THE INFLUENCE OF RESOURCE DEPENDENCY ON COLLABORATION IN THE CONSTRUCTION SUPPLY CHAIN

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 look at how supply chain actors behave from partner selection through to project completion, suggesting a conceptual model that addresses the relationship dynamic between actors through the life of the project. 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.

Key words: Resource dependency, Trust, Price, Construction Supply Chain

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, Briscoe & Millett 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, Dickinson & Khalfan 2007; Humphreys, Matthews & Kumaraswamy 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 (Zhang, Henke & Griffith 2009). The construction industry seems to be lagging well behind other industries, this is 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, Briscoe & Millett 2001; Saad, Jones & James 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 & 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, P 2004). 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 successfully complete a project (Dubois & Gadde 2000), on the other they regard them as the biggest potential for cost saving, creating an environment of unfair practices (Humphreys, Matthews & Kumaraswamy 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 & Dubois 2010).

Due to the industries adversarial nature, trust becomes an important issue in particular when trust has been highlighted as critical to the management of a cohesive supply chain (Pinto, Slevin & English 2008). However, rather than focus on trust building, the industry still tends to select suppliers based on price (Hartmann & Caerteling 2010). 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, de Haan & Joosten 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 & Dainty 2005; Cox, Andrew & Ireland 2002).

Much of the literature still suggests collaborative partnering as a solution to strengthening the construction supply chain process (Cheng & Li 2001; Ingirige & Sexton 2006; Love, Irani & Edwards 2004). 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 & 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, Briscoe & Millett 2001; Humphreys, Matthews & Kumaraswamy 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 co-operation between actors is more of a case of have to rather than want to. 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 & Maloni 2005; 2007). Price competition dominated by self-interest and mistrust with parties only looking to achieving their own objectives and maximizing their own profits, with no regard to the impact on others, maintains the adversarial relationships (Meng, Sun & Jones 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 & Fowler 2006; Green, Fernie & Weller 2005; Winch 2003).

Construction encompasses a large and diverse industry ranging from small maintenance projects to the construction of major infrastructure (Segerstedt & 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 & Dainty 2005; Cox, Andrew & Ireland 2002), it is very much a diverse industry in terms of its coverage (Segerstedt & 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 inhibiter 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, Irani & Edwards 2004), with only tier one contactors adopting the approach. There are little collaborative strategies below the tier one level (Akintoye, McIntosh & Fitzgerald 2000) which would signify that further improvement is still possible.

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 & 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).

These three stages of the relationship dynamic, quite distinct in the procurement and management process, have been identified through the literature however they have not been viewed as a whole but rather as independent constructs within the supply chain. 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 (power) impact on collaboration between the client, contractor and supplier in the construction supply chain?'

This will be explored by the following sub-questions:

1. *How is dependency exploited by all actors in the supply chain to influence other actors in both the upstream and downstream direction?*
2. *How do price and trust correlate within the supply chain and how does it impact on the relationship?*
3. *How does the use of mediated and non-mediated power enforce/ensure compliance within the supply chain?*
4. *How is the relationship between actors affected by dependency, trust/price, (Non) mediated power beyond the project?*

A conceptual model and propositions 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. LITERATURE REVIEW AND CONCEPTUAL MODEL

With supply chain transactions generally being considered to be a dyadic exchange, the dependency between the two actors becomes an important issue, 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, O'Loughlin and Zutshi (2012), was considered as the best method, as the intention is to collect information regarding a specific phenomenon. Utilising electronic data bases and data reduction procedures, searches were conducted to collect information relating to Resource Dependency Theory (Pfeffer & Salancik 2003) and its application within a dyadic relationship. As observed by Fayezi, O'Loughlin and Zutshi (2012), a coded review was carried out utilising the Emerald, Science Direct and the Business Source Complete, on line data bases, 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 1084 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, Dickinson & Khalfan 2007; Humphreys, Matthews & Kumaraswamy 2003; Matthews et al. 2000). Considering that resources are a necessity 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 & Dubois 2010) and not understanding stakeholder's needs can lead to disruption and conflict within the supply chain (Olander & Landin 2005). Further analysis showed that even though there is considerable literature on dependency and interdependencies on resources within the supply chain, 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 & Piskorski 2005). However from the articles that were reviewed, the following has some bearing on this research.

