Submitted to Building Research and Information

A SYSTEMIC VIEW OF DISPUTE CAUSATION

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Research Paper

SEPTEMBER 2008

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ABSTRACT

Disputes have become an endemic feature of the Australian construction industry. If they are not resolved promptly they can escalate causing schedule delays, lead to claims that require litigation proceedings for resolution and destroy business relationships. The competitive nature and contractual complexity inherent within construction can aggravate the incidence of disputes. Research over the last two decades has revealed that factors such as scope changes, poor contract documentation, restricted access, unforeseen ground conditions, and contractual ambiguities are contributors of disputes. While this is widely known, disputes still prevail over such issues. Before disputes can be avoided an understanding of what the underlying conditions that contributes to their occurrence needs to be determined so that mechanisms can be put in place to prevent them from arising. In this paper the literature is examined and a series of causal models are developed to demonstrate the interdependency between key variables that contribute to disputes. The developed models are used to identify a number of strategies that can be adopted to reduce the immediate incidence of disputes in construction.

Keywords: Behavior, dispute, causal models, contract documentation, scope changes.

INTRODUCTION

During the last two decades the Australian construction industry has been in an intense period of introspection, specifically examining how it can improve its performance and productivity (NWPC and NBCC, 1990; Gyles, 1992; CIDA, 1995 DIST, 1998; Cole 2002; Blake Waldron Dawson, 2006). Time and cost overruns in construction projects has become a ubiquitous feature of the industry (Love *et al*., 2005; Blake Waldron Dawson, 2006). Significant factors that have been identified as contributing to time and cost overruns in Australian construction projects are *rework* (Love, 2002), *variations* (Chan and Yeong, 1995; Blake Waldron Dawson, 2006), *incorrect design and incomplete documentation* (Tilley *et al*. 2000; Love *et al*. 2006), and *late authority approvals* (Blake Waldron Dawson, 2006). As a result of such issues arising in projects, conflict and disputes may occur, which can lead to the disruption of construction schedules, increased project costs, and even adversely influence relationships between project participants (Yiu and Cheung, 2004). If a dispute is not resolved promptly, then it may escalate, and ultimately require litigation proceedings, which can be extremely costly for the parties concerned (Cheung *et al*., 2004).

Research into determining the causes of disputes has reached saturation point; consistently the same causal variables are identified and continue to manifest in projects (e.g., Semple *et al*., 1994; Kumaraswamy, 1997; Cheung and Yiu, 2006; Yiu and Cheung, 2007). Because most of the studies undertaken have been based upon questionnaires (e.g., Kumaraswamy, 1997) or derived from case law (e.g., Watts and Scrivener, 1992), the factors identified lack contextual meaning. For example, poor communication has been identified as a cause of disputes (Bristow and Vassilopoulos, 1995; Kumaraswamy, 1997). Yet problems do not arise because X does not communicate Z to Y, but the way Y interprets Z in light of some prior experience (or lack of), which X does not know about. Thus, X fails to make allowances for Z, and Y does not realize X does this because Y thinks both experiences are representative (Busby, 2001). Simply improving communication practices by improving information flow with technology or using Computer-Aided-Design will not reduce *per se* the incidence of disputes in construction. Fundamentally, work processes, policies, and procedures as well behaviors need to change in concert if disputes are to be reduced in construction. Considering the increasing complexity of construction projects and the economic environments within which they are being procured, there is a need to obtain an ameliorated understanding of the underlying conditions that contribute to disputes. The dispute literature is examined and a series of causal models are developed to demonstrate the interdependency between variables that contribute to disputes. The developed models are used to identify a number of key strategies that can be adopted to reduce the incidence of disputes in construction.

CONFLICT, CLAIM AND DISPUTE

A plethora of definitions as to what constitutes a dispute can be found in the normative literature. The terms conflict, claim and dispute are often used interchangeably, but their meanings are very different. Figure 1 identifies the relationship between these terms. Examples of how each of these terms has been defined include:

- *Conflict* – "serious disagreement and agreement about something important" (Collins, 1995). Similarly, Leung *et al*. (2005) define conflict as a "functional or dysfunctional element in the management process". Willmot and Hocker (1998), on the other hand, provide a detailed definition of conflict as "an expressed struggle between at least two independent parties who perceive incompatible goals, scare resources, and interference from other achieving those goals". According to Brown and Marriot (1998) a dispute is regarded as a form of conflict that is made public and requires resolution.
- *Claim* – "for the assertion of a right to money, property or remedy" (Powell-Smith and Stephenson, 1993). Likewise, Semple *et al*. (1994) define a claim as "a request for compensation for damages incurred by any party to a

contract". Levin (1998) defines a claim as "a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in certain sum, the adjustment or interpretation of contract terms, or other relief arising under or related to a given contract"

- *Dispute* – "any contract question or controversy that must be settled beyond the jobsite management" (Diekmann and Girard, 1995).

Reid and Ellis (2007) argue that there is no definitive meaning of a dispute and the existence of which is a subjective issue requiring a common-sense approach that relies on the facts, the law and policy considerations. Ndekugri and Russell (2006) and Reid and Ellis (2007) refer to the *Halki Principle* (Halki Shipping Corporation *v* Sopex Oils Ltd, [1998], 1 WLR CA) where a dispute does not exist until a claim has been submitted and rejected; a claim being a request for compensation for damages incurred by any party to the contract.

< Figure 1. Conflict, claims and disputes >

When disputes occur they invariably require resolution and therefore are associated with distinct legal remedies (Fenn *et al*., 1997). Conflict is endemic within construction projects; it exists where there is incompatibility of interest (Fenn *et al*., 1997). This incompatibility generally arises because of the differing norms and values as well as competing objectives and goals of project participants. Conflict is further exasperated by the use of particular procurement strategies (e.g., traditional lump sum contracts) that discourage integration, cooperation and collaboration between project participants, particularly clients and contractors (Zaghoul and Hartman, 2003).

In an attempt to reduce the incidence of conflicts and disputes a plethora of strategies to build 'trust between parties' and improve 'teamwork', 'communication', 'joint problem solving' and 'inter-organizational relationships' in projects have been utilized including; alliancing, and partnering arrangements (Brown, 1994; Larson, 1995; Kumaraswamy, 1997; Holt *et al*., 2003; Harmon, 2003; Cheung *et al*., 2003; Wong *et al*., 2008). The use of alliancing and partnering arrangements can enable conflict between parties to be managed to the point of preventing a dispute from emerging (Fenn *et al*., 1997).

