

Key drivers of effective collaborative working in construction supply chain in South Africa

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ABSTRACT

Recent research into construction supply chain, has identified need to pursue the drivers for effective collaborative working in construction project delivery. Identification and implementation of the drivers for effective collaboration is deemed to be the precursor for optimising the benefits of collaborative working in construction project delivery. However, there has been little research that focus on key drivers of collaborative working in the construction sector compared to the manufacturing, production and service delivery sectors. The aim of this study is to identify the key drivers for effective collaborative working in construction project delivery. The study primarily adopted an exploratory qualitative design using interviews on three case study projects that adopted collaborative working in South Africa. The data was analysed using thematic analysis. The results revealed, efficient operational governance practices in team work, effective Integration strategies in team management and people and environmental management strategies as the three main factor drivers for effective collaboration in construction business and project delivery. It further established effective communication, building trust, managerial and employee support & motivation and effective leadership as the under bedding tenets of these driving themes. The findings thus affirmed that the human behavioural and environmental factors cannot be overlooked if effective collaborative working in construction project delivery can be achieved. The drivers for effective collaborative working could be diverse with limited understanding of the key factors in the construction industry. The study has given an understanding of the key drivers of effective collaboration that can help stakeholders and practitioners to operationalise the factors in order to optimise the benefits of collaborative working in construction supply chain.

KEYWORDS: Collaborative Working, Construction Supply Chain, Integration Strategies.

INTRODUCTION

Despite the numerous enticing benefits associated with the adoption of strategic collaborative contracting and working in construction supply chain reported in plethora of literature (see Xue *et al.*, 2010; Xue *et al.*, 2007; Rahman & Kumaraswamy, 2008; Chan *et al.*, 2004; Ingirige & Sexton, 2006), there are enough evidence suggesting that non-traditional contracting continue to encounter numerous social, economic, cultural, managerial, financial and organisational barriers (Kwofie *et al.*, 2017; Khurana *et al.*, 2011; Pala *et al.*, 2012; Briscoe *et al.*, 2002 & 2004; Green *et al.*, 2005; Xue *et al.*, 2005; Walker *et al.*, 2014; Rahman & Kumaraswamy, 2012; 2008; Ingirige & Sexton, 2006). These barriers hamper the attainment of effective

collaborative working almost an impossibility. However, emerging research into construction supply chain, has identified the need to pursue the drivers for effective collaborative working in construction project delivery. This recognition is borne out of the theoretical and practical foundation that, identification and implementation of the drivers for effective collaboration is deemed to be the precursor for optimising the benefits of collaborative working in construction project delivery. Xue *et al.* (2010) intimated that, construction business and working environments are constantly changing and evolving which is further characterised by tense competitiveness and wide international and global links. Against this developments, such business and working environment require construction organisations to establish effective and efficient integrative collaborative management systems in their supply chain (Xue *et al.*, 2010; Rahman & Kumaraswamy, 2008; Xue *et al.*, 2005).

In the light of this, collaborative working (CW) has emerged as a non-traditional procurement working that is capable of improving performance and enhancing competitiveness by responding to the constantly changing environment in construction industry (Xue *et al.*, 2010; Davis & Walker, 2009; Bresnen, 2010; Chan *et al.*, 2010; Kwofie *et al.*, 2017). However, there is enough evidence from extant literature that suggest that collaborative working in construction project environment and business suffers from lack of effectiveness and efficiencies which are primarily due to the influence of the business environment and human behaviour (Chen 2003; Cicmil & Marshall 2005; Pryke 2004; Xue *et al.*, 2005). Consequently, the patterns of social dimensions of human working differ from organisation to organisation, place to place, one industry to another, and across cultures, making it such a very complex and dynamic environment (Ingirige & Sexton, 2006; Mignone *et al.*, 2016). In manufacturing, production, services delivery and construction industries, there has been a general consensus for the need to pursue an agenda towards attaining effective collaboration among supply chain. Kohli and Jensen (2010), Fawcett *et al.* (2008), Khurana *et al.* (2011) and Solaimani *et al.* (2015) provided the evidence of such pursuit in manufacturing, production and service delivery supply chain. These studies have primarily focused on the measure of effectiveness among supply chain, identification of drivers and enabling factors for effective collaborative supply chain in marketing, manufacturing and production sectors.

Despite this recognition for an effort towards an insight into the drivers of effective collaboration working in construction working, little attention has been given to this in construction sector supply chain. Notable studies have focused on the barriers to collaborative working and other forms of non-traditional procurement, relationship management as well as rate of adoption of collaborative working in construction supply chain (see Pala *et al.*, 2012; Rahman & Kumaraswamy, 2008; Xue *et al.*, 2005; Saad *et al.*, 2002; Briscoe *et al.*, 2004). In the light of this, the identification of the key drivers of effective collaborative working in construction supply chain is an imminent necessity. Hence the aim of this study is to identify the key drivers to effective collaborative working in construction supply chain. It is expected that, the knowledge and understanding of these drivers of effective collaborative working as well as the implementation and practice of these drivers is needed, to ameliorate the emerging barriers and challenges in non-traditional construction supply chain.

