Stirring sustainable procurement by conceptualizing relationship quality in construction

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Abstract

Appreciating the value of effective and efficient procurement strategies, major construction industry reports and practitioners have either proposed new procurement strategies or improvised the current practice. The relational approach and especially relationship contracting as part of contemporary procurement strategies have been advocated in pursuit of a more sustainable procurement culture as well as a more sustainable built environment. Although different relational contracting methodologies such as partnering, alliancing and joint ventures have been advocated the actual conceptualization and assessment of relationships seems to be weak in the construction industry. Looking at marketing and business research context where a move form transactional to relational has been made the systematic framework of relationship quality is inspired and introduced for construction. This framework comprises of a high order construct involving antecedents, measures and outcomes for the system. Conflict and dispute are considered as the main corresponding antecedents to relationship quality in construction, complemented by performance and relationship status impacting sustainability as the outcomes of the system. It is demonstrated that the changes in contracting circumstances, built environment culture may affect the different layers of the systematic framework for relationship quality in construction projects then modifications are implemented and corresponding constructs are driven for two different construction cases. This illustrates the variations to the relationship quality's systematic construct as the result of the changing contract conditions and built environment. The driven variable systematic construct for relationship quality may provide an assessment tool for evaluating the relationships created by contracting procedures in different built environments. Through examining system reliability theories a fault tree is derived for the systematic framework of relationship quality. Possible combinations of components, causes and events for the two mentioned construction project cases are illustrated through Fault Tree Analysis. The fault tree analysis primarily indicates the combination of events leading to relationship deterioration and also provides a monitoring tool for relationship quality in different circumstances, the ability to have such indications about

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relationship quality may help increase performance alongside stirring sustainable procurement.

Keywords: Sustainable Procurement, Relationship Quality, Conflict, Dispute, Fault Tree Analysis

1. Introduction

The complex, fragmented and adversarial nature of the construction industry which involves different specialized parties is mounting more and more conflicts and tensions between the interests of different parties every day. Several major industry reports have pointed out that the construction industry is filled with many shortcomings which are hindering the realization of the industries full potential, making it a bulky, inefficient and dispute prone industry over-consuming vital and precious resources of nations. Some of these problems are seen partially as the consequence of inadequate, traditional and faulty procurement systems, In fact complications encountered throughout most of the construction projects delivery process has triggered a new collaborative and relational perspectives on procurement of such projects. A report by the Construction Review Committee of Hong Kong (CIRC, 2001) states that construction costs are high and the industry is very fragmented and beset with adversarial culture, this is setting the scene for confrontation instead of collaboration. Another big problem associated with the construction industry is the cost over value approach in tendering, there is a tendency to award contracts to the lowest bidders and delivery programmes are often unrealistically compressed (CIRC, 2001). Cox and Thompson (1997) stated that traditional contracts have been compounded by drives of 'Value for Money' where through competitive tender the works are procured to the lowest-price offered with little or no guarantee (or even incentive) of future work. They regarded the focus on relationships as short-term (for the duration of the project) with both parties attempting to lever what they can out of the existing contract resulting into opportunistic and adversarial arms-length relations rather than working collaboratively together. Wolstenholme (2009) also addressed the fact that most client business models are focused on short-term gains and do not reward suppliers who can deliver long-term sustainable solutions.

High risks and blame culture with unequal risk allocation is also another concerning aspect of the industry(CIRC, 2001; Egan, 1998), hence Wolstenholme (2009) boldly claims “Scratch beneath the surface and you find many so-called partners still seek to avoid or exploit risk to maximise their own profits, rather than find ways to share risk and collaborate genuinely so that all can profit”. Separation of design and construction or poor communication leading to low constructability, undermined accountability by prevalence of non-value adding multi-layered subcontracting and lax supervision, Labour sensitive and inadequately trained workforce, Health and safety issues alongside the dangerous and polluting nature of the construction industry are other problems which have been raised in reports and research works(Construction Industry Review Committee, 2001; Dozzi, Hartman, Tidsbury, & Ashrafi, 1996; Egan, 1998; Latham, 1994; New Zealand Construction Industry Council, 2006; Wolstenholme, 2009).