Bearing in mind the *Halki Principle*, a claim is deemed to be an integral part of the dispute process. Yet claims are unavoidable and necessary to accommodate unforeseen changes in project conditions in a contractual sense (Kumaraswamy, 1997). Essentially, claims in this context are the administrative processes required to handle construction events that take place where the contract "leaves off"– changed conditions, design changes, defective specifications, quantity variations, delays, disruptions and accelerations (Levin, 1998). While many claims can be resolved

harmoniously, the prior presence of conflict between parties may initiate an unnecessary dispute (Kumaraswamy, 1997).

There may be instances where there are stark differences between parties and they have diametrically opposed opinions and their resultant dispute simply cannot be resolved without third party intervention. There will also be occasions where one of the parties takes a stance to improve its commercial bargaining position. In this situation, mediation, adjudication arbitration and litigation in their various forms can be used to resolve the dispute at hand. The availability of adjudication clauses such as those contained in standard forms of contract makes this a less destructive action for the parties concerned.

According to Carnell (2000) disputes should not be demonized, as resolution mechanisms have their place in the construction process. This is especially the case when onerous and one-sided amendments to standard forms, often drafted by lawyers with the objective of improving their clients' position at the exception of fairness; or when the only way in which a party can actually protect their position because the contract conditions promote conflict (Clegg, 1992). Inappropriate risk allocation through disclaimer clauses in contracts is a significant reason for increasing total construction costs (Hartman, 1998). The most common *exculpatory* clauses used in construction are (Zaghoul and Hartman, 2003):

- uncertainty of work conditions;
- delaying events;
- indemnification;
- liquidated damages; and
- sufficiency in contract documents.

The use of disclaimer clauses to shift project risks to other contracting parties is still a general practice in the construction industry (Cole, 2002). To reach an improved understanding of the risk allocation process, a trust relationship between contracting parties needs to be established (Zaghoul and Hartman, 2003). This process should happen at the onset of the project so that risks can be managed or mitigated through a process of *negotiation* (Kozek and Hebbard, 1998). In particular, there is a need for a greater understanding of risk allocation between contracted parties so as to determine who owns or can manage the risk (Cole, 2002).

DISPUTE CAUSATION

The literature is replete with theorizing about what the causes of disputes (Table 1). Fenn *et al*. (1997) previously suggested that there had been limited empirical evidence that has been structured to justify the theories that had been presented. It would

appear that Fenn *et al.*'s (1997) observation is still pertinent some ten years on. Much of the research that has been undertaken simply seeks to identify a list of factors or triggers that show some association with disputes. In fact, many of the factors identified are not dissimilar in nature (Table 1). The identification of such factors, while useful, does not explain the underlying causal nature of disputes.

< Table 1. Claims and disputes in construction >

In an attempt to examine the causality of disputes, Kumaraswamy (1997) sought to determine the *root* (the underlying reason of the problem and if eliminated, would prevent recurrence) and *proximate* (immediately precedes and produces the effect) causes. Root causes identified by Kumaraswamy (1997) include: unfair risk allocation, unrealistic time/cost/quality targets by the client, adversarial industry culture, inappropriate contract type, and unrealistic information expectations. Proximate causes identified included: inadequate brief, slow client responses, inaccurate design information, inaccurate design documentation, inappropriate contract form, inadequate contract administration, and inappropriate contractor selection.

A close examination of root and proximate causes of disputes proposed by authors such as Kumaraswamy (1997) makes it difficult to determine what originally gave rise to the other in many instances. Here parallels can be drawn with the 'chicken or the egg causality dilemma' and the circular cause of consequence (Garner, 2003). There are many real world examples of circular cause-and-effect, in which the chicken-or-egg dilemma helps identify the analytical problem. For example, fear of economic downturn causes people to spend less, therefore reducing demand, resulting in an economic downturn. A lack of professionalism by design professionals because of reduced design fees can result in inadequate contract documentation being produced, and therefore lead to rework that manifests as a lack of professionalism and may eventually emerge in a dispute. Many of the root causes of disputes identified in the literature can be managed and controlled using various project management strategies, tools and techniques. For example, errors in documentation can be reduced prevented through the use of design audits and reviews. The exception, being uncontrollable external events such as weather, unforeseen ground conditions and the behavior of parties (Kumaraswamy, 1997).

Mitropoulos and Howell (2001) suggest that a combination of environmental and behavioral problems can lead to disputes. The inherent degree of uncertainty that prevails within construction projects can result in planning being a problematic issue, especially when information is not available. When uncertainty is high, initial drawings and specifications will invariably change, and the project team will have to solve problems as they arise during construction. Once changes arise they may be

deemed to be ambiguous and as a result disagreements between parties can arise. This is because under the concept of *bounded rationality* not all potential contingencies are identifiable and can be assessed until they materialize (Williamson, 1979). When parties enter into a contract and a specific clause fails to account for an unforeseen event or it is interpreted to suit the particular circumstances that have arisen, then there is a potential for *opportunism.* In this instance there is likelihood for a party to opportunistically to exploit or delay another to maximize their own gain (Mitropoulos and Howell, 2001). The dispute causation factors of uncertainty, contractual problems and opportunistic behavior identified by Mitropoulos and Howell (2001) are similar to those recognized by Diekman *et al*. (1994): (1) project uncertainty, which cause change beyond the expectation of the party, (2) process problems, which includes imperfect contracts and unrealistic performance expectations, and (3) people issues, problems due to poor communication, poor interpersonal skills, opportunistic behavior and cognitive dissonance.