LITERATURE REVIEW

Perspectives of Collaborative Working in Construction

Collaborative working (CW) has emerged as a sure non-traditional effective and efficient integrative management systems capable of improving the performance and non-adversarial nature compared to traditional models. The concept of collaboration, alliancing, partnering and coalition have been in the construction industry lexicon for many decades, however, these terms have often been confused and sometimes interchanged without much particular attention and consideration of their intrinsic unique attributes and characteristics (Xue *et al.*, 2010; Xu *et al.*, 2005; Briscoe *et al.*, 2004). However, in spite of several years of adoption and practice of CW in the construction industry, there has been lack of consensus and no precise definitions of the term. Nonetheless, from the opinion of Xue *et al.* (2010), CW is defined as jointly working together of individuals, organisation or project stakeholders to effectively and efficiently deliver a product outcome acceptable by all. Collaborative working in construction supply chain is perceived to be a means that adequately enable management of complex infrastructure projects with enhanced performance and desired outcome (Hauck *et al.*, 2004; Love *et al.*, 2010; Davis & Love, 2011).

Interestingly, other studies also argue that collaborative working and other forms of non-traditional procurement such as alliancing and partnering fail to deliver the desired outcomes and these happenings are primarily due to unclear expectations and undefined business processes that do not create an effective environment for effective collaboration (Bresnen and Marshall 2000; Barratt, 2004; Akintan & Morledge, 2013; Dike & Kapogiannis, 2014). This notwithstanding, there is increasing evidence from literature indicating that project team participants in construction supply chain are actively and increasingly seeking opportunities to form structured collaborative ‘networks’ in the delivery of construction projects (Cheng *et al.*, 2000; Pryke 2005; Chan *et al.*, 2008; Mohammad-Hasanzadeh *et al.*, 2014; Kwofie *et al.*, 2017). This is because collaborative working is seen as a more structured means of enhancing team performance and value-added returns from investment in construction compared to traditional procurement models (Morwood *et al.*, 2008; Love *et al.*, 2010).

Challenges to Collaborative Working in Construction

There is a general consensus and perception among project participants and stakeholders suggesting that collaborative working is most suitable for overcoming problems and improving the overall performance in project delivery in the construction industry. However, in spite of efforts and extensive adoption of collaborative working in construction supply chains, these perceived benefits are not optimised in project delivery. One primary attribution to this development is inherent in social, economic, managerial, cultural, technological and organisational challenges construction collaborative working faces (see Pala *et al.*, 2012; Pryke 2005). Hartmann *et al.* (2009) and Chan *et al.* (2008) suggested marginal use of collaborative technologies, poor joint-problem solving remain another challenge that contribute to the adversarial culture in construction supply chain making collaborative working non effective.

According to Xue *et al.* (2010), business environment and human behaviours are the two dominant factors that challenge the success and effectiveness of collaborative working in construction project delivery. Chen (2003) and Cicmil and Marshall (2005) also posited that construction project delivery exhibit business environment that is often characterised by complexity and cultural diversities that significantly militate against collaborative working.

Xue *et al.* (2005) identified lack of coordination as another challenge in collaborative working environment in construction project delivery. From these, it has been revealed that, collaborative business culture, attitudes and strategy (working forms) in the construction industry are emerging and evolving (Cicmil & Marshall, 2005; Xue *et al.*, 2005), and thus, collaborative working participants must adapt in order to overcome the barriers and challenges they face.

Pursuing the Drivers for Effective Collaborative Working in Construction

The urgency of working models in achieving industry wide improvement, enterprise level business strategies and project level operational objectives is significant for all the actors involved in any construction supply chain. Hence, the identification and development of the drivers for effective collaborative working plays a crucial role in the success of construction collaborative supply chain operations. This is premised on the theoretical foundation that, the changing business environment requires construction business environment and organisations to establish effective and efficient collaborative management systems to engender their survival (Kwofie *et al.*, 2017; Xue *et al.*, 2010). Effective collaborative working has been regarded as the critical success factor for a construction organisations' survival and performance improvement by responding to the changing environment and challenges in construction project delivery (Chan *et al.*, 2008; Xue *et al.*, 2005; Xu *et al.*, 2005). It can be acknowledged that, much efforts have been made aimed at improving the effectiveness of collaborative working in construction project delivery, but knowledge and understanding of the key drivers to effective collaboration is still lacking.