2. The need for sustainable procurement in construction

The need for change mentioned in many construction industry reports brought about a general realization and consensus that the current code of conduct and traditional procurement strategies accustomed with the construction industry are to a large extent responsible for the existing fragmented and adversarial work environment leading to major unwelcomed conflict, disputes, defects and underperformances in the industry (Love et al., 2002). Wolstenholme (2009) described the industry still as a fragmented industry which could lead to a poor quality product and danger of adversarial relationships within project teams. This adversarial culture and confrontation will almost certainly trigger disputes and conflicts between participants and within project teams. Project dispute is inevitable on construction sites threatening the long-term relationship of project team members (Barnett, 1997), dispute can be regarded as a crisis in every construction project which may damage contracting relations resulting in lengthy program delay and shortage of funding if not handled adequately (Humphreys, Matthews, & Kumaraswamy, 2003).

An important driver of change mentioned in Egan's (1998) report is integrated processes and teams in addition there are suggestions that the best practice guidelines for procurement strategies is to have clients, consultants, contractors and suppliers work together towards improving quality, reduction of costs, decrease disputes and conflict, bringing innovation, sharing the risks and a more effective delivery of project. Accordingly Latham (1994) and Egan (1998) have triggered a partnering movement in the construction industry however the mainstream thinking of the construction industry is believed to be short term and the challenge is to overcome this project focused perception in the industry and enhancing a more valuable relationship model. The increase in construction industrialization is bringing the realization of long-term relationships to significant importance (Bygballe et al., 2010). Despite appreciation of their advantages there is major underperformance in implementing partnering and long-term relationships (Winch, 2000). Even in New Zealand NZCIC (2006) has revealed procurement practice is suffering from short-term focus on cost over value and lowest bid approach with inappropriate risk allocation in the construction industry. Industry reports insist on a change in procurement towards a more sustainable procurement and contracting arrangement.

3. The relational approach and Relationship quality

In order to move towards a more relationship preserving and sustainable procurement construction industry there was a need for observing the relationship status. The monitoring and observation of relationships should provide indications on the state of the relationships throughout the projects or even after projects completion. A good and consistent monitoring tool should be able to spot the weakness of the relationships and also indicate if the relationship is fit for retaining. Monitoring relationships is perhaps the first step of moving towards relational contracting and procurement approaches resulting in more collaboration and long-term relationships striving towards the ultimate goal of sustainable procurement.

Relationship quality is a concept developed for relational marketing purposes for the broad marketing objective of customer retention. This concept was introduced and defined in many different ways, however the general consensus regards relationship quality as a high order construct with antecedents and outcomes.

4. The Systematic layers and timeline of Relationship Quality

Based on the fact that relational contracting and collaboration in construction maybe fundamentally similar to customer retention and keeping healthy business relationships with the customer in the market environment Jelodar & Yiu (2012b) have proposed a systematic framework of layers for relationship quality in construction projects. Figure 1 describes the systematic framework of relationship quality in four different variable layers of triggering layer, antecedent layer, moderation layer and the outcome layer plus a constant layer of relationship quality. Conflict and dispute have been regards as the main antecedents of relationship quality in construction as shown in Figure 1, therefore the study of conflict and dispute should follow a systematic and perhaps deductive approach based on events their precedents and outcomes exhibited on the timeline of project procurement or even after project execution in cases of prolonged and resource consuming dispute episodes exceeding beyond the project lifecycle.