SYSTEMIC VIEW OF DISPUTES

To understand the mechanisms that contribute to the underlying problems that arise in projects, such as delays, rework, and scope change, a systems perspective has been used (Rodrigues and Bowers, 1996; Rodrigues and Williams, 1998). Such a perspective provides a fundamental shift in thinking and can encourage the 'dispute problem' to be visualized in a holistic manner. By adopting a systems perspective the interdependence and links amongst different components of a system can be explored. The environment within which construction projects are procured can be categorized as being comprised of the following systems, as illustrated in Figure 2:

- *Project management*, which includes the procurement strategy (design and production management), contract arrangement, selection processes, and technology implemented to deliver a project.
- *Organizational*, which includes the practices, policies, procedures, culture, and social responsibility of the firm; and
- *People*, which includes the underlying values, attitudes, personality, education, training, experience and motivation of individuals that can influence organizational and project outcomes;

< Figure 2. Interaction of systems within a project >

The major elements that need to be considered within the people system are the experience of the individual, the training they may require, their psychological wellbeing, workload, and job satisfaction. Individuals need to be experienced with the work they have been allocated to undertake so as to reduce the likelihood of errors being made. In construction there is a proclivity for people to be subjected to high job

demands, which can result in workplace stress being endured. According to Beehr and Newman (1978) stress can cause job dissatisfaction and result in psychological (e.g. tension, anxiety, irritability, boredom and procrastination) and behavioral symptoms (e.g. changes in productivity, absence and turnover, changes in eating habits, increased alcohol consumption and sleep disorders).

Changes in an individual's attitudes and disposition and changes in an individual's behavior can adversely influence their decision-making capacity, relationships, and their ability to solve problems and negotiate, especially over contractual claims. The organizational system is the interface between the individual and the project and is the cultural setting of the individual's workplace. Here practices, policies and procedures are put into place and tasks are performed in accordance to the organization's role in the project. Project scope, contractual conditions, particularly the allocation of risk and responsibility, and procurement strategy are key elements to be considered by the organization as this will influence their planning and resourcing and their ability to achieve project outcomes. The organization needs to examine how it can best deliver is client's requirements with the resources available and within the parameters specified. In the project system, the procurement strategy adopted will influence how design, quality and production process will be managed and how issues of 'uncertainty' are addressed within a project.

DISPUTE DYNAMICS

Determining how various factors are related to one another is central to understanding a project system's performance. In order to establish the underlying causes of a dispute it is necessary to examine the relationship between project variables. For example what variables are related to one another? What are the internal mechanisms by which a particular factor causes a change in another factor? For example, poor communication can lead to disputes, but how? How does an affected factor cause change in such a way that the former input is ultimately affected? Poor communication can lead to a dispute, but the dispute may eventually force improvements in communication. In addressing these issues, the technique of causal loop diagramming is used to provide a platform for linking causal variables of disputes.

A causal loop diagram can show explicitly the direction and type of causality among major variables. It can be used to model the influences of inputs on outputs and vice-versa. For example, if variable *A* is causing a change in variable *B*, the direction of causality is from *A* to *B*. If an increase (decrease) in variable *A* leads to increase (decrease) in variable *B* then the type of causality is positive. Otherwise it is negative. There are two types of feedback loops: (1) negative feedback loops, (2) positive feedback loops. A negative feedback loop is in equilibrium or stability-seeking loop.

The loop perceives discrepancies between desired and actual states and takes action to keep the real world close to the desired state. A positive feedback loop generates growth not equilibrium as in a negative feedback loop.

Causal modeling of this nature has been used to examine claims (Cooper, 1980), rework (Cooper, 1993; Love *et al*., 2008a), delays and disruption (Ackerman *et al*., 1997), the impact of client behavior on project performance (Rodrigues and Williams, 1998), and the effects of scope on project performance (Chritamara *et al*., 2001; Chritamara *et al*., 2002). Causal models can provide managers with the necessary insights about the inter-dependencies and the behavior between key variables that can contribute to disputes so that learning and process improvements can be made to future projects (Ackermann *et al*., 1997; Eden *et al*. 2000).

An examination of Table 1 reveals that the key causal factors contributing to disputes are scope changes that arise from the innate uncertainty that exists within the *project management system* (e.g., scope changes, design errors, site conditions), poor contract documentation that arise from the *organizational system* (e.g., inadequate/incomplete design information, ambiguities in contract documents), and behavioral adaptations of individuals within the *people system* (e.g. poor communication, poor management, skill and experience, and personality traits).

Change of Scope

Additions, deletions, omissions, or changes in the nature of the work to be undertaken lead to changes in scope being made. Most changes orders that occur are at the request of the client and are generally in the form of design changes. Zeitoun and Oberlander (1993) found that the median cost of change orders for 71 fixed price projects were 5.3% of contract value and 6.8% for 35 cost reimbursable projects. Zeitoun and Oberlander (1993) suggests that the procurement method adopted for a project can influence cost and schedule growth in projects. For example, they reported that traditional lump sum methods are subject to greater cost and schedule growth than construction management and design and build projects. Similarly, Cox *et al*. (1999) have revealed that cost of design change orders initiated by clients to range from 5% to 8% of contract value even when projects are managed effectively. Love (2002) has revealed that design change orders initiated by clients account for 79% of rework costs that arise in projects, with the remainder costs being attributable to omissions errors and construction changes.

Most clients who procure construction projects tend to be inexperienced and may only ever build once or twice (Sharif and Morledge, 1997). Clients are often bemused by unrealistic expectations and do not understand the design process and the part they have to play in it (Blackmore, 1990). Even organizations that regularly procure

projects such as the public sector are not necessarily experienced, as they may only be familiar with one procurement method such as traditional lump sum. This method has tended to prevail within the marketplace even though it is associated with design and cost problems (Love et *al*., 2008b). When an inexperienced client recognizes a need for a building they will invariably seek the advice of an architect. From this point forward, the client will rely heavily on the advice given by the architect.

When a traditional method is employed, an architect is likely to gain a higher fee due to the greater design work required. It is therefore in the interest of the architect to persuade the client to use a traditional method of procurement. In Figures 3 and 4 the factors that contribute to scope changes are identified. Scope uncertainty arises because of client experience, their requirements, stakeholder needs, physical location and the prevailing economic environment. A client who understands their scope should be able to select a procurement option that best meets their needs. The requirement of contractor involvement during the design process can improve constructability and reduce the probability of design changes. When there is scope uncertainty and no contractor involvement during design then the likelihood of scope changes increases, which may increase project costs and time and lead to claims and disputes.

< Figure 3. Factors influencing the occurrence of scope changes >

< Figure 4. Scope changes and acceleration of works >

Contract Documentation

Design consultants (such as architects and engineers) are expected to use reasonable and ordinary care in the practice of their profession and their responsibilities are in part defined by *social ascription* (Grunwald, 2001). From a legal perspective this is well known among the professions but clients are not always aware or made of aware of this (Guckert and King, 2002). Architects and engineers cannot guarantee the results of their service. Their liability for errors and omissions, however, can be "determined by whether they have performed their services with the standard of care consistent with other professional designers within their community" (Guckert and King, 2002). Once clients are aware of their designer's obligation they often find it difficult to comprehend what is meant by *standard of care* (Chapman, 1998).