The key drivers of effective collaborative working when identified can serve as the bridge that can be adopted and implemented towards attaining the desired benefits and optimising improvement in collaborative working in construction supply chain. However, it is argued that for such bridges aimed at bringing effective collaborative working in supply chains to effectively function, the drivers that form the bridges must focus on ensuring transparent information systems, cross-functional collaboration, and collaborative planning across the supply chain (Fawcett *et al.*, 200; Kulp *et al.*, 2004; Mentzer *et al.*, 2000). These tenets are useful to overcome the cultural, emotional, physical, and strategic gaps preventing effective collaboration in supply chains (Fawcett *et al.*, 2008).

STUDY METHODOLOGY

Given the limited study in identification of the drivers for effective collaborative working in construction project environment, the study adopted an exploratory research design using qualitative approach. The primary data collection consisted of a convergence of two data sources, which entails interviews and archival documents (Klenke, 2015) with interviews being the chief data source. This was done to ensure triangulation. According to Yin (2013), triangulation is based on a principle of seeking at least three ways of verifying or corroborating a practice or finding. This approach endeavoured to validate and subsequently strengthen the credibility of the study (Yin, 2013). Three case study projects (Hospital, University and Social housing) using collaborative working supply chain in South Africa in three provinces (Gauteng, Free State and Mpumalanga), were selected. According to Yin (2013), by using a case study research, one gains particular pragmatic inquiry and in-depth understandings or insights into contemporary phenomenon within its real-life context, especially when the boundaries between

phenomenon and context are not clearly evident as is the case of Collaborative Procurement in South African construction industry.

A total of thirty one (31) participants who form the project team on the three case study projects were interviewed. The analysis started by coding and transcribing of the interview data and using an approach adapted from the thematic analysis flowchart of an inductive qualitative model by Hesse-Biber and Leavy (2010) as illustrated in Figure 1.

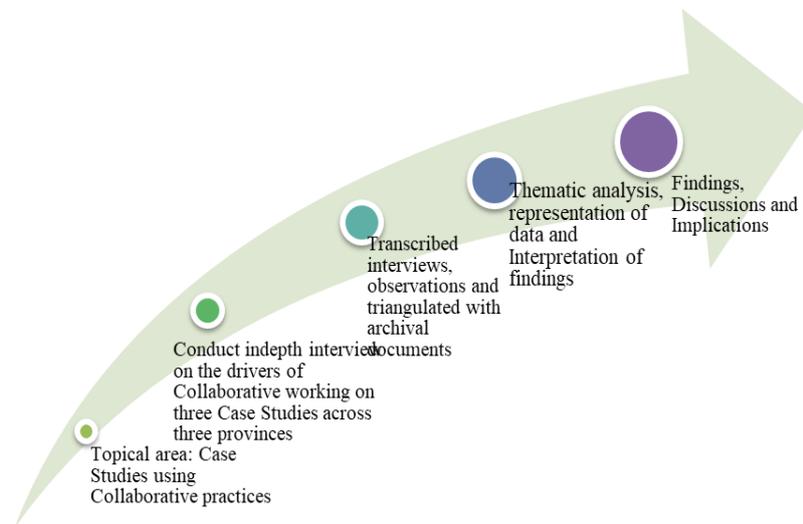


Figure 1: The Research process (Adapted from Hesse-Biber and Leavy, 2010)

The figure demonstrates the process followed to objectively achieve the aim of this study. As displayed in the figure, the process took a progressive stride from data collection to documenting future research as a result. The results from the thematic analysis was structured into main themes and subthemes under the main themes.

RESULTS, FINDINGS AND DISCUSSIONS

Analysis of Background Information

The summary of the taxonomy of respondents, their roles and average years of experience are presented in Table 2. The experiences exhibited by the respondents suggest that, most respondents are having an average years of experience above 10 years and thus, are more likely to understand the subject matter and offer accurate responses hence giving credence to the findings.

Likewise, from the array of professionals involved, it could be deduced that, the findings come from the experiences of almost all the key actors in project teams and participants in collaborative working and is reflect the reality in construction project environment.

Table 1: Background information on interview respondents

Professional Role	No of respondents	Average years of experience in CP
Project manager	2	13
Contracts manager	6	6
Construction manager	1	26
Supplier	1	8
Site agent	2	19
Foreman	7	14
Wet trades subcontractor	8	4
Specialist subcontractor	4	10
TOTAL	31	

Presentation of Findings and Discussion

Thematic Analysis - Key drivers of effective collaborative working in construction project delivery

The qualitative thematic analysis revealed three main themes as the key drivers for effective collaborative working in construction supply chain. Under these main themes, subthemes defining the main themes were also established. The main themes and subthemes are presented in Table 2.0 below. The numbers in brackets attached to the themes and sub-themes represents the number counts or times these variables were suggested by the interviewees.

