
Resource dependency and collaboration in construction supply chain: literature review and development of a conceptual framework

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Abstract: The construction industry supply chain is seen as a highly volatile and inefficient mechanism that falls well short of expectations due to its project focus rather than its supply chain management prowess. Relationships are short term and project-based so the development of enduring relationships become difficult. The purpose of this study is to present a conceptual model that looks at how construction supply chain actors develop relationships from partner selection through to project completion. The conceptual model, suggests that the relationship is dynamic and changes through the life cycle of a project and is linked to future working relationships. Proposing that dependency and collaboration, trust and price and mediated and non-mediated power become interrelated rather than individual constructs that act independently on the relationship. The relationships proposed will provide an avenue to further extend the literature on supply chain relationships, not only in the construction industry but possibly in other industries that rely heavily on third party suppliers.

Keywords: resource dependency; trust; price; construction supply chain; collaboration.

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1 Introduction

The construction supply chain is regarded as highly complex due to the industry's ever changing nature and the addition of another unique layer of complexities that segments the supply chain down as far as labour only components (Dainty et al., 2001). Over the years the industry has become so heavily reliant on subcontractors and suppliers, that they are engaged in up to 90% of the works (Eriksson et al., 2007; Humphreys et al., 2003; Matthews et al., 2000). It has been widely recognised that cooperation within a supply chain has become an increasingly important component to generating relationship benefits that improve quality, productivity, shorten lead times and reduce costs to create a competitive advantage (Zhang et al., 2009; Halley et al., 2010). Dubois and Gadde (2002) suggest that the construction industry is lagging well behind other industries due to the belief that the industry has a limited idea of supply chain management principles resulting in a lack of clarity within the industry and its understanding of what is required in a supply chain relationship (Dainty et al., 2001; Saad et al., 2002).

One explanation offered for this failure is directed at the significantly strong focus the industry has toward the project management rather than the supply chain management (Dubois and Gadde, 2000, 2002). Adversarialism and opportunism is also considered to be rife at all stages of the project due to the barriers to entry being low, maintaining the high degree of fragmentation and low levels of profitability (Ireland, 2004; Khalfan et al., 2010). Within a construction project one critical issue that needs to be considered is that while the main contractor on the one hand relies heavily on subcontractors and suppliers to supply the resources to successfully complete a project (Dubois and Gadde, 2000), on

the other they regard them as the biggest potential for cost saving, creating an environment of unfair practices (Humphreys et al., 2003). This reflects poorly on the industry as it tends to perceive partnering as a way to manage projects and does not provide the subcontractor with any tangible benefits leaving the subcontractor exposed to bullying (Gadde and Dubois, 2010). Furthermore, using supply chain management models and theories from other industries have also failed to deliver tangible solutions (Khalfan et al., 2010; Bankvall et al., 2010).

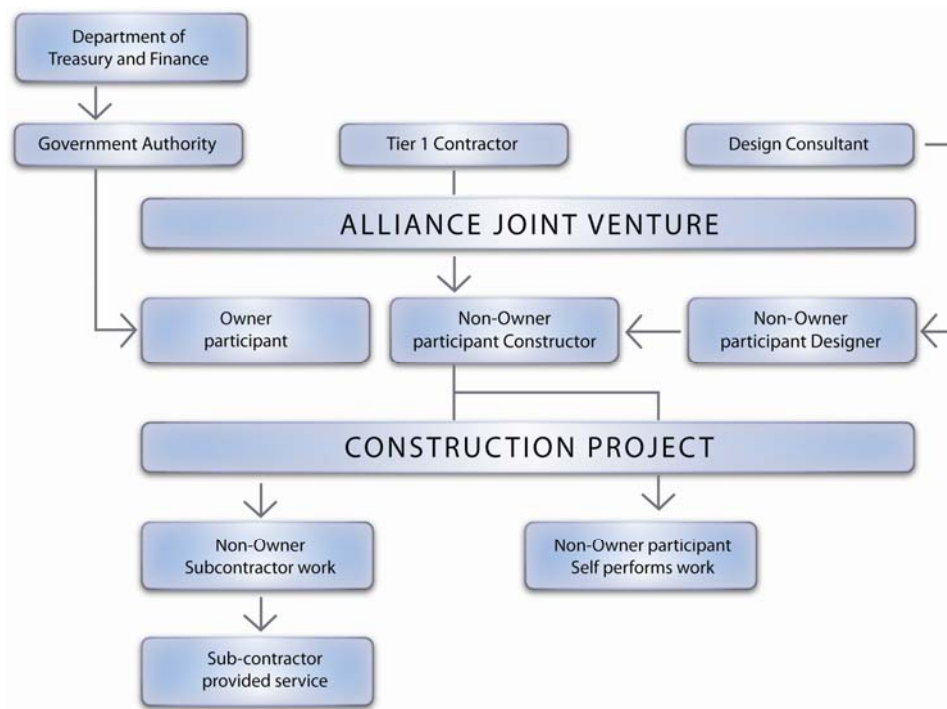
Due to the construction industries adversarial nature, trust becomes an important issue therefore partner selection is an important function (Kumar et al., 2011; Gnanasekaran et al., 2010) not only in securing the right skill set and required resources, but in particular when trust has been highlighted as critical to the management of a cohesive supply chain (Pinto et al., 2008). However, rather than focus on trust building, the industry still tends to select suppliers based on price (Hartmann and Caerteling, 2010) and perhaps ignoring factors such as trust, resources and ability of skills. This tendency is perhaps caused by the project specific requirements meaning that there is an ever changing group of suppliers or subcontractors at the lower tiers from one project to the next (Voordijk et al., 2000), making it difficult to build a cohesive and lasting relationship. Therefore, the development of trust between actors becomes difficult as the short term project-based focus contributes to relationships remaining fragmented and at 'arm's length' or in other words distant which are seen as further contributing to the industries inability to come to grips with managing the supply chain (Bankvall et al., 2010; Briscoe and Dainty, 2005; Cox and Ireland, 2002).