Usually this is left up to a court of law or a panel of experts once a breach of the standard of care is identified, but this can be a long and tedious process for clients with no guarantee of a successful outcome (e.g., Chapman, 1998). Even when a standard of care is agreed upon pre-contract, any financial recovery may hinge on whether the mistake was an error (mistakes made by the designer) or omission

(omitted from the contract). A particularly difficult issue to determine relates to what management practices that should have been implemented to prevent the error or omission from occurring in the first place. Rounce (1998) has suggested that architects specifically lack procedures to control the design process and generally do not implement activities that assure conformance. As a result, design related documentation produced often contains errors and omissions and often leads to contractual claims and disputes (Diekmann and Nelson, 1985).

Figure 5 provides an overview of the factors that contribute to erroneous contract documentation being produced by design consultants. An array of variables contributes to errors being made in contract documents. There is a need to obtain a thorough understanding of client requirements so as to develop the project's scope (including objectives and constraints), which will influence the contracting strategy that is necessarily adopted for a project. Often clients do not give enough time to designers to design and document (Tilley and McFallen, 2000), which can influence the fees charged, as well as the planning and resource requirements for the project. Staff with the appropriate experience will be allocated to the project or a series of projects and this will influence individual workloads. The practice of 'time boxing' may be initiated, especially when design fees are considered to be low, or when staff have considerable workloads and are unable to cope with their job demands. In this instance, a fixed time is allocated to complete each task, irrespective of whether documentation is complete or not (Love *et al*. 1999).

Issues associated with uncertainty will not have been identified during the planning process and as result tasks that are being undertaken by individual may be interrupted, which can lead to them deviating from what was being done and forgetting to complete the respective task. Thus, omission errors arise within contract documentation, which may not be identified until construction is well underway. The time to rectify the error may affect the progress of the work or even require a design change and thus lead to a claim being made for additional payment or an extension of time.

Errors can arise because of poor knowledge, carelessness and negligence, and intent (Kaminetzky, 1991). Poor knowledge is often a result of insufficient education and training, and experience. Carelessness and negligence include errors in calculations and detailing, and incorrect reading of drawings and specifications. These are errors of execution and are a result of lack of due diligence. Regardless of the skill level, experience or training that individual's possess, errors may be made at any time during a project's life cycle. The later design errors are identified in the project cycle the more costly they are likely to be to rectify, especially once construction has commenced. Many design firms, however, fail to undertake design audits,

verifications and reviews of the documents that they produce prior to tendering (Love *et al*. 2003).

There is an explicit moral belief within society that professionals should not make errors (Busby and Coekelbergh, 2003). According to Reason (2002) there are two corollaries to such a view. First, the errors of professionals are deemed to be invariably rare, but when they do occur then they are significant in the causation of adverse events. Second, that an error of adverse consequences must be negligent or even reckless and deserve deterrent sanctions. Amalberti (1997) states that responsible and highly trained professionals regularly make errors, many of which are detected and recovered or inconsequential in nature. The identification of errors, particularly during design, can be useful in 'trial and error' learning or serendipitous discovery. Error identification within a system may often help design professionals understand the underlying nature of a task that may have come become routine, automated, or simply taken for granted (Busby, 2001).

< Figure 5. Factors influencing the occurrence of erroneous contract documents >

Behavioral Adaptations of Individuals

Cherns and Bryant (1984) and Smith (2005) have suggested problems concerning design changes, delays, and difficulties during the construction phase have their origins in unresolved conflicts within the client organization. Such conflicts often remain unresolved when the decision to build is taken and are exacerbated by an early persistence on an oversimplified client representative function. Architects have typically adopted this function, and as a result are prone to recommending a traditionally based procurement option were they can provide complete control throughout the construction process. It has been suggested that the personality differences between architects and construction managers can lead to conflict as they may have diametrically opposed goals, objectives and values (Gardiner and Simmons, 1992; Leung *et al*., 2002).

According to Loosemore (1999) when an issue arises power struggles can emerge between different groups who seek to offload responsibility for its occurrence. Such power struggles are often exasperated in times of recession when margins are particularly tight. When a power struggle does emerge there is a reluctance to accept responsibility, contractual clauses may be interpreted differently or the contract may fail to cover an unexpected event (Loosemore and Hughes, 1998).

The values that an individual possesses will largely depend upon their education, training, experience, judgment and ethics (Figure 6). When an issue arises that requires resolution it is necessary for individuals to recognize the professional knowledge of each other so as to ensure an appropriate resolution is attained. The way

that individuals interact with one another is fundamental to resolving issues. Aggressive and passive forms of communication between individuals can trigger conflict and thus discourage open, frank or democratic discussion which is needed when addressing issues that have arisen (Fodor, 1976).

An individual's emotional intelligence is also integral to the problem solving process. Being emotionally intelligent involves being actively able to identify, understand, process and influence one's own emotions and those of others to guide feeling, thinking and action (Mayer and Salovey, 1997). Individuals who possess a high degree of emotional intelligence are able to make informed decisions, better cope with environmental demands and pressures, handle conflict in an effective manner, communicate in interesting and assertive ways and make others feel better in their work environment (Mayer and Salovey, 1997). For the project participants who are constantly confronted with solving issues during pre and post construction activities, an ability to formulate satisfactory solutions is essential.

< Figure 6. Behavioral factors influencing disputes >

Individual moods and emotions, emotion sharing processes, and team affective composition may all be modified by the affective context (i.e. emotion norms that govern emotional expression) in which a project team is situated (Hackman, 1992). Isen and Daubman (1984) have demonstrated that positive affect predicts better creativity, greater cognitive flexibility and problem solving (Figure 6). Individuals who have a positive mood toward problem solving will invariably evaluate things more positively than those who have a negative mood (Mayer *et al*., 1992). Negotiations, for example, between a contractor and a client's representative (with respect to a claim) can be a highly emotionally charged situation for both parties, especially when substantial financial investments are at stake. The negotiation process is fraught with emotion, and emotional relationships and contingent interactions can all impact the outcome (Baron, 1993). Thus, when entering negotiations or solving problems with team members or subcontractors it is important that individuals are cognizant that their emotional standing can influence their mood, those around them and the outcome.