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 & 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. Clothing and apparel in some areas has 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. 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 organization's dependency and that of their partner's dependency to fully appreciate the exchange relationship (Fink, James & Hatten 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 & 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 & Salancik 2003).

2.1 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, Kanda & Deshmukh 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 & Lusch 2004; Zacharia, Nix & Lusch 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. 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 specialized 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, Andrew & Ireland 2002; Love, Irani & Edwards 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 & 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.

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, Webster & Campbell 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, Andrew, Sanderson & Watson (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 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).*

2.2 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, Slevin & English 2008) and it has become a key area of research within the construction management segment (Mc Dermott, Khalfan & Swan 2005). Trust is seen as an essential ingredient to the improvement of inter-organizational relationships between principal actors in project development, such as contractors, owners, and suppliers (Pinto, Slevin & English 2008). 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 & 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, Andrew & Ireland 2002; Love, Irani & Edwards 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, Briscoe & Millett 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, McDermott & Swan 2007), tender price is still the most significant parameter used in bid evaluation in construction (Eriksson, Nilsson & Atkin 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, Henneberg & Naudé 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, CH, Holt & Harris 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 & Caerteling 2010; Wong, Peter S.P., Cheung & Ho 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 & 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).*

2.3 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 dichotomization 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 & Benton 2000). Research by Brown, Lusch and Nicholson (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,

Gassenheimer & Kelley (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 & Benton 2000).

The use of mediated power by buying organisations to influence and control other supply chain participants is commonly seen in practice (Handley & 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, Lusch & Nicholson (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 & 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 & 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 & 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, Gagalyuk & Hanf (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, Cheung & Chan (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, Cheung & Chan 2012; Wong, Peter S.P. & Cheung 2004).

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

3. DISCUSSION

Collaboration has often been used interchangeably with partnering, alliances, joint ventures or networks (Hughes, Williams & Ren 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, Hampson & Peters 2002) Trust (Akintoye & Main 2007; Chen & Paulraj 2004; Pinto, Slevin & English 2008) Communication

(Wood & Ellis 2005), Risk (Zaghloul & Hartman 2003) and continuous improvement (Oakland & Marosszeky 2006) while paying little attention to supplier dependency and pressures of price. This failure to address or identify price pressures has contributed to construction clients not understanding their own demand profile, often finding themselves faced with a highly competitive and adversarial supply market, resulting in becoming prey to opportunistic behaviour from larger construction firms (Ireland, P 2004).

The relationship between all supply chain actors at each stage of the procurement process (Figure. 6) becomes important, in particular 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). 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, 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 programs across various other industries to improve relationships between buyer and supplier has not reached intended aspirations (Cao & Zhang 2011; Gadde & Dubois 2010; MacDuffie, John P. 2005; Zhang, Henke & Griffith 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 & Maloni 2005; MacDuffie, John P. & Helper 2006; Zhang, Henke & Griffith 2009). However what seems to be missing in the selection of the supply chain actors is that the strong focus on price during the tender process can create a competitive environment before the sub-contractor is selected, whereas a trust-based selection process may well constitute a more co-operative environment during the project realisation (Hartmann & Caerteling 2010). However, Seifert, Zequeira and Liao (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 & Li 2001; Ingirige & Sexton 2006; Love, Irani & Edwards 2004; Zhang, Henke & Griffith 2009). However the use of power to achieve the desired outcome is seen as common place within the supply chain (Handley & Benton 2012) and is considered a major contributor to the failure of collaborative programs (Zhang, Henke & Griffith 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.

4. CASE STUDY AS MEANS TO FURTHER INVESTIGATION

There are no set requirements on the number of cases to be studied when adopting a case study methodology and according to Romano (1989) the decision on how many should be left to the researcher. However Eisenhardt (1989) recommends that somewhere between four and ten is a

practical number as long as the information gathered reaches 'theoretical saturation', or in other words starts to become repetitive. The researcher proposes that, due to the extent and nature of the research, using a range of between four and ten cases, as suggested by Eisenhardt (1989) would be appropriate. Face-to-face interviews, involving actors from each of the selected cases would be conducted in order to identify the power relationships between groups and actors within the supply chain. These actors will consist of at least one client, one project manager, one principle contractor, one sub-contractor and one supplier from each of the cases which will be selected from various projects currently underway in Victoria. Face-to-face interviews will continue for each case until, as suggested by Eisenhardt (1989), 'theoretical saturation' has been achieved and no new ideas or themes arise.