Much of the literature still suggests collaborative partnering as a solution to strengthening the construction supply chain process (Cheng and Li, 2001; Ingirige and Sexton, 2006; Love et al., 2004; Gadde and Dubois, 2010; Love et al., 2004; Doz and Hamel, 1998), while the resource-based view has gained popularity over the last 20 years (Halley et al., 2010). However, like most current literature on supply chain management they make the ambiguous assumption that the constituents of the supplier-buyer dyad are willing and able to cultivate mutually beneficial relationships (Benton and Maloni, 2005). With perhaps the biggest barrier to improving relations are the sub-contractors and suppliers who are sceptical about partnering as they consider it as a way for contractors to transfer costs upstream, thereby reducing the suppliers' margins (Dainty et al., 2001; Humphreys et al., 2003).

Considering there is a high dependency on subcontractors and suppliers within the construction industry and such a strong resistance to partnering, it could be almost conceivable that any cooperation between actors is more of a case of have to rather than want to (Donato et al., 2013). According to Benton and Maloni (2005), investigating what creates the power base and how it affects the relationship is an important first step in understanding or identifying dependency imbalances in the supply chain. These imbalances in dependencies create power regimes (Watson, 2001) that lead to larger more powerful organisations controlling the contract (Benton and Maloni, 2005). Price competition dominated by self-interest and mistrust with parties only looking to achieving their own objectives and maximising their own profits, with no regard to the impact on others, maintains the adversarial relationships (Meng et al., 2011). Implementing best practices from other industries have not been successful and some researchers have argued the view that the inadequate supply chain performance may suggest that either models or systems used by other industries are not appropriate within the construction context (Fearne and Fowler, 2006; Green et al., 2005; Winch, 2003).

Construction encompasses a large and diverse industry ranging from small maintenance projects to the construction of major infrastructure (Segerstedt and Olofsson, 2010) this implies that a wide range of resources, skills and competencies are required to meet the challenges of individual projects (Figure 1). Therefore, while the construction industry is considered a highly volatile and fragmented industry (Bankvall et al., 2010; Briscoe and Dainty, 2005; Cox and Ireland, 2002), it is very much a diverse industry in terms of its coverage (Segerstedt and Olofsson, 2010). This diverse and complex nature has also been well documented along with the challenges faced by the industry that are seen as an inhibitor to growth. Reliance on resources such as sub-contractors and suppliers needs to be considered as pivotal to the success of a project, however collaborative partnering as a whole has only been sporadically used to make improvements to the construction project environment (Love et al., 2004), with only tier one contractors adopting the approach. There are little collaborative strategies below the tier one level (Akintoye et al., 2000; Donato et al., 2013) which would signify that further improvement is still possible.

Figure 1 Construction supply chain with permission from J.D. Paterson and Associates (<http://www.jdpa.com.au>) (see online version for colours)



Building trust has always been considered a key element to building better relationships and research by Hartman and Caerteling (2010) found that when a relationship emerges with a subcontractor they are likely to acquire more work even if past performances varied, however the main contractor will only select a known firm when they perceive the price offered for the work to be market-conform. This would indicate that some leading

questions need to be asked about the nature of integration, in respect to how far it can go and what type and level applies for each link in the chain (Bask and Juga, 2001).