DISPUTE MITIGATION

The developed causal models illustrate the complexity surrounding the causes of disputes. No single variable can be considered to the sole cause of a dispute. Considering the nature of dispute of causes that have been identified some key strategies can be used to reduce their occurrence from a *project management*, *organizational* and *people* perspective.

Project Management

The minimization of scope changes is fundamental to dispute mitigation. Initially focusing on obtaining scope certainty and providing adequate time to plan and develop the contract documentation can reduce the probability of scope changes occurring. Clients and stakeholders (e.g., end-users) need to be kept constantly informed and integrated within the design process. Design by its very nature is an iterative process and as the design evolves and materializes through various developmental phases then the client should be required to 'sign-off" after each phase is completed so as to acknowledge their requirements are being met and translated into a workable solution. Tools such as quality function deployment can be used to extract detailed requirements during the scope development process, though their use in practice has been limited (Love *et al*., 2003).

The procurement strategy and the selection of contractors and consultants is an area that requires attention and in particular a shift away from traditional to non-traditional methods. While this shift has been advocated for many years, clients still predominately use traditional methods of delivery in Australia (Love *et al*., 2008b). The identification, allocation and proactive management of risk are central to dispute mitigation, particularly with reference to ground conditions. Standard forms of contract should be used, as both parties are generally familiar with the obligations assumed by each party.

The use of competitive tendering often results in the lowest 'price' being accepted by a client. Lowest price does not necessarily result in best value for money. Often the contractor with the lowest bid will have the smallest margin. If this margin is depleted then there is a possibility they may adopt opportunistic practices to recover any losses that may have been made. The use of negotiated or selective tendering juxtaposed with a policy whereby contractors openly present their margins and how they priced the project could potentially breakdown any 'them and us' barrier that is perceived to prevail. Such an approach relies heavily upon trust and cooperation between parties. The formation of alliances can be used to engender these traits, though for them to effective behavioral and cultural barriers need to be addressed. For example, the use of incentive contracts could be used to espouse collaboration between consultants, contractors and subcontractors. In addition, the sharing of knowledge through the establishment of inter-organizational communities of practice would encourage joint problem solving and possibly reduce the incidence of conflict between parties.

Organization

The management practices adopted by consultants and contractors have a role to play in reducing the incidence of disputes. From an organizational perspective, the key issue contributing to disputes relates to the production of contract documentation.

Research suggests that a major factor contributing to poor contract documentation is the level of fees paid to consultancy firms and the resultant managerial practices that are implemented (Love *et al*. 2003). Tendering for consultancy services has typically resulted in sub-optimal design solutions and contract documentation being produced (Tilley and McFallen, 2000). In addition, the business environment within which client's operate has resulted in increasing demands being placed on consultants to design and document within tight and often unrealistic timeframes.

To improve the quality of documentation that is produced, firms must initially adhere to policies and procedures, especially those embedded within quality assurance. Consultants have an obligation and a responsibility to produce documentation that is able to use effectively to construct a building that is required by the client. Undertaking design verifications, reviews and audits is a necessity. In fact, in large complex projects the use of a third party auditor to review the design and documentation could prevent scope changes, omissions errors, and design errors manifesting downstream on-site thereby reducing the likelihood of rework and a dispute. So, in essence:

- sufficient time should be permitted to ensure that the design and documentation are properly carried out and meet the client's requirements;
- there should be single point responsibility for managing and coordinating the documentation process; and
- consultants should be paid a realistic level of fees for the work they undertake. For example, initially through the process of negotiation a lump sum and then additional work paid on a cost-plus basis.

The above recommendations are by new means new, but adherence to them would provide the basis for producing documentation that is fit for their intended purpose. Ultimately, consultants should improve their internal management practices and educate their clients about the design and documentation, which can be readily achieved by involving and providing a sense of ownership of the process.

People

Firms need to make conscious decisions about the people they use to procure their projects. Differing personality types are needed for specific types of project because of the client's nature and the team they are working with. Firms need to select personnel who have the emotional intelligence to deal with the challenges that are imposed upon them. Thus, it is imperative that firms have a sound understanding of their staffs' personality type, their emotional intelligence and how they are able to cope with the pressures associated with their role in the specific project. Personality tests should be undertaken, as part of the recruitment process to determine how

individuals fit with the affective context of the organization and the projects they will be involved with. For complex projects, for example, consideration should be given to the composition of the project team in terms of their personalities and how they could potentially solve problems that may arise. The development of an emotionally intelligent team that is able to stimulate creativity and solve problems that arise during design and construction will be able to manage conflict more effectively and resolve issues through negotiation as a project progresses.

CONCLUSION

A considerable amount of research has been undertaken with regard to the dispute causation within construction. Research has eschewed identifying the interrelatedness of variables, which has blurred researchers understanding of dispute causation and lead to latent work practices being embedded within the contracting environment within which projects are procured. Despite calls for the construction industry to improve its performance through the adoption of principles and techniques associated with lean production and supply chain management, poor contract documentation, scope changes and adverse behavioral adaptations of individual still prevail. Thus, it would appear that there is a lack of understanding about the dynamics of disputes. With this in mind, this paper has attempted to identify the underlying dynamics influencing disputes through the use of causal modeling and suggest some key prevention strategies. Further empirical research is required to determine the recurring latent conditions that contribute disputes. Once these conditions are examined then effective strategies for dispute avoidance can be identified and advancement toward improving the performance of construction projects made.

Acknowledgments

The authors would like to thank the financial support provided by the CRC for Innovation.

