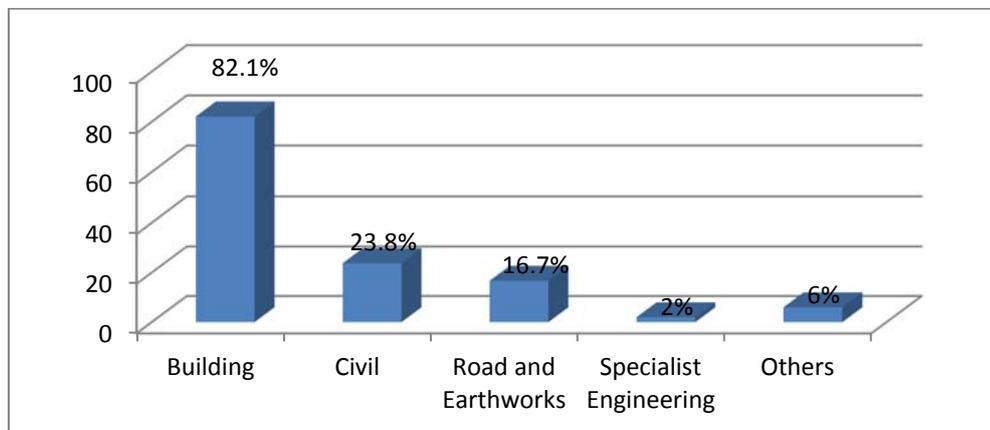


Figure 2.0 Respondents' sector profile  
Source: Author's Questionnaire survey

Due to the above the first section of the question was used to establish an understanding on what level collaboration is practised in South African CSCs. Mean scores were used to establish how frequent the various collaborative models were being made used. Subcontracting came up as the most frequently exercised collaboration modus operandi by the respondents with an overall mean score of 3.96, this was followed by Joint Venturing (mean = 2.49). The two models (Sub-contracting and Joint venturing) are very common in developing countries like South Africa where companies find themselves having to consolidate resources to be in a better position to complete the scope of works (CIDB, 2003). Overall Partnering, Alliancing

and Relationship contracting produced relatively low means scores and ranked in third, fourth and fifth respectively (see table 1.0)

**Table 1.0** Collaborative models used by respondents

Collaborative models	Overall		Clients		Consultants		Contractor	
	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean
Sub-contracting	1	3.43	1	3.17	2	2.27	1	3.96
Joint Venturing	2	2.49	2	2.42	1	2.60	2	2.49
Partnering	3	2.08	3	2.33	3	2.13	3	1.93
Alliancing	4	1.65	5	1.62	4	1.93	5	1.56
Relationship contracting	5		4	1.88	5	1.47	4	1.60
Number of respondents ( <i>n</i> )		84		24		15		45

Source: Author's Questionnaire survey

#### 1.4.2 Challenges and barriers in CSC collaboration

Inherent problems in the day-to-day running of construction projects have left the industry with some undesirable qualities. Stakeholders are faced with the challenge of surviving in very competitive environments at all stages of the construction supply chain, compelling them to adopt suitable strategies and make changes to suit current practices. The respondents were asked to identify to what degree various factors created challenges in the CSC. Since CSCs are made of different groups it is expected that challenges will differ from one group to another. Therefore in the study the factors of each group were identified to consider what the most challenging factors in each filed of practice were (see table 3.0).

##### **Client**

The client group ranked (1) "lack of top management support", (2) unrealistic deadline" and (3) "excessive working hours" as the most important contributing factors of challenges with mean scores of 4.29, 4.08 and 4.08 respectively. "High stress levels", "frequent disputes and unpleasant relations with other personnel" were ranked as the least contributing factors.

##### **Consultants**

The consultants group ranked (1) "unrealistic deadline", (2) "bureaucracy" and (3) "lack of top management support" as the biggest contributors of challenges in the CSC with means scores of 4.20, 4.20 and 4.13 respectively. Like the client group as discussed earlier "high stress levels", "frequent disputes and unpleasant relations with other personnel" were also ranked as the least contributing factors

##### **Contractors**

The group of contractors ranked (1) "lack of top management support", (2) unrealistic deadline" and (3) "high workload" as the biggest contributors of challenges in the CSC with means scores of 4.29, 4.27 and 4.20 respectively. "Bureaucracy", "frequent disputes" and "unpleasant relations with other personnel" were ranked as the lowest contributors of challenges in the CSC.