From the literature it is apparent that a defined gap exists between the construction industry's understanding of supply chain management and from the traits demonstrated by actors. An even greater gap exists when it comes to understanding why the industry is so adversarial when dependence on a third party supplier is relatively high. Price and trust seem to be interwoven when selecting suppliers and relationships seem difficult to establish. The main issue of contention seems to be that the relationship is addressed as a constant rather than an evolving construct that changes at various points in the project procurement and management process (Figure 2).

Figure 2 Supplier selection process (see online version for colours)



Source: Adopted from Tatari et al. (2008)

These three stages of the relationship dynamic, selection or short listing suppliers, calling for tenders or quotes and the project realisation are quite distinct as the relationship commences at the procurement phase and continues on to the on site management process. While the all three stages, have been identified through the literature they have not been viewed as a whole process but rather as independent constructs within the supply chain (Donato et al., 2013). In order to remedy this, the focus of this research will be to identify what role dependency plays in the establishment of the supply chain, from supplier selection, bidding process and project realisation and how the exchanges that occur affect the relationship between actors during each of these stages of the process to ascertain the following question.

“How does dependency impact on collaboration between the client, contractor and supplier in the construction supply chain?”

A conceptual model will be presented as a precursor to further research, examining aspects of relationships between constructs that have not been covered in the literature. The relationships proposed will provide an avenue to further extend the literature on supply chain relationships, not only in the construction industry but possibly in other industries that rely heavily on third party suppliers.

2 Research method

This research conducts a systematic review of research articles and develops a conceptual model on relationship in construction supply chain. We consider literature review as a research tool. Literature review is a systematic, explicit, and reproducible design for identifying, evaluating, interpreting/synthesising, and refining the existing body of scattered knowledge in recorded documents (Fink, 1998). Literature review usually summarise existing research by identifying patterns, themes and issues (Seuring and Muller, 2008), can contribute to identify the conceptual content of the field towards

theory development (Meredith, 1993), helps to identify the knowledge gaps to be filled in order to develop the existing body of knowledge (Harland et al., 2006; Tranfield et al., 2003). During theory development process, logic replaces data as the basis for evaluation (Meredith, 1993).

3 Literature review and conceptual model

With supply chain transactions generally being considered to be a dyadic exchange, it is not only the commitment from the two actors that is important (Millington et al., 2006; Kumar et al., 2011), the dependency between the two actors also shapes the relationship, in particular within the construction industry where there is a strong dependency on external contractors and suppliers to ensure the completion of a project. A documentary research approach similar to that employed by Fayezi et al. (2012), was considered as the best method, as the intention is to collect information regarding a specific phenomenon. Utilising electronic databases and data reduction procedures, searches were conducted to collect information relating to resource dependency theory (Pfeffer and Salancik, 2003) and its application within a dyadic relationship. As observed by Fayezi et al. (2012), a coded review was carried out utilising the Emerald, ScienceDirect and the Business Source Complete, on line databases, following the three-stage data reduction process using keywords, title, abstract and conclusion.

A search was conducted for papers looking for the words resource dependency, construction, supply chain and project that appeared in the title, keyword or abstract of articles in various combinations ranging from 2000 to 2013. While the search produced over 1,084 articles, this number was reduced by restricting the search to articles that specifically related to supply chains, project management or construction. In the case where there was uncertainty of the content of the article, the article was reviewed before dismissal. In total 11 articles were found that discussed resource dependency with respect to a dyadic relationship (Table 1). The review of articles was undertaken with the view of determining in what context resource dependency was observed, how it affected the relationship in particular in reference to trust and price.

The analysis showed that resource dependency has not been a major topic of discussion over the search period 2000 to 2013 and in particular within the construction industry, which is surprising given the high dependency on third party suppliers in the industry (Eriksson et al., 2007; Humphreys et al., 2003; Matthews et al., 2000). Considering that resources are necessary in any environment to perform the required task, understanding the concerns of all the actors within this highly dependent supply chain becomes critical. In particular as within the construction industry where negative perceptions already exist (Gadde and Dubois, 2010) and not understanding stakeholder's needs can lead to disruption and conflict within the supply chain (Olander and Landin, 2005). Further analysis showed that even though there is considerable literature on dependency and interdependencies on resources within the supply chain (Halley et al., 2010; Priem and Butler, 2001; Wernerfelt, 1984), only one article was published in a supply chain journal. So it is not surprising that resource dependency has perhaps become nothing more than a metaphor that has been given little importance when it comes to theoretical advancement or testable empirical research (Casciaro and Piskorski, 2005). However, from the articles that were reviewed, the following has some bearing on this research.