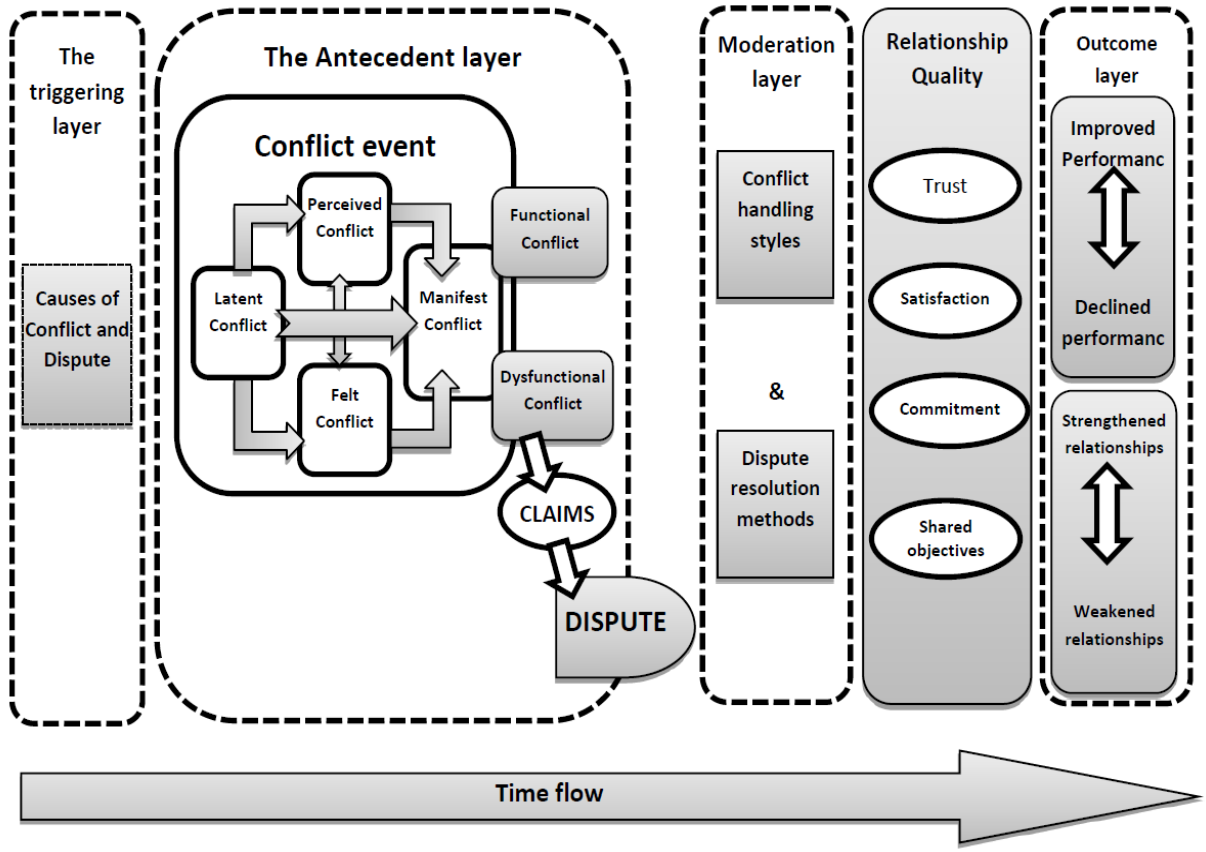

Figure 1: The general systematic framework of relationship quality for construction

Basic events which can trigger changes in relationship quality indicate that the triggering layer may influence both the antecedent layer and also the relationship quality. The antecedent layer is a complex layer containing the conflict process model and dispute. Each component of this process model can affect measures of relationship quality (trust satisfaction, commitment and shared objectives) it is notable that the antecedent layer may have diverse effects on relationship quality. The next layer is the moderation layer which in

this case comprises of components that are used to manage conflicts and disputes. They can cause changes in relationship quality. Contrary to the previous layers the final layer which is the outcome layer is influenced by the relationship quality.

On the other hand Jelodar & Yiu (2012a) have developed a timeline approach in evaluating relationships via the above proposed framework. In this approach the bench mark relationship quality is observed based on its simple derived feature or measures at the start of the project and the variation of these measures are observed after the occurrence of different incidents in each consecutive layer or even in the same layer. For instance the features of relationship quality can be evaluated after events of the triggering layer which are generally the causes of conflict and dispute, bearing in mind that one cause or several causes can happen in the same or different points in time. The same goes for all the other events in the antecedent and the moderation layer. The events of the first three layers may affect the relationship quality and also the outcome layer.

5. Different compositions of Relationship quality

Based on the above elaborated systematic framework different unique relationship quality models can be drawn for each different construction project. The events of the first three layers of the framework are variable and a function of the project conditions and incidents, whereas the relationship quality layer is constant throughout different projects and explains the features and measures of relationship quality. In this section two cases are used to illustrate the different compositions of the relationship quality and the associated models.