Table 2: Key Drivers of Effective Collaborative Working and Practices in Construction

Dimensions of Key Drivers of Effective Collaborative Working and Practices in Construction	
Main Themes	Sub-themes
Efficient Operational Governance Practices in teamwork (24)	<ol style="list-style-type: none"> 1. Effective communication and information sharing (21) 2. Transparent operational procedures (14) 3. Adoption of an ICT-based management systems and innovations (9)
Effective Integration strategies in team management (18)	<ol style="list-style-type: none"> 1. Understanding team culture and team dynamics (16) 2. Effective conflict resolution mechanism (18) 3. Dynamic leadership & direction (10) 4. Build trust and open alliances among all participants (24)
People & Environmental Management strategies (22)	<ol style="list-style-type: none"> 1. Mutual respect for each other (16) 2. Build effective consensus collective goals (18) 3. Managerial and employee support & motivation (12)

*Figures in parenthesis standing for number of times it appeared in the interview

Analysing the interview transcripts using the thematic analysis as eluded in previous section facilitated the identification of three main themes as key drivers for effective collaborative working and practices in construction business environment and project delivery which seemed to corroborate suggestions in literature. From Table 2, a condensed summary of the three main

themes and the sub-themes from the interviewee statements based on their experiences of the research participants in terms of drivers to collaborative working is presented. From Table 2, the three main themes were ‘*Efficient operational governance practices in teamwork*’, ‘*Effective integration strategies in team management*’ and ‘*People and environmental management strategies*’. ‘Efficient operational governance and practices in teamwork’ as a key driver of collaborative working was counted to be 24 times, forming 77% whereas ‘Effective integration strategies in team management’ was 18 times which is approximately 58% of the suggestions of the interviewees. The thematic analysis further counted ‘People and environmental management strategies’, 22 times forming 71% of the suggestions from the interviewees.

Efficient operational governance practices in teamwork

From the broad theme of ‘*Efficient operational governance practices in teamwork*’ as a key driver of effective collaborative working in construction project delivery and supply chains, further synthesis revealed three sub-themes as underlining factors that engender efficient operational governance practices in teamwork. These factors were effective communication and information sharing, transparent operational procedures and adoption of an ICT-based management systems and innovations. Under operational governance and practices, ‘*Effective communication and information sharing*’, ‘*Transparent operational procedures*’, and ‘*Adoption of an ICT-based management systems and innovations*’ were deemed as the key drivers to ensuring efficient operational governance practices in teamwork towards effective collaborative working in construction project delivery. Even though the construction project and business environment is undoubtedly different from other sectors such as manufacturing, production and service delivery industries, it can be attested that, the emergence of ‘effective communication and information sharing’ is largely in agreement with the findings in by Khurana *et al.* (2011) and Fawcett *et al.* (2008). This revelation further attest to the relevance of effective communication in construction project delivery irrespective of the procurement strategy being adopted. This can be supported by a typical statement made by one of the interviewee as:

... if every information needed is given on time, we will have zero problems in the project process and any cause to delay...

From this it can be unequivocally stated that, ensuring effective communication and timely sharing of related information is critical if effective collaborative working can be realised in construction project delivery. Additionally, the results further reveal that ensuring ‘transparent operational procedures’ is a good operational governance practices that is essential to effective collaborative working in construction project delivery. Fawcett *et al.* (2008) revealed that, transparent procedures in marketing supply chain is critical to maintain their confidence and support. This was also corroborated by Kholi and Jensen (2010) and Soosay *et al.* (2008). In the opinion of Soosay *et al.* (2008), ensuring transparent procedure increases effectiveness and opportunities for innovation and improves relationship building with both customers and suppliers. The results as presented in Table 2. also indicated that ‘adoption of an ICT-based management systems and innovations’ is significant to effective collaborative working in construction. Hartmann *et al.* (2009) and Xue *et al.* (2005) established that, participants in collaborative supply chains being overwhelmed by volume of work to be done remains an emerging challenge that stifle effective efficient collaborative working and coordination in design and construction teams. Against this background, it can be contended that, the

emergence of the factor affirms the already held knowledge and perception of the significant role ICT can play in ensuring effective and efficient management systems in construction project delivery. Mao *et al.* (2007) intimated that construction projects environment are heavily document-oriented and thus attaining effective coordination is almost impossible without the use of information management and communication technology. Hence these findings should endear stakeholders in collaborative non-traditional construction supply chains to explore bespoke ICT tools that adapt to their operational context and enhances operational actives towards collaborative effectiveness. Likewise, automating the construction delivery process can help relief the work burden on collaborative working participants.