Table 1 Summary of resource dependency articles

Author	Journal	Industry	Relationship	Objective	Trust and price
Kanda and Deshmukh (2009)	<i>Computers & Industrial Engineering</i>	Equipment manufacture	Supply chain contacts	Development of a framework to improve contract evaluation to improve partner relations	References to buying selling price rather than price selection. Trust was not mentioned.
Bretherton and Chaston (2005)	<i>Journal of Small Business and Enterprise Development</i>	Wineries	Strategic alliances	To demonstrate how access to scarce resources have created sustainable competitive advantage	No reference to price selection, some discussion on trust, however only in the generic terms and in the context of its importance in an alliance.
Chatterjee (2004)	<i>Journal of Business Research</i>	On line retail	Alliances	Examine how exchange behaviour, contributes to the successful continuation of an alliance relationship	No references to trust or price
Fink and Hatten (2011)	<i>Journal of Strategic Marketing</i>	Paper mills	Consumer – supplier	Determine level of perception of dependency from both a buyer and supplier perspective	No references to trust or price
Hofer et al. (2012)	<i>Journal of Retailing</i>	Retail	Retailer – supplier	Benefits for supplier in long-term relationships with key retail accounts	No references to trust or price
Kull and Closs (2008)	<i>European Journal of Operational Research</i>	Not specified	Not specified	Risk of disruption through supply chain failure	No references to trust or price
Lämsiluoto et al. (2013)	<i>Management Accounting Research</i>	University	Stakeholders	Resource dependency as a filter for performance measuring systems	No references to trust or price
Murphy (2012)	<i>Strategic Outsourcing: An International Journal</i>	Not Specified	Outsourcing	Better procurement and benefit from outsourcing arrangements to enable small firms to compete with larger competitors	Some reference to price for services. No mention of trust in the relationship.
Rodrigue and Biswas (2004)	<i>Journal of Production and Brand Management</i>	Consumer goods	Brand alliances	Effects of resource dependency and contract exclusivity on the attitudes and intentions of consumers in brand alliances	Acceptance of paying premium price for brand name. No reference to trust.
Strange (2011)	<i>Journal of Management & Governance</i>	Manufacturing	Outsourcing	Investigating a firms tendency to out source	Some reference to price in terms of cost of a transaction.
Yeh (2005)	<i>Supply Chain Management: An International Journal</i>	Taiwanese motor industry	Cooperative supply chain	Investigation of key constructs resource dependency and risk with trust and relationship commitment and their influence on a cooperative relationship	Identifies trust as key construct between actors in order to implement successful cooperation. Price is not mentioned.

Fink et al. (2011) suggests that within any exchange between a supplier and a customer, differing values exist and that the relationship of both customer and supplier needs to be considered in terms of the exchange benefits and the dependency along with the role of different exchange benefits to determine or explain the relationships between dependency, environmental uncertainty and relational exchange. Differing methodologies have been employed to overcome resource acquisition in different industries, such as wineries in New Zealand engaging in strategic alliances, rather than structural ties, at various stages of the value chain, to gain access to scarce resources and capabilities (Bretherton and Chaston, 2005). In the retail sector where Hofer et al. (2012) suggested that smaller suppliers have developed long term relationships with the large retailers and will gain long term benefits even if they lose some of their market leverage. In clothing and apparel sector, some businesses have outsourced their manufacturing interests to external suppliers focusing only on product development rather than manufacture (Strange, 2011).

Unequal resource contribution in a buyer-supplier dyad result in power imbalances thus relationships prosper when they are structured toward balance (Rodrigue and Biswas, 2004). Strange (2011) argued that outsourcing should not be viewed as a simple example of a 'make or buy' decision, but that it is also necessary to take into account the power asymmetries between the parties within the production chain. Therefore, it is suggested by Rodrigue and Biswas (2004) that firms are likely to benefit if they look for partners that contribute valuable, but equivalent, resources to the relationship. Therefore, each partner's exchange benefits are important when it comes to understanding perceptions of dependency which may be of greater importance than environmental resource or technological factors, implying that managers must evaluate both their own organisation's dependency and that of their partner's dependency to fully appreciate the exchange relationship (Fink et al., 2011). However, small firms usually do not control many of the resources necessary to run, maintain, and grow their businesses so they rely on external organisations to attain the necessary means to compete (Murphy, 2012). Therefore, in particular within the construction industry with a vastly segmented supply chain, trust and commitment are seen as a major contributing factor to a dyadic relationship success (Bretherton and Chaston, 2005).

Motivations toward outsourcing in recent years have been considered as an enabler for major firms to either concentrate on 'core competencies', gain access to expertise and skills not available in-house, or to take advantage of economies of scale (Strange, 2011). However, the dependency theory makes the assumption that the principle goal is survival explaining the behaviour of firms in a dyadic relationship according to how they behave and interact within their environment. This draws on the firm's dependency on its environment for survival and success (Pfeffer and Salancik, 2003).