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Table 1. Claims and disputes in construction (Adapted from Kumaraswamy, 1997)

Author(s)	**Factors contributing to claims/disputes**
Blake Dawson Waldron (2006)	*Nine* key causes in disputes: 1. Variations to scope 2. Contract interpretation 3. EOT claims 4. Site conditions 5. Late, incomplete or substandard information 6. Obtaining approvals 7. Site access 8. Quality of design 9. Availability of resources
Cheung and Yui (2006)	*Three* root causes of disputes: 1. *Conflict* - Task interdependency, differentiations, communication obstacles, tensions, personality traits 2. *Triggering events* - Non performance, payment, time 3. *Contract Provision*
Yiu and Cheung (2004)	*Significant* sources: • Construction related: variation and delay in work progress • Human behaviour parties: expectations and inter parties' problems
Killian (2003)	• *Project management procedure*: Change order, pre-award design review, pre-construction conference proceedings, and quality assurance. • *Design errors*: errors in drawings and defective specifications. • *Contracting officer*: Knowledge of local statues, faulty negotiation procedure, scheduling, bid review • *Contracting practices*: Contract familiarity/client contracting procedures. • *Site management*: scheduling, project management procedures, quality control, and financial packages • *Bid development errors*: estimating error
Mitropoulos and Howell (2001)	Factors that drive the development of a dispute: 1. Project uncertainty 2. Contractual problems 3. Opportunistic behaviour

Kumaraswamy (1997)	*Five* common category of claims: 1. Variations due to site conditions 2. Variations due to client changes 3. Variations due to design errors 4. Unforseen ground conditions 5. Ambiguities in contract documents *Five* common causes of claims: 1. Inaccurate design information 2. Inadequate design information 3. Slow client response to decision 4. Poor communication 5. Unrealistic time targets
Colin *et al*. (1996)	*Six* key dispute areas: 1. Payment and budget 2. Performance 3. Delay and time 4. Negligence 5. Quality 6. Administration
Sykes (1996)	*Two* major groupings of claims and disputes: 1. Misunderstandings 2. Unpredictability
Bristow and Vasilopoulos (1995)	*Five* primary causes of claims: 1. Unrealistic expectations by parties 2. Ambiguous contract documents 3. Poor communications between project participants; 4. Lack of team spirit 5. Failure of participants to deal promptly with changes and unexpected outcomes
Diekman*et al*. (1994)	*Three* main dispute areas: 1. Project uncertainty 2. Process problems 3. People issues
Heath *et al*. (1994)	*Five* main categories of claims: 1. Extension of time 2. Variations in quantities 3. Variations in specifications 4. Drawing changes 5. Others *Seven* main types of disputes: 1. Contract terms 2. Payments 3. Variations 4. Extensions of time 5. Nomination

	6. Re-nomination 7. Availability of information
Rhys Jones (1994)	*Ten* factors in the development of disputes: 1. Poor management 2. Adversarial culture 3. Poor communications 4. Inadequate design 5. Economic environment 6. Unrealistic tendering 7. Influence of lawyers 8. Unrealistic client expectations 9. Inadequate contract drafting 10. Poor workmanship
Semple *et al*. (1994)	*Six* commons categories of dispute claims: 1. Premium time 2. Equipment costs 3. Financing costs 4. Loss of revenue 5. Loss of productivity 6. Site overhead *Four* common causes of claims: 1. Acceleration 2. Restricted access 3. Weather/cold 4. Increase in scope
Watts and Scrivener (1992)	Most frequent sources of claims: 1. Variations 2. Negligence in tort 3. Delays
Hewitt (1991)	*Six* areas: 1. Change of scope 2. Change conditions 3. Delay 4. Disruption 5. Acceleration 6. Termination

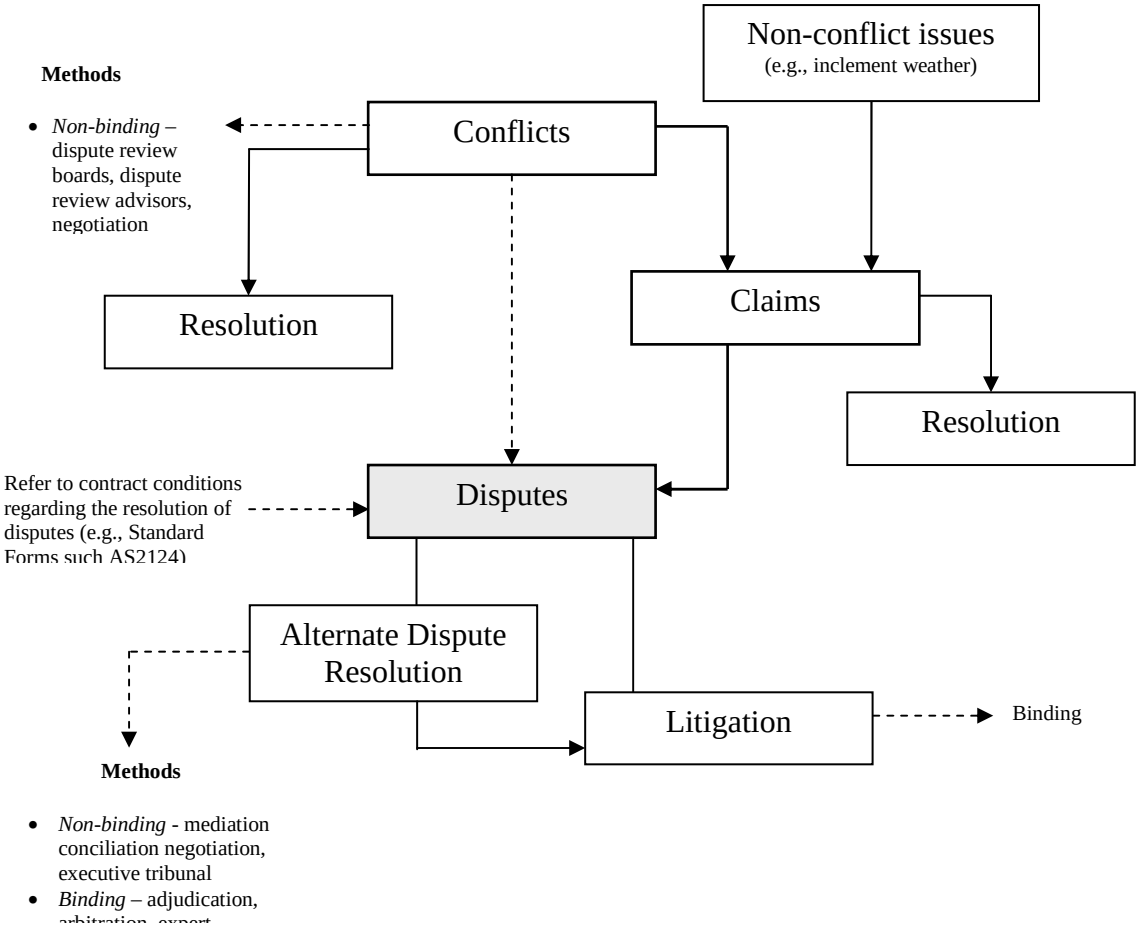

Figure 1. Conflict, claims and disputes

(*Adapted* from Kumaraswamy, 1997 and Fenn *et al*., 1997)