Effective integration strategies in team management

Furthermore, ‘effective integration strategies’ also dominated as a driving impetus to effective collaborative working in construction business environment. In this regard, ‘understanding team culture and team dynamics’, ‘effective conflict resolution mechanism’, ‘dynamic leadership & direction’ and ‘building trust and open alliances among all participants’ typified four key factors critical to effective integration strategies in team management that can engender effective collaborative working and practices in construction supply chain. From this it can be said that, the impact of cultural variability, team dynamics and lack of team integration on project and team performance is vaguely acknowledged in diverse construction literature (see Kwofie *et al.*, 2015; Tuuli *et al.*, 2010; Ankrah *et al.*, 2005). In this regard, the relevance of this results to effective collaborative working is that, understanding the cultural environment and the team dynamics is crucial. This can go a long way to ensuring a stable and integrated team towards effective collaborative working. It can be said that the emergence of ‘building trust and open alliances among all participants’ is no shocking and unexpected. Experiences of trust failure, trust related conflicts and discords among project teams and stakeholders are well acknowledged and rife in construction literature. However, it further cement how relevant building trust and good alliances is crucial to the construction project environment. Gad and Shane (2014) intimated that issue of trust is fundamental to all aspects of human interaction and thus critical in building lasting relationships in project environment. It is sternly emphasised that, construction endeavours are heavily embedded in varying levels and degrees of human component (Gad & Shane, 2014; Xue *et al.*, 2010; Xue *et al.*, 2005). Against this, if effective collaborative working can be realised in construction project delivery, building trust and all dimensions of trust cannot be overlooked.

The revelation of ‘dynamic leadership & direction’ cement the ever relevance of effective leadership in construction project delivery. Wong *et al.* (2005) and Chinowsky *et al.* (2007) intimated that effective leadership that is able to give direction, motivate and drive team vision plays important role in the organisational effectiveness and team performance. This allows for all participants to buy into what is being done and offer full support. This however is contrary to Kohli and Kensen (2010) and Fawcett *et al.* (2008) where leadership was not found among the bridges to effective collaborative working supply chain in marketing and manufacturing. This in reality typify the uniqueness of the construction business environment. Additionally, ‘effective conflict resolution mechanism’ was determined to be a relevant factor towards effective collaborative working in construction. Juxtaposing this to the reality in the

construction environment it can be said that conflicts are real and dominate most challenges facing construction project delivery success. Xue *et al.* (2010) contended that, adopting collaborative working in construction project delivery calls for radical changes in culture and attitudes to reduce adversarial conflicts. Several studies have indicated the industry's adversarial culture and disjointed relationships as the major hindrance in achieving collaboration and improved performance within construction supply chains (Dike & Kapogiannis, 2014). In this regard it can be stated that, given that less adversarial nature of collaborative working reported in extant literature, it is prime for the industry to pursue this to ensure a more friendly atmosphere, as well as develop effective conflict resolution mechanism given that any human interactions and collaborative working cannot be devoid of conflicts.

People and environmental management strategies

Lastly, people & environmental management was counted as another key driving factor to effective, collaborative working in construction project delivery. In this regard, 'mutual respect for each other', build effective consensus and collective goals' and 'managerial and employee support & motivation' were identified as the main underlining drivers of people & environmental management strategies to drive effective collaborative working in construction project delivery. In the opinion of Spekman *et al.* (2002) effective man management, understanding of working environment and context and earning management support are precursor for effective collaborative working in supply chain. Khurana *et al.* (2011) revealed that lack of management support often leads to people unwilling to offer needed information in manufacturing supply chain. However, it can be said that construction environment offer different setting and challenges. Against this, it is important for collaborative supply chain participants earn good support from each other and management, gain enough understanding of their working context and build collaborative operational consensus to goals and objectives to engender the effectiveness of their supply chain.

CONCLUSION AND IMPLICATION OF FINDINGS

Give the lack of studies identifying the drivers to effective collaboration in construction project delivery, this study by adopting exploratory qualitative design using interview and thematic analysis has filled the knowledge gap. The study has revealed 'operational governance practices', 'effective integration strategies' and 'people & environmental management' as the key drivers to attaining effective collaborative working in construction project delivery. The findings revealed here study indicate that though some of the results seem obvious and are in congruence with other studies on collaborative supply chains in manufacturing, marketing and service delivery industry, it also further brought to light some intrinsic revelations that affirm the uniqueness of the construction environment. From the results, it can be affirmed that, the operational governance practices, effective Integration strategies and people & environmental management factors that drive effective collaboration are embedded in the human factors and business environment domain. Likewise, the emergence of 'understanding team culture and team dynamics' and 'dynamic leadership & direction' affirm the uniqueness of the construction project environment compared to manufacturing, production and service delivery supply chains.

With the importance of supply chains in achieving industry wide improvement plans, driving effective enterprise level strategies and attaining project level operational objectives, the

findings herein professed is significant for all the actors involved in collaborative construction supply chain to ender themselves to practically and consciously apply these factors to engender effective collaborative working in construction supply chain.