3.1 Dependency and collaboration

In today's dynamic markets and volatile economic environment, organisations are finding it increasingly difficult to compete effectively if they remain isolated from their suppliers and other entities in the supply chain (Thakkar et al., 2008). Collaboration with suppliers, customers and, in some cases even competitors, to co-create solutions to problems has become increasingly important to an organisation's business strategy and basis of

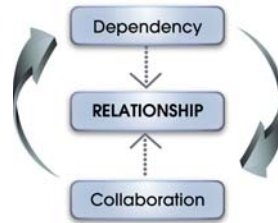
competitive advantage (Vargo and Lusch, 2004; Zacharia et al., 2011). According to Emerson (1962), mutual dependence is what brings people together to form exchange relationships. However, it also provides a power base that allows one actor to control or influence another by controlling the things he values and in some cases there is little effort to coordinate with other companies unless it directly benefits one's own bottom line (Shahabuddin, 2011). Collaboration and co-dependency is achieved through strong trusting relationships (Rogers, 2005). So, when entering into an outsourced arrangement for services, it requires a degree of observation, planning and resourcing however organisations are quick to identify and evaluate technical supplier attributes (previous experience, resources and cost), but slow to identify the 'softer' relationship elements such as partnering ability, empathy, collaboration ability, strong leadership, enthusiasm and emotional intellect (Rogers, 2005). Dependency, on the other hand, is easier to acknowledge in a relationship as it relates to the state of being subordinate to another party's behaviour, which implies that "one's outcome is contingent on the trustworthiness or untrustworthiness of another" (Léger et al., 2006).

However, according to Cousins and Crone (2003) a dependent relationship is negative and one-sided where a power imbalance operates that disadvantages the more vulnerable party. This may result from a number of factors such as the high cost of switching to other business partners, high information asymmetry between counterparts, and lack of competitive options, as well as specialised knowledge (Léger et al., 2006). Project needs and requirements vary from project to project, maintaining short-term project-based relationships (Bankvall et al., 2010; Cox and Ireland, 2002; Love et al., 2004). Building long-term relationships with sub-contractors and suppliers would be difficult if the supply chain constantly changes from project to project. Contractual commitments between contractor and supplier are based on legal commitments rather than cooperative values implying that mutual benefits and trust could be a low priority (Mudambi and Helper, 1998). It could well be considered that a successful project emerges from a collaborative environment rather than a dependency perspective. However, the selection of the right subcontractor with the appropriate skill set is also necessary (Gnanasekaran et al., 2010).

In construction, there is a distinction between strategic long-term partnering and project-based short-term partnering, in that a strategic partnership is intended to last for significant periods of time and run over into several projects seeking to make long-term gains, while project partnerships are project specific and focus on short-term benefits (Beach et al., 2005). Further work by Watson (2001) suggests that supply chain fragmentation can occur, if the interdependencies between the actors are not strong and independent power structures may exist within the supply chain that could undermine the integrity of the integration of that supply chain. Suggesting that when buyer, supplier interdependency is high, the probability of supply chain integration is high. However, in the case where there is buyer dominance or the reverse, supplier dominance, then a separation occurs due to an imbalance of power. Research by Cox et al. (2001) on these boundaries/interfaces concluded that the success or failure can be primarily linked to the complexity of the power exchange (Mediated or Non-Mediated see Section 2.3) underpinning the supply network relationships, adding that it is the nature of the power exchange that actually defines the real commercial interests of buyers and suppliers and determines whether they manage their direct and indirect relationships with others in their supply network.

Proposition 1 Dependency and collaboration are inversely correlated to each other. That means non-mediated power dominates when collaboration is high and mediated power dominates when collaboration is low, if there are significant imbalances in interdependencies (Figure 3).

Figure 3 Dependency – collaboration model (see online version for colours)



3.2 Trust and price

A great deal of literature has pointed to the importance of trust as a facilitator of positive relationships among project stakeholders (Pinto et al., 2008) and it has become a key area of research within the construction management segment (McDermott et al., 2005). Trust is seen as an essential ingredient to the improvement of inter-organisational relationships between principal actors in project development, such as contractors, owners, and suppliers (Pinto et al., 2008, Kumar et al., 2011). However, construction often involves a degree of uncertainty and exposure to high risk, and has an orientation towards conflict and imperfect information where adversarial relationships and defensive behaviour tend to surface (Lau and Rowlinson, 2009). Project needs and requirements vary from project to project, so relationships within the construction industry are generally considered short term and based on a project by project basis (Bankvall et al., 2010; Cox and Ireland, 2002; Love et al., 2004). Building long-term relationships with sub-contractors and suppliers would be difficult if the supply chain constantly changes from project to project so developing trusting relationships become a low priority as actors lack the time to engage in lengthy interactions that contribute to the development of enduring trusting relationships (Dainty et al., 2001).