Case one; in this case project type is expansion of a countryside road to a national highway going through privately owned lands. Contract condition design bid built lump sum and follows the FIDIC conditions of contract (red book). In these contracts dispute resolution procedure starts with Dispute Adjudication Board (DAB) then amicable settlement and the last resort is arbitration.

For this project any cause can occur and trigger conflict or dispute; however some causes according to the conditions of the project may be more probable to occur. For instance part of the governments and the client organization's responsibility is to free all the lands for the course of the high way and also control the existing traffic on the countryside road, if the client or the government fails to do so this may mean late availability of site and limitations in access which are project and uncertainty related causes. Other causes may also happen for instance from time constraints under the FIDIC contract, disputes may arise which are more contract and process related or even poor communication could trigger conflict because the contract is rather fragmented into design-bid-built procedures. Thus some causes are more probable then others as illustrated in the layered system drawn for case one (Figure 2).

For the antecedent layer there is a probability of occurrence for functional and dysfunctional conflicts as well as claims and disputes. But as far as the moderation layer is concerned the contract has previously defined means of conflict management and dispute resolution. The events of this layer are either in the form of Dispute Adjudication Board (DAB), amicable settlement or arbitration. However amicable settlement itself may be obtained through a

variety of different methods (direct negotiation, the engineers recommendation, mediation and conciliation)(Totterdill, 2006); which may impact the relationship quality differently. In this model the first three layers are able to first affect the relationship quality and also their consecutive layer. The events in each layer may or may not occur or on the other hand even several loops of the these events may occur each time triggering different conflicts or dispute simply meaning that different causes may trigger different conflict and dispute events at the same time or in different points of time for the projects. The relationship quality layer consists of the measures drawn from previous studies that will best describe relationship quality (Jelodar & Yiu, 2012b).

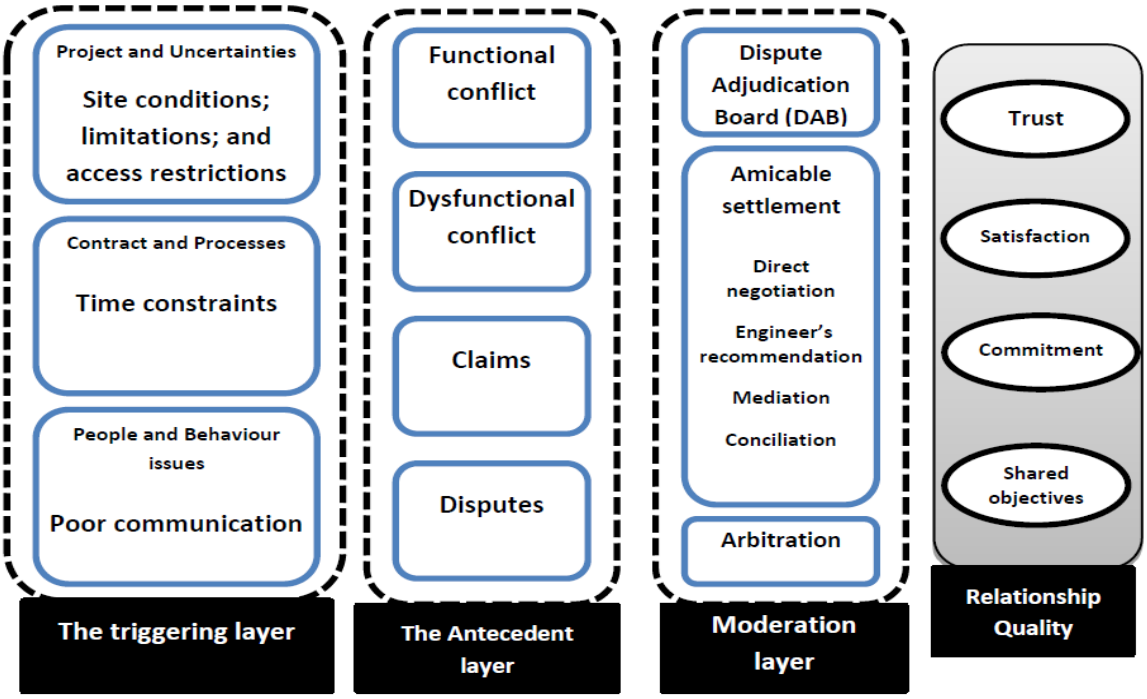

Figure 2: systematic framework for case one

Case two; the project type is the construction of a multi-storey commercial and shopping centre with contemporary architectural design in New Zealand. Contract conditions are design built measurement by bills of quantity, the contract is based on the NZS 3910:2003 domestic contract. The proposed dispute resolution procedure of this contract starts with engineer review, then mediation if not settled, through dispute tribunal or arbitration.