While the industry can be divided into many segments, cases will be examined from each of the following segments; major infrastructure, prominent residential subdivision, major commercial inner city construction and a major road construction project. These groups have been considered due to the environments in which they operate. Where major infrastructure and road construction projects are carried out as joint ventures, an alliance is established between several tier one contractors and in some cases the government. Projects are usually designed and constructed under a collaborative agreement between the members of the alliance. Residential subdivisions and inner city commercial buildings usually have one principle contractor and have been designed and supervised by a project manager or architect who is engaged by the client to ensure compliance.

These cases and actors will be sourced from my own contacts and with the assistance of the Civil Contractors Federation. By selecting these varying types of construction projects, it will provide the ideal environment as they also share a number of similarities, such as site establishment and earthworks and in most cases using the same sub-contractors and suppliers as part of their supply chain. This will provide an opportunity to cross reference the use of power from both a collaboratively managed and a single entity managed environment.

According to Creswell (2009) preparing one or two central questions and a further five to seven sub-questions, where the sub-questions narrow the focus but leave the questioning open, the research questions should begin with 'what' or 'how' to convey an open or emerging design. However Creswell (2009) also adds that the questions will evolve and change during the study in a manner consistent with the assumptions of emerging design. A sample set of questions relating to collaboration, power and performance would be asked in order to ascertain the participant's view of the situation. Questions such as, "*How well do the actors in your supply chain collaborate" and "What do you perceive as inhibitors/drivers to collaboration",* would target the specific constructs required to answer the question by determining the relationship between the three constructs.

Stake (1995) points out that in a case study, the same questions are seldom asked of different participants and that each interviewee will have a different experience and different story to tell so the objective is to attain the description of an episode. This will allow themes and patterns to develop that can be analysed and interpreted by thematic analysis which can be used to reflect reality, and to unpick or unravel the surface of 'reality' (Willig 2001). According to Rice and Ezzy (1999), data needs to be reviewed multiple times in order to establish the patterns that will become categories for analysis. All interviews will be considered confidential and recorded with the consent of the participant. Transcripts will be drafted and returned to all participants for approval before any data is analysed. The member checks should eliminate any bias within the transcripts. Validation and interpretation of data can also be enhanced by the use of products such as NVIVO.

5. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

The aim of this paper was to focus on the dependency aspect of the supply chain relationship within the construction industry with particular emphases on resources as a prelude to partner selection. A conceptual model (Figure 6) was presented that provides an evolution of the relationship with a construction supply chain on a project level. Three phases of the project development were identified

as having an impact on the relationship between supply chain actors. However, while there has been research at each of these three phases, the constructs have been discussed in isolation. There is very little research on comparing the relationship dynamic at these different stages and their impact on the relationship as well as the overall performance of the supply chain. By clarifying the relationship at the primary stage of the selection process becomes imperative as this will establish how the next two stages of the process will impact on the ongoing relationship. First, do principle contractors engage sub-contractors due to dependency on resources or it purely based on the value of economic transactions? Secondly, how does trust versus price impact on the relationship and, finally, what are the key drivers to instigating the use of (non)–mediated power? These questions can only be answered by further research into the impact of resource dependency and what influence it has on collaboration.

The nature and background of the research typically identifies the type of research methodology that is required Creswell (Creswell 2009). Considering the research question and background, this research should use a qualitative approach, due to a qualitative study being of an exploratory nature, where the context becomes very important due to a lack of theory. Furthermore, it provides insight into what is occurring in a particular situation and according to Creswell (2009) it is better suited when the researcher is seeking the 'why', rather than the 'how' of a phenomena or event (Rubin & Babbie 2008; Yin 2009). According to Yin (2009), the case study method is an appropriate strategy when the researcher has little control over the events being observed, and when the object is a contemporary phenomenon within some real life context. Some researchers also advocate using specific propositions in case studies to increase the limits on scope and increase the feasibility of completing the project (Baxter & Jack 2008). The model provides a useful indication on the direction of future research not so much within the links of the three pairs of constructs but rather in the linking of the three. This research will 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 its co-related dependencies, the balance between trust and price and the power exchange. The research will also expand the current knowledge on factors that affect supply chain performance within the construction industry, providing a further avenue to solving its continuing problems in performance.