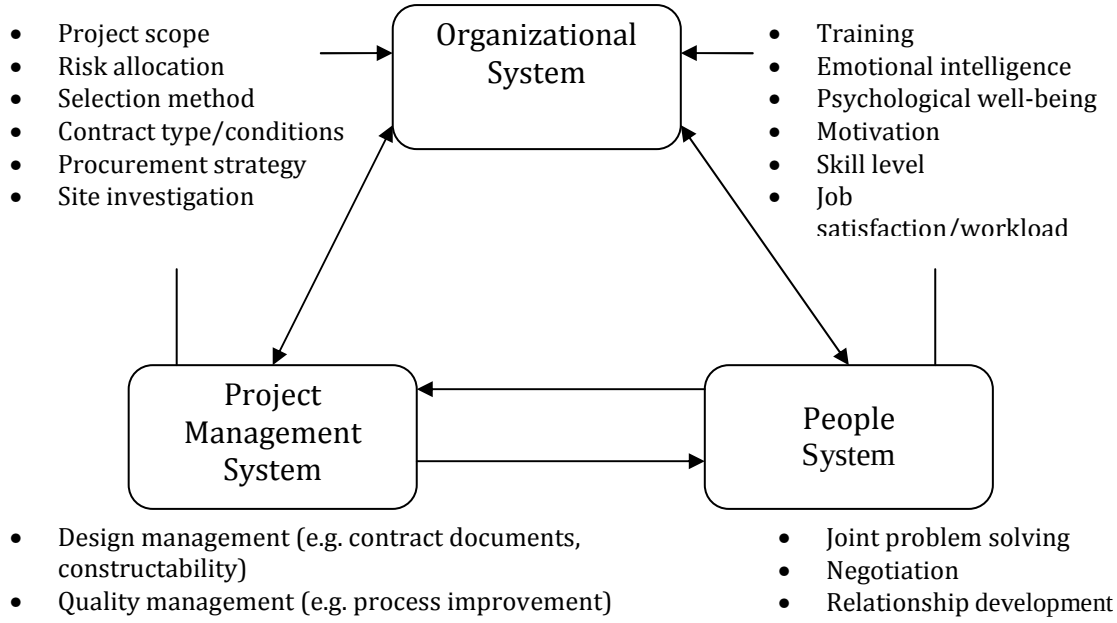

Figure 2. Interaction of systems within a project

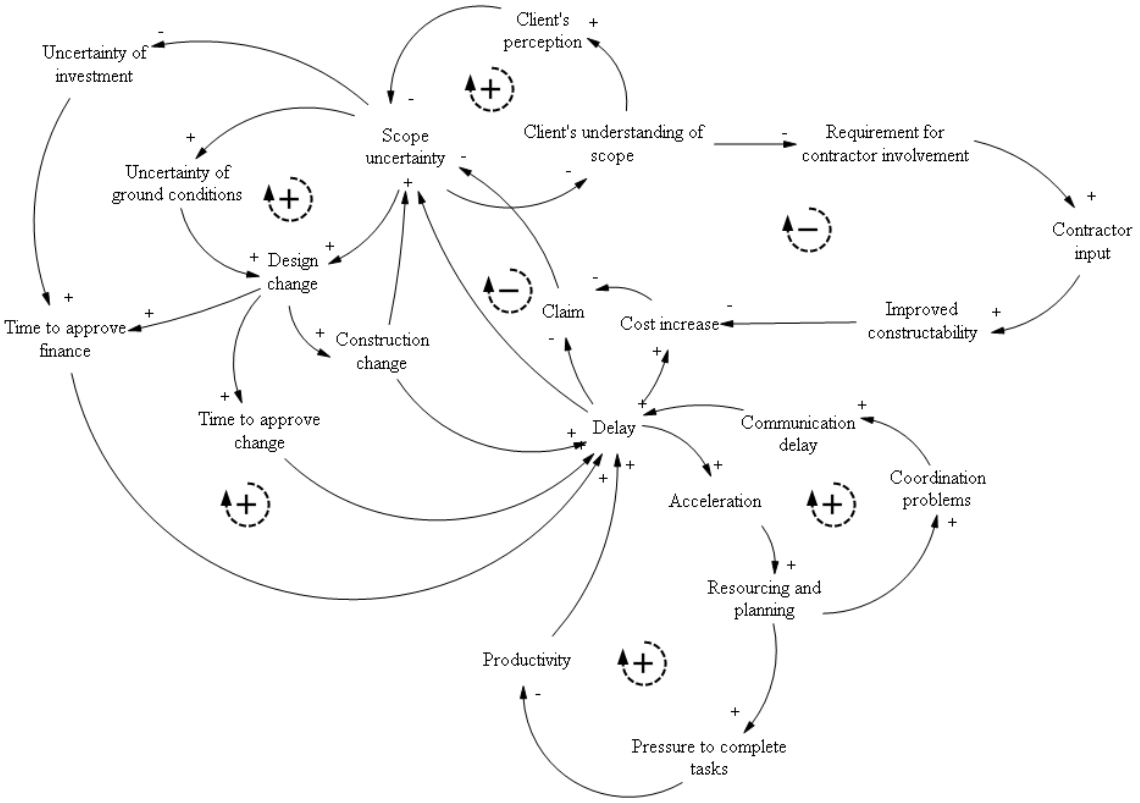

Figure 3. Factors influencing the occurrence of scope changes

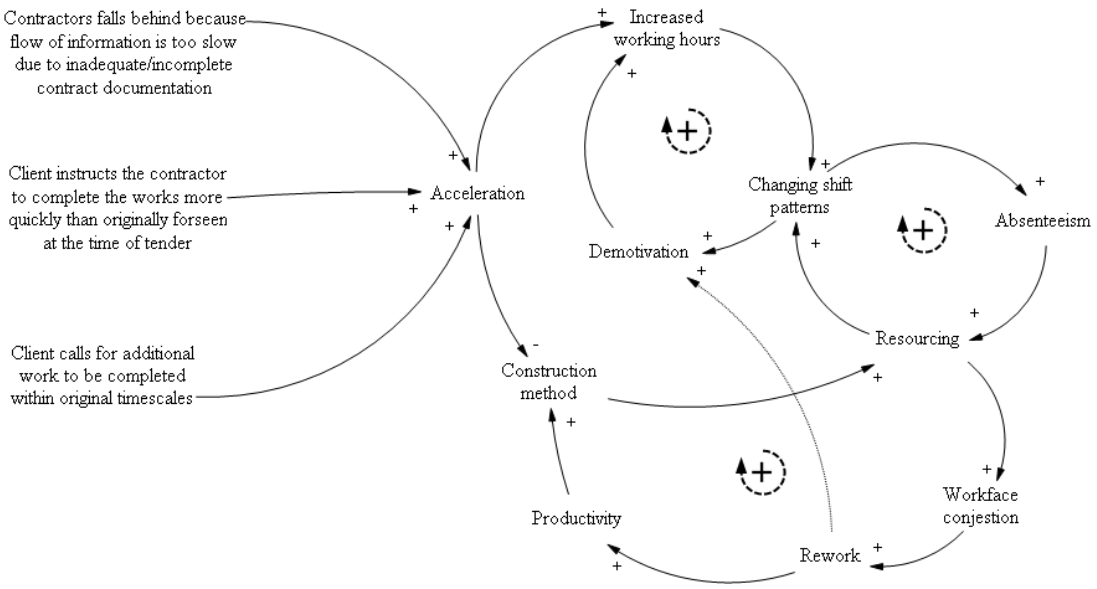