Although like the previous case any cause of conflict and dispute may occur some causes are more likely to occur according to the nature of the project, such as technical problems due to complexity of design and construction, design errors, ambiguities and change orders, lack of experience with the type of work performed. Again for the antecedent layer the probability of occurrence for functional and dysfunctional conflicts as well as claims and disputes exists. However the contract condition determines the dispute resolution process by the previously mentioned four steps which is completely different with the conditions mentioned in the previous contract. A similar systematic illustration is drawn for this case which is quite different with case one's systematic illustration (Figure 3). The systematic

approach allows the practitioners to draw their unique system based on the events that are most likely to happen in their unique projects. This allows the evaluation of relationship quality easier through each step of the project because most the events that may influence relationship quality are indicated in the corresponding layer.

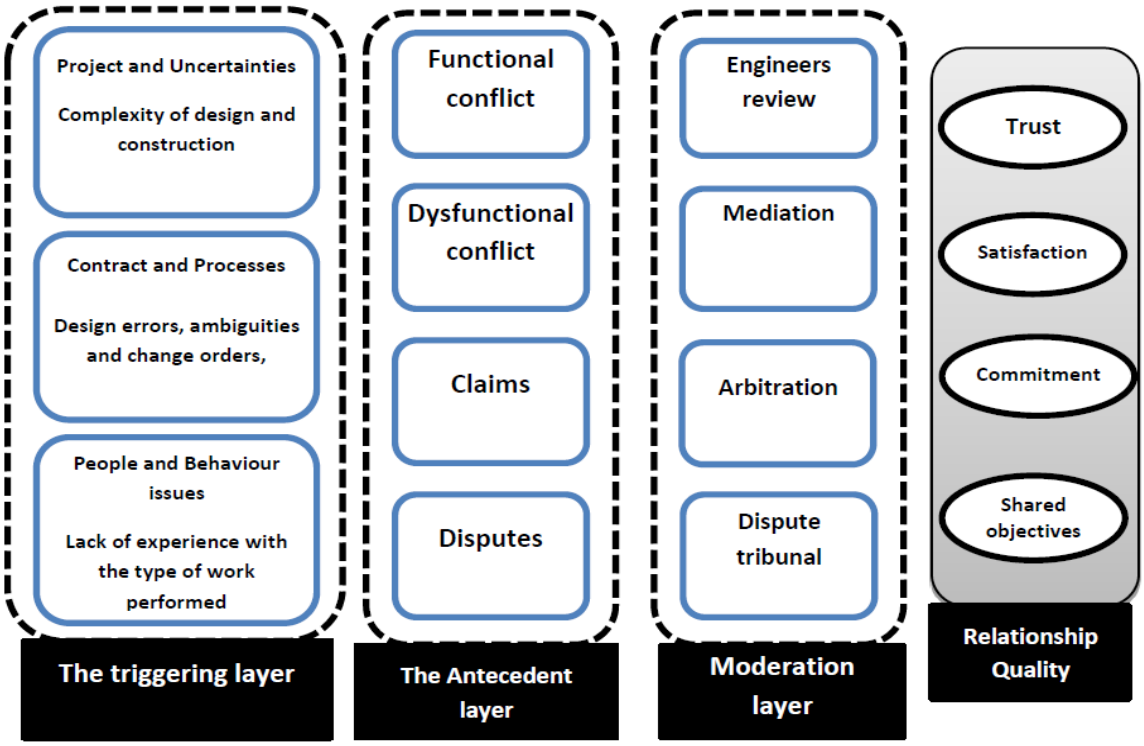

Figure 3: systematic framework for case two

6. Failure models of relationship quality via applying system Reliability theories

After establishing the systematic framework of relationship quality for each project the relationship quality of construction parties are regarded as a dynamic system which may be influenced by a number of layer and their incorporated events. The failure of this system simply means the failure of the system components such as conflict management and dispute resolution strategies in balancing out causes of conflict and dispute consequently diminished relationship quality of the parties. System failure models such as Fault Tree Analysis can be used to evaluate the possible failure of the system according to the components derived for each project discussed in the previous section. Rausand & Høyland (1994) defined the fault tree as “a logic diagram that displays the interrelationships between a potential critical event (accident) in a system and the causes for this event”. The fault tree can be either qualitative or quantitative and normally aims to; list the possible combinations of factors, errors, events, and component failures that may result in a critical event in the system. The Fault Tree Analysis (FTA) also helps to identify the probability that a critical event will occur during a specified time interval. In drawing the fault tree the top event is normally the system failure notion. Because the aim is to use FTA to evaluate the

relationship failure as a system fault in construction projects the top event is deterioration of relationship quality. Based on this top event and the systematic framework derived for each case the fault tree of each project is extracted. In this section the fault trees related to the previous mentioned cases are derived and illustrated in Figure 4.