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7. FIGURES

Figure 1: Construction supply chain with permission from J.D. Paterson and Associates (www.jdpa.com.au)

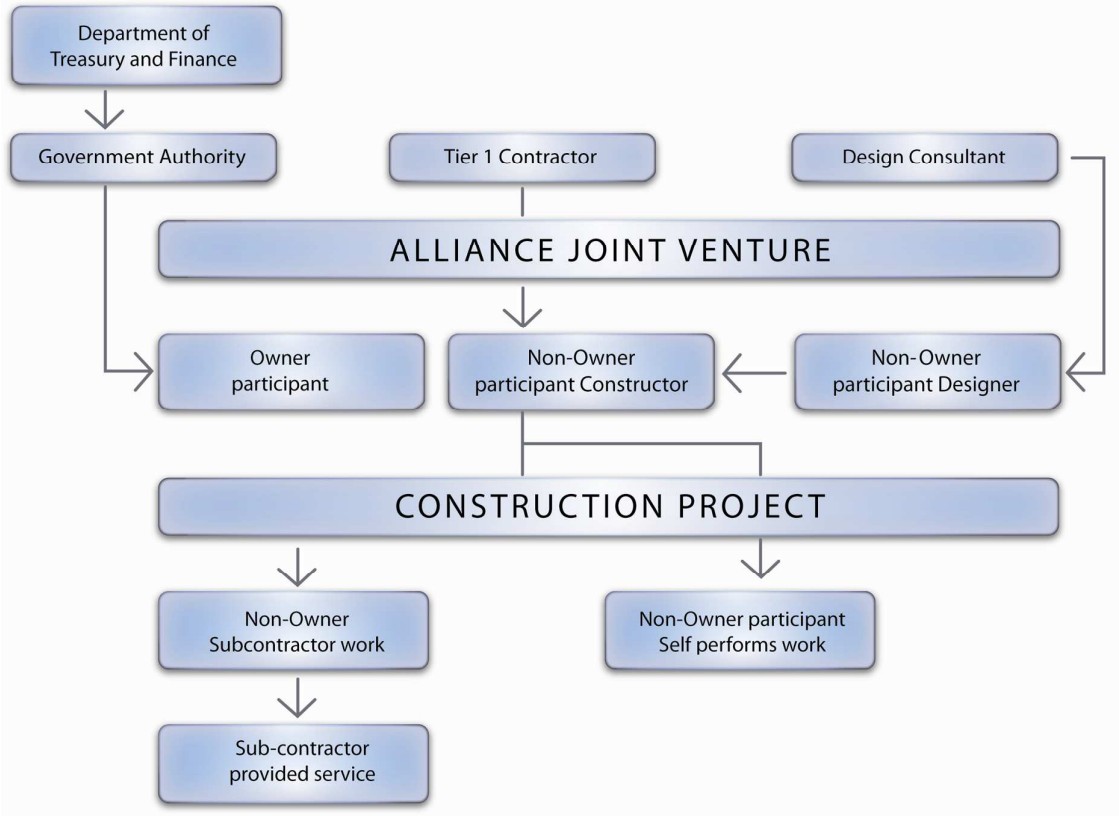


Figure 2: Suppler selection process adopted from Tatari, Castro-Lacouture & Skibniewski (2008)