This study has sought to reveal the key drivers that can influence effective collaborative working in construction environment and project delivery. However, one apparent limitation in the findings is that, the nature and extent to which these factors can bring about effective collaboration cannot be determined in this study. Against this, given the relevance and the need to attain effective collaborative working in construction supply chains, it is important for further quantitative studies to be conducted to establish the extent and the nature of the impact of these factors on collaborative working. This is relevant to further offer rigour and credence to the factors, as well as deepen the knowledge and understanding inherent in this study

REFERENCES

- Akintan, O.A and Morledge, R. (2013). Improving the collaboration between main contractors and subcontractors within traditional construction procurement. *Journal of Construction Management*, 281236, 1-11. <https://doi.org/10.1155/2013/281236>
- Ankrah, N.A., Proverbs, D., Antwi, A. and Debrah, Y. (2005). The influence of organisational culture on contractor performance. In Sullivan, K. & Kashiwagi, D.T. (Eds.) Proceedings of the CIB W92/T23/W107 International Symposium on Procurement Systems: The Impact of Cultural Differences and Systems on Construction Performance, Las Vegas, 2, 373-381.
- Barratt, M. (2004). Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal*, 9(1), 30-42. <https://doi.org/10.1108/13598540410517566>
- Bresnen, M. (2010). Keeping it real? Constituting partnering through boundary objects. *Construction Management and Economics*, 28(6), 615-628. <https://doi.org/10.1080/01446191003587711>
- Bresnen, M. and Marshall, N. (2000). Partnering in construction: A critical review of issues, problems and dilemmas. *Construction Management and Economics*, 18(2), 229-237. <https://doi.org/10.1080/014461900370852>
- Briscoe, G., Dainty, A.R.J. and Millett, S. (2001). Construction supply chain partnerships: Skills, knowledge and attitudinal requirements. *European Journal of Purchasing and Supply Management*, 7(4), 243-255. [https://doi.org/10.1016/S0969-7012\(01\)00005-3](https://doi.org/10.1016/S0969-7012(01)00005-3)
- Briscoe, G.H., Dainty, A.R.J., Millett, S.J. and Neale, R.H. (2004). Client-led strategies for construction supply chain improvement, *Construction Management and Economics* 22(2), 193- 201. <https://doi.org/10.1080/0144619042000201394>
- Chan, A.P.C., Chan, D.W. and Yeung, J.F. (2010), Relational Contracting for Construction Excellence: Principles, Practices and Case Studies. Spon Press, Abingdon. <https://doi.org/10.4324/9780203926727>
- Chan, A.P.C., Chan, D.W.M., Fan, L.C.N., Lam, P.T.I. and Yeung, J.F.Y. (2008). Achieving partnering success through an incentive agreement: Lesson learned from an underground railway extension project in Hong Kong. *Journal of Management in Engineering, ASCE*, 24(3), 128-137. [https://doi.org/10.1061/\(ASCE\)0742-597X\(2008\)24:3\(128\)](https://doi.org/10.1061/(ASCE)0742-597X(2008)24:3(128))
- Chan, A.P.C., Chan, D.W.M., Chiang, Y.H., Tang, B.S., Chan, E.H.W. and Ho, K.S.K. (2004). Exploring critical success factors for partnering in construction projects. *Journal of Construction Engineering and Management*, 130(2), 188-198. [https://doi.org/10.1061/\(ASCE\)0733-9364\(2004\)130:2\(188\)](https://doi.org/10.1061/(ASCE)0733-9364(2004)130:2(188))
- Chen, C.J. (2003). The effects of environment and partner characteristics on the choice of alliance forms. *International Journal of Project Management*, 21(2), 115-124. [https://doi.org/10.1016/S0263-7863\(01\)00082-5](https://doi.org/10.1016/S0263-7863(01)00082-5)

- Cheng, E.W.L., Li, H. and Love, P.E.D. (2000). Establishment of critical success factors for construction partnering. *Journal of Management in Engineering*, 16(2), 84-92. [https://doi.org/10.1061/\(ASCE\)0742-597X\(2000\)16:2\(84\)](https://doi.org/10.1061/(ASCE)0742-597X(2000)16:2(84))
- Chinowsky, P., Molenaar, K. and Realph, A. (2007). Learning organizations in construction. *Journal of Management in Engineering*, 23(1), 27-34. [https://doi.org/10.1061/\(ASCE\)0742-597X\(2007\)23:1\(27\)](https://doi.org/10.1061/(ASCE)0742-597X(2007)23:1(27))
- Cicmil, S. and Marshall, D. (2005). Insights into collaboration at the project level: Complexity, social interaction and procurement mechanisms. *Building Research Information*, 33(6), 523-535. <https://doi.org/10.1080/09613210500288886>
- Davis, P. and Love, P. (2011). Alliance contracting: Adding value through relationship development. *Engineering, Construction and Architectural Management*, 18(5), 444-461. <https://doi.org/10.1108/09699981111165167>
- Davis, P.R. and Walker, D.H.T. (2009). Building capability in construction projects: A relationship-based approach. *Engineering, Construction and Architectural Management*, 16(5), 475-489. <https://doi.org/10.1108/09699980910988375>
- Dike, I.U. and Kapogiannis, G. (2014). A conceptual model for improving construction supply chain performance. In: Raiden, A B and Aboagye-Nimo, E (Eds) Proceedings 30th Association of Researchers in Construction Management Conference, Portsmouth, UK. 1-3 September, 1029-1038
- Fawcett, S.E., Magnan, G.M. and McCarter, M.W. (2008). Benefits, barriers and bridges to effective supply chain management. *Supply Chain Management: An International Journal*, 13(1), 35-48. <https://doi.org/10.1108/13598540810850300>
- Gad, G.M. and Shane, J.S. (2011). Trust in the construction industry: A literature review. In: Construction Research Congress 2014: Construction in a Global Network, 2136-2145.
- Green, S.D., Fernie, S. and Weller, S. (2005). Making sense of supply chain management: A comparative study of aerospace and construction. *Construction Management and Economics*, 23(6), 579-593. <https://doi.org/10.1080/01446190500126882>
- Hartmann, T., Fischer, M. and Haymaker, J. (2009). Implementing information systems with project teams using ethnographic-action research. *Advanced Engineering Informatics*, 23(1), 57-67. <https://doi.org/10.1016/j.aei.2008.06.006>
- Hauck, A.J., Walker, D.H.T., Hampson, K.D. and Peters, R.J. (2004). Project alliancing at national museum of Australia-collaborative process. *Journal of Construction Engineering and Management*, 130(1), 143-152. [https://doi.org/10.1061/\(ASCE\)0733-9364\(2004\)130:1\(143\)](https://doi.org/10.1061/(ASCE)0733-9364(2004)130:1(143))
- Hesse-Biber, S. and Leavy, P. (2010). *The Practice of Qualitative Research*. SAGE Publications.
- Ingirige, B. and Sexton, M. (2006). Alliances in construction: Investigating initiatives and barriers for long-term collaboration. *Engineering, Construction and Architectural Management*, 13(5), 521-535. <https://doi.org/10.1108/09699980610690774>
- Khurana, M.K., Mishra, P.K. and Singh, A.R. (2011). Barriers to information sharing in supply chain of manufacturing industries. *International Journal of Manufacturing Systems*, 1, 9-29. <https://doi.org/10.3923/ijmsaj.2011.9.29>
- Klenke, K. (2015). *Qualitative Research in the Study of Leadership*. Emerald Group Publishing. UK. <https://doi.org/10.1108/9781785606502>
- Kohli, A. and Jensen, J. (2010). Assessing effective of supply chain collaboration. *Supply chain forum: An International Journal*, 2-16. <https://doi.org/10.1080/16258312.2010.11517228>
- Kulp, S.C., Lee, H.L. and Ofek, E. (2004). Manufacturing benefits from information integration with retail customers. *Management Science*, 50(4), 431-444. <https://doi.org/10.1287/mnsc.1030.0182>