In both cases conflict and dispute systematically will contribute to the deterioration of relationship quality, therefore all the possible causes of conflict and dispute should be included in the fault tree. The first step in developing the tree is to understand how relationships my fail, as illustrated in the systematic framework the triggering layer will start conflict and disputes which in most cases will adversely affect the relationship quality except for cases where they lead to functional conflict. On the other hand the moderation layer will try to moderate this negative effect by applying conflict management and dispute resolution strategies, if this endeavour is unsuccessful then failure of relationship may occur. Consequently for the relationship to deteriorate a dispute or adversarial event is needed and the problem must go unresolved that is why these events are linked and demonstrated in Figure 4 via an “and” gate to the top event. Figure 4 also shows that conflicts either directly arise from causes or from contract provisions, in addition disputes are linked with conflicts or unaccepted claims. The conditions of contract will dictate how the adversarial event, dispute or problem should be resolved as demonstrated in Figure 4 the two cases have a totally different conflict management and dispute resolution strategy. In case one the focused is basically on more informal and more effective dispute resolution methods whereas in case two although mediation is mentioned but ultimately the dispute tribunal may get involved which is devastating for relationships among the parties.

Another issue with the fault tree model in figure 4 is that some events and especially causes of conflict and dispute are more likely to occur in different conditions of contract. As discussed before for case one late availability of site, limitations in access, time constraints, and poor communication are more probable to occur based on the nature of the contract. The FTA model illustrates the possible combination of causes and events that may lead to relationship deterioration in construction projects. Furthermore if the probabilities associated with each cause and event of the fault tree is obtained the ultimate probability of the system failure in this case relationship quality deterioration for different types of projects and various contract conditions could be obtained.

7. Conclusion

Moving towards a more relational contracting and working environment seems to have become the main theme of a lot of industry reports. The construction industry needs to make amends and move towards a more sustainable procurement procedure this is to prohibit the extensive loss of money and resources. A systematic framework for relationship quality has been developed in order to evaluate and provide indications on the working relationships of contracting parties in construction. It was shown that the current systematic frame work is an indication of the relationship quality system not a generalized structure which could fit all project types nonetheless a construct unique to each structure can be drawn which was demonstrated by two construction project cases. In these cases the probability for the occurrence of certain causes of conflict and dispute as part of the triggering layer will change

due to the project type. It was also demonstrated that the conditions of contract can have a defining effect on the moderation layer of the systematic framework by identifying the procedures of conflict management and dispute resolution in their content. Consequently it can be said that the type of project, contracting arrangement and build environment culture usually determines the systematic framework of relationship quality for different projects.