Figure 3: Dependency and collaboration model

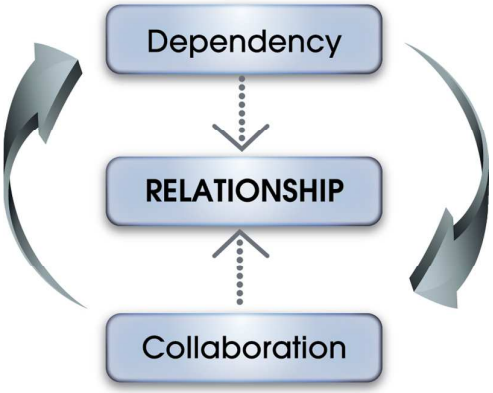


Figure 4: Price and trust model

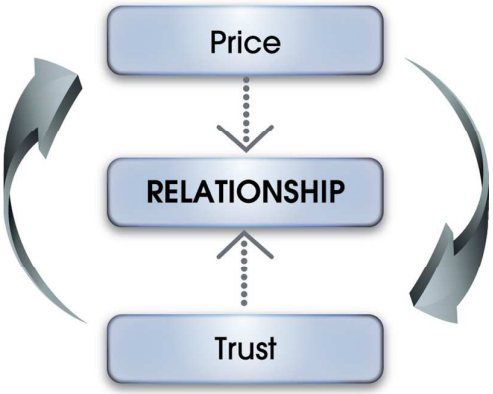


Figure 5: Mediated and non-mediated power model

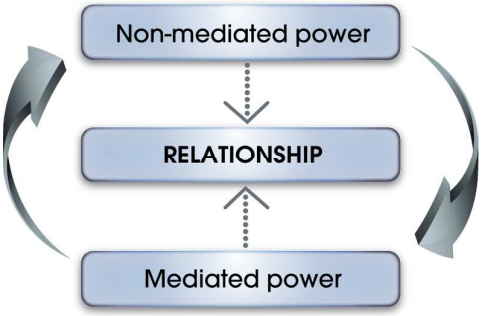
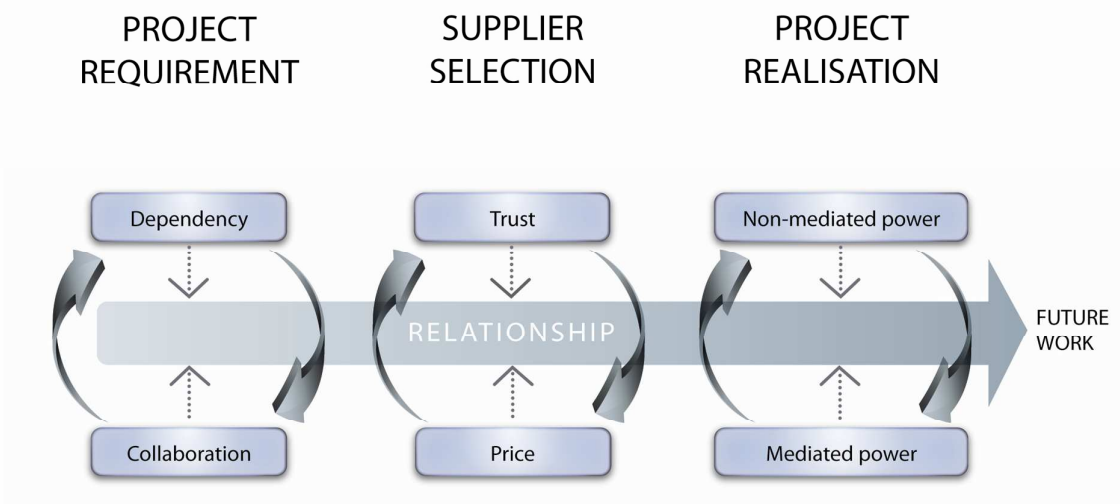


Figure 6: Relationship model



8. TABLES

Table 1 Summary of Resource Dependency Articles

Author	Journal	Industry	Relationship	Objective	Trust and Price
Arshinder, Kanda & Deshmukh (2009)	Computers & Industrial Engineering	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)	Journal of Small Business and Enterprise Development	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)	Journal of Business Research	On line retail	Alliances	Examine how exchange behaviour, contributes to the successful continuation of an alliance relationship.	No references to trust or price
Fink James and Hatten (2011)	Journal of Strategic Marketing	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)	Journal of Retailing	Retail	Retailer-Supplier	Benefits for supplier in long term relationships with key retail accounts	No references to trust or price
Kull and Closs (2008)	European Journal of Operational Research	Not Specified	Not Specified	Risk of disruption through supply chain failure	No references to trust or price
Länsiluoto, Järvenpää & Krumwiede (2013)	Management Accounting Research	University	Stakeholders	Resource dependency as a filter for performance measuring systems	No references to trust or price
Murphy and Wu (2012)	Strategic Outsourcing: An International Journal	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

Author	Journal	Industry	Relationship	Objective	Trust and Price
Rodrigue and Abhijit (2004)	Journal of Production and Brand Management	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)	Journal of Management & Governance	Manufacturing	Outsourcing	Investigating a firms tendency to out source	Some reference to price in terms of cost of a transaction
Yeh (2005)	Supply Chain Management: An International Journal	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

15. Technology, Innovation and Supply Chain Management
Interactive Session

THE INFLUENCE OF RESOURCE DEPENDENCY ON COLLABORATION IN THE CONSTRUCTION SUPPLY CHAIN

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