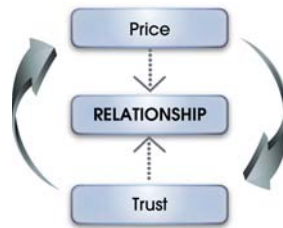
Therefore, while trust has been identified as a determining factor to bring about reduced cost of negotiation, decreased monitoring costs, and increased possibility for attaining mutually beneficial agreements (Khalfan et al., 2007), tender price is still the most significant parameter used in bid evaluation in construction (Eriksson et al., 2008). Companies still rely heavily on formal contracts for governance even though there is a project dependency structure that requires both parties to work together to deliver agreed outcomes (Jiang et al., 2012). Research by Hartman and Caerteling (2010) found that the main contractors are not willing to compromise on price and will tend to favour a lower price from an unknown contractor rather than a higher bid from a known contractor where there is an existing relationship. So, a price-based selection would indicate that there is little credence given to a contractor's financial soundness, management capabilities, and technical expertise during the tender evaluation (Wong et al., 2001). This creates what appears to be a conundrum, as on one hand adversarial relations and

mistrusts emerge from competitive bidding, while on the other hand, long-term relationships that may create trust among project participants, could be perceived as preventing the main contractor from taking advantage of favourable offers (Hartmann and Caerteling, 2010; Wong et al., 2005).

Even though principal contractors were cognisant of the benefits of trust between partners, they allowed bidding by new sub-contractors to ensure that incumbent sub-contractors confirmed with market-conforming bids (Hartmann and Caerteling, 2010). This potentially exerted pressure on incumbent sub-contractors to match what may be considered a market-conforming bid in order to maintain an ongoing relationship. Both Segerstedt and Olofsson (2010) and Hartman and Caerteling (2010) agree that both price and trust cannot be considered as mutually exclusive but are rather an intertwined procurement mechanism. This may indicate that they are a dichotomy rather than conflicting or mutually exclusive.

Proposition 2 Trust and price are a dichotomy used by the contractor to influence sub-contractors and suppliers to maintain low prices (Figure 4).

Figure 4 Price – trust model (see online version for colours)



3.3 Mediated and non-mediated power

The research of power is well grounded within the social and political sciences and can be defined as an organisation's ability to influence the intentions and actions of another (Emerson, 1962). Over the years, scholars have attempted to simplify power research through dichotomisation of the different bases into categories such as coercive/non-coercive, mediated/non-mediated, each being noted to have a contrasting effect on inter-firm relationships (Maloni and Benton, 2000). Research by Brown et al. (1995) found that the use of mediated power lowered commitment due to resentment over the subordinate situation whereas non-mediated power increases commitment. While Skinner et al. (1992) established that coercive power holds a negative association with cooperation, Maloni and Benton (2000) also point out that the level of conflict between two organisations is associated positively with mediated power and negatively with non-mediated power. These findings confirm that the effects of power on inter-firm relationships hold direct implications for the supply chain affecting trust, cooperation, commitment, conflict, and conflict resolution which are critical to effective supply chain collaboration (Maloni and Benton, 2000).

The use of mediated power by buying organisations to influence and control other supply chain participants is commonly seen in practice (Handley and Benton, 2012).

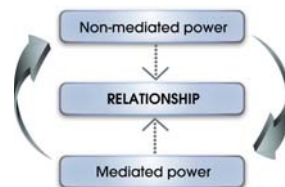
Supply chain researchers have applied the power literature to the analysis of buyer-supplier relationships and have found that the different bases of power affect inter-firm relationships in significant, yet contrasting ways. Research by Brown et al. (1995) found that use of mediated (e.g., coercive, legal legitimate, reward) power will lower genuine commitment by the target due to resentment over the subordinate situation whereas non-mediated (e.g., expert, referent, legitimate) power increases commitment (Maloni and Benton, 2000). In any project, and especially in construction projects, the complexity increases as many different and sometimes discrepant interests need to be considered, in particular when an actor can be an individual or a group with the power to be a threat or a benefit (Olander and Landin, 2005). Handley and Benton (2012) suggest that organisations that are fully cognisant of the negative relational impact of mediated power, will rely more on mediated power when it is perceived that they have numerous qualified and easily accessible alternatives to the current service provider. Alternatively, when buyers view their sourcing options as limited, or at least unattractive, they appear more inclined to rely on non-mediated methods.