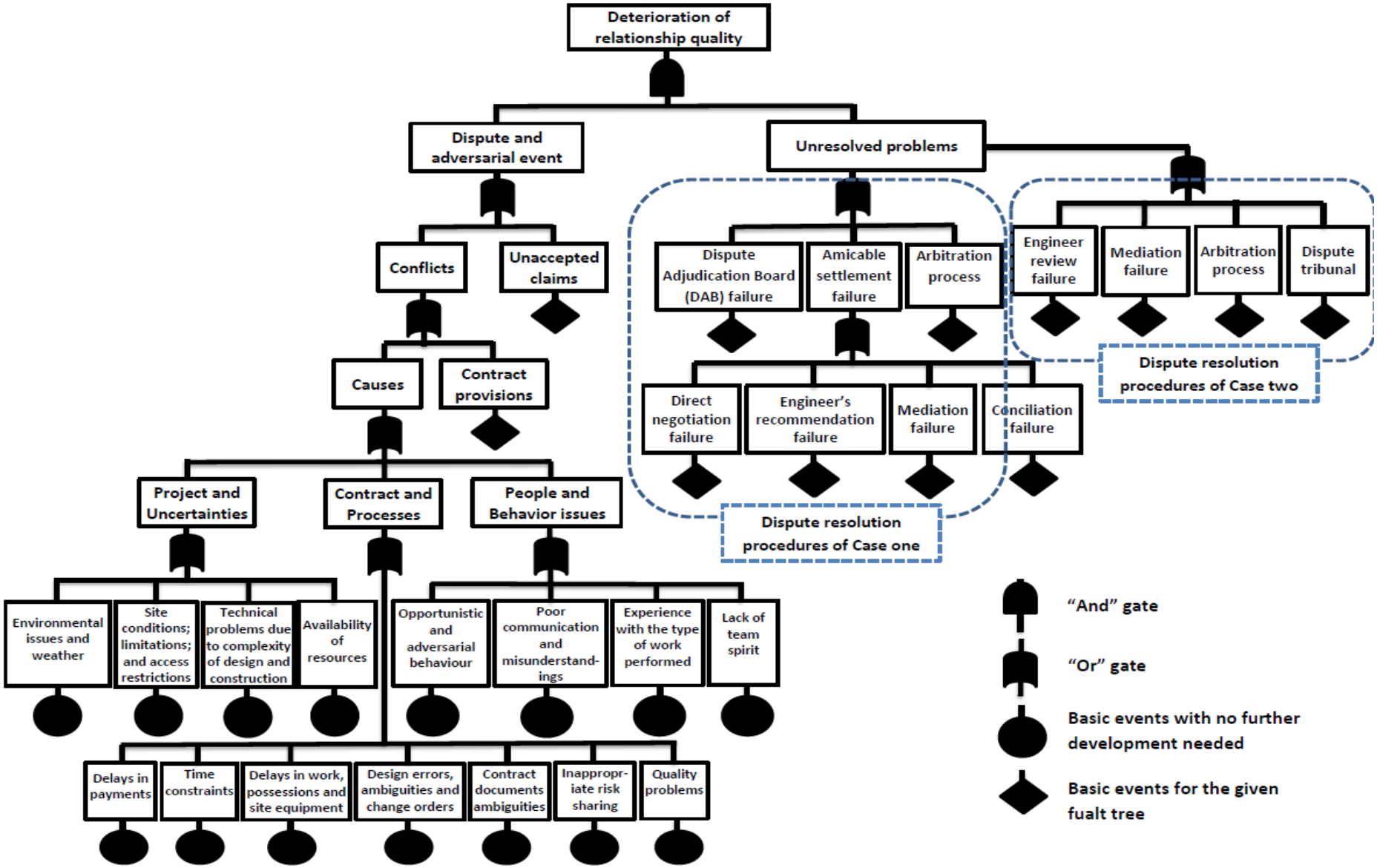

Figure 4: Fault Tree Analysis of the relationship quality system in construction

Based on the identified systematic framework for relationship quality a Fault Tree Analysis can be performed to shows all the possible combinations of components, causes and events for any construction project. This was illustrated by developing the fault tree of the previous mentioned cases. This Fault Tree Analysis first of all may indicate the combination of events leading to relationship deterioration and also a monitoring tool for relationship quality in different circumstances, the ability to have such indications about relationship quality failure may help increase performance alongside stirring sustainable procurement. The basic idea is to find out what possible circumstances and events may lead to relationship failure or deterioration and either take preventive actions or amendments to keep and maintain relationships in favour of sustainability in contracting and procurement. In cases were the relationship is deteriorating or not beneficial it can be cut saving both sides a lot money resources and hassle.

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