Figure 4. Scope changes and acceleration of works

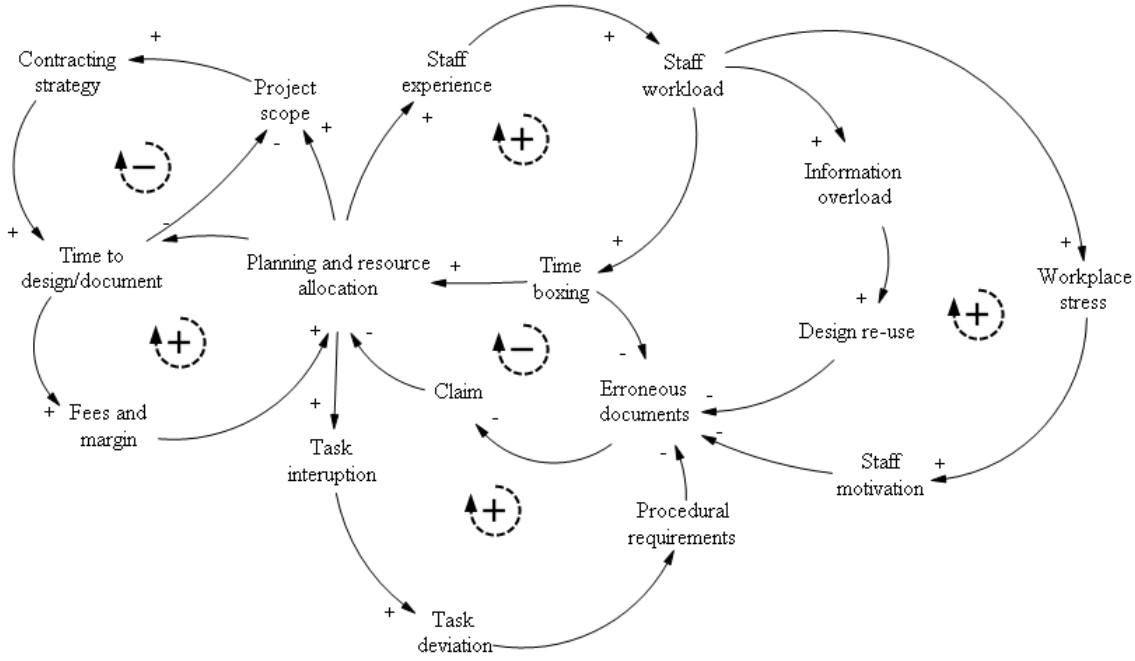

Figure 5. Factors influencing the occurrence of erroneous contract documents

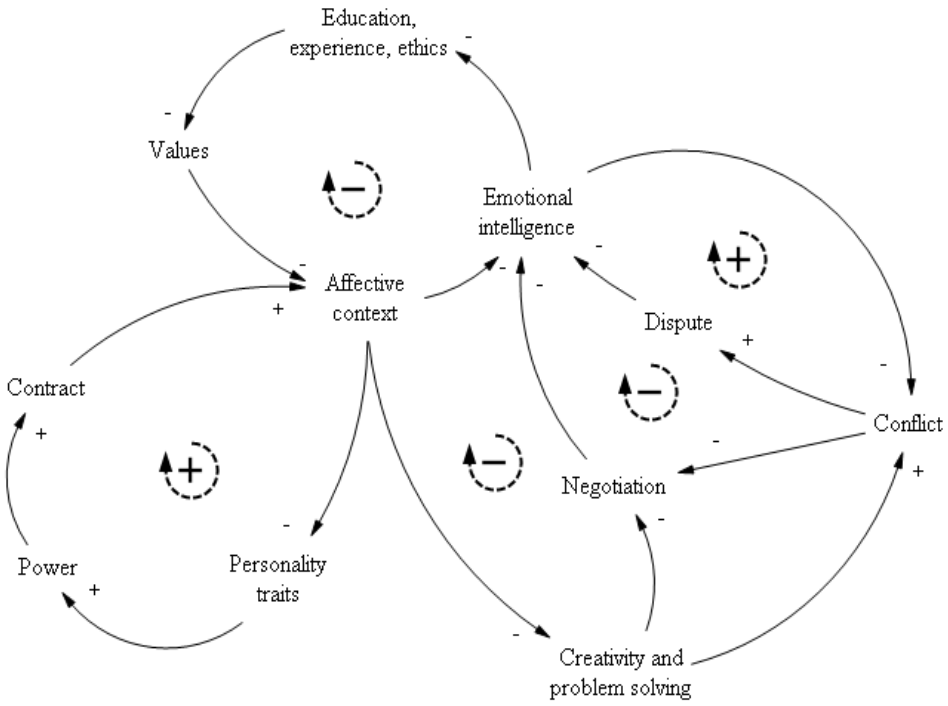

Figure 6. Behavioral factors influencing disputes