The use of mediated power has also been viewed as an alternative control mechanism relied upon by buyers in conditions where they experience difficulties in effectively deploying contractual and monitoring mechanisms (Handley and Benton, 2012). Researchers have suggested various points of view with some examples from Whitmeyer (2001) who suggests that if the intent was to maximise material gain or profit that power could be measured by the extent to which an actor can affect some social phenomena by differentiating between, one's own interest, outcomes and behaviour. While Frazier and Summers (1986) looked at it from a dependency perspective where the power one has over another is directly related to the dependency between the two. A literature review by Belaya et al. (2009) concluded that while power is a multidimensional concept, they argued that in a supply chain context measuring power should include aspects of dependency, source of power over the target and power to influence the target.

The construction industry has well established processes that seem to have developed into an institutional arrangement between contracting organisations that make reciprocal exchanges under risk-laden contracts. According to Chow et al. (2012) these exchanges are more likely based on fear and/or power rather than trust. However, even though these adverse conditions are present, some construction firms manage to overcome these barriers against trust and successfully establish long-term business partnerships (Chow et al., 2012; Wong and Cheung, 2004).

Proposition 3 Use of non-mediated or mediated power leads to project performance rather than collaborative relationships (Figure 5).

Figure 5 Power model (see online version for colours)

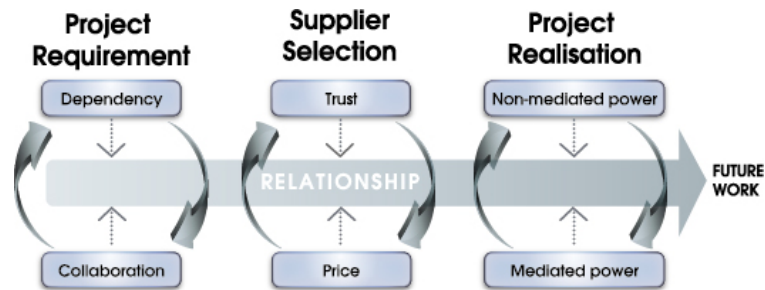


4 Relationship model and discussion

Collaboration has often been used interchangeably with partnering, alliances, joint ventures or networks (Hughes et al., 2012) and has been the subject of varying research often seen as the solution to streamlining the supply chain to deliver a competitive advantage within the desired market space. The construction industry has proven to be a major challenge when trying to find a comparable solution due to the nature of relationships within the context of the industry. Literature has addressed improving performance through, mutual objectives (Walker et al., 2002) trust (Akintoye and Main, 2007; Chen and Paulraj, 2004; Pinto et al., 2008) communication (Wood and Ellis, 2005; Magnan et al., 2011), risk (Zaghoul and Hartman, 2003) and continuous improvement (Oakland and Marosszeky, 2006) while paying little attention to supplier selection, supplier dependency and pressures of price. This failure to address or identify the relationship dynamic and the affects of price pressures has contributed to construction clients not understanding their own demand profile, often finding themselves faced with a highly competitive, volatile and adversarial supply market that results in becoming prey to opportunistic behaviour from larger construction firms (Ireland, 2004).

Summarising the propositions of dependency-collaboration, price-trust and power, a complete relationship model is developed in Figure 6. It can be seen that the relationship between all supply chain actors at each stage of the project procurement process (project requirements, supplier selection and project realisation) becomes important, not only in terms of resources but also when there is an imbalance of power as this is often considered a major drawback having a negative influence to maintaining long-term relationships and a deterrent to trust (Ferrer et al., 2010).

Figure 6 Relationship model (see online version for colours)



Watson (2001) suggests that when buyer/supplier interdependency is high, the probability of supply chain integration is high. However, in the case where there is buyer dominance or the reverse, supplier dominance, then a separation occurs due to an imbalance of power. Research by Cox et al. (2001) on these boundaries/interfaces concluded that the success or failure can be primarily linked to the complexity of the power exchange underpinning the supply network relationships and perhaps the availability of resources, adding that it is the nature of the power exchange that actually defines the real commercial interests of buyers and suppliers and determines whether they manage their direct and indirect relationships with others in their supply network. According to both Watson (2001) and Cox et al. (2001), the level of interdependency between actors can determine the power exchange within a relationship. Imbalances occur within the supply

chain when one or a group of actors dominate the supply chain. This separation creates an area of uncertainty where the management of that segment of the supply chain can become difficult (Watson, 2001).

With many cooperative programmes across various other industries to improve relationships between buyer and supplier have not reached intended aspirations (Cao and Zhang, 2011; Gadde and Dubois, 2010; MacDuffie and Helper, 2006; Zhang et al., 2009) price pressure has been considered as one of the major causes attributing to this failure, in particular, when buyers impose pressure on their suppliers to continually improve the quality of their delivery or product while at the same time expecting a reduction in cost (Benton and Maloni, 2005; MacDuffie and Helper, 2006; Zhang et al., 2009). However, what seems to be missing in the selection of the supply chain actors is that the strong focus on price during the selection and tender process can create a competitive environment before the sub-contractor is has even been awarded the project, whereas a trust-based selection process may well constitute a more cooperative environment during the project realisation (Hartmann and Caerteling, 2010). However, Seifert et al. (2012) found that in the retail industry both the supplier and the retailer would prefer to act alone rather than coordinate with the manufacturer when sub-supply chain coordination was suggested. Therefore, if contradiction partly explains the popularity of price-only contracts in practice it may go some way to understanding the peculiarities in the construction supply chain.