**Table 2.0** Factors creating challenges for construction practitioners

Factors	Overall		Clients		Consultants		Contractor	
	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean
Lack of top management support	1	4.26	1	4.29	3	4.13	1	4.29
Unrealistic deadline	2	4.20	2	4.08	1	4.20	2	4.27
Lack of commitment from other parties	3	4.13	4	4.04	3	4.13	4	4.18
High workload	4	4.07	7	3.92	5	3.93	3	4.20
Communication barriers	5	4.06	4	4.04	5	3.93	5	4.11
Excessive working hours	6	4.01	2	4.08	5	3.93	6	4.00
Bureaucracy	7	4.00	6	4.00	1	4.20	8	3.93
High stress levels	8	3.87	8	3.83	8	3.60	7	3.98
Frequent disputes	9	3.75	9	3.75	10	3.27	9	3.91
Unpleasant relations with other personnel	10	3.75	9	3.75	8	3.60	10	3.80
Number of respondents (n)	84		24		15		45	

Source: Author's Questionnaire survey

Cheung et al., (2003) identified that barriers related to rigid tenders processes, misunderstanding of partnering processes, and lack of knowledge, experience and commitment in adopting partnering. Mbachu and Nkado's (2007) identification of distasteful relations in the South African construction industry traced back to, inter alia, the divergence in the views of project stakeholders. Phua and Rowlinson (2003) identified that in-grouping and out-grouping influenced co-operative behaviour in a bad way. They go on to say that the disjointed nature of the construction industry is a result of professional alliances, where construction professionals are singled out according to their area of knowledge (in-grouping). This creates a synthetic barrier for relationship success by dividing the construction professionals, separating them from other organisations. Identifying the root of the problem is not an easy fact finding process because the problem could be incognito (disguised) throughout the project. For this study the respondents revealed that

**Table 3.0** Factors obstructing collaboration

Obstruction Factors	Overall		Clients		Consultants		Contractor	
	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean
Inexperience with collaboration	1	3.81	1	3.96	4	3.73	1	3.76
Corruption	2	3.77	2	3.87	4	3.73	2	3.73

Lack of faith in the benefits of collaboration	3	3.70	5	3.71	4	3.73	3	3.69
Lack of commitment to the process	4	3.68	6	3.63	1	4.00	6	3.60
Overdependence on others	5	3.65	9	3.50	3	3.87	4	3.67
Misunderstanding of collaborative concepts	6	3.62	8	3.54	1	4.00	7	3.53
Distrust from past experiences	6	3.62	4	3.75	7	3.67	7	3.53
Inherent aggressive nature of the industry	8	3.60	3	3.79	9	3.13	5	3.64
Cost of training to implement the collaborative process	9	3.43	6	3.63	8	3.33	9	3.36
Cultural barriers	10	2.95	10	3.33	10	2.53	10	2.89
Number of respondents ( <i>n</i> )	84		24		15		45	

Source: Author's Questionnaire survey

“inexperience with collaboration” and “corruption” are the biggest contributing factors that restrict the use of collaborative models. Individually, clients and contractors also conceded in ranking the two factors first and second respectively. However consultants ranked “misunderstanding of the collaborative concept” and “lack of commitment in the collaborative process” as the two impediments of collaboration. Other important factors obstructing collaboration were identified to be “lack of faith in the benefits collaboration”, “lack of commitment in the process” and “overdependence on others” (see table 4.0).

## 1.5 DISCUSSION AND CONCLUSION

The South African construction industry exists in a very dynamic and volatile environment; therefore a shift to a more integrated supply chain is desperately needed. The reality however is that collaborative tools relating to South Africa have rarely been studied in academia. This study revealed that the extent with which collaborative tools are being practised in South Africa is also desperately low in comparison with first world regions. Sub-contracting and joint venturing were the two most commonly used collaborative tools in South African with Partnering and Alliancing being virtually absent to the industry.

Literature suggests that when put up against other professionals, construction practitioners indicated high levels of stress (Bowen et al., 2013; Chan et al., 2012; Lueng et al., 2008). This presents a major challenge and puts great strain on supply chain integration (Baiden, 2006). In the context of South Africa this challenge is further exacerbated by the diverse cultural setting that practitioners find themselves in. Stakeholders are faced with the challenge of surviving in very competitive environments at all stages of the construction supply chain, compelling them to adopt suitable strategies and

make changes to suit current practices. The study identified that lack of top management support, the setting of unrealistic deadlines and compelling people to work excessive working hours were the greatest challenges that practitioners were faced with in CSCs. Inexperience with collaboration and corruption were identified as the biggest contributing factors that restrict the use of collaborative models.

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