- Kwofie, T.E., Alhassan, A., Botchway, E. and Afranie, I. (2015). Factors contributing towards the effectiveness of construction project teams. *International Journal of Construction Management*, 15(2), 170-178. <https://doi.org/10.1080/15623599.2015.1033818>
- Kwofie, T.E., Aigbavboa, C.O. and Matsane, Z. S-S. (2017). Collaborative practices in South African construction project delivery. *International Journal of Construction Supply Chain Management*, 7(2), 39-55. <https://doi.org/10.14424/ijscsm702017-39-55>
- Love, P.E.D., Mistry, D. and Davis, P.R. (2010). Price competitive alliance projects: Identification of success factors for public clients. *Journal of Construction Engineering and Management*, 136(9), 947-956. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000208](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000208)
- Mao, W., Zhu, Y. and Ahmad, I. (2007). Applying metadata models to unstructured content of construction documents: A view-based approach. *Automation in Construction*, 16, 242-252. <https://doi.org/10.1016/j.autcon.2006.05.005>
- Mentzer, J.T., Foggin, J.H. and Golcic, S.L. (2000). Collaboration: The enablers, impediments, and benefits. *Supply Chain Management Review*, 4(4), 52-58.
- Mignone, G., Hosseini, M.R., Chileshe, N. and Arashpour, M. (2016). Enhancing collaboration in BIM-based construction networks through Organisational Discontinuity Theory: A Case Study of the New Royal Adelaide Hospital. *Architectural Engineering and Design Management*, 12(5), 333-352. <https://doi.org/10.1080/17452007.2016.1169987>
- Mohammad-Hasanzadeh, S., Hosseinalipour, M. and Hafezi, M. (2014). Collaborative procurement in construction projects performance measures, case study: Partnering in Iranian construction industry. *Procedia - Social and Behavioural Science*, 119, 811-818. <https://doi.org/10.1016/j.sbspro.2014.03.091>
- Morwood, R., Scott, D. and Pitcher, I. (2008). Alliancing A Participant's Guide: Real Life Experiences for Constructors, Designers, Facilitators and Clients, AECOM.
- Pala, M., Edum-Fotwe F., Ruikar, K., Peters, C. and Doughty, N. (2012). Improving supplier relationship management within the AEC sector. In: Smith, S.D (Ed) Procs 28th Annual Association of Researchers in Construction Management Conference, Edinburgh, UK. 3-5 September, 707-716.
- Pryke, S.D. (2004). Analysing construction project coalitions: Exploring the application of social network analysis. *Construction Management and Economics*, 22(8), 787-797. <https://doi.org/10.1080/0144619042000206533>
- Rahman, M.M. and Kumaraswamy, M.M. (2008). Relational contracting and teambuilding: Assessing potential contractual and non-contractual incentives. *Journal of Management in Engineering*, 24(1), 48-63. [https://doi.org/10.1061/\(ASCE\)0742-597X\(2008\)24:1\(48\)](https://doi.org/10.1061/(ASCE)0742-597X(2008)24:1(48))
- Rahman, M.M. and Kumaraswamy, M.M. (2012). Multicountry perspectives of relational contracting and integrated project teams. *Journal of Construction Engineering and Management*, 138(4), 469-480. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000463](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000463)
- Saad, M., Jones, M. and James, P. (2002). A review of the progress towards the adoption of supply chain management (SCM) relationships in construction. *European Journal of Purchasing and Supply Management*, 8(2002), 173-183. [https://doi.org/10.1016/S0969-7012\(02\)00007-2](https://doi.org/10.1016/S0969-7012(02)00007-2)
- Solaimani, S., Gulyaz, E., van der Veen, J. and Venugopal, V. (2015). Enablers and inhibitors of collaborative supply chains: An integrative framework. The 26th conference of Production and Operations Management Society (POMS): Washington, DC.
- Soosay, C.A., Hyland, P.W. & Ferrer, M. (2008). Supply chain collaboration: Capacities for continuous innovation. *Supply Chain Management: An International Journal*, 13(2), 160-169. <https://doi.org/10.1108/13598540810860994>

- Spekman, R.E., Spear, J., & Kamauff, J.W. (2002). Supply chain competency: Learning as a key component. *Supply Chain Management: An International Journal*, 7(1), 41-55. <https://doi.org/10.1108/13598540210414373>
- Tuuli, M.M., Rowlinson, S. and Koh, T.Y. (2010). Dynamics of control in construction project teams. *Construction Management and Economics*, 28(2), 189-202. <https://doi.org/10.1080/01446190903365657>
- Walker, B., Mills, A. and Walker, D. (2014). Enabling construction innovation: The role of a no-blame culture as a collaboration behavioural driver in project alliances. *Construction Management and Economics*, 32(3), 229-245. <https://doi.org/10.1080/01446193.2014.892629>
- Wong, P.S.P., Cheung, S.O., and Ho, P.K.M. (2005). Contractor as trust initiator in construction partnering- Prisoner's dilemma perspective. *Journal of Construction Engineering and Management*, 131(10), 1045-1053. [https://doi.org/10.1061/\(ASCE\)0733-9364\(2005\)131:10\(1045\)](https://doi.org/10.1061/(ASCE)0733-9364(2005)131:10(1045))
- Xue, X., Shen, Q. and Ren, Z. (2010). Critical review of collaborative working in construction projects: Business environment and human behaviors. *Journal of Management in Engineering* 26(4), 196-208. [https://doi.org/10.1061/\(ASCE\)ME.1943-5479.0000025](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000025)
- Xue, X. L., Li, X. D., Shen, Q. P. and Wang, Y. W. (2005). An agent based framework for supply chain coordination in construction. *Automation in Construction*, 14(3), 413-430. <https://doi.org/10.1016/j.autcon.2004.08.010>
- Xue, X.L., Wang, Y.W., Shen, Q.P., and Yu, X.G. (2007). Coordination mechanisms for construction supply chain management in the Internet environment. *International Journal of Project Management*, 25(2), 150-157. <https://doi.org/10.1016/j.ijproman.2006.09.006>
- Yin, R. (2013). Case Study Research: Design and Methods. Thousand Oaks, CA: Sage Publications