With the realisation that clients, contractors and suppliers need to change their operational structure or they may no longer be able to compete effectively, researchers have argued that managing the supply chain appropriately will ultimately lead to the best solution. Collaboration amongst actors in the project supply chain is considered to be a key factor in gaining a competitive advantage and improving project performance (Cheng and Li, 2001; Ingirige and Sexton, 2006; Love et al., 2004; Zhang et al., 2009). However, it may be a case of the buyers being less willing to collaborate than the sellers (Shahabuddin, 2011), creating an environment that sees the use of power to achieve the desired outcome as common place within the supply chain (Handley and Benton, 2012) and is considered a major contributor to the failure of collaborative programmes (Zhang et al., 2009). Understanding the relationship at each exchange in the supplier selection process becomes very important as there currently is no understanding how the relationship changes from the selection process to the realisation process.

5 Conclusions and future research directions

The aim of this paper was to conceptualise the influence of resource dependency from a relationship view, that beginnings with the supplier selection rather than the project realisation. Imbalance in dependency between actors within a supply chain creates fragmentation and an imbalance in power that affects performance (Watson, 2001; Cox et al., 2001). This imbalance should be identifiable at the beginning of the relationship and with the construction industry being considered as highly fragmented and plagued with performance issues (Vrijhoef and Koskela, 2000; Cox and Ireland, 2002, Love et al., 2004; Bankvall et al., 2010) these imbalances are self-evident. The influence of power on collaboration within the supply chain has also been identified as a contributing factor to both positive and negative outcomes in the manufacturing, retail and supermarket industries (Handley and Benton, 2012). Therefore, collaboration has been the focal point

in much of the literature as a solution to improve supply chain performance not only in the above mentioned industries but also in the construction industry (Love et al., 2004; Cheng and Li, 2001; Gadde and Dubois, 2010; Ingirige and Sexton, 2006). However, with construction companies using significant levels of third part suppliers, resource dependency is only part of the picture and there needs to be an understanding of how each interaction affects the relationship not only in the short term, single project context, but in a more long-term-based project to project context. However, relationship between collaboration and resources dependency has not been considered as a possible contributing factor to the industries inability to resolve its long standing poor performance issues.

Much of the research within supply chains relationships focuses on dyadic relationships that are already in a buyer supplier relationship (Kahkonen, 2011) and as such do not consider the relationship leading up to the exchange or the key drivers that create the exchange. The conceptual model (Figure 6) presented provides an evolution of the relationship within a construction supply chain on, not only a project level but as a dynamic exchange that consider the interaction between actors on a continuous cycle. The three phases of the project relationship (Figure 2), development were identified as having an impact on the relationship between supply chain actors, however resources as well as past performance will to some extent determine or at the least have an effect on future partner selection. Therefore, understanding how these three phases integrate, and flow from project to project will provide greater insight than the constructs being studied in isolation as is currently the case.

In a practical sense this model will provide a deeper understanding of how actors interact and how the interaction affects partner selection allowing the supply chain actors to identify and deal with the positive and negative aspects of the relationship. The model will also provide a new conceptual lens, for academic communities, industrial relations advocates and supply chain experts to consider a more focused and in-depth view of the construction industry supply chain in terms of resources and the relationship exchange. Looking at the supply chain from the selection process, rather than the project by project focus will also expand the current knowledge on relationships that affect supply chain performance within the construction industry, providing a further avenue to solving its continuing problems in performance.

As a conceptual model where there is a lack of theory the context becomes important, so establishing a case studies (Creswell, 2009), to test the validity of the model will be paramount in setting the ground work to understanding the 'why' rather than the 'how' of the phenomena or event (Rubin and Babbie, 2008; Gravetter and Forzano, 2012; Yin, 2009). In this instance the event is the effect resources have on the relationship. Therefore, adopting a qualitative approach will allow the researcher to interview the actors on a construction site allowing them to describe what they believe is occurring from their own perspective. Collection data and on site allows the examination of a phenomenon in its natural setting so the researcher has little control over the events being observed, in particular when the object is a contemporary phenomenon within some real life context (Yin, 2009). Once the base of the theory has been validated the model can be tested in other industries where resource dependency is high and the research methodology can be expanded to encompass quantitative as well as mixed